

CONTINUOUS IMPROVEMENT PROJECT DATABASE

Project Name	Project Description	Division	Project Year	Contact Name	Contact Number	Project Category
Fence Post Puller	Prior method of post removal required the employee to manually pull up on the post while moving the post back and forth. This placed the employee at risk for back injury. Often this process was not successful and some employees used a backhoe to remove the post which can cause the post to be damaged and unable to be reused and/or the post exits the ground forcefully and can strike employees nearby. Sometimes a shovel was used to dig the post out. Under the proposed method using the puller tool the post is under control and exits the ground at a controlled rate. The employee uses the fulcrum based tool enhancing safety to the member, rate of production and the re-use of the post.	Div 3	2009	C Francka	(910) 371-2372	Safety Improvement
Central Insurance Verification	<p>Prior to the Statewide Driver License Central Issuance Project, DMV's DL/ID issuance process was performed utilizing an over the counter methodology. The over the counter methodology has been proven to be DMV's largest area of vulnerability in both the issuance process as well as overall security of facilities, equipment and DL/ID card materials. In addition, during the issuance process, the over the counter methodology afforded DMV limited time to verify the customer's identity documents prior to the customer receiving a DL/ID. The verification and record review process was deemed inefficient, arduous and untimely. Because of limitations, detection of identity fraud and identity theft occurred well after the customer received the actual DL/ID. Most often the customer would have already transferred the fraudulent issuance to another state, therefore adding more complexity to the case review. The Driver License Central Issuance Project deters the attempt to obtain an issuance under false pretense. The Project has eliminated facility security vulnerabilities. DMV now houses a secure Central Print Facility within its headquarters site. The Central Issuance Project affords DMV time to complete the electronic verification process prior to mailing the DL/ID to the customer. The Central Issuance electronic verification process includes verification of lawful status in the United States which helps safeguard not only North Carolina but U.S. borders as well. The address verification process combats address fraud. The verification of social security data foils identity theft. The face recognition initiative detects multiple identities and the verification of out-of-state licenses that are transferred to NC authenticates other state's DL/IDs. If the customer information fails the verification process, the customer is notified via correspondence and the DL/ID card is withheld.</p> <p>Although the Central Issuance Project has visibly changed the manner in which we conduct business with the citizens of North Carolina; DMV's effort to elevate security and the protection of citizens' data reaches far beyond the North Carolina Division of Motor Vehicles. These elevated security efforts have proven to have nationwide implications.</p>	DMV	2009	Barbara Webb	(919)861-3299	Customer Service

Attenuator Upgrade	<p>Within the Roadside Environmental Pesticide program two of our challenges are water supply and traffic control. We send out advance warning vehicles and quite often an attenuator. We will sometimes send out a water truck to act as a nurse truck for the sprayer. This is generally a flatbed with a 1000 gallon or larger water tank.</p> <p>We have long wondered why not place a water tank on the attenuator in place of the ballast it carries. After being told there could not be a loose tank on the truck, we responded that it would be attached to the body of the truck. Then we found out there is a minimum weight for the attenuator. Next we discovered there was a maximum weight that was less than the GVWR of the truck on which the attenuator was mounted. D-2 Equipment Superintendent Buddy Dixon contacted the attenuator manufacturer and they helped us by finding that there was not a problem with the maximum weight until we got over 67,000 pounds. This helped a lot since the GVWR on the truck we use is 33,000 pounds. Then we discovered that the height of the attenuator from pavement level could not change more than a specified amount with the tank empty or full. After research we found this to not be a problem as we were within the manufacturer's guidelines.</p> <p>The equipment shop removed the existing ballast from the attenuator truck and installed our 1,000 gallon tank along with enough weight to keep the truck within minimum guidelines when the tank is empty. After this truck was retrofit, we prepared to place a tank on a second attenuator. We planned on using a 1500 gallon tank. The height of the tank proved to be too high for the attenuator unit to fold up, so we thought we were back to a 1000 gallon tank. Brian Dixon of the Greenville Equipment Shop said he could build us a tank from steel that would hold 1500 gallons and would be heavy enough that no additional ballast would be needed. This unit has proven to be much more effective than the 1000 gallon tank as we can fill our smaller sprayer three times instead of two and the 1500 gallon tank is approximately the same size as our larger trucks.</p> <p>The approximate \$2,500.00 cost of placing the tank on the attenuator is easily offset by the \$281.60 daily savings* of not having another truck and employee on this task. * Based on an 8 hour day.</p>	Div 2	2009	John Wells	(252) 830-3146	Dollar Savings
Easy Reach Straps	<p>It is a State Law and requirement to tarp all loads that are within 6" of the top rail on all trucks. The North Carolina Department of Transportation provides an automatic arm system tarp on all dump trucks. The arms automatically deploy the tarp using a spring tension system. This performs perfectly, but it has one problem. The tarp will not lay down when the equipment reaches certain speeds. It has a tendency to flop up and down sending the material being hauled into the roadway increasing the chance of damage claims from the traveling public. To prevent this from happening we secure the sides of the tarp with rubber tie downs. This function is preformed by climbing up the side of the dump truck and hooking a strap in a tarp ring. In doing this, the employees had to contend with falling hazards and structural failures. This was less than desirable from a safety standpoint.</p> <p>We have developed a simple way to improve a rubber tie down strap. Safety modifications to the rubber strap consist of enclosing the rubber strap with a 1 PVC plastic pipe. By modifying this rubber strap it eliminates climbing because the function can be preformed from the ground level.</p> <p>Division Eleven strives to excel and our safety philosophy is all accidents and injuries can be prevented. Observing our employees completing this task, we knew we had to re-engineer this task to solve the problem. This product has increased our efficiency and productivity. Our mission is to keep up with research and development of new safety devices.</p>	Div 11	2009	Matthew Oliverson	(336) 903-9235	Safety Improvement

Construction Waste Reduction	<p>NCDOT has an aging building stock. Based on that reality, there was a potential to do a great deal of environmental damage by putting this material into the landfills. In addition to the environmental damage, the cost of putting construction waste into the landfill is increasing, and, in the foreseeable future, this material will not even be allowed in the landfill.</p> <p>Solution: Create an ad-hoc team to develop and implement a Construction Waste Reduction and Recycling Program, implemented state-wide, for all NCDOT building demolition, renovation, and new construction projects.</p> <p>Results: The Construction Waste Reduction and Recycling Program has been in place for two years, continues to successfully create significant reductions in the amount of material going to the landfills, continues to create savings and generate revenue for NCDOT, and, most importantly, continues to enhance, not degrade, the natural and built environment.</p> <p>The program continues to foster a team effort between NCDOT as Owner/designer, and the General Contractors, in taking joint responsibility for this environmental stewardship.</p> <p>The five pilot projects documented in this CPI entry resulted in the following avoided cost, savings, and revenue to NCDOT a net total of \$92,183.02. These projects diverted the following total material from the landfill: 1,652 tons.(with a diversion rate of 82.5%) The original goal was to divert at least 50% of the waste material from the landfill the resulting 82.5% diversion rate greatly exceeded the original goals, and appears to be a realistic goal for the future</p>	General Services	2009	John Sharp	(919)715-3708	Dollar Savings
Safe Storage of Chemicals	<p>NCDOT stores and uses chemicals in almost all of their processes and procedures. Safely storing and using these chemicals is an ongoing challenge. The Architect has developed a simple, color coded system for identifying and storing the chemicals with a system that can be used by all NCDOT Units, to increase the life safety in storage facilities for all NCDOT staff. This system of safe storage of chemicals was piloted in new Truck/material storage facilities for the Roadside Environmental Unit in Division 4, and the new Truck storage facility for the Roadside Environmental Unit and the Traffic Services Unit in Division 2.</p> <p>Solution: Using the North Carolina Building Code as a guide, all of the bid list chemicals from the Roadside Environmental and Traffic Services units were itemized and color coded by flash point. A spreadsheet was developed and provided that showed the maximum amount of each flash point (color) that could be safely stored in one control area (room), then the palette labels were color coded to match. As material is purchased and delivered, the user can then easily determine what material, and how much of each type, can be stored in each control area.</p> <p>This organizational system for safely storing chemicals will now be applied to all of the NCDOT building types; because the system is so simple and easy to implement, the program has created a much safer work environment for present and future NCDOT staff.</p>	General Services	2009	Randi Taylor	(919)715-0400	Safety Improvement
Contract Resurfacing Guidelines	<p>Each year there is contract resurfacing on both the Primary and Secondary System. These contract needs are developed within the Division. Unfortunately, many times there is poor communication between the various departments. This causes the following problems: roads scheduled for resurfacing are striped just months before resurfacing begins; utility companies have plans for repairs or new installations and shortly after the resurfacing they open cut the fresh asphalt; roads are resurfaced and within a matter of a few years are dug up and patched to replace a failed drainage pipe.</p> <p>By providing and following the Contract Resurfacing Guidelines, the proper notifications are sent to the parties who need to know in advance of a scheduled resurfacing project. Utility companies are given the opportunity to make repairs in advance and to make repairs by open cutting the roadway rather than boring since it will be resurfaced soon. This preserves the quality of NCDOT resurfacing, reduces project overruns and allows for preventative maintenance.</p> <p>The Contract Resurfacing Guidelines are being implemented this year.</p>	Div 14	2009	Steve Cannon	(828) 891-7911	Communications

Stormwater BMP Device	<p>Stormwater runoff from paved roadways is documented to convey pollutants into adjacent waterways. The NCDOT constructs several types of stormwater Best Management Practice (BMP) devices that control and treat stormwater pollution runoff from a roadway project prior to entering adjacent waters. There are over 300 stormwater BMP devices currently installed in Division 5. A BMP Location Survey Form is completed for each device located in the Division. Early efforts to catalog the devices in the Division included sorting all the BMP Location Survey Forms by county and making them available to the District office.</p> <p>Parties that propose land-disturbing activities within NCDOT right-of-way (ROW) are required to submit an encroachment application (with a construction plan depicting the proposed activity) to the District Office. Three stormwater BMP devices were inadvertently destroyed through encroachment activities from 2007-2008. Sorting the BMP Location Survey Forms by county and making them available to the District office did not provide adequate protection to the stormwater BMP devices.</p> <p>Division personnel created a GIS data layer identifying the location of each stormwater BMP device in the Division using the latitude and longitude listed on each BMP Location Survey Form. This allows personnel to open up the GIS data layer (using ArcGIS) which identifies the location of each stormwater BMP device located in the Division with an icon. The process has recently been further refined to allow each icon to be hyperlinked with the corresponding Stormwater BMP Location Form. This process has been termed Division 5 Stormwater BMP e-tracking database.</p> <p>The District office can now review each encroachment application to determine if any stormwater BMP devices will be impacted by the proposed construction within the NCDOT ROW. This should result in the elimination of inadvertent destruction of stormwater BMP devices in the Division.</p>	Div 5	2009	Chris Murray	(919)220-4633	Communications
Special Vehicle Replica Project	<p>According to the Bureau of License & Theft and the State, Custom-Built & Antique Registration Procedures booklet, Replica vehicles are to be titled with the year model of the vehicle they are intended to replicate. In addition, GS 20-79.4 (Historic Vehicle Owner) allows issuance of an Antique or Horseless Carriage plate for a motor vehicle that is at least 35 years old, measured from the date of manufacture.</p> <p>Prior to implementation of the State Titling and Registration System (STARS) Vehicle Replica Project enhancement, vehicles were being titled by License Plate Agencies as antiques that were actually kits or replicas.</p> <p>Modifications were made to STARS using existing hardware and software to allow the Special Title Unit to label a vehicle as a Replica, Street Rod, or any other approved label, or remove a label if done in error. Labeled vehicles are automatically branded as Reconstruction. The modifications were made to Titling, Registration, and Inquiry and Correspondence subsystems.</p> <p>As a result of the Special Vehicle Replica Project enhancement, STARS can now:</p> <ol style="list-style-type: none"> 1. Provide for labeling of a vehicle 2. Automatically brand labeled vehicles 3. Print the chosen label on Titling and Registration services documents 4. Display the chosen label for online services when appropriate 5. Display the chosen label on selective Correspondence 6. Prevent the issuance of an antique or horseless carriage plate to a Replica vehicle only. 	DMV	2009	Jeff Martin	(919)508-1778	Customer Service
ITS Site Survey & Rapid CCTV Survey	<p>Conventional CCTV (Traffic Camera) Surveys require the use of a great deal of time, manpower and equipment. Bad weather, soft soil and the size of the truck limit the setup options available to the crew and lengthen the time required. This resulted in less than optimal images that had to be transferred to a computer for finishing touches. All of this was time consuming.</p> <p>A rapid CCTV system was developed using materials on the service truck the required no additional money. A telescopic height pole was fitted with a small CCTV test unit. The images were captured on a laptop computer using software developed in-house. The software captured and cataloged the images, allowing for quick processing and use. Images are immediately mailed from site to engineers.</p> <p>After the initial test site the unit was able to process four sites. A service truck was able to survey 18 sites in a day during rain with serious soft soil conditions in the survey zone. The data was processed in a quarter of the required time for a standard site survey.</p>	Triad Transportation Management System	2009	Michael Venable	(336) 315-7080	Cycle Time Reduction

Natural Resources Tech Report	<p>The Natural Environment Unit (NEU) is responsible for overseeing the preparation of Natural Resource Technical Reports (NRTR). The NEU develops the standard templates for these documents so that in-house staff biologists and consultants can produce similar products. NEU sought ways to reduce the amount of time necessary to complete NRTR's to improve the cycle time for NEPA document preparation.</p> <p>A team of NEU biologists and managers was established to reevaluate the NRTR template. This team met several times to evaluate the various components of the document and decide what was truly necessary and what could be reduced or eliminated. Ultimately, the NRTR template was simplified to only those topics essential for compliance with NEPA requirements. The NRTR documents have been considerably streamlined. The text of a typical NRTR document has been reduced by over 50%, and a consistent format has been established for all deliverables. Increased efficiency in document preparation and review translates into man-hour savings, cost savings and reduction in cycle time for NRTR preparation in the NEPA process.</p>	PDEA	2009	James Hauser	(919)431-6631	Cycle Time Reduction
Asphalt Surface Treatment	<p>Over the years Division 11 has tried to develop and improve its chip seals. It is important that this be done before water, traffic, salt and cold weather have a chance to worsen the situation.</p> <p>The goal was to find a better patch that will extend the life of the pavement regardless of weather conditions. Find a cost-effective way to patch and out last conventional hot mix patching.</p> <p>Division 11 has been successful in applying a Latex Polymer Liquid Asphalt and a light weight aggregate that can be 66% more cost-effective. After many years using AST patching, the life of the pavement has been extended by 3 to 5 years. The need for patching has decreased by 30% and the number of claims for damage to vehicles from loose stone was reduced by 80%.</p>	Div 11	2009	Matthew Oliverson	(336) 903-9235	Dollar Savings
Mulching Plant Beds	<p>Division 10 has 55 acres of plant bed area that are maintained by the state. Approximately one-third of this area needs to be mulched annually to keep it presentable. Division 10 needs 21,780 cubic yards of mulching material for 18 acres. A tractor trailer can bring 100 cubic yards of mulch in a single delivery at a cost of \$900 per load. 218 loads would be needed to achieve this level at a cost of \$192,200.</p> <p>Division 10 acquired a mulching material through Triangle Brick in Wadesboro. They have a hardwood mulching materials that is used in their brick process. They do not use all of the hardwood mulch which means that leftover mulch is a waste product for them.</p> <p>This past year, approximately 4,000 cubic yards of mulch from Triangle Brick has been hauled, at no cost to the state. This resulted in a savings of about \$36,000 worth of mulch that Division 10 will not have to purchase.</p>	Div 10	2009	Tim Simpson	(704) 982-1028	Dollar Savings
Sign Repair	<p>DOC crews were constantly requesting new signs for trash pickup. We began questioning the need for so many signs. They told us that their signs were tattered and torn. We asked the DOC to bring us their worn and torn signs.</p> <p>We decided that these signs were repairable and began taking them to a local upholstery shop.</p> <p>Each sign was repaired for an average cost of \$8.50 versus \$115 for a new sign. This saved the unit money as well as the taxpayers.</p>	Div 11	2009	B.K. Hamby	(336) 903-9103	Dollar Savings
Rescue of US70 West of Kinston	<p>Proposed removal of 1 mile of west-bound 2-lanes of US 70 west of Kinston would involve \$100,000 costs, extensive obliteration/construction time and inconveniences to affected local businesses and workforces.</p> <p>Suggestions have been forwarded to Wilson construction Office, Division 4 to revise plan designs to retain and slightly adjust down-graded portion of US 70.</p> <p>Currently awaiting review, evaluation and possibly redesign by NCDOT engineering staff as a value engineering proposal.</p>	Div 4	2009	Jonathan Barnes		Dollar Savings
Clear Savings on Windshields	<p>Several years ago we noticed that we were replacing more and more windshields due to road hazards. We decided to see if we could get a company to come around to state locations and repair windshields before they started cracking. We began research and shopping around for the best cost, good quality repairs, and a company that would be able to drive to all DOT sites in our area. In 2008 we rescued 34 windshields from being replaced and saved approximately \$8,000.</p>	Div 10	2009	Robert Waterhouse	(704) 596-2131	Dollar Savings

Paperless Solutions for Documents Sent to PMU	<p>Project Management funds over 1800 projects annually through various project phases Preliminary Engineering, Right Of Way, Construction, and Mitigation. Each project contains from 80 to over 300 pages of documentation needed for project funding. As society becomes more technologically advanced, cost wise, and conservative in expending our natural resources, Project Management felt there was a better way to proceed regarding document management.</p> <p>As a result of SAP and IXOS integration, it was decided that it would be beneficial to encourage a paperless way of sharing needed information/documentation via the document originator scanning the document to the 3rd Level WBS Element of the appropriate project phase, and notifying the recipients electronically.</p> <p>As a result, cost, labor, and environmental savings can be realized by reduction of hardcopy distribution. Each recipient receives from 144,000 to over 540,000 pages annually of essential funding documentation. Taking these numbers into account and considering that most distribution lists contain an average of 10 recipients, there can be a median annual cost savings of \$30,590.00 per recipient.</p>	Project Management Unit	2009	David Rhodes	(919)733-2039	Dollar Savings
Repotting of Bare Root Forestry	<p>In late winter, early Spring 2008, one of our maintenance units went out and disturbed a quarter acre of land that had been reforested with loblolly pines. The land owner requested that we replant this area in loblollies again. I contacted the Forestry Service to find some trees and they advised me to call their Goldsboro office and try to get some of the throwaways. I later learned that they cleaned out the coolers in May. The Forestry Service was agreeable to us coming and getting their throwaways.</p> <p>In May 2008, we sent a flatbed to Goldsboro, primarily to get loblolly pines but also to get whatever they had in the coolers that were to be thrown away. Our guys came back with 100 white ash, 200 black cherry, 200 pin oaks, 100 locusts, 100 button bush 250 loblolly pine, 500 long leaf pine, 1000 white pine, 500 Virginia pine, 100 rebbuds, 200 dogwoods and 200 shumard oaks.</p> <p>The nursery was able to pot up all of these trees and, so far, we have been able to plant the loblollies back for the landowner. We are preparing a bed at the Welcome Center on I-77 and will use a lot of the redbuds and dogwoods at this location, with the rest being planted at the I-85 and I-485 interchange in the coming weeks. Some of the other pines and oaks will need another year of growth before using them, but they will offer up good trees in ensuring years at no cost to the taxpayers. The estimated value currently on all of the obtained trees in 2008 is \$35,000. This is a growing asset for the state, the plants that we do not wish to use this year will be a larger plant in future years, ergo a more valuable asset to the state when it is planted along state right of way. We plan to continue this program and will pursue obtaining more trees this spring for planting in the future.</p>	Div 10	2009	Tim Simpson	(704) 982-1028	Dollar Savings
Spills are no Thrill	<p>The herbicide crew needed a place to park their application equipment and store inventory in a manner that would contain any type of spills. This would prevent stormwater contamination and protect the environment.</p> <p>The solution was to design and build a structure with an integral collection system in the floor. This allowed collection for reuse of any product that may spill from inventory or the application vehicles.</p> <p>A storage facility for product inventory and a four bay building with integral floor drains was constructed. These floor drains accumulate in a sump where it is pumped to a collections tank for reuse. The structure was also designed with radiant heaters to prevent freezing of the application vehicle plumbing. This was a secondary benefit from having an enclosed collection pad.</p>	Div 4	2009	J.C. Duckworth	(252) 237-6164	Energy and Environment
Certification & Bridge Coating	<p>NCDOT has approximately 5000 bridges in the state that were coated with lead paint before it was known to be a hazardous material when it is being removed. When 29CFR 1926.62 was enacted, it became part of the responsibility of the Chemical Laboratory, Materials and Tests Unit, to determine if lead paint existed on a bridge, needed to be stripped and recoated, or removed and spot painted.</p> <p>There were a number of solutions, such as: 1) hire a staff of inspectors to cover bridge painting and lead abatement projects across the state and certify inspectors already in the workforce; 2) hire CEI firms which would have been an expensive solution (4 times our in-house costs); 3) train the inspectors already in the field prior to a project being let in their area. Training the inspectors already in the field - a "train on-demand" concept was the best solution. This allows the instructor and assistant to become mentors, troubleshooters and experts when needed on the projects.</p> <p>The "train on-demand" concept became a nationally recognized certification course consisting of a 2-day classroom instruction, with hands-on training, testing with equipment used in the field, a textbook, as well as a reference for inspectors. An exam is given requiring a passing grade of 70% and a certificate showing the course was completed and passed.</p>	Materials & Tests	2009	Chris Peoples	(919)329-4090	Labor Hour Savings

Pre-Trip Inspection Guidebook	<p>Students in multiple sessions of Division 14 Fleet Safety classes needed consistent, thorough demonstrations of the Pre-Trip Inspection (a requirement of CDL licensed operators and NCDOT policy) that all could view clearly as well as personal study guides for the procedure.</p> <p>A PowerPoint slideshow and a fully illustrated guidebook to accompany the presentation were developed using photographs and audio recordings of actual DOT vehicles. The slideshow can be presented at varying pace to accommodate circumstances and student/instructor needs. The guidebook provides versatility in that, while it is useful as a companion to the slideshow in class, it is also useful as a reference for new employees, employees required or wishing to improve their skills in the procedures, and for supervisors who oversee employees required to perform these inspections.</p> <p>Pre-Trip Inspection exams administered as part of Division 14 Fleet Safety classes show dramatically improved scores following implementation of the slideshow and guidebook. The numbers of equipment accidents reported in any month since the implementation of the slideshow and guidebook are lower than those recorded any other month of 2008.</p>	Div 14	2009	Candie Auvil	(828) 631-1182	Safety Improvement
Tail Gate Prop	<p>The operator of the dump truck needed a safe and effective way to clean off the tailgate apron after dumping only a partial load of gravel without causing injury to himself and/or others. It is necessary to clean all loose gravel from the apron before relocating the truck to prevent rocks from falling from the truck and causing possible windshield or body damage to vehicles which may be traveling behind the dump truck.</p> <p>After realizing the potential hazards of this operation, the Road Oil and Equipment Safety Awareness Team (Larry Thompson, Michael Garner, Terrell Reynolds) in Division 8 discussed a possible solution to the problem. They designed and fabricated a tail gate prop.</p> <p>The tail gate prop is user friendly for the operator. There are no safety hazards. It is inexpensive to fabricate, and if used correctly, should reduce the chance of injuries to hands, fingers, and arms. Fewer injuries means less lost work time and fewer worker's compensation claims, which could be a major cost savings.</p>	Div 8	2009	Larry Thompson	(704) 982-0101	Safety Improvement
Chain Caddy	<p>The process of manually cutting equipment chains to length required the use of a bolt cutter. This had to be handled by two people forcing the tool to be used in a manner that could cause injury.</p> <p>The solution to these problems is the Chain Caddy. This allows cutting of equipment chains in a controlled fashion greatly limiting the chance of slips, trips and falls during this task. Though the initial cost of the construction is about \$402.00, it will be quickly gained back by the savings in labor hours, one man vs. two, and the replacement cost of the bolt cutting edges. The Chain Caddy provides a safe and efficient task station where chains can be cut to length. It is a tool which can help eliminate injuries caused by slips, trips and fall.</p>	Div 9	2009	Mark Crook	(336) 249 7001	Safety Improvement
Shovel Retainer	<p>There was no proper location on the truck bed where a shovel could be secured. A shovel is always needed to clean excess material out of the truck bed and off the bed apron.</p> <p>Proper location was identified on the dump body for installation of the shovel holder. The holder was then designed, fabricated, and installed. The shovel holder will keep the shovel from collecting dirt and debris on the handles of the shovel. The truck operator now has the capability to pick up small dead animals off the highway while driving to and from the job site. This eliminates the need for sending out an additional employee, which would be a cost savings to the department.</p> <p>The operator no longer has to climb up on the bed to retrieve the shovel, which will prevent possible falls and muscle strains. The shovel is secured on the truck preventing the possibility of it falling into the roadway which could cause broken windshields, body damage, or even vehicle accidents.</p>	Div 8	2009	Stephen Thompson	(336) 896-7021	Safety Improvement
Straw Blowing Procedures	<p>During the straw blowing operations, operators were required to stand on the rear of a slick flat bed truck to feed bales of straw into the blower. No means was provided to prevent the employee from falling off and under the wheels of the straw blower being pulled behind.</p> <p>The solution was to build an approved handrail system that would help prevent someone from falling off the truck if they slipped. The blower chute on the blower was also modified to hydraulically raise and lower to clear the handrail system as needed to turn and cross uneven terrain.</p> <p>The handrail system provides a much safer workstation for employees to perform the straw blowing operation. The equipment is safer and user-friendly.</p>	Div 10	2009	Rick Mabry	(704) 596 2131	Safety Improvement

NCDOT-IMAP Training Ground	<p>There was no unified training for the IMAP drivers. Each IMAP unit trained differently and there was no internal communication. People were still making common errors that could lead to injury or even death. Quick Clearance was a new idea to the state and had not been integrated into any training regiments.</p> <p>Build a training facility where responders could receive actual training on incidents encountered in the field. This training facility could reach beyond NCDOT and other first responding agencies. The facility would also provide NCDOT the ability to video record the different training practices and to create a training film library that could be shared with other IMAP units, other NCDOT units, Contractors, and first responding agencies.</p>	Div 10	2009	Tim Kirk	(704) 982-0101	Safety Improvement
Video system on Centerline Paint Machine	<p>Division 10 Traffic Services received a new centerline paint truck in early 2008. The new truck is considerably larger than the previous truck and striping narrow, secondary roads is more difficult due to the size of the truck. The operator had to lean out the window of the new truck to see and this put the operator at risk for being hit by oncoming traffic, debris, etc.</p> <p>The solution had to include keeping a sealed cab. A video system with the camera mounted underneath the truck allowed maximum visibility. A monitor was also mounted inside the cab for the operator.</p> <p>The video system eliminated obstructions because it was placed under the truck for optimal viewing. Another benefit of this modification is the safety of the operator because he/she can stay inside the cab of the truck. This video system can be used by each and every paint crew across the state.</p>	Div 10	2009	Donald Griffith	(704) 982-1998	Safety Improvement
Asphalt Pavements Online Study Course & Exam	<p>Due to budget constraints, the units had to find a more cost effective way to provide the course to Technicians who are required to complete it. The solution Develop an online course that would reduce costs for both the Department and Industry.</p> <p>Application fee per student was reduced from \$100 to \$50 Passing rates rose from 80-90% to 95-100% The transferable format can be used for other certification classes</p>	Construction & Materials and Tests	2009	Wiley Jones	(919)733-2210	Dollar Savings
Equipment Trailer Safety Step	<p>Problem: Trailers with factory installed steps are often welded to the trailer tongue, which is hard to use when the equipment is loaded.</p> <p>The steps are also more susceptible to damage from bumping the ground. Employee complaints and accident reports regarding factory steps were becoming frequent issues.Solution:</p> <p>Division 5 Equipment Shop designed a step which can be installed anywhere on any model trailer and only costs \$45 per step.</p> <p>It can save the Department up to \$213,195 in parts and labor if used on the 699 trailers currently in service.</p>	Division 5 Equipment Unit	2009	Adrian Rigsbee	(919)477-2128	Dollar Savings
Sustainable Rest Area Design U.S. 421 Wilkes County	<p>Problem: In the U.S., buildings account for: 39 percent of the total energy use 68 percent of the total electricity consumption 12 percent of the total water consumption NC's rest areas need to serve the traveling public in a much more sustainable way to help preserve our state's natural resources.Solution:</p> <p>Built a more environmentally sustainable facility.</p> <p>It conserves natural resources and teaches the importance of sustainable building practices and the benefits that can be achieved by using them.</p>	Roadside Environmental Unit	2009	Connie Morgan	(919)733-2920	Energy and Environment
NC National Law Enforcement DMV Image Retrieval	<p>Problem: Law Enforcement officers could not easily verify the identity of individuals during roadside stops, if the driver did not have a photo ID.</p> <p>Solution: Working with several agencies, DMV made driver license photos appear along with driver data when officers search the network. Image retrieval data is available to participating states and other agencies</p>	DMV	2009	Carla Thorpe	(919)508-1753	Safety Improvement

Utility Savings	In the past NCDOT has been charged water and sewer rates for all the water used at the Selma Rest Area, located on I-95 in Johnston County. In an effort to reduce costs separate water meters were installed at each building at the site. These meters reflected the amounts of water used and amounts that would discharge into the sanitary sewer. An agreement was made with the Town of Selma to separate the billing rates. During the first full year of use, NCDOT was able to save \$4,197.50 for water not charged with sewer rates.	Div 4	2009	George Harrell	(252) 237-6164	Dollar Savings
Self-Contained Hydraulic System for PM's	The old process for performing salt spreader PM's required taking a truck, loader, and additional operator out of regular service. The salt spreader was then installed on the truck in order to perform the semi-annual PM's. To solve this problem a self-contained hydraulic pumping system was developed to eliminate truck, loader, and additional operator. One single transportation worker can now perform the PM's. Use of the self-contained hydraulic system has generated annual savings to Division 3 of \$23,553 per year. This is a result of saved equipment costs and added labor. The cost of the system is prorated for a five-year life.	Div 3	2009	Allen Brinson	(910) 347-5223	Dollar Savings
Dynamic Message Sign Installations	The previous practice of Dynamic Message Sign (DMS) installations was to install overhead sign structures with ground-mounted control cabinets. The cost of these structures averaged \$50,355. The ground-mounted control cabinets were prone to flooding and damage by mowing crews. To alleviate concerns with overhead installations, the ITS Section has changed the practice to place the DMS's on the roadway shoulder using Pedestal or Butterfly type structures. The DMS displays are mounted 25 feet above ground and the control cabinets are attached near the base of the structures. This has resulted in improved visibility of the DMS from all travel lanes, ease of installation and maintenance and a 50% reduction in the cost of DMS structures and approximately \$1,500 cost savings on the control cabinet installation. This equates to approximately \$25,000 cost savings per DMS installation.	ITS and Signals	2009	Greg Fuller		Dollar Savings
Adopt-A-Highway Web 3.0 Application	The Adopt-A-Highway (AAH) program was in need of an upgrade from its legacy mainframe system that would allow the program's 96 AAH coordinators and co-coordinators quick and accurate processing of new applications, as well as producing management reports and labels for more than 6,000 AAH groups. The legacy database was state of the art when it was designed in 1989. A Web-based AAH database and report system that integrates the mainframe legacy system and the IVR system was developed, resulting in improved efficiency in the workplace and improved customer service to AAH groups. AAH coordinators now use the most advanced AAH system in the nation. Applicants are now able to enter data using the web site, reducing the coordinator workload. Management reports may be sorted easily by various criteria, giving AAH coordinators time saving management tools. Searches for any group and researching pickup history is easily done and available more quickly. Pickup reports are available in real time and labels for groups may be printed locally. The new system saves 1778 labor hours annually.	Office of Beautification Program	2009	Tiffany Crosby	(919)733-2920	Cycle Time Reduction
Analytical Instrumentation Update	The Chemical Laboratory had an outdated X-ray instrument that was use to analyze Portland cement, fly ash, and metal alloys. Traditional wet chemistry methods, which provided more accuracy, were used to analyze materials that failed the X-ray test. The Chemical Laboratory is accredited by the Cement and Concrete Reference Laboratory (CCRL). The old unit was not capable of passing accreditation testing. Research determined that wavelength dispersive X-ray fluorescence (WDXRF) equipment would pass the stringent requirements of ASTM C-114 Standard Test Methods for Chemical Analysis of Hydraulic Cement. A new unit was purchased and placed in service allowing more accurate tests than with the old instrument and avoiding time consuming wet chemistry methods. The new unit streamlined many of the tests above and beyond expectations. It is accredited by CCRL for Portland cement testing and is used for proficiency sample testing of various grades of cement and fly ash materials. The new unit is capable of testing cement percentage in concrete cores, composition of slab zinc alloy, zinc dust, and identification of material for oxides. It reduced the need for many traditional wet chemistry tests performed by the laboratory and now saves approximately 1,594 labor hours annually.	Materials & Test	2009	Kelly Croft	(919)329-4090	Cycle Time Reduction
Sign Rack	Traffic Services needed an organized way to transport highway signs in the sign trucks that would reduce the time it takes to access the right sign and protect the signs from damage caused by signs rubbing together. A sign rack made out of a 12 x 12 x 1 1/2" piece of solid plastic with 1/4 inch deep slots 1/4 inch wide apart was fabricated. The new sign rack can be placed in the side storage areas of a sign truck. This enables the storage of 29 signs in a rotating rack. The new sign rack maintains an inventory of signs, protect signs from damage and make them readily accessible. The sign rack saves time by reducing the time it takes to access signs and retrieve needed signs.	Division 2 - Traffic Services	2009	Wesley Brazelton		Cycle Time Reduction

Asphalt Solvent Testing Program	<p>The Department was purchasing a variety of asphalt solvents at \$8.75 to \$16.29 per gallon from various vendors at different prices with little knowledge of the products, or their impact on field personnel time & resources. These products used were not evaluated for environmental, safety or performance criteria.</p> <p>State Road Maintenance sought the help of NCSU, Roadside Environmental, NCDENR and EPA. Sampling & testing protocol were established and test procedures were developed for evaluating asphalt solvent effectiveness. Roadside Environmental developed protocols to eliminate harmful constituents by coordinating with NCDENR to meet existing EPA regulations and consulted safety/environmental regulations to establish safe handling criteria for field personnel. A Qualified Products List (QPL) was developed and submitted to Purchasing for proper procurement of asphalt solvents. Changes are made in the testing program as deemed necessary by the implementation team.</p> <p>As a result of implementing this program, the Department now has a QPL resulting in an annual contract with one vendor providing asphalt solvent that meets established environmental, safety and performance criteria. At \$8.17 per gallon in 2006, the Department realizes a cost saving of approximately \$250,000 per year.</p>	Division of Highways	2009	Kelly Croft	(919)329-4090	Energy and Environment
Backhoe Mounted Guardrail Excavator	<p>The problem related to cleaning away the accumulated buildup of soil from under the guardrail. In mountain counties there is little room to get behind the guardrail to clear away excess soil buildup. In most areas the only way to clear away this buildup is to remove the guardrail and excavate the material and then reset the guardrail.</p> <p>The team decided to fabricate an attachment that would do this without the need to remove the guardrail. We took an old backhoe bucket and old motor grader blade and added steel to extend the length of the backhoe bucket to form a three-foot motorgrader blade extension.</p> <p>When this new attachment is used to replace the bucket on the backhoe, material can be pushed out from the backside of the guardrail or pulled through under the guardrail to be picked up by a belt loader or wasted over the fill or shoulder. This tool has the versatility to both push and pull material.</p>	Division 11 - Avery Maintenance	2009	Jerry Combs	(828) 625-5334	Labor Hour Savings
Robotic Total Station Surveying Equipment	<p>The safety procedures adopted by the Signals & Geometrics Section of the ITS & Signals Unit require a spotter be present with the rodman to ensure the rodman's safety when performing stadia surveys of existing intersections for signalization at high speed locations. The section is not able to obtain new positions to meet the increasing workload related to safe, efficient designs for traffic signals along the state highway system. A team was formed to investigate a means to more effectively utilize manpower for stadia surveys.</p> <p>Robotic total station survey (RTSS) equipment is the most effective & economical means to utilize manpower for stadia surveys. RTSS equipment requires fewer employees on a survey team and it enables employees to develop traffic signal plans utilizing less manpower while maintaining required survey stadia accuracy and safety for employees. The NCDOT Locations & Surveys Unit ensured that the equipment purchased would meet the needs of the section and be compatible with equipment used by other units within NCDOT.</p> <p>Manpower required for a survey team has been reduced by one person for high-speed locations requiring a stadia survey and resulted in saving 10 to 25 percent in field survey time.</p>	Traffic Engineering & Safety Systems and ITS Signa	2009	Nathanial Bitting		Labor Hour Savings
Approved Encroachment Cross-Reference Map	<p>Approved Encroachment or driveway permits were difficult to locate because they were never cross-referenced so that district staff could locate them. For example, if a municipality contacted the district office and wanted to know what type of encroachments existed on a particular SR route then the staff was forced to search through all encroachments to find the needed information.</p> <p>A county map was used to color code all approved encroachments and referenced by a file number that allows staff to easily locate the approved documentation. Files for approved encroachments and driveways were filed by city, utility company, and/or individuals. An Excel worksheet was created that logged the reference number (which was logged on the map as well), date received, date approved, location, encroachment type, and any other remarks for each encroachment agreement. The spreadsheet can be sorted by information type to reduce the time required by staff to locate specific data.</p> <p>The color-coded map helps staff to immediately identify the type of encroachment at each location. By providing the reference number on the map, time needed to locate approved encroachment data was significantly reduced. This greatly improves customer service, reduces labor time and keeps data easily accessible.</p>	Div 12	2009	Caroline Dedmon		Labor Hour Savings

Earthwork Computation Spreadsheet	<p>The problem was reflected in the time and training required to compute earthwork volume for estimated and final quantities to be paid on construction projects.</p> <p>A spreadsheet was created to enable anyone to enter data from x-section notes or plotted areas. Entry does not require any special training and can be used by anyone. It is helpful in establishing estimated quantities of earthwork throughout a project as well as computing exact final quantities.</p> <p>The user is able to enter as much or as little information as warranted to obtain results at any stage of the project. If estimated quantities are needed and it is known that earthwork will continue in the same area, it may not be necessary to use all shots taken. The spreadsheet can be updated to produce the exact quantities as the need arises. This improvement enables tracking of earthwork quantities paid and generates a source document for final quantities</p>	Div 10	2009	Hilda Beck		Labor Hour Savings
Field Welder Certification Program	<p>Prior to January 1, 2006, all contractors' welders were required to be tested by an approved independent testing agency. After successfully completing the test, the testing agency issued a certification and submitted it to the Materials and Tests Unit for review and approval. The Department did not have any guidelines for what qualified a testing agency. Some testing agencies were not using qualified individuals to witness the testing. Some were not requiring a picture ID to identify the person taking the test, and, in some cases, falsified certification papers were found.</p> <p>The Materials and Tests Unit developed a Field Welder Certification Program. This program is designed to have Materials and Tests personnel have one-on-one contact with each welder prior to them showing up on an NCDOT project. This allows M&T to verify the individual's identity by requiring a picture ID, to witness the field test, and to review the Department's and Bridge Welding Code requirements. Successful applicants are issued a Department picture certification card.</p> <p>This program has improved the quality of welding performed on NCDOT construction projects. It has educated welders on the requirements for proper welding, the proper equipment and proper storage of welding electrodes. It brings about personal contact between the welder and a Materials and Tests Unit inspector prior to certification.</p>	Materials & Test	2009	Gary Bristow	(336) 993-2300	Customer Service
NC Improved STAA Truck Route Tools	<p>Since the National Surface Transportation Assistance Act of 1982, North Carolina has experienced tremendous growth and significant changes in its highway system and freight needs. North Carolina's Surface Transportation Assistant Act and National Truck Network Map and supporting materials were in need of a major overhaul. In the electronic age customers, including terminal operators, trucking industry, and the enforcement community, have an expectation and need for immediate on-line access to these critical networks and North Carolina was still exclusively utilizing US Mail to send hard copies of these maps.</p> <p>The solution involved a comprehensive multi-agency process improvement effort (NCDOT, GIS, Regional Traffic Engineering, Traffic Safety Unit, and NCSHP) to research, investigate, and update North Carolina's National Truck Network Map while also working toward producing a version of tools that was accessible via the internet.</p> <p>Through a multi-agency process improvement effort, the result was the Updated and Improved STAA NC National Truck Network Map tool with insets available in traditional paper and electronic (PDF) formats.</p>	GIS and Traffic Engineering & Safety	2009	Terry Norris	(919)212-5950	Customer Service
Road Oil Coordination	<p>With pavement preservation becoming a goal of maintenance, more coordination was necessary with other departments for maximum efficiency.</p> <p>Sampson Maintenance and Road Oil worked together to create a road oil program that helped both units achieve their goals. The patching operation and road oil operation were coordinated to work off of the same plan. Using a road conditioning survey, the CME identified roads in a segment of the county that qualified for possible road oil treatment and a map was marked using highlighters. The CME and Road Oil supervisor rode together on each road, and identified and agreed on needed treatment. A new map and spreadsheet were created with each road numbered in sequential order. All patching and crack pouring were performed well ahead of schedule.</p>	Division 3 - Sampson County Maintenance	2009	Carrie Holland	(910) 592-1434	Communications

<p>Bridge Survey Report Preliminary Review</p>	<p>Hydraulic Bridge Survey Reports were completed and sealed by Professional Engineers before submitting them to the Structure Design Unit. At times Structure Engineers disagreed on the most appropriate span arrangement or proper girder selection for a particular stream crossing. Requests for revisions to Hydraulic Bridge Survey Reports resulted in rework and possibly going back to a private firm at additional cost. There was no formal process in place to insure agreement between units and to prevent rework. At approximately 14 months prior to R/W the Hydraulic Design Engineer submits the draft layout to the Structure Design Engineer for review. He coordinates with the Bridge Construction Engineer and FHWA for comments on the proposed layout and selection of structure type. Within 13 months prior to R/W the Structure Design Engineer concurs with the layout as submitted or requests changes as necessary. At 12 months prior to R/W, the Hydraulic Engineer submits the Final Bridge Survey Report to the Structure Design Unit.</p> <p>The results of this preliminary review process of the Bridge Survey are that reports have greatly reduced, the amount of rework by the Hydraulics Unit. It has improved the lines of communication between the two Units. Input from the Construction Unit during the review process has also improved constructability and helped to avoid problems in the field after the projects are let to contract.</p>	<p>Highway Design Branch</p>	<p>2009</p>	<p>David Chang</p>	<p>(919)250-4100</p>	<p>Communications</p>
<p>State Agencies Functioning Effectively Together</p>	<p>There is a general lack of communication of information that would benefit the driving public. To improve communication and customer service the team provided existing equipment, DOT Message Boards, to State Highway Patrolmen to promote public awareness of "Operation Slow Down" program in an effort to make the highways safer to travel and save lives. SHP utilized the existing safety equipment to communicate the existence of their program to the public and the DOT increased their utilization rate for the message boards. By joining forces both agencies were able to provide the public with improved customer service, safer roads for all motorists, and the benefits of State Agencies Functioning Effectively Together Yearlong.</p>	<p>Division 7 - Alamance County Maintenance</p>	<p>2009</p>	<p>Michael Venable</p>	<p>(336) 315-7080</p>	<p>Communications</p>
<p>Wireless Link Between Laptop Computer and Traffic Signal</p>	<p>In order to use the laptop computer for programming, preventive maintenance, and troubleshooting traffic signal equipment, the technician has historically had only two options. The first was to remove the laptop computer from the truck exposing it to rain, sand, and other elements that reduced its usable life. The second option was to park the truck in close proximity to the signal cabinet and run a cable from the computer to the traffic signal equipment. This option places the technician, pedestrians, and the motoring public at risk of injury or death. The solution was to use 2.4ghz spread spectrum radio modems that can be compatible with various types of traffic control equipment. As a result of the implementation of the wireless connection, technicians are able to perform the required tasks with the trucks parked in areas that allow the greatest safety for technicians, pedestrians, and the motoring public. An unexpected benefit of the project is increased productivity from technicians who complete the required task using laptop computer.</p>	<p>Division 1 - Operations & Traffic</p>	<p>2009</p>	<p>Leslie Newbern</p>	<p>(336) 315-7080</p>	<p>Safety Improvement</p>
<p>Positive Drug Testing</p>	<p>In 2004, transit company representatives approached DMV with concerns that they had no way of identifying new hires who had been previously dismissed after testing positive on mandatory drug tests required of commercial drivers. The transit companies wanted to establish some way to mark a commercial driver license with information that the driver had previously failed a federally required drug test. DMV sought legislation that mandates that The employer of any employee who tests positive in a drug or alcohol test required under the Federal Motor Carrier Safety Administration (FMCSA) regulations shall notify DMV in writing within five business days following confirmation of a positive drug test. The legislation also provided for disqualification of the drivers. In the first 14 months of operation, this regulation has helped keep 273 persons with a drug and alcohol problem off the road. The law also creates an incentive for drivers to get treatment for their drug/alcohol problem and, thereby, have the disqualification removed from their record. Sixty-five (65) persons have taken advantage of this option for treatment.</p>	<p>DMV - Driver and Vehicle Services Section</p>	<p>2009</p>	<p>Debbie Jones</p>	<p>(919)861-3231</p>	<p>Safety Improvement</p>
<p>Innovative Rumblestrips on US 421 in Chatham County</p>	<p>A severe pattern of vehicles crossing the centerline developed on a two-lane section of US 421 from approximately SR 2119 to SR 1010 in Chatham County. Accidents resulted in high profile fatalities and severe injuries. With traffic volumes increasing and work beginning on the US 421 widening project, immediate action was required to attempt to eliminate the head-on type crashes along US 421 in Chatham County. A multi-unit team consisting of Division 8 staff, Sandhills Regional Traffic Engineering, Traffic Safety Systems, and Work Zone Traffic Control, was charged with developing and rapidly implementing an effective corrective countermeasure. The team developed and implemented the split centerline rumble strip configuration treatment. With the development and implementation of the split pattern centerline rumble strips, there has been significant reduction of the drift across center lane departure type crashes during critical construction phase.</p>	<p>Traffic Operations & Investigative Section - Sandh</p>	<p>2009</p>	<p>Al Grandy</p>	<p>(910) 437-2614</p>	<p>Safety Improvement</p>

Daily Crew Assignments	<p>Lack of communication between Supervisors and clerks, wrong information on FR1101's (ex. Wrong WBS, function codes, MMS task numbers, etc. I would have FR11's with incomplete work orders on it, not enough information on job sites, no MMS numbers, incorrect task numbers, and employees checked in on the board, but out of work.</p> <p>Solution: I created a spreadsheet in excel with all of the employees on it with special blocks for each Supervisor/CrewLeader. I created spaces for the Supervisor's to write down the employees with each Supervisor, their WBS elements, their function codes, their mms task numbers, their job sites. At the bottom of each sheet, I have all employees names with lines so they can check them if they're here or write out if they are not</p> <p>Results: This sheet if filled out daily, corrects 99% of the mistakes that I find on daily FR11's and helps me tremendously. If I am missing an employee, I can check on this sheet to see if they are with someone (in case they were left off of FR11 by mistake) or if they are out of work, etc. Also if the WBS element is wrong on FR11, I can check this sheet to see if numbers were omitted, if it was the right WBS element they were given or if the WBS was erroneously left off. If someone calls in and needs to know where a Crew is working, I can check this sheet to see what road they are working on and what Supervisor they are working with and get up with them quicker. IT SAVES me lots of time and makes my documents that I enter have FEWER errors (or incorrect information)!</p>	Div. 10, District 3, Anson Maintenance	2008	Tim Boland	(704)-982-0101	Communications
Stormwater BMP tracking database	<p>Problem: The NPDES Stormwater Permit and NCDENR-DWQ riparian buffer rule require the perpetual maintenance and protection of stormwater BMP devices. There are over 230 stormwater BMPs located in Division 5. The District Office requires information concerning the location of these devices in the Division when reviewing encroachment applications.</p> <p>Solution: Division staff evaluated the information collected on the BMP Location Survey form and determined there was a need to maintain a Division-wide tracking inventory of each stormwater BMP device. The stormwater BMPs in the inventory are separated by TIP construction number and then sorted based on location (i.e. county) supported by each District office in the Division. The District office is then provided a Stormwater BMP Tracking Database that contains a copy of each completed BMP Location Survey Form. The District office will review the database when reviewing encroachment applications.</p>	Division 5 Construction	2008	Christopher A. Murray	(919) 220-4633	Communications
DIP (Division Improvement Program)	<p>In 2006, Division 6 in conjunction with the GIS unit conceptualized the Integrated Cooperative Planning Procedure (ICPP) that was a method and tools to better plan how and where we should focus our bituminous operations and resurfacing efforts. The key components of this program involved dividing our counties into individual sections, focusing work efforts within a particular section, and developing tools to help determine which sections have priority. This method worked well for our Division and led to better efficiencies in our Bituminous Operations in particular.</p> <p>Building upon our positive results from the ICPP experience, our Division Engineer challenged management to begin to improve our operations in all areas under the guiding principal that pavements should be driving our maintenance decisions and activities. Thus, evolved the current phase of continuous improvement known as the Division Improvement Program (DIP). The primary expectation of DIP was to develop and implement processes that integrate the contributions off all units into a critical path in the areas of resurfacing, bituminous operations, vegetation management, secondary construction, and division design construct applications.</p> <p>During the process of developing the DIP, committee members soon learned that, although we all work for the same company, our individual units were all too often working in isolation without knowledge of what other units were doing or had the capabilities of doing. Due to this lack of coordination between units, we realized that we were not reaching the maximum benefit of what could be accomplished by working together from a unified game plan and, in fact, were being counterproductive to each other in certain operations.</p> <p>The result of this process improvement includes written processes and timelines that have been field implemented in the areas of resurfacing, bituminous operations, vegetation management, secondary construction, and division design construct applications. Several new plans and tools resulted from the efforts including a master paving plan for each District; 2-year plant mix resurfacing plans; 3-year bituminous operations plan; a division wide vegetation management plan (spraying and mowing); standard transmittal format for communicating upcoming work activities / needs between road oil, maintenance, and traffic; and a common environmental review format for tracking permit status. In all, the effort has led to the units working together to minimize 'mistakes' and get the most benefit possible by coordinating our individual work activities to work collectively toward a common outcome.</p>	Div 6	2008	Kenneth L. Clark		Communications

