

List of CPI Projects

COMMUNICATIONS CATEGORY:

Contract Resurfacing Guidelines (Division 14) Team Leader - Steve Cannon;
Team Members - Brian Burch, Jamie Wilson, Reuben Moore, Ralph Cannady, Roger Hamilton, Bill Parrish, Scott Cook, Jonathan Woodard, Rick Styles, Dale Buchanan

Project Description: 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.

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.

The Contract Resurfacing Guidelines are being implemented this year.

Stormwater BMP Device (Division 5) Team Leader – Chris Murray
Team Members – David Davis, Heather Montague

Project Description: 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.

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.

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.

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.

CUSTOMER SERVICE CATEGORY:

Special Vehicle Replica Project (DMV) Team Leader - Jeff Martin

Team Members – Joseph Gardner, JR, Portia Manley, Maggie Thomas, Richard Howard, Paula Windley, Alison Roach, Donna Boone, Pam Lett, Marvin Shelton, Paul Cusac, Brian Bozard, Steve Lamm, Bruce Collins, Lester Fisher, Robert Hines, Ku-May Wu, Subrahmanyam Vasa

Project Description: 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.

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.

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.

As a result of the Special Vehicle Replica Project enhancement, STARS can now:

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.

CYCLE TIME REDUCTION CATEGORY:

ITS Site Survey & Rapid CCTV Survey (Triad Transportation Management System)

Team Leader – Michael Venable

Team Members – Barton B. Marney, James Jackson

Project Description: 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.

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.

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.

Natural Resources Tech Report (PDEA)

Team Leader – James Hauser
Team Members – Elizabeth Lusk, Chris Rivenbark, Rachelle Beauregard, Carla Dagnino, Tim Bassette, Bruce Ellis

Project Description: 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.

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.

DOLLAR SAVINGS CATEGORY:

Asphalt Surface Treatment (AST) Patching (Division 11)

Team Leader – Matthew Oliverson

Team Members – Ronnie Minton, Keith Haynes, Brenda Love

Project Description: 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.

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.

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%.

Using Latex Polymers (Division 11) Team Leader – Matthew Oliverson

Team Members – Ronnie Minton, Keith Haynes, Brenda Love

Project Description: 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.

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.

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.

Mulching Plant Beds (Division 10) Team Leader – Tim Simpson

Team Members – Bruce Myers, Robin Martin, Roger Haithcock, Kenneth Eudy, Todd Crump

Project Description: 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.

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.

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.

Sign Repair (Division 11) Team Leader - B.K. Hamby

Team Members - Randall McSwain, Tom Honeycutt

Project Description: 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.

We decided that these signs were repairable and began taking them to a local upholstery shop.

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.

Rescue of US70 West of Kinston (Division 4) Team Leader - Jonathan Barnes

Project Description: 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.

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.

Currently awaiting review, evaluation and possibly redesign by NCDOT engineering staff as a value engineering proposal.

Clear Savings on Windshields (Division 10) Team Leader - Robert Waterhouse, II

Project Description: 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.

Paperless Solutions for Documents Sent to PMU (Project Management Unit)

Team Leader- David Rhodes

Team Members- Bill Martin, Lisa Gilchrist, Hardee Cox, Anne Reed, Patricia Pollard, Cathy Dragonette, Dorothy Rainey, Jasmine Lovett, Majed Al-Ghandour

Project Description: 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.

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.

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.

Repotting of Bare Root Forestry (Division 10)

Team Leader- Tim Simpson

Team Members- Bruce Myers, Robin Martin, Roger Haithcock, Kenneth Eudy and Todd Crump

Project Description: 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.

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 redbuds, 200 dogwoods and 200 shumard oaks.

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 ensuing 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.

ENERGY AND ENVIRONMENT CATEGORY:

Spills are no Thrill (Division 4) Team Leader – J.C. Duckworth
Team Members- R.D. Simpson, R.K. Baker, B.K. Glover

Project Description: 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.

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.

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.

LABOR HOUR SAVINGS CATEGORY:

Certification & Bridge Coating (Materials & Tests) Team Leader – Dan L. Smith
Team Members – Norma Smith, Chris Peoples, PE, Kelly Croft, Mike Summers

Project Description: 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.

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.

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.

SAFETY IMPROVEMENT CATEGORY:

Pre-Trip Inspection Guidebook (Division 14) Team Leaders – Candie Auvil, Jim Pressley
Team Members – Paul Earwood, Darrell Brooks, David Capps, Steve Huntley, Jeff Wallace

Project Description: 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.

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.

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.

Tail Gate Prop (Division 8) Team Leader – Larry Thompson
Team Members – Michael Garner, Terrell Reynolds

Project Description: 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.

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.

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.

Chain Caddy (Division 9) Team Leader – Mark Crook
Team Members – Danny Crawford, Ernie Smith

Project Description: 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.

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.

Shovel Retainer (Division 8) Team Leader- Billy E. Poole

Team Members- Michael Garner, Stephen Thompson

Project Description: 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.

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.

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.

Straw Blowing Procedures (Division 10)

Team Leader- Rick Mabry

Team Members- Bob Waterhouse, Dave Litz, Richard Thompson, Tim Simpson, Bruce Myers, Larry Hill

Space

Project Description: 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.

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.

The handrail system provides a much safer workstation for employees to perform the straw blowing operation. The equipment is safer and user-friendly.

NCDOT-IMAP Training Ground (Division 10)

Team Leader- Tim Kirk

Team Members- Brian Purvis, Rob Stone, Ann Lorscheider, Melvin Dorsey, Ron Pharr, Scott Jackson, Jen Thompson

Project Description: 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.

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.

Delete

Video system on Centerline Paint Machine (Division 10)

Project Description: 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.

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.

Video System on Centerline Paint Machine (Division 10)

Team Leader- Donald Griffith

Team Members- Mike Carriker, Larry McNeill, Ronnie Davis, Philip Coley, Jarod Austin, Rick Mabry, Melvin Furr, Gary Meisenheimer

Space

Project Description: 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.

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.

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.