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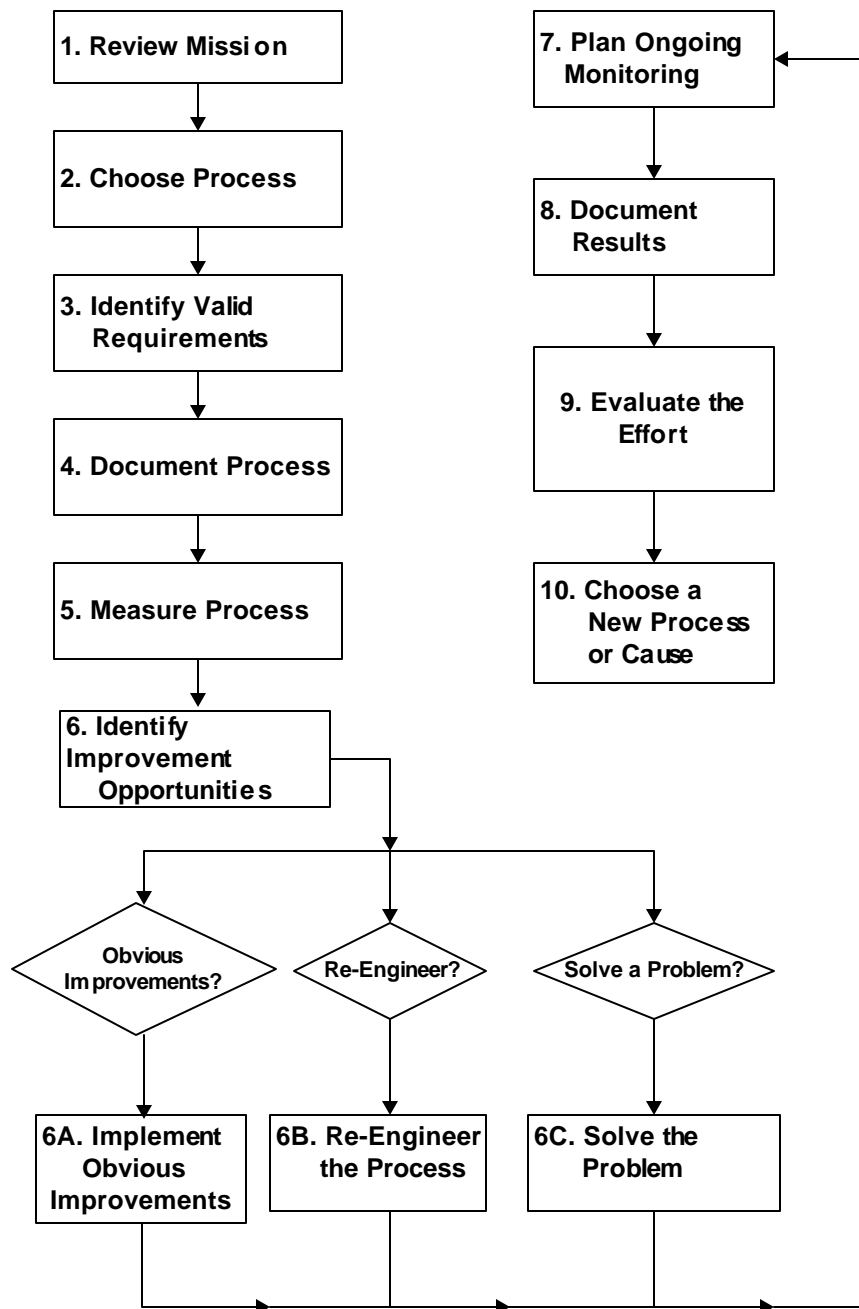
PURPOSE

The purpose of this book is to recognize individuals, teams and work units for their accomplishments in improving processes, projects and programs in the Department of Transportation. The development of ideas for improvement is only the first step in the process. Many employees have great ideas for improving the way we do business. Managers, supervisors and employees must take the ideas further by implementing the improvements and ensuring that the resources and communications are established to make them work. This takes time and energy. **This book is dedicated to those managers and employees that have developed ideas and implemented them to improve work processes and customer service in the Department of Transportation.**

This book contains many excellent ideas for improvements that can be implemented throughout the department. You are encouraged to review the projects and implement any that may apply to your organization. Each initiative contains a short description of an improvement opportunity, the action taken to make the improvement and the results of the action. A contact person is identified at the bottom of each improvement if more details are desired.

Improving DOT One Process at A Time

CPI PROCESS OVERVIEW



CPI PROGRAM GOALS, OBJECTIVES, AND PROCESS

The GOALS of the Continuous Process Improvement Program are to increase productivity and cut cost, increase customer service, and improve business processes. The OBJECTIVES are to increase employee involvement, document core processes, communicate ideas, and recognize outstanding accomplishments.

The CPI Program is a management supported and driven program. Management at all levels encourages participation in the program. The awards program encourages individuals, units, and cross functional teams to apply for recognition awards via an application process. An awards committee reviews documentation of the projects and selects outstanding projects to receive special recognition at the annual CPI Conference.