GIS Maps for Projects	<p>Problem: Not being able to effectively communicate with ease to the different units, the public, contractors, and fellow co-workers about highway projects is an ongoing problem. Many times projects are discussed without all of the involved parties understanding what is being said. In NCDOT the projects consist of some kind of alteration to the surface of land. In doing this people want to know what is the impact. It may involve a new road, resurfacing an exiting road, utilities, drainage, landscaping, buildings, and many other items. Illustrating the concept from one person to another can become very complicated without visual aids</p> <p>Solution: The solution is a phrase most people have used many times, a picture is worth a thousand words. We used a local GIS (geographical information system) to create maps in a digital format or a hard copy. The GIS consist of many layers of data that included aerial photo maps, contour lines, roads, property lines and owners, CADD drawings, utilities, boundaries of counties, and cities, along with various other layers.</p> <p>Results: NCDOT representatives and employees can have help in illustrating the intent or purpose involving a project with visual aids, maps.</p>	Div 10	2008	Barrett Eatman	(704)-982-0101	Communications
Increased Public Awareness & Context Sensitive with Existing Systems	<p>Problem: As the number of registered vehicles increases throughout the State of North Carolina, traffic engineers and designers have had to deal with an ever-increasing amount of traffic on the State's highway system. This increase in traffic has created significant pressure on the system, resulting in increased congestion and the consequent loss of social and economic productivity. Traditional solutions to these types of problems have involved planning, designing and constructing new highways and additional public infrastructure. In the present circumstance, with declining revenues and increasing costs of highway construction, the ability of the State to continue on this course has been compromised in the extreme. As a result, new, creative strategies must be developed in order to take better advantage of our existing transportation assets. The solutions described in this document have, and should continue to have, a positive impact on the State's ability to maximize the efficiency and effectiveness of its current transportation assets.</p> <p>Solution: In order to address the issues described in the problem statement presented above, it is important to know what assets are available so that they can be effectively implemented and deployed. For the purposes of this discussion, the primary assets that are utilized are the portable Changeable Message Signs and overhead Dynamic Message Signs that are currently in the Department of Transportation inventory. The key to the success of this project is the use of these devices in circumstances and situations that will maximize the efficiency of the highway system. To accomplish this task, the Transportation Management Center has chosen to involve various stakeholders in a process that increases communication and understanding among the various players in the transportation environment. Through this process, relationships among participants have been improved and better communications have been established. This has allowed comprehensive regional planning to take place, particularly when significant events occur that transcends jurisdictional boundaries. Communications have also been improved using the State's TIMS system in a manner that provides information to the public that has not traditionally been made available to them. This information includes graphic and geographic imagery, more user-friendly 511 information, as well and information specific to projects catalogued on the system. The overall strategy of engagement and creative uses of current technology has proven to be a viable solution to the problem of congestion and other related transportation management issues.</p> <p>Results: The result of these efforts include better understanding between various interest groups and an appreciation of their specific responsibilities, increased cooperation of agencies across geographic and philosophical boundaries and increased communications with the Department's primary customer, the traveling public.</p>	Triad TMC	2008	Michael Venable	(336)-315-7080	Communications
Maintenance Preconstruction Conference	<p>Problem: In 2006, Division 14 had 89 secondary construction and small construction projects to complete. These projects required several permits, including permits from Division of Water Quality, Land Quality, Air Quality, and Army Corps of Engineers. Unfortunately, the Division experienced project delays, noncompliance issues with permits, and strained relationships during the 2006 construction season. The primary cause of these problems was lack of communication between Division units and contractors prior to and during construction of projects.</p> <p>Solution: The Division implemented a required Preconstruction Conference, including a form, prior to the 2007 construction season. This form included critical dates for completion of construction and permits, as well as, individuals responsible for the project. It also gave assurance to project engineers and inspectors that projects had been properly planned and permitted prior to construction.</p>	Division 14 Operations	2008	Brian C. Burch	(828).586.2141	Communications

Secure Your Load	<p>Problem: Roadside litter is a problem in North Carolina. In 2006, the NCDOT spent more than \$16.6 million to remove more than 10.1 million pounds of roadside litter. More than 5,600 litter citations were issued by a multitude of law enforcement agencies. Yet the littering continues. Mecklenburg County Solid Waste and Recycling states that In North Carolina, half of all litter is blown, not thrown, from vehicles whose loads are not properly secured.</p> <p>Solution: The strategy is to continue litter cleanup events, education, prevention and law enforcement all of which are necessary to control littering. This project focussed on education and prevention by communicating to North Carolinians that securing loads will increase roadway safety and reduce litter.</p>	Office of Beautification Programs	2008	George Kapetanakis	(919)-715-2553	Communications
Improvements to the Driveway Permit Applications Process	<p>Problem: Over 100 driveway permit applications are received yearly in our District. A hand-written logbook was used to record receipt at the Maintenance Office but it provided no way to quickly generate reports. It may take days or months for the application to be investigated and sent to the District for final determination. When an applicant called about the status of his application, it was often difficult to quickly get the information. Various letters sent during the application review were copies of old form letters. A required list of Special Provisions was assembled using a cut and paste method from previous applications. Required detail attachments were copies of old sketches used for decades. Time and money was spent sending engineers' plans back and forth for revisions until acceptable.</p> <p>Solution: A database was created that is shared by District and Maintenance personnel to track driveway permit applications. This database allows Maintenance personnel to record the application data when received and subsequent actions taken, for District personnel to view the progress of the application process, for standard letters to be easily generated without additional data entry, for the Special Provisions to be standardized, and for reports to be easily generated. Detail drawings were recreated in CADD, converted to pdf files, and links created in the database for easy printing. Engineers' plans are now sent via email and one copy plotted for review. Multiple drawing sets are not required until everything is finalized.</p>	Division 3, District 1	2008	Karen Arriola	(910)-346-2040	Customer Service
NCDOT At Your Door	<p>Problem: Work crews from both the Bituminous Unit and the Maintenance Unit were getting numerous calls about work along their project site from the property owners. Some calls were basic questions about what was occurring along their property and/or how long our crews will take. However, many complaints were received due to the lack of information available to the property owners. For example, one of the most common complaints that we received occurred during our Bituminous operations in which motorists noticed loose stones impacting their car.</p> <p>Solution: Door hangers allowed us to inform the property owners what our crews would be doing, what to expect while our crews are working, how their commute will be affected, and who to contact if they have any other questions. These hangers were a convenient method to contact property owners prior to work crews mobilizing.</p>	Division 12 Cleveland Co Maintenance and Bituminou	2008	Steve Rackley	(704)-480-9027	Customer Service
Down Hole Video Inspection	<p>Problem: The Materials and Tests Unit routinely performs video inspection of Pipe Lines and Drainage Structures using cameras mounted on remote operated, self propelled pipe rovers that are inserted into the pipe or structure that provide both real time and recorded imagery of the interior of the structure so that the condition of the structure may be assessed. Unfortunately, the equipment is bulky. The large rover (used on pipe 24 in diameter and larger) weighs approximately 285 lbs. and must remain tethered to a power/control unit mounted in a 24,000 lb. GVW support truck that includes a crane for lifting the rover in and out of the vehicle. The smaller rover (used on pipe 6-24 in diameter) weighs approximately 60 lbs. and must also be operated from the same support truck. The rovers require a minimum two-man crew to operate and are based in Raleigh. Since the equipment is based in Raleigh, the support truck is also used for other purposes (such as concrete coring), and it requires a two-man crew, response time for inspections has been less than adequate at times.</p> <p>Solution: The Unit has acquired two Quickview Down Hole Video Inspection units that have been assigned to locations in both the eastern and western ends of the State. These units are lightweight, portable cameras that can be operated by a single technician located at the drainage structure that also provide both real time and taped imagery of the interior of the structure so that the condition of the structure may be assessed. The units weigh approximately 15 lbs. and may be used to inspect pipe 6-60 in diameter as well as shallow bridge foundations, box culverts, masonry drainage structures, and sinkholes.</p>	Materials and Tests Unit	2008	Jason Fragnito	(919)-329-4203	Customer Service

Office Assistant III Position Description Manual	<p>Problem: In the past, this position has remained vacant for months at a time. Since this Office Assistant III provides services to the DDC Department, the Safety Department, and the Moving Ahead Department, a vacancy in this position causes hardship to whomever is required to perform those duties. A good deal of the duties performed by this Office Assistant III are not the same as the duties performed by the other Administrative Assistants in the Division office.</p> <p>Solution: A detailed and organized manual was written, printed out, and also stored on the hard drive for use by whomever is filling in for this assistant during an absence or between permanent employees.</p>	Division 10 DDC	2008	Cindy Iorlano	(704)-982-0101	Customer Service
Prequalification Automation Web Application	<p>Problem: Paper applications and limited human resources for centralization of the prequalification process. At present, all contractors are submitting paper applications. Furthermore, private consultants have to submit individual packages to every unit or branch with which they are seeking approval. With centralization, all contractors will have one primary point of contact as regards prequalification, the Construction Unit.</p> <p>Solution: We created an online application to serve both contractors and consultants.</p> <p>Results: Firms can now go online to submit their prequalification materials. Essentially, they will now have one primary point of contact regarding their prequalification. Some items cannot be digitized and will have to be shipped. Once information is entered, future renewals will be much simpler. The Department's reviews will also be simpler and quicker.</p>	Construction Unit	2008	Greg Keel	(919)-733-2210	Customer Service
Contaminated Waste Minimization	<p>Problem: US Highway 17 Bypass in Beaufort County crosses an unregulated abandoned landfill and an actively monitored US EPA Superfund Site. Material in the landfill posed an environmental risk, a constructability risk for proposed 30- inch concrete piles to support the Pamlico River Bridge. The Superfund site contained documented herbicides and pesticides in both soil and ground water, originating from a former agricultural supply facility at the site, which posed health risks to site workers, nearby residents and business patrons. The amount of material recommended for removal and disposal was estimated at 57,000 cubic yards at an estimated excavation and disposal cost of \$4 million.</p> <p>Solution: A comprehensive Contaminated Waste Minimization Plan was successfully developed by the Geotechnical Engineering Unit, in coordination with state and federal regulators and the Design Build contractor, to address concerns regarding waste disposal, workers' safety and project schedules. Through utilization of this plan, the amount of material requiring disposal was reduced by 99% to only 600 cubic yards of landfill debris. All contaminated material excavated from the Superfund site was incorporated into the roadway fill under a 12-inch compacted cap to act as a physical barrier to prevent health risks to the site workers, nearby residents, and businesses. The waste minimization resulted in a cost avoidance of almost \$4 million.</p>	Geotechnical Engineering Unit	2008	Cyrus Parker	(919)-250-4088	Dollar Savings
Division One Brine Systems	<p>Problem: Conventional snow/ice control methods yielded unsatisfactory results. Other Divisions were instituting brine operations, and achieving much improved removal of snow/ice from roadways. Division One desired to utilize brine on a Divisionwide basis, but purchase of prefabricated units for a project of this magnitude was deemed unfeasible.</p> <p>Solution: The Division decided to pursue construction of homemade units, based on designs observed in other Divisions. Estimates for the materials were computed, and approval to proceed was obtained. Materials were purchased, and the production and distribution systems were constructed.</p> <p>Results: After the work was completed, the total cost for the project was \$197,993.09, a savings of \$350,843.30 over prefabricated systems. The Division now has the capability to treat all necessary routes prior to events. This results on enhanced safety for employees, motorists, and enhanced public image for the Department.</p>	Div 1	2008	Win Bridgers	(252)-332-4021	Dollar Savings

<p>Installation of four (4) test piles & PDA on Ocracoke Island</p>	<p>Problem: As a result of bids being received at 675% above the Engineer's estimate and a extremely compressed schedule/deadline it was evident that the Division could not contract the installation of four test piles and the associated PDA testing required. Due to the restrictive time schedule and the necessity of the data provided by the PDA testing, an out of the box solution had to be formulated and quickly implemented.</p> <p>Solution: The Division consulted with the Geotechnical Unit and decided to perform this work with Division forces. Due to the crane size necessitated due to the pile and hammer size the Division had to contract (using a fully operated rental agreement) for an 80-ton track crane. Another rental agreement was utilized to provide a D30-32 Impact Hammer, a D19-42 Impact Hammer, and all required hardware for the diesel hammers. Division personnel requisitioned the 4 concrete piles along with the 4 steel pile tips to be driven on this project. The Division used Bridge Maintenance personnel for the delivery of all materials and the labor necessary to drive the 4 PDAs. The Geotechnical Unit helped in this endeavor by provided expert advice and a contract technician to perform the PDA testing.</p> <p>Results: After all work was completed, the total cost for the project was \$157,638.03, a saving of \$302,059.97 (when compared to the lowest responsive bid we received of \$459,698.00). As a result of this project necessary data was obtained to ensure the replacement of seven bridges along NC 12 was let in time to meet the restrictive closure period (of 75 days during the winter of 2007-08).</p>	<p>Div 1</p>	<p>2008</p>	<p>Sterling Baker</p>	<p>(252)-482-7977</p>	<p>Dollar Savings</p>
<p>JOINT VESSEL SECURITY PLAN IMPLEMENTTION</p>	<p>Problem: Due to the many U.S. Coast Guard rules and regulation the 33 CFR Navigation and Navigable Water reference manual was utilized as a guide. This was a very lengthy and extensive process to follow for compliance. Many hurdles had to be made to meet the requirements and additional communication devises needed for compliance not to mention required training, drills and exercises (still required), public access and applicability. Numerous telephone and correspondence transpired with the Commander of the U.S. Coast Guard.</p> <p>Solution: All aspects of Maritime Security for vessels and facilities were implemented for compliance and approval by the U.S. Coast Guard before acceptance of the plan. This was a tedious process set forth involving coordination and scheduling, record reporting and massive training and control measures of safety for the shore facilities and vessels. Massive man-hours were utilized to meet the compliance levels required to meet the Homeland Security guidelines set forth.</p>	<p>Ferry Div</p>	<p>2008</p>	<p>Robert Hill</p>	<p>(252)-447-1055</p>	<p>Dollar Savings</p>
<p>Sampson County Rest Area Septic System</p>	<p>Problem: The Wastewater Treatment Plant (WWTP) at the Sampson County Rest Area was costing the NCDOT in excess of \$19,000 per year due primarily to labor expense for an Operator in Responsible Charge (ORC) to operate the WWTP.</p> <p>Solution: The Roadside Environmental Unit Central Office and Division 3 Roadside Environmental Unit staff worked together to install a traditional septic system at the rest area to take the place of the WWTP. The traditional septic system does not require an ORC and so would result in dollar savings to the NCDOT.</p> <p>Results: The septic system was activated on September 6, 2007 and the WWTP was deactivated. As of December 31, 2007, the NCDOT has saved \$4,790 resultant from the conversion. The septic system installation and deactivation of the WWTP is resulting in savings of in excess of \$19,000 per year.</p>	<p>NCDOT-Roadside Environmental Unit</p>	<p>2008</p>	<p>Stonewall Mathis</p>	<p>(910) 259-4919</p>	<p>Dollar Savings</p>
<p>Electronic File Storage & Paper Consumption Reduction</p>	<p>Problem: The problem centers around the amount of paperwork that is submitted for driveway permit and encroachment applications. Currently the Department requires 4 sets of drawings and plans for driveway permits and 5 sets for standard encroachments (additional copies are necessary for Raleigh review). Because of the numerous copies, large amounts of paper products are being utilized The number of copies also require adequate storage space for the documentation.</p> <p>Solution: The apparent solution is to reduce the number of paper submittal copies. The Department could reduce the amount of submitted paperwork by converting the internal circulation to electronic files This would require relatively inexpensive hard drive storage areas. District Offices could scan the smaller documentation, using the local scanners. Large plan copies could be scanned at the Division Office. All approvals and comments could be handled through electronic approvals, thus reducing the need to transport files. Electronic approvals would also allow a clear file history. The encroachment and driveway packets could be scanned into a hard drive system. Copies for the Division, District, and County Maintenance Office would be completely electronic and allow instant access as necessary.</p>	<p>Boone District</p>	<p>2008</p>	<p>Brandon Greer</p>	<p>(828) 265-5380</p>	<p>Energy and Environment</p>

Electronic Programmable Thermostats	<p>Problem: Energy was wasted because manual thermostats were being used to control roughly 3,000 sf of office space. Unless someone physically changed the settings every morning and evening, the climate control system was running all night and weekend as if the building was occupied.</p> <p>Solution: Install electronic thermostats that can be programmed for time of day and day of week to minimize energy use.</p> <p>Results: Energy is saved by controlling the climate in an appropriate fashion. Time is also saved because this solution requires little daily intervention from our staff.</p>	Division 10 Office	2008	Tim Boland	(704)-982-0101	Energy and Environment
Erosion Control on R-2231	<p>Problem: Due to default of contract obligations on TIP Project R-2231, the prime contractor was removed and the project sat idle for several weeks. The Division Engineer requested that maintenance, operations, and construction units mobilize personnel and equipment to perform erosion control maintenance and repair. The project was 16.2 miles in length with approximately 5 miles on 4 lane highway unpaved. Several meetings were held with division staff to determine the personnel and equipment needed to perform erosion work. Three maintenance crews from Montgomery, Richmond, and Randolph Counties along with others were mobilized to begin erosion work on the project.</p> <p>Solution: The three maintenance crews performed erosion control maintenance throughout the project. The Randolph County maintenance crew worked on the northern section which was mostly complete. The Montgomery and Richmond County crews worked on the southern part of the project which had 5 miles of unpaved roadway and various erosion problems. These crews not only repaired erosion devices, but repaired eroded cut and fill slopes, graded shoulders and ditches, and built some median bridge protection.</p>	Division 8	2008	Kevin Hedrick	(910) 582-7075	Energy and Environment
HVAC Run Time Adjustment	<p>Problem: The Materials and Tests Unit main laboratory building in Raleigh is a 33,515 square foot facility with a volume of 526,882 cubic feet that was constructed in 1963. The heating and ventilation system is essentially the same as when it was installed with no design or operational changes and only replacement of components as they have worn out. The building is a complex one with sections of the building requiring having specific temperature and humidity requirements for sample curing and testing and where the users in one section may be requiring air conditioning due to the generation of heat through the use of laboratory equipment such as ovens, burners, and electronic equipment whereas the users in another section may be requiring heating due to outside air exchange for ventilation (dust and fume removal) and from operation of large roll up doors located on the loading dock. As a result, both the heating (boiler) and air conditioning (chillers) run all day, all year, at an enormous energy cost.</p> <p>Solution: Upgrade the system controls so that the building HVAC system could be regulated up/down with adjustment of airflow to sections of the building in order that the boiler, chiller, air handler units, and other motors, do not run at full capacity all day every day but run only ten hours per day on workdays.</p>	Facilities Management /Materials and Tests Unit	2008	Mike Cottle	(919)329-4299	Energy and Environment
Salt Spreader Stands	<p>Problem: Division 10 Bituminous unit had 5 of our salt spreaders sitting on concrete barriers wall. Our operation for loading and unloading salt spreaders is to use the bridge department boom truck or use a front-end loader. An employee has to climb up the concrete barriers to get on top of the salt spreader unit. Once on top of the spreader, the employee hooks the four-legged chain. Then the employee has to climb down off of the spreaders using the concrete barrier as a stepping stool. After this operation is completed, the boom truck operator or loader operator takes control of the operation. There are two ground guides and a spotter; the spotter directs the truck operator to back up slowly. The two guides are holding onto the spreader, where it will not hit the ground or the back of the truck. As the truck is backing up, the operator slowly lowers the spreader into place. Once in place, the guides make sure that the spreader can be locked into place. Then the operator finishes lowering the spreader into the truck bed. Then employee climbs back onto the top of the spreader, and unlatches the chains from the spreader.</p> <p>Solution: Division 10 Bituminous purchased 5 Swenson leg stands at a cost of \$2,495 each from Carolina Industrial Equipment. These stands have reduced the number of needed personnel, eases the workload on the crew, eliminates overhead hazards, prevents slips, falls and pinch points and frees up personnel. These stands provide for combined labor hour savings and safety improvement.</p>	Division 10 Roadoil Department	2008	Chip Speight	(704)-982-0714	Safety Improvement

Stormwater Pollution Prevention Plan (SPPP/SPCC-IIP)	<p>Problem: The SPPP and the SPCC programs are paper and process intensive programs that require reporting and updating over time. The initial versions were hard copy documents that were soon out of date after the program was established. Reprinting and coordinating updates required significant resources and staff. In addition, programs required reporting which would have resulted in thousands of hard copy documents being sent to a central location.</p> <p>Solution: Development of an internet based management system that allowed for the over one-hundred and fifty (150) end users across the state to input, update, and receive information in an efficient process that facilitates communication and control while maintaining environmental compliance</p> <p>Results: The benefits of an integrated SPPP/SPCC Plan include: The ability to readily access regulatory information from different locations; Streamlined management and the ability to efficiently make global changes; Version control and assurance that each facility's Plans are up-to-date and in compliance; Centrally located data that can be verified by the appropriate users; Readily accessible performance measures for compliance checks; Elimination of thousands of hard copy records per year; Ability to update and assign compliance personnel from local or centralized location; and Maintain a sustainable system that can be managed with minimal resources</p>	Roadside Environmental/Hydraulics Unit, Web Service	2008	Johnie Marion	(919)-861-3770	Labor Hour Savings
Truck in a Box (TIB)	<p>Problem: It is hard to find wiring problems by yourself. It is not easy or convenient or cost effective to pull someone in to assist in the diagnostics of wiring of trucks and trailers.</p> <p>Solution: To design a box to set beside the truck so that one person can diagnose wiring problems, something that would be easily moved, easily read and easily understood while directing your attention to the cause of a problem and to help in the set up of wiring DOT truck and trailer equipment in the same manner to remove a lot of guess work.</p> <p>Results: The results have been a quicker and easier method of checking truck and trailer plugs. TIB has reduced time and labor which is equivalent to money. TIB is not expensive to build or to maintain. It has located misaligned wires in the trailer receptacle and trailer brake box, discovering that the trailer was wired backwards or not DOT specifications</p>	Division 7 Camp Burton Sub Shop	2008	Mark Brooks	(919)375-5831	Labor Hour Savings
Vibratory Plate Tamps	<p>Problem: Many of our small dump trucks tied up pulling patch rollers and not available for other operations.</p> <p>Solution: At the yearly equipment buy, I requested plate tamps for each of the patch crews. Each crew was assigned a tamp and used for most potholes.</p> <p>Results: Having 5 fulltime patch crews we used to have 5 small dump trucks tied up with patching and paving operations. Since implementing the vibratory plate tamps only 2 crews need the use of rollers and dump trucks to transport them. The full depth patch crew and the paving crew still need the larger rollers, but the trucks are also used for these operations to transport material. 3 small dumps are now available to be sent on other operations. After evaluating the plate tamps we were also able to reduce our roller and trailer compliment by 2 each.</p>	Div 10 / Union Maintenance	2008	David Gillette	(704) 283-5941	Labor Hour Savings
Cutting 3/8" and 5/16" Grade 80 Chain with Torch	<p>Problem: When cutting 3/8" and 5/16" grade 80 chain, we were having the shop to bring torch to the back of the parts department, pull out chain, measure and have technician cut when needed. Often flammable materials had to be cleared from the area before using this torch.</p> <p>Solution: After the purchase of our electric chain cutter, we save time by cutting chain ourselves. Also, it is safer than using a torch.</p> <p>Results: The results of this new process are a safer and faster way to fill chain orders.</p>	Division 10 Equipment	2008	Ricky R. Mabry	(704)-596-2131	Safety Improvement

Fatal Slip Reporting	<p>Problem: Local town, city and municipality fatal crashes not being reported to the Traffic Safety Systems Management Section. To date only those crashes that are being investigated by NCSHP are reviewed and investigated for possible safety improvements to the area in which the fatal crash occurred. The fatal crashes that occur in these towns, cities and municipalities are not being reported accurately which accounts for approximately 24% of fatal crashes that are occurring in just the Eastern Region (Divisions 1, 2 and 4). When computed statewide many fatal crashes are going unnoticed. Were they less important?</p> <p>Solution: Have local town, city and municipalities report, in the same fashion as does NC Highway Patrol, their fatal crashes to the Traffic Safety Systems Management Section for an investigation of the crash site for possible safety issues concerning the roadway. A Fatal Reporting Form has been developed to allow town, cities and municipalities to report fatal crashes that are occurring within their jurisdictions. This allows these agencies to receive the benefit of the Regional Traffic Investigation Teams to assess the area and to assist in providing solutions for safety improvements if needed.</p> <p>Results: The results will be safer roads and highways within the state of North Carolina.</p>	NC DOT/Division of Highways	2008	Debroah Leonard	(252)237.6164	Safety Improvement
Sign Attachment Study	<p>Problem: Isolated incidents of falling sign panels resulted in a statewide study of the welded studs used in attaching overhead sign. The study speculates that less than 10% of existing structures have significant stud failures.</p> <p>Solution: The study recommends the use of an additional connection. Thru bolts placed in each interior panel, similar to existing requirements for end panels, will improve the safety factor.</p> <p>Results:Standard drawings were revised to implement the current attachment practice.</p>	Congestion Management & Signing Unit Date	2008	Ron King	(919)662-4339	Safety Improvement
One Man Patcher	<p>Problem: In 2004 after a heavy snow season followed by an unusually wet spring, the roads in the county were in very poor condition with many potholes. We had 5 patch crews working 6 days a week and could not keep up with the potholes.</p> <p>Solution: We rented a patch truck made by Roscco from Interstate Equipment Co. The machine patches using tar and gravel and is self contained on a 33,000 GVW truck. This operation requires only one employee to operate, and one inmate to stop traffic if the patcher is around a curve or down a hill in a blind spot. The patcher approaches a hole, blows out loose material with compressed air then fills it with a combination of tar and No. 78 stone. On an average hole the process takes about 30 seconds to complete.</p> <p>Results: This single truck (1 TW and 1 inmate) are able to patch on average 50 to 100 (140 has been max) holes a day. This operation is able to fill more holes than all 5 patch crews combined. Each conventional patch crew consisted of 1 TSI, 2 TW, 2 inmates, 1 crewcab dump, 1 tar kettle, 1 roller, 1 roller trailer. This patch truck not only helped to get the potholes under control but also has allowed us to spend less time on response and more time on preventative maintenance</p>	Div 10 / Union Maintenance	2008	David Gillette	(704) 283-5941	Safety Improvement
Tare & Gravel Vs. Cold Patch	<p>Problem: When crews could not get asphalt from the plant they were using cold patch material to patch potholes. The cold patch material is very expensive – over double that of regular asphalt.</p> <p>Solution: To minimize the amount of cold patch material used we went back to the old method of hand patching with tar and gravel. The cold patch material is now only used if plant mix is unavailable and conditions will not allow the use of tar and gravel.</p> <p>Results: Tar and gravel is readily available on the yard and the least expensive material to use. Under proper conditions and if applied correctly the tar and gravel application provides as good a patch as any product. Utilizing this method of patching has cut our use of the more expensive cold patch material by 80 percent</p>	Div 10 / Union Maintenance	2008	David Gillette	(704) 283-5941	Safety Improvement

Beam Winch	<p>We needed some way to pull the new pipe through the existing pipe without any equipment being placed in the stream. A winch would work, but where would we put it? How would we hold it? How would we charge the batteries? We determined that three H-Piles could be used to form a beam that would span the creek and provide a stable platform for the winch. The center H-Pile was offset from the two end H-Piles to help prevent twisting of the beam during the pulling process. Placement of the Beam Winch” across the concrete wing walls of the existing structure would provide ample support.</p> <p>The Equipment department had an arrow board that had been wrecked but the engine and charging system was still operational. It was stripped down to just the frame with the stabilizers used for legs.</p> <p>The liner pipe was installed in a safe process with minimum impact to the environment and traffic flow. The Department and DOT customers also benefited from the use of the recycled materials; winch, battery charging generator, and H-Piles. By using recycled materials we were able to save the Department a total of \$7263.09.</p>	Div 7	2007	Tim Powers	(336)-375-5589	Dollar Savings
Using Latex Polymers	<p>Over the years Division 11 has been concerned about the short pavement life of Asphalt Surface Treatment (tar and chip). Due to the variation in weather conditions within different parts of the state, life expectancy of pavement can be shortened due to extremes in temperature.</p> <p>Division 11 was interested in a type of binder (liquid) that will extend the life of pavement. Polymers (liquid) have greater elasticity which allow the pavement s to expand and contract without cracking, thus, extending the life of the pavement regardless of weather conditions.</p> <p>After four years of using latex polymers, the life of the pavement has been extended 48%. Division 11 also found that the need for patching has decreased by 50%. On high traffic roads the number of claims for damage to vehicles from loose stone has been reduced by over 50% due to the retention that the polymer liquid binder provides.</p>	Div 11	2007	Matthew Oliverson	(336) 903-9235	Dollar Savings
Drought Assistance to the State's Livestock Farmers	<p>Problem: The severe drought of 2007 caused a critical shortage of forage hay for North Carolina's livestock farmers. Due to the drought, hay production in the State was 37% less than the previous year. The preliminary estimate was a shortage of 800,000 large bales of hay; later that estimate was increased to 1.8 million bales. The NCDA&CS began to seek any and all available sources of forages for livestock. One potential source was the hay mulch used annually by the NCDOT for its wildflower program.</p> <p>Solution: The NCDA&CS contacted the NCDOT Roadside Environmental Unit requesting that the DOT divert our contracted hay mulch to the State's livestock farmers, due to the extreme shortage of hay for feeding livestock. The Roadside Environmental Unit considers the request and decides to respond positively to the NCDA&CS request, in the best interest of the State's economy. Correspondence is prepared and sent to the NCDA&CS to confirm the affirmative response and to provide a list of the suppliers.</p>	Roadside Environmental Unit	2007	Don C. Smith	(919)-733-2920	Customer Service
Reclamation of Calcium Chloride	<p>Problem: During a snow and ice event we load our spreaders saddle tanks with 100 gallons of calcium chloride in order to pre-wet salt before application. The problem occurs when a storm event don't develop in the manner in which it was forecasted and we do not use the material we loaded onto the trucks.</p> <p>Traditionally our department has been able to unload unused salt back into its storage bins, but there is no way to unload hundreds of gallons of calcium chloride back into its original 5000 gallon storage tank directly from the trucks saddle tanks.</p> <p>Solution: Our solution to returning this unused material back to its original tank is to create an intermediate tank in which to drain the saddle tanks into. After the intermediate holding tank has been filled, the material can then be pumped mechanically back into its original 5000 gallons storage tank located at the salt brine plant.</p> <p>Results: At 0.63 cents per gallon there isn't much cost savings in reclaiming this material, however the benefits lie in not storing this corrosive material in our equipment or discharging this chemical all at once into the environment.</p>	Newell Maintenance	2007	John Edmonds	(704) 596-5782	Cycle Time Reduction

Ineffective Use of the Office SAP Document Scanner	<p>Problem: When scanning documents we had been unaware that we were able to change the profile on the scanner from the default setting to a color setting. Using default for all documents was causing unreadable scans to end user (Raleigh Commercial Accounts). Due to this, it was taking us away from our desk to make additional copies of documents and having to make unnecessary calls to the vendor to make a request that they modify their invoices to suit our needs.</p> <p>Solution: When the appropriate profile is selected, it allows us (accounts payable clerks) to make a true copy of the document.</p> <p>Results: Saves time of going through trail and error to produce a copy that end users can read.</p>	NCDOT, Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Cycle Time Reduction
Secondary Construction Right of way	<p>Problem: In the past, we would survey a road, draw plans, and send to right of way unit for R/W acquisition. After performing all of this work, property owners at times express their wishes to keep the road unpaved. If property owners do not dedicate right of way, the Department will not pave the road. In an effort to keep the road unpaved, the property owners advise that they are not going to sign right of way.</p> <p>Solution: See attached letter set out to property owners prior to surveying and drawing road plans. Property owners given opportunity to comment and express their wishes prior to commitment of department resources.</p> <p>Results: Less time spent on roads where right of way will not be granted and therefore road will not be paved.</p>	Division 10, District 3	2007	Scott Cole	(704)289-1397	Cycle Time Reduction
Mobile Column Lifts	<p>Problem: Much of the work performed in the Albemarle Shop is related to preventative maintenance. This requires vehicles to be raised for all service and brake inspections. This work was being performed with floor jacks and jack stands. Also, technicians had to work while lying on creepers on the floor.</p> <p>Solution: Due to the completion of a new facility at the Albemarle Shop we now have enough ceiling height to install a lift system. The type chosen was a mobile column lift. This allows lifts to be utilized in any of the seven (7) open bays.</p> <p>Results: Faster and safe lifting of equipment. We are now able to work standing under trucks. No longer need to lie on creepers under equipment. Much safer and more productive.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Labor Hour Savings
Aluminum Tailgates on Trash Trucks	<p>Problem: Newell Maintenance has two flat bed trucks equipped to pick up and dispose of trash from the highway. These trucks were originally built with wood lift tailgates. They were heavy and hard to lift and store while dumping the load. Also, the wood was easily damaged if gates were dropped to the ground.</p> <p>Solution: The Charlotte Shop designed, constructed, and installed new aluminum tailgates for the back of these trash trucks. The gates and holders have provided the employees easy access to the bed of the truck without having to strain with heavy wooden gates. Cables were attached between the gates and the truck bed to allow the gates to hang on the side of the body while the load is dumped. This prevents loss and damage to the gates. Sheeting for these gates was cut from used aluminum sign materials.</p> <p>Results: This has reduced the chance for injuries, i.e., back strains and hand injuries.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement

Flip Sign Safety Latches	<p>Problem: During events at Lowe’s Motor Speedway, numerous ground mounted signs need to be changed to indicate which lanes are open and which lanes are closed. This is achieved with the use of flip signs, A flip sign is a sign that is cut in the middle and a hinge is installed allowing the sign face to be opened and closed. Personnel had to exit the vehicle and manually move a lever to flip a sign either up or down to inform the traveling public of a traffic control change during a race event. This resulted in personnel either walking around or standing atop one of the sign trucks within traffic control that was being changed or implemented. There are many distractions to drivers within race traffic including advertising, alcohol, scantily clad people, roadside sales, roadside parking, pedestrians weaving in and out of traffic, tour busses, the traffic control itself (counterflow and work barrels), etc.</p> <p>Solution: Design a flip sign latch that was spring loaded so that personnel could quickly deploy or store traffic control information signs with a pole type tool that would activate the mechanism from inside the safety of s sign truck and keep traffic control convoy moving steadily.</p> <p>Results: Safety is improved by allowing the sign erector to remain inside the vehicle while flipping signs. Previously NCDOT personnel would have to exit the vehicle and physically change the sign from the inbound to outbound pattern.</p>	Division 10 Traffic Services	2007	Donald Griffith	(704)-982-1998	Safety Improvement
Lube Bay Lighting	<p>Problem: When vehicles were raised on the lifts for service, the lights were blocked causing poor lighting while under the unit.</p> <p>Solution: The Charlotte Shop designed and constructed a way to add light under a piece of equipment while changing the oil. This was achieved by adding lights on the walls about four feet from the floor.</p> <p>Results: This made it safer for employees to perform their duties with less risk of injury and eyestrain.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Propane Bottle Lift Sling and Storage	<p>Problem: Equipment in the shop for repairs sometimes has propane bottles attached. If the bottles are full they sometimes will leak propane through the relief valve due to expansion from being in the heated shop area. Also welding maybe performed on/or in the area of the tanks. For safety reasons propane bottles must be removed from equipment in for repairs. The large bottles are too heavy to be handled by hand. The cap ring at the top of the bottle can not be used for lifting.</p> <p>Solution: The Charlotte Shop designed and constructed a new way to remove and store large propane cylinders while equipment is being services. Bottles are removed/installed with the overhead crane and stored outside in holders away from fire sources. The lifting strap is approved for lifting propane bottles.</p> <p>Results: This reduces the risk of fire inside the shop and helps prevent back injuries.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Shop Lift Attachment Holders	<p>Problem: The Charlotte Shop has several lifts designed to raise vehicles for service. The lifts use attachments to adapt the lift to different trucks and were always lying around on the floor causing trip and lifting hazards.</p> <p>Solution: The Charlotte Shop designed, constructed, and installed holders for the lift attachments. The holders provide employees easy access to the attachments without having to bend all the way to the floor or under a bench.</p> <p>Results: This has reduced the chance for injuries including back strain and trip hazards.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Small Tire Changer	<p>Problem: The Charlotte Tire Shop was having problems with tire repairs on small tires, i.e., the type on lawn mowers and other small equipment.</p> <p>Solution: The Charlotte Shop designed and constructed a way to replace and/or repair small tires in a safer manner. This was achieved by attaching the small tire changer to an old rim, which is securely clamped in the larger tire-changing machine.</p> <p>Results: This puts the small changer in a better working area and puts less strain on employee’s back. While working up off the floor, there is less chance of slipping and less risk of injury.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement

Tailgate Removal Hammer	<p>Problem: The Division Safety Committee developed the Tailgate Removal Procedures (submitted for an Award) to aid in the removal of tailgates from the back of Dump Trucks. Upon the removal of the tailgate, the Dump Trucks would be equipped with spreaders so the employees could apply salt, sand, and brine to the roadways during inclement weather. Injuries were occurring during the removal of the tailgates such as finger, hand incidents and one incident including a blow to the head of one employee.</p> <p>Solution: The removal procedures were developed. In these procedures, a pin-removal and a Plastic Dead Blow Hammer were made to aid in the removal process. These hammers (fiberglass) were distributed to each location that was removing tailgates to place spreaders in the back of Dump Trucks.</p> <p>Results: The hammers assisted in removing these tailgates off the back of Dump Trucks to place the spreaders on for inclement weather. Consequently, the employees would not need to use their hands to remove pins from the tailgate</p>	Div 10	2007	Darla H. Burris	(704) 982-0101	Safety Improvement
Environment Unit Data Warehouse	<p>Problem: The NEU tracked project information using an assortment of reports, databases and spreadsheets. Information tracked individual staff oftentimes was needed by the whole unit. This created a crisis if the staff member was out of the office and others could not retrieve the information. Additionally, if a request came in from other units, it presented a challenge to find out who had the answer to a particular problem.</p> <p>Solution: NEU surveyed its existing resources for tracking project information. We then solicited input from our customers to evaluate needs and existing data gaps. Finally, NEU partnered with NCDOT IT Web Services Team to develop a web accessible database that would enable better data storage and information sharing.</p>	Preconstruction-PDEA	2007	James Merrick	(919)707-2207	Communications
Tractor Mounted Brush Sprayer	<p>Problem: Our dormant stem spray program is performed in the months of January, February and March. During this time the highway shoulders are generally wet, creating a problem for our spray trucks. Woody brush and tree limbs are gradually overtaking the shoulders, creating a safety problem and making mowing the shoulders difficult. We needed a sprayer that would get better traction and still reach the spray target.</p> <p>Solution: We already had a 4-wheel drive tractor and a tractor-mounted sprayer with a front mounted boom that was used for curb and gutter spraying, but we needed a way to elevate the spray head to reach the target area. TS3 Vann Sparrow and TS2 Greg Rayburn had the idea to modify the curb and gutter sprayer with an extension, a lift device and an actuator (device to tilt the spray head). They also used spray nozzles used in another operation. This helped to hold down costs. The nozzles produce a wide spray pattern. This modified sprayer has made it possible to access areas that previously were very difficult to spray.</p>	Operations - Division 2	2007	John Wells	(252) 830-3146.	Customer Service
House Move Calculations	<p>Problem: Most all house move reviews require repetitive type calculations involving different sets of numbers each time. The task of conducting these calculations takes time and increases the risk of miscalculations through human error.</p> <p>Solution: A spreadsheet was developed to calculate house move data automatically.</p>	Operations Division 8	2007	Reuben Blakley	(336) 629-1423.	Customer Service
Route Audit Survey	<p>Problem: There was a need to update and make corrections to the Pavement Condition Survey report. To do this, it was first necessary to make corrections to the Universal GIS report.</p> <p>Solution: We began by taking a map, a copy of the maintenance road list both alphabetical and numerical and a notebook for notes into the field. Following the routes on the map, data that is posted in the field at each intersection was compared to data on the map and both maintenance road lists. When data matched up, we proceeded to the next intersection. When data did not match or was missing, a note was made of the needed corrections. After collecting all differences on the map, research was conducted to find the correct data. This research included going through maintenance road files, old GIS maps, GIS road files, the county GIS iMap, county court records and talking with people responsible for those files and reports. After finding the correct data, the unit responsible for reporting the data was contacted and given the correct data to update their files.</p>	Operations – Pavement Management Unit	2007	Steven G. Hinnant	(919) 250-4094.	Customer Service
Program Development Document Management System (PDDMS) IXOS Tool	<p>Problem: The Program Development Branch receives numerous printed project documents from various NCDOT units. Substantial time and personnel are expended to manually file and retrieve so many documents for BOT members, state auditors, and FHWA officials as needed.</p> <p>Solution: A complete Document Management System was designed within SAP for all Program Development needs using the IXOS system that is connected to WBS. At any time, SAP users can go to the TIP Project and find pertinent documents that have been scanned to the system. This system helps to speed up retrieval for any document related to a TIP project, thus freeing up personnel for other activities.</p>	Financial Management - Program Development Branch	2007	Majed Al-Ghandour	(919) 733-2039.	Customer Service

Driving Records Online	<p>Problem: DMV had a slow and outdated process of providing driving records to the public. Time sensitive material could take up to eight to ten days to be received.</p> <p>Solution: To use the existing mainframe database and applications to develop a new application by which customers could electronically request, and in some cases receive, save, and print Non-Certified Driving Records at their own personal computer. The new application reduces the processing time for Certified Driving Records by as much as 50 percent. The new process does not eliminate the previous system but offers the public another option which results in improved service.</p>	Division of Motor Vehicles	2007	Laura Main	(919) 861-3301.	Customer Service
Rainfall Estimate Website	<p>Problem: There is a National Pollutant Discharge Elimination System permit requirement to check erosion control devices after a one-half inch or greater rainfall event. Traveling to road construction sites to check conditions after every rainfall event is very time-consuming. There was a need to determine when one-half inch of rainfall has occurred at a highway construction site without having to visit the site.</p> <p>Solution: The Highway Stormwater Program staff worked with the NC Climatic Office to develop a rainfall estimate website that allows users to estimate the rainfall at any road construction site in North Carolina and send an email alert to the user when one-half inch of rainfall has occurred.</p>	Operations - Roadside Environmental	2007	Bob Holman	(919) 861-3779.	Cycle Time Reduction
Pre-Augering H-Piles in Weathered Rock for Interior Bents	<p>Problem: Several decades ago bridges were designed to resist scour. In recent years, to improve lateral stability of interior bents that will resist the destabilizing effects of scour, NCDOT engineers have shifted from driven pile foundations and spread footings to drilled pier foundations resting within rock sockets. These drilled pier foundations are significantly more costly than previously used foundations. To save money and better utilize resources, we developed a new installation technique for piles to be installed within a rock socket.</p> <p>Solution: The Geotechnical Engineering Unit uses one of their CME 55 drill rigs with 12 inch augers to pre-auger the hole into weathered rock to a depth sufficient for lateral stability. Bridge Maintenance then drives the H-pile with their pile driving hammer into the pre-augered hole.</p>	DOH- Div 9, Div 12, BMU, & GEU	2007	John Fargher	(704) 455-8902.	Dollar Savings
Inactive Project Report	<p>Problem: Funding issues existed which needed to be addressed. There were active projects that needed additional funds for activity completion. These additional funds are limited within the constraints of the Department's annual highway budget.</p> <p>Solution: To find available funds to be better used on active projects or future priority projects created a need for an inactive project report to show those projects which have had no activity/expenditures within a specified (24 months) range.</p>	Financial Management- Project Management	2007	Majed Al-Ghandour	(919) 733-2039.	Dollar Savings
Installation of Four Test Piles & PDA on Ocracoke Island	<p>Problem: As a result of bids being received at 675% above the Engineer's estimate and an extremely compressed schedule/deadline it was evident that the Division could not contract the installation of four test piles and the associated PDA testing required. Due to the restrictive time schedule and the necessity of the data provided by the PDA testing, an out of the box solution had to be formulated and quickly implemented.</p> <p>Solution: The Division consulted with the Geotechnical Unit and decided to perform this work with Division forces. A fully operated rental agreement was used for the needed 80-ton track crane. Division personnel acquired the needed concrete piles and steel pipe tips. Bridge Maintenance personnel were used for the delivery of all materials and the labor necessary to drive the 4 PDAs. The Geotechnical Unit provided expert advice and a contract technician to perform the PDA testing.</p>	Operations- Division 1	2007	Sterling Bake	(252) 482-7977	Dollar Savings
Welcome Center Waterless Urinals	<p>Problem: Because of the severe drought in North Carolina, Governor Easley asked all state agencies to reduce water usage at all state facilities. The Northampton County Welcome Center uses 5.45 million gallons of water per year. It has 10 urinals, 44 commodes and 24 sinks. This facility provides service for over 2.2 million people a year.</p> <p>Solution: We installed 10 water free urinals at the Welcome Center at a saving of 980,460 gallons of water per year.</p>	Operations- Division 4	2007	Steve Hamill	(252) 237-6164	Dollar Savings
Eliminate Temporary Traffic Signals	<p>Problem: A bridge replacement project on Meadow Road in Eden called for installing a temporary traffic signal during a temporary detour.</p> <p>Solution: After reviewing the plans and the actual conditions in the field, it was found that the traffic could be maintained by shifting the existing traffic circle.</p>	Operations- Division 7	2007	Randy McKinney	(336) 634-5635.	Dollar Savings

