N.C. Department of Transportation
Continuous Process Improvement
Results & Award Form

Category (Check One Only)

X	Dollar Savings	☐	Internal Customer Service
☐	Cycle Time Reduction	☐	External Customer Service
☐	Internal Communications	☐	Safety Improvement
☐	External Communications	☐	Labor Hour Savings
☐	Environmental Sustainability		

Submission (Check One Only) X Award Application ☐ Results Book Only
(Do not complete questions 1-4)

Person or Team Being Nominated:

Team Name Team Manteo Team Leader R. W. Midgett, PE

Team Members Randy W. Midgett, PE, Pablo A. Hernandez, PE

Facilitator(s) _____ Team Sponsor _____

Process Owner _____

Organization Name: Division of Highways – Division One – Manteo Construction

Name of the Project: Pile Jetting Spoil Cleanup

Provide a brief description of the problem, action taken to solve it and results of your action. This description is not considered in scoring but will appear in the Results Book. (300 words)

The Manteo Resident Engineer's office was faced with a challenge to develop a method of cleanup for spoils generated during the installation of piling in sensitive wetlands for the new Croatan Sound Bridge Project. Rather than relying on the contractor to solve this problem, a NCDOT team was developed to take ownership of, research innovative methods, and select the course of action. The primary customer in this effort was the Contractor. The Department, Regulatory Agencies, and Citizens are stakeholders.

The team held brainstorming sessions and performed independent research to determine viable pile installation and cleanup methods. The only cleanup method with a proven track record which would satisfy regulatory requirements was excavation of the spoils with a clam bucket operated by a crane working from the project's temporary access bridge. This method had the potential to damage the wetlands root mat. It also would have caused considerable disruption to the Contractor.

A method of conveying the material approximately 1900 foot to high land was identified during a search of methods utilized by other industries. The shipbuilding and roofing industry utilizes industrial vacuums to convey materials. Industry representatives were contacted and the team made a visit to a shipyard in Virginia where the technology was working. Next an onsite demonstration was performed to insure conveyance of similar material over the required distance. This was the longest conveyance distance ever attempted by the manufacturer of this equipment. The test was successful. Department personnel presented a video of the cleanup method to the Environmental Agencies. They approved this method of cleanup as their preferred method.

Full-scale implementation of this method was implemented in early August 2000 and completed in May 2001. The Contractor was allowed to work unimpeded. The Regulatory Agencies received an Environmentally responsible cleanup. The citizens were saved considerable expense.

To check eligibility for the State Employee Incentive Bonus Program, contact the DOT Bonus Program Coordinator at (919) 733-7686.

Criteria

1- What are the tangible, intangible and verifiable results or impact of the project? Applicant should compare before and after data. In projects without data, evidence should indicate a verifiable improvement in quality. [50 points]

After several months of proposals to the Environmental Regulatory Agencies, the only method they would approve for cleanup was the removal of spoils by a clam bucket operated by a crane mounted on the Project's temporary work trestle. This method of cleanup would have caused the Contractor to stop production driving at each bent to refit the crane with a clam bucket and spend several days cleaning up the jetted material prior to moving his equipment on to the next bent. It was estimated that this extra procedure would add an additional 45 days to the construction time of these bents. The additional cost to the project of this operation was estimated to be $3,382,773. This figure included the direct cost of performing the work and the indirect cost of 45 days of additional overhead and expenses to the Department and the Contractor by extending the completion date of the project for this work.

The alternative vacuum cleanup method developed and implemented by the team required the purchase of the equipment. The cost of this equipment was approximately $132,000. The only remaining expense was labor and the cost of operating the vacuum unit. (Fuel, Repairs, Maintenance). This cost was approximately $178,000. The cleanup method required no assistance from any of the equipment dedicated to the bridge construction. The operation proceeded with cleaning up the jetted material completely independent of bridge construction. Therefore no impacts or delays to the construction schedule were incurred. The work force performing the cleanup consisted of three laborers, the vacuum unit and associated piping. The total cost of performing this cleanup was approximately $310,000. This alternative method saved the stakeholders approximately 3 million dollars and reduced the anticipated delivery date of the project to the public by approximately 45 days.

Representatives from the US Army Corps of Engineers and CAMA have inspected the cleanup and praised the innovation. They indicated that the new method provided a more thorough cleanup and less root mat damage than the original clam bucket method they had required. The vacuum cleanup method has since become a permit condition mandated by the Corps of Engineers for wetlands cleanup on another project.

2- What is the size of affected population, or potential population if the project is implemented among its widest possible audience? [10 points]

If the results of this project are used to develop cleanup procedures for other similar construction impacts, we could see the vacuum method of spoil cleanup become a standard on all bridge projects having wetlands impacts in the state. The vacuum method is also currently being considered for culvert and pipe clean out by maintenance personnel.

3- Explain how the project could serve as a model for others to follow. Include the innovation, difficulty of implementation and documentation of results. [20 points]

The project can serve as a model for others to follow by demonstrating the results of thinking outside the confines of only what has been done in the past. By bringing in equipment from another industry a successful new application for the construction industry was developed.

Difficulties in implementation were many. The manufacturers of the equipment were skeptical that their equipment could perform the task. Only after an onsite experiment of actually vacuuming material over 1900 feet were they comfortable recommending their own equipment for the task. The Contractor was reluctant to try and use a piece of equipment that they had no history or experience using. The regulatory agencies would not permit wholesale use of the equipment without a demonstration. Upper level managers in the Department were cautious of approving the expenditure on an unproven method.

The potential savings of resources and reduced impacts to the project schedule eased concerns. Results were documented through actual cost records kept during implementing this new procedure.

4- Explain the process of implementation and provide documentation. [20 points]

The first phase of the process of implementation was brainstorming. Many ideas were researched and went through an examination of barriers and aids to document the hindering and supporting factors for each idea. The list was reduced to processes that were determined to be viable.

During the course of research on the vacuum method, manufacturers of equipment were contacted to discuss the applicability of their equipment to our problem. Only one manufacturer indicated that they thought their equipment may be capable of performing the task. The manufacturer could not guarantee success, but indicated that they had a similar unit operating in a shipyard in Virginia. We arranged an onsite visit to study the unit in operation. From there we negotiated with the manufacturer to perform an onsite demonstration of the equipment to determine if the equipment could actually convey our material over the required distance of 1900 feet. The experiment was performed at the expense of the Department. It was successful. A video of the demonstration was shown to managers within the Department as well as the Environmental Resource Agencies. Approval was gained to proceed with the full-scale implementation.

Implementation of the cleanup method began in August 2000 and was completed in May 2001. Approximately 1,321 hours of vacuuming were required to perform the cleanup. The entire process from identification of the problem, to development of the method, permitting, and to completion lasted from August 1999 to May 2001.

Identify attached documentation: Cost Breakdown for Actual Expenditures, Cost Estimate Backup provided to USACoE 1/28/200, Permit Application to USACoE 4/6/2000.

Contact Person	R. W. Midgett, PE	**Date Submitted**	**July 24, 2001**
	(if different from team leader)		(No later than July 31)
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Immediate Supervisor	**Robert Capehart, PE**	**Phone #**	252-482-7977

(Supervisor must approve application.)

E-mail to CPI@dot.state.nc.us, **mail** disk to Productivity Services, Transportation Building, Raleigh, or **fax** to (919) 715-2533.

(Revised 2/2000)