Participants may also submit applications that they have implemented as a result of projects published in this **Results Book**. Participants may prefer not to apply for a recognition award. These are referred to as "Results Only" applications.

Applications are submitted annually through Unit Managers under one of seven award categories. Three applications are selected for special recognition from each category with one applicant chosen as the winner of each category. A MOST OUTSTANDING trophy is awarded to one of the seven category winners. Each awards category has a set of criteria that is used to judge the applications. People from all areas of the department are solicited to participate on the selection committee.

CRITERIA



Dollar Savings

The improvement results in dollar savings through a cost reduction, a productivity increase, or a cost avoidance. The savings is the net result of all process costs including labor, materials, equipment, energy, capital, etc. The improvement impacts the DOT budget and savings are tangible and verifiable.



Labor Hour Savings

The initiative shows a reduction in labor hours to accomplish a process. The improvement shows a net reduction in the total labor hours required for effectively completing an operation that supports and enhances performance or customer service.



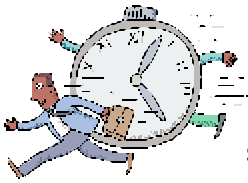
Communication

The improvement results in more effective or efficient internal or external communications that support and enhance mission requirements. The results include reduction in response time, improved customer awareness, more effective distribution of information, or improved customer access to information.



Customer Service

The initiative shows improvement in areas important to internal or external customers' valid requirements and expectations. Improvements may be related to process outputs, complaint management, customer satisfaction, or other customer requirements.



Cycle Time Reduction

The improvement shows a net reduction in the total cycle time required for effectively completing an operation that supports the mission. The time from the beginning of a process to the end of a process is reduced to produce the product of service.



Safety Improvement

The initiative shows an improvement in safety process or accident/injury prevention that results from changes to an existing process for the general public or department employees. The initiative shows a net reduction in the number and severity of accidents, an improvement in safety procedures that reduce risk of accident or injury, or a substantial reduction in workers compensation costs.



Environmental Sustainability

The initiative shows improvement in environmental areas important to sustaining a natural, clean, and healthy environment. Improvements may be related to reducing waste, energy, and resource consumption; recycling and composting; maintaining and improving natural resources; securing a clean, safe environment; or making environmentally friendly purchases.

MOST OUTSTANDING



This initiative is the improvement that exemplifies the **Continuous Process Improvement Program** and produces extraordinary results. The project demonstrates the most effective use of a team, a facilitator, the steps in the CPI Guide and the appropriate use of CPI tools. This improvement is selected from among the winners of the seven other award categories.

PROGRAM RESULTS OVERVIEW

After nine years in existence, the CPI Program continues to have a good participation rate. This year, there were fifty projects submitted for the awards program and for the results only documentation. A breakout of initiatives by division/branch is shown:

<u>Division/Branch</u>	<u>Initiatives</u>	<u>Total</u>
General Services	1	
Administration Total		1
Asset Management	3	
Construction Unit	1	
Materials & Tests	2	
Division 1	2	
Division 2	4	
Division 3	4	
Division 4	2	
Division 7	4	
Division 8	1	
Division 9	1	
Division 10	2	
Division 11	3	
Division 12	1	
Division 13	2	
Division 14	2	
Operations Total		29

<u>Division/Branch</u>	<u>Initiatives</u>	<u>Total</u>
Highway Design	6	
Traffic Engineering	8	
Preconstruction Total		14
Driver & Vehicle Services	1	
License & Theft	1	
DMV Totals		2
Program Development	1	
Financial Division Totals		1
DEPARTMENT TOTAL		50

Some of the highlights of the initiatives are summarized here:

- \$3,374,548 in **dollar savings** and cost avoidances was documented by **nine** initiatives this past year. Last year's input was 4.0 million. This does not include dollars saved in other award categories.
- **Six** participants documented 1,309 hours this year. Last year **labor hour savings** were 195,826. Additionally associated labor costs were reduced by \$36,171.
- There were **six** applications for **communications improvements**.
- **Customer service enhancements** were made in **eight** different areas affecting both internal and external customers.
- **Three** projects demonstrated **environmental sustainability**.
- **Twelve** projects **improved safety**, safety training, or safety reporting.
- **Cycle Times** of **six** processes reduced total elapsed time of the processes from beginning to end. Additionally labor hours were reduced by 3,487 hours.

Communications

11-Communications



Team Name:
Traffic Engineering
Roundtable Solutions
Process

Team Leader: A. D. Wyatt
Team Members: Division and
Regional Traffic Engineers

Traffic Engineering Roundtable

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.

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.

Results

The Traffic Engineering Solutions meetings have provided an effective and productive medium for the open discussion, development, and sharing of ideas, experiences, and solutions. The feedback from the first two years of these meetings has been very positive and we are optimistic that we can continue to improve these solution-generating workshops.