Tar & Gravel Vs. Cold Patch	<p>Problem: When crews could not get asphalt from the plant they were using cold patch material to patch potholes. The cold patch material is very expensive, over double that of regular asphalt.</p> <p>Solution: To minimize the amount of cold patch material used we went back to the old method of hand patching with tar and gravel. The cold patch material is now only used if plant mix is unavailable and conditions will not allow the use of tar and gravel.</p>	Operations- Division 10	2007	David Gillette	(704) 283-5941	Dollar Savings
New Municipal Mowing Agreements	<p>Problem: Our mowing agreements were outdated and vague, resulting in NCDOT being invoiced for excessive amounts and at varying times throughout the year. Invoices were not submitted for as much as three years. This adversely affected maintenance budgets.</p> <p>Solution: We designed new agreements that brought our mowing reimbursements more in line with what our contractors are paid in those counties and limits invoicing to the number of cycles they mow. The new agreements specify invoice time frames, include project special provisions, roads to be mowed, along with mileage, and sample invoices. These agreements require the same safety, traffic control, and performance standards that contractors and state forces must comply with.</p>	Operations- Division 11	2007	Wayne Atkins	(336) 903-9122.	Dollar Savings
Contaminated Waste Minimization	<p>Problem: US Hwy 17 Bypass in Beaufort County crosses an unregulated abandoned landfill and an actively monitored US EPA Superfund Site. Material in the landfill posed an environmental risk, a constructability risk for proposed 30- inch concrete piles to support the Pamlico River Bridge. The Superfund site contained documented herbicides and pesticides in both soil and ground water, originating from a former agricultural supply facility at the site, which posed health risks to site workers, nearby residents and business patrons. The amount of material recommended for removal and disposal was estimated at 57,000 cubic yards at an estimated excavation and disposal cost of \$4 million.</p> <p>Solution: A comprehensive Contaminated Waste Minimization Plan was successfully developed by the Geotechnical Engineering Unit, in coordination with state and federal regulators and the Design Build contractor.</p>	Preconstruction- Geotechnical	2007	Cyrus Parker	(919) 250-4088.	Dollar Savings
Mulching ROW	<p>Problem: Excess growth on DOT right of way needed to be removed in an environmentally friendly way.</p> <p>Solution: Contacted a local tree mulching company for removal of trees and vegetation by mulching on site.</p>	Operations- Division 3	2007	L.E. Reynolds	(910) 592-1434	Energy and Environment
Electronic Distribution of Memorandums	<p>Problem: The Congestion Management Section observed the following items related to distribution of our memorandums (1) traditional distribution of our memorandums was consuming a lot of office paper and energy, (2) memorandums that were being sent out by mail were being distributed through our courier service, which was consuming gas at increasing prices, and (3) units were receiving multiple copies of our memorandum thus wasting paper and energy.</p> <p>Solution: The Access Review, MSTA, and Plan Review squads implemented multiple pilot projects throughout 2006 to determine the feasibility of electronic distribution of our memorandums. Since we were receiving positive feedback from our recipients, we implemented full scale electronic distribution.</p>	Preconstruction- Congestion Management	2007	Erin Hardee	(919) 773-2884.	Labor Hour Savings
Loading TIP Data into SAP Tool	<p>Problem: Extensive time and personnel were expended to manually transfer the latest TIP Data into the SAP//PMII system. It was slow and tedious, with a significant financial and scheduling risk resulting from input delays or data inaccuracies. It took approximate 2560 hours to manually enter TIP data.</p> <p>Solution: We automated the annual TIP Data entry, improving the timeliness and accuracy of the data transfer, decreasing the financial and scheduling risk and freeing up personnel for other assignments</p>	Financial Management- Project Development	2007	Majed Al-Ghandour	(919) 733- 2039	Labor Hour Savings
Guardrail Location Mapping	<p>Problem: While there are lists of secondary road numbers, there is no indication of exactly where the actual sections of guardrails were located. Many man-hours have been spent searching entire secondary routes in an effort to find the exact locations of guardrail sections in order to maintain uncontrolled vegetation by spraying operations and vegetation management.</p> <p>Solution: The sections of guardrail were documented on existing maps and then transferred onto new county maps. Those sections were highlighted according to route type.</p>	Operations Division 5	2007	Mark Conner	(919) 733-7141	Labor Hour Savings

Salt Spreader Stands	<p>Problem: Division 10 Bituminous unit had 5 of our salt spreaders sitting on concrete barriers wall. An employee has to climb up the concrete barriers to get on top of the salt spreader unit. Once on top of the spreader, the employee hooks the four-legged chain. Then the employee has to climb down off of the spreaders using the concrete barrier as a stepping stool. After this operation is completed, the boom truck operator or loader operator takes control of the operation. There are two ground guides and a spotter; the spotter directs the truck operator.</p> <p>Solution: Division 10 Bituminous purchased 5 Swenson leg stands. These stands have reduced the number of needed personnel, eased the workload on the crew, eliminated overhead hazards, prevented slips, falls and pinch points and freed up personnel.</p>	Operations Division 10	2007	Chip Speight	(704)782-0714	Labor Hour Savings
Vibratory Plate Tamps	<p>Problem: Many of our small dump trucks have been tied up pulling patch rollers and not available for other operations.</p> <p>Solution: At the yearly equipment buy, I requested plate tamps for each of the patch crews. Each crew was assigned a tamp which is used for most potholes. This would allow unutilized trucks not just sitting on jobs which also improves the unit cost for patching operations</p>	Operations – Division 10	2007	David Gillette	(704) 283-5941.	Labor Hour Savings
Erosion Control Quantity Mapper	<p>Problem: There was an increased workload on Soil and Water Engineering Section staff from TIP letting schedule and other POC projects.</p> <p>Solution: Reduce the time required to compile and estimate erosion control quantities to allow more time for erosion control plan production. By nature of NCDOT erosion control standards and Microstation/Geopak quantity computation methods, the EC quantities are scrambled throughout the EC design spreadsheets and are not organized consistent to the master EC quantity spreadsheet. The EC Quantity Mapper serves as a link between EC design spreadsheets and the master EC quantity spreadsheet, and allows for Soil and Water Engineering staff to copy and paste quantity values from the EC design sheets to the Mapper. Then, the Mapper arranges the quantities for copying and pasting into the master EC quantity spreadsheet.</p>	Operations - Roadside Environmental Unit	2007	Barney Blackburn	(919)-733-2920	Labor Hour Savings
Stormwater Pollution Prevention Plan and Spill Prevention Control	<p>Problem: The SPPP and the SPCC programs are paper and process intensive programs that require reporting and updating over time. The initial versions were hard copy documents that were soon out of date after the program was established. Reprinting and coordinating updates required significant resources and staff. In addition, programs required reporting which would have resulted in thousands of hard copy documents being sent to a central location.</p> <p>Solution: Development of an internet based management system that allowed for the over one-hundred and fifty (150) end users across the state to input, update, and receive information in an efficient process that facilitates communication and control while maintaining environmental compliance.</p>	Operations Roadside Environmental	2007	Johnie Marion	(919) 861-3770.	Labor Hour Savings
Safety and Traffic Operations Meetings	<p>Problem: The North Carolina Department of Transportation Safety and Mobility Policy requires that work zones be monitored during construction to enhance safety and reduce congestion and delays.</p> <p>Solution: The Safety & Traffic Operation Meetings provide an opportunity for key stakeholders to discuss upcoming traffic shift, enforcement, speed limit, incidents, public information, and construction updates. Regular agenda items included upcoming traffic shift, enforcement, speed limit, incidents, public information, and construction updates.</p>	Division of Highways	2007	Jennifer Portanova	(919) 250-4159	Safety Improvement
New Construction of Oil/Lube Storage Building	<p>Problem: The existing lube storage building was too small to store the required lubes in a safe manner. There was very little mobility or access and there was a risk of injury any time stock movement was required. In addition, spill containment was a challenge.</p> <p>Solution: Employees at the Mt. Pleasant Shop in Division 10 built a larger building for the purpose of storing required lubricants.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
New Shop Entrance	<p>Problem: After the Division Shop was constructed, the shop foreman's office, which is a work bay in the middle of the shop, was added. There was no outside entrance close to this office. Outside department employee traffic was forced to come through the main work area of the shop.</p> <p>Solution: The Charlotte Shop designed, constructed and installed a new shop entrance door. This door provides easy access to the shop foreman's office. Employees do not need to walk through the main work area of the shop.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement

Shop Lift Attachment Holders	<p>Problem: The Charlotte Shop has several lifts designed to raise vehicles for service. The lifts use attachments to adapt the lift to different trucks and were always lying around on the floor causing tripping and lifting hazards.</p> <p>Solution: The Charlotte Shop designed, constructed and installed holders for the lift attachments. The holders provide employees easy access to the attachments without having to bend all the way to the floor, or reaching under a bench.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Storage Building	<p>Problem: The Charlotte Shop has some tools that are seasonal and only used a couple of times per year. These tools were being stored in the rear work bay, making that bay unavailable for other use.</p> <p>Solution: Employees at the Charlotte Shop designed and constructed a new place to store these seasonal tools when not in use. A used Leonard Mobile Unit became available when the old Monroe Shop was decommissioned. This unit was installed outside the main shop area and is equipped to store and organize the seasonal tools and other miscellaneous spare parts.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Welder Storage	<p>Problem: The Charlotte Shop has a portable welder that is moved around the outside of the shop by forklift, but mostly stays outside the welding bay. Storing the unit outside the welding bay sometimes blocks the door.</p> <p>Solution: Employees at the Charlotte Shop designed and installed a new pad to store the portable welder when not in use. This provides easy access to the welder away from everyday shop traffic.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Plate Tamp Lift	<p>Problem: The Monroe Maintenance shop of Division 10 uses plate tamps for asphalt operations. These tamps weigh approximately 200 pounds. The tamps would have to be loaded onto the patch trucks by hand, and unloaded by hand when used. Operators complained of back stress due to lifting these heavy tamps.</p> <p>Solution: A truck mount hydraulic lift was designed and installed by the Monroe Shop. One prototype was put into service and tested. All patch crews have since requested these hydraulic lifts and they have been installed on all of the patch trucks in Union County. These lifts have been approved by the Division 10 Safety personnel.</p>	Operations Division 10	2007	Charles Hatley	(704) 283-6242	Safety Improvement
Overhead Sign Measurements	<p>Problem: To install the current lane closure signs, several departments and numerous employees had to be involved. The departments involved were: 1) Division Traffic Services signal and signs units; 2) Division Incident Management; 3) Local Police Department; 4) Highway Patrol. All total, 12 to 17 people were involved in the process. Division 10 has been researching ways to install signs on the interstate without having to have someone physically go up in a bucket truck to measure the sign to be installed.</p> <p>Solution: Park a vehicle on the shoulder of the road between employees and the oncoming traffic so that working personnel can extend a grade rod up to the sign structure. Another person can take a picture of the overhead sign along with the grade rod. Total time to accomplish this is less than five minutes. There has also been a reduction of employees involved down to 2 or 3.</p>	Operations Division 10	2007	Tim Kirk	(704) 342-6812.	Safety Improvement
Tailgate Removal Procedures	<p>Problem: In the past, removing tailgates from trucks resulted in injuries such as pinched or scraped hands and fingers, trauma to the head, and bruised or crushed toes and feet.</p> <p>Solution: Employees in Division 10 devised a safer procedure for removing tailgates. It involves the use of hoists, lift slings and D-rings to remove tailgates. The recommended method is as follows:</p> <ol style="list-style-type: none"> 1. Attach a lift sling to the tailgate; hook the center ring of lift sling to boom pole then lift boom pole until lift sling in taut. 2. Remove pins from the tailgate. Use a fiberglass hammer and pin-removal hammer to remove pin from the tailgate. 3. Transport the detached tailgate and place in the storage rack. <p>The Specification Committee approved that all new dump trucks will be equipped with D-rings to aid in tailgate removal.</p>	Operations Division 10	2007	Darla Burriss	(704) 982-0101.	Safety Improvement
Snow Plow Jack	<p>Problem: In the past when attaching and removing plows from the truck, employees were required to lift and strain with pry bars when performing this operation. Many employees suffered pinched fingers and the potential for back injuries was very high.</p> <p>Solution: Employees at the McDowell County Maintenance shop decided that the solution was to attach jacks to the side of the plow to adjust the plow to the correct height to attach and detach it.</p>	Operations Division 13	2007	Donnie Dockery	(828) 652-4024	Safety Improvement

<p>Notice Storage and Theft Unit Automation Project</p>	<p>The Notice, Storage and Theft Unit is responsible for receiving unclaimed vehicle reports filed by businesses where vehicles are garaged, repaired, parked or stored for the public and the vehicles have been unclaimed for 10 days. In 2006 this unit received and processed 49,716 unclaimed vehicle reports and 38,027 notice of intent to sell vehicle reports. Due to the manual labor in processing, there was a 4-week backlog in processing reports which created a financial impact on the owners and lien holders who had to pay storage-related fees each day the vehicle remained unclaimed.</p> <p>A detailed feasibility study was completed in which the DOT Information Technology Unit recommended that the current systems be incorporated with the Stars Vehicle Registration System. This allowed automation of the notification letters with minimal data entry from unit employees. At a minimal cost IT and team members from the NST Unit implemented the software solution.</p> <p>The software solution resolved the backlog, allowed owners and lien holders to save money by being notified sooner of the storage of their vehicle and helped reduce errors that resulted in tort claims. The new system provides notification letters with accurate owner, lien holder and address information.</p>	<p>DMV NST</p>	<p>2006</p>	<p>Joseph Gardner</p>	<p>(919)861-3137</p>	<p>Customer Service</p>
<p>Completing Highway Safety Improvement Program Investigations</p>	<p>Problem: The Traffic Safety Systems Management Section identified 3,456 potentially hazardous locations statewide at the beginning of their two-year HSIP cycle in April 2005. With limited manpower, Traffic Operations and Investigations Section is charged with completing investigations, making recommendations, and developing improvement projects for as many of these locations as possible during the two-year cycle period.</p> <p>Solution: A full-time temporary engineer with almost 40 years of directly related traffic engineering and highway safety experience was hired to focus entirely on the task of completing HSIP investigations and developing treatments/countermeasure projects.</p>	<p>Preconstruction - Traffic Engineering</p>	<p>2006</p>	<p>P.H. Daughtry</p>	<p>(252) 296-3522</p>	<p>Safety Improvement</p>
<p>Innovative Centerline Rumble Strips on US 421 in Chatham County</p>	<p>Problem: A severe pattern of vehicles crossing the centerline developed on a two-lane section of US 421 from approximately SR 2119 to SR 1010 in Chatham County. These types of accidents resulted in several high profile fatal and severe injury crashes. With traffic volumes increasing and work beginning on the US 421 widening project, immediate action was required to attempt to eliminate the head-on type crashes along US 421 in Chatham County.</p> <p>Solution: A multi-unit team consisting of Division 8 staff, Sandhills Regional Traffic Engineering, Traffic Safety Systems, and Work Zone Traffic Control, was charged with developing and rapidly implementing an effective corrective countermeasure. The team developed and implemented the split centerline rumble strip configuration treatment.</p>	<p>Preconstruction - Traffic & Operations - Division</p>	<p>2006</p>	<p>Renee Roach</p>	<p>(910) 437-2614</p>	<p>Safety Improvement</p>
<p>Redesign of Survey Equipment Box</p>	<p>Problem: A survey equipment box on the work vehicle is used in both transporting engineering equipment and storing supplies while simultaneously providing quick access. The standard plywood equipment box and Lexan shield installed in the rear cargo area prevent safe operation of the vehicle. The height and position of the box combined with the shield's construction significantly reduces visibility and impairs the operator's ability to safely back-up the vehicle and monitor rear-approaching traffic.</p> <p>Solution: A newly designed survey equipment box was built and installed. The new box increased rear visibility to the original equipment manufacturer's specifications. The new box is constructed from 16-gauge mild steel sheeting providing improved containment of the equipment.</p>	<p>Preconstruction - Highway Design</p>	<p>2006</p>	<p>Charles Brown</p>	<p>(919) 250-4109</p>	<p>Safety Improvement</p>
<p>Actuated Signal Warning Flasher at "Dowdle Mountain</p>	<p>Problem: The Division Traffic Engineering Team is Division 14 was assigned to install a traffic control signal on a high-speed four-lane highway. The problem was that some traffic, traveling above the 55 mph speed limit, would be in a different dilemma zone due to traveling at a speed outside the design parameter. The dilemma zone is the area in advance of a traffic signal where approaching traffic is unsure whether to try to stop or to proceed through the intersection. The team wanted to communicate to the driver a warning, at the appropriate point, that the signal is changing to red and that the driver needed to slow down and stop.</p> <p>Solution: The team decided on a Traffic Signal Ahead warning sign with flashing warning beacons that were connected to the signal and only flashed when the signal indication was amber or red.</p>	<p>Operations - Division 14</p>	<p>2006</p>	<p>Reuben Moore</p>	<p>(828) 586-2141</p>	<p>Safety Improvement</p>

Equipment Handling Stands	<p>Problem: The Bituminous Unit in Division 11 have had several safety issues with their old equipment hangers, such as, hazardous climbing, working under suspended loads, and pinch points. The equipment was loaded and unloaded with chain hoists and loaders. This has led to personal injuries and mechanical failure</p> <p>Solution: The Bituminous Operations team recommends a new product that will improve safety. This product is the Stands Alone Equipment Handling Stands which needs no chains or hangers to function. The mainframe, stringers, supports and legs are fabricated using structural steel tubing. The equipment stand has a manually operated safety lock and latch with a full width roller and bumper bar. All that is required is to back under the stand with bed raised, then lower the bed; the equipment actually loads itself.</p>	Operations - Division 11	2006	Matthew Oliverson	(336) 903-9235	Safety Improvement
Safety Handrails for Sign Erector Trucks	<p>Problem: Division 10 inspects all new equipment prior to utilization for proper safety devices. It was determined that the sign erector truck did not provide for the proper mounting and dismounting at the rear of the vehicle. Employees mounted and dismounted their vehicles using unstable or unsafe means of third point contact.</p> <p>Solution: The installation of additional grab handles to the rear cargo area of the sign truck allows Division 10 Traffic Services to meet Standard Operation Procedures, as well as nationwide safety standards set for mounting and dismounting of equipment.</p>	Operations - Division 10	2006	Donald Griffith	(704) 982-1998	Safety Improvement
Sign Board Safety Mirror	<p>Problem: The Incident Management Assistance Program (IMAP) drivers in Divisions 7 and 9 were having trouble verifying that the arrow board was up and functioning properly without getting out of the truck to visually inspect the board.</p> <p>Solution: In order to lower the risk of drivers being struck by passing motorists, a sign board safety mirror was placed on the truck to view the arrow board from inside the cab of the truck.</p>	Operations - Divisions 7/9	2006	Sam Whittington	(336) 315-7080	Safety Improvement
Brantley Vise	<p>Problem: The problem was to eliminate the risk of equipment damage and/or personal injury from routine handling of the 50-pound weights used to secure the volumeter during density tests for embankments.</p> <p>Solution: An employee in Division 4, Resident Engineer's Office - Wilson, designed and fabricated a portable, lightweight volumeter/molding securing vise, weighing only 11 pounds. This device was named the "Brantley Vise. This devise has a simple design, is relatively inexpensive, and is easy to fabricate.</p>	Operations - Division 4	2006	Dennis Brantley	(252) 237-6164	Safety Improvement
Robotic Total Station Surveying Equipment	<p>Problem: The safety procedures adopted by the Signals & Geometrics Section of the ITS & Signals Unit require a spotter be present with the rodman to ensure the rodman's safety when performing stadia surveys of existing intersections for signalization at high speed locations. The Section will not be able to obtain new positions for an increasing workload associated with its responsibility to provide safe, efficient designs for traffic signals along the state highway system. A team was formed to investigate a means to more effectively utilize manpower for stadia surveys.</p> <p>Solution: Robotic total station survey (RTSS) equipment is the most effective & economical means to utilize manpower for stadia surveys. RTSS equipment allowed fewer employees on a survey team and it enabled employees to develop traffic signal plans utilizing less manpower while maintaining required survey stadia accuracy without decreasing safety for employees. The NCDOT Locations & Surveys Unit ensured that the equipment purchased would meet the needs of the Section and be compatible with equipment used by other Units within NCDOT.</p>	Preconstruction - Traffic Engineering	2006	Richard Mullinax	(919) 733-5569	Labor Hour Savings
Development of a Simplified Method for Predicting Dead Load Deflections of Steel Plate Girders	<p>Problem: Bridges are being constructed with longer spans, higher skews, and/or in stages to minimize traffic interruptions or environmental impacts. Over the last few years, matching final deck elevations to the plan elevations has become a problem since the predicted deflection of steel plate girders does not match the actual deflections measured in the field. The current deflection prediction is based on a single girder line analysis that doesn't take into account skew or stiffness of adjacent girders.</p> <p>Solution: The solution to this problem of extensive computer modeling was to create an empirically based simplified method that would significantly reduce the amount of time required to predict the deflection of steel plate girders. It takes into account the effects of bridge skew, girder length, girder spacing, cross-frame stiffness, in-place deck slab thickness & composite action on a portion of the girder length. Structure Design partnered with NCSU in a research project. Taking what NCSU had done, Structure Design created a simple spreadsheet program that incorporates the empirically based method and that is now integrated directly into the design process.</p>	Preconstruction - Highway Design	2006	Tom Koch	(919) 250-4037	Labor Hour Savings

Approved Encroachment Cross-Reference Map	<p>Problem: Approved Encroachment or driveway permits were difficult to locate because they were never cross-referenced so that district staff could locate them. For example if a municipality contacted the district office and wanted to know what type of encroachments existed on a particular SR route then the staff was forced to search through all encroachments to find the needed information.</p> <p>Solution: A county map was used to color code all approved encroachments and referenced by a file number that allows staff to easily locate the approved documentation. Files for approved encroachments and driveways were filed by city, utility company, and/or individuals. An excel worksheet was also created that logged the reference number (which was logged on the map as well), date received, date approved, location, encroachment type, and any other remarks for each encroachment agreement. The spreadsheet can be sorted or filtered by information type to reduce the time required by staff to reduce labor time when looking for specific data.</p>	Operations - Division 12	2006	Caroline Dedmon	(704) 480-5425	Labor Hour Savings
Backhoe Mounted Guardrail Excavator	<p>Problem: The problem we were having was the capability of cleaning away the accumulated buildup of soil from under the guardrail. In mountain counties there is little room to get behind the guardrail to clear away excess soil buildup. In most areas the only way to clear away this buildup is to remove the guardrail and excavate the material and then reset the guardrail.</p> <p>Solution: Our team decided to fabricate an attachment that would do this without the need to remove the guardrail. We took an old backhoe bucket and old motor grader blade and purchased some steel and extended the length of the backhoe bucket to form a three-foot extension with the motorgrader blade on the front edge. The motorgrader blade is replaceable and can be made wider or narrower.</p>	Operations - Division 11	2006	Jerry Combs	(828) 265-5380	Labor Hour Savings
Earthwork Computation Spreadsheet	<p>Problem: Time and training required to compute earthwork volume for estimated and final quantities to be paid on construction projects.</p> <p>Solution: A spreadsheet was created to enable anyone to enter data from x-section notes or plotted areas. Entry does not require any special training and can be used by anyone. It is helpful in establishing estimated quantities of earthwork throughout a project as well as computing exact final quantities.</p>	Operations - Division 10	2006	Margaret Hough	(704) 394-8314	Labor Hour Savings
Drainage Improvements	<p>Problem: Beavers were causing a drainage problem on several roads by building dams inside of crossline pipes.</p> <p>Solution: The maintenance department made several gates to prohibit debris from entering the pipe. The gates were built with #5 rebar and could be removed easily with a backhoe.</p>	Operations - Division 3	2006	L.E. Reynolds	(910) 592-1434	Labor Hour Savings
Low Volume Bridge Approach Investigations	<p>Problem: The FHWA identified significant cost and scope issues with the re-construction of very low volume bridges under North Carolina's TIP and Bridge Replacement/Upgrade programs. Most significantly many of these structures on lower tier facilities were utilizing the same basic design and permitting criteria as those major structures on new TIP and new Bridge projects on high speed higher tier Strategic Corridors. The costs environmental- financial- project delivery time - were significant and the cumulative impact was that fewer bridges were able to be replaced resulting in longer than optimal operational lives for structures with low sufficiency rating.</p> <p>Solution: A process improvement team was activated with an ambitious goal of identifying issues and outlining a plan to improve our bridge project scoping process and associated recommendations. The inter-agency team produced and implemented recommendations for bridge projects</p>	Preconstruction - Highway Design & Traffic Engin	2006	Anthony Wyatt	(919) 733-1593	Environmental Sustainability
Silt Fence Recycling	<p>Problem: Need to recycle silt fencing to save landfill space. Approximately 5000 LF of silt fencing is used annually in secondary road construction and typical section improvements.</p> <p>Solution: Sampson Maintenance began recycling the silt fence and storing it in the maintenance yard.</p>	Operations - Division 3	2006	L.E Reynolds	(910) 592-1434	Environmental Sustainability
Procurement Cost Reduction of LED Traffic Signal Modules	<p>Problem: The cost of LED signal modules is higher than the cost of incandescent bulbs. We would like to achieve a reduction in the procurement costs of these modules. LED traffic signal modules are becoming a standard commodity. Companies are now manufacturing larger quantities and more companies are manufacturing the modules. These factors may provide an opportunity to lower procurement costs.</p> <p>Solution: The solution is to create a new contract bid for LED traffic signal modules rather than to extend the present contract.</p>	Preconstruction - Traffic Engineering	2006	Milton Dean	(919) 733-5666	Dollar Savings

DMS Installations Project	<p>Problem: The previous practice of Dynamic Message Sign (DMS) installations was to install overhead sign structures with ground-mounted control cabinets. The cost of these structures averaged \$50,355. The ground-mounted control cabinets were prone to flooding and damage by mowing crews. Previously with flip disk technology, the control cabinets were placed 50 to 75 feet in advance of the DMSs. This allowed maintenance personnel to view the DMS display while working in the control cabinet. With the new LED technology, placing the control cabinet in advance of the DMS does not provide message legibility from a distance of 50 to 75 feet; therefore, placing ground mounted control cabinets in advance of the DMSs are no longer effective.</p> <p>Solution: To alleviate concerns with overhead installations, the ITS Section has changed the practice to place the DMSs on the roadway shoulder using Pedestal or Butterfly type structures. The DMS displays are mounted 25 feet above ground and the control cabinets are attached near the base of the structures.</p>	Preconstruction - Traffic Engineering	2006	Tom Parker	(919) 733-1506	Dollar Savings
Overhead Sign Design Wind Area Reduction	<p>Problem: Find a way to reduce the design wind area used to compute wind loads on overhead sign structures while maintaining flexibility to add additional wording to signs. The design wind area exceeds the actual sign area by as much as 80%. This is done to allow flexibility in making last minute changes to overhead signs during and after construction. However, it also results in design wind force effects that are larger than those produced by the actual sign wind area. The larger force effects require larger and more costly structural members and larger foundation sizes.</p> <p>Solution: Eliminate design wind area and use a slightly larger sign panel size to accommodate additional text. Use that actual sign panel area to compute design wind forces.</p>	Preconstruction - Highway Design Branch	2006	James Gaither	(919) 250-4042	Dollar Savings
Webcast Field Inspections	<p>Problem: Roadway Design meets with field offices for most projects during the design phase. These field inspections are in the division office where the project is to be built. If a project is being built in Division 1, 2, 12, 13, or 14, members of the design team (Roadway, Hydro, Traffic, Structures, etc) drive from Raleigh to these Divisions (up to six hours away) to meet and discuss project specifics.</p> <p>Solution: Web conferencing allowed everyone in Raleigh (approximately 6 to 10 people) to meet in a conference room and discuss the project with everyone in the division without Raleigh personnel having to drive to the Division office. A license was required for \$100 (\$50 per location) which allowed viewing of the plans over the internet. The Web conferencing meeting lasted only 30 minutes.</p>	Preconstruction - Highway Design Branch	2006	Jim McMellon	(919) 250-4016	Dollar Savings
Eliminate Stream Relocation	<p>Problem: A bridge replacement project (TIP B-3630) on John Oakley Road in Caswell County called for relocating approximately 150 feet of an existing stream.</p> <p>Solution: Upon reviewing the plans and the actual conditions in the field, it was found that the project could be completed without relocating the existing stream.</p>	Operations - Division 7	2006	Randy McKinney	(336) 634-5635	Dollar Savings
Utility Savings	<p>Problem: In the past NCDOT has been charged water and sewer rates for all the water used at the Selma Rest Area, located on I-95 in Johnston County.</p> <p>Solution: Separate water meters were installed at each building at the site. These meters reflected the amounts of water used and amounts that would discharge into the sanitary sewer. An agreement was made with the Town of Selma to separate the billing rates.</p>	Operations - Division 4	2006	Robert Simpson	(252) 237-6164	Dollar Savings
Self-Contained Hydraulic System For Salt Spreader PMs	<p>Problem: Old process for performing salt spreader PMs required taking a truck, loader, and additional operator out of regular service. Salt spreader was then installed on the truck in order to perform semi-annual PMs.</p> <p>Solution: A self-contained hydraulic pumping system was developed to eliminate truck, loader, and additional operator. One transportation worker could perform the PMs alone.</p>	Operations - Division 3	2006	Jesse Hansley	(910) 347-5223	Dollar Savings
Post Ladder / Turner	<p>Problem: As part of sign maintenance, periodically a sign has to be repositioned during installation, or due to wind events or a vehicle accident. In the past, the sign department utilized a post turner to accomplish this task. Utilization of a ladder was also required during this task. Too much time was spent gathering tools and setting up a ladder to perform this task. A new way to minimize the time it takes to reposition a sign or replace a sign without having to get out all the tools and a ladder was needed.</p> <p>Solution: A new post turner was developed that grips the 4 x 4 and incorporates a small steel step welded to the handle that can be used as a step to reach the sign.</p>	Operations - Division 2	2006	Jim Evans	(252) 830-3490	Cycle Time Reduction

Bolt Breaker	<p>Problem: During the course of day to day operations, traffic services is required to replace or repair road signs due to damage or change in signage. In order to complete these task the employees have to remove the current sign by loosening the nuts which are typically rusty. This is achieved by using a pair of vice-grips. The vice-grips slip off the rusty nut causing employees to readjust the tool resulting in a time consuming process.</p> <p>Solution: A bolt breaker was developed using a 9/16 deep well socket welded to a handle approximately 12 in length to give the user plenty of grip. Once placed over the nut, the 9/16 socket will not slip off and the user does not need to adjust the tool.</p>	Operations - Division 2	2006	Jim Evans	(252) 830-3490	Cycle Time Reduction
Analytical Instrumentation Update	<p>Problem: The Materials and Tests Unit Chemical Laboratory had an outdated X-ray instrument with which to analyze Portland cement, fly ash, and metal alloys. Analysis of materials that failed the X-ray test were re-tested using traditional wet chemistry methods which were more accurate than the X-ray method, and for which the Chemical Laboratory is accredited by the Cement and Concrete Reference Laboratory (CCRL). This involves handling hazardous solutions and is extremely labor intensive. The old unit was not capable of passing accreditation testing.</p> <p>Solution: Research determined that wavelength dispersive X-ray fluorescence (WDXRF) equipment would pass the stringent requirements of ASTM C-114 Standard Test Methods for Chemical Analysis of Hydraulic Cement. A new unit was purchased and placed in service allowing more accurate tests than with the old instrument and avoiding time consuming wet chemistry methods</p>	Operations - Materials and Tests Unit	2006	Kelly Croft	(919) 329-4090	Cycle Time Reduction
Adopt-A-Highway Web 3.0 Application	<p>Problem: The Adopt-A-Highway (AAH) program was in need of an upgrade from its legacy mainframe system that would allow the program's 96 AAH coordinators and co-coordinators quick and accurate processing of new applications, as well as producing management reports and labels for more than 6,000 AAH groups. The legacy database was state of the art when it was designed in 1989, but technical support was becoming less available, making it difficult to sustain the integrity of the legacy system. In addition, the AAH program needed an intuitive type database and report system that was easier to learn than the legacy system, which no longer had training classes available.</p> <p>Solution: A Web-based AAH database and report system that integrates the mainframe legacy system and the IVR system was developed, resulting in improved efficiency in the workplace and improved customer service to AAH groups.</p>	Operations - Asset Management	2006	Anne Walker	919-715-2551	Cycle Time Reduction
Silt Trap Cleanout	<p>Problem: The Materials and Tests Unit has large silt traps installed in the main laboratory that collect fine material (silts, sand, cement, etc.) and prevent the clogging of drains. The traps have to be cleaned once every six months and have traditionally been cleaned by removing the lids or grate, bailing the water out of the trap, and scooping the material out by hand. The cleanout process required four employees working two days to complete. The operation was disruptive to testing processes since laboratory personnel had to work around the crew and could not perform tests that used the drain being cleaned out. Employees were also exposed to whatever bacterial or chemical material had accumulated with the silt in the drain and it posed a slip hazard due to water and silt being dripped across the floors as the material was carried out of the building.</p> <p>Solution: A septic tank pumping service was hired to pump all the silt traps and dispose of the waste material offsite.</p>	Administration - General Services	2006	Mike Cottle	(919) 733-4101	Cycle Time Reduction
Flowcharts for Business Processes	<p>Problem: Many NCDOT customers, both internal and external, are not familiar with the funding process of the Program Development Branch. It is a very complicated process to understand based on the various types of funding. Examples of the difficulties faced by customers include how to receive project funding on time, what is needed for a funding request, how to validate the required information, and how to process all the details of a funding request to the Board of Transportation.</p> <p>Solution: We believed that our processes were difficult for our customers to understand so we simplified these processes through the development of flowcharts. A high level of information is represented in the flowcharts that gives a complete understanding of our business process as well as validation checks for Board of Transportation funding authorization and other related issues.</p>	Financial - Program Development	2006	Majed Al-Ghandour	(919) 733-2039	Customer Service

NC Safety Summary Map Tools	<p>Problem: Safety information is frequently presented and accessible in formats that are difficult to read and understand. In support of strategic highway safety efforts aimed at reducing fatal and severe injury crashes on North Carolina streets and highways, there was a need for additional visual mechanisms and improved formats to present aggregate safety information for a variety of safety partners.</p> <p>Solution: Working with representatives of North Carolina's Executive Committee for Highway Safety (N.C. State Highway Patrol, Governor's Highway Safety Program and the Traffic Safety Unit), team members from NCDOT's GIS Unit and Traffic Engineering & Safety Systems Unit researched, developed, refined, and published a series of simple color coded three-year Safety Summary Maps. The maps visually summarize all reported vehicle crashes, large truck involved crashes and motorcycle involved crashes.</p>	Preconstruction - Traffic Engineering	2006	A. D. Wyatt	(919) 733-1593	Customer Service
NC Improved STAA Truck Route Tools	<p>Problem: Since the original National Surface Transportation Assistance Act of 1982, North Carolina has experienced tremendous growth and significant changes in our highway system and freight needs. Largely unchanged since originally designated in the Code of Federal Register in the 1980's and subsequently into North Carolina General Statutes and Administrative Code in the early 1990's, North Carolina's Surface Transportation Assistant Act and National Truck Network Map and supporting materials were in need of a major overhaul. In the electronic age the customers (terminal operators, trucking industry, and enforcement community) have an expectation and need for immediate on-line access to these critical networks and unfortunately North Carolina was still exclusively utilizing US Mail to mail hard copies of these maps.</p> <p>Solution: The solution involved a comprehensive multi-agency process improvement effort (NCDOT, GIS, Regional Traffic Engineering, Traffic Safety Unit, and NCSHP) to research, investigate, and update North Carolina's National Truck Network Map while also working toward producing a version of tools that was accessible via the internet.</p>	Preconstruction - Traffic Engineering	2006	A. D. Wyatt	(919) 733-1593	Customer Service
Property Owner Mowing Agreement	<p>Problem: Property owners often do not like the method or results of machine clearing of the right of way. They would rather do the work themselves but are not always familiar with the standards required by NCDOT. They also need to be held accountable to these standards in the interest of the safety of the traveling public.</p> <p>Solution: A signed agreement is executed with the property owner that contains the mowing standards. The agreement is also signed by the County Maintenance Engineer and returned to the property owner. A copy is placed in the district road file for the particular road and a copy is sent to the county maintenance facility to be placed in a mowing agreement file. The Sign Department is notified and Do Not Mow signs are placed at each end of the section covered by the agreement. Mowing contractors are notified not to mow these signed areas. If the property owner does not maintain the area to NCDOT specifications, the agreement is voided.</p>	Operations - Division 14	2006	Steve Cannon	(828) 891-7911	Customer Service
Customized Phone Log	<p>Problem: The Division Traffic Engineering Office typically receives an enormous number of phone calls. Sometimes as many as 20 to 30 customers contact the Division Traffic Engineer (DTE) each day asking for speed limits, traffic signals, or other concerns. It has been a very cumbersome task for the DTE to record phone calls and forward tasks to his staff or other units.</p> <p>Solution: A phone log was developed to provide a quick "check box" type approach to recording and forwarding phone calls. The log captures the customer's name, phone number, nature of call, and county of origin. The log provides a check box list showing individuals who commonly receive forwarded messages from the DTE. The log also provides a check box list to indicate if the phone call was a returned call, from voice mail, from email, and if a message was left or if the customer was spoken to. Recently the customized phone log was modified to fit within the popular Covey Planner that many NCDOT employees are using.</p>	Operations - Division 13	2006	Mark Teague	(828) 251-6171	Customer Service
Electronic Bid Packages for DDC's and Districts	<p>Problem: Mailing bid packages reduces by three to five days the time a contractor has to prepare bids, which shortens the amount of time the contractor has to contact prospective subcontractors. In addition, considerable time is spent copying Advertisement Letters and Bid Proposals, which translates into additional money, materials and poor environmental stewardship.</p> <p>Solution: Rather than mailing out paper copies of bid proposal packages, password protected Word documents via email are sent. Drawings can be captured into jpeg files and emailed at the same time. If the files are too large to email, they can be transferred through the FTS system. This will save time, money, and manpower and be more environmentally friendly. Paper copies can be sent to contractors without computer access. Return receipts can be requested when sending an email to insure that the email is received.</p>	Operations - Division 7	2006	C.T. Huskins	(336) 256-0553	Customer Service

Facility/Shop Audit Check	<p>Problem: The safety audit had become a routine checklist that did not provide a means to track trends or provide information needed for decision making and upgrading facilities. OSHA compliance concerns were not given detailed attention and the diversity of equipment shops, maintenance facilities and office environments were not given consideration on the previous form. Comments and suggestions were separate from items being evaluated. Also, the previous form could not effectively highlight training needs. An evaluation tool with greater detail and more precision was needed.</p> <p>Solution: A workable audit tool was needed to provide information to decision-makers, communicate hazards to employees, reduce incidents and improve regulatory compliance. The Facility/Shop Audit Check was developed to address these needs.</p>	Operations - Division 1	2006	Jo Ann White	(252) 482-7977	Communications
"Under Construction: Trucking in the Work Zone"	<p>Problem: In 2005, there were 30 fatalities in North Carolina work zones. Although this number reflects a 40% decrease in work-zone related fatalities from 2004, there remains an obvious need for increased education about the hazards associated with driving through work zones. As an integral part of North Carolina's economic infrastructure, professional truck drivers spend the majority of their time on the road. The amounts of time truckers spend in work zones will only increase as the state's population continues to grow making work zone crashes involving large trucks significantly more likely.</p> <p>Solution: In an effort to educate professional truck drivers about the hazards associated with work zones and highlight their roles as one of NCDOT's partners in highway safety, NCDOT and CAGC partnered with various trucking industry representatives to produce a video entitled Under Construction: Trucking in the Work Zone. The video highlights truckers' responsibilities and provides them with tools for driving safely through work zones.</p>	Operations - Construction Unit	2006	Michelle Long	(919) 733-2210, ext. 221	Communications
Traffic Engineering Roundtable	<p>Problem: With the graying of the profession, North Carolina, like many other states, has found itself with a shortage of highly trained and seasoned professional traffic engineers. It is also without an effective regular accessible mechanism for traffic engineering professionals to network and work together to improve processes, and procedures. Recognizing the significance of professional development and the critical role that traffic engineers will play in addressing congestion, safety, regulatory, and access management issues, the need for an effective, ongoing, productive forum involving all of the state's traffic engineers became apparent.</p> <p>Solution: The Traffic Engineering and Safety Systems Branch joined with the DOH-Operations to develop Roundtable Solutions forums. These were technically engaging and built on contemporary traffic and safety issues for NCDOT's Field Traffic Engineers. The meetings were designed to provide consistent and, critical traffic engineering information in an atmosphere that promotes challenging the status quo and improving the level of service provided the traveling public by NCDOT.</p>	Operations - All Divisions	2006	A. D. Wyatt	(919) 733-1593	Communications
Crossing Signal Construction Inspection Process Improvement	<p>Previously applied methods of crossing signal construction inspection were proving less adequate due to the advance in technology and construction methods in the railroad industry. Rail Division Crossing Hazard Elimination Unit Construction Project Engineers, in conjunction with NCDOT and Federal Railroad Administration (FRA) Signal Inspectors, determined that the former construction inspection method required improvement in crossing signal functional and operational parameters to meet Federal regulatory requirements and the public safety purpose of crossing safety projects.</p> <p>Construction Project Engineers developed and refined the crossing signal construction inspection process and checklist, with input from Unit and Branch management, NCDOT and FRA Signal Inspectors, and key railroad company personnel.</p>	Transit - Rail Division	2005	Donald Hudson	(919) 715-7295.	Safety Improvement
Electronic Transfer of Railroad Crossing Signal PS&E Packages	<p>The Rail Division and railroad companies who are responsible for final engineering and construction of railroad crossing safety projects, have experienced delays of 2 to 4 weeks in delivery of plans, specifications, estimates, and materials lists being forwarded by regular mail. In addition, NCDOT and Norfolk Southern have experienced submittals being lost in the mail, with further time and cost involved in duplicating and resubmitting the packages. A trial transmittal of project documents, including NCDOT plans on aerial photography, was initiated. Norfolk Southern was unable to utilize NCDOT's CADD file formats. The team developed a protocol by which NCDOT's CADD drawings could be transmitted by converting them to JPEG format. Norfolk Southern returns its civil and electrical engineering drawings, materials lists, and cost estimates in PDF format.</p>	Transit - Rail Division	2005	Jason Field	(919) 733-5587	Cycle Time Reduction

Alternate Method for Sign Illumination	<p>Rising electrical service costs and limited maintenance resources are impending problems for overhead sign lighting. The Signing Section aimed to reduce the costs of sign lighting. The section investigated alternate methods of sign illumination, finding a method that meets the federal requirements and reduces cost.</p> <p>As a result, overhead signs no longer require the traditional lighting methods and its costs. The Signing Section now endorses Type IX retro-reflective sign sheeting as an alternate method for sign illumination. This alternate method reduces signing cost while maintaining a high quality, safe, and effective transportation system.</p>	Preconstruction Traffic Engineering	2005	Ayman Alqudwah	(919) 250-4151	Dollar Savings
Signing Rodeo	<p>The Signing Section takes pride in fulfilling its mission to provide a safe and integrated transportation system to the traveling public. With this in mind, the Signing Section took on the challenge of sponsoring its first signing workshop to provide consistent statewide training. The following classes were taught:</p> <p>Sign Placement and S Dimension Verification, to develop and define the concepts of sign placement, horizontal and vertical clearances, approach distances, and survey verifications.</p> <p>Materials, which focused on sign retroreflectivity and the how and why of nighttime sign visibility.</p> <p>Inspections, to explore practical examples of sign inspection by providing clear direction on acceptable sign installations as well as common pitfalls and their resulting problems.</p> <p>Signing Supports and Storage, which gave instruction on the correct installation and application of crashworthy supports in addition to developing consistency in practice with sign storage and cover.</p> <p>Sign Fabrication, which included a brief video tour of the largest sign plant in the country, followed by examples of sign fabrication</p>	Preconstruction-Traffic Engineering	2005	Clarence Bunting	(919) 250-4145	Customer Service
Ground Mounted Support Design Program	<p>Safety, consistency, and working productivity are issues that challenge NCDOT to improve. The Ground Mounted Support Design Program is a software solution that addresses all of these issues by communicating updated safety information to signing personnel while increasing design productivity and consistency.</p> <p>Larger ground mounted signs cannot be supported by direct driven posts. Steel beams in concrete footings are used to resist the large wind forces generated by these signs. The support chart's fundamental task is to design beam sections and concrete footings from sign sizes and field conditions. However, drivers who have departed from the road are in danger of being hurt by hitting these steel beams. In response to this, the program incorporates the latest AASHTO breakaway requirements into the initial design, producing a safe crashworthy design. The final product becomes a complete solution to all support and footing design needs.</p>	Preconstruction-Traffic Engineering	2005	Clarence Bunting	(919) 250-4145	Communications
Toe Scour Protection System	<p>Rains from the 2004 hurricane season caused a massive amount of damage to western North Carolina. Interstate I-40, which is the major transportation artery between North Carolina and Tennessee, was closed when several landslides occurred near the NC-Tennessee border.</p> <p>The Highway Design Branch was directed to design a solution that would repair the slopes and open I-40 as soon as possible. A significant amount of coordination and teamwork between the Highway Design Branch, Construction Unit, and Division 14 was required to complete the design work and contracts within 23 calendar days. The Geotechnical Engineering Unit, Structure Design Unit, and the Hydraulics Unit developed a new solution to prevent future erosion at toe of repaired slopes and preserve the safety of the traveling public.</p>	Preconstruction-Highway Design Branch	2005	Nilesh Surti	(919) 250-4088	Safety Improvement
Utilization of GPS RTK (with and without NRTK) in Stakeout	<p>In field surveying, the location of points (aerial targets, property corners, drainage features, edges of pavement, etc.) is time-consuming. Using traditional survey methods, a 3-person survey crew has to traverse distance to locate or set points. Prior to fieldwork, often-complex calculations are necessary to determine angles & distances. Someone must compute the desired information from recorded notes requiring substantial man-hours. With GPS RTK (Real Time Kinematic) Surveys, fewer personnel are needed for fieldwork & traversing is no longer necessary. This results in greater accuracy & reduced field time, both in elapsed procedure time & man-hours. Since data is electronic, office computations are substantially reduced or eliminated, resulting in a further man-hour reduction. In many cases, when an answer is needed right away, the GPS RTK information is immediate,</p>	Preconstruction-Highway Design Branch	2005	Charles Brown	(919) 250-4109.	Labor Hour Savings

Development of Prestressed Concrete Box Beams	<p>Historically, NCDOT has utilized two types of precast prestressed concrete units for use in bridge decks—voided (cored) slabs and prestressed concrete girders. Each has its advantages and limitations. Girders are more durable, have greater capacity, and can span longer distances. Slabs have a much more shallow structure depth and are faster to install, leading to faster construction times. Slabs are especially viable on rural, off-system stream crossings with low traffic volumes, which accounts for a high percentage of bridge replacement projects each year.</p> <p>To provide bridge designers with more choices, Engineering Development developed standard box beams. These structural units can span up to 105 feet (up to 65 feet for top down) while maintaining a structure depth about 1.5' less than a comparable girder bridge.</p>	Preconstruction – Highway Design Branch	2005	Tom Koch	(919) 250-4046	Dollar Savings
Standard Overhang Falsework Designs	NCDOT requires submittal of plans and calculations for concrete forms for bridge decks, called falsework, to the Structure Design department for approval. Structure Design staff reviews proposed designs for strength, constructability and safety. Especially important is a review of the falsework of bridge deck overhangs which cantilever from the exterior girder. Falsework is subject to the load of the concrete before it hardens and the weight of the screed, a machine that spreads and smoothes the freshly poured concrete to the proper thickness and finish. Due to the many screed types, overhang lengths, concrete thicknesses, exterior girder types, and the proprietary nature of the falsework supports, the designs for overhang falsework are highly variable. Disagreements between DOT and Contractors have often lead to delays and unexpected costs to the Contractor since they are often required to use more substantial falsework than was assumed in the original bid. On large projects this has been a source of substantial litigation.	Preconstruction - Highway Design Branch	2005	Tom Koch	(919) 250-4046.	Cycle Time Reduction
Tailgate Safety Meeting Plan and Report	<p>In January 2004, Division 14 experienced a workplace fatality. An employee committed a violation of Safe Operating Procedure and disregarded a supervisor's direct instruction. The employee placed himself in danger and was run over by a Blaw-Knox shoulder building machine. The incident investigation team received conflicting information regarding the conduct of the required tailgate safety meeting.</p> <p>The Safety Programs Subcommittee reviewed existing literature regarding the workplace safety program and designed a survey for Division 14 to report on current practices with tailgate safety meetings. The survey resulted in an identified need for a formalization of the process of planning and reporting on tailgate safety meetings. The committee refined the Tailgate Safety Meeting Plan and Report form for crew leaders and supervisors to use.</p>	Operations-Division 14	2005	Reuben Moore	(828) 586-2141	Safety Improvement
Embankment Repair on I-40	<p>Failure of the fill slope occurred on I-40 between the roadway and the Pigeon River beneath a retaining wall containing a cross pipe outlet. The foundation of the retaining wall was exposed and was undercut near the midpoint just below the pipe outlet. The foundation and retaining wall did not appear to have moved. The decision was made to repair the slope with obsolete portable concrete barriers and back fill underneath the retaining wall foundation.</p> <p>The length of the proposed fill was 60-90 feet and the height was approximately 53 feet. The pipe invert near the bottom of the retaining wall was approximately 16 feet below the top of the wall. The only access to the work site was from above. An access road was cut into the fill slope from above. All access to the site was from I-40 itself, which necessitated a lane closure while construction was underway.</p>	Operations Division 14	2005	Jamie Wilson	(828) 586-2141	Environmental Sustainability
Skid Steer GR Blade	Our crew has the task of removing soil and debris from underneath the guardrail so water could sheet flow off the roadway. In the past, this task had to be done with a motor grader or manpower and shovels. This process was very time consuming and labor intensive. In order to save time, we designed a blade apparatus that fits on the fork of a skid steer loader. The device allows the operator to push the material out from under the guardrail and off the slope and enable a backhoe or force feed loader to pick it up. This device saves labor hours.	Operations- Division 13	2005	Gabriel Johnson	(828) 625-4024	Labor Hour Savings
Benefits and Life Planning Workshop	An employee approached the Division Engineer about the need to obtain information on planning for retirement, obtaining contacts for services such as investments, and obtaining information on choices that would need to be made prior to and after retirement. The Division Engineer put together a team to take the former Prepare workshop and redesign it to fit the needs of the division employees. Thus far, two workshops have been held beginning with employees closest to retirement status. In these workshops, speakers from the community are chosen to discuss such issues as nursing home/assisted living options, financial investments, financial/identity security, medical	Operations- Division 8	2005	Mary Helms	(910) 944-2344	Communications

