

Equipment Management Decentralization by the North Carolina Department of Transportation

Requested by

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December 30, 2011

The Caltrans Division of Research and Innovation (DRI) receives and evaluates numerous research problem statements for funding every year. DRI conducts Preliminary Investigations on these problem statements to better scope and prioritize the proposed research in light of existing credible work on the topics nationally and internationally. Online and print sources for Preliminary Investigations include the National Cooperative Highway Research Program (NCHRP) and other Transportation Research Board (TRB) programs, the American Association of State Highway and Transportation Officials (AASHTO), the research and practices of other transportation agencies, and related academic and industry research. The views and conclusions in cited works, while generally peer reviewed or published by authoritative sources, may not be accepted without qualification by all experts in the field.

Executive Summary

Background

In 1985, the North Carolina Department of Transportation decentralized its management of equipment, so that equipment field personnel reported to division maintenance engineers instead of NCDOT's central equipment unit. As the California Department of Transportation considers a similar restructuring, it is interested in NCDOT's lessons learned from this decentralization, including how it handles roles and responsibilities, how the transition was managed and communicated, and whether it is happy with the results.

Summary of Findings

The contact currently listed as the Director of Fleet and Material Management in the AASHTO Equipment Reference Book, Drew Harbinson, is no longer with the North Carolina Department of Transportation. We subsequently made inquiries with:

- Charles Mitchell, current Director of the Fleet and Material Management Unit, (919) 733-2220, cmitchelljr@ncdot.gov.
- Paul Kauffmann, principle investigator for two studies on NCDOT's equipment management (see **Related Resources**).
- John Kirby of NCDOT Research and Development, project manager for these studies.

Charles Mitchell did not respond to our inquiries, and John Kirby did not have information on this topic. Paul Kauffmann's studies turned out not to be directly related to NCDOT's decentralization of equipment management, but he referred us to Newell Brooks and Ronnie Houchens, both of the Fleet and Material Management Unit, as the best resources for information on this topic.

We were able to discuss NCDOT's equipment management decentralization with Newell Brooks. According to Mr. Brooks, NCDOT decentralized its equipment management in 1985. But decentralization has been problematic, because the knowledge needed for repair decisions lies with specialists at the central equipment unit, not with the division maintenance engineers to whom field personnel now report. Consequently, NCDOT is exploring moving back to centralized equipment management.

Contacts

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Consultation with NCDOT

Newell Brooks

The North Carolina Department of Transportation decentralized its equipment management in 1985, and since that time has not made significant changes to its equipment management. Mr. Brooks has been with NCDOT long enough to have seen this transition first hand. In 1985, only the reporting structure was changed, so that equipment field personnel reported to a division maintenance engineer instead of to NCDOT's central Fleet and Material Management Unit (NCDOT has 14 divisions). This change in reporting was not well planned or managed. According to Mr. Brooks, personnel came in one Monday morning and learned they were reporting to a different supervisor. This was initially a division maintenance engineer, then changed for some time to a division operations engineer and subsequently back to maintenance. This was essentially just a change in immediate supervisor, and applied only to equipment repair decisions. The central office still owns, maintains and does budgeting for all equipment. The central office is essentially an equipment rental agency: it buys equipment and fuel, and rents equipment to any division, or to any government entity, state or federal. The division itself makes repair decisions within a given budget determined by the central unit.

Equipment decentralization has been problematic for NCDOT, and there is talk of returning to a centralized system. The problem is essentially that the division maintenance engineer does not have the knowledge or desire to make big-picture equipment repair decisions, and these decisions may conflict with central unit priorities. Field equipment personnel are essentially dealing with two masters: the division supervisor may tell them to repair a piece of equipment, but the central office may tell them they do not have the budget to do so, or that the repair is not cost-effective and that the central office can instead send a piece of replacement equipment. Or it may be more important to repair one kind of equipment before another. The central equipment unit manages vendors and recalls, has eight different shops, its own foundry and the ability to manufacture parts; divisions are not able to track these capabilities when making repair decisions. The knowledge required to prioritize repair decisions is with specialists in the central equipment unit. Consequently, NCDOT is considering returning to a centralized approach to equipment management.

Mr. Brooks was unaware of any written documents or other resources related to NCDOT's 1985 decentralization of equipment management.

Related Resources

North Carolina Department of Transportation Fleet and Material Management Unit:

http://www.ncdot.org/doh/operations/dp_chief_eng/EquipInvent/

- Fleet Management Manual:
http://www.ncdot.gov/doh/operations/dp_chief_eng/EquipInvent/MANUALS/Fleet_Management_Manual.pdf
- Workstream: Equipment Management:
<http://www.ncdot.gov/download/performance/Volume4fEquipmentManagement.pdf>

The unit was audited in 2010:

Performance Audit North Carolina Department of Transportation Heavy Equipment Fleet Management, North Carolina Office of the State Auditor, September 2010.

<http://www.ncauditor.net/EPSSWeb/Reports/Performance/PER-2010-7255.pdf>

This audit found that NCDOT significantly underutilizes its equipment:

An analysis of DOT reports for approximately 2,300 pieces of heavy equipment, costing around \$153 million, shows that more than half of those items were used less than 30% of the available time between October 1, 2006, and September 30, 2009. Approximately one third of these pieces, costing \$56 million, were used less than 15% of the time during each year of the three-year period.

It was recommended that NCDOT develop performance measures, policies and procedures to reduce equipment underutilization, and dispose of underused equipment.

Fleet Management Criteria: Disposal Points and Utilization Rates, Paul Kaffmann et al., East Carolina University, October 2010.

See **Appendix A** for the full report, provided by the author at the instruction of NCDOT project manager John Kirby.

This study developed models to help reduce the underutilization found in the state audit.

Abstract: The goals of this study were to determine, for six equipment classes (three on road and three off road), a methodology for evaluating aging (or depreciation), disposal points, and overall utilization. The primary deliverable was development of a decision model which would help reduce cost, improve the age of the fleet and its readiness to serve the public, and improve overall utilization. The study identified an approach to segment or tier equipment utilization based on usage purpose so that specific needs and supporting equipment could be more readily identified by management. The study examined salvage values and identified trends in market value decline based on historical records. Using internal cost information, the study identifies trends in cost of operation and use as equipment ages. This information was integrated into an optimal economic life model based on equivalent uniform annual cost to identify the optimal disposal point for the six classes. The analytical models developed in the study provide a foundation for long term analysis of fleet size and the cost effectiveness of disposal points.

An ongoing follow-up study is evaluating these models:

Fleet Management Performance Monitoring, Paul Kaffmann et al., East Carolina University, End Date: August, 2013.

Abstract at: <http://rip.trb.org/browse/dproject.asp?n=28814>

From the Abstract: This proposal builds on the six analytical models recently completed for the project "Fleet Management Criteria: Disposal Points and Utilization Rates" and addresses the need for expansion and application of this approach to management and analysis of equipment, utilization, costs, and optimal life cycle for the remaining classes in the North Carolina Department of Transportation (NCDOT) fleet.