For more information, call A. D. Wyatt at (919) 733-1593



Team Name: Under
Construction: Trucking
in the Work Zone

Team Leader:
Michelle Long, PE
Team Members: Tammy
Stewart, Amanda Perry,
Sherell Williams, Jimmy
Travis, Jayce Williams,
CAGC, North Carolina
Trucking Association, &
NCSHP

“Under Construction: Trucking in the Work Zone”

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.

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.

Results

“Under Construction: Trucking in the Work Zone” has been extremely well received by the professional trucking industry since distribution began in December 2006. More than 2,000 copies of the video have been distributed to date.

For more information, call Michelle Long, PE at (919) 733-2210, ext. 221



Team Name:

Team Leader: Jo Ann White
Team Members: R. Leigh

Facility/Shop Audit Check

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.

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.

Results

The new audit form provides the following improvements: 1) Items are grouped into main headings and areas of concern; 2) Auditor can evaluate 17 separate areas of concern and provide comments and feedback from employees; 3) Trends of non-compliance are documented; 4) An increase in the number of audits done and identified deficiencies; and 5) Better hazard awareness and employee involvement.

For more information, call Jo Ann White at (252) 482-7977



Team Name:
Sampson Maintenance

Team Leader: L.E. Reynolds
Team Members:

Road Oil Coordination

Problem: With pavement preservation becoming a goal of maintenance, more coordination was necessary with other departments and was critical for maximum efficiency.

Solution: Sampson County Maintenance and Road Oil worked together to create a road oil program that helped both departments achieve their goals. The patching operation and road oil operation were coordinated to work off of the same plan.

Results

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.

For more information, call L.E. Reynolds at (910) 592-1434



Team Name:
Alamance County
Maintenance

Team Leader:
Michael Venable
Team Members:
C. VanHalem, William Teague,
First Sergeant Culler

State Agencies Functioning Effectively Together Yearlong

Problem: Lack of communicating existence of "Operation Slow Down" to the public.

Solution: Improved communication and customer service by providing existing equipment, DOT message boards, to State Highway Patrol (SHP) to promote public awareness of a program in an effort to make the highways safer to travel and save lives.

Results

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."

For more information, call Michael Venable at (336) 570-6815



Team Name:
Stream Crossing
Communications

Team Leader: David Chang
and Ricky Keith
Team Members: B. Cox,
R. Henegar, J. Twisdale,
M. Price, R. Girolami, O. Azizi,
M. Clawson, L. Brooks,
J. Frye, M. Bailey, N. Bullock,
C. Hunt, A. Nottingham and
Q. Nguyen

Bridge Survey Report

Problem: 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 prevent rework.

Solution: At approximately 14 months prior to R/W the Hydraulic Design Engineer submits the draft layout to the Structure Design Engineer for review. Then 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.

Results

The results of this preliminary review process of the Bridge Survey Reports have greatly reduced the amount of rework by the Hydraulics Unit. It has also drastically 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.

For more information, call Ricky Keith at (919) 250-4037

17-Communications

Customer Service

18-Customer Service



Team Name:
License and Theft
Bureau

Team Leader:
John Robinson, Jr.
Team Members:
Michelle Hinton, Cheryl
Leach, Joseph Gardner

Notice, Storage and Theft Unit Automation Project

Problem: 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 process of completing notification letters, this unit operated with a 4-week backlog in processing these reports, creating a financial impact on the owners and lienholders by having to pay storage-related fees each day the vehicle remained unclaimed.

Solution: Upon the completion of a detailed feasibility study, 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.

Results

The software solution resolved the backlog which has allowed owners and lienholders to save money by being notified sooner of the storage of their vehicle. Also, it has helped in reducing errors in this unit, which in the past resulted in costly tort claims resulting from human error. With the new system the notification letters are sent with accurate owner, lienholder and address information.

For more information, call Joseph Gardner at (919) 861-3166



Team Name:
Division 7 DDC

Team Leader: C.T. Huskins
Team Members:
C.T. Huskins, M.S. Venable

Electronic Bid Packages for DDC's and Districts

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.

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.

Results

Through this system, contractors have between three and five additional days to prepare bid packages. Also, taxpayer money is used more efficiently by reducing or eliminating postage, materials and other expenses.

For more information, call C.T. Huskins at (336) 256-0553

20-Customer Service



Team Name:
Division 13 – Traffic
Engineering

Team Leader: Mark Teague
Team Members:
Mark Teague

Customized Phone Log

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.

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.

Results

The customized phone log has made it much easier to record and forward phone calls very quickly by simply checking pre-formatted boxes. It has been much easier to track phone call histories and research back through previous weeks to find specific calls of interest.

For more information, call Mark Teague at (828) 251-6171

21-Customer Service



Team Name:
Division 14 – District 1

Team Leader: Steve Cannon
Team Members: J. Moore,
M. Gibbs, L. Jones,
M. Thomas, D. Capps,
D. Pressley, B. Burch

Property Owner Mowing Agreement

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.

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.