Engineering Control for Lead Work	<p>It is a common practice to use fans to blow smoke away from cutting and welding operations. Division 7 Bridge Maintenance had difficulty positioning fans and maintaining airflow across the intended work area especially between I-Beams underneath bridges.</p> <p>Northern Industrial Tools Blue Blower has proven to be a compact fan that can be positioned easily to blow smoke away from welders. A powerful, portable blower moves up to 300 cubic feet per minute (300 CFM on high; 200 CFM on medium; 100 CFM on low), up to 30 feet away. Adjustable air direction controls heat, fumes, odors and dust. This fan system includes a 12-foot, 14-gauge grounded cord, 2 built-in 15 Amp grounded receptacles for power tools, a 115 volt motor and is UL approved.</p>	Operations-Division 7	2005	Tim Powers	(336) 375-5589	Safety Improvement
Fence Line Sprayer	In order to spray unwanted trees and weeds on control of access fences in areas where our spray trucks can not reach, the Division staff has used inmates to manually cut the fence or use back pack sprayers. This is a slow, labor-intensive operation and when you manually cut trees and do not treat the stumps with herbicide the trees will regrow additional stems and not solve the problem.	Operations - Division 7	2005	K.A. Taffer	(336) 334-3192	Cycle Time Reduction
Salt Brine Trough	Salt Brine operations are still rather new at the State and the current Emergency Response and Procedures Manual does not include Salt Brine calibration instructions. During the last snow / ice storm, our facility utilized the instructions listed in the Draft Skill Based Pay Operations Manual for Snow and Ice to calibrate Salt Brine equipment. These instructions are clearly written in a step-by-step procedure. The instructions call for the tank's feeder hose to be detached from the spray nozzle and spray bar during the calibration procedure and then reassembled once the equipment is calibrated. When our spray bar was damaged and repaired we had to recalibrate the equipment and discovered the feeder hose could not be detached from the spray bar. The CPI team decided that since we could not detach the spray bar from the feeder hose that we should create a trough to hang from the spray bar.	Operations - Division 7	2005	M.S. Venable	(336) 570-6815	Cycle Time Reduction
Bryan Blvd. Detour Revision	<p>The contract called for a detour on Bryan Boulevard where the Western Urban Loop crossed in order to build two new bridges. The original plan was to detour traffic in one direction while building the first bridge. Then, traffic would be detoured in the other direction onto the new bridge while the second bridge was built.</p> <p>The original plan would have traffic detoured for about eighteen months and called for the construction of long, temporary walls to allow for bridge construction. The contractor, APAC-Major Projects, along with English Construction, proposed that the detour alignment be redesigned to allow for both directions of traffic to be detoured at the same time, allowing the construction of both bridges to occur concurrently.</p>	Operations- Division 7	2005	Darrell Ferguson	(336) 334-3228.	Customer Service
Soules Swamp Boardwalk	US 701 Business crosses Soules Swamp on the south side of the City of Whiteville. The swamp is approximately 1000 ft. wide and separates a low-income residential area from a shopping district. Although there was a bridge with a 5-foot sidewalk across the run of the swamp, there was no sidewalk up to the bridge on either side. People were trying to cross the swamp on foot, usually by walking very close to or even on, the roadway, creating a serious safety hazard between pedestrians and the motoring public. Structural analysis of the existing infrastructure, such as concrete piers anchoring a sewer main, revealed that the piers could support additional weight. The solution was to construct a wooden boardwalk on top of the sewer main, using the concrete piers for footing support, in those areas where the existing shoulder was too narrow for a conventional sidewalk. In those areas where the shoulder was wide enough, a standard 5-foot wide concrete sidewalk was constructed.	Operations-Division 6	2005	R. Allen Waddell	(910) 642-3760.	Safety Improvement
Rapid Frame	While framing for concrete lids for junction boxes, drop inlets and catch basins lumber always had to be cut for the particular box size. Thus causing a waste in lumber and man-hours to build for each. The solution was the Rapid Frame, which consists of 4 pieces of lumber and 4 T-channels. All can be reused by simply adjusting to the lid size required and tack nail T-channels.	Operations- Division 6	2005	G.M. Taylor	(910) 486-1421.	Labor Hour Savings
Modified Offset Catch Basins	<p>Project involved converting offset open throat catch basins to standard grated catch basins. Work involved casting new top slabs and placing new hooded frame and grate. New grate was still offset, but by placing concrete apron in front of grate to line up with existing curb and gutter this allowed a straight line for the edge of asphalt pavement. This allowed a better joint at the gutter line, and for future resurfacing projects will allow straight line milling, eliminating the need for incidental milling in the offset areas.</p> <p>This method has been used eighteen times thus far within the Whiteville Resident Office area of Division 6.</p>	Operations Division 6	2005	W. R. Marsh	(910) 642-2489	Dollar Savings

Span Replacement	<p>In the past five years more than a dozen bridges in Division 6 have been severely damaged enough by vehicles carrying oversized loads to warrant closing the bridge. These types of impacts usually occur to bridges with vertical clearances between 14'-5 and 14'-9. The department typically has three repair choices: 1) replace the girder but leave the clearance the same, 2) repair and raise the entire bridge, which is very costly, and 3) replace the damaged span with a cored slab span.</p> <p>The third option is the most cost effective due to the fact that the work can be accomplished in less than three weeks by the department. No additional work has to be done to raise other spans nor is earthwork/paving to approaches required. Replacement of original girders with a cored slab also provides an additional 18 of vertical clearance.</p> <p>The cost in traffic delays and rerouting as a result of damaged bridges is estimated to be \$480,000 per day for I-95 and \$17,000 per day for secondary crossings.</p>	Operations- Division 6	2005	Sonny Upole	(910) 829-6345.	Customer Service
ICPP (Integrated Cooperative Planning Procedure)	<p>Division 6 wanted to find a better way to plan, coordinate and improve the efficiency of the Bituminous Operation with other units.</p> <p>The County Maintenance engineers and the Bituminous supervisor determined each counties annual resurfacing requirements. Counties were divided into sections that could be prioritized based on paving needs. This information was used to plan the work of Maintenance, Bituminous, Traffic and Roadside units within the section. Grouping work led each section to become more productive and cost effective. GIS assisted Division 6 by merging road treatment data with the Pavement Condition survey and Universe data, which was overlaid on GIS digital road layer. This allowed the division to select road segments by querying multiple road conditions at one time. The application facilitates a centralized means of communication between County Maintenance engineers, Bituminous supervisor, GIS and DDC unit.</p>	Operations- Division 6	2005	Greg Burns	(910)437-2611	Communications
The Gate-R	<p>Removal and replacement of Dump Truck tailgates in order to facilitate installation of Sand / Salt In-Body Spreaders when a snow or ice storm threatened was a hazardous work task involving a crew of 5 people and the use of a loader. The task was fraught with unnecessary exposure to pinch points and precarious positioning of personnel. Ankles were strained from slips and falls that were occurring during the process of climbing the vehicle dump body in order to access the tailgate pins. Fingers were frequently pinched during the removal of the safety pins. Overhead lifting techniques were placing personnel in hazardous situations. A loader was needed to perform the operation which tied it up when it could be better utilized to load the trucks with anti-icing material (Sand / Salt). The tailgates were ferried across the yard for storage, which was taking up valuable time and space and causing congestion in the already busy yard. The team designed and built the Gate-R to improve efficiency and reduce risk.</p>	Operations - Division 5	2005	D.J. Viventi	(336) 599-5255.	Cycle Time Reduction
Better Safety Meetings	<p>Incident reports are generated every month based on incidents and injuries that have occurred over the previous month. A committee involving employees from the area in which the incident occurs reviews these incidents and injuries and forwards their recommendations to the division safety meeting. Reports completed in the field have the advantage of being familiar with the area in which the incident occurs.</p> <p>To adequately review incidents at the division level, a PowerPoint presentation was developed to show every incident and injury that has occurred. Pictures from every incident and injury are taken soon after the incident has occurred to view the location, damage and possible causes of the incidents. Corrective action(s) can be determined after review. After the incident review meeting, the employees' names are removed from the PowerPoint and it is shown at the safety meeting.</p>	Operations-Division 4	2005	Deborah Leonard	(252) 237-6164	Safety Improvement
Pipe Database	<p>In order to plan the maintenance of anything, one must know the quantity of the asset and its condition. It was not known how many crossline pipes exist in our district or their condition. Information was gathered and entered into a database. The database includes a button that looks up the site on topo maps using GPS coordinates that are included in the database. The button provides a location map and environmental assessment of the site. It also allows use of GIS software to view the data. Pictures can also be pulled into the database, allowing one to see the site without having to visit or search through a stack of photos.</p>	Operations- Division 4	2005	F. Enders	(252) 583-5861.	Cycle Time Reduction

Preplanning Typical Repairs	<p>The normal procedure for highway maintenance is to plan repairs as needed and perform preventive maintenance as much as possible. The traffic control during routine maintenance can be dangerous as well as counterproductive. The action taken to eliminate much of the routine traffic was to preplan and perform routine maintenance such as crack pouring, patching, overlays, shoulder repairs and ditch cleaning on roads that have been closed for bridge replacements.</p> <p>NC 403 and SR 1006 are normally two heavily traveled roads. Setting up and maintaining traffic control require a lane closure as well as a pilot truck. The local resident engineer was contacted to coordinate the work during the time of a bridge replacement on each of these two roads.</p>	Operations-Division 3	2005	L.E. Reynolds	(910) 592-1434.	Safety Improvement
Truck Bed	<p>The Department of Transportation is currently providing training in the form of a truck roadeo and a backhoe roadeo. The backhoe roadeo is a new event and a sandbox was needed during the training. The Sampson Maintenance department was given the task of building a metal sandbox. The materials and labor would exceed \$400. The conclusion was to use an existing pickup truck body of a wrecked pickup. The truck body is easy to maintain, very visible (DOT yellow) and very cost effective.</p>	Operations-Division 3	2005	L.E. Reynolds	(910) 592-1434.	Dollar Savings
Ink Cartridge	<p>There is a program available with a local office supply store that will give a free ream of office paper for each printer cartridge turned in. This removes the old cartridges from the waste stream and provides Division 3 with copy paper for internal use within the Division.</p> <p>This program is in use within Division 3. There are approximately 200 printers within the Division. Each has an average of two cartridges that are usually replaced twice a year. The cost of a ream of office copy paper is currently \$3.29.</p>	Operations-Division 3	2005	L.E. Reynolds	(910) 592-1434.	Dollar Savings
Safety Awareness Wristband Promotion	<p>Awareness wristbands have recently become very popular. These bands are used to raise awareness of various diseases and other items of special interest.</p> <p>The Safety Workshop Committee in Division 2 wanted to find a good way to promote safety and get all Division employees involved. Since a lot of employees were already wearing various awareness wristbands, the committee decided that the use of wristbands with a safety motto would help promote safety awareness throughout the Division.</p> <p>Orange wristbands with NCDOT DIV. 2 NO ONE GETS HURT inscribed on them were ordered and distributed to all employees.</p>	Operations-Division 2	2005	John Wells	(252) 830-3146.	Safety Improvement
Swivel Winch	<p>There are five main problems associated with the daily task of the removal of debris and dead animals from the roadway: 1. Two or more employees are needed to remove large animals, 2. The handling of carcasses which have begun to decay or been mangled by vehicles, 3. Retrieval and removal of animals down steep slopes or across ditches, 4. Raising large animals into the back of dump trucks to be taken to disposal sites, and 5. Having enough shoulder to allow the truck to get off the road during loading. There was a need for a device that would enable a single employee to perform this task in a safe and timely manner. The solution was the development of the truck mounted swivel winch. The winch is mounted in the back corner of a pickup truck and utilizes a cantilever type structure which aids in the lifting action needed to raise a large animal into the truck. The supported weight is then swiveled into the bed of the truck by means of a flange bearing. The winch is equipped with 250 feet of cable and the sling is made of a 24-inch wide cold feed belt.</p>	Operations-Division 1	2005	Retha Leigh	(252) 797-4598.	Safety Improvement
Polycarbonate Signal Heads	<p>Traffic signals in Dare county are located in a challenging environment that adds to the difficulties in performing maintenance activities. Challenges such as high winds and salt air degrade most materials if left unprotected or unsecured. Signal heads which house the red, yellow, and green indications suffer the most due being mounted above the roadway and within direct sight of the breaking, ocean waves. Because of the corrosive damage occurring to the signal heads, electronic technicians had to replace them once every three years. In addition the constant and sometimes high winds would cause the tunnel visors to blow off the signal heads. It was because of this continuous chore and associated costs that it was decided to try a signal head made from a different material.</p> <p>After some research, the solution was to replace the standard signal head made of painted aluminum with another made of UV stabilized polycarbonate plastic. The polycarbonate plastic material is colored yellow so there is no paint to flake off. Due to the relative lightweight nature of polycarbonate heads, the use of polycarbonate signal heads was limited to a rigid mount on a metal mast arm. Span wire applications were avoided because the wind would blow the signal heads out of position and tear them apart.</p>	Operations Division 1	2005	Madison Phillips	(252) 482-7977.	Dollar Savings

Pavement Condition Survey Data Entry Project	For 20 years, NCDOT has conducted a biannual Pavement Condition Survey (PCS) of NC highways. The survey is conducted using pre-printed forms. After completion, the results of the surveys are keyed in by personnel in the field offices. The results of the survey are then used to calculate funding needs for NCDOT road maintenance, distribution of hundreds of millions of maintenance dollars & to track the long-term performance of the highway network. From 1982 to 2002, data entry and reporting was carried out on a mainframe system. For the last decade, data has been transferred from the mainframe to an Oracle database for long-term storage & data modeling purposes. After this transfer it was possible to conduct extensive error checking & perform QA/QC checks. The data was then uploaded back to the mainframe for final report generation. As the data set grew to 1,000,000 lines or more, it became difficult and time-consuming to maintain and update the data. New software was developed to allow direct entry into the Oracle system.	Operations- Asset Management	2005	Neil Mastin	(919) 250-4094.	Labor Hour Savings
A Good Tomorrow	New hires at NCDOT are given a mandatory two-day employee orientation session which includes an overview of NCDOT benefits and policies and safety training. Since environmental awareness is also very important to NCDOT, and training is expensive, the concept of an environmental stewardship video for new hires was developed. The video is less than ten minutes long and showcases NCDOT environmental stewardship programs and emphasizes environmental excellence. The concept was developed in collaboration between the NCDOT Media Unit and the Environmental Operations Section of the Roadside Environmental Unit. The video, titled A Good Tomorrow, highlights NCDOT environmental stewardship actions and environmental programs across the Department and strives to instill team-based environmental pride, responsibility and ethics in the new employee.	Operations Asset Management	2005	Robin Little	(919) 861-3781	Environmental Sustainability
A, B, C's Litter Project	North Carolina has a roadside litter problem. By the end of 2004, the Department of Transportation expended more than \$15 million dollars to remove more than 10 million pounds of litter from the state's roadways. Littering is both intentional and unintentional by citizens and visitors who travel the highways of North Carolina. The law defines littering as illegal and imposes fines and community service work upon those convicted. More than 4,000 litter citations were written in 2004. One component to abating litter accumulation is education. Litter Project A, B, C's purpose was to utilize the K-12 classrooms as a means to promote the litter prevention message. The project undertaken was to use the Roadside Environmental Unit's State Fair Booth, within the Gardener's Flower Show section of the State Fair, as a means to promote litter prevention to the state's youth through their teachers. The Office of Beautification Programs set up a teachers' window where teachers could request a teacher's kit. The kits were comprised of Don't Litter Decals, Swat-A-Litterbug cards, temporary tattoos and stickers, litter law flyers and car litter bags that had a stop the littering message printed on one side. The kit provided litter prevention material for 30 students.	Operations- Asset Management	2005	George Kapetanakis	(919) 715-3188.	Customer Service
Employee Training Profile Management System (Update & Revision)	Since the implementation of Skill Base Pay and Competency Base Pay, training has become the focus of improvement projects. With many units in DOT conducting training and tracking training in various types of tools including paper tools, training records and data management was fragmented. Additionally, this was frustrating to employees, supervisors and managers who were trying to track training records, or analyze and report on various training data and information. To resolve this issue, a committee was formed to develop one web-based application that would serve the needs of all training groups, provide employees easy access to training records and information, and give management a tool to improve the productivity, efficiency, and effectiveness of training data management. Since its implementation, this system has given employees unlimited access to their individual training records and training data, allowed management to query the system and provide reports, and all information is in one central location.	Human Resources	2005	Angela Crawford	(919)662-3582.	Communications
E-learning	The Division of Human Resources has been looking for innovative ways to improve communication and customer service. With employees working in every county of the state, DOT faces many challenges regarding communication and information sharing among employees. With the implementation of Career Banding, training of employees has become more important than ever. HR decided to pilot e-learning which delivers training via the internet, intranet, audio/video tape, satellite broadcast, interactive TV and CD-ROM. HR implemented five pilot e-learning courses: (1) Introduction to Career Banding; (2) Mentoring as a Workforce Development Strategy; (3) Workforce Planning; (4) Unlawful Workplace Harassment Update, and (5) Unlawful Workplace Violence Update. DOT's e-learning courses are free, take little time to complete, and have no associated travel expenses, HR does not require prior supervisor's approval or going through the training coordinator. Just click on the links for e-learning.	Human Resources	2005	Angela Crawford	(919)662-3582.	Communications
Electronic Draft of the 12-Month Let List and the Design Build Let List	For many years Project Management sent as many as 500 copies of the 12-Month Let List and the Design-Build Let List to various consultants and preconstruction units every month. As a result of computer technology, it has been determined to be more beneficial both monetarily and from a human resource standpoint to utilize available resources to improve upon our service industry	Financial- Program Development	2005	David Rhodes	(919) 733-2039 ext 301.	Labor Hour Savings

Reduced Copies of Motor Vehicle Laws	Each year all Drivers License examiners and many others in different departments of state and local government receive a personal copy of the Motor Vehicle Laws of North Carolina, Annotated. If each office or work area received just one copy this would be and obvious savings in cost and materials.	DMV Driver & Vehicle Services	2005	Bruce Goeden	(919) 468-0319.	Dollar Savings
Staggered Renewal	NCDMV currently requires all Apportioned Motor Carriers, Commercial Vehicles, Special Mobile, For Hire, Non-Dealers transporters, Drive Away, Taxis and Unassigned National Guard to expire on December 31st of each year. During the peak renewal period from Jan 1 through Feb 15, the two state DMV agencies are required to work overtime and temporary personnel must be hired in order to assist during the peak time. Customers have to wait in long lines, which causes to be very customer unfriendly. Recent legislation allows for staggered renewals for the above listed vehicles. The team helped in the design and functionality of converting the customers' expiration date to spread the renewals throughout the year.	DMV- Driver & Vehicle Services	2005	Don Ferrier	(919) 861-3332.	Dollar Savings
Driver License Face Recognition	Identity theft and identity fraud are the fastest growing crimes in the U.S. Theft of identity or the creation of a false identity is typically used to commit financial fraud, to escape criminal prosecution, or to expedite the commission of terrorist crimes. DMV has a database of over 19 million customer images, representing almost 99% of all North Carolinians with a driver license or identification card. Face recognition technology is a relatively new form of biometric identifier that uses unique measurements of key facial points to create an algorithm to establish a face recognition score to match images in seconds across the 19 million images in the DMV database. In 2005 DMV began rolling out face recognition technology. Its database is the third largest in the world, behind Pakistan and the state of Illinois.	DMV Driver & Vehicle Services	2005	Barbara Webb	(919) 861-3210.	Customer Service
Online Defensive Driving Course	The Materials and Tests (M & T) Unit staff members drive a combined 2.2 million miles a year in a variety of vehicles provided by both the NCDOT Equipment Unit and by DOA Motor Fleet Management. As part of an ongoing Unit goal to improve safety both in the workplace and in the lives of the Unit's employees, a defensive driving class was arranged. The National Safety Council was contacted and their on-line defensive driving course was made available to all M & T Unit employees. After completion of the course, the provider administered a test on-line and certificates were presented for successful completion of the course. All 186 members of the M & T Unit took and passed the course. Arrangements were subsequently made for the Construction Unit's staff to participate in the program.	Construction- Materials and Tests	2005	Randy Pace	(919) 733-7091.	Safety Improvement
Self Study Concrete Class	M&T offers a concrete certification class for field technicians. It takes 2 days of instruction and 1 day of tests. Limited seating and scheduling problems prohibited many field technicians from attending. A self-study class was developed to reduce the amount of time spent in class. During 2005 four self study class were held with an average attendance of 30 technicians who had to be away from their assigned duty station for only one day instead of three.	Construction- Materials and Tests	2005	Walton Jones	(919) 329-4221.	Labor Hour Savings
In the Zone Driver Education Kit	As NCDOT works diligently to improve the states highway system, the safety of the public, NCDOT employees and contractors continues to be a challenge. Data shows that 221 people were killed in NC work zones between January 2000 and December 2004. An aggressive and effective education directed at safety and awareness in work zones is needed. Increases in the state's population and the number of work zones and related activities will put more motorists and tourists at greater risk. New drivers will face an increased number of work zones early in their driving careers. To better prepare new and inexperienced drivers for their roles as safe drivers in work zones, NCDOT partnered with ATSSA, IRTBA and NCHP to produce an educational video package entitled In the Zone. The video was filmed in a North Carolina work zone and features volunteers, construction personnel, NCSHP and NASCAR driver, Todd Bodine.	Construction Unit	2005	Jimmy Travis	(919)733-2210.	Communications

Field Concrete Technician CD	NCDOT's Concrete Field Certification is currently effective for 5 years. It involves classroom time, passing a written exam and demonstrations. Graduates of the program tend to forget procedures and tests during the period between certification and re-certification, plus there are also routine updates and changes to specifications and test methods. A method was needed to serve as a reference for technicians in the field. Materials & Tests Unit Concrete School personnel developed a CD that included information on the proper running of field tests used in the acceptance of concrete. It serves as a reference tool and learning aid for unit's Concrete Technician Certification Classes.	Construction- Materials and Tests	2005	Walton Jones	(919) 329-4221.	Communications
NCDOT Swap Shop	NCDOT's 14,000 employees state-wide had no formal process in place to view and obtain NCDOT item(s)/material(s) that were in the process of being surplus. The NCDOT Swap Shop Program established a formal process where employees can view and obtain these items/materials. This program not only improves communication and information sharing among all employees, but also demonstrates our commitment to preserve natural and financial resources and in being good stewards of the environment	Administration General Services	2005	John Sharp	(919) 715-6054x230.	Environmental Sustainability
NC Executive Committee for Highway Safety	While major strides have been made in highway safety in North Carolina over the years, in 2003 there were 231,247 reported traffic crashes that resulted in 1,552 persons killed and over 134,000 injuries on our highways. After ten (10) months of coordinating the many safety initiatives within and outside of NCDOT, the N.C. Executive Committee for Highway Safety (ECHS) was formed and held its first meeting. The ECHS identifies, prioritizes, promotes and supports the AASHTO Strategic Highway Safety Plan (SHSP) in North Carolina's highway safety strategy to save lives and reduce injuries. It is comprised of six active Working Groups, each assigned a specific emphasis area to analyze problems and developing specific strategies and countermeasures.	Department of Transportation	2004	Cliff Braam	(919)-733-3915	Safety Improvement
Cyberstreet Internal Bulletin Board	Employees were finding it difficult to find manuals, organization web sites, employee policies and procedures, and engineering reference materials. Also, there was a need for employees to have a central location to receive information for meetings and employee functions. In addition, employees needed a common place to store and easily access training information, personnel materials and orientation information. An internal electronic bulletin board (Cyberstreet) was created using HTML. Cyberstreet is an internal webpage that is located on the server where all employees can access it. The homepage has links to each section in our unit along with links to the NCDOT homepage and our unit's homepage. There is room to place messages about any pertinent meeting that employees need to attend and important information they need to know. Cyberstreet has links to the NCDOT internal portal, directory, and Human Resources Manual. It is a quick reference for important information.	Preconstruction- Traffic Engineering	2004	Amanda Smith	(919)-250-4151.	Communications
Construction Career Days	One out of every 10 workers in the United States either directly or indirectly makes his or her living in the construction industry. The shortage of skilled craftsmen and construction equipment operators creates employment opportunities. The North Carolina Department of Transportation's On-The-Job Training Program and the Carolinas Association of General Contractors (CAGC) uses its Construction Career Days Program to make high school juniors and seniors aware of the opportunities available after high school. This program allows high schools students from across the state to talk with dozens of commercial contractors and NCDOT personnel about employment opportunities and careers in the construction industry. Representatives from industry and community colleges staff vendor booths, provide information, and give students hands-on experience with the latest equipment. Students experience the latest tools and equipment used by the construction industry, ask questions and get feedback. During the hands-on exercises, students get the opportunity to view heavy equipment, talk to the operators and see demonstrations of heavy equipment in action.	Construction	2004	Marvin Butler	(919)733-7174	Communications
Defining the GIS Distribution Center	The GIS Unit infrastructure is comprised of three technical operating sections: Mapping, Road Inventory and Program & Analysis. Together these sections provide Geographic Information Systems, Mapping, and Road Inventory services to the NCDOT. In addition, the unit is working cooperatively with other state, county, and local agencies to build a statewide digital spatial database. The GIS Distribution Center was created in 2003 to serve as the primary contact for geospatial information for the NCDOT. One of the many successful results was allowing county map creation and distribution in one central location, the GIS Unit. We experienced immediate growth receiving multiple map order requests daily.	Information Technology- GIS	2004	L.C. Smith	(919)212-6002	Communications

Special Alert Checklist	NCDOT strives to provide a safe and efficient transportation system for its citizens. Unfortunately, accidents occur everyday on North Carolina's highways that disrupt their travels. NCDOT has many mechanisms in place to provide information to the motorists about these disruptions including a website, the 511 Traveler Information Telephone System, Dynamic Message Signs, Highway Advisory Radios, etc. These resources are typically used by individual Divisions to provide information in their local areas. Before late 2003 there was no structured process in place to assure that information was disseminated across the state using these tools. In 2003 the ITS Operations Unit created a Special Alert Checklist which identifies all of the methods of traveler information available to let the public know about major accidents. The user can select all of the appropriate tools for the situation from this list. Contact information is then provided in a companion notebook that allows the user to reach all of the necessary parties to begin the process of regional or statewide traveler information.	Information Technology-Operations	2004	Kelly Damron	(919)-233-2330	Communications
Environmental Pre-Let Review	The NCDOT is required to obtain various environmental permits for projects. This process involves the submitting permit drawings that depict impacts to the environment associated with roadway construction to the USACE and NCDENR-DWQ. Environmental permits state that all construction must be completed in strict accordance to the permit drawings that were previously submitted to the regulatory agencies. A comprehensive pre-letting review of active TIP construction projects in Division 5 revealed significant discrepancies at permitted sites between the roadway plans and permit drawings. These discrepancies could result in violations of the environmental permits if not addressed. The Division Environmental Supervisor identified all discrepancies and initiated modifications to the permits. Construction of projects at many permitted sites could not be completed until permit modifications were issued by the regulatory agencies. This resulted in significant project delays, as construction at the permitted sites could not be brought to conclusion in a timely manner.	Operations- Div 5	2004	Jon Nance	(919)-560-6851	Communications
DOT Training Inventory Catalog	The Human Resources Division's customers include those applicants applying for position at DOT, as well as the 14,000 DOT employees that it serves. Since HR considers the work force the most valuable DOT asset, it is always looking for innovative ways to improve communication and customer service. With people working in every county of the state, DOT faces many challenges regarding communication and information sharing among employees. Furthermore, with many units in the department organizing and implementing various train opportunities, training had become fragmented and there was no central point of contact for information regarding what training was available to employees. To make this information readily available to employees and provide supervisors and managers with an inventory of available training so that career development plans would be easier, a DOT training Inventory Catalog was developed. The publishing of this catalog took over a year to develop.	Human Resources	2004	Angela Crawford	(919)662-3582	Communications
DOT SECC Centralization	The Human Resources Division's customers include those applicants applying for position at DOT, as well as the 14,000 DOT employees that it serves. Since HR considers the work force the most valuable DOT asset, it is always looking for innovative ways to improve communication and customer service. The State Employees' Combined Campaign is no exception. For many years, the DOT campaign was fragmented with different areas of the department moving in different directions, different kick-off dates, processes and goals. State level campaign organizers directed information to central administration located in Raleigh to build support for the campaign in Raleigh/Wake County. Outside of Raleigh, employees in divisions and branches located in regional offices were receiving information from Raleigh-based division heads as well as local coordinators that often conflicted and confused regarding the process and submission of forms.	Human Resources	2004	Angela Crawford	(919)662-3582	Communications
TIP Developments	More and more developments are being constructed along TIP corridors before the TIP projects are constructed. When the development and TIP projects fall within City Limits, oftentimes curb and gutter and sidewalk are requirements for the developers to construct. I have had many projects where only preliminary plans have been developed for the TIP projects, and the projects are 5 to 10 years away. In these instances, requiring the developer to construct curb and gutter and sidewalk is useless when it will have to be torn out in the future and replaced at the department's cost.	Operations- Div 10	2004	Matt Weiss	(704)-982-0104	Communications
County Resurfacing History Map	Our office wanted a visual representation of the roads that have been resurfaced over the past years. I used a county map and highlighted the roads for respective years that they were resurfaced. I updated it each fall and I will start to include Moving Ahead and Senate Bill Projects. The pavement condition survey is helpful, however, with the highlighted maps, you can see which roads have been resurfaced and which areas have been concentrated on very easily. I use these maps when reviewing utility encroachment contracts. It allows me to easily review the utility route, and determine if it will be in conflict, or how strict we need to be with utility cuts in the pavement, placing spoil on the roadway, and location of the utility.	Operations- Div 10	2004	Matt Weiss	(704)-982-0104	Communications

Bus Placards	Each year trash finds its way to the 78,500 miles of roadsides maintained by NCDOT. This trash becomes litter when it hits the roadway regardless of its source. The NCDOT spends more than \$12 million annually to clean up roadside litter. Providing citizens information on what constitutes litter and that litter is illegal will help change the cultural practice of disposing of trash illegally. One item, cigarette butts, accumulates by the millions along the roadsides. These are difficult to pick up and take over a decade to decompose. The toxic chemicals in cigarette filters leach out slowly over the years and negatively impact the environment. A campaign was started to inform riders of mass transit buses. Some riders smoke and dispose of their cigarettes onto the ground to snuff them out prior to boarding. These discarded cigarettes butts become litter when they are left behind on the ground. These discarded cigarette butts become litter when they are left behind on the ground. If cited by a law enforcement officer and upon conviction, this littering offense could cost the individual a fine of up to a \$1,000.	Construction-Roadside Environmental	2004	George Kapetanakis	(919)-715-3188.	Communications
Roadside Environmental Training/Competition	Roadside Environment recognized the need to improve employee recognition for knowledge, skills, safety and environmental awareness as related to performance of the major operational functions of the unit and Highway Division. A 3-year training/competition program was developed for personnel to promote work zone safety and environmental stewardship. It involved one year each in Roadside Roundup, Hydrodeo and Landscape Roadeo. Participation from all 14 Highway Divisions was strongly encouraged. They had to meet the minimum criteria regarding classification, licenses and skill block completion. The format consisted of various stations with obstacle courses for trucks, targeted spray application areas, written examination/work exercises, equipment appearance/condition, troubleshooting, safety checklists, inspections, plant/weed identification, etc. The overall training experience was enhanced by lectures and tours. First and second place awards were presented at the NCDOT Roadside Environmental Annual Conference held in December	Construction-Roadside Environmental	2004	Ted Sherrod	(919)-7233-2920	Communications
Salt Works Poster	The Highway Stormwater Program (HSP) has been trying to develop a simple but effective means of communicating with the various NCDOT field operation units across the Sate concerning stormwater related issues. HSP wanted to develop some type of media that defined potential stormwater impacts and preventive measures for various NCDOT operations. The HSP first wanted to relay environmentally sound steps for applying salt to roadways during the winter. Based on comments received from two earlier maintenance focus groups, the idea emerged to develop a poster on each stormwater topic of concern.	Construction-Roadside Environmental	2004	Bob Holman	(919)733-2920	Communications
Motor Carrier Internet Renewal	Motor carriers engaged in interstate commerce transporting federally regulated goods require a Single State Registration Receipt (RS-3). Motor carriers engaged in interstate commerce transporting goods exempt from federal regulations in North Carolina are required to have a Bingo Stamp affixed to a federal D-1 Cab Card. The motor carrier was limited to thirty-nine locations within the state where they could renew the motor carrier accounts. Otherwise, they had to rely on using the U.S. mail service to renew their accounts. This presented problems, including 1) having to rely on the U.S. mail service, 2) long waits to receive services, 3) inconvenience, and 4) large fines from citations for failure to have required documents by the renewal deadline. To minimize problems, motor carrier internet renewal was developed and implemented in January 2003. This consisted of the Single State Registration Renewal and the Interstate Exempt Renewal	Division of Motor Vehicles	2004	Tony Spence	(919) 861-3332.	Customer Service
IRP Clearinghouse	As a member of the International Registration Plan, there exists a reciprocal agreement between the jurisdictions to collect all monies due from each IRP registrant for all jurisdictions of travel, followed by monthly disbursement in a timely manner. This process presented several problems, including the manual process of mailing recaps/transmittals and checks each month to all jurisdictions, not receiving monies due from other jurisdictions in the timeframe established by IRP, Inc., loss of revenue from interest on monies not received in a timely manner, and reissuing checks that were lost in the mail. To reduce these problems, North Carolina IRP joined the IRP Clearinghouse in July 2001, Currently, 43 jurisdictions participate in the program.	Division of Motor Vehicles	2004	Tony Spence	(919) 861-3332	Customer Service
IRP Internet Renewal	The interstate trucking industry in North Carolina was limited to two locations in the state (Raleigh and Charlotte) to process their annual IRP renewal application. The only other option for renewal was by mail. The annual IRP renewal period for the approximately 12,000 North Carolina based carriers was open from January 1st to February 15th each year. This presented problems for carriers and service providers, including a large number of customers at each of the two renewal locations during the renewal period, long waits for customers to receive services, having to rely on the mail service, and employees working mandatory overtime. To resolve these problems, the IRP internet renewal was developed and implemented in January 2002.	Division of Motor Vehicles	2004	Tony Spence	(919) 861-3332	Customer Service

Design Manual	The ITS and Signals Unit's Design Manual is used by private engineering firms, municipalities, and others, in addition to in-house staff to provide guidance in the design of signals and ITS. This manual was only available in paper format, causing delays in getting the information to the recipients.	Preconstruction-Traffic Engineering	2004	Greg Fuller	(919) 733-8333.	Customer Service
Secondary Paved Road Improvement Program	Our unit has been unable to fully utilize all of our Secondary Road Funds in recent years due to the lack of available right of way and environmental issues on unpaved secondary roads in priority. Several Districts had begun to pursue improvements to the secondary paved road system to expend these funds. Additionally, G.S. 136-182 was amended to allow the expenditure of Secondary Trust Funds for safety improvements on secondary paved roads. Recognizing this, we elected to pursue a priority system similar to the unpaved secondary road priority rating system to assist in determining which secondary paved roads to attempt to pave. A team of Transportation Engineers was assembled that had experience in constructing and maintaining roads within Division 14. After a series of meetings and discussions, this team developed the Secondary Paved Road Improvement Program document. This document is used to determine the priority order in which secondary paved roads will be attempted for improvement. This document also provides guidance to the engineer on the ideal typical section based on service to be provided in the design year.	Operations-Div 14	2004	Brian Burch	(828) 586-2141.	Customer Service
New Fraud Unit	The Fraud Unit was created in September 2003 within the License & Theft Bureau and is responsible for identifying fraudulent documents. The unit also assists citizens who are victims of fraud by working with local, state, and federal agencies. The unit has two certified instructors who have been trained by the American Association of Motor Vehicle Administrators. They will train DMV employees in the recognition of altered or counterfeit paper and plastic documents. In keeping with the DMV Commissioner's mandate of one DMV, the Fraud Unit also works closely with all DMV sections to ensure fraud is not committed against the division. This ensures that records and files are accurate and that precise information is provided. It will also help to safeguard files from contamination and fraudulent information from being received, both of which will save time and money.	Division of Motor Vehicles	2004	R.E. Flaherty	(919) 861-3185.	Customer Service
Plastic Cylinder Crate for Concrete Cylinder Molds	The Physical Testing Lab of the Materials and Test Unit is responsible for performing compression tests on 4x8 concrete cylinders made out in the field. These cylinders represent the concrete used on NCDOT projects. It is very important that the top of the cylinders be completely level. It is also important the cylinders are not damaged when being transported to the laboratory. When the fresh concrete is cast in the cylinder molds they are supposed to be taken to a safe, level location to set up. In many instances the cylinders were set on uneven ground or they would tip over resulting in crooked cylinders. When cylinders are received in our lab considerable work went into cutting, grinding, and measuring any uneven cylinders. Another common problem was cylinders being damaged while being transported to the lab if they became loose in the vehicle. Again, once they were received, extra work had to be done in order to make the cylinders testable	Construction-Material and Tests	2004	Sam Frederick	(919) 733-7091	Customer Service
Adopt-A-Highway Coordinator Manual	The State of North Carolina established the first Adopt-A-Highway (AAH) program in 1988. Each year the program saves taxpayers up to \$4 million in labor costs associated with roadside litter cleanup. NCDOT administers the program through the Roadside Environmental Unit's Office of Beautification Programs. The AAH program incorporates the participation of 56 statewide coordinators at the county level. In some cases one coordinator may have responsibility for multiple counties. It is common for coordinators to rotate out of their positions. New personnel coming in as coordinator are immediately immersed into administering the program with minimal training. Satisfaction of the coordinators and other volunteers diminishes with the lack of program knowledge. To improve satisfaction within the AAH program and fill the knowledge void for new and veteran coordinators, it was necessary to provide an AAH Coordinator's Manual for reference.	Construction-Roadside Environmental	2004	George Kapetanakis	(919) 715-2553	Customer Service
Storm Relief	Due to the large number of Interstate and US highways that run through the division, each construction office has been assigned to a county to help the maintenance camps during storm events. Each maintenance camp has been allowed to use the construction personnel to best suit their needs. The construction personnel have been used to follow contract snow removal crews, help plow snow, and help clear debris from roadways	Operations-Div 7	2004	Kris Lorenz	(336) 334-3228.	Customer Service
Snow and Ice Removal	Due to the large number of roads that are in the division, residential streets were the last to have snow and ice removed. This caused an increase in the number of calls and complaints from the traveling public who were not able to reach the main roads. To address this problem, each construction office has been assigned at least one vehicle that is equipped with a snowplow. These vehicles are assigned to a county maintenance camp and are used for clearing residential streets during a snow event	Operations-Div 7	2004	Kris Lorenz	(336) 334-3228.	Customer Service

511 Travel Information Line	<p>Travelers in NC want access to information about their trips. Several agencies within the Department of Transportation and within other public agencies have access numbers that the public can call to retrieve information. However, there was no single number that a caller could dial to access these information resources within the state. A caller must remember all the numbers to each individual agency to obtain information they desired.</p> <p>The NC 511 system is a comprehensive multi-modal voice activated/voice response system that encompasses many of the different agencies that provide travel information to our customers into a single phone call. The NC 511 system provides real time travel information on impacts to our roadways due to usual events and/or weather. The system also acts like a speed dial to various other agencies.</p> <p>Another feature of the NC 511 is that it has the capability of a floodgate message that allows NCDOT to input an event that is having a high impact on travel in NC (i.e., AMBER Alert).</p>	Information Technology-Operations	2004	Kelly Damron	(919) 233-9331.	Customer Service
Call Center Consolidation	<p>When customers contact the Division of Motor Vehicles they are given the option to select from three separate service areas; Vehicle Registration, Drivers License, and Liability Insurance. Once the customer has selected a particular call center the call is then transferred to a customer service representative for assistance. If the customer's question exceeds the knowledge of the answering customer service representative the caller would then have to be placed on hold and transferred to another call center. This in turn increased the wait time for customers by placing them back in queue. Upon review of the present call center system, it was decided to combine the three call centers to form a consolidated call center.</p>	Division of Motor Vehicles	2004	Paula Windley	(919) 861-3332.	Customer Service
State Infrastructure Bank (SIB) Management	<p>As North Carolina grows, many local needs for safe and efficient transportation will go unmet. Necessary transportation improvements will be shelved because of strained local budgets that meet only minimum public requirements. Transportation projects will be passed over from year to year for lack of resources to meet the local financial match responsibility. A small town or rural county may have limited revenue for basic services and lack a large enough cash reserve to match many federal and state transportation programs.</p> <p>The State Infrastructure Bank (SIB) arose out of the need to improve, rehabilitate, and renovate transportation facilities. The Department of Transportation will utilize reserve balances and cash flows for loans to local governments and transportation authorities to stimulate and advance needed projects</p>	Environment & Planning-Program Development	2004	Moy Biswas	(919) 714-2465.	Customer Service
T & D On-line Calendar	<p>The Division of Human Resources' customers includes not only those applicants applying for positions at NCDOT, but also the 14,000 department employees that the division services. Since Human Resources considers the workforce the most valuable NCDOT asset, it is always looking for innovative ways to improve customer service. With employees in all counties of the state, NCDOT faces many challenges regarding communication and information sharing among its workers.</p> <p>The Training & Development Section of Human Resources wanted to provide better customer service by making its training course schedule available to employees online. After management approval was gained. A committee was formed to discuss how the new process would work. The committee included an administrative person, a trainer, and a web developer from IT.</p>	Human Resources	2004	Angela Crawford	(919) 662-3582.	Customer Service
Career Banding, SBP, CBP Procedures Manual	<p>The Department of Human Resources' customers not only includes those applicants applying for positions, but they also include the 14,000 DOT employees the division services. Since HR considers the work force to be the most valuable DOT asset, it is always looking for innovative ways to improve communication and customer service. With employees in each county of the state, DOT faces many challenges regarding communication and information sharing. As the department implemented more Career Banding, Skill Based Pay and Competency Base Pay programs, HR identified a need for consistency among programs and across occupational areas, and for better communication on these programs. One way to ensure consistency, better communication, and improved customer service was to provide a procedures manual to each division, section and unit to serve as a foundation for individual program development.</p>	Human Resources	2004	Angela Crawford	(919) 662-3582.	Customer Service
SDP/DBP Database Systems	<p>The skill based pay and competency based pay database systems were each independently run. Efforts have now been made to standardize them and make them more user friendly. One of the ways that this has been accomplished is by tying the personnel main frame system information to the databases. A person entering the data only has to type in the personnel number of the employee and all data fields are populated.</p>	Human Resources	2004	Angie Fanelli	(919) 733-2987.	Customer Service

Employee Training Profile Management System	The Department of Human Resources' customers not only includes those applicants applying for positions, but they also include the 14,000 DOT employees the division services. Since HR considers the work force to be the most valuable DOT asset, it is always looking for innovative ways to improve communication and customer service. With employees in each county of the state, DOT faces many challenges regarding communication and information sharing. Since the implementation of Skill Based Pay and Competency Based Pay, training (which is a key element in these programs) has become the focus of customer service and communication improvement projects. With many sections/units conducting and tracking training, records and data management was fragmented. Also, it was frustrating to employees trying to track their training and to managers trying to report and analyze training data. To resolve this issue, a committee was formed to develop a web-based application to serve the needs of all training groups. It would give employees and managers easy access to records as well as better tools for productivity and efficiency.	Human Resources	2004	Angela Crawford	(919) 662-3582.	Customer Service
SBP/CBP Training Toolbox	The Department of Human Resources' customers not only includes those applicants applying for positions, but they also include the 14,000 DOT employees the division services. Since HR considers the work force to be the most valuable DOT asset, it is always looking for innovative ways to improve communication and customer service. With employees in each county of the state, DOT faces many challenges regarding communication and information sharing. As the department implemented more Skill Based Pay (SBP) and Competency Base Pay (CBP) programs, the SBP/CBP Training Work Group noticed a need for consistency among various training programs across the state, and a need for tools to help divisions, sections and units develop their SBP/CBP training programs in an efficient, effective and consistent manner. A SBP/CBP Training Toolbox was created.	Human Resources	2004	Angela Crawford	(919) 662-3582.	Customer Service
LE Training Request System	The Department of Human Resources' customers not only includes those applicants applying for positions, but they also include the 14,000 DOT employees the division services. Since HR considers the work force to be the most valuable DOT asset, it is always looking for innovative ways to improve communication and customer service. With employees in each county of the state, DOT faces many challenges regarding communication and information sharing. The old training request process included a long paper trail from the employee, to the supervisor, to the training administration unit for approval or denial. Compiling data on requests, approvals and denials was a cumbersome process of going through numerous files. The License & Theft Unit wanted to streamline the request process and make it easier for management to monitor and track the training that had been requested, approved or denied	Human Resources	2004	Angela Crawford	(919) 662-3582	Customer Service
Interstate Salt Brine Application Equipment	To allow for pretreatment of Interstates 77 and 85 with brine, two used 5000 gallon chemical tankers with chlorobutyl linings to prevent corrosion were purchased. These units were delivered to the Charlotte Equipment Shop where preventive maintenance was performed on all lighting and brake systems. Each unit was equipped with a hydraulic driven water pump, electrical control valves, spray nozzles, and cab mounted controls. This retrofit allows the operator to choose two or three lanes of coverage from the operator's seat. Two Road Oil Unit road tractors not being used during snow and ice removal were used to pull the tankers. The tankers were also equipped with hoses and valves to allow them to transport brine product from the brine plant to several remote storage locations within Division Ten. Two smaller hydroseeders from the Landscape Unit were used to apply brine on the on/off ramps and overpasses on the interstate routes. The hydroseeders were retrofitted with electrical valves, spray nozzles and cab controls that can spray one or two lanes from controls in the cab.	Operations-Div 10	2004	Rick Mabry	(704) 596-2131.	Customer Service
Hydraulic Hose Machine	The Monroe Shop did not have the equipment to fabricate hydraulic hoses. When needed, the hoses were ordered or purchased from outside vendors. A hydraulic hose crimp machine was purchased for the Monroe Shop, and the fittings and hoses were added to the shop's parts inventory.	Operations-Div 10	2004	Edward Hill	(704) 283-6242.	Customer Service
Skill Based Pay Learning Improvement	According to the National Institute for Literacy, more than 20% of adults read at or below a fifth grade level. In the course of developing the CPI project, we discovered that 25% of our transportation workers have significant literacy needs. To overcome this problem, the CPI team created several Skill Based Pay (SBP) books on tape. A team member reads the books aloud and records himself or herself on tape so that employees with reading difficulties can participate in the SBP program without being embarrassed about their educational limitations.	Operations- Division 7	2004	Michael Venable	(336) 570-6833	Customer Service

Use of Light Weight Aggregate	Loose aggregate on asphalt surface treatments has always been one of our major concerns. Complaints from property owners have been received due to excess aggregate that had been broomed into their yard to allow for road painting. Tort claims for cracked windshields and chipped paint have resulted. To solve this problem, we looked to the light weight aggregate suppliers in North Carolina for a material that has the same gradation of 2-MS sand. This enabled us to use the light weight aggregate screenings on our last application of asphalt emulsion to lock the quarried aggregate in place. This process allowed us to drop the final application of asphalt emulsion from .2 gallons per square yard to .16 gallons per square yard. This also enabled us to use only five pounds per square yard of light weight aggregate screenings versus 12 pounds per square yard of quarried aggregate. Light weight aggregate screenings that did not adhere to the asphalt emulsion were blown to the right of way and dispersed.	Operations- Division 7	2004	Mark Fogleman	(336) 334-3192.	Customer Service
Plan & Permit Review Process	<p>Design plans and / or recommendations from the Roadway Design Unit, the Structure Design Unit, the Geotechnical Unit, Hydraulics Unit, Roadside Environmental, Traffic Control Unit, Utility Sections, Traffic Engineering Branch, and the Division Offices are an integral part of the permit drawings used for the Department's permit application submittal to the U.S. Army Corps of Engineers (USACE), Division of Water Quality (DWQ), and Division of Coastal Management (DCM). In order to improve the accuracy and coordination between the permit drawings and roadway design plans, a revised process is needed that will provide final plans earlier in the process. In other words, there needs to be a time when design changes that occur beyond that point are the extreme and not the norm.</p> <p>To allow this to happen, procedural changes are recommended to the project development process that occur on a project between the public involvement phase until letting. Key groups, i.e. Division, Congestion Management, Utilities, Right of Way, and others, will partner with the Highway Design Branch earlier in the design decision making process.</p>	Preconstruction- Highway Design	2004	Ron Allen	(919)212-5730	Cycle Time Reduction
Hydro Demolition	A Process was needed to reduce the time need to rehabilitate a bridge deck for a project in Bertie County. The project would take 18 months using standard methods forcing traffic to be detoured for 50 miles during the rehabilitation of the structure. A project in Columbia, SC was using the Hydro-Demolition process for dual three lane structures on I-77. Each structure was approximately 5500 feet long. The Bertie County structure is approximately 1 mile long. Both structures in SC were completed and open to traffic in 25 days. The Bridge Maintenance Unit set up a pilot project using the Hydro-Demolition in Greene County. The Greene County project, using our standard method of deck rehabilitation would have taken 14 weeks. Using Hydro-Demolition, the project was complete and open to traffic within 2 weeks. Using this project on the Bertie County project will reduce the time from 18 months to 30 days.	Operations-Asset Management	2004	Mike Summers	(919)835-8277	Cycle Time Reduction
Sign Lighting Outline Qualified Product List	<p>Through the use of critical analysis and problem solving, collaboration, and relationship building, the members of the signing electrical squad streamlined a cumbersome and time-consuming process. In the past, contractors were required to submit a description of each proposed sign lighting construction material to the Resident Engineer. This catalog cut submittal was sent to the signing section, researched for compliance with NCDOT specifications, approved, and sent back to the Resident Engineer.</p> <p>Analyzing possible ways to minimize the processing time for catalog cut submittals, the signing section electrical squad learned of web-based tools that could provide a good solution. With help from IT, the signing section electrical squad developed a qualified product list (QPL). The Signing QPL (SQPL) is an online database containing sign lighting materials approved for construction. The development of the SQPL has allowed the signing section to rewrite the policy for submitting catalog cuts.</p>	Preconstruction- Traffic Engineering	2004	Ayman Alqudwah		Cycle Time Reduction
E-mailing of Test Reports Between Departments	<p>The processing of grass seed test reports has been made easier and faster with the use of a scanner and e-mail.</p> <p>The Department of Agriculture must certify Grass seeds used by the Department and its contractors before it is used. Grass seed is sampled by either Department of Agriculture inspectors or NCDOT Materials Inspectors and sent to the Department of Agriculture laboratory in Raleigh for testing. Test results are then sent to the Materials & Tests Unit and the Roadside Environmental Unit for evaluation, processing and entry onto the Materials and Tests Unit Web Page. The Department tested 732 lots representing 8,761,392 lbs. of grass seeds in 2003.</p> <p>Previously, the Department of Agriculture laboratory's five page test reports were mailed through the Courier Service which charged \$.18 cents per envelope with an average of delivery of five business days. Sometimes the reports did not arrive in a timely manner and usage of the seed on the project was delayed as the seed supplier and contractor had to wait for the test results to be posted by the Materials and Test Unit.</p>	Construction- Materials and Tests	2004	Abby Daniel	(919)733-7091	Cycle Time Reduction

