



RESEARCH SERVICES SECTION

TECHNICAL SUMMARY

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PROJECT COST:

\$88,000



The project aimed to enable planners to effectively expand the network and alleviate congestion.

Beyond Business as Usual: Ensuring the Network We Want Is the Network We Get

What Was the Need?

In 2003, Mn/DOT completed the research report “[If They Come, Will You Build It?](#)” (2003-37), which used computerized models to examine the growth of the highway network based on its current and historical condition, traffic demand, demographic characteristics, project costs and budget. Extending that research, “Beyond Business as Usual” tested the implications of existing decision rules on potential future links in the road and highway network. In addition, performance measures, such as average travel time per trip, were developed to evaluate the highway system on an ongoing basis.

Modeling highway networks in this way can suggest the consequences of alternative scenarios of road construction and how well the network will move traffic, considering safety, efficiency and cost. The model incorporated a standard set of decision rules typically used by state and local governments to make transportation planning decisions, but the rules actually used to make these decisions are often inconsistent among and even within planning agencies. In some cases, there are no formal, documented rules for determining which highways to repair or expand. Additional research was required to determine what effect changing these rules would have on the highway network model.

What Was Our Goal?

The objective of this study was to document the range of existing construction decision rules and jointly develop new ones with Mn/DOT staff and local community transportation representatives. Investigators then aimed to compare and analyze highway network models incorporating these varying rule sets to determine which ones would, if employed consistently, produce the greatest benefit for the Twin Cities Metropolitan Area Transportation Network.

What Did We Do?

Researchers conducted a literature review and interviewed state and local engineers to document the rules historically used to prioritize highway expansion and repairs. They also documented the performance measures in use to gain a better understanding of how Mn/DOT prioritizes repairs and expansions.

Researchers then compared forecast networks that use these historical decision rules and performance measures with networks constructed according to alternate sets of decision rules that were developed with Mn/DOT and Metropolitan Council staff input. By evaluating the future network models generated using these rule sets, researchers assessed whether the network generated in the absence of a change in decision rules would outperform or underperform the networks developed by applying newly created decision rules. This evaluation enabled new decision rules for network construction to be tested.

What Did We Learn?

In general, every scenario formulated via these analyses provided better accessibility in the year 2030 than in the year 2005. However, there were no major differences between the different scenarios modeled using the historical and the updated decision rules. This research found that to provide a significantly better transportation network given the system’s mature stage, there is a need for increased investment. When compared

“This project highlights the challenges of improving the performance of a mature transportation network, especially when resources are scarce and the competing demands are many.”

–Rabinder Bains,
Economic Policy Analyst,
Mn/DOT Office of Investment Management

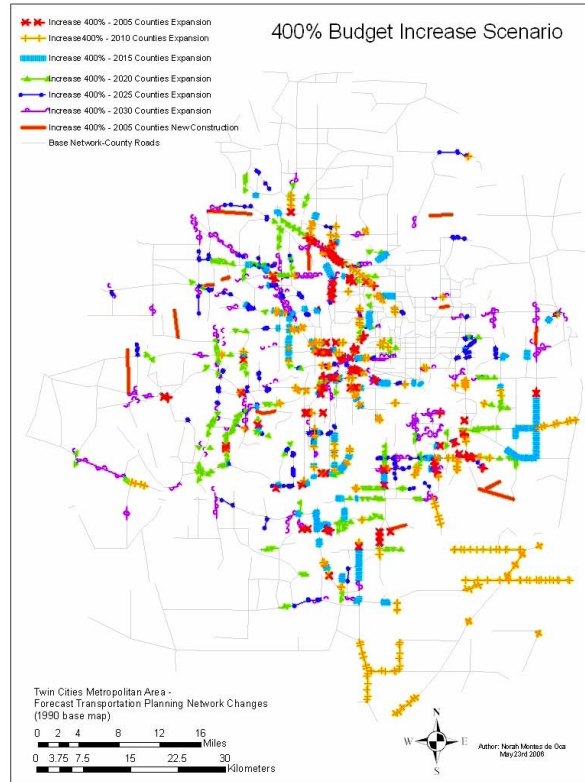
“A key benefit of modeling is that it requires coding decisions into a computer program in a logical way. This forces us to document all of the assumptions that are expressed vaguely in typical communication.”

–David Levinson,
Associate Professor,
University of Minnesota
Department of Civil Engineering

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Computer modeling was used to generate different highway network scenarios given different construction decision rules and investment levels.

to changes in total investment, changing specific decision rules applied to the network resulted in only marginal changes in network performance.

This study found a gap between how staff perceives the decision-making process and how official documents suggest it happens. While many official documents refer to selection criteria such as safety, capacity and pavement conditions, most staff interviewed could not say how particular projects emerge from these official criteria.

Additionally, the study found that improvements can be made to the investment models, particularly in the way resources are allocated between new construction and expansion of existing facilities. The lack of consistent decision-making criteria between new construction and expansion means that spending decisions have not been consistent.

What's Next?

Mn/DOT intends to work closely with staff and community transportation representatives to ensure everyone understands its documented construction decision rules and performance measures. This will help planners across agencies consistently prioritize new construction projects and expansions. Mn/DOT is also taking a close look at current and future revenue streams to determine how best to increase revenue and how to make the best use of the current and future budget.

One suggested line of future research is to compare the effectiveness of decision-making rules used in different metropolitan areas to optimize investment policies according to specific community characteristics.

This Technical Summary pertains to Report 2006-36, “Beyond Business as Usual: Ensuring the Network We Want Is the Network We Get,” published September 2006. The full report can be accessed at <http://www.lrrb.org/PDF/200636.pdf>. This project was an extension of report 2003-37, “If They Come, Will You Build It? Urban Transportation Growth Models,” published December 2003, which can be accessed at <http://www.lrrb.org/PDF/200337.pdf>.