Results

Increased customer service and satisfaction by the property owners are the result of this initiative, as well as cost savings by the department due to not having to mow the area. In addition, the ability to use the written agreement to hold property owners accountable in maintaining the standards set forth in the written agreement is an added benefit.

For more information, call Steve Cannon at (828) 891-7911



Team Name:
Field Welder
Certification

Team Leader: Steve Walton
Team Members: Gary
Bristow, David Greene, Jr.

Field Welder Certification Program

Problem: 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, we found falsified certification papers.

Solution: 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 the Bridge Welding Code's requirements, particularly pre-heat requirements and rod storage and control. Successful applicants are issued a Department picture certification card.

Results

This program has improved the quality of welding being performed on NCDOT construction projects. It has educated welders regarding 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.

For more information, call Steve Walton at (336) 993-2300

23-Customer Service



Team Name:
NC Improved STAA
Tools

Team Leader:
A. D. Wyatt and Jon Broom
Team Members: Lisa Avery,
Marilyn Graham, John
Permar, Terry Norris,
Regional Traffic Staff

NC Improved STAA Truck Route Tools

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.

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.

Results

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:

<http://www.ncdot.org/it/gis/DataDistribution/statewideMaps/default.html>

For more information, call A. D. Wyatt at (919) 733-1593

24-Customer Service



Team Name: Safety
Summary Map Tools

Team Leader:
Terry Norris and Mark Mintz
Team Members: Mark Brown,
John Permar, John Stokes,
Tony Wyatt

NC Safety Summary Map Tools

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.

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.

Results

The maps have proven to be very beneficial and an effective mechanism to compliment traditional safety program and strategic highway safety efforts. The NCSHP has used the maps to develop targeted resource strategies for motorcycle safety. NCDOT has used the maps to improve public education and public understanding of safety problems. The maps can be found at: <http://www.ncdot.org/it/gis/DataDistribution/CrashMaps/default.html>.

For more information, call A. D. Wyatt at (919) 733-1593

25-Customer Service



Team Name:
Project Management
Unit

Team Leader:
Majed Al-Ghandour
Team Members: Bill Martin,
David Rhodes, Anne Reed,
Tammy Horton, Becky Luce-
Clark, Lisa Gilchrist

Flowcharts for Business Processes

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.

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.

Results

Customers are able to quickly understand our processes by following the diagrams and using simple logic and decision tree principles.

For more information, call Majed Al-Ghandour at (919) 733-2039

Cycle Time Reduction

27-Cycle Time Reduction



Team Name:
Facility Maintenance

Team Leader: Mike Cottle

Silt Trap Cleanout

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.

Solution: A septic tank pumping service was hired to pump all the silt traps and dispose of the waste material offsite.

Results

Silt traps are now cleaned in approximately two hours instead of two days with minor disruptions to laboratory personnel. Material is conveyed from the silt traps to the transport truck by vacuum hose so there are no wet floors to contend with and the material is treated at disposal. Personnel no longer have to physically come into contact with waste material in the basins.

For more information, call Mike Cottle at (919) 733-4101

28-Cycle Time Reduction



Team Name:
WEBPACK

Team Leader: Anne Walker
Team Members: Tim
Kingsbury, James Merricks,
Zachery Whitaker, George
Kapetanakis, Tiffaney Crosby,
Jer Warren

Adopt-A-Highway Web 3.0 Application

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.

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.

Results

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.

For more information, call Anne Walker at 919-715-2551

29-Cycle Time Reduction



Team Name:
Chemical Lab Crew

Team Leader: Kelly Croft
Team Members: Gary
Roberts, Chris Peoples

Analytical Instrumentation Update

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.

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.

Results

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 saves approximately 1,594 labor hours annually.

For more information, call Mr. Kelly Croft at (919) 329-4090

30-Cycle Time Reduction



Team Name:
Traffic Services

Team Leader:
Wesley Brazelton
Team Members: Jim Evans

Bolt Breaker

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 loosing 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.

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.

Results

The bolt breaker reduces the time required to replace and/or repair highway signs. In a couple of up and down motions the bolt will break—a much easier and more efficient process than using vice-grips. The bolt breaker breaks the bolt at the point where the nut is located, allowing for easy removal of the bolt and sign.

For more information, call Jim Evans at (252) 830-3490

31-Cycle Time Reduction



Team Name:
Traffic Services

Team Leader:
Wesley Brazelton
Team Members: Jim Evans

Post Ladder / Turner

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.

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.

Results

The new post turner reduces the time it takes to reposition or replace highway signs because it enables turning the sign back instead of having to dig it up and reset it. It also saves time because it has a built-in step which makes it possible to reach the sign without having to set up a ladder.

For more information, call Jim Evans at (252) 830-3490

32-Cycle Time Reduction



Team Name:
Traffic Services

Team Leader:
Wesley Brazelton
Team Members: Jim Evans

Sign Rack

Problem: 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.

Solution: A sign rack made out of a 12 x 12 x 1 ½" piece of solid plastic with ¼ inch deep slots ¼ 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.