Automated Open Suspense File	When the Division of Motor Vehicles contacts a vehicle owner by mail, a suspense file is set up. These files are housed on 94 feet of shelving in our Telephone Communication Center. At any given time there are approximately 11,000 files on these shelves. When a phone call concerning a file is received, the file must be pulled from the shelf. It takes about 5 minutes to locate and pull each file and have it available to respond to the caller. There are times when the file is already out to someone else or misfiled, which would add additional time to locate the file. There is one full time file checker and she is assisted by others when needed. After a review of the present system it was decided that the file system should be automated. This would allow review of the file on line.	Division of Motor Vehicles	2004	Richard Howard	(704) 480-5580	Cycle Time Reduction
Parcel Information Service	DOT offices need address information on property (parcel) ownership for various purposes. This information is valuable for contacting property owners to inform them of citizen information workshops, design public hearings, etc. In the past, DOT offices would send personnel to local tax agencies to gather parcel owner information, or would collect the information directly in the field. These were expensive (travel costs and subsistence) and time-consuming methods of collecting the information. Sometimes different DOT offices would contact a local agency at different times for the same data. That was a source of irritation for the local agency because it demonstrated an uncoordinated effort by DOT offices, and caused the agency to do duplicate work. The GIS Unit developed a service to obtain digital parcel data from local agencies and redistribute the information to DOT offices as needed. Most counties now have parcel data in electronic format. GIS collects data from local agencies through web download or phone ordering. The data is stored and organized into a standard GIS format. The GIS Unit currently possesses 87 (87% of state) county parcel layers.	Information Technology-GIS	2004	Chris Tilley	(919)707-2156	Cycle Time Reduction
Environmental Permit Process Improvement	The environmental permitting process associated with building and maintaining North Carolina's transportation system is lengthy and highly complex, involving many state and federal agencies. In an effort to improve the workflow effectiveness and efficiency of the environmental permit development, coordination, and issuance process, the NC Department of Transportation (NCDOT), along with the NC Department of Environment and Natural Resources (DENR), and the US Army Corps of Engineers (USACE) jointly sponsored a process improvement initiative. The initiative was initially undertaken with the primary purpose of developing quality permit applications and issuing environmental permits that support the timely delivery of the transportation program while minimizing disruption to the natural and human environment. In North Carolina, the permitting process is integral with the project development and National Environmental Policy Act decision-making process. While the original intent of the initiative was to improve the permitting process, the project development process also had to be examined in order to effect substantive change.	Environment & Planning-Project Development	2004	Debbie Barbour	(919)733-8425	Cycle Time Reduction
Road Addition Mapping	Recently we have begun to use aerial photography to aid in our road addition process. Previously, when roads were added to the State system we would sketch the road into our county maps and the accuracy was not as it should. With the help of our CAD operators, they can use aerial maps to outline the roads and print out a much more detailed map that gives the exact location, length and reference to other roads.	Operations-Div 10	2004	Matt Weiss	(704) 982-0104	Cycle Time Reduction
One Man Patcher	After a heavy snow season followed by an unusually wet spring, the roads in the county were in very poor condition with many potholes. We rented a patch machine made by Rosco from Interstate Equipment Co. The machine patches using tar and gravel and is self-contained on a 33,000 GVW truck. The operation requires only one person to operate, and a second if needed to stop traffic when operating in a curve or other blind spots. This operation has patched up to 120 holes in a single day, with 75 to 100 being normal. The single truck was able to patch more holes than all 5 patch crews combined. Each conventional patch crew consisted of 1 TSI, 2 TW, 2 inmates, 1 Crewcab Dump, 1 Tar Kettle, 1 Small Dump, 1 Roller, and 1 Roller Trailer. The use of this machine has not only helped to get potholes under control, but has allowed us to concentrate less on response and more on routine maintenance of roads.	Operations-Div 10	2004	W.D. Gillette	(704) 289-1330	Cycle Time Reduction
Work Instruction Manual for Office Procedures	The Division 10 Equipment Office clerical staff consists of an office manager and three processing assistants each having designated duties to perform. In the absence of an employee, their designated duties are normally put on hold until they return back to work because other employees are not trained in those areas. Also, if a position becomes vacant, all office personnel brainstorm together to figure out the process to carry on those duties. Since there is no formal training for out specific jobs, we felt the need to cross-train all current personnel and come up with a method to train new personnel as well. Implementing and creating a training/work instruction manual has solved this problem. Office personnel and the equipment superintendent have created a detailed manual to include all transactions that are used to perform day-to-day operations in the Division 10 Equipment Unit.	Operations-Div 10	2004	Anne Evans	(704) 596-2131	Cycle Time Reduction

Preformed Thermoplastic Detectable Warning (Wheelchair Ramps)	<p>Standard procedure for retrofitting wheelchair ramps for the sight impaired with detectable warning now calls for truncated domes that can be felt underfoot or by canes as the boundary between pedestrian and vehicular routes. There have been issues in the past due to constructability problems with the concrete installation. The standard installation of the truncated domes usually consists of saw cutting and removing concrete. Pour new concrete and stamp with a rubber mat to form the domes, which has not always produced the dome effect. When the domes are not formed as required the process may have to be repeated numerous times. In addition to these possible problems, the concrete must be allowed to harden before use.</p> <p>By using preformed thermoplastic, the process consists of cleaning the area and laying an adhesive mat, heating, then rolling of new thermoplastic mat. The process takes around 20-30 minutes.</p>	Operations- Division 7	2004	Bobby Norris	(336) 634-5635	Cycle Time Reduction
Bituminous Unit Operating Year-round	<p>Division 11 Bituminous Unit has decided to keep the Bituminous Unit intact year round rather than temporarily transferring the employees and equipment to other Units within the Division during the off season. We are now utilizing our employees year round, resulting in the Unit being more efficient and productive. In doing this, we have the teamwork and partnership of the Division Counties. Bituminous Operations has started stockpiling and snow removal, utilizing only DOT employees and equipment, rather than extensively utilizing contract Fully Operated Rental Equipment.</p> <p>Prior to this change, we were paying an average of \$3,246.72 per day with rental equipment to stockpile. Now we're paying approximately \$2,343.84 per day with DOT personnel. This is a cost savings of \$108,345.60 by Division per season just by using DOT personnel and equipment. Statewide, it could be a savings of \$1,516,838.40.</p>	Operations-Div 11	2004	Matthew Oliverson	(336) 903-9235	Dollar Savings
Substitute Vacuum Pump Oil Source	<p>M&T purchased an instrument to test metal alloys in May 1996. It uses two vacuum pumps to keep the various chambers under vacuum when needed. The pumps must run continuously and require oil changes each 90 days at 1 liter per pump. An approved fluid must be used which costs \$86.50 per liter from the instrument manufacturer. This year a source was found which will furnish the fluid directly to the Department so that the instrument manufacturer's price markup is avoided. The oil from the new source costs \$8.75 per liter, creating a savings of \$77.75 per oil change.</p>	Construction-Materials and Tests	2004	Kelly Croft	(919)329-4090	Dollar Savings
Revision of DWI Restoration Hearing Process	<p>From March,1988 until May,2004, the DWI Restoration Hearing process required a panel of three (3) Driver License Hearing Officers to conduct the DWI hearings. Forty (40) hearings were scheduled one week per month per panel in established hearing locations. On average, there were six (6) DWI Panels assigned each month to conduct these hearings. The cost for one Driver License Hearing Officer to travel for one week each month was averaged to cost \$450.00 per week. This included overnight lodging and meals at or below the state allowed per diem. For one 3-person panel, the average cost was estimated at \$1,300.00 per week or \$8,100.00 per month for 6 panels which averaged \$97,200.00 per year. The average cost for 7 panels was estimated at \$9,450.00 per month or \$113,400.00 per year.</p>	Division of Motor Vehicles	2004	Wayne Hurder		Dollar Savings
Right of Way Electronic File System	<p>The Right of Way Branch is responsible for the acquisitions of property for construction. A large amount of legal documentation is generated for each claim. Right of Way is required by State and Federal Laws to retain this documentation from 2 to 15 years, depending on the type of claim. The State Records Center is where the documentation was retained. Due to the recent State Budget Crunch, State Records was no longer able to store our documentation. Right of Way had to devise a new method of storing its documentation.</p> <p>After reviewing several alternatives, Right of Way initiated a system called ROW-EFS (Right of Way Electronic File System) where the information is processed, stored and archived electronically using existing computer technologies already in house. This system would incorporate all 20 Right of Way offices. New procedures had to be developed and taught to all of the Right of Way employees.</p>	Preconstruction-Right of Way	2004	Grady Morris	(919)733-7932	Dollar Savings
Developer Resurfacing	<p>Due to the large amount of development in Cabarrus County, and with the majority of these developments the developer must construct roadway improvements. To eliminate conflict with our resurfacing contracts, we have determined that if the development is approved, and set for construction before we receive that upcoming year resurfacing list, and the subject development is within limits of our projects, we leave out their proposed improvements from our resurfacing program. By not overlaying their improvements, we can save tenths of miles in resurfacing and add other maps to our contract.</p>	Operations-Div 10	2004	: Matt Weiss	(704) 982-0104	Dollar Savings

Aerial Mapping of Quantities	This process is new so it is difficult to say if the actual quantities installed we be closely related to those that are being estimated. It has, however, decreased the time it takes to get quantities by 50%. Instead of two people spending an entire day collecting measurements, now only one person can complete the project. If the average engineer (TE1) makes \$19/hr then wages not spent on the extra personnel for one day is \$152.00. To perform the investigation requires at least one round trip of approximately 220 miles at \$.25/mile which equals \$55.00 in vehicle costs plus \$16.28 in fuel. The total savings per contract would amount to \$223.28.	Operations-Div 10	2004	Tim Kirk	(704) 982-0101	Dollar Savings
Pallet Return	Inventory and supplies that the Roadside Environmental Unit receives for our daily operation comes on pallets and gets stockpiled at the local yards. As the crews clean trash and debris from the yard, the pallets were taken to the landfill at a cost to the department.	Operations- Division 7	2004	Ken Taffer	(336) 334-3192	Dollar Savings
Salt Building Drapery	This CPI team was formed to resolve problems with our salt storage facility. The specific problem with our storage unit was shrinkage and polluting the nearby environment. During heavy rain events, rainwater would blow into the open front of our salt storage units and erode our salt piles. In addition, evidence of storm water runoff pollution was apparent because the surrounding grassy areas were dead and brown. The CPI team attempted several different ideas; however, their most innovative idea was the addition of drapery to the front of each salt building structure to prevent rainwater blowing into the storage units. The Salt building curtains consisted of fence posts, fence couplings, and tarps which were all available from the Central Depot in Raleigh. After installation there was no loss of salt and grassy areas recovered with the elimination of storm water runoff.	Operations-Div 7	2004	Michal Venable	(336) 315-7080	Environmental Sustainability
Mitigation Process Improvement Initiative	The Mitigation Process Improvement Initiative was initiated through a mutual agreement with the NC Department of Transportation (DOT), the NC Department of Environment and Natural Resources (DENR), and the US Army Corps of Engineers Wilmington District (USACE). The process mission was to develop a structured mitigation process that supports the timely delivery of NC's Transportation Program while appropriately compensating for unavoidable and minimized wetland, stream, and buffer impacts. The initiative was undertaken with the overall purpose to improve the effectiveness and efficiency of the DOT/DENR/USACE compensatory mitigation process. This process improvement initiative is highly complex and has involved numerous representatives of various state and federal resource agencies. The Ecosystem Enhancement Program (EEP) was the result of recommendations developed by the process owners.	Environment & Planning-Project Development	2004	Bill Gilmore	(336) 903-9184	Environmental Sustainability
Access Management Signal Analysis Check List Program	The AM Group does approximately 1,000 annual analysis of Roadway Network files from private engineering firms. Data is text doc. by Signalized System Analyses Software (Synchro). The Process Management Section created an Access 97 Visual Basic application (Signal Analysis Check List) that reads the Synchro output, analyzes the data and outputs the data in both a macro and micro report format and stores the data for future retrieval. Before implementation of Signal Analysis Check List it took an hour to analyze an average file however, now it only takes 2 minutes.	Preconstruction-Traffic Engineering	2004	Louis Kudelka	(919)250-4151	Labor Hour Savings
Signing Rodeo Database	The Signing Section recognized a need for a tool that would organize and automate the registration and associated administration processes involved with the Signing Rodeo, a training program. Process Management developed an Access 97 database application that automates all recognized data centric business processes. Manually completing these tasks would take approximately 240 hours per training event.	Preconstruction-Traffic Engineering	2004	Louis Kudelka	(919)250-4151	Labor Hour Savings
Timesheet Data Entry Process	The timesheet data entry process required the same data to be entered into electronic spreadsheets twice. The process was redesigned to eliminate the second manual entry of timesheet data from the paper copy. A new spreadsheet was developed for NON-TIP employees and the Pmii spreadsheet was used for TIP employees. The first spread sheet is saved to the file server and the time entry personnel copy and paste directly into the SAP system.	Preconstruction-Traffic Engineering	2004	Jennifer Portanova	(919)250-4151	Labor Hour Savings
Research Program Management Database (eXpress)	Due to the high volume of research projects managed by The R&D unit, the large number of internal Department customers involved in guiding the research and the extensive list of universities and academic researchers conducting the research, the R & D Unit embarked on a plan to better organize the project information and management procedures. A database was constructed in modular fashion. Because of the database a higher percentage of time can be spent on assuring that research project objects are achieved and more attention is given to implementing the results.	Environment & Planning-Program Development	2004	R. Rochelle	(919)250-4128	Labor Hour Savings

LIDAR Utilization for Design Base Mapping	Accurate elevation data is required to produce base mapping products for functional, preliminary and final design. NCDOT collects this data using photogrammetric techniques. When other sources of current and accurate elevation data are available, the Photogrammetry Unit will utilize that data. NCFMP (North Carolina Floodplain Mapping Program) collected LIDAR (Light Detection and Ranging) elevation data in 2001 and 2003 for approximately 85% of the state. The availability of the NCFMP LIDAR elevation data has improved the Photogrammetry Unit's capacity to rapidly produce base mapping products in response to catastrophic emergency events such Hurricane Isabel. It has also enabled Photogrammetry to produce significantly more accurate base mapping for functional design.	Preconstruction-Highway Design	2004	Keith Johnston	(919)250-4001	Labor Hour Savings
Auger Shaft Seals	Auger bearings on the tailgate spreaders were failing prematurely due to the gap on the inner side of the bearing allowing salt contact with bearing face. Some were failing in as little as six months. To address this problem seal plates and seals were fabricated and installed. The process utilized recycled road signs and supplies. Spreaders without this modification require bearings replacement twice a year, with the modifications they have had the same bearing for three years with no signs of corrosion or internal wear.	Operations- Division 7	2004	Randy Richardson	(336)-668-2855	Labor Hour Savings
ERCON Database	The REU utilized a mainframe application to submit erosion and sedimentation control evaluations to Division Operations and Construction. The application had many limitations and had quickly become outdated. DOT Engineering Application Development, Highway Systems Support and REU developed a database and electronic distribution system that could be supported with laptop and desktop flexibility.	Construction-Roadside Environmental	2004	Ted Sherrod	(919)733-2920	Labor Hour Savings
Regional Traffic Safety Council Robert Waterhouse	In 2003, there were 250,933 reported traffic crashes in North Carolina that resulted in a total of 1,559 persons killed and 134,00 injuries on our highways. The NC Executive Committee for Highway Safety (NCHS) was formed in April 2003 to identify, prioritize, promote and support all 22 key emphasis areas in the AASHTO Strategic Highway Safety Plan (SHSP). The Executive Committee adopted the national goal of 1.0 fatalities/100 MVM (million vehicle miles of travel) by the year 2008. Presently, North Carolina's rate is approximately 1.6 fatalities/100 MVM. In an effort to reach the goal of 1.0/100 MVM in North Carolina, NCDOT representatives held meetings with the Executive Director of the Piedmont Authority for Regional Transportation (PART) to establish a safety council made up of representatives from rural areas of the Piedmont area. This council would assist the rural areas and give those citizens a place to turn with their safety issues and/or problems.	Preconstruction-Traffic Engineering	2004	Vickie Embry	(336) 896-7037	Safety Improvement
Revised Rumble Strip Policy	The old guidelines for rumble strips used by the NCDOT specified that rumble strips should only be placed on the following types of median divided roadways: Interstate Through Routes, Rural Freeway Segments, and Expressway Segments that are located in sparsely developed rural areas. Rumble strips are raised or grooved patterns that are placed along paved roadway shoulders to provide both an audible warning (i.e., rumbling sound) and a physical vibration. As drivers drift beyond their designated travel lane, the warning alerts the motorist that a steering correction is required. Recognizing the growing run-off-the-road (ROR) safety problems and the fatigued and distracted driver benefits of continuous milled rumble strips, an aggressive effort to reduce the number of ROR crashes was initiated by the NC Board of Transportation and North Carolina's Executive Committee for Highway Safety.	Preconstruction-Highway Design	2004	Roger Thomas	(919)250-4016	Safety Improvement
Rest Area Safety	In 2003, NCDOT engaged the qualified assistance of Edwin Weaver, PE of the NCSU School of Civil Engineering for a comprehensive study of the 61 North Carolina rest areas. The purpose of this study was to justify the levels of funding allocated to backlog maintenance and for necessary facility upgrades. The information gathered during the study provided NCDOT with the current condition of the rest area sites as well as an overall inventory of the infrastructure components (restroom buildings, vending buildings, picnic tables and shelters, HVAC, plumbing, etc.).	Construction-Roadside Environmental	2004	Tad Davis	(919)733-2920	Safety Improvement
Transportation Notification System	Federal Motor Carrier Safety Administration Regulations required commercial trucking companies and transportation companies to request a motor vehicle report (MVR) from each driver on a semi-annual basis. Transportation companies advised DMV that there were little to no voluntary driver reports on traffic convictions, license suspensions or license cancellations nor commercial driver license disqualification outside of the required semi-annual MVR checks. The North Carolina Division of Motor Vehicles took the initiative to develop a computer system that would give companies access to real time driver license record reporting. The NC DMV (Driver License Section) and the Transportation Information Technology team developed a proof of concept system known as the North Carolina Transportation Notification System (TNS).	Division of Motor Vehicles	2004	Barbara Webb	(919)861-3299	Safety Improvement
Move It On Over Public Awareness Campaign	Based on national statistics, approximately 50% of the nation's congestion is due to unplanned traffic incidents. Secondary crashes account for approximately 20% of vehicular crashes and approximately 18% of freeway fatalities. The Move Over Law and the Fender-Bender Law both deal with the movement of vehicles and motorist safety along North Carolina's highways. However, the public was not aware of the relatively new laws. A committee was formed with representatives from NCDOT, NC State Highway Patrol, Governor's Highway Safety Program, NC Trucking Association, and Federal Highway Administration in an effort to develop a public awareness program for the two laws.	Department of Transportation	2004	Rob Stone	(810) 944-2344	Safety Improvement

Tailgate Pin Punch	The removal of dump truck tailgate pins often resulted in smashed fingers and hands. In order to prevent this safety hazard, an inexpensive hand tool was created to assist in the removal of the tailgate pins. A simple piece of soft stock steel machined down to the proper diameter and length with a handle attached. A dead blow hammer was used to prevent the metal from shearing.	Operations-Div 10	2004	John Edmonds	(704) 596-6900	Safety Improvement
False Floor	In order to access equipment from the bed of traffic services trucks, it was necessary for operators to keep getting up and down in the back of the truck several times during the workday. Team members in the Division 10 Charlotte Shop designed, constructed and installed a false floor for the bed of their service trucks. Under the floor is a spot for signs, poles, and any hardware needed to install and repair signs. The truck operators now have easy access to the equipment.	Operations-Div 10	2004	Robert Waterhouse	(704) 596-2123	Safety Improvement
Parts Truck Modification	Personnel in the Division 10 Newell Parts Department discovered that the parts delivery truck needed stronger sides as well as a stronger headboard in the box part of the truck. They installed plywood and handrails to the sides of the box interior to secure the parts being transported daily to the shops within Division 10.	Operations-Div 10	2004	Jonathan Rinehardt	(704) 596-2123	Safety Improvement
Containment Area for Fuel Truck	In the past, there was no containment area for possible fuel or lube spills from the fuel truck. The Anson Shop personnel in Division 10, with the help of the Department of Corrections, constructed a covered parking area for the Anson Shop fuel truck. This area also provides a containment wall in the event of a fuel or lube spill from the fuel truck.	Operations-Div 10	2004	Eugene Cash	(704) 694-2636	Safety Improvement
Improved Paint Markings	Newly paved contract roads are striped in two ways, either with paint or long life markings which is usually thermoplastic. On contract paint roads, there have been problems with the edge-line radii and the white mini skips wearing out before the rest of the road did. Mini skips are a paint line 4-inches wide and two feet long with an eight-foot gap between the mini skips. They are a continuation of the edge-line at intersections that help motorists on the main road continue to follow the flow of the road. They also help motorists on the intersecting road decide how far they can safely pull up at the intersection. A decision was made to add in the contract for these newly paved roads that the radii and the mini skip lines at intersections be put in with thermoplastic and that the width of the mini skips be increased to 6-inches.	Operations-Division 7	2004	Larry Lashley	(336) 256-0551	Safety Improvement
Caswell Lighting	During the adverse weather season of 2003, the existing lights in the Caswell County Maintenance yard did not provide adequate lighting to work in a safe and efficient manner. At that time, there was only one area light at the salt storage area. Two more area lights were located at the front of the maintenance yard. The only way to work safely with the existing lighting was to use headlights from dump trucks and flashlights. This was an unsafe working environment for the employees working throughout the night during adverse weather conditions. To correct this problem, the Caswell Safety team contacted local electrical contractors to provide bids to install 18 400-watt high-pressure sodium lighting fixtures onto the existing poles. The contract was awarded and the lighting fixtures were installed	Operations-Division 7	2004	Cindy Schrodt	(336) 694-6101	Safety Improvement
Scaffold Attachment for Concrete Headwall	There have been problems working on back side of a concrete headwall form. The Alamance Bridge Maintenance team made a 2' high X 3' wide angle and used 2-3/4 inch anchor bolts to anchor the form to the headwall. Once the scaffold supports were fabricated, they can be used whenever needed.	Operations-Division 7	2004	A.C. Levens	(336) 375-5589	Safety Improvement
Yes! Yes! We Can Stop Littering	The citizens of N. C. expect the department to provide a high standard of motoring safety and environmental soundness, as well as beauty along our roadsides. The North Carolina school system provides an ideal opportunity to educate the state's youth and by extension their parents and their communities about the harmful effects of litter and how we can stop littering and improve our quality of life. With this view in mind the Union County Rotary Club and the schools system in Union Count developed a classroom course entitled YES! YES! WE CAN STOP LITTERING. The department was a partner in implementing the program successfully in the Union County school system and is working with the Rotary Clubs of N. C. to implement the program in the school systems of all 100 counties.	OPERATIONS - ROADSIDE ENVIRONMENTAL	2003	Anne Walker	(919) 715-2550.	Environmental Sustainability
Road Oil Database	There continues to be difficulty in record keeping on paving history within the division and providing access to this information for all departments. A division database was created in ACCESS to record all aspects of road paving. As a result county engineers and otherdepartment heads now have access to the database that allows them to identify roads that Road Oil has paved and those that havereceived markings. This information reduces the need to send out a person to identify whether a road that has been paved needs remarking.	OPERATIONS - DIVISION 9	2003	Noel Chilton	(336) 896-7019.	Environmental Sustainability

Portable Temporary Bridge	In the past Bridge Maintenance in Div. 11 has had to place temporary detours using pipe in streams. Div. 11 designed and built a temporary bridge which can be dismantled into 4 or 5 separate pieces and is easily transported to location. Savings of \$20,000 realized per site with no impact to environment and elimination of weeks of construction.	Div 11	2003	Dennis Bennett	(336)903-9124	Dollar Savings
Cable Guardrail Mower	Previously 8 employees and 4 hours were required to cut grass around 1 mile of guardrails - plus 2 trucks to haul equipment to site. Team designed mowing system mounted on tractor to cut grass. Current process reduces manpower and equipment and allows 2.6 miles to be mowed in 1 hour. New process saves \$7,837.80 and 262.2 labor hours	Div 11	2003	Donald Stanley	(336) 903-9121	Dollar Savings
Daylily Planting	Daylilies were to be planted along US 64 and US 74 Bypasses totaling 64.74 acres or 46,162 daylilies. By providing daylilies grown by DOC to contractor, DOT was able to save \$3.07 per plant. Total savings to DOT \$141,768.18. Public response has been very positive to beauty provided by the plantings along our highways.	Div 8	2003	Arnold Lassiter	(910) 944-2344	Dollar Savings
PEF Estimate Database Application By: Traffic Control	Previous PEF application was part of a large database which required users to figure work estimates offline and enter into database. New process uses linked databases to import info from other existing Oracle database and allows for data entry without offline computations (now done by system). New process reduces time involved by 50% and increases accuracy .	PreConstruction	2003	Glenn Dennison	(919)250-4151	Cycle Time Reduction
Improving the Earthwork Measuring Process	Measuring unclassified excavation was a time consuming process involving photo missions by plane and significant field personnel computations to obtain final measurements. New process process involved several changes - lump sum payments on smaller projects and producing the computation during design and showing on plans. This eliminated template computation by field personnel on all projects and eliminated flights on lump sum projects	Operations PreConstruction	2003	Ellis Powell	(919) 733-2210	Cycle Time Reduction
Cultural Resources Programmatic Review	NCDOT Cultural Resources Unit and the Roadside Environmental Unit were interested in reducing amount of paperwork, review time and project delays required to obtain State Historic Preservation Office review on Division projects. A need for a more proactive approach was identified. Meetings with the Office of State Archeology, the Historic Preservation Office and the Army Corps of Engineers resulted in a process flow chart and final protocol that required more info early in review process. Utilizing this approach resulted in time saving, labor saving and environmental sustainability.' Time savings of 4,300 hours and labor cost savings of \$144,000 were realized.	Environment Planning & Local Government	2003	Robin Little	(919) 715-1757	Cycle Time Reduction
Improved Litter Trucks	Due to shortage of guards for DOC crews and fewer DOT employees, Alamance Maintenance had a reduction of 63% in its litter patrols. Previous process for picking up litter involved using a pickup truck to haul litter to landfill. Pickup truck had limited capacity and required several trips to landfill. Team looked at options and decided a larger truck with Tommy Lift would reduce labor and trips to landfill. Two person crews can haul more in one load and can remove large appliances easier. Crews can stay in field longer and reduce trips to landfill.	Div 7	2003	Michael Venable	(336) 570-6833	Cycle Time Reduction
Secondary Road Paving Standards, Context Sensitive Solutions	Div. 14 received much scrutiny of their secondary roads paving standards from property owners and environmental agencies. Safe and effective uniform standards were needed. Div. 14 developed a document entitled Secondary Road Paving Standards" which gives guidance to engineers on selecting the least disruptive, but adequate section for a project.	Operations Div 14	2003	Joel Setzer	(828) 586-2141	Environmental Sustainability
Recycled Appliances & Cross Line Pipes	Div. 7 was faced with serious budget problems which caused a 63% reduction of litter patrol crews. A deal was worked out to allow the crews to dispose of large appliances and metal cross pipes at the local recycling plant which they passed on the way to the landfill. As a result, 199,370 pounds of scrap appliances were recycled. In addition, they improved cycle time, created revenue and reduced the amount of trash and fees at the landfill	Div 7 Maintenance	2003	Michael Venable	(336)570-6833	Environmental Sustainability
Median Guardrail Turf Conversion	Guardrail in median creates challenges for maintenance of turf there. Previous methods of changing turf vegetation involved sodding and overseeding over a period of 2 to 3 years. Div. 14 selected a more desirable mix of hard fescue and bluegrass more suitable to cooler areas west of Raleigh. New mixture has year round growth, low fertilizer requirements, better drought tolerance and less mowing. Also, the active year round grass provides better pollution absorption, is suitable for poor soils and less runoff to harm environment.	Operations Div 14	2003	Reuben Moore	(828)586-2141	Environmental Sustainability

New Information Technology	Obtaining accurate field data required site investigations or field meetings. Team developed method which utilized web sites aerial photography and GIS to acquire same data. New method saves time by reducing field investigations. Review time for projects has decreased by 50% and outstanding projects have been reduced by the same amount. Nearly 50,000 labor hours per year have been saved.	Traffic Engineering	2003	Gary Faulkner	(919)250-4151	Labor Hour Savings
Ddraft	Right of Way agents prepare all deeds and easement agreements associated with acquisition or purchase of rights of way and easement areas for projects. Average time to complete these was approximately 2 hours. A CADD section in the Branch was created to to draft the deed descriptions from electronic plans. Time required to to produce deed descriptions was reduced to 19 minutes for highway project and 25 minutes for bridge projects.Total time savings is 7,726 hours.	PreConstruction	2003	Grady Morris	(919) 733-7932	Labor Hour Savings
Network Print TIP	Printing and assembling TIP documents using offset printing is labor intensive consisting of 5 separately printed documents. Documents are printed at various intervals on odd/even years requiring several months and significant overtime. The team developed a plan to utilize electronic printing on CD technology on a Xerox 4890. Actual number of copies printed were reduced due to print on demand technology. It provided effective highlight color printing, reduced amount of errors and significantly reduced print production window. Documents were in-house outsourced to Mainframe/Network Printing operation at DMV. Total savings were 1,860 labor hours	Administration	2003	Keith Wilder	(919)715-0400	Labor Hour Savings
QC/QA Program for Epoxy Coating of Reinforcing Bars	Previously, inspection of epoxy coated rebar was done after it was loaded onto the truck which is very difficult. M&T implemented the QC/QA Program which requires the coater to take full responsibility for production and testing of coating process and includes having an internal quality control plan and maintaining CRSI certification. No price increase was incurred due to implementation of program. Annual savings for this implementation is over 3,100 hours and a related annual cost savings of \$150,000	Operations	2003	Cecil Jones	(919)733-7411	Labor Hour Savings
Improved Research Products & Technology Transfer	Research & Development Unit solicits, promotes and manages research for all modes of transportation. Unit currently facilitates 80 contract research projects ranging from use of bio-diesel fuels to using innovative polymer materials for bridge rehabilitation and taking between 1 and 3 years and costing between \$30,000 and \$1.5 million. Recently R&D has implemented a process which involves faster dissemination of research results through the use of web sites, interactive CD's, video, datasets and software developed as part of the research. This has led to research customers throughout DOT being able to implement research in a more timely and powerful manner through a more efficient and effective means of technology transfer.	Research & Analysis	2003	Rodger Rochelle	(919) 715-4657	Customer Service
ROW-EFS	Historically, ROW files including deeds and agreements, individual project claim files, appraisals and other documents have been filed as hard copy documents within an ever-expanding series of file rooms and storage cabinets. Due to space restrictions, 3,000 files annually had to be transferred to State Records Center which were then destroyed after 10-15 years and lost to both ROW and general public. ROW put in an electronic scanning and filing system in place.This system allows immediate access to needed information to multiple users and eliminates hard copy filing. Also, when internal network is expanded to Division offices, more user will be able to easily access files.	PreConstruction ROW	2003	Grady Morris	(919) 733-7932	Customer Service
CARS & HP320 Pilot Project	Currently, CARS is used to track citizen concerns by NCDOT and Form HP320 is used by the Highway Patrol to track citizen complaints about highways and rights of way. The HP320 is sent to DOT to address the problem and the back of form is completed and returned to Highway Patrol after issue is resolved. New process allows SHP to enter info directly into CARS instead of HP320. Old process took approximately 4 weeks to turn around, while new process provides real-time notification to appropriate unit and allows DOT to respond to issues in more timely manner.	Operations Div 4&7	2003	Debbie Leonard	(252)237-6164	Customer Service
GIS Map & Data Distribution	Previously, DOT county maps were distributed by another unit during limited hours - 78% of maps were 4 years old, thus outdated. GIS created the GIS Distribution Center (DC) to serve as central location for processing and distributing GIS info and products. In December, 2002, county map distribution was transferred to the DC which created a central location for creation and distribution of maps. Map sales are now recorded in an electronic database. Improved communications have been initiated between the DC and mapping sections. Customers may contact the DC between 8 am and 5 pm, and most requests are filled within 24 hours	GIS	2003	L.C.Smith	(919) 212-5000	Customer Service

Special Provisions & Standard Drawings on the Internet	Previously, consultants would have to request special provision and drawings for erosion control from the Soil & Water Section of the Roadside & Environmental Unit. Hard copies would then be mailed to consultant. Soil & Water and Emerging Technologies Section designed and implemented a web site from which the consultants could retrieve the standard drawings and special provisions. Contractor's no longer have to formally request items and wait to get them back. Also, having drawings online facilitates revisions to drawings	Roadside Environmental	2003	Derek Smith	(919)733-2920	Customer Service
Enhancements to On-Line TIP	Previously, access to TIP online was gained by clicking on links labeled by NCDOT division. This was useful to personnel familiar with division geography, but very confusing to others. In addition, project location maps were accessed by separate links. Beginning with the 2004-2010 TIP, the web site was reconfigured to provide users a clickable map of the state showing both counties and divisions. Users may also access projects by category. Also, a second enhancement allowed the user to pull up all data for a project from one place and data was provided in separate window formatted for printing.	TIP Unit	2003	Brian Padfield	(919)733-2039	Customer Service
Colored & Uniformed Survey Stakes for Environmental Areas	In summer of 2001, NCDOT initiated a new program to address environmental stewardship. A Division Environmental Officer (DEO) was created to assist field personnel in identifying environmentally sensitive areas. CPI team discovered that stakes were color coded red or white to identify sensitive areas, but had symbols that were confusing. Team decided to introduce a new color - pink - to identify environmentally sensitive areas. Since its introduction, no further mishaps have occurred and confusion has been eliminated. DEO meets with personnel to advise them of importance of pink stakes	Operations Div 7	2003	Michael Venable	(336)570-6833	Communications
CEI Contract Administration Guidelines & Workshop	In early 1990's, NCDOT wrote its first contract for private construction and engineering inspection (CEI) services.. No guidelines to aid in administering contracts or to describe program - only construction personnel served as resources. Team was formed to write guidelines and to conduct a series of workshops for NCDOT construction engineers and private firm personnel based on these guidelines. As a result, both NCDOT personnel and private firms have a better understanding of the CEI program.	Operations Construction	2003	Jimmie Travis	(919)733-2210	Communications
The Book Federal FY 2003 Appropriations Requests	NCDOT needed to develop a resource for NC's congressional representatives to use during appropriation bill process since there was no systematic effort towards influencing such bills. A working group was formed to develop a process for generating NCDOT's input for the FFY 2003 appropriations. Project resulted in The Book, a bound catalog of desirable earmarked projects categorized by US congressional districts and by all modes. Copies were delivered to NCDOT personnel, NCDOT's Federal Legislative liaison in Washington. They in turn met with NC's congressional representatives and provided copies. Subsequently, the FFY 2003 Appropriation Bill passed and NC's projects that were included came primarily from the wish list included in The Book.	Program Development	2003	Moy Biswas	(919)715-2465	Communications
Safety City at the 2002 NC State Fair	NCDOT strives to provide a safe, efficient transportation system for the traveling public. With increase in highway construction work zones across the state, motorists, tourists and construction personnel are at greater risk of injury. Over the last 5 years, 166 people were killed in NC construction, utility and maintenance work zones. A need for an aggressive and effective education effort directed at safety and awareness in work zones was realized due to the number of deaths. At the 2002 NC State Fair, NCDOT partnered with 9 other state agencies.	Construction	2003	Jimmie Travis	(919)733-2210	Communications
Decision Aid for Wildflower Management Program	Wildflowers are recognizable component of NC's Roadside Enhancement Program which tourists and citizens give positive feedback to the Department. Weed competition makes keeping these beds looking their best very difficult. NCDOT and NC State entered into an agreement to evaluate cultural and chemical management techniques for wildflowers. Greenhouse and field trials have been conducted on 28 species of wildflowers and the effectiveness of 31 herbicides on these wildflowers have been evaluated. An interactive CD which allows managers to cross-reference various combinations of wildflowers, herbicides and weed species to determine the best control methodology for specific planting sites. This CD is shared with Division personnel as well as other DOT's across the country.	Roadside Environmental	2003	Derek Smith	(919)733-2920	Communications
Quick Connect Snow Plow	The current process of connecting snow plows to truck frames usually required 3-4 employees, a sledgehammer, a pry bar and 10-15 minutes. Also, the process required employees to be between plow and truck. A Stokes County maintenance team fabricated parts and modified their plows & frames using a quick connect system based on the PennDOT's in-house design. New design now takes 1 person 2 minutes to connect the plow to the frame and also reduces employees exposure to safety hazards.	Div 9	2003	Kent Boyer	(336)593-8541	Safety Improvement

Access Management	Due to poor past management of street and driveway access, the state highway system is operating below its original intended purpose. Because of numerous points of access/conflicts, safety is compromised, capacity is being reduced and driver workload is diminished due to poor management of side street conflicts. An NCDOT Access Management policy has been developed and recently implemented. Access Management has the potential to save the traveling public as much as \$240 million per year in crash costs alone. The goal is to enhance road safety, improve motorist mobility and reduce environmental impacts.	Traffic Engineering	2003	Gary Faulkner	(919)250-4151	Safety Improvement
Air Compressor Air Hose Renovation	Rockingham County Maintenance Unit identified a problem in changing attachments on hose of compressor. Compressor coupling would wear due to twisting of hose during use which caused wearing of threads on coupling. Hose would sometimes disconnect under pressure which caused a safety hazard Employee suggested replacing threaded coupling with a quick couple coupling. For total cost of \$40.32, fast and easier connections can be made and since the hose swivels freely there are no twisted or kinked hoses.	Div 7	2003	L.R.Presnell	(336)634-5642	Safety Improvement
PR-139 Electronic Reporting	Civil Rights Compliance officers needed to have the method of checking, summarizing, and reporting of statistical information regarding minority and female employment on form PR-1391 (annual report federally mandated from contractors and subcontractors working on federally funded highway projects) improved. An electronic version was developed which identifies errors and eliminates the need for hand adding of hundreds of numbers. There is a request for the Construction Unit to make this electronic reporting available to the Resident Engineer Offices to expedite the submittal process.	ADMINISTRATION	2002	Candie Auvil	(919)733-2300	Labor Hour Savings
IRP Internet Renewal	The Interstate Trucking Industry in North Carolina was limited to two locations in the state (Raleigh and Charlotte) to process their annual IRP renewal. At the time, applications or renewals could be processed by mail. The annual IRP renewal period for the approximately 12,000 North Carolina based carriers runs from January 1st through February 15th of each year. This presented numerous problems, such as hundreds of customers at each IRP Headquarters office each day during the renewal period, extremely long waiting time for customers to receive service, having to rely on the mail service, and employees working mandatory overtime. To overcome the problem, an IRP Internet renewal was developed and implemented in January 2002.	DIVISION OF MOTOR VEHICLES	2002	Lois Warren	(919)861-3503	Customer Service
Duplicate Driver License On-Line Service	The number of driver license customers has been increasing 5% to 6% per year for the last several years but the number of examiners has remained the same. This has resulted in long lines, especially in high growth areas. In January 2001 a team was assembled to review the possibility of issuing driver licenses via the Internet. Under statute duplicate licenses can be issued for persons with a change of address, lost or stolen license, or damaged license. The team initially developed business rules to accommodate the average customer as well as keep within the guidelines established by North Carolina General Statutes. The challenge was to create a user friendly, yet secured application that required a minimum of user interaction and time. Security issues were discussed with Massachusetts, Ohio and Virginia DMVs. Based on these states' experiences, the team developed a process for issuing duplicate driver licenses over the Internet incorporating a Personal Identification Number (PIN) to enhance security.	DIVISION OF MOTOR VEHICLES	2002	Barbara Webb	(919)861-3210.	Customer Service
Prima Facie (False Certification)	The Vehicle Financial Responsibility Act of 1957 (General Statute 20-309) requires all vehicles registered in North Carolina to maintain financial responsibility (liability insurance, financial security deposit, or self-insurer). Per General Statute the state is obliged to revoke the license of those giving false information to DMV for operation of a motor vehicle. Once DMV is notified that liability insurance coverage has terminated, the customer is sent a request for verification of insurance. In the event of a discrepancy, a prima facie is processed and held for a set time until the customer responds. If the customer does not submit proof or pay a fine, the prima facie file is applied revoking the license plate. This manual process proved to be inefficient.	DIVISION OF MOTOR VEHICLES	2002	Brenda Freeman	(919)861-3332.	Communications
I-95 Work Zone Team	From a traffic safety standpoint, construction work zones are problematic because they present drivers with changes to the roadway environment (i.e., lane restrictions, changes in alignment, absent or poor centerline, absence of paved shoulder, etc.). The increased risks associated with these conditions are accentuated by high vehicle speeds and motorists who follow too closely. NCDOT attempts to maintain throughput without creating unsafe speed differentials often result in little or no posted reduction in vehicle speeds. Because of the constrained roadway and shoulder environment in the work zone, traditional enforcement operations are difficult, limited for the most part to officers and vehicles positioned in advance of the work zone or merge points with blue lights flashing.	DIVISION OF MOTOR VEHICLES	2002	Lt. Mark Nichols	(919)861-3185.	Safety Improvement

GPS/GIS Application for Commercial Motor Vehicle Enforcement	The Motor Carrier Safety Assistance Program (MCSAP) administered by NCDMV Enforcement is responsible for commercial motor vehicle safety efforts statewide. These efforts are managed out of eight (8) districts. The present pilot project involves the implementation of Global Positioning System (GPS) and Geographic Information System (GIS) technologies in the 12-county area covered by District III. The NCDOT Engineering Applications Group developed a specifically designed GPS event capture capability. By entering enforcement events and their geo-specific locations into the same GIS database environment as (truck-involved) crashes, NCDMV Enforcement will be able to relate the spatial and temporal characteristics of specific commercial motor vehicle (CMV) enforcement activities. The system also documents enforcement vehicle location on a continuous basis (i.e., every 5 minutes).	DIVISION OF MOTOR VEHICLES	2002	Capt. George Gray	(919)861-3185.	Safety Improvement
Use of Fully Operated Rental Equipment to Condition SR Roads	Rockingham County had not been able to complete its Secondary Road Construction Program due to a number of factors beyond the Control of Henry Adkins, County Maintenance Engineer. In July 2001, he was given the task of constructing and paving all roads with right-of-way approval in previous year's programs and the current year (approx. 20 miles) by October 2002. Henry had to develop a method to construct the roads and have them prepared for Road Oil to pave this season while continuing to meet the maintenance needs. Henry met with John Hunsinger, District Engineer, to propose a plan with production as the goal. Three fully-operated rental equipment grade crews constructed as many as five roads at the same time to meet this goal. The volume of work produced so many roads with stone to be conditioned for paving that he switched one fully-operated rental equipment crews from grading to conditioning the roads for paving in April to allow his grade crew to continue construction with two fully operated rental equipment crews	OPERATIONS - DIVISION 7	2002	Henry Adkins	(336) 634-5642.	Cycle Time Reduction
IRP Clearinghouse	As a member of the International Registration Plan, there existed a reciprocal agreement between the jurisdictions to collect all monies due from each IRP Registrant for each jurisdiction of travel and disburse them monthly in a timely manner. This process presented several problems: 1) This was a manual process of mailing recaps/ transmittals and checks for payment to all jurisdictions each month, 2) NC did not always receive the monies due from other jurisdictions in the time frame set forth by IRP, Inc., 3) Loss of revenue from the interest on all monies not received in a timely manner, 4) Checks had to be reissued due to being lost in the mail. NC IRP joined the IRP Clearinghouse in July, 2001. Currently 24 jurisdictions participate in the IRP Clearinghouse.	DIVISION OF MOTOR VEHICLES	2002	Lois Warren	(919)861-3503.	Cycle Time Reduction
Liability Insurance/Notice of Termination FS-4B	The Vehicle Financial Responsibility Act of 1957 requires all vehicles registered in North Carolina to maintain continuous financial responsibility. Insurance terminations are received from insurance companies upon cancellation of a policy. The customer has 20 days to respond, after which, the license plate is revoked for 30 days. Prior to October 2001 STARS (State Titling and Registration System) did not interface with LITES (Liability Insurance Tracking Enforcement System) to display multiple insurance lapses. License plate agencies do not access LITES and are unable to advise customers of pending insurance lapses when current insurance penalties are collected. This created confusion for the customer as notification for a subsequent insurance lapse was generated the next business day requesting the customer to respond within 20 days to avoid revocation. If the customer was not aware of subsequent insurance lapses, the notification was often ignored and the license plate was eventually revoked for failure to comply.	DIVISION OF MOTOR VEHICLES	2002	Brenda Freeman	(919)861-3332.	Customer Service
Establishing Performance Measures for Motor Vehicle Inspectors	The DMV Enforcement section have uniformed and non-uniformed personnel. Non-uniformed personnel, known as inspectors, are charged with the responsibility of investigating auto theft, administering the safety and emission inspection program for motor vehicles, and the licensure and regulation of automobile dealers. The staff is required to provide data regarding the activities of all personnel. Typically, the requests may originate as legislative inquiries or due to budgetary planning needs. To compound the problem, activities of inspectors are difficult to quantify, as they conduct a wide variety of different types of investigations that range greatly in the amount of time needed for completion. working team was organized to address the problem. The team developed a computerized Excel form, which allowed inspectors to electronically transmit a monthly report to their district offices. In turn, the district offices copied and pasted the report on a spreadsheet and transmitted a district summary to headquarters.	DIVISION OF MOTOR VEHICLES	2002	B. A. Riggs	(919)861-3135.	Customer Service
Superelevation Calculator	In the design of a roadway with horizontal curves, it is necessary to compute the transition of the roadway edge of pavement elevations to develop superelevation of curves, or banking of curves. The calculations are based on design criteria, which are obtained from the AASHTO Design manual for Highways. Once this data has been decided upon, the project specific calculations can begin. This is where improvements could be made. The calculations are repetitive and numerous; therefore, the chance of error significant. An Excel spreadsheet was designed to generate superelevation rates at each even increment of superelevation change, as well as each even fifty-foot station. This is accomplished after the data from the AASHTO publication is entered into the specified data fields. Other elements of the spreadsheet alert the designer to the overlap of curves when multiple curves are required. This assures proper spacing of curves for adequate superelevation transition.	OPERATIONS - DIVISION 14	2002	Greg Shuler	(828) 586-2141.	Cycle Time Reduction

