UTC Project Information	
Project Title	A Network-Level Decision Making Tool for Pavement Maintenance and User Safety
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Funding Source(s) and Amounts Provided (by each agency or organization)	University of Washington PacTrans $36,335 Oregon State University $36,335
Total Project Cost	$72,670
Agency ID or Contract Number	DTRT13-G-UTC40
Start and End Dates	September 16, 2015– September 15, 2016
Brief Description of Research Project	Data from NCHRP 720 report (Chatti and Zaabar, 2012) show that reducing the road roughness by maintenance and rehabilitation can create $0.4 to $0.8 reduction in user costs (mostly related to vehicle maintenance and fuel consumption) for one truck for one lane mile. This data alone suggests that hundreds of millions of dollars can be saved annually by developing more effective pavement management strategies for the entire Pacific Northwest road network. The network-level decision making software proposed here will help state Department of Transportation (DOT) engineers select the most efficient maintenance and rehabilitation strategies to minimize cost and maximize user and agency benefits. Developed tool can be used to evaluate and emphasize the effectiveness of sustainable pavement strategies, such as high-recycled asphalt pavement (RAP) mixtures and thin overlays. In the future, developed software can be modified to consider reduction in greenhouse gas (GHG) emissions as a benefit to perform pavement life cycle assessment (LCA).

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	This was a "small project" with $36,335 funding level. This level of funding just allowed us to develop a prototype software. We need additional funding to improve our developed software and integrate it into a pavement management system (PMS). Suggested Implementation Strategies After following the recommendations suggested in section 1.7, finalized decision-making tool can be implemented. Two possible implementation strategies are given as follows: 1. State DOTs can allocate budget to districts based on pavement condition ratings. Each district will use the developed tool to identify the sections (or road segments) that will provide the highest level of user and agency benefits by considering user safety. The network for the analysis will be each district, not the whole state. 2. The tool can perform the budget allocation for the entire state DOTs highway network. DOTs can also incorporate their priorities (safety, structural integrity, minimum allowed pavement ratings, critical commercial areas, and etc.) into the software to change-modify the tools recommendations. The tool will estimate required budget for each district, and those amounts will be directed to every district. Then, each district will make their own prioritization to maintain the sections. Districts can consider tool's recommendation in their decision process to maximize user benefits and safety. Maps and tables showing the IRI trigger levels for different climate regions and traffic levels should also be developed. These maps and tables can be used by DOTs pavement engineers and managers during the maintenance and rehabilitation decision-making process. Using the developed software, case studies should be developed to evaluate software decisions. A report and a presentation file will be prepared to document research findings and recommendations. It is expected that state DOTs Maintenance Departments will implement the research findings to more effectively and efficiently manage roadway maintenance and rehabilitation.

Impacts/Benefits of Implementation (actual, or anticipated)	The network-level decision-making tool is immensely useful for analyzing which roadway sections within the network will provide the most efficient allocation of agency maintenance budgets and yield the most benefit to road users. This tool could be even more useful if the roadway sections were spatially cataloged such that users of the tool could visually analyze which sections are more critical to maintain or rehabilitate.
Web Links • Reports • Project Website	http://depts.washington.edu/pactrans/wp-content/uploads/2015/11/2015-S-OSU-99_Erdem-Coleri_A-Network-Level.compressed.pdf