Results

The new sign rack makes it possible to maintain an accurate inventory of signs because the signs are organized in a more visible storage compartment. The signs are also protected from damage because they are stored in a manner that does not allow them to rub together. Use of the sign rack saves time because it reduces the time it takes to access the signs.

For more information, call Jim Evans at (252) 830-3490

33-Cycle Time Reduction

Dollar Savings

34-Dollar Savings



Team Name:
Division 3 Equipment

Team Leader: Jesse Hansley
Team Members:
Alan Brinson, Namon Edens,
Steve Taylor, Deb Branham

Self-Contained Hydraulic System For Salt Spreader PMs

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.

Solution: A self-contained hydraulic pumping system was developed to eliminate truck, loader, and additional operator. One transportation worker could perform the PMs alone.

Results

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.

For more information, call Jesse Hansley at (910) 347-5223

35-Dollar Savings

Operations - Division 4



Team Name:
Division 4 Roadside
Environmental

Team Leader: George Harrell
Team Members: Robert
Simpson

Utility Savings

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.

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.

Results

During the first full year of use, NCDOT was able to save \$4,197.50 for water not charged with sewer rates.

For more information, call Robert Simpson at (252) 237-6164

36-Dollar Savings



Team Name:
Reidsville Construction

Team Leader: BL Norris
Team Members:
RC McKinney, JS Knowles,
DC Childress, M Venable

Eliminate Stream Relocation

Results Book Only

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.

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.

Results

The elimination of the stream relocation resulted in a cost saving to the Department and created no negative environmental impacts. By eliminating the items of pay for the proposed stream relocation, a savings of \$34,310 was accomplished.

For more information, call Randy McKinney at (336) 634-5635

37-Dollar Savings

Operations - Division 11



Team Name:
Bituminous Operations

Team Leader:
Matthew Oliverson
Team Members: Brenda
Owings, Ronnie Minton,
Keith Haynes

Use of Latex Polymers

Problem: Life expectancy and life cycle costs of secondary roads have always been a problem for the effective operations of the Division's bituminous resurfacing program.

Solution: During the 2005 paving season the Division 11 Bituminous Unit began use of latex polymers in its liquid asphalt. Although the cost of latex polymers is 23.6% higher it provides the following benefits. Life expectancy is increased from an average of 4 years to now being around 8 years. Glass breakage claims are reduced by 50% due to better stone retention. Use of latex is more environmentally friendly. Airborne dust particles are reduced.

As the result of the success of the 2005 program, the use of latex polymers has been expanded to include contract AST applications.

Results

For 2006 with the changes in procedures and addition of contract AST applications, the expected one-year savings to Division 11 is \$1,693,691.30.

For more information, call Matthew Oliverson at (336) 903-9235

38-Dollar Savings



Team Name:
Roadway Design

Team Leader: Jim McMellon
Team Members:
Scott Blevins, Leon Morris,
Robert Stroup

Webcast Field Inspections

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.

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.

Results

A savings of approximately \$3500 was achieved assuming the average cost of \$30/hr for each engineer and \$0.25/mile. This is per conference and it is possible that Roadway Design alone could use this up to 20 times per year, resulting in an annual cost savings of approximately \$70,000.

For more information, call Jim McMellon at (919) 250-4016

39-Dollar Savings



Team Name:
Structure Design &
Signing Units

Team Leader: Paul Lambert
Team Members: James
Gaither, Ron King, Clarence
Bunting, Walter Johnson,
Allen Raynor

Overhead Sign Design Wind Area Reduction

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.

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.

Results

By using the actual sign panel area to compute wind load force effects, the resulting structural member sizes and foundation sizes are reduced and thus are less costly. Based on 100 installations there is an estimated \$1,200,000 per year in materials savings.

For more information, call James Gaither at (919) 250-4042

40-Dollar Savings



Team Name:
DMS Evaluation
Committee

Team Leader: Tom Parker
Team Members: Greg Fuller,
Buddy Murr, Mohd Aslami

DMS Installations Project

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.

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.

Results

1) Improved visibility of the DMS from all travel lanes. 2) Ease of installation and maintenance. 3) 50% reduction in the cost of DMS structures and approximately \$1,500.00 cost savings on the control cabinet installation. This equates to approximately \$25,000 cost savings per DMS installation.

For more information, call Tom Parker at (919) 733-1506

41-Dollar Savings



Team Name:
Wireless
Communications

Team Leader: Neil Avery
Team Members: Greg Fuller,
Buddy Murr, Ted Faulkner

Wireless Communication Between Traffic Signals

Problem: The practice of interconnecting adjacent traffic signals along corridors in order to maintain traffic progression is accomplished primarily by using fiber optic communications cable as the communications medium. However, as more and more utilities are being installed along the right-of-way the process of installing this type of communications medium is escalating. Based on 2006 Bid Averages, the cost of interconnecting 3 to 4 traffic signals (within a one mile segment) with fiber optic cable can run as high as \$64,000. This cost does not include design and utility adjustments for joint-use poles.