Stockpiling Fill Material at Maintenance Camp	Alamance County Maintenance is responsible for the grading and construction of the Secondary Road Construction Program as well as other duties. One of the on-going duties is the search for and hauling of proper fill material to various projects. During the summer of 2001, DMV was beginning construction on a new facility approx. 1/2 mile from the maintenance Camp. The site they were building on required a large section of cut from the existing grade. The contractor would have to haul the material to an area located a great distance away. It was suggested that he could save both time and money by hauling his material just a short distance to the Maintenance Camp and stockpiling it there at no cost to NCDOT. In return, NCDOT could have a large amount of fill material on-site to be used at the Maintenance Engineer's discretion	OPERATIONS - DIVISION 7	2002	Derek Dixon	(336) 570-6833.	Cycle Time Reduction
Use of Fully Operated Rental Equipment to Condition SR Roads	Rockingham County had not been able to complete its Secondary Road Construction Program due to a number of factors beyond theControl of Henry Adkins, County Maintenance Engineer. In July 2001, he was given the task of constructing and paving all roads with right-of-way approval in previous year's programs and the current year (approx. 20 miles) by October 2002. Henry had to develop a method to construct the roads and have them prepared for Road Oil to pave this season while continuing to meet the maintenance needs. Henry met with John Hunsinger, District Engineer, to propose a plan with production as the goal. Three fully-operated rental equipment grade crews constructed as many as five roads at the same time to meet this goal. The volume of work produced so many roads with stone to be conditioned for paving that he switched one fully-operated rental equipment crews from grading to conditioning the roads for paving in April to allow his grade crew to continue construction with two fully operated rental equipment crews.	OPERATIONS - DIVISION 7	2002	Henry Adkins	(336) 634-5642.	Cycle Time Reduction
Flip Detour Signs	Division 10 Traffic Services installs detour signs as needed forconstruction. In the past, the signs were covered until they becameeffective. The problem would occur when weather would blow the covers off in which the sign would then have to be recovered by Traffic Services or the department they were installed for. Other problems occurred when the detour was completed and Traffic Services wasn't informed. Traffic Services developed a sign that flips by installing a hinge in the middle of the sign. This way the sign could be folded up to display the wording or folded down to cover the wording. By using this method, one person could stand on the ground and fold the sign up or down very easily. A latch was used at the top of sign to hold it in place.	OPERATIONS - DIVISION 10	2002	Mike Campbell	(704) 982-0101.	Cycle Time Reduction
Guardrail Tagging System	With the increase in installation of guardrail and cable guide-rail,comes the increase in rail damage due to vehicle crashes. In order for the State to be compensated for this damage, a responsible party must be identified and billed. Notification of damage is the 1st step. A collision report (DMV-349) is filled out by the law enforcement agency. The reports locate the damaged property in order for an estimate to be prepared. At times, this can be difficult and dangerous due to high-speed roadways with high volume of traffic.The team has developed a tagging system in which the investigating officer tags the damage at time of the crash. The tag is waterproof and secured by flex ties, bright yellow and orange in color, so it can be easily seen by DOH employees. The tag contains the basic information necessary to identify the responsible party. The tag also contains an estimated length of damage which enables DOH to properly begin the billing proess by estimating the repair cost for the billing form (Form 990). Tags can also be located prior to a writtenreport being received and called in to the local county maintenance facility to speed up the billing process and to expedite repairs.	OPERATIONS - DIVISION 4	2002	Debbie Leonard	(252) 237-6164.	Cycle Time Reduction
Moving Shoulder Reconstruction Operation	Repairing low shoulders after a road was resurfaced was both tohaul in the material and use a grader to level out the dirt, or use a grader mounted disk to pull up existing shoulder dirt. Use of the disk is better if the drop is less than 5", over that would not pull up enough. Equipment used is the grader with a mounted disk, an additional grader to kick off any dirt that is pulled onto the pavement, a broom tractor to sweep the pavement clean, a crew cab gang truck and 2 flaggers. A truck mounted attenuator at the back of the caravan with a "Slow Moving Traffic Ahead" sign and other advanced warning signs was utilized using one less employee. The caravan moves down one side of the road to the end of the workzone, turns around, and comes down the other side. They turn around and go to the next workzone. By this time, the crew leader will have the signs moved and the operation can continue.	OPERATIONS - DIVISION 4	2002	Chris Pendergraph	(919)934-6176.	Cycle Time Reduction
PM Box	In the past, when a mechanic was to perform a preventive maintenance on a vehicle or equipment, he would go to the parts counter for the needed filters and parts and this could sometimes be time consuming.A new process was implemented to reduce the mechanic's timewaiting for parts. Upon calling the parts department, personnel place the needed filters into a box with the equipment number on it.	OPERATIONS - DIVISION 10	2002	Keith Smith	(704) 596-2131	Cycle Time Reduction

US Mailbox	The Division 10 Equipment Shop and the District 2 Office/Newell Maintenance facility had separate PO Box rentals. On a daily basis when mail was picked up, each location had mail that belonged to one another delaying that facility in getting mail on time. Due to a busy work schedule, mail was not always picked up in a timely manner and would cause hardships. The post office was the mailing address and mail would be returned to the vendor due to an insufficient address since the Division was not set up to receive mail at the physical address. Also on one occasion, an employee went to pick up the mail and pulled out in flowing traffic and was hit by another vehicle crossing over a railroad track at a very dangerous intersection. Fortunately, the employee was not injured which could have led to thousands of dollars being spent on a workers comp claim. The post office was contacted for details on how to install a US mailbox.	OPERATIONS - DIVISION 10	2002	Anne Evans	(704) 596-2131	Cycle Time Reduction
Steel Pipe Installation	Replacement of a deteriorated 92" pipes culvert. This pipe had approximately 60' of fill. Replacement cost would be extremely high, because of fill removal, excavation size and location with other highways. Three private driveways would have been cut due to excavation, as well as expensive engineered retaining/shoring system installed, because of the depth of full and close proximity of a major highway next to the project.	OPERATIONS - DIVISION 13	2002	Ken Anderson	(828) 298-1128.	Dollar Savings
Hot Spray Thermo	Division Two were reaching the end of their life span. The remaining roadway life was approximately 2-3 years about half the life of normal thermoplastic pavement markings. Painting of the existing surfaces was an option but would require several remarking operations before the roadway was resurfaced. Through contacts with vendors, a new product called hot spray thermo was reviewed. This product provided a life span that matched the remaining pavement life and provided a product comparable with standard long life thermoplastic. Based on our investigation we elected to utilize this product. Additionally, to enhance visibility during both daylight and night we elected to increase the existing 4 line width to 6.	OPERATIONS - DIVISION 2	2002	Steve Hamilton	(252) 695-2044	Dollar Savings
US 70 Conversion from Bahiagrass to Centipede	The Division Two Roadside Environmental crew has begun a multi-year conversion of the shoulders and median sections of US-70 in Jones and Craven counties to centipede grass from bahia. The bahia requires mowing 6-7 times a year, while the centipede will only need to be mowed about twice. Centipede will take 2-3 years to become fully established but will create savings after that. With the use of specialized herbicides, sod seeding and fertilization we are trying to expedite the process.	OPERATIONS - DIVISION 2	2002	John Wells	(252) 830-3146.	Dollar Savings
Reuse of Clipped-off ABC Scheduled for Discarding	On this major interstate highway construction project, the project plans and special provisions indicated that a nominal 2 of the existing 12 aggregate base course layer was to be clipped off to establish the subgrade, and the remaining 10 layer is to be conditioned. The 2 clipped off material was to be discarded. The plans also indicated that a quantity of 60,600 tons of ABC was to be hauled to the site from the quarry to construct finished ABC shoulders, median, and rest area ramp base course.	OPERATIONS - DIVISION 13	2002	Stan Hyatt	(828) 251-6171.	Dollar Savings
Wiring an Existing Building	The building that is being used for the storage of salt, sand and signs had never been wired. This was causing a safety concern as well as delays when loading materials during the night. A local electrician submitted an estimate of \$4,904. Traffic Services in Wilmington was contacted to see if they could help. They would be able to provide lights, poles, breakers, receptacles and a panel box at no cost. These materials were salvaged from previous projects. The only expense would be for labor, equipment and wire.	OPERATIONS - DIVISION 3	2002	Linwood Reynolds	(910) 592-6174.	Dollar Savings
Construction Debris Disposal Elimination	Concrete pipe and asphalt have been disposed of by hauling to the Duplin County landfill. The tipping fees for fiscal year 2000/2001 were \$29,305.20. We contacted S&W Concrete Company of Wallace and they agreed to let us haul all the concrete and asphalt to their business at no charge. S&W recently purchased a recycling machine and will recycle the material.	OPERATIONS - DIVISION 3	2002	Linwood Reynolds	(910) 592-6174.	Dollar Savings
Skilled Based Pay Testing	The Skill Based Pay-testing site in Wilmington was causing the participating Duplin County Maintenance Department employees to miss three hours each month in travel and testing time. This was causing a problem by disrupting crew activities due to a shortage of employees. Ms. Leary-Ezell and I discussed the down time and she asked if it would be okay if the testing be performed in our office in Kenansville. I agreed and Ms Leary-Ezell contacted Nancy McMillian (Div Three Testing Coordinator) and presented the idea. Ms McMillian obtained approval from Jackson Provost. I then discussed the idea with all employees and asked that they should take as many tests as possible and that we would cut the testing dates from 12 to 6 per year.	OPERATIONS - DIVISION 3	2002	Linwood Reynolds	(910) 592-6174.	Dollar Savings
APA Repair	The asphalt lab owns an Asphalt Pavement Analyzer manufactured by PTI, Inc. This wheel-tracking device runs a continuous load over asphalt specimens to try to predict rutting. Rut tests are becoming an integral part of our mix design process. Specialized maintenance skills are required to keep this equipment in working condition, and over the years, numerous repairs have been made to this machine. Chris Bacchi, the Assistant Asphalt Design Engineer, has made a trip to PTI in Atlanta in the past and has learned how the APA is built and how it functions. Through numerous phone calls and this training, Chris has learned how to perform all of the necessary repairs, including part replacement and calibration. The manufacturer charges for travel time as well as labor to come and make repairs.	PRECONSTRUCTION	2002	Chris Bacchi	(919) 733-3563.	Dollar Savings

Equipment Identification Numbers	Since 1994 the Equipment Unit has used adhesive vinyl lettering and numbers for marking equipment identification numbers on our over the road vehicles. This produced a much neater job than spray painting the signage as had been done in the past. As we continued to use adhesive vinyl more and more, its usefulness for special signage and equipment marking became more apparent. However, the cost of purchasing the finished vinyl product continued to rise. A team was assembled to investigate the feasibility of purchasing a vinyl plotter and the software necessary to produce our own signage in-house. Prices were obtained for materials. A demonstration of the sign making process was viewed. The cost of the signage over the past twelve months was compared to the cost of purchasing the vinyl material and estimated cost for a twelve-month period. Calculations showed that producing our signage in-house would generate significant savings.	OPERATIONS - MAINTENANCE	2002	Charles Jones	(919) 733-3572.	Dollar Savings
Wilmington Satellite Laboratory	There has been a tremendous increase in the number of projects in the Wilmington area that utilize drilled piers in the construction of structures. This trend is expected to continue over an extended time frame, resulting in a large quantity of concrete test cylinders generated for testing. The closest Material and Tests facility to these projects that can perform these tests is approximately two hours away, so a satellite laboratory was established in Wilmington that eliminated the time and use of a vehicle to transport the cylinders to Raleigh or Fayetteville.	OPERATIONS - DIVISION 3	2002	Jack Cowser	(919) 733-7088.	Dollar Savings
Electronic Utilization of Pavement Condition Survey	Every two years Division personnel conduct a pavement conditionsurvey of all primary and secondary roads. The Pavement Management Unit is responsible for processing and transmitting this data to Division, District and County maintenance personnel. Previously, hard copies of this data were given to all Division, District and County Maintenance Engineers The Pavement Condition Survey data is now available on the Pavement Management Unit web site and a CD containing this data is given to each Division, District and County Maintenance Engineer. Hard copies are now processed only for the Pavement Management Unit and each Division office.	OPERATIONS - CONSTRUCTION	2002	Jerry Blackwelder	(919) 250-4094	Dollar Savings
Rest Area	The Division endeavors to provide safe and attractive rest areas at a reasonable cost to the taxpayer. At times situations arise that require job specific equipment for short periods of time. We obtained a Purchase Order Contract with a local equipment rental company for daily, weekly, and monthly rentals. Some equipment used are 1) concrete planers for uneven sidewalks, 2) stump grinder for removing dead trees, 3) small backhoe for plumbing repairs, and 4) concrete mixer. This equipment rents from \$60 to \$125 per day and \$180 to \$375 per week. Purchase of this equipment would cost from \$2500 to over \$16,000.	OPERATIONS - DIVISION 9	2002	J. M. Lineberry	(336) 896-7039	Dollar Savings
Blanket" Permanent Raised Pavement Marker Contract	Historically, the Traffic Services Supervisor waited until the spring to determine which roads had markers scraped off during the winter plowing operation. Quantities were based on state or division bid averages. The drawbacks were: 1) Having to wait until after the letting to determine exactly how many maps could be completed within the allotted budget. 2) Waiting until later in the year to let contracts, the greater chance that the contractor had already booked work. 3) Prices would generally be higher. A blanket contract for raised pavement marker was let December 5, 2001 instead of late March as in the previous year. The Traffic Services Supervisor estimated the quantity range and a percentage of roads that required raised pavement markers.	OPERATIONS - DIVISION 7	2002	Evan Andrews	(336) 256-0553	Dollar Savings
Cost Saving Operation for Drag Seal	The drag seal procedure was jeopardized due to a defective broom section. The broom bristles were not installed correctly to the wooden frames and were embedding in the seal making them a hazard to the public both pedestrians and motor vehicles. The team brainstormed to find an alternative method. A baseball infield was dragged with a chain link fence as part of the research. The uniformity within the field after this operation was observed. A ten-foot section of 9-gauge chain link fence was purchased; a 70-grade chain was attached to the fencing, and hooked to a pick up truck. The road was dragged with the fencing. The desired uniformity for 78m aggregate was obtained, the voids were filled within the aggregate, and the next application of liquid asphalt penetrated the aggregate effectively	OPERATIONS - DIVISION 7	2002	Mark Fogleman	(336) 334-3192	Dollar Savings
Hydraulic Hose Fabrication	In the past, most hydraulic hoses, as well as fittings, were purchased from outside vendors. This process was expensive, as well as, time consuming. The Albemarle equipment shop decided it was time to change this process. A hydraulic hose crimp machine was added as well as a 10x14 room addition to the shop.	OPERATIONS - DIVISION 10	2002	Melvin Furr	(704) 982-1997	Dollar Savings
Asphalt Distributor Hose Upgrade	It was 2 months when the hose began to fail, a new one had to be special ordered. Delivery times were about two weeks, and cost was over \$900.00. In order to install the new hose, the pump had to be removed and four new gaskets installed. This took an average of 5-6 hours of labor. New gaskets were about \$10.00 each. The decision was made to modify the plumbing of the asphalt distributor to accept a common hose that was carried in inventory by the local contract supplier. The modification was performed by removing the existing coupling and welding an elbow to the pipe. Four permanently mounted hose swivel couplings were added at a cost of \$35.00 each, eliminating the need for gaskets. Total change of hoses now takes less than one hour. The new hoses cost less than \$400.00 for the pair.	OPERATIONS - DIVISION 13	2002	Jerry Murray	(828) 298-0220	Dollar Savings

Replacement of Steel Plank Floor on a 150-ft. Span Bridge	Bridge Maintenance is responsible for a variety of structure maintenance activities. One type of maintenance performed several times a year is the replacement of steel plank flooring or rehabilitation on bridge structures. To reduce bridge closing for these repairs a new method of replacement was used. Instead of air hammers and muscle a Skid Steer Loader with an impact tool attachment is used. This allowed for a two-week reduction in the bridge closing (from 6 weeks to 4) and a reduction of required labor from 6 workers to four workers.	OPERATIONS - DIVISION 10	2002	Terry Harris	(704) 982-0101.	Dollar Savings
Lime	In the past Division Four used bagged lime for application to wildflower beds. This process was used because many of the sites were small and spread throughout the Division. Bag costs averaged \$73.20 per ton. Bulk suppliers were contacted to determine if they could apply bulk lime with a continuous sequence. The supplier was met at a central location, led to the multiple sites, informed of the application rates at each site, and allowed to move from site to site for application.	OPERATIONS - DIVISION 4	2002	Brian Glover	(252) 237-6164.	Dollar Savings
Dump Truck Canvas Stop	It is the goal of the Halifax Equipment Shop to keep the amount of unnecessary repairs to a minimum and keep the equipment on line or rented. There is currently an L-shaped bracket at the top/rear of the dump truck that is fastened to the body to receive the canvas rollback bar to cover the load. The position of the L-bracket is easily damaged while loading or unloading. There was an apparent need to improve this process and relocate the angle instead of just continuing to repair the damaged L-bracket. The action that was taken was to remove the L-bracket and attach a 3/8 angle near the fulcrum of the rollback bar, which is located just to the rear center of the truck body. This stop is less susceptible to damage.	OPERATIONS - DIVISION 4	2002	Joe Nelson	(252) 583-4221.	Dollar Savings
Granville County Rest Area Automatic Doors	In the fall of 1998 the Roadside Environmental Unit replaced the twenty-two year old manual swinging doors on the I-85 Granville County North Bound Lane Rest Area with an automatic sliding door. The cost was \$4,660.50. During the plan preparation stages of the Granville County Rest Area renovation, the REU instructed the architect to design the new building addition so that the existing automatic doors could be reused instead of a new set of doors being purchased.	OPERATIONS - ROADSIDE ENVIRONMENTAL	2002	Jennifer Pitts	(919) 733-2920.	Dollar Savings
LED Signal Head Retrofits under TIP Projects	Signal standards have changed in the past 2-3 years to include all LED signal displays. Initially only red LEDs were required, finally all LED. Traffic Services is faced with retrofitting these new signals with all LED displays using maintenance or other funding sources. All LED signals have shown as much as 50% less power consumption as old incandescent displays also LED visibility improves controlled intersection safety, and the five-year warranty on LEDs has reduced trouble calls for bulb replacement. In order to solve the problem, we proposed to get approval to let the signal contractor on the TIP project retrofit the signal heads while the project is ongoing. By letting the contractor perform the work during construction, DOT forces would not have to make a second visit to retrofit after construction is completed.	OPERATIONS - DIVISION 12	2002	Jimmy Hamrick	(704) 480-9033.	Dollar Savings
Recycled Erosion Control Stone	Riprap stone used for temporary erosion control devices on secondary roads construction has to be removed when projects are completed and permanent vegetation is established. Rather than dispose of used material, the stone is removed and stockpiled at maintenance facilities. As small amounts of riprap are needed for repairs and other maintenance activities, the recycled stone is used for these activities. This eliminates purchasing additional stone or hauling small quantities from the quarry and allows us to use the stone twice for one price	OPERATIONS - DIVISION 8	2002	Johnny Ransdell	(919) 775-3122.	Dollar Savings
School Zone Flashers	Our school zone warning flashers have always run on AC electricity and used incandescent bulbs. We decided that we would try solar for power and replace bulbs with LEDs. The installation cost for one set of solar powered flashers is \$6,221 compared with \$3,949 for conventional flashers. The payback period for the added costs over the annual energy saving of \$336.36 is seven years. Based on a two-year comparison so far both systems have performed without failure. It is expected that the conventional bulbs will begin to need to be replaced adding maintenance cost to conventional flashers. Data is not currently available.	OPERATIONS - DIVISION 11	2002	Dwayne Bauguess	(336) 667-1648.	Dollar Savings
Shoulder Machine	Due to the expense of self-propelled wideners, which cost \$120,000 per unit, we are experimenting with a shoulder machine, which attaches to the front of a rubber-tired loader at a unit cost of \$30,000. Thus far, the unit works great for shoulder work when dispensing dirt. Currently we are making modifications to achieve the same results with asphalt. With modifications in place we expect to achieve the same good results with dirt as well.	OPERATIONS - DIVISION 8	2002	Mike Garner	(910) 947-2721	Dollar Savings

Use of Nextels to Communicate with the Contractor	There has always been a problem in communicating with the contractor on a project. This problem existed at different levels. At times the head project inspector has a hard time locating and communicating with the project superintendent. Likewise, the DOT engineer frequently has a hard time reaching a project manager/engineer from the contractor. The contractor on the project was using the Nextel radio to communicate with each other. Our office had a possible solution to the problem. We asked the contractor if a couple of Nextel radios could be donated to our office for the duration of the project. One Nextel radio went to the Assistant Resident Engineer on the project, the other went to the head project inspector.	OPERATIONS - DIVISION 10	2002	Brady McKenzie	(704) 289-1330.	Communications
Creation & Implementation of a Utility Herbicide Request Form	By law NCDOT has governing authority over all vegetation growing along our rights of way. In order to accommodate utilities that wish to use these rights of way, NCDOT has prescribed to a standard permitting process. This permitting process was confusing and some utilities were unaware that they needed to obtain a permit to control vegetation under their power lines. In order to clarify the Department's position and to streamline the permitting process, NCDOT's Roadside Environmental Unit developed a Utility Herbicide Request form. This form is accessible via the NCDOT's website to North Carolina's major power companies and the State's 27 Electric Membership Cooperatives.	OPERATIONS - ROADSIDE ENVIRONMENTAL	2002	Derek Smith	(919) 733-2920.	Communications
Work Zone Safety Poster Contest & Calendar	It is the goal of the N.C. DOT to continuously provide a safe, efficient, customer-service driven transportation system for the citizens of North Carolina. The department faces many new challenges regarding the safety of highway workers and the traveling public. With increased growth throughout the state, work zones and construction-related activities are reaching a new historical high. There are currently over 400 major work zones across the state, which places North Carolina motorists and tourists at a potentially greater risk. In 2001, there were 30 motorists killed in North Carolina work zones. Since January 1996, over 180 people have been killed in N.C. construction, utility and maintenance work zones. These numbers confirm the need for an aggressive and effective education effort directed at increasing safety and awareness in highway work zones.	CONSTRUCTION & MAINTENANCE	2002	Jimmy Travis	(919) 733-2210	Communications
P. O. Contract - Advertising of Bids	Much work is let every month through the purchase order contract program. Some work is not on a specific route and is needed on an as-requested basis. P. O. contracts that did not require an on-site showing presented a problem as far as getting a contract package to the appropriate bidder. Contracts would normally be given out at the showing of jobs, which is sometimes mandatory. In the past (for non-showing jobs), entire proposals would be sent to each contractor on the mailing list. P.O. contracts range from 40-60 pages in length and may go out to as many as 90 different contractors. This resulted in an immense cost in postage and paper.	OPERATIONS - DIVISION 11	2002	Brian Hamby	(336) 667-9117	Communications
District Communication	The process of bringing a road from an unpaved route to a paved route requires many steps. These steps once required you to do extensive research at many different locations around the office to determine at what point in the timeline each route is located. The need to know what information is available is crucial to the time in which a road can begin construction.	OPERATIONS - DIVISION 11	2002	Brian Hamby	(336) 667-9117.	Communications
Online Submission of Oversize/Overweight Permit Application	Due to 2000 legislative changes in the North Carolina Motor Vehicle Law and the NCDOT Administrative Code, both of which govern issuance of Oversize/Overweight (OS/OW) permits, the volume of applications for permits greatly increased. This required both the DOT Central Permit Office and the trucking industry to do more with less. Implementation of the Automated Routing Permit System (ARPS) brought a more efficient application process for obtaining the OS/OW permits. Prior to installation of the ARPS Internet web application program in August 2001, movers had four options for requesting an OS/OW permit. These options were telephone, facsimile, in person, or by mail. The two options most often used, telephone and facsimile resulted in lost productive man-hours for both the movers	OPERATIONS - PERMIT	2002	Gwen Hobby	(919) 733-4740.	Customer Service
Guardrail Placement Rating System	With limited funding available, a fair and efficient system for evaluating the locations that warrant the installation of guardrail was needed. An unfunded need list was in existence that contained projects that were several years old. It was very difficult to determine the priority of a project in order to maximize the limited funding available. The team included NCDOT engineers as well as a lieutenant from the State Highway Patrol and a county commissioner. All members had a stake in the placement of guardrail. To determine opinions on the current method of guardrail placement, a questionnaire was completed. This established a baseline from which to work. It was determined that there was no standardized guardrail priority system. The team determined items to consider and ranked them in order of importance. Point values were then assigned to each of the factors considered.	OPERATIONS - DIVISION 13	2002	Mark Teague	(828) 251-6171.	Customer Service
Salt Brine System	The salt brine system was developed in order to provide a higher level of service to the public during the onset of snow and ice events, primarily in Henderson County. The system currently in operation has two mix bins and 20,000 gallons of storage capacity. We have six tandem truck tanks with a capacity of 1,200 gallons each and two tanks with a capacity of 2,500 gallons each that mount on a low boy.	OPERATIONS - DIVISION 14	2002	Mark Gibbs	(828) 891-7911.	Customer Service

NCDOT Division of Highways Design-Build	Our office is currently administering a one-of-a-kind project. It is an alternative contracting method known as Design/Build, and is the first of its kind under the 1998 Design/Build legislation in the state of North Carolina. Interstate 77, which currently carries 73,000 cars per day on four lanes, is being widened from two to four lanes in each direction for approximately 8.9 miles from I-85 to just north of the proposed Charlotte Outer Loop in Mecklenburg County. A highway project such as this would traditionally take about two and a half years with the construction lasting for about three years. The highway project would, therefore, normally take about five and a half years to complete. However, under Design/Build, the team has committed to open all lanes to traffic by December 2003 and was able to begin construction on December 3, 2001, which means a little more than two years under construction.	OPERATIONS - DIVISION 10	2002	Leslie Reynolds	(704) 982-0101.	Customer Service
NC 16 Widening Project #6.780002	two-lane section of roadway into a three-lane curb and gutter section on NC 16. Problems with the task included: 1) No purchase of right of way could be obtained due to limited funding. 2) The section of roadway included residential and commercial property. 3) There was no recorded DOT right of way on 97% of properties. 4) One property owner was trying to organize the other property owners into an opposition of the project unless they were compensated monetarily. The first goal at hand was to head off the negative criticism by informing each property owner of the DOT's intentions and explain the positive benefits the widening would have on their property. Alexander County Maintenance employees conducted several informal meetings with property owners. Most were initially against the project. During these meetings it became evident that many would be willing to give up the necessary right of way in exchange for things like additional driveway entrances and something in writing indicating that the DOT would not take any additional property.	OPERATIONS - DIVISION 12	2002	John Cook	(704) 876-4001.	Customer Service
Woody Construction Debris to Useable Lumber	Over the past year, logs were accumulated from roadway cleaning debris and stored at the Pitt County sandpit. Rather than paying a landfill a tipping fee to dispose of these trees, a local person with a portable sawmill was contracted to come to the pit and saw the logs into usable lumber. When about 20 logs were accumulated the portable sawmill was called. These 20 logs yielded 100 - 2" x 6" x 16' boards, and 40 - 2" x 10" x 16' boards. The sawyer charged \$500 for his labor.	OPERATIONS - DIVISION 2	2002	Woody Jarvis	(252) 946-3689.	Customer Service
Truck Kitty Litter Box	According to our Stormwater Pollution Prevention Plan (SPPP), to avoid fluid leaks from exposure to rainfall and possibly causing the polluted rainwater from entering the storm drainage system, we should provide drip pans for all vehicles and equipment that leak. Some equipment such as asphalt distributors with spray bars, have many places where potential leaks originate and it becomes impossible and/or impractical to provide a drip pan. In reviewing this problem, the SPPP team originally built three drip pans for the Road Oil Unit to use. The SPPP team discovered several problems with the pans ranging from the number, the size, the weight of the pans, employee frustration with emptying them and disposing of the collected material.	OPERATIONS - DIVISION 7	2002	Michael Venable	(336) 570-6833.	Environmental Sustainability
Bridgesharks	Drift and debris constantly build up against bridge columns during heavy rains causing scouring of the river banks and silt sedimentation build-up against the debris. The Bridgeshark is installed on the face of bridge columns and is designed to eliminate drift accumulation on the columns. It consists of a molded polyethylene turbine attached to a stainless steel track. The rotating turbine will slide up and down on the track relative to the water surface elevation and is designed to intercept and turn floating trees, logs, and debris before they impact the column face. The Bridgesharks were installed on Bridge #50 in Chatham County that spans Deep River.	OPERATIONS - DIVISION 8	2002	Richard Hancock	(910) 944-2344.	Environmental Sustainability
Roadside Quail Habitat Area	The Roadside Environmental Unit is working with the Division of Wildlife Resources to develop and enhance habitat suitable for quail on NCDOT rights-of-way in Division 12. The REU was approached by Wildlife Resources biologist Terry Sharpe, who needed our cooperation to maximize quail habitat areas adjacent to I-77 north of Statesville. Several of the landowners along this corridor had agreed with the Division of Wildlife to develop quail habitat on their land. The effectiveness of this project was limited, however, in that the habitat areas lacked continuity. Our right-of-way provides a link between the properties. Through selective mowing and tree removal and replacing fescue with native grasses, we hope to develop a stretch of 3.5 miles of right-of-way into a corridor for quail movement and habitation. This area incorporates two existing wildflower beds and includes a median meadow area.	OPERATIONS - ROADSIDE ENVIRONMENTAL	2002	Derek Smith	(919) 733-2920.	Environmental Sustainability
Bituminous Treatment/Retreatments Field Record Form	The process of keeping records of the bituminous treatment of roads was cumbersome due to the forms involved. The forms had to be clipped together with paperclips, with carbon paper in between. This was difficult to do, and not very reliable. The forms were hard to keep properly lined up so that the carbon was in the proper position to make the copy. The carbon paper was very messy, and also difficult to keep in the correct position	OPERATIONS - DIVISION 13	2002	Ken Putnam	(828) 251-6171	Environmental Sustainability

Access Sign In/Out Program	Administrative Support staff was unable to accurately identify office staff signed in and out of the office. To remedy the problem they followed the following steps: Develop and implement Access Sign In/Out Program. Load program on office PCs in start up menu for employees to use and update. Macro ensures accurate information updating in seconds. Each employee's name is alphabetized on the spreadsheet, which includes the office phone extensions. There are columns for Out Time and In Time, Day Left and Day Returning and Location which contain drop down menus which record time and allow the options for Meeting, Lunch, Sick, Annual Leave, etc. However, any reason can be typed in the Location column. Once all information is entered, the employee hits the Save and Refresh button. This action updates the spreadsheet for all employees running the active window.	OPERATIONS - DIVISION 10	2002	Cynthia Doby	(704) 982-0101.	Communications
Access to Skill Based Pay Manuals via REU Web Site	Over the last 5 years, NCDOT and its division field personnel have benefited from an innovative program referred to as Skill Based Pay (SBP). The program cornerstone rests in the employees who wish to become proficient in specific skills (e.g., operating equipment, obtaining state certification to apply herbicides, or learn advanced soil stabilization techniques). Once these self-motivated employees meet the objectives set forth in the training manuals and pass topic related final exams, the department rewards the employees monetarily. As divisions identify needs for employees with specific skills, employees are able to proceed with training by completing related Skill Block Training Manuals. Obtaining SBP Manuals was a time consuming and laborious process that was subject to mishandling	OPERATIONS - ROADSIDE ENVIRONMENTAL	2002	Derek Smith	(919) 733-2920.	Communications
Window Tinting	The Ahoskie District Office Building has historically suffered from inadequate HVAC, specifically, air conditioning. Temperatures in offices located on the south side of the building often reached 80 degrees during time of bright sun. The problem existed regardless of the air temperature outside. In an effort to improve work conditions within the office, revisions to the existing HVAC were investigated. The costs of the necessary modifications approached \$50,000. Given the unavailability of funds, other options were considered. The most economical solution found was the application of window tinting in the affected offices. Contacts were made with local vendors, but none could provide the necessary materials. A search of the Internet yielded a wholesale company that could provide material at a very reasonable price. The necessary paperwork was completed and the material shipped. A member of the District Office Staff then installed the tinting.	OPERATIONS - DIVISION 1	2002	C. W. Bridgers	(252) 482-7977	Communications
Truck Mounted Snow Plow Lift Arm Extension Bracket	The existing truck mounted snowplow lift arms did not lift the blades high enough. It was decided that an extension bracket on the lift arm could be fabricated and installed to allow the blade to be lifted to a greater height. The extension is cut out of a piece of steel stock and welded together. It is bolted on the existing lift arm rather than welded, so that it can be removed when necessary	OPERATIONS - DIVISION 13	2002	Jerry Murray	(828) 298-0692	Customer Service
Lift Cable Tool	services packages and mechanic service packages, the lift cables are often found to be defective. In the past when these cables were replaced it was very difficult to obtain the correct tension on the new cable. This would often lead to premature cable failure due to cable backlash. Also, at best, it took two mechanics to install the lift cable. The Monroe Shop Team came up with a solution to this problem. A cable tension tool was designed and built. This tool hooks to the rear of the vehicle and the new cable is routed through it, when the cable is wound on the crane lift drum, it has the correct tension on it.	OPERATIONS - DIVISION 10	2002	Charles Hatley	(704) 283-6242.	Customer Service
Development of CD of Pesticide Labels & Safety Information	Annually, by competitive bid process, NCDOT's Central Roadside Environmental Unit purchases a diverse array of pesticides for Division field forces. These pesticides are necessary tools for managing vegetation along the State's 78,000 miles of rights-of-way. Every vendor is required to supply 50 labels and MSDS's for every product they are awarded. It is required that this information be the most current available from EPA. In previous years no monetary penalty was associated with this contract thus vendors would: 1) Supply the wrong label and MSDS for the specific product formulation requested; 2) Provide illegible photocopies of the labeling; 3) Try to shift this responsibility to the manufacturers. 4) Fail to provide this material in a timely fashion despite repeated telephone calls.	OPERATIONS - ROADSIDE ENVIRONMENTAL	2002	Derek Smith	(919) 733-2920.	Customer Service
GPS for Secondary Road Improvements	Each year the District Office is responsible for staking, preparing construction plans (known as "Straight-Line Diagrams", obtaining right-of-way, and construction. These plans were used for right-of-way acquisition, environmental permit applications, and roadway construction. The Straight-Line Diagrams did not include any curve information and contained very limited property boundary information. The District Office needed a way to reproduce the right-of-way on the parcels more accurately. The District Office Survey Crew used a Trimble Pro XR GPS unit to collect topographic data for the roads on the Secondary Construction Program. The information is processed and construction plans are prepared using Micro-station and Geopak on CADD workstation. The plans include horizontal alignment information, proposed roadway and right-of-way, property boundaries including bearings and distances, property owners, and erosion control information.	OPERATIONS - DIVISION 11	2002	Charles Reinhardt	(336) 385-2257	Customer Service

Asphalt Roller Types	The Division Bitumous unit has been using a classcode 2510 Asphalt roller. It is not designed for or held up well in seal type operations. It only compacts 3' of roadway at a time creating long waits for crews and lost production time.. Replaced by a classcode 2507 vibratory roller which has increased overall production. This roller covers 4' in one pass and is twice as fast. It is also designed for aggregates used by the Bitumous unit.	OPERATIONS - DIVISION 2	2002	Cleve Woolard	(252) 830-3146.	Customer Service
QMS HP-48 Calculator Program	performs sampling and testing of Asphalt pavements. It is done in the laboratory and roadway. The data obtained is must be accurate as the data is used to determine if the payment will be a full contract price. The technician involved in the sampling and testing must perform many mathematical calculations without error in a timely manner. A series of programs were developed for the HP-48 programmable calculator to make it easy to perform the mathematical calculations for the QA/QC technician. The programs are used in conjunction with NCDOT forms. The programs ask the user to input the data at the correct interval, performs the calculations and gives the user the correct answer	OPERATIONS - DIVISION 14	2002	Dan Hunter	(828) 586-2141	Labor Hour Savings
Injection Truck	When calculating the amount of material per acre, the injection system takes 50% less time than the conventional method. The computer on the injection system does the calculations and has been tested 100% accurate. Also, the injection tanks mixes the accurate amount of material needed, eliminating guesswork and reducing wastes/overage. At day's end all work accomplished can be printed out. In past there was a need for a crash truck, advance warning and a sign crew (4 pieces of equipment and 5 men). Now 1 man and 1 piece of equipment do the same task. It has also improved safety in that it is off road and not endangering the public. All work is done out of travel lanes.	OPERATIONS - DIVISION 9	2002	Jeff Hardy	(336) 896-7039	Labor Hour Savings
Tax Maps	Due to the increased workload on the District Office, a time saving method was needed to enable District staff to process secondary road and new addition packages in a timelier manner. All four required sets of each package were individually prepared and each package took 4 hours to assemble after the information was gathered. Most tax maps are now obtained through the use of compact disc, edited through Word, and then copies made from the original set.	OPERATIONS - DIVISION 9	2002	David Lipe	(704) 639-7560	Labor Hour Savings
Saturday CSWP Work Crew	DOT and DOC have been forced to cut back on personnel since Feb 2001. As a result, our office lost 63% of its regular patrol crews and DOC was unable to respond to any request for litter pick-ups due to a shortage of guards. For several years DOT and CSWP(Community Service Work Program) had severed their relationship due to conflicts. However to overcome the problems and past differences DOT's CPI team and CSWP met and were able to overcome the obstacles. CPI started utilizing the CSWP's Saturday pick-ups but also discovered several other useful ways to utilize this new resource.	OPERATIONS - DIVISION 7	2002	Michael Venable	(336) 570-6833	Labor Hour Savings
Modification to "Under Railer"	The original "Under Railer" would not push the spoil material under the guardrail and past the break point of the shoulder. It left a berm behind the guardrail which trapped water. We came up with the idea to attach the "Under Railer" to a motor grader and use the hydraulics of the grader to telescope the arm and blade out an additional 7-8 feet to roll spoil material over the bank.	OPERATIONS - DIVISION 14	2002	Mark Gibbs	(828) 891-7911	Labor Hour Savings
Combined State Form 19 & OSH 301	Incidents, injuries and accidents are required to be reported to two separate State agencies. In many cases the information and criteria to report is similar. However, historically, each agency has required the use of its particular form. (Form 19 for the NC Industria ICommission and a separate form for NC DOL, form 301.) This reporting requirement is applicable to a majority of the private sector, third party insurance companies and all state agencies. This created a duplication of effort. Research was done the see where areas of overlap occurred. Since information on the form is treated as data input, the form was developed to not interfere with that process. A consolidation of the forms was approved for use in June 2002.	SAFETY & LOSS CONTROL	2002	Chuck Stanfill	250-4200 x 243.	Labor Hour Savings
Utilization of Reports	Utilizing Bi-Weekly Budget Reports sent to Bridge Supervisors and Tech III. This report insures better planning and budgeting. Bridge Supervisors can use this to get work order numbers, plan workweek in advance, and road closings. This also helps them keep tabs on projects under construction and county highway construction. Tech III's use this report to plan work for setting grades and layout of some structures. This also helps keep up with permit status and when projects are complete	OPERATIONS - DIVISION 11	2002	J. F. Pendry	(336) 667-9111	Labor Hour Savings
Emergency Call-Out Program	The State Road Maintenance Unit is responsible for maintaining records of vehicles that respond to emergency call outs after normal working hours. Forms were filled out manually, then compiled, photocopied & sent in. It was then entered into an excel program which substantiate the need for commuting in state vehicles. This time consuming process created problems with information not being submitted to Divisions on time, confusion of types of calls, repeated handling, multiples copies of same material, accuracy and time used in verifying missing or inaccurate information. The Unit worked with IT in developing a web accessible database to capture the emergency callback information with the goal of most efficient way to obtain information, systematically enter it &generate reports in a quicker & more efficient manner.	CONSTRUCTION & MAINTENANCE	2002	Dianna Turner	(919) 733-3725.	Labor Hour Savings

Secondary Road Parcels	The District survey crew collects all data needed for plans on secondary road projects involving turn lanes and widening. When the data is collected a CAD tech will draw tax parcels. This process included: 1) Obtaining maps from tax dept. 2) CAD technicians scaling tax parcels and drawing them on respective project maps. This averaged 8-man hours/project. Using ARC VIEW software the process is now 30 minutes. Digital data is obtained from county Tax dept and the data is converted into a format that can be then imported to Mico-station. Once the data is in Micro-Station the CAD techs rotate and scale the parcels.	OPERATIONS - DIVISION 8	2002	Reuben Blakley	(336) 629-1423.	Labor Hour Savings
Truck Mounted Impact Attenuator Cab Mounted Controls	The Roadside Environmental Unit conducts many slow-moving spraying operations on multilane primary and interstate highways. A caravan of four vehicles is used for the operation, one of which is a protection vehicle with a truck mounted impact attenuator. To begin operations, the entire caravan needs to find a safe place to pull off of the road so that the operator of the protection vehicle can lower the impact attenuator. This takes approximately 15 minutes, and the operator has to exit the cab of the truck, walk to the rear of the truck, and stand between the impact attenuator and the rear of the truck. This is necessary because of the location of the switches and indicator lights. Throughout this procedure, the operator is exposed to dangerous high-speed traffic.	OPERATIONS - DIVISION 13	2002	Keith Hill	(828) 251-6253.	Safety Improvement
Work Zone Signing Removal	Work zone signs that are not removed from the project at the completion of the project are a safety hazard to the traveling public and DOT maintenance operations. This problem occurs most often on contract resurfacing projects. These projects have a large number of signs scattered over many locations. When work zone signs are abandoned on the project, it is only a matter of time before the sign and upper U-channel post are removed by passersby or damaged. Once the upper U-channel posts are gone the lower U-channel posts that remain are the real safety hazards. These posts are easily concealed in the grass on the shoulder and could cause damage to right-of-way mowing equipment and vehicles that pull off onto the shoulder.	OPERATIONS - DIVISION 9	2002	Mark Crook	(336) 249-7001	Safety Improvement
Guardrail Spraying Improvement	The guardrail spraying operation consisted of a 1000 gallon skid mounted sprayer on the back of a flatbed truck with two men leaning over the side of the truck spraying the front and back of the rails with herbicide using hand-held spray guns. This operation can be very dangerous on a multilane interstate with traffic volumes of 125,000 vehicles a day. Using the hand-held spray guns also limits the width of the area being sprayed. The area in front of the guardrail to the edge of pavement cannot be reached with the handheld spray gun, so a second round was necessary to apply herbicide to this area. This procedure doubles exposure to the herbicides, as well as to heavy traffic since the equipment must operate on the shoulder or in the road.	OPERATIONS - DIVISION 7	2002	Ken Taffer	(336) 334-3192	Safety Improvement
Improved Structured Flagger Training for All New Hires	Historically, scheduled and structured flagger training was only offered by ITRE once a year to the field maintenance employees. Since classes were limited, veteran employees who may or may not have been qualified to train new employees were assigned as mentors to the new hires. Both good and bad habits were passed on to new employees. By the time ITRE classes were available, the new employees may have been assigned to flagging duties for more than a year. As a result, the ITRE classes were ineffective. To end the cycle of poor flagging, the Alamance Maintenance CPI team worked with ITRE to increase the number of qualified trainers. All of the Transportation Supervisors were sent to the ITRE course for Flagger Instructor Training	OPERATIONS - DIVISION 7	2002	Michael Venable	(336) 570-6833	Safety Improvement
Pipe & Culvert Automated Video Inspection	Historically, scheduled and structured flagger training was only offered by ITRE once a year to the field maintenance employees. Since classes were limited, veteran employees who may or may not have been qualified to train new employees were assigned as mentors to the new hires. Both good and bad habits were passed on to new employees. By the time ITRE classes were available, the new employees may have been assigned to flagging duties for more than a year. As a result, the ITRE classes were ineffective. To end the cycle of poor flagging, the Alamance Maintenance CPI team worked with ITRE to increase the number of qualified trainers. All of the Transportation Supervisors were sent to the ITRE course for Flagger Instructor Training.	OPERATIONS - DIVISION 7	2002	Michael Venable	(336) 570-6833	Safety Improvement
Rut Measurement Tool	Every two years a condition survey of the paved road network is performed on all state maintained primary, secondary, and urban systems. Raters had to get out of the car and measure rutting at least once per day by using a straight edge and ruler at ground level. While the current procedure is performed quickly, it was necessary for the raters to be in a travel lane with on-coming traffic in either a stooping or squatting position trying to get a measurement from a smaller ruler. An added hindrance to the process was the direct sunlight and glare for employees wearing glasses/bifocals.	OPERATIONS - DIVISION 8	2002	Harold Matthews	(910) 582-7075.	Safety Improvement

Hydraulic Cylinder Safety Lock	<p>The neat appearance of our highways is a top priority within the State of North Carolina. Thus, mowing is a vital part of maintaining the neatness of our highway system. It is often necessary for the mowing operator to get under a rear-mounted mower to replace blades or remove material caught in the reel, which results in a safety hazard for the operator. In addition, hauling mowers back to the shop for these minor repair results in lost efficiency and increased labor costs.</p> <p>The Division 8 Equipment team developed a device to make it safer for an operator or mechanic to work underneath a rear-mounted mower without the risk of the lift falling.</p>	OPERATIONS - DIVISION 8	2002	Gary Nance	(910) 947-2721.	Safety Improvement
Pin Driver	<p>Currently, sledgehammers are used to drive pins for ABC nuclear density tests. This process is time-consuming, labor intensive, and can create unsafe working conditions. The CPI team in the Wilson Resident Engineer's Office of Division 4 proposed the use of a demolition hammer to drive these pins. For trial purposes, the team borrowed all the equipment needed from the Division 4 equipment shop. That equipment included a portable generator, a demolition hammer, and a ground rod bit. They ran the test using a demolition hammer on 10 test sections that include 5 holes each for a total of 50 holes. The readings from each of these holes were compared to an adjacent hole that was prepared using the conventional method of driving the pin with a sledgehammer.</p>	OPERATIONS - DIVISION 4	2002	John Finnell	(252) 237-6164	Safety Improvement
Overhead Power Line Covers	<p>Backing up trucks with raised beds and leaving a dumpsite with a raised bed often results in the bed coming in contact with overhead power lines. In fact, approximately 17% of construction accidents with dump trucks involve electrocution. NCDOT has also had problems with equipment such as cranes, backhoes, and boomed equipment coming in contact with power lines. In order to ensure safety of workers, Division Four purchased covers that are lime-yellow in color to fit over a 28 traffic cone. These cone covers can also be used with the 36 cones that are already in stock.</p>	OPERATIONS - DIVISION 4	2002	Deborah Leonard	(252) 237-6164.	Safety Improvement
Portable Shade Tree	<p>When mechanics work on equipment that has broken down on the road, it is often in extreme heat and direct sunlight. This often leads to heat exhaustion, fatigue, sunburn, and using tools that are extremely hot.</p> <p>This situation lead to the development of the Portable Shade Tree. This is an umbrella that is mounted on a magnet that can be easily attached to a piece of equipment. Using the wing nut attached to the mounting bracket and repositioning the magnet, this portable shade tree can be positioned in any direction to counter the angle of the sun to provide shade.</p>	OPERATIONS - DIVISION 4	2002	Joe Nelson	(252) 583-4221	Safety Improvement
Warning Sign for Low Utility Lines	<p>Over a three-year period, Division maintenance and construction departments experienced about six accidents where power and utility lines were knocked down by equipment. The Division Safety Committee was faced with the challenge to develop countermeasures to reduce or eliminate these hazardous incidents, which posed potential fatal conditions not only to the equipment operators and employees, but also to the traveling public.</p> <p>Division 12 Traffic Services Department fabricated a warning sign (Low Utility Lines) and made this sign available to all departments that had equipment (i.e., dump trucks, backhoes, etc.) which were susceptible to accidents involving power lines. The purpose of this warning sign was to provide a constant reminder of the presence of power and utility lines.</p>	OPERATIONS - DIVISION 12	2002	Reuben Chandler	(704) 480-9021	Safety Improvement
NC OSH 300 Form Statewide Teleconference	<p>The Federal DOL and NC OSHA adopted the use of three new forms and reporting procedures for incidents/injuries beginning January 2002, a statewide requirement for the private and public sector. Failure to abide by the new regulation could result in OSHA fines and a loss of information related to safety programs. Training on the use of the new forms and procedures was only available through costly seminars provided by private companies or through sessions presented by OSHA at various Community Colleges. State agencies and municipalities do not have the same issues as the private sector, thus the OSHA all-inclusive training would be lengthy and not as cost effective. Although never before utilized for the statewide training of a large segment of state employees, the use of a statewide teleconference to provide the necessary information to these entities was a logical choice.</p>	SAFETY & LOSS CONTROL	2002	Chuck Stanfill	(919) 250-4200 x 241.	Customer Service
DMV Fiscal Refund System	<p>The DMV Fiscal Section issues refund checks to customers who have overpaid for license renewals, personalized tags and the like. Issuing more than 5,000 refunds/month through an antiquated system created in 1983 with limited functionality. It is largely a manual effort that is prone to error, creates a strain on resources and limits a timely response to customer inquiries, becoming more difficult to manage as the volume increases. The ITBUS team redesigned the existing system by adding new functionality to complement the current functionality. The goal was to automate the manual effort of processing refunds. To redesign -1) Document the current 'As Is' refund process to determine what areas could be improved. 2) Document the user requirements for the existing functionality and all improvements. 3) Create a Detail Design document of the new refund system to use as a guide for programming and implementing the new refund system.</p>	INFORMATION TECHNOLOGY	2002	Eric Lingerfelt	(919) 508-1790.	Labor Hour Savings

