

# CONTINUOUS IMPROVEMENT PROJECT DATABASE

## DIVISION 11 PROJECTS

Project Name	Project Description	Division	Project Year	Contact Name	Contact Number	Project Category
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
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
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
Electronic File Storage & Paper Consumption Reduction	<p><b>Problem:</b> 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><b>Solution:</b> 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>	Boone District	2008	Brandon Greer	(828) 265-5380	Energy and Environment

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
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
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
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
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
Portable Temporary Bridge	<p>In the past Bridge Maintenance in Div. 11 has had to place temporary detours using pipe in streams.</p> <p>Div. 11 designed and built a temporary bridge which can be dismantled into 4 or 5 separate pieces and is easily transported to location.</p> <p>Savings of \$20,000 realized per site with no impact to environment and elimination of weeks of construction.</p>	Div 11	2003	Dennis Bennett	(336)903-9124	Dollar Savings
Cable Guardrail Mower	<p>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</p>	Div 11	2003	Donald Stanley	(336) 903-9121	Dollar Savings

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
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
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
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
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
Improvements to Special Markings Truck	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.  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	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. Not only was the water line replaced but also a bottom fill system was installed. In doing so, it 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
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
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
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
Secondary Road Construction Tracking Form	<p>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.</p>	OPERATIONS DIVISION 11	2001	B. K. Hamby	(336) 667-9117	Communications