Solution: In conjunction with fiber optic communications cable, wireless technology may be used as an alternative for smaller type systems or for systems that fall in environmentally sensitive locations where it may be infeasible to install cable. In addition, wireless technology is a cost-effective alternative to providing communications to traffic signals that are located in outlying/remote areas of an existing system.

Results

1) Provide reliable communications link. 2) Less involvement with utilities which reduces design time and exposure to the hazards associated with time spent working beside the highway. 3) Lower cost of deployment. 4) Ease of installation and maintenance.

For more information, call Neil Avery at (919) 733-5643

42-Dollar Savings



Team Name:
Signals Management

Team Leader: Milton Dean
Team Members: Kelvin Peele,
Ken Morge

Procurement Cost Reduction of LED Traffic Signal Modules

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.

Solution: The solution is to create a new contract bid for LED traffic signal modules rather than to extend the present contract.

Results

The new contract provided a reduction in cost for an estimated annual cost savings of over \$35,000. The annual cost savings was calculated by taking the difference between the total overall contract prices of the old contract and the new contract. The total overall contract prices were determined by the sum of the line item total bid prices.

For more information, call Milton Dean at (919) 733-5666

43-Dollar Savings

Environmental Sustainability

44-Environmental Sustainability



Team Name:
Solvent Squad

Team Leader:
Emily McGraw, PE
Team Members:
Chris Peoples, Kelly Croft,
Chris Niver, John Kirby,
A. Battle Whitely

Asphalt Solvent Testing Program

Problem: The Department was purchasing a variety of asphalt solvents from various vendors at different prices with little knowledge of the products causing ineffective use of field personnel time & resources. The Department was paying between \$8.75 and \$16.29 per gallon. The products used were not evaluated for environmental, safety or performance criteria.

Solution: SRM asked NCSU, to develop a test procedure for evaluating asphalt solvent effectiveness. M&T established the sampling and testing protocol. REU developed protocols to eliminate harmful constituents by coordinating with NCDENR to meet existing EPA regulations. REU referenced safety/environmental regulations to establish safe handling criteria for field personnel. A Qualified Products List (QPL) was developed. The QPL is submitted to Purchasing for proper procurement of asphalt solvents. Changes are made in the testing program as deemed necessary by the implementation team.

Results

As a result of implementing this program, the Department now has a QPL, from which, an annual contract with one asphalt solvent vendor provides asphalt solvent meeting established environmental, safety and performance criteria for \$8.17 per gallon in 2006. Based on prior and post implementation prices, the Department realizes a cost saving of approximately \$250,000 per year.

For more information, call Emily McGraw or Chris Peoples at (919) 733-3725



Team Name:
L.E. Reynolds

Team Leader: L.E. Reynolds
Team Members:

Silt Fence Recycling

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.

Solution: Sampson Maintenance began recycling the silt fence and storing it in the maintenance yard.

Results

The percentage saved was 25 percent. This has resulted in a saving for landfill space.

For more information, call L.E Reynolds (910) 592-1434

Preconstruction - Highway Design & Traffic Engineering



Team Name:
Highway Design and
Traffic Engineering

Team Leader: Jay Bennett
and Kevin Lacy
Team Members: Sandra
Stepney and Regional Traffic
Engineering

Low Volume Bridge Approach Investigations

Results Book Only

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.

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.

Results

The net resultant is that the Department will be able to get more obsolete bridges replaced sooner and the replacement structures will be more appropriate for the conditions and levels of service provided – all this while reducing the net impact to North Carolina's precious environmental assets/resources. Textbook – WIN - WIN (Covey).

For more information, call Anthony Wyatt at (919) 733-1593

Labor Hour Savings

48-Labor Hour Savings



Team Name:
L.E. Reynolds

Team Leader: L. E. Reynolds
Team Members:

Drainage Improvements

Results Book Only

Problem: Beavers were causing a drainage problem on several roads by building dams inside of crossline pipes.

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.

Results

The drainage problems due to beaver dams have been resolved.

For more information, call L.E. Reynolds at (910) 592-1434

49-Labor Hour Savings



Team Name:
Team Smith

Team Leader: Terrell Smith
Team Members: Robert
Fields, Andrew McManus,
Hilda Beck, Margaret Hough

Earthwork Computation Spreadsheet

Problem: Time and training required to compute earthwork volume for estimated and final quantities to be paid on construction projects.

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.

Results

User is able to enter as much or as little information as is needed to obtain the result needed 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. Spreadsheet can be updated to produce the exact quantities as the need arises. Enables tracking of earthwork quantities paid and generates a source document for final quantities.

For more information, call Margaret Hough at (704) 394-8314

50-Labor Hour Savings



Team Name:
Avery Maintenance

Team Leader: Jerry Combs
Team Members: Jerry
Brooks, Donny Garland,
Nathan Clark, Frank Ruppard

Backhoe Mounted Guardrail Excavator

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.

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.

Results

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. We feel that this tool is more versatile than those submitted in the past, since it can both push and pull the material.