Disaster Recovery Query Application	When there is a federally declared disaster, NCDOT receives funds from 2 federal agencies for cleanup & relief work. FHWA & FEMA require extensive data to verify the claims for reimbursement. NCDOT must prepare their applications for reimbursement carefully to ensure that all eligible funds will be claimed. This preparation relies extensively on data stored on mainframe computer systems even though the systems are not designed to manage the data needed by FHWA and FEMA. Data gathering traditionally consisted of calls placed to ITBUS to run reports for each disaster. The reports were analyzed by the Disaster Recovery Team (DRT) and were manually entered into spreadsheets for analysis, averaging 7 reports/week. The solution consisted of a mainframe program coupled with a Microsoft Access application. The mainframe program generates a file for each disaster that contains complete data necessary for FHWA or FEMA applications. The Access application allows DRT to import the disaster-specific data, run queries on the data & exports the data to their analysis spreadsheets.	DEPARTMENT OF TRANSPORTATION	2002	Cora Bright	(919) 508-1878	Labor Hour Savings
Productivity Services Marketing Survey	As part of a broader marketing strategy for the unit, Productivity Services wanted to gain insight into the level of awareness other NCDOT units have with our range of services. A decision was made to develop a brief questionnaire. A team prepared a draft questionnaire for review among all unit members. The survey form consisted of a measurement for overall familiarity with the role of Productivity Services, an indicator concerning use of the section's services over the past three years, and a measurement for level of awareness of Productivity Services' various offerings. Recipients were also asked to indicate if they would like to be contacted with additional information. The questionnaire was distributed by mail to all senior managers as well as division/unit/section managers throughout the department.	FINANCIAL	2002	Doug Cox	(919) 733-2806	Customer Service
NCDOT Annual Statewide Model Bridge Building Competition	In 1999, the Human Resources Unit, assisted by the Construction Unit, developed the first NCDOT Model Bridge Building Competition. The competition, which complemented educational outreach programs already offered, addressed the need for new methods of recruiting civil engineers. The number of college graduates entering the engineering profession had dropped significantly. It was believed that if students' interest could be sparked as early as middle or high school, perhaps more college students would consider careers in engineering and other transportation fields; hence, the Bridge Competition Committee created this innovative, hands-on approach to learning. The competition would stress the importance of excelling in all school subjects by including a written report, oral presentation, Design Drawing, and Model Efficiency.	HUMAN RESOURCES & INTER-GOVERNMENTAL	2002	Helen Dickens	(919) 733-7686	Communications
County Maintenance Map TIF Image Conversion & Distribution	County Map users were having difficulty reading Microstation files downloaded off the GIS web site correctly. A new digital product was needed to allow users to view county maps without the use of special CAD software. TIF images were decided to be the best format to help distribute consistent maps over the GIS web site Digital images made it easier for other units in DOT (as well as the general public) to view all 282 county map sheets. County maps are available on the GIS web site and are updated after every workday. Maps can be plotted directly from the TIF image if a hard copy is necessary and small sections can also be printed. If an office had a PhotoShop software or paint program such as Adobe PhotoShop, areas could be highlighted or additional text could be added before the image is printed and allow users to customize their own maps.	PLANNING & ENVIRONMENT	2002	Terry Norris	(919) 250-4188 x 204.	Customer Service
3D Measurement Implementation	NCDOT has attempted to obtain reliable route & milepost information for decades. Due to the creation of the Linear Referencing System (LRS) for the purpose of sharing (or linking) data between multiple data sets this information has become very important. The primary way of collecting route and milepost information was the use of an automobile mounted survey meter. A 2-man team would be sent to the subject location & record measurements on paper maps, which is used to update information for mileage dependent database tables. This time consuming process allowed many errors. These errors in the DOT mileage database were unacceptable for the building of the LRS. The GIS Unit has developed a procedure for identifying accurate milepost information. Graphical linework was moved to match corresponding locations on photography. This process is called photo-revision. Revised linework is overlaid on Digital Elevation Model data to generate 3D measurements, which are extremely accurate. The difference between 3D & survey meter measurements are within a hundredth of a mile per half-mile section of road.	GIS	2002	Chris Tilley	(919) 212-6040.	Labor Hour Savings
Realignment of the Planning Units	Assessment of our capabilities in meeting the future demands of state and local officials, agency and environmental partners and the citizens of North Carolina. As a result of this assessment, we have determined that our organizational structure limited our ability to provide effective and efficient transportation planning service for all of North Carolina. The Planning Group of the Statewide Planning Branch realigned along geographic boundaries. Under the new alignment, transportation planning for the MPOs, RPOs, counties and small urban areas would be done by staff on a geographically based team with the state broken down into six regions, including the Mountains, Metrolina, Triad, Triangle, Southeast and Northeast.	PLANNING & ENVIRONMENTAL	2002	Laura Cove	(919) 715-5737.	Customer Service

Turning Movement Request Form	The Traffic Survey Unit collects different types of traffic related data for many users in the Statewide Planning Branch. Turning Movement s are one type of traffic count that is required for most project work and model updates. Historically, requesting turning movements counts required a memo specific to the project location, a map and two forms that had to be manually completed for each project. A requestor could take up to several hours to complete all the necessary forms for just one project. Additionally, the Traffic Unit was relocating to a remote location from the branch, so additional lead-time would be required to send the request by interoffice mail or unit.	PLANNING & ENVIRONMENTAL	2002	Kent Taylor	(919) 733-4705.	Customer Service
Form Letter Application	Refer to an "Index" which listed all forms available for their projects. The users had to look in separate file folders for the letters and procedures. In order to complete the forms, users had to look up all their project information and who the letter should be addressed/ copied to along with their appropriate titles. The Form Letter database was developed that pulls data from a "backend" database that is linked to an NCDOT Oracle database. This allows the user to select their Project TIP number and any other pertinent information if automatically filled in for them. Other features include: 1) Procedures are readily available; 2) An automatic merge function creates a MS Word document allowing further edit; 3) Temporary tables associated with each form; 4) An e-mail feature is included to report problems; 5) A web link is included for easy access to the 12-Month Let List.	PRECONSTRUCTION	2002	Paula Bausch	(919) 250-4151.	Cycle Time Reduction
Electronic Copies of Aerial Photos	The Department prints numerous amounts of aerial photos each year. Each photo costs approximately \$50 to print. Congestion Management alone spends over \$3,000 a year printing aerial photos. In addition, these photos can be very large in size and can lead to filing space concerns. Congestion management is addressing this by having aerial photos sent electronically as jpeg files instead of printing hard copies. Less money is spent on printing the hard copy of the photo, filing space is reduced, and manipulating the photo is much easier. Additionally the photo can be obtained within hours instead of up to three days.	PRECONSTRUCTION	2002	Stacey Silva	(919) 250-4151.	Dollar Savings
AG's Office Crash Report Retrieval Project	Each year the AG's Tort Claim Section processes thousands of tort claims against the State of North Carolina. The Tort Claim Section addresses all general liability claims made against the state. Regardless of a case's outcome, the crash report (DMV-349 Form) is one of the most important records that must be viewed in order to better understand the case and further defend the state in motor vehicle crashes. Traditionally, the Tort Claim Section obtains this document by sending staff members to DMV to complete forms to request hard copies of crash report. TSSMU and/or DMV personnel retrieve the crash reports, print copies, and send them back to the Tort Claim Section as requested.	PRECONSTRUCTION	2002	Tony Ku	(919) 733-5418.	Communications
On-Line Bidding	The NCDOT Highway letting process has remained unchanged for decades. Contractors have been required to attend highway lettings in person, physically delivering their bids and witnessing the opening of bid proposals. This required contractors to travel from all parts of the state to Raleigh once a month and arrive in time to attend the 10:00 a.m. letting. In most cases, this resulted in appreciable expenses to the contractor for travel, lodging, and sustenance as well as lost production for personnel attending the letting. Even though we furnished diskettes to the contractors to facilitate their bid preparation, the Department required and only accepted hand-signed printouts as official bids. Also, DOT expended considerable resources in purchasing and preparing diskettes, travelling to the letting, and hand entering bid information into the letting system.	PRECONSTRUCTION	2002	Randy Garris	(919) 250-4124	Communications
"SMARTZONE" on I-95 in Cumberland County	NCDOT needed a system or method to mitigate traffic backups and delays on TIP construction projects through the use of intelligent transportation technology deployed for "workzone" applications. The I-95 corridor has a past history of crashes and fatalities during major construction projects. Our goal was to find a system that would offer "real time" traffic information that would reduce backups, which contribute to congestion and crashes. The team developed conceptual drawings and a specification that utilized available technology in a "portable" system that works independently of human intervention, thus creating a "SMARTZONE". The system consists of changeable message signs, traffic sensors, cameras and computer software that calculates delays, measured in minutes in the workzone. These delays are displayed on the changeable message signs in a "real time" manner via wireless media.	PRECONSTRUCTION	2002	Steve Kite	(919) 250-4151	Communications

NC Traffic Signal Operations & Maintenance	<p>There are approximately 8,000 traffic signals on the NC State Highway System for government agencies to maintain and operate. Operations and maintenance activities have been fragmented with a lack of a baseline performance standard for division staff, municipal personnel, and contractors. This project established requirements for a good traffic signal system management program to promote safe, efficient function of traffic signals along the State Highway System.</p> <p>The program promotes a transition from emergency maintenance activities to preventive maintenance activities. Included in the program is the updating of municipal maintenance agreements. Reimbursement schedules for the municipalities were updated and five levels of service were established to ensure baseline standards are met. The program further establishes methods for performing audits including a signal inventory and maintenance tracking system to electronically track maintenance calls, equipment inventory, worked performed, and work time.</p>	PRECONSTRUCTION	2002	Troy Peoples	(919) 733-3915	Customer Service
Guidelines for Agreement Process & Reimbursement to NCDOT by Municipality/Developer	<p>When a developer/municipality requests a change to be made to an active DOT project, such as adding a left or right turn lane, a problem occurred in incorporating these design changes and collecting the cost associated with the changes. It created difficulty for our Design and Construction engineers to determine what steps to follow to execute the request. In addition, the developer or municipality did not know whom to call to track the progress of the request. A cross-functional team was developed. The team was responsible for the preparation of guidelines to follow when additional design or construction improvements are requested on active TIP projects. The team was also responsible for developing a way to show how the new process will help NCDOT to be reimbursed for improvements</p>	PRECONSTRUCTION	2002	Wayne Johnson	(919) 250-4128	Customer Service
Information Transmittals	<p>The need for timely transmittals of guidelines and policies to employees of the section is crucial for maintaining consistent and efficient customer service. Guidelines and policies impact not only employees of the section but also others that do business with the section such as engineering firms, attorneys, private citizens and other NCDOT units and sections. Traditionally guidelines and policies were given to employees at meetings and/or through the dissemination of paper copies. When a prior implemented guideline was needed, time was spent researching and tracking down the paper copy. In an effort to remedy this problem and provide employees with timely and consistent notification of guidelines and policies, a public drive was established on the section's computer network to accommodate scanned and electronic documents. All employees have read-only access to this drive.</p>	PRECONSTRUCTION	2002	Richard Mullinax	(919) 733-5569	Communications
Area Traffic Database	<p>The Area Traffic Office is a multi-task operation responsible for a variety of work that requires a diverse filing system. Files include TIP Projects, WProjects, Spot Safety Projects, Fatal Investigations, Governor's Highway Safety Program Studies, Signals, Intersections Studies, and Railroad Crossing Studies. The nature of these studies and projects makes it difficult to track files, find related files, or determine if a location had ever had a study conducted. It required physically searching the file cabinets, sometimes with little information. A great deal of time was lost determining if there was an existing study or project on a location, and then it could take from 15 minutes to 2 hours to locate the file. Attempts were made to organize the system but there was no central database to handle the entire file. In addition, there was no electronic capabilities established to produce related forms or reports that had to be developed by physically gathering information from related files, then compiling the data manually. This process could take anywhere from an hour up to a day to complete.</p>	PRECONSTRUCTION	2002	Janet Whetstone	(910) 437-2614.	Communications
Project Management Database	<p>The Traffic Control Section was using a local database to track TIP Project assignments, lettings and manday requirements. Section personnel including data from other systems and printed materials entered all data. A new system was needed that would have Branch-level use and track project development milestones. Traffic Control worked with IT to develop a Traffic Control function within the existing Project Activity and Workday Scheduling (PAWS) system. It was developed, tested and refined. Beginning December 2001, the PAWS system became the new project management application for Traffic Control.</p>	PRECONSTRUCTION	2002	Glenn Dennison	(919) 250-4151	Labor Hour Savings
CrashWeb Batch Print Service	<p>Our unit does crash analysis, which requires copying thousands of DMV 349 crash reports. We either had to print off reports from a microfiche machine or from a web application (CrashWeb) which allows retrieval of only one crash at a time. Since no longer keep microfiche copies of any crashes after 2000, we are increasingly dependent upon CrashWeb. It was extremely time consuming, pulling and printing each crash one by one. The solution was for the CrashWeb application to allow for the creation of batches that could be retrieved and printed in one process. The system allows us to copy a list of crashes and paste them into the CrashWeb service and then submit the request. Moments later a batch' is created which can either be viewed or printed.</p>	PRECONSTRUCTION	2002	Jeff Rom	(919) 733-8304	Labor Hour Savings

Using OPUS to Control Proposed Bridge Replacement Projects	DOH uses aerial photography to develop base mapping & digital terrain modeling for bridge replacement projects, requiring photo ground control by Location & Surveys to adjust the photography for photogrammetric survey methods & to reference the digital mapping to project coordinate datum for planning, environmental impact studies, design, right-of-way acquisition, & construction. L & S uses Global Positioning System (GPS) technology to provide State Plane Coordinates for required photo ground control points. When controlling bridge replacement projects using GPS technology, the fast static method was applied for the horizontal & vertical coordinate network. It used 1 technician for 4 man-hours to plan, schedule, & post the GPS network data. This method used 3 technicians & 2 vehicles for 2 workdays to set the aerial photo targets (6-8 targets), locate Geodetic control monuments, obtain GPS Obstruction charts, operate GPS session receivers, & remove aerial photo targets from locations after completion of photogrammetric flight. Setting 2 GPS azimuth monuments for an average of 52 man-hours per project and 32 vehicle hours.	PRECONSTRUCTION	2002	Pat Tuttle	(336) 896-7008	Labor Hour Savings
Reduced Environmental Documentation Using Abbreviated Format	The Environmental & Planning Branch of the Rail Division was interested in reducing the amount of documentation for a Final Environmental Impact Statement (FEIS) on the Southeast Highspeed Rail Project (SEHSR). The FEIS covers a large study area corridor of approximately 500 miles, across the state of Virginia and North Carolina. After reviewing public and agency comments on the draft document, it was found that no significant changes would need to be made. The team investigated using an abbreviated format for the FEIS. The team discussed this approach with Federal Highway Administration, and it was agreed that the approach was appropriate.	TRANSIT - RAIL	2002	David Foster	(919) 508-1917	Dollar Savings
SARAH 2.0 (Statewide Authoritative Railroad & Highway	SARAH 1.0 was a MS Access front end application with an Oracle backend which was cumbersome, slow, difficult to maintain & limited to 3-6 users. There were logic problems in the existing Data Model, which caused a series of failures in various required reports. SARAH database maintains inventory records of 10,477 rail/highway crossings in NC, allowing for data-entry, adhoc query capability, trend analysis, rail crossing modeling used in the Crossing Safety improvement programs, project tracking capability, & construction/maintenance contract & payment tracking. SARAH 2.0 was developed in a rapid prototypical environment which resulted in a web browser thin client application with a 3-tier enterprise architecture, allowing SARAH to support 40-50 clients in an intra-net environment. All requests (which include: media, federal & state agencies, special studies conducted by private & public agencies & contractors/consultants) can be accessed by all sections within the Eng & Safety Branch on individual clients computers using of a web browser; allowing instant access to data, reports, analysis & visual information on rail/highway crossings.	TRANSIT - RAIL DIVISION	2002	Ric Cruz	(919) 715-6129	Labor Hour Savings
Metal Strain Pole Program	The Structure Design Unit of the Design Branch was interested in improving the turn-around time of the numerous numbers of the tubular structures of signal supports among other assignments of this group. An old DOS analysis program was being used, in addition to hand calculations. Because of the nature of this DOS program, the review of the input prior to printing was impossible, resulting in waste of time and paper. Personnel averaged 6 to 8 hours of calculation per pole, and 24 to 32 hours of calculation per 4-pole intersection. Periodically, because of change in type or specification of the loading, the calculation had to be repeated. The Structure Design Unit team designed a computer program to enter and analyze the data. The goal of the new program is to perform complex structural analyses based on the available information from traffic engineers and in accordance with the latest national code. A statewide standard for the different intersection geometry has been implemented and is in use.	PRECONSTRUCTION	2001	Wahid Naim	(919) 250-4047	Labor Hour Savings
English/Metric Project Special Provisions	With the Department's implementation of the metric system unit of measurements on construction projects, traffic signal project special provisions were developed as two separate document files; one for metric units of measurement and one for English unit of measurements. This made it necessary to ensure two separate, but similar, documents were simultaneously kept up-to-date. It also increased the potential for errors in translating English to metric values or visa-versa, as well as the potential for the project special provisions with the incorrect system of measurements being selected for a particular project.	PRECONSTRUCTION	2001	Richard Mullinax	(919) 733-3915	Customer Service

Administrative Tracking	<p>Tracking incremental salary raises for TEI Trainee and probationary status with dates had become an administrative paper trail nightmare. As we have gotten more comfortable with Netscape calendar and learned its usefulness as a task-tracking tool, we realized how the probationary period and incremental trainee raises could be noted on key dates for responsible parties to handle at the appropriate time. Administrative staff schedules notes with reminders for the employee, immediate supervisor, section head and clerical supervisor on the calendar so that incremental raises will occur on a timely basis. This practice eliminates dealing with Personnel on retroactive salary issues.</p> <p>Administrative staff will enter reminders of employees on probationary status on the calendars of the immediate supervisor and the section head. Nine months probation will be used initially, but section head can request that they come off probation earlier if they so desire.</p>	PRECONSTRUCTION	2001	Peggy Barnhill	(919) 250-4151	Communications
The Beacon" Unit Newsletter	<p>In order to minimize unit-wide emails and to improve information sharing within the Traffic Congestion & Engineering Operations Unit, a committee was formed to develop a monthly newsletter. The newsletter is predominantly distributed in an electronic format using HTML and placed on our unit's server so our employees can view the newsletter from their workstations. Using HTML also makes it possible to include live links to any referenced web pages and email addresses. A PDF version is also available for anyone that does not have access to our server. This version is forwarded to interested individuals each month in addition to the release of the newsletter to unit employees. The newsletter announces employees that are joining or leaving the unit as well as anyone receiving a promotion, technical articles, section accomplishments, special projects and tips for improving various work-related tasks are submitted each month and included. Birthdays, volunteer opportunities and even employee highlights touch on the personal side of the unit. The newsletter also introduces and provides updates on various professional organizations relevant to our employees to encourage extracurricular career development.</p>	PRECONSTRUCTION	2001	Jeffery Dale	(919) 250 4151	Communications
TCEO Unit Orientation Checklist	<p>The majority of the personnel issues are covered by the new employee orientation that is offered on the first Monday of every pay period. Our checklist was revised to serve as a supplement of this training. The checklist has two major parts, the Operational Functions and the Administrative Functions. The Operational Functions has eight parts that include: 1) Introduction to the Administrative Staff; 2) Work Hours; 3) Telephone Operation; 4) Computer; 5) Layout; 6) Safety/Equipment; 7) Seating Assignment; and 8) Organizational Chart. The Administrative Functions portion includes six sections: 1) Time Sheet; 2) Supplies; 3) copiers/Printers/Plotters/Fax Machine; 4) Cutting/Trimming Machine; 5) File Room; and 6) Mail. Each of these sections is then broken down into anywhere from tow to fifteen check items.</p>	PRECONSTRUCTION	2001	Ron King	(919) 250 4151	Communications
Fatal Accident Database	<p>As part of the Area Traffic staff, the Area Accident Investigation Engineers are required to investigate fatal accidents. There are five Area Offices located across the state with each office responsible for a certain section of the state. Information gathered as part of the accident investigation includes a copy of the accident report, the date and location of the accident, specifics of the accident (alcohol and seatbelt usage, age of driver, etc.), accident site information (road geometrics, signing, etc.) and the remarks and recommendations of the Accident Investigation Engineer.</p> <p>The Fatal Accident Database was developed to better handle this information. Following an investigation, the information gathered is entered into a database file. The database will allow the engineer to quickly reference this information in the future. For example, if the Accident Investigation Engineer wanted to find all the fatalities that he or she has investigated on a particular road or highway in the past year, searching the database would take considerably less time than searching through the hard copies kept in a filing cabinet.</p>	PRECONSTRUCTION	2001	Scott Collier	(919) 233-9331	Communications
Safety Project Development Guide Website	<p>The evaluation of safety projects determines what type of projects work best to improve safety at a particular location. Project evaluations provide feedback to the project development engineers so they can select cost effective projects in a timely manner, thereby improving the safety and efficiency of North Carolina's roads. This web site was developed to provide support to engineers in a consistent and convenient manner. The web site has opened a channel of communication between safety evaluation engineers researching traffic safety statistics and the traffic engineering field engineers who use the safety statistics in their daily jobs. As engineers evaluate previous safety projects and discover countermeasures and crash reduction factors pertinent to certain situations, that statistical data is made immediately available via the web site. The online tool aids the traffic engineers in developing safety projects by organizing and disseminating necessary information into an easily accessible format, which will save man-hours and improve the overall project development process.</p>	PRECONSTRUCTION	2001	Laura Slusher	(919) 7331593	Communications

Work Zone Traffic Control Rodeo	<p>A wide range of Traffic Control Devices is used in the maintenance of traffic in a work zone. With 14 divisions statewide and approximately 70,000 miles of state maintained roads, the Traffic Control Section saw a need to develop the 2001 Work Zone Traffic Control Rodeo to train NCDOT, municipalities, and private industry in maintenance, troubleshooting and information on specific devices. The Rodeo was compiled of 7 classes that were attended by all participants; Overview of Work Zone Elements, Advance Warning Signs, Electronic Advance Warning, Channelizing Devices, TMIA's and Crash Cushions, Work Area Protection and Other Work Zone Devices. Each class focused on theory, installation, maintenance, usage and troubleshooting of the respective devices. Manufacturing industry, the contractor, NCDOT field personnel and the Traffic Control Section provided class materials. This collaboration insured the material taught was informational, accurate and included the latest technology.</p>	PRECONSTRUCTION	2001	Meredith McDiarmid	(919) 250-4159	Communications
Hydrostripper	<p>Aluminum sign recycling is conducted through arrangements between the NCDOT and Department of Corrections. In the past, DOC used old archaic abrasive dry sanding machines to remove the reflective material from signs. It frequently took 10 passes through the sanding machine to get the old reflective material from signs. In addition to eventually grinding down the thickness of the aluminum, this process also remove the chromate conversion coating necessary to retard corrosion. The cleaned sign was then shipped to Pennsylvania, where the chromate coating was reapplied. In addition to the added cost, the chromate conversion treatment is an environmentally unfriendly operation due to the chromium in the coating.</p> <p>The desire was to establish an efficient, environmentally friendly, state-of-the-art highway sign reclaiming operation. After further research, DOC purchased a Hydrostripper. The Hydrostripper utilizes a high-pressure water system to remove old reflective material from the signs. Because it uses water, the signs are not ground away which allows the aluminum to be used over and over. The most outstanding feature of this method is that the aluminum is not affected during the cleaning process, thereby eliminating the need to reapply the chromate coating.</p>	PRECONSTRUCTION	2001	John Grant	(919) 715-0951	Environmental Sustainability
Publication of AADT Maps on the Internet	<p>The Traffic Survey Unit responds to many requests for traffic information from the public. Previously, customers had to provide a description of the location they needed data for over the telephone. The data was researched while the customer was on the telephone for small requests, or a list was provided and the data was faxed for larger requests. Some customers had to purchase maps to meet their traffic data requirements. Many customers had expressed interest in being able to view on the Internet the Annual Average Daily Traffic (AADT) maps that are published annually. A team was organized to develop a better way to serve external customers.</p> <p>The team coordinated with the GIS Section to determine what was needed to provide Internet access to maps. Arrangements were made to print our publication with a contractor who used printing technology that produces electronic images of large-scale maps. We implemented a quality control process to ensure the scanned images were legible and complete. The images were placed on a web image server and the GIS Section set up a viewing application. The web pages and viewing application were tested and altered to better suit a user's needs. Web pages are updated annually and electronic images are produced internally.</p>	PRECONSTRUCTION	2001	Kent Taylor	(919) 733-4705	Customer Service
Directional Drilling	<p>Two methods have accomplished the process of installing conduit under existing roadways in the past. The least preferred method was to physically cut out a section of the roadway, open a trench, and install the conduit. Once the conduit was installed and the trench compacted, the roadway was replaced.</p> <p>The second method is known as Jack & Boring. In this process a pit is dug and a horizontal drilling machine is placed in the pit, which basically drills a hole under the roadway in which a conduit is to be pulled back through. This process, while preferred over open cutting the roadway, has drawbacks. In most areas there is not enough right-of-way to place the machine or a suitable pit area cannot be selected due to the underground utilities that are already present.</p> <p>Traffic Management Systems has adopted directional drilling as the preferred method. The drill head is launched from ground level at an angle into the ground and makes a bore under the roadway. However, in this process the drill head can be controlled by the operator who controls the drill head's horizontal and vertical positioning underground. A locating device that is operated by a second individual tracks the drill head. When the drill head reaches its exiting point, it is removed and a back reamer is installed in its place, along with the conduit to be pulled back through.</p>	PRECONSTRUCTION	2001	Greg Fuller	(919) 733-8021	Customer Service

Standard Strain Pole/ Metal Pole with Mast Arm Designs	<p>Traditionally, the use of wood poles at signalized intersections has been the most common method for suspending signal head assemblies over a roadway. The use of strain poles / metal poles with mast arms was generally limited. Initially cheaper to install, wood poles require a higher level of maintenance over strain poles/ metal poles with mast arms. Strain poles / metal poles with mast arms provide for a longer service life and more consistent strength over time. Generally, there is no hardware tightening, and no re-treatment of the assemblies is necessary to ensure reliable service life. Unlike wood poles, strain poles / metal poles with mast arms may have a salvage value at the end of their service life and pose no hazardous material disposal concerns. A major disadvantage of strain poles / metal poles with mast arms was the time consuming preliminary engineering for the department and pole fabricators.</p> <p>Recognizing this, a task force was established between the Signals and Geometric Section and the Structure Design Unit to develop standard strain poles / metal pole with mast arm designs for use statewide at signalized intersections. As a result, the work group developed and has implemented new standard designs. The standard designs are applicable for about 80-90 percent of the installations requiring strain poles / metal poles with mast arms.</p>	PRECONSTRUCTION	2001	Richard Mullinax	(919) 733-3915	Customer Service
Traffic Signals: Review & Approval Process for Private Developers	<p>Traffic signals are being installed by private developers at an increasing rate. These signals, although privately funded, still must be approved by DOT through permits, agreements, and plan review. Longer review turnaround times have resulted due to increasing volumes. Though a review process was in place, many developers, PEFs, and even DOT personnel were unaware of the existing procedure. In addition, although steps to the process were defined, no time frame was specified for the amount of time required to follow each step. A committee was formed to review and revise the approval process and educate all involved parties on the revised process. The ultimate goal was to accelerate the approval process through clarity and education.</p> <p>The committee was comprised of representatives of municipalities, PEFs, and all areas of DOT in an effort to involve all aspects of the approval process. The committee met many times over an 18-month period, carefully examining every step of the approval process for efficiency, clarity, and time frames.</p>	PRECONSTRUCTION	2001	Ken Ivey	(919) 715-7736	Customer Service
ASC Battery Replacement Program	<p>The batteries in Econolite ASC-8000 traffic signal controllers are difficult to replace because they are soldered to a printed circuit board. Field technicians normally do not perform solder/desolder operations on printed circuit boards. In addition, the batteries are not a common type so they must be ordered through electronics parts suppliers. Therefore, the batteries were not changed on controllers in the field. While depleted batteries are replaced when controllers are repaired in our Traffic Electronic Center (TEC), only a limited number of these controllers have required repair. TEC technicians observed several controllers, in which battery decay had sent corrosive fumes onto the controller printed circuit board, rendering the controller beyond repair. When these controllers failed at an intersection, the intersection traffic signals would revert to flashing operation, and undesirable mode of operation.</p> <p>A proactive battery replacement program was initiated. TEC technicians then scheduled visits to each division to replace batteries on an established schedule.</p>	PRECONSTRUCTION	2001	John Montgomery	(919) 733-5666	Dollar Savings
Heat Shrink Tubing Method	<p>Traffic Management Systems Section specified mechanical sealing bushings to seal riser/conduits where communication cables (fiber optic cables) enter and exits the riser/conduit at the top of a utility pole. The conduit extends from the base of a utility pole to the point where the cable enters the riser/conduit. The bushing is used to prevent water from entering the conduit and running down into a cabinet where it can damage equipment.</p> <p>To install the mechanical sealing bushing requires the installer to tighten screws, which compresses two steel plates with a neoprene gasket between them to achieve a proper seal between the riser/conduit and the communications cable. Since this operation is performed at the top of a utility pole it is difficult to inspect.</p>	PRECONSTRUCTION	2001	Greg Fuller	(919) 733-8021	Dollar Savings
Traffic Control Estimate System	<p>The Traffic Control Section is required to provide at least four traffic control estimates for every Transportation Improvement Program (TIP) project in NC. The estimates include scoping, letting list verification, preliminary and final quantity estimate. Each estimate is hand calculated to itemize and document each and every traffic control device that will be used in a specific TIP project. It involves many hours of calculation and the data from these estimates have to be keyed into three separate programs. Other than being inefficient, entering the same data into three separate programs allows for possible inconsistencies between estimate reports on the same project.</p> <p>A consolidated estimate program was created to more efficiently create traffic control estimates.</p>	PRECONSTRUCTION	2001	Jeff Rom	(919) 250-4159	Cycle Time Reduction

Roughness Averaging Automation	<p>Members of the Primary Roads section need to have the ability to quickly sum-up and average a series of values for the processing of the roughness section reports. This task is accomplished by delineating a section of roadway into 1/100ths of a mile and then summing up the inclusive value. This procedure is relatively easy unless the section becomes ponderously long (i.e., keying in 76 entries for a 7.53 mile section without missing a value or the miscounting of entries which would cause an error in the averaging computation).</p> <p>The Geographic Information Systems Unit wrote a visual basic macro that copies the contents of an ascii file into an existing EXCEL worksheet. This spreadsheet was set-up to do summation and average computations using a collapsible or expandable bracketing frame that can slide up and down the column of data creating the bounds for the summation and average calculations.</p>	PLANNING & ENVIRONMENT	2001	Tony Medlin	(919) 250-4188	Labor Hour Savings
Utilizing GPS in Gathering HPMS Data	<p>As part of NCDOT's compliance with the FHWA Highway Performance Monitoring System program (HPMS), the Road Inventory section must gather data for specific stretches of existing roadways. The Road Inventory section maintains data for approximately 3,600 samples statewide. While the current method yields accurate data, collecting travel lane curve and grade readings in traffic can be hazardous and time-consuming.</p> <p>A Trimble Pathfinder GPS unit was integrated into the data gathering process, specifically to replace the manual collection method currently used. The present field form was formatted via the Pathfinder software into the hand unit of the GPS. This allows all the required data to be compiled electronically and in one file.</p>	PLANNING & ENVIRONMENTAL	2001	Hardee Cox	(919) 250-4188	Labor Hour Savings
Environmental Streamlining for Enhancement Projects	<p>All projects receiving federal funding must undertake an environmental review consistent with the National Environmental Policy Act (NEPA). Environmental documentation for Enhancement projects typically are Categorical Exclusions (CE), but could require the more detailed Environmental Assessment (EA) or Environmental Impact Statement (EIS). CEs are further subdivided into Type 1 and Type 2 CEs. For projects requiring a CE review, the NCDOT had developed a standard eight-page form to be submitted. For the Enhancement projects, Enhancement staff (in conjunction with PD&EA and FHWA staff) have developed two methods to streamline this environmental documentation requirement.</p>	PLANNING & ENVIRONMENT	2001	Rob Ayers	(919) 733-2039	Customer Service
Enhancement Program Implementation: Project Manager's Guide	<p>In 1998, the Board of Transportation decided to allocate a portion of the Federal Enhancement funds externally to communities in order for these communities to implement projects. This differed from past guidance, as between 1991 and 1997 the BOT allocated all of the Enhancement funds internally to support Department goals. Statewide Calls for Projects were held in 1999 and 2000, resulting in more than 160 awards to communities throughout the state. Although these projects were all included in the Transportation Improvement Program, the Enhancement staff (initially two employees--now four) were tasked with managing these project, including the oversight of all aspects of project development--from project inception through project completion. Essentially the Enhancement staff had to learn about all of the relevant issues associated with program implementation, and then create a management system for these projects.</p> <p>Enhancement staff developed the Enhancement Program Implementation: Project Manager's Guide (hereafter referred to as the "document") to assist DOT project managers with project management. In addition, this guide is distributed externally to award recipients to assist them in project implementation. Processes, relevant state and federal guidelines, and sample documents have been researched and compiled into this one source.</p>	PLANNING & ENVIRONMENT	2001	Rob Ayers	(919) 733-2039	Customer Service
Point of Contact List	<p>The mission of Statewide Planning is to provide a "customer responsive process" as a part of our partnership with local officials in the state's 17 MPOs, as well as other NCDOT branches. A large portion of each MPO Coordinator's time is spent answering questions concerning the status of TIP projects in their area, although project specific work is done in other branches of NCDOT (Roadway, PD&EA, Public Involvement). Citizens often find NCDOT to be vast and confusing when seeking information on their own.</p> <p>In order to improve both internal and external communications, as well as provide quick and accurate responses, several coordinators have created a point of contact list for TIP projects in their area. At a minimum, this list provides the name and telephone number of a contact for the latest project information in each of the pre-construction areas. Other information that may be included is the stage of the project, opportunities for public involvement, e-mail addresses, and construction start date.</p>	PLANNING & ENVIRONMENT	2001	Beverly Williams	(919) 733-4705	Customer Service

<p>Streamlining Street Name Database Processes</p>	<p>The Secondary Roads Group of the GIS Unit-Road Inventory Section maintains a cross-reference file of state maintained secondary roads and their respective numbers. This file is updated monthly. The file has been maintained on the NCDOT mainframe system for years. When a list of a county road number/name file was needed, the request would be made by phone, mail, e-mail, or walk-in. The request would usually take 3 or 4 days to be delivered. Other circumstances, such as orders of 15 counties or more that required an invoice to be prepared or digital copies, added up to two additional days.</p> <p>Realizing the need for a more efficient system for distributing this information, the programming staff of the LRS Group of the Road Inventory Section was called upon to build an Access database of the file with update capability, report production, and availability over the Internet. A program was developed over a three-week period whereby the file could be updated with networked computers. Short reports could be printed in the Road Inventory Section immediately, and completed reports of the entire file could be printed and bound into a book the same day in the NCDOT Reproduction department</p>	<p>PLANNING & ENVIRONMENTAL</p>	<p>2001</p>	<p>L. C. Smith</p>	<p>(919) 250-4188</p>	<p>Customer Service</p>
<p>T.I.P. Web</p>	<p>The Transportation Improvement Program provides state and federal government agencies, the business community, and the citizens of our state with a comprehensive document for the transportation projects within the State of North Carolina. Up until this year the only means of providing project information has been in printed format - one book containing scheduling information and the second book consisting of maps for the highway construction portion of the T.I.P. Each of the books has a production cost of \$25.00, and additional cost is incurred for postage.</p> <p>This year for the first time all the information contained in both of these books is on the Internet. The text information stored in a Microsoft Access Database, an Excel Spreadsheet, or a Word Document were converted to an .PDF file type and incorporated into the T.I.P. web site. The 1692 individual project maps were converted to .JPG file type, and links to these individual project maps were created by outlining the project alignment (location) on the fourteen division maps.</p> <p>To date the Transportation Improvement Program (T.I.P.) web site has had over 55,000 hits since going online on June 7, 2001.</p>	<p>PLANNING & ENVIRONMENTAL</p>	<p>2001</p>	<p>Chuck Short</p>	<p>(919) 733-2039</p>	<p>Customer Service</p>
<p>County Maintenance Map Automation</p>	<p>The NCDOT GIS Unit wanted to reduce the long update cycle for county maintenance maps. User's of the county maintenance maps traditionally had a one to two year turnaround time before they were able to view the changes to the state maintained road system.</p> <p>County maintenance maps have been converted to a digital product and are now available for download on the GIS web page.</p>	<p>PLANNING & ENVIRONMENTAL</p>	<p>2001</p>	<p>Terry Norris</p>	<p>(919) 715-3700</p>	<p>Cycle Time Reduction</p>
<p>Permit Process Improvement Initiative</p>	<p>The environmental permitting process associated with building and maintaining North Carolina's transportation system is lengthy and highly complex, involving many state and federal agencies. The current process takes as many as 10 or more years for a highly complex project. In an effort to improve the workflow effectiveness and efficiency of the environmental permit development, coordination, and issuance process, the NC Department of Transportation (NCDOT), the NC Department of Environment and Natural Resources (DENR), and the US Army Corps of Engineers (COE) are jointly sponsoring a process improvement initiative. The initiative was undertaken with the primary purpose of developing quality permit applications and issuing environmental permits that support the timely delivery of the transportation program while minimizing disruption to the natural and human environment.</p> <p>Recommendations to streamline the project development and permitting process as well as a high level implementation plan and detailed implementation project plans have been developed. A coordination team has been assembled to oversee implementation and facilitate communication and decision making.</p>	<p>PLANNING & ENVIRONMENTAL</p>	<p>2001</p>	<p>Julie Hunkins</p>	<p>(919)508-1852</p>	<p>Cycle Time Reduction</p>
<p>Human Resources Reorganization</p>	<p>The Division of Human Resources for DMV operated autonomously from the Department's Human Resources Office. This created duplication of effort, cost deficiencies and confusion for managers and employees. The DMV is one of the many divisions staffed to DOT. There were 8 positions staffed to the DMV HR Office that provided the same services to 2,000 employees that 16 staff members provide 12,000 DOT employees. To ensure consistency, reduce expended resources and increase productivity the DMV HR function was consolidated into the DOT HR Office. The DOT HR Office absorbed some of the DMV employees into vacant positions within the DOT HR Department. One of the DMV employees came over and assumed the role for vacancy postings and another position came to the section to perform Personnel Technician duties in reviewing DMV hiring packages for qualification status. Another Personnel Technician remained on site to provide benefits and retirement services to the DMV employees. This position will report to the DOT Benefits Manager. Two other positions were transferred to our Training and Development Division.</p>	<p>HUMAN RESOURCES & INTER-GOVERNMENTAL</p>	<p>2001</p>	<p>Becky Keith</p>	<p>(919) 733-5846</p>	<p>Customer Service</p>

Literacy Improvement Program	<p>It was felt that NCDOT could do more to help its employees improve their literacy. The Secretary commissioned HR to examine the possibilities of setting up a formal structure so literacy improvement opportunities could be continuously offered to all DOT employees at all literacy levels. A Literacy Committee was established to study literacy levels of DOT employees, and establish a literacy program.</p> <p>The first task was to determine the literacy levels in the organization. We enlisted the help of the North Carolina Community College System (NCCCS). They recommended the Comprehensive Adult Student Assessment System (CASAS) and agreed to administer it for us. Our selected sample groups came from the Division of Motor Vehicles (30% randomly selected) Century Center (30% randomly selected) and 3 counties in one of the 14 Divisions (all employees in the counties). Lists of all names for the first two groups were provided to our Information Technology group, who made the random selection of testees. Testing dates and locations were coordinated with NCCCS personnel. We attempted to minimize the travel time for employees. The testing was completed and the report submitted back to us on 1 Nov 00. Roughly 50% of DOT employees could use some help. A formal policy was written, coordinated through the heads of major DOT divisions and subsequently approved by the Secretary on November 13, 2000.</p>	HUMAN RESOURCES & INTER-GOVERNMENTAL	2001	Angela Strach	(919) 733-5846	Communications
State Employees Wellness Fair	<p>The Department of Human Resources' customers not only includes those applicants applying for positions at DOT, but they also include the 14,000 DOT employees that the division services. Since HR considers the work force the most valuable DOT asset, they are always looking for innovative ways to show appreciation for, support, recognize, honor and help employees. Studies done by insurance providers suggest that, due to medical expenses, state employees may neglect their health, avoid preventative medical care, and are often a high risk for problems such as high blood pressure and cholesterol. An Employee Wellness Fair was designed to educate employees about the importance of preventative health, safety, and physical and mental well being. After DOT began putting on a Wellness fair, several state agencies approached DOT about co-coordinating a wellness fair for all state employees. A State Agency Wellness Committee was formed whose purpose was sponsoring a multi-agency Employee Wellness Fair for Raleigh-based state employees. The Wellness Fair provides state employees an opportunity to check cholesterol levels and to learn ways of reducing their HDL and Tri-glycerides. Other screenings include glaucoma tests, stress and allergy tests, hearing test and spinal examinations.</p>	HUMAN RESOURCES & INTER-GOVERNMENTAL	2001	Angela Strach	(919) 733-5846	Communications
HR Web Page Redesign	<p>The Division of Human Resources was interested in improving its external customer service and communication through a more simplified and user friendly website. In reviewing our previous website, we noticed areas that were hard to navigate, and identified areas that needed redesigning, which would assist DOT employees, other state agencies, and the general public. More importantly, we realized that our customers might not necessarily understand all the personnel terms therefore making it hard to navigate or find various topics such as sick leave, salary ranges, and job postings.</p> <p>A team was formed to review the website for ease of use, range of services, and communication of programs, policies and services. A timeframe was also established as to when our new website would be available for on-line customer service. The team leader worked with the various sections in personnel such as Merit-Based Hiring, Salary & Policy Administration, Retirement & Benefits, Personnel Training, Personnel Recruitment, and Position Management to coordinate collecting information to be put on the web pages.</p>	HUMAN RESOURCES & INTER-GOVERNMENTAL	2001	Angela Strach	(919) 733-5846	Customer Service
Qualification Evaluation System	<p>In October of 1997, Senate Bill 886 was passed to ensure qualified persons were hired for State Government positions. The Bill required all State Agencies to recruit and hire applicants based on merit. To ensure that DOT complied with the new law, the Human Resources Department created the Qualification Review Section and implemented the Merit-Based Selection and Recruitment Plan. The Qualification Review Unit set a standard of evaluating all personnel packages within 24-hours. However, storing, compiling, and providing applicant information to applicants, the Legal Department, the General Assembly, OSP, or Employee Relations became a time consuming, tedious process.</p> <p>The Human Resources Department noticed that there was a great demand and need for applicant data and partnered with the Information Technology Section to develop the "Qualification Evaluation System" (QES). The system maintains a database on all applicants that have applied for positions with the Department of Transportation and Division of Motor Vehicles.</p>	HUMAN RESOURCES & INTER-GOVERNMENTAL	2001	Angela Strach	(919) 733-5846	Cycle Time Reduction

Tying Balanced Score Card to Performance Management System	<p>In 1999, the Productivity Services staff developed and implemented a Balanced Score Card system to measure individual performance and effectiveness in providing services to the department. To further enhance this system, the staff embarked on tying the results of Balanced Score Card measures attained by each staff member to his or her Performance Measurement evaluation.</p> <p>The three Balanced Score Card measures used (client ratings, staff cost versus hiring outside consultants, and percentage of project objectives achieved) represent three of the five rating criteria for the key responsibilities portion of the Performance Management review. As with all other Performance Management dimensions, each Balanced Score Card measure is defined in terms of staff expectations in order to meet prescribed levels of performance ratings, as well as required documentation to validate the performance rating.</p>	FINANCIAL	2001	Ron Oates	(919) 733-2083	Communications
Automated Leave Request	<p>Personnel regulations require that employees submit leave requests to the supervisor in order to take time off. In the past a Leave Request Form was completed by the employee, submitted to the supervisor via mail system, the supervisor approved the request by signing the form, and then returning it to the employee. This took anywhere from an hour to several days depending on schedules.</p> <p>To eliminate the paperwork and to reduce the time to receive approval, the team developed an Automated Leave Request System. By using the LAN and PC system, the employee selects New Daily Note on the date for which he/she requests leave on the Netscape Calendar. The employee enters the supervisor's name and records their name and the time for which he/she requests leave. Their request appears on the supervisor's calendar. The supervisor selects the keep in agenda to indicate approval. The employee can check their calendar to know if it has been approved.</p>	FINANCIAL	2001	Ron Oates	(919) 733-208	Communications
Emergency Meal Reimbursement for Employees	<p>Historically, the department has reimbursed employees \$10 for meals (other than lunch) when an employee was on duty for twelve hours or more continuously due to emergency situations involving hurricanes, severe snow storms or other crises. In order to receive this money, EACH employee had to complete an Expense Voucher Form 600-EXP and send it to Fiscal for payment. Processing the large number of expense vouchers involved much time, especially after storms like Hurricane Fran when hundreds of checks were processed. It was not uncommon to still be processing payments four to six months after the event under the old system.</p> <p>Effective November 20, 2000 a new procedure was established for employees to receive emergency pay. Under the new guidelines divisions may reimburse employees for emergency meals through imprest cash. Instead of completing individual expense voucher forms, the division lists all employees eligible for emergency meal reimbursement during a pay period on form ERPM-5. Form ERPM-6 serves as a request for a warrant. The division then processes a check made payable to the supervising engineer, who in turn cashes the check and distributes the money.</p>	FINANCIAL	2001	Brent Hamilton	(919) 733-3624-452	Cycle Time Reduction
On-Line Expense Voucher System	<p>The manual process of paying expense vouchers was very labor intensive and slow. From the field perspective, forms had to be completed, charges required the correct charge code and had to be added by charge code, all rules had to be remembered and followed, and then all forms and receipts had to be mailed to Fiscal in Raleigh. From Fiscal's perspective, the forms had to be audited for adherence to the rules, charge codes had to be verified, forms had to be re-added, data had to be entered into the warrant system, and then the check, form, and receipts had to be indexed and scanned. This process could take 3 weeks or more to complete.</p> <p>A new on-line expense voucher system was developed to allow direct input of expense voucher information from any computer with mainframe access. 95% of the rules are built into the program so that the user need only enter dates and locations.</p>	FINANCIAL	2001	Brent Hamilton	(919) 733-3624-452	Cycle Time Reduction
In The Loop A Monthly Newsletter for Employees of NCDOT	<p>With 14,000 people working in every county of the state, NCDOT faced many challenges regarding communication and information sharing among employees. Several years ago, the department published a paper based employee newsletter called theExtra Mile. The cost and procedures associated with printing and mailing it caused the newsletter to be out of date by the time it reached all units and divisions.</p> <p>To remedy this, Secretary Tippett requested a new, web-based newsletter to be produced and distributed by the Public Information Office. The goal is to provide information to help employees do their jobs better. These features include news from the field, project profiles, training and development resources, safety tips and announcements from Human Resources. Another goal is to encourage communication among all employees in every unit in every county. Features include human-interest stories, employee profiles and employee awards and achievements. Newsletter correspondents were recruited from divisions and units across the department. It was determined that the web provided the quickest and most effective method of distribution.</p>	PUBLIC INFORMATION	2001	Cherie Gibson	(919) 733-2522	Communications

Advance Flashing Warning Light for Flagman Stop/Slow Paddle	<p>Motorists on the North Carolina roadways are experiencing greater difficulties seeing our Roadway Maintenance flaggers while approaching NCDOT work zones. After several close call reports of motorists driving into the work zone buffers prior to stopping, it was deemed necessary to develop a safety device which would increase the visibility of the work zone flaggers and provide for earlier recognition of the stop/slow paddles within the work zones.</p> <p>Granville County Roadway Maintenance in Division 5 developed an advance warning flashing red light with a 12-volt mobile power source that can easily be attached to the current stop/slow paddles. Prior to approaching an NCDOT Work Zone, motorists are immediately alerted to the presence and location of the flagger. The flashing warning light is extremely effective in low visibility conditions or when the flagger is positioned in shaded areas of the roadway.</p>	OPERATIONS DIVISION 5	2001	Mark Cooney	(919) 693-8164.	Safety Improvement
Voice Activated Intercoms	<p>In the erosion control operations, two pieces of equipment are used, the Hydroseeder and the mulch blower. The hydroseeder operator is on top of the vehicle and the mulch/straw blower operator is on a trailer that is being towed by a flatbed truck loaded with straw. The operators could not communicate with the individual driving the flatbed truck since the machines were so loud.</p> <p>Division 13 Roadside Environment office purchased voice activated intercoms and headsets to aid workers in communication during the erosion control operations. The vehicle driver is able to alert the hydroseeder and mulch blower operators of low power/phone lines, tree limbs, traffic, etc. In addition, the operators can easily notify the driver if equipment has malfunctioned, or to slow down, stop or speed up.</p>	OPERATIONS DIVISION 13	2001	Keith Hill	(828) 2549590.	Safety Improvement
Lowboy Trailer	<p>disconnected from a truck. At times the truck could be 100 feet or more away from the trailer when unloading. This is very dangerous at night or in times of low visibility.</p> <p>The Division 1 Equipment team installed strobe lights in the rear taillights that work off of a battery mounted on the trailer. There is a toggle switch on the rear of the trailer that operates these lights. The battery is wired into the lights with a diode in line to keep the battery charged. The strobe lights can also be used when moving equipment to make the trailer more visible.</p>	OPERATIONS DIVISION 1	2001	Ricky Feher	(252) 426-5738	Safety Improvement
Liftgate	<p>In the past, there have been several minor muscle strains associated with lifting heavy objects into utility pick-up/trash trucks with a standard tailgate. It has always been difficult for one person to load heavy objects such as large animals and appliances alone.</p> <p>In order to reduce the risk of injury caused by lifting large heavy objects, the Caswell County Maintenance purchased a hydraulically powered liftgate (Tommylift) at a one-time cost of \$1,750.00. This liftgate will drop down flush with the ground and allow one employee to load all but the heaviest objects.</p>	OPERATIONS DIVISION 7	2001	Herbert McDowell	(336) 694-6101	Safety Improvement
Snow Plow Jacks	<p>The process of using a pry bar or lever to attach a snowplow on a dump truck is cumbersome in snowy conditions and can be hazardous. Normally three or four people are required to attach a snowplow to a dump truck (1 driver, 1 or 2 to use the lever and 1 to install the pins). In 2000, there was one injury due to a lever slipping and striking an employee on the shoulder.</p> <p>The Division 7 team recognized the potential for injuries and the difficulty of installing snowplows. The equipment department investigated the feasibility of adding a jack to the frame of the plow. Skid jacks were welded on the plow frame to adjust the height of the plow when attaching the plow to the truck.</p>	OPERATIONS DIVISION 7	2001	Paul Ingram	(336) 375-5475.	Safety Improvement
Guardrail Sign Mounts for Median Guardrails	<p>Due to the installation of the median guardrails on multi-lane highways, additional signing is needed to safely operate the herbicide spray trucks. Mounting signs in conventional stands is dangerous to both State forces and the public because workers must carry the sign stand across 2-4 lanes of highway in the face of speeding cars and trucks. The median guardrails do not allow enough room for a worker and truck to stop in the median and open doors, unload signs and racks, and safely erect the signs. Mounting the signs inside the median does not provide adequate visibility.</p> <p>Using the Equipment Unit's welding shop, the Division 9 Roadside Environmental Herbicide Crew designed a simple mounting bracket that will attach to different guardrail widths and can be used with the current roll-up type signs. It is less cumbersome than any commercial model and safer to carry across the roadway. The Division 9 team used eight sign mounting brackets with a total cost of \$96 in material and labor. A comparable cost for commercial brackets would have been approximately \$300 to \$450.</p>	OPERATIONS DIVISION 9	2001	P. H. Suggs	(336) 896-7039	Safety Improvement

NC-125 & NC-903 Rumble Strips	<p>When faced with having to repair rumble strips on NC-125 and NC-903 worn by traffic and snowplows, the Halifax Maintenance Yard began looking for a solution to having to bring in a unit from outside the maintenance yard to do this expensive work. Safety to the traveling public is compromised if these rumble strips fall into disrepair. When the accidents for three years before the rumble strips were originally installed are compared to the three years after installation, there was a noticeable reduction in preventable accidents.</p> <p>Employees at the Halifax Maintenance Yard in Division Four devised a plan to use a template to keep asphalt and 78M stone in place so it could be rolled. This was a less expensive solution than using thermoplastic, saving \$.82 per linear foot. This reduced the total cost by \$700, 37% savings. The use of a template to keep readily available stone and asphalt in place allows the maintenance yard to quickly repair rumble strips.</p>	OPERATIONS DIVISION 4	2001	Franz Enders	(252) 583-5861	Safety Improvement
Safer Intersection Work with Detours	<p>The Division 4 Construction office in Nashville needed to find a safer way to perform intersection work at NC 97 and Nashville Road in Rocky Mount. Due to the amount of traffic at this intersection, which included a significant number of tractor-trailer semis, minimizing the impact of intersection work on the traveling public while providing a safer work zone environment was essential. It was determined that a temporary road closure (one intersection leg at a time) and a temporary detour would greatly reduce exposure of workers to dangerous traffic. It would also reduce exposure of the traveling public to construction equipment, as well as eliminate intersection congestion.</p> <p>NCDOT and contractor personnel contacted the City of Rocky Mount to discuss the possibility of detouring traffic. Rocky Mount officials agreed that detouring traffic would be a safer approach; however, they also wanted to minimize the length of time the detour would be in place. The road closure for Nashville Road north of NC 97, as well as south of NC 97, was limited to one week each. Thus, the total detour time was two weeks.</p>	OPERATIONS DIVISION 4	2001	Lynn Raynor	(252) 459-2129	Safety Improvement
Flexi-Guide 300 Curb System	<p>“Gate running” at gated railroad crossings has been identified as a major problem across the nation. The NCDOT Rail Division has been using curb systems at railroad grade crossings where motorized gate arms are used and where the potential for gate running exists. The Flexi-Guide 300 Curb System was installed on May 16, 2001 at NC 42 and US 70 in Clayton, NC. Due to heavy traffic volumes and anticipated future growth in traffic volume at this intersection, the Flexi-Guide 300 Curb System was intended to deter motorists from driving around the gate crossing. The unique design of this new system combines strong color conspicuity, excellent reflectivity, and visual structure to provide an effective 24/7 deterrence to gate running. This system can easily be removed and re-bolted to the road surface when resurfacing is required. The Flexi-Guide 300 Curb System can also be used as an effective traffic-calming device in neighborhoods, as a traffic roundabout, and as a positive means for separating traffic moving in the same or opposite directions.</p>	OPERATIONS DIVISION 4	2001	Sid Tomlinson	(252) 237-6164	Safety Improvement
Mobile Concrete Transport Unit	<p>Using one 6.0 c. f. wheelbarrow or two 12-quart buckets (weighing approximately 60 pounds each) in transporting a heavy load of concrete from a concrete truck or a concrete pump truck to the concrete testing location can lead to serious back injuries.</p> <p>The construction unit in Division 4 fabricated a Mobile Concrete Transport Unit (MCTU) container using scrapped aluminum highway signs obtained from the NCDOT Division 4 Traffic Services Unit. The dimension of the container can be adjusted to accommodate whatever type of hand truck is used and does not have to be permanently attached to the hand truck. The signs can be obtained from the Division Traffic Services Office and can be welded together by any certified welder. The MCTU can be used by anyone who has to transport concrete for testing</p>	OPERATIONS DIVISION 4	2001	Michael Biedell	(252) 237-6164	Safety Improvement
Paint Handling	<p>Paint for pavement marking is currently supplied by the NC Corrections Enterprise in 30-gallon drums. It takes approximately one hour to unload the transfer truck with a six-person crew. Employees are exposed to strain, repetitive and crushing injuries. The barrels must be stored on one level, then loaded on a supply truck for use.</p> <p>The paint team in Division 13 has proposed that NC Corrections Enterprises purchase or lease totes to contain paint. Totes are 300 to 400 gallons (replaces 10-15 drums) and are reusable and stackable. A forklift is required to lift these totes and one employee with a forklift can unload a supply truck in substantially less time, and load up the empty containers. They can be unloaded from the bottom, can be strapped to a supply truck bed and unloaded without moving, and they take up less space in storage and transit. These totes are in use by private paint contractors and are available for purchase or lease from several companies.</p>	OPERATIONS DIVISION 13	2001	Jeff Moore	(828) 251-6250	Safety Improvement

"Staking with Ease"	<p>There are various problems associated with staking by pine-wood materials: 1) the material is heavy and cumbersome and must be sorted and placed within limited confines of the survey vehicle; 2) the control stakes require attaching flagging that when placed in pastures, cattle and/or horses frequently ingest the vinyl material torn from the stakes; 3) repeat handling is necessary because all the stakes are written up at once, then sequentially loaded into the vehicle and distributed on site at required locations; 4) stakes must be driven into sometimes hard, dry, or even frozen ground by a 10 or 12 pound sledge hammer which is a potential risk factor; and 5) wooden stakes have a short duration period and re-staking is necessary.</p> <p>A new process utilizing wire stakes secured with a vinyl flag was implemented by the survey stakeout time in Division 10. They weigh less than four pounds each and can be easily placed with a wire flag tool. This eliminates repeat handling of bulky, heavy wooden materials and no prior distribution or laying-out on site is necessary.</p>	OPERATIONS DIVISION 10	2001	Ronald Posey	(704) 982-0104	Labor Hour Savings
A Boom Mower Improvement	<p>There has been a problem with debris getting stuck between the screen/plexiglass and glass on boom mowers, which impairs the operator's visibility. Objects thrown by the mower have also shattered the cab's glass windows and doors.</p> <p>The Beaufort County Maintenance unit has investigated the feasibility of ordering boom mowers with shatterproof glass, which would eliminate the need to retrofit the cab with an expanded metal screen or plexiglass over the cab's glass. It would improve the operator's visibility as well as make it easier and safer to clean the glass.</p>	OPERATIONS DIVISION 2	2001	R. A. Lewis	(252) 946-3054	Labor Hour Savings
Sluice Gate Rod Cover	<p>A number of roadside hazardous spill containment devices have been installed in Orange County to help prevent accidental releases of hazardous substances in the event of a traffic accident. The devices are controlled by manually operated sluice gates, which can contain the flow of a hazardous material in a stilling basin. These gates utilize a large hand wheel to turn a threaded rod that lifts a gate valve. The rod is exposed to weather and has required cleaning and lubrication approximately six times per year.</p> <p>The Orange County Maintenance team fabricated a cover for the rod by using scrap PVC pipe and fittings. The cover slides over the threaded rod and eliminates the loss of lubricant due to rain and wind. The cover can remain in place continuously, including during operation.</p>	OPERATIONS DIVISION 7	2001	Chuck Edwards	(919) 7152533	Labor Hour Savings
Drill Press for Concrete Patching	<p>Concrete patching is necessary when a concrete slab breaks or potholes occur. Holes are drilled (doweled) into the existing damaged concrete so that rebar (steel bars) can be placed on six-inch centers across the width of the area to be patched. The rebar is placed in the doweled holes to serve as a load transfer mechanism from the new to the old concrete which ties everything together.</p> <p>The existing drill used weighs eighteen pounds and requires two people because of the awkward positioning of bending and/or squatting. Drilling the holes would be similar to jackhammering horizontally about five inches off the ground.</p> <p>The Forsyth Maintenance team started using a new drill press for concrete patching that is easier to use and only requires one person to operate.</p>	OPERATIONS DIVISION 9	2001	Gary Neal	(336) 896-7014	Labor Hour Savings
Distribution of Pavement Review Packets Using Website	<p>Every month a review of TIP project pavement designs is held. Typically, the review will cover four projects and for each project the pavement designer prepares a summary of two to four alternative pavement designs and summary design inputs. The report prepared by the Geotechnical Unit is also attached. In the past, this information was compiled for all the projects for that month, a cover sheet was attached, and copies were prepared for everyone invited to the Pavement Review Committee meeting. Typically, 25 copies would be made and then hand-delivered to Raleigh attendees and delivered by courier service to Division personnel. In order to improve the process, reduce copying, and save the delivery time, the Pavement Design team started scanning the review package information and posting it on the Pavement Management Unit website. An email message is then sent to all individuals who previously received review packets alerting them of the new material, including a hot button to access the material for review.</p>	OPERATIONS CONSTRUCTION	2001	Judith Corley-Lay	(919) 250-4094	Labor Hour Savings

Secondary Road Construction Plans	<p>Each year the Elkin District Office is responsible for staking, preparing construction plans, obtaining right-of-way, and construction for approximately 30 unpaved roads in its three counties. In previous years, the construction plans, better known as Straight-Line Diagrams, were drawn by hand. This was a slow process for one employee, so sections of the project were distributed equally between members of the survey crew. This process would occupy a 3-man crew for a whole day. Right-of-way problems were frequently encountered causing revisions that were difficult to make and time-consuming since the plans were drawn by hand. With the implementation of Microstation in the District Office, the construction plans are now prepared using the computer. The survey crew can remain on schedule with one member preparing the plans on CADD while the other crew members continued staking the remaining roads on the Secondary Construction Program. In addition, any construction plan revisions are much easier and less time-consuming to perform using the computer.</p>	OPERATIONS DIVISION 11	2001	Charles Reinhardt	(336) 835-4241	Labor Hour Savings
Backpack Sprayer Holder	<p>Storing backpack sprayers during transit has interfered with removing traffic control signs. The backpacks also restrict rear view mirror vision and have been subject to damage and spillage.</p> <p>The Surry County Herbicide Crew designed a backpack holder that is portable and mounts into sign rack standard holes. The holder will secure two backpack sprayers, keeping them secure during transit and preventing possible spillage and damage. In addition, the newly designed backpack holder eliminates rear view mirror vision problems, eliminates interference with traffic control sign removal and allows easy access to backpacks.</p>	OPERATIONS DIVISION 11	2001	J. A. Edsel	(336) 903-9240	Labor Hour Savings
Light Emitting Diode (LED) Signal Module Evaluation	<p>To ensure that LED modules are visually effective and will provide a safe traffic flow under windy, swaying conditions, they are visually evaluated. The evaluation process required 17 people and one bucket truck for eight hours for every evaluation. The evaluating observers would determine whether there was a significant reduction in the brightness of the indication prior to being obscured by the visor. This test method allowed some variability in the testing parameters from each test set-up. Vendors suggested the variable test parameters could have a negative effect on the evaluation of their products.</p> <p>To develop a more objective visual evaluation, a new test fixture was designed and installed at a new test site that did not require the bucket truck to mount and change the modules. The test fixture allows more accuracy in determining when the signal indication blanks out during swaying by using a mechanical tilting mechanism, and cuts the evaluation time in half.</p>	PRECONSTRUCTION	2001	Ken Morge	(919) 233-1209.	Labor Hour Savings
Concrete Deck Patching	<p>The use of Duracal Quickset in concrete deck patching requires demolition of potholes. It is water-based, cannot be used below 32 degrees, cracks during curing, has long set-up and drying times, and durability is usually less than one year. In order to improve the process of patching potholes, the McDowell Bridge Maintenance used a magnesium and ammonia-based product called MG KRETE to repair three decks. This product sets-up four times faster, does not require demolition, does not freeze or crack, can be used in below freezing temperatures, is less labor intensive and is very durable. The following is a comparison of labor hours for three bridge projects:</p>	OPERATIONS DIVISION 13	2001	Ken Anderson	(828) 298-1128	Labor Hour Savings
Rest Area Forms Reduction	<p>The Central Roadside Environmental Unit's Rest Area Section receives several different reports monthly from the Divisions. Each Rest area turns in monthly, a daily meter reading, a monthly usage survey, a recycling report and Division Inspection reports. The Division inspects contractor-maintained rest areas a minimum of 3 times weekly. This paper work, along with monthly invoices, Weekly Contract Supervisor Worklogs and Employees Monthly Worklogs are all very important for the day to day administering of the Maintenance contracts by the Divisions. When low bid maintenance of rest areas was first begun, the central office monitored it very closely for any problems that might arise with the proposals, that are generated in this office, and to insure that the Department was getting the service that we expected. Since the program has matured over the years and is now a normal practice, the close monitoring of all the day to day paperwork by the central office is no longer necessary. The Divisions have been asked to no longer send copies of the Monthly Invoice, Supervisors Weekly Worklog, and Employees Monthly Worklog to the central office. They should keep all originals in their files until the contract is complete. The central office does want to remain aware of the condition of the facilities. Therefore, the Divisions have been requested to send in a copy of 1 weekly inspection report for each facility, instead of the original 3 inspections per week. Many of the Divisions are now sending the reports and inspections by E-mail.</p>	OPERATIONS ROADSIDE ENVIRONMENTAL	2001	Jennifer Pitts	(919) 733-2920	Customer Service

Windsor Probe	Materials and Tests Unit performs investigations on materials that do not meet the minimum requirements for specifications. One investigation involves in-place strength of concrete when test cylinders do meet the required strengths. In the past, M&T would remove cores from the structure and then test for strength. This method is the most accurate, the most costly and time consuming. The time and cost makes this method not very economical. The Rebound Hammer, a non-destructive test system, was then introduced as a strength indicator and became the standard for our investigation and recommendation. The rebound hammer system requires ten different readings within a specified area. These readings are then averaged and strength is then interpolated using a graph. This method is very quick and efficient, but there have always been questions concerning the depth at which the individual readings can measure. A large percentage of the investigations using the Rebound Hammer still required a core sample be taken to achieve an accurate measure. Recently M&T has purchased six Windsor Probe Test Systems to be used statewide.	OPERATIONS MATERIALS & TESTS	2001	Sam Frederick	(919) 733-7091	Customer Service
Skill Block Tracking	The Skill Based Pay Program recognized four functional areas of maintenance operations-roadway, roadside, bridge and traffic services. Approximately 4,000 transportation workers (TW's) participate in this program. Since inception of the program grants on average 2,000 skill blocks per year. An important factor in administering and monitoring the Skill Based Pay Program is the ability to monitor and track the awarding of skill blocks to TW's. Prior to June 2000, Position Management collected data on skill blocks that were granted at six-month intervals. This data was entered into an Excel spreadsheet and then distributed to each division. The divisions would then cut and disburse the segments to the appropriate people for them to interpret. This process was used from the inception date of the program August 1996. By 1999, the spreadsheet had grown to approximately six feet in length and become unmanageable and almost impossible to interpret	OPERATIONS - MAINTENANCE	2001	Don Aschbrenner	(919) 733-3725	Customer Service
Road Oil Database	There has always been difficulty keeping records on the paving history within the division and providing access to this information to all departments. With the creation of a division database to record all aspects of the paving of each road, county engineer now have access to all pertinent information regarding the roads paved in their county. Road ratings can also be integrated in the database to provide rating information on all primary and secondary roadways within the division. Traffic services also gets a biweekly printout including length, to and from, to assist them in planning for the markings.	OPERATIONS DIVISION 9	2001	Noel Chilton	(336) 896-7019	Communications
Secondary Road Construction Tracking Form	District 3 recognized the need to streamline the process of tracking secondary road construction projects. Projects were being tracked separately by the District Engineer, County Maintenance Engineer, and Assistant District Engineer causing a coordination problem between the three. No set form was available for quick reference that listed information needed to coordinate the purchase order and maintenance construction programs, resulting in a loss in the amount of road miles that could be constructed within a reasonable time frame. Ideas were submitted from the three parties regarding information they needed in the construction process. A form was then developed to show all the needed information from the three parties. Every month the sheet is updated at each maintenance office and forwarded to the District Office where the information is compiled on one form and emailed back to the individual maintenance offices.	OPERATIONS DIVISION 11	2001	B. K. Hamby	(336) 667-9117	Communications
Procedures for Selective Vegetation Removal (SVR) Permit Processing	In August 2000, the Division Roadside Environmental Departments (statewide) were given the responsibility of managing all aspects of the Selective Vegetation Removal (SVR) policies within the Outdoor Advertising Control Program. After a few weeks of learning the various aspects of the new responsibility by trial and error, it was determined that a written step-by-step process was needed in order to coordinate the responsibilities within the Division Four Roadside Environmental Department. A small work group was formed to review the entire process from start to finish, in accordance with the revised SVR policy and to develop the permit process. A written 30-step process was developed to cover most potential situations that may occur within the selective vegetation removal permit process.	OPERATIONS DIVISION 4	2001	Don Smith	(252) 237-6164	Communications

Monarch Butterfly Program	<p>The annual migration of monarch butterflies is one of the marvels of nature. Monarchs stay over winter in parts of Mexico and southern California. Each spring they begin a round trip journey of several thousand miles that takes four or five generations to complete. They fly north as far as southern Canada, then return each fall to the same spot where their ancestors spent the previous winter. Monarch larvae feed exclusively on species of milkweed. Without milkweed along their migration routes, monarchs would be unable to reproduce.</p> <p>Due to development, farming practices and changes in land use, milkweed is becoming increasingly less common throughout the United States, including North Carolina. There has been a corresponding noticeable decline in the number of monarchs that visit North Carolina during their migration. In late 1999, Dr. Voit Gilmore, Chairman of the Governor's Clean NC 2000 Board, approached the NCDOT with concerns about the downward trend in the monarch butterfly population. The Roadside Environmental Unit agreed to research the issue, and as a result, the "Monarch Butterfly Program" was implemented.</p>	OPERATIONS ROADSIDE ENVIRONMENTAL	2001	David L. King	(919) 733-2920	Environmental Sustainability
CRS-2 Loading Hose Overflow Collector	After reviewing the former practice of loading CRS-2 into the asphalt distributor, the team discovered a considerable amount of CRS-2 was dripping onto the ground after loading had occurred. In order to prevent excess CRS-2 from being spilled onto the ground, the maintenance mechanic on the yard developed a sealed containment system for connecting the dripping CRS-2 hose after the loading is completed. The solution involves placing a quick connect system on the end of the loading hose and also on top of a 55 gallon barrel. This sealed barrel prevents the CRS-2 from dripping onto the ground and adversely effecting the environment, as well as preventing rainwater from entering the storage container	OPERATIONS DIVISION 9	2001	John Rhyne	(336) 631-1360	Environmental Sustainability
Chipping to Reduce Brush Volume	Orange County Maintenance is responsible for the grading and construction of an annual secondary road program. One of the steps of this process is the clearing and grubbing of roadway rights of way prior to grading. The brush that was generated was trucked to local landfills using contracted and DOT operated dump trucks. The CPI team decided to utilize a contracted brush chipper to reduce the brush volume and to dispose of as many chips as possible by spreading them along the right of way limits or to provide to nearby property owners at no cost to the department. Hauling brush to a landfill would be done only when no other means available.	OPERATIONS DIVISION 7	2001	Chuck Edwards	(919) 732-4330	Environmental Sustainability
Recycle Power Poles	<p>The Williamston Bypass construction project of US 64 crossed a baseball field previously owned by the Town of Williamston. The right of way acquisition made the Department the owner of the field and all appurtenances. This included 13 power poles. While arranging for disposal of the transformers, a representative of NC Power indicated the Williamston Fire Department was in need of poles for a training facility. We contacted Jim Peele, Captain of the Fire Department, who confirmed they were interested. Captain Peele has agreed to remove the poles at no cost to the Department.</p> <p>An estimate for removal and disposal was requested from Barnhill Contracting Co., prime contractor on the above project. The quote received was as follows:</p> <p>4 small poles @ \$450/ea. = \$1800 9 tall poles @ \$1000/ea. = \$9000</p> <p>Therefore, the total cost to the Department would have been \$10,800.</p>	OPERATIONS DIVISION 1	2001	C. W. Bridgers	(252) 792-0347	Environmental Sustainability
Maintenance Yard Improvement	<p>In 1998 the State of North Carolina implemented a Stormwater Pollution Prevention Plan (SPPP) for Maintenance yards. Each year at different times the SPPP leader has to observe different Stormwater Discharge Outfall (SDO) locations for pollutants such as salt runoff, metallic debris, oils, gases, etc. In the past we have had problems getting all metal objects subject to rust under a shelter where it would not be exposed to rainfall. There were several buildings on the site that were old and were not being fully utilized.</p> <p>We recently remodeled and improved the structural stability of several buildings that have not been fully used. By improving these v, such as new roofs, cleaning, painting, and adding some structural stability, we increased the space to provide shelter for salt spreaders, tailgates, and other various pieces of equipment. By doing this, the run off of hazardous salt material and rust has been reduced to streams.</p>	OPERATIONS DIVISION 11	2001	Travis Spicer	(336) 835-4241	Environmental Sustainability

Environmental Program Coordination	<p>Division Four is faced with increased need for environmental compliance, coordination and notification for maintenance activities in the Division. This need was made even greater with the introduction of Buffer requirements for the Neuse and Tar River and the maintenance activities stemming from hurricane-related flooding.</p> <p>The Division Engineer, and the new Division Environmental Officer (DEO), formed a team comprised of the DEO, Assistant District Engineers from the three districts and the Bridge Maintenance Supervisor. The Assistant District Engineers and Bridge Maintenance Supervisor were designated as District Environmental Coordinators (DECs) and were assigned to help environmental coordination efforts underway by the DEO.</p>	OPERATIONS DIVISION 4	2001	Robin Little	(252) 237-6164	Environmental Sustainability
Subdivision Review	<p>In the year 2000, the Salisbury District Office reviewed the design of 60 proposed subdivisions for their compliance with state standards. Included in this review was the analysis of the proposed storm drainage system of new subdivision roads. In the past, all subdivision plans with curb and gutter were sent to the Hydraulics Unit in Raleigh for a review of the storm drainage. This process took an average of three weeks per subdivision for the plans to be mailed to Raleigh, reviewed, and returned to the district office.</p> <p>To reduce the amount of time necessary to review each subdivision, an engineer from the Hydraulics Unit came to the district office and trained the technicians in the district so that they were competent to perform some of the reviews in-house.</p>	OPERATIONS DIVISION 9	2001	David Lipe	(704) 639-7560	Customer Service
Night-time Spray Operation	<p>The installation of several miles of median guardrail provided a challenge for the Division to maintain the vegetation in the median. In many areas, the median was not wide enough for the roadside mowers to operate without closing the left lane of interstate. Spraying had not been performed in the interstate median of this Division for several years due to the volume of traffic. We found that if we closed the left lane on the interstate with a slow moving caravan during the daytime, the traffic bottlenecked and accidents occurred. We also had too many near misses which caused this operation to be unsafe. The best option to maintain the vegetation in the median was with the plant growth regulators and herbicides, as this has been done in the eastern region of North Carolina for years. We chose to try nighttime spraying.</p> <p>In the nighttime spraying operation, we had the advantage of much less traffic volume. Also, the lighting used on arrow-boards and flashing lights were much more visible. We were concerned about impaired motorist so we only sprayed Sunday through Wednesday nights. The only equipment modifications we did were to add reflective tape to the vehicles and install lights on the spray boom. These lights were adjusted to light the area the nozzles were spraying and not to blind oncoming traffic.</p>	OPERATIONS DIVISION 12	2001	Phil Fox	(704) 480-9020	Customer Service
AAH & the Spanish Speaking Community in NC	<p>The steady increase in the growth of North Carolina's Spanish-speaking population offers an opportunity for the Adopt-A-Highway (AAH) program to grow as a multicultural anti-litter program and increase its effectiveness in keeping our state clean and beautiful. It was decided that the basic tools needed to support the participation of the Spanish speaking community in the Adopt-A-Highway program were a Spanish language volunteer highway safety training video and informational brochure. The N.C. Agency for Public Telecommunications expertly provided the services to accomplish our goal. As a consequence, North Carolina is the first state to provide an AAH brochure ("Cómo adoptar una carretera en Carolina del Norte") and highway safety training to its Spanish-speaking community in the Spanish language.</p>	OPERATIONS ROADSIDE ENVIRONMENTAL	2001	Anne Walker	(919) 715-2550	Customer Service
Traveler Information Management System (TIMS)	<p>In the aftermath of Hurricane Floyd, over 1,500 roads were closed due to flooding. Motorists attempting to return home or check on relatives and friends needed to know the conditions of the road system. Emergency responders such as the Red Cross needed to get supplies to the persons stranded in flood areas. The Traveler Information Management System (TIMS) was created to provide real-time road condition information to as many people as possible via the Internet.</p> <p>The purpose of the system is to have a central location where the public, media, emergency service providers, other state and federal agencies, and NCDOT personnel can go for real time information on the condition of the state's highways. TIMS provides this location while minimizing the amount of additional work required of NCDOT field forces. TIMS automated several existing paper processes performed by NCDOT field personnel related to road condition. Information relating to road construction and maintenance, bridge projects, ice and snow conditions, and road closures are now collected at one site and provided to anyone with access to the Internet. In addition, TIMS allows NCDOT users to subscribe to the system and be alerted, via e-mail or pager, when an incident that meets their pre-set criteria is entered into the TIMS system.</p>	OPERATIONS ITS	2001	Kelly Hutchinson	(919) 233-9331	Customer Service

-95 Welcome Center Parking Notification in Northampton County	<p>An on-going problem was identified involving excessive overnight trucker parking at the I-95 Welcome Center (southbound) in Northampton County, just south of the NC/VA State line. The truck parking lot at this facility has nineteen marked spaces. Actual counts of parked trucks were taken at random times overnight, and revealed that routinely there were as many as 50-60 trucks. Trucks were parked along grassed or soiled shoulders, exit and entrance ramps, and curb and gutter sections. The problems created involve safety and maintenance issues.</p> <p>A work group was formed to address the problem and offer suggestions for improvements. Several permanent, long-range solutions were suggested but with funding uncertainties, a short-term pilot project was decided upon for implementation. The pilot project recommendation consisted of placing a portable trailer-mounted Changeable Message Sign (CMS) along I-95 southbound, in Virginia, in advance of the Welcome Center for notification to truckers that no parking spaces are available.</p>	OPERATIONS DIVISION 4	2001	Steve Hamill	(252) 237-6164	Customer Service
Work Zone Education & Safety Program	<p>The safety of highway workers and the traveling public throughout the state continues to be one of the most important challenges the department must face. NCDOT continuously strives to provide a safe, efficient, customer-service driven transportation system for the citizens of North Carolina. Construction on North Carolina highways is reaching a new historical high. With increased growth throughout the state, work zones and construction-related activities also are reaching unparalleled proportions. There are currently over 400 major work zones across the state. The increase in highway construction work zones places North Carolina motorists and tourists at a potentially greater risk. Data shows that 151 people were killed in N.C. construction, utility and maintenance work zones between January 1996 and December 2000. This number alone confirms the need for an aggressive and effective education effort directed at increasing safety and awareness in highway work zones. In April 2000 & 2001, the NCDOT kicked off a Work Zone Safety public information initiative -- Speed a Little. Lose a Lot. -- targeting speeding in the work zone.</p>	DIVISION OF HIGHWAYS	2001	Jimmy Travis	(919) 733-2210	Communications
Go wild with the NC Wildflower Program Video	<p>The Office of Beautification Programs and members of the Roadside Environmental Unit's vegetation management team developed a 5-minute instructional video to teach anyone from the wildflower enthusiast to the master gardener how to plant a wildflower garden. A vegetation management expert demonstrated the necessary steps to plant a wildflower garden in the video. The narrator of the video was Mike Gray who is a well-known gardening guru and has his own show The Almanac Gardener that airs on UNC-TV. The video was produced in response to numerous inquiries by the public, media, garden clubs and county extension offices to learn how we prepare and maintain wildflower beds with such success. Garden clubs and county extension offices each received a complimentary copy of the video that has been made available for people to check out.</p>	OPERATIONS ROADSIDE ENVIRONMENTAL	2001	Heather Thompson	(919) 715-2553	Communications
Roadbind	<p>On secondary road construction projects, one of our greatest costs is ABC stone for our base. Our normal procedure is to place 8 of ABC stone and then pave with BST. On project 6.640011, we substituted 4 of ABC stone base with an application of roadbind adhesive to the remaining 4 of ABC stone. We then scarify the stone base to mix the roadbind into the 4 of stone and regrade. Then compact and allow it to cure 1-2 weeks before paving with BST.</p> <p>Roadbind is a by-product from the pulp mills. It is lignon that binds the fibers of the tree together. This lignon when mixed with the ABC creates a stronger bond between the stone aggregates and creates a stronger base. The advantages of roadbind are 1) Equal to or stronger than stone base alone. 2) Dust inhibitor. 3) Reduced time for stone setup. 4) Lower cost.</p>	OPERATIONS DIVISION 9	2001	Kent Boyer	(336) 593-8541	Dollar Savings
Guardrail Sign Mounts for Median Guardrails Median Guardrails	<p>Due to the installation of the median guardrails on our multi-lane highways, additional signing is needed to safely operate the spray trucks. Mounting signs in conventional stands is dangerous to both State forces and the public due to having to carry the sign and stand across multiple lanes and then erecting it on a narrow shoulder. We looked at several commercial sign brackets for mounting signs on posts or rails but none were completely compatible with our signs or the guardrails. Using metal stock, we designed a simple bracket that will attach to different guardrail widths and can be used with our current roll-up type signs. It is less cumbersome than any commercial model we examined and therefore safer to carry across the roadway. Time saved in erecting the sign means less exposure to traffic. The cost of the commercial sign mounts varied from \$35.00 to \$45.00 per mount with additional costs added for standards and uprights to attach the signs. Utilizing our welding shop, we used raw metal stock to make the mounting bracket and salvaged square tubing from obsolete sign stands for the uprights.</p>	OPERATIONS DIVISION 9	2001	P. H. Suggs	(336) 896-7039.	Dollar Savings

Off Road Herbicide Truck	<p>The Division Nine-Roadside Environmental Department was faced with the challenge of continuing herbicide applications while improving safety and efficiency. In response to a series of accidents during herbicide applications in the east, it was decided to explore a safer method of applying herbicides.</p> <p>A study was completed by the Division equipment personnel and those from Roadside Environmental for the construction of an off-road herbicide application truck.</p> <p>A truck was fabricated from an existing flat bed truck and modified for off-road use.</p>	OPERATIONS DIVISION 9	2001	Speedy Floyd	(336) 631-1340	Dollar Savings
The Beast	<p>Due to the vast amount of clearing required for secondary construction, a way to dispose of vegetation and stumps efficiently and cost effectively was needed. The costs of equipment rental, labor, and landfill fees created the need to find a better method of disposal. Initially, a Waste Wood Recycler called The Beast was rented to effectively and efficiently grind up all debris. There was a dramatic increase in the rental rate of this piece of equipment prompting Division 8 to pursue the purchase of its own recycler.</p> <p>The uniqueness of this project lies in the fact that there was not an equipment class code for this particular piece of equipment. This team had to pave the way for such a purchase from scratch.</p> <p>By purchasing this piece of equipment and renting from us, we not only save \$9300 per month in rental charges, but also contribute back into the system funds for future equipment purchases.</p>	OPERATIONS DIVISION 8	2001	Richard Hancock	(910) 944-2344.	Dollar Savings
NHS Retroreflectance Reading	<p>The need to collect data for Pavement Marking Inspection Reports manually exposes both DOT employees and the employees of private contractors to high volumes and vehicle speeds of the motoring public. It also decreases travel efficiency through lane closures to obtain measurements. This team investigated the idea of having the collection of retroreflectivity data collected by a mobile unit.</p> <p>A mobile unit would collect readings every 10-15 feet where as manually, readings are done 6 times per line per mile. The mobile unit summarizes data every 1/10 of a mile creating a gain of 4 readings per mile using a mobile unit. The biggest advantage in using a mobile retroreflectometer is the cost savings generated. The cost for DOT employees to collect data for 150 miles would be approximately \$20,000.00. Depending on the number of mobilization charges, a contractor could provide a mobile unit for as little as \$6,300.00. If additional mobilization charges are necessary, the total savings will be between \$7,000 and \$13,000. That is a cost saving based on this project alone. A per mile savings statewide could range from \$47 to \$87.</p>	OPERATIONS DIVISION 8	2001	Will Garner	(910) 944-2344	Dollar Savings
Confront vs. Transline/Garlon 3A	<p>Transline and Garlon 3A are two herbicides that can be combined together to form a highly effective broad-spectrum herbicide. A mixture of these two herbicides is available in a product called Confront. For several years NCDOT mixed Transline and Garlon 3A together, in effect making their own Confront. This had been the most cost-effective utilization of these products due to the high cost of Confront when first introduced. NCDOT has been able to negotiate the price of Confront downward to the point that it is now cheaper to buy Confront than it is to mix Garlon 3A and Transline.</p>	OPERATIONS ROADSIDE ENVIRONMENTAL	2001	Derek Smith	(919) 733-2920	Dollar Savings
Aerial Device Boom Inspection Intervals	<p>Due to the time frame set up by National Crane Mfg. Company, it was necessary for DOT to perform a major tear down inspection once every three years regardless of utilization. Due to the suggestion of our Crane Committee, the end result was that the interval was changed from once every three years to once every 3,000 hrs. of utilization. The only modifications to the aerial device necessary to accomplish this was to install an hour meter that worked only when the Aerial equipment was in use, which was a cost of about \$75 per unit. By doing this, it extended the crane inspection interval to about once every ten years. By changing the interval from a time interval to utilization interval was a great savings on labor, material, and cost of downtime (departments having to do without their equipment during tear down period).</p> <p>Crane tear down inspections typically cost from \$8,000 to \$12,000 each. These factors multiplied by about 80 units in the DOT fleet adds up to substantial savings.</p>	OPERATIONS MAINTENANCE	2001	H. R. Hoyle	(919) 733-3572	Dollar Savings

Litter Pick-Up Sticks	<p>Adopt-A-Highway and other volunteers, maintenance work crews, inmates and community service workers collected more than 10 million pounds of litter from North Carolina's roadsides during 2000. Cleanup supplies are provided to volunteers and workers to make cleaning our roadsides more efficient and economical. The litter pickup stick was a tool provided to increase labor efficiency in picking up litter. While the pickup stick did increase efficiency, it was costly at \$5.50 each and the stick point that pierced the litter was easily breakable, resulting in sticks having to be replaced frequently.</p> <p>A department employee submitted a suggestion and blueprint showing how DOT could make its own more efficient and lower cost pickup stick with PVC tubing, caps and glue, flat head screws and red colored duct tape. The material and labor cost of the new stick is \$2.50 each, a saving for DOT of \$3.00 per stick. The point on the new stick is more durable than the point on the old stick and, therefore, will result in fewer replacement sticks requisitioned from inventory control, resulting in an even lower annual cost for pickup sticks as we work to keep our roadsides litter free. The new stick has a sturdy point that can pierce aluminum cans and heavier objects, which the previous stick could not do. The new stick is also lighter in weight, and easier to manipulate than the previous stick.</p>	OPERATIONS ROADSIDE ENVIRONMENTAL	2001	Anne Walker	(919) 715-2550	Dollar Savings
Equipment/Personnel Complement	<p>After budget review meetings with Division & District Engineers, we were instructed to review personnel & equipment complements & determine areas that could be cut to allow for budget savings. After reviewing information regarding the equipment usage based on fuel consumption for the past year, we were able to reduce our complement by 7 pieces of equipment for a cost saving of \$3308.50/pp or \$86,021.00/yr budget savings. All equipment had reached its maximum depreciation except for a Thermolay Patch Truck that was transferred to another unit that was in need of this.</p> <p>The complement of crew cab trucks was reduced from 9 to 7 allowing 1 spare. Crews are required to be multifunctional throughout the day and the Thermolay was not cost effective. The grader was the oldest and used basically as a spare. Due to the infrequency of snow and the reduction of dirt road miles in the county, the cost savings far exceeded the need for the spare grader. The other pieces of equipment were removed due to their condition or lack of use. No equipment was turned in that would have a negative impact on our operations.</p>	OPERATIONS DIVISION 10	2001	Janice Bobo	(704) 982-0104	Dollar Savings
Bridge Timber Disposal	<p>When demolishing structures in the past, several miles had to be driven to a demolition dumpsite and pay for disposal. In the past months, a different approach to disposing of materials that are not salvageable began. The old timbers and non-useable materials are now being offered to local property owners free of charge if they sign an agreement to allow DOT Bridge Maintenance to dump the materials on their property. DOT is saving money due to the following factors: 1) Material is only handled one time in loading saving in labor and time. 2) Saving on the average of \$26 - \$40 per ton on disposal fees. 3) Dumping locally saving on labor and mileage. 4) Speeding up the project by having a quick turnaround on the trucks and are using less trucks for hauling.</p>	OPERATIONS DIVISION 10	2001	Garland Haywood	(704) 982-3720	Dollar Savings
Portable Traffic Lights	<p>For several Bridge Maintenance projects, it is required for the lane to be impassable 24 hours a day and these projects may take weeks or months. With a 5-man minimum crew size and a workload requiring several projects at a time, flagging is sometimes not an option. Portable traffic lights have helped with this problem and have become almost a necessity in day-to-day operations. One set of traffic lights is currently owned and another set of traffic lights is on rent. These lights work well in high volume, limited sight distances, and work 24 hours a day without a break. With this versatility, both sets of traffic lights stay busy all of the time. These traffic lights cut costs on extensive projects, but they also increase safety in our work zones and cut down on man-hours as well.</p>	OPERATIONS DIVISION 2	2001	T. A. Edgerton	(252) 830-3490	Dollar Savings
Portable Depth Finder	<p>At times in Bridge Maintenance work, stream depths have to be determined or check for scour in fast moving, deep water. In the past, we have had two methods of doing this. The first method is to use a level rod, and there are two problems with using this method. The 1st problem is that you are limited to 25', and from the top of the bridge, you may not be able to reach the bottom. The 2nd problem with this method is that if you can reach the bottom, the fast moving water may break your level rod. The 2nd method of checking stream depth is to tie a heavy weight to a tape measure and lower it to the bottom for a depth. The problem with this method is that the weighted tape measure often moves down stream loosing accuracy in a high flow situation.</p> <p>As a solution to this problem, I constructed the Portable Depth Finder to aid in determining a profile of the bed. The device was assembled in less than 30 minutes, and for about \$130, will instantly determine the water depth. Level rods are at least \$130 each and do not last long in high flow conditions, and can only determine limited depths.</p>	OPERATIONS DIVISION 2	2001	T. A. Edgerton	(252) 830-3490	Dollar Savings

Carbide Tipped Snow Plow Blade Results in Rockingham County	In our snow removal operation in Rockingham County, we had to change worn out plow blades frequently. Truck operators were losing an average of about two hours each time a blade was replaced, traveling from his route to headquarters, replacing the blade, and back to his push route. These delays caused safety concerns and unsatisfactory customer relations, along with additional labor and equipment hours required completing our snow removal operation. In 1998 Carbide Tipped blades were placed on two of our snowplows to be evaluated for cost and time savings. The results showed Carbide Tipped blades lasted ten times longer than regular steel blades, thus decreasing our cost and increasing employee efficiency with improved customer service	OPERATIONS DIVISION 7	2001	Henry Adkins	(336) 634-5642	Dollar Savings
Pile Jetting Spoil Cleanup	<p>The Manteo Resident Engineer's Office was faced with a challenge to develop a method of cleanup for spoils generated during the installation of piling in sensitive wetlands for the new Croatan Sound Bridge Project. Rather than relying on the contractor to solve this problem, a NCDOT team was developed to take ownership of research innovative methods, and select the course of action.</p> <p>A method of conveying the material approximately 1900 foot to high land was identified during a search of methods utilized by other industries. The shipbuilding and roofing industry utilize industrial vacuums to convey materials. The team made a visit to a shipyard in Virginia where the technology was working. An onsite demonstration was performed to insure conveyance of similar material over the required distance. The test was successful. Department personnel presented a video of the cleanup method to the Environmental Agencies. They approved this method of cleanup as their preferred method.</p>	OPERATIONS DIVISION 1	2001	Randy Midgett	(252) 473-3637	Dollar Savings
Improvements to Special Markings Truck	<p>The special markings truck had three 60-gallon tanks and one 4-gallon tank. The most that the special markings crew can use in a day is approximately ten gallons of paint. The 60-gallon tanks took up most of the room in the bed of the truck. An additional pickup was often needed to carry construction signs. To clean these tanks someone had to lean inside the tanks, which the employee could have injured his/her back or became sick from the paint fumes.</p> <p>With the assistance of the Equipment Department, the 60-gallon tanks and the 4-gallon tank were replaced with three 10-gallon tanks. Also the Equipment Department purchased plastic liners for the new tanks. Roll-up construction signs were also purchased</p>	OPERATIONS DIVISION 11	2001	Dwayne Bauguess	(336) 903-9160	Dollar Savings
Patch Crew Improvements	<p>Maintenance is responsible each year for patching in order to better the roads. This could be resurfacing, patching, or just patching because the road just simply needs patching. Each patch crew has to fill up water tanks each morning located on their squad trucks in order to fill the tanks on the roller. This consisted of having to climb up in the bed of the truck, which could be a safety factor, and it took about 40-45 minutes to fill the tanks.</p> <p>The old water line was ¾ diameter. We replaced the old line with a 1-1/2 water line. No only was the water line replaced but also a bottom fill system was installed. In doing so, is saved the patch crew approximately 35 minutes in the filling of the water tanks. Currently there are 20 patch crew employees that would be waiting on the squad truck to arrive at the job site.</p>	OPERATIONS DIVISION 11	2001	T. J. Spicer	(336) 835-4241	Dollar Savings
Wasted Stone on Secondary Road Construction Projects	<p>For Secondary Road Construction Projects (SRCP), the roads that are prepared for paving end up with a considerable amount of segregated stone that is typically kicked to the shoulder of the road. Not only is the stone wasted, but also in locations where people live the stone presents a problem for people trying to maintain their yard and shoulders of the road in their yard with stone scatted on the shoulder.</p> <p>This innovation is not time consuming or difficult to perform. A rubber tire loader or a force-feed loader and trucks are the only additional equipment needed. The finished road is a much cleaner job without the stone cast on the shoulder of the road.</p> <p>Instead of kicking the stone on the shoulder, the rubber tire or force-feed loader can pick up the windrow of segregated stone. This stone can either be used on driveways on the job to prevent haul cost on can be stockpiled in the yard for later use on driveways</p>	OPERATIONS DIVISION 4	2001	Danny Rackley	(252) 459-2762.	Dollar Savings

Central Inventory Improvement	<p>A warehouse of about 4900 square feet has been established in Newton, NC with a primary objective of providing a satellite warehouse location for certain assets managed by Central Inventory. The goal of this satellite warehouse was to make these assets more readily available to western divisions. The location was managed by a Storeroom Manager (GR 59), who utilized a pickup truck and two forklifts in the performance of his duties.</p> <p>The location did not have delivery capability except to the local community, thus assets had to be picked up by the divisions or arrangements were made for Central Inventory delivery trucks to stop and pickup the assets for delivery to the western divisions. Additionally, the movement of assets through the warehouse indicated the activity might not justify the costs. A thumbnail analysis of the system indicated the assets could be distributed through Central Inventory nearly as effectively with a negligible difference in costs. As a result, the warehouse was closed effective April 27, 2001 with personnel transferred to Division 12</p>	OPERATIONS EQUIPMENT	2001	Dave Vanpelt	(919) 733-2220	Dollar Savings
Tackifier Application Efficiency	<p>Seeding crews use CRS-2 asphalt emulsion as a tackifier over the top of grain straw mulch applied on seeding jobs. In the past, truck-towed asphalt kettles of 600 gallon capacity have been used. These units are messy to work with, time consuming to heat if they sit overnight, and must be unhooked from the trucks to be heated. The problem of finding a safe place to drop the kettle, re-heat and wait for a spare or empty truck is compounded by the straw mulch blowing away from the shoulders due to traffic. The lull between the mulch application and the tackifier application results in poor quality work and in loss of time. This reduces the efficiency of the crew in moving on to the next job site. The poor mulch retention along the roadways often requires re-application of both mulch and tackifier in order to protect the shoulder from eroding.</p> <p>Two 1250-gallon asphalt distributors were obtained from the Division 9 Equipment Department when the Division 9 Bituminous Department turned them in. The Equipment Department re-fitted the rear of the units to use a hand spray wand. A pintle hook was attached to the rear of the distributor to enable the crew to carry a mulch blower to the job site as well.</p>	OPERATIONS DIVISION 9	2001	P. H. Suggs	(336) 896-7039	Cycle Time Reduction
Mulch Application Efficiency	<p>During a review of work processes, crew leaders and personnel indicated a desire to make the mulching operation of their roadside work more efficient. Due to current technology, the application equipment is as efficient as possible. The larger problem is the supply of mulch materials on the job site. A review of the process revealed that the truck payload size required the mulch blower to be hooked to and unhooked from multiple trucks to complete projects. The loading and handling of the trucks proved to be the most time consuming factor in this process. Fewer truck changes would mean more time applying mulch.</p> <p>The team set out to determine the most efficient way to increase the straw mulch payload safely. Utilizing the current trailers to haul straw required too much extra handling. The team discussed putting a pintle hook on the rear of the trailers. This allows the mulch blower to be hooked directly to the trailer. The Division 9 Equipment shop reviewed the request with the Division Safety Officer and outfitted the trailers with the pintle hooks.</p>	OPERATIONS DIVISION 9	2001	J. D. Tucker	(336) 896-7039	Cycle Time Reduction
Encroachment Computer Program	<p>Processing encroachment agreements in the District office was very time consuming. After the plans were approved, the Assistant District Engineer had to fill out a paper form with all of the information for the agreement, note all of the provisions and carbon copies required, and then log the agreement into a diary. The secretary would type up the agreement, which consisted of a transmittal letter to the Division Office, an agreement contract to the applicant, and usually two pages of provisions. The Assistant District Engineer would then proof the letters and give them to the District Engineer for signature.</p> <p>The processing time for encroachment agreements was usually two weeks. In order to lessen this time an Encroachment Computer Program was created. With this program, the data for the encroachment agreement is logged into a computer and, instead of filling out a paper form, provisions for the agreement are chosen on the computer by the simple click of a mouse button. Then the whole agreement, including the transmittal letter, the agreement contract to the applicant and all provisions, is printed in one step</p>	OPERATIONS DIVISION 4	2001	Chris Pendergraph	(919) 731-7938	Cycle Time Reduction