For more information, call Jerry Combs at (828) 265-5380

51-Labor Hour Savings



Team Name:
Division 12, District 1

Team Leader:
Caroline Dedmon
Team Members:
Caroline Dedmon

Approved Encroachment Cross-Reference Map

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.

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.

Results

The color-coded map helps staff to immediately identify the type of encroachment at each location and by having the reference number shown on the map, the time to locate approved encroachment data for more specific information was significantly reduced. This greatly improved customer service, reduced labor time and keeps data easily accessible.

For more information, call Caroline Dedmon at (704) 480-5425

52-Labor Hour Savings



Team Name:
Engineering
Development

Team Leader:
Gichuru Muchane
Team Members: Tom Koch,
David Stark, Daniel Heath

Development of a Simplified Method for Predicting Dead Load Deflections of Steel Plate Girders

Results Book Only

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.

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.

Results

Time reduction from roughly 60-80 hours to complete a computer model to 2 hours to acquire the necessary data to execute the program. Additional benefits are decreased construction delays and the costs associated with those delays and an increase in deck durability due to proper bridge deck thickness.

For more information, call Tom Koch at (919) 250-4037
53-Labor Hour Savings



Team Name:
Surveying Equipment

Team Leader:
Boniface Maduabuchukwu
Team Members:
Nathaniel Bitting, Lori Boyer,
Munther Mahbooba,
Innocent Umozurike,
Richard Mullinax

Robotic Total Station Surveying Equipment

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.

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.

Results

Manpower required for a survey team has been reduced by one person for high-speed locations requiring a stadia survey and has resulted in timesavings estimated to be 10 to 25 percent of in field survey time.

For more information, call Richard Mullinax at (919) 733-5569

54-Labor Hour Savings

Safety Improvement

55-Safety Improvement



Team Name:
Positive Drug Testing

Team Leader:
Will Williamson
Team Members: Robbie
Quinn, Cathy Matthews,
Debbie Jones

Positive Drug Testing

Problem: In 2004, representatives of the transit companies approached DMV with concerns that when they hired employees they had no way of knowing whether that new employee had been dismissed after testing positively 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.

Solution: DMV's solution to the problem was 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 proposal also provided for disqualification of the drivers until they had completed substance abuse treatment.

Results

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 to the driver(s) 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.

For more information, call Will Williamson at (919) 861-3808



Team Name:
Division 1, Operations,
Traffic

Team Leader:
Madison Phillips

Team Members: Donald
Northcott, Leslie Newbern,
Richard Slachta

Wireless Link Between Laptop Computer and Traffic Signal

Problem: 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 is to remove the laptop computer from the truck, which at times exposed the computer to rain, sand, and other elements that reduced the usable life of the computer. The second option involved parking the truck in close proximity to the signal cabinet and run a cable from the computer to the traffic signal equipment. Having to park the truck near the signal cabinet often places the technician, pedestrians, and the motoring public at risk of injury or death.

Solution: The solution was to use 2.4ghz spread spectrum radio modems that can be compatible with various types of traffic control equipment.

Results

As a result of the implementation of the wireless interconnect, the technicians are able to perform the required tasks with the trucks parked in a position to allow the greatest safety for the technician, pedestrians, and the motoring public. An unexpected benefit of the project was increased productivity from the technicians in completing the tasks requiring use of the laptop computer.

For more information, call Madison Phillips at (252) 482-7977

57-Safety Improvement



Team Name:
Division 2 Traffic

Team Leader:
Wesley Brazelton
Team Members:
Wesley Brazelton, Jim Evans

Post Puller

Problem: Removing 4 x 4 sign posts from the ground using a shovel or post hole digger is a physically demanding task that puts strain on the back and shoulder muscles. Some of the issues that a sign department faces that add to the physical demand are location of the sign post, moisture in the ground causing suction, and broken posts.

Solution: The solution was to develop a post puller that could be used in lieu of a shovel or post hole diggers that would reduce the physical demand on back and shoulders. The idea of the post puller came from the use of an old car jack. By hooking a chain on the 4 x 4 and then hooking the chain on the car jack, the post could then be easily pulled out of the ground. For deeper buried and larger posts, an extension can be added to the lever.

Results

The post puller works like a regular car jack except it moves freely up and down without a clicking motion. It also reduces the time it takes to remove sign posts, thus saving time for the sign department to perform other essential functions. Use of the post puller instead of a shovel reduces the physical strain on the back and shoulder muscles.

For more information, call Jim Evans at (252) 830-3493



Team Name:
Brantley

Team Leader:
Dennis F. Brantley
Team Members: Todd Lewis

Brantley Vise

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.

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 device has a simple design, is relatively inexpensive, and is easy to fabricate.

Results

By using the Brantley Vise, there is no need to use the conventional free-hanging weights over the volumeter/mold assembly when taking the compacted volume and empty mold volume measurements. This device is more easily maneuverable and reduces the potential for personal injury.

For more information, call Dennis Brantley at (252) 237-6164



Team Name:
Incident Management

Team Leader:
Sam Whittington
Team Members: Tim Smith,
Jerry Brown, Mike Venable

Sign Board Safety Mirror

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.

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.

Results

With the safety mirror mounted on the outside of the IMAP truck, drivers are no longer forced to get out of the truck to verify that the arrow board is up. This reduces the risk of a driver being struck by oncoming traffic.

For more information, call Sam Whittington at (336) 315-7080

60-Safety Improvement



Team Name:
Division 10 Traffic

Team Leader: Donald Griffith
Team Members: Tim Boland,
David Naylor, Tim Kirk, Rick
Mabry, Darla Burris, Johnny
Coleman, Bob Finnley, Mike
Kendall

Safety Handrails for Sign Erector Trucks

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.

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.

Results

Safety is enhanced by reducing or even eliminating the potential for a fall due to the lack of maintaining a three point method of mounting and dismounting equipment. If this improvement is implemented statewide, NCDOT may see fewer cases of employee injury as well as a reduction in statewide claims to workers compensation.

For more information, call Donald Griffith at (704) 982-1998

61-Safety Improvement



Team Name:
Bituminous Operations

Team Leader:
Matthew Oliverson
Team Members: Brenda
Owings, Ronnie Minton,
Keith Haynes

Equipment Handling Stands

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

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.

Results

The Stands Alone product can be loaded or unloaded in 2-3 minutes. Utilization of this product during emergency response and inclement weather provides more efficiency and productivity and is expected to minimize the risk for personal injuries.

For more information, call Matthew Oliverson at (336) 903-9235



Team Name:
McDowell Spray Crew

Team Leader:
David Silver
Team Members: Anthony
Reel, Donnie Dockery, Brad
Smythe

Spray Boom Attachment

Problem: The McDowell Spray Crew had a 100 gallon skid mount spray rig that only had a hand gun attachment to spray kudzu, woody growth, stump treatment, etc. They were spraying with the windows rolled down and running the hose around using the handgun out the window. Chemical spray was drifting back into the truck, creating a possible health risk to employees assigned to this operation.

Solution: The team looked at a factory spray rig assigned to Craggy, made some design drawings, took measurements, and built a front mounted spray boom for the trucks. The unit took less than two days to assemble in-house; using mostly used parts available in the shop.

Results

With the use of this front mounted spray boom, spraying can be done with the truck windows closed and more target area can be covered per shift. The unit can be changed from one side of the truck to the other. It also has a 24-inch hydraulic cylinder so the truck can be driven in the travel lane, emergency strip, or grass medium, with the spray heads on both sides of the guardrail.

For more information, call David Silver at (828) 652-2131

63-Safety Improvement



Team Name:
Division Traffic
Engineering

Team Leader:
Reuben Moore
Team Members: Scott Cook,
Roger Ayers, Steve Heim,
Steve Buchanan, Tim Ashe

Actuated Signal Warning Flasher at “Dowdle Mountain”

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.

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.

Results

The sign with flashers was placed adjacent to the roadway vehicle detector (loop). If an approaching vehicle arrives at this detector, it keeps the signal green long enough to safely clear the intersection. If, however, the vehicle does not make it to the detector before the signal changes to amber, the vehicle will still be in front of the warning sign, and should see the warning beacons start to flash.

For more information, call Reuben Moore at (828) 586-2141

64-Safety Improvement



Team Name:
Survey Equipment Box

Team Leader:
Keith Honeycutt
Team Members: Stuart
Glover, Alfred Wilson, Tony
Raines, Lonnie Barefoot,
Derek Bradner

Redesign of Survey Equipment Box

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.

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.

Results

The redesigned survey equipment box enhances safety by returning to the original equipment manufacturer's rear field of view, restoring the operators' ability to safely back the vehicle and monitor rear-approaching traffic via the rear view mirror. In addition, the number of backing accidents has been reduced. To date, 24 new survey equipment boxes have been installed.

For more information, call Charles Brown at (919) 250-4109



Team Name:
US 421 Safety

Team Leader: Renee Roach
Team Members: John
Olinger, John McDonald,
Al Grandy, Chris Howard

Innovative Centerline Rumble Strips on US 421 in Chatham County

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.

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.

Results

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.

For more information, call Renee Roach at (910) 437-2614



Team Name:
Wilson Regional Traffic

Team Leader:
P.H. Daughtry, III, PE
Team Members:
L.N. Stallings, PE

Completing Highway Safety Improvement Program Investigations

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.

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.

Results

With minimal additional job responsibilities interfering, this temporary engineer has been able to independently complete over 100 investigations and develop corresponding improvement projects in the past 18 months. The end results are safer roadways and an assertion that even more could be done in this important safety initiative area if more resources were dedicated to its cause.

For more information, call P.H. Daughtry at (252) 296-3522

67-Safety Improvement

We thank you for your on-going support of the CPI Program. We urge you to use the ideas presented this year, and in prior years, to guide your organization to better ways to utilize taxpayer dollars and to improve the efficiency, quality and safety of our transportation network.

The NCDOT Continuous Process Improvement Steering Committee