



**Project Information Form**

Project Title	Development of Risk Management Strategies for State DOTs to Effectively Deal with Volatile Prices of Transportation Construction Materials (Risk Management Systems for GDOT)
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Funding Source(s) and Amounts Provided (by each agency or organization)	UTC: \$67,678.00  GDOT: \$92,493.00
Total Project Cost	\$160,171.00
Agency ID or Contract Number	UTC: 4956614  GDOT: 4956615
Start and End Dates	Start Date: May 1, 2012  End Date: June 30, 2014
Brief Description of Research Project	The overarching objective of this project is to enhance transportation agencies' understanding of the opportunities, challenges and best practices for utilizing risk management strategies for the asphalt cement price volatility in transportation projects. The final deliverable of this project is a comprehensive risk management guide that systematically addresses risk management for asphalt cement price volatility. The specific research objectives are:  1) Identify and analyze the latest developments and trends in utilization of risk management strategies for the mitigation of asphalt cement



	<p>price risk;</p> <ol style="list-style-type: none"> <li>2) Identify key features for the most promising risk management strategies and establish their respective potential benefits and limitations;</li> <li>3) Enhance the assessment of risk management strategies considering the strategic objectives of transportation agencies and unique project goals;</li> <li>4) Enhance the quantitative assessment of risk management strategies considering their key respective parameters;</li> <li>5) Devise appropriate risk identification and allocation matrices for the successful adoption of asphalt cement price risk management strategies; and</li> </ol> <p>Transform research findings into educational and professional development activities.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>(Attach Any Photos)</p>	<p>The primary contributions of this research to the body of knowledge are: (a) the creation of several multivariate regression models that have the power to explain the variations of highway contractors' submitted bid prices for major asphalt line items; and (b) the empirical assessment of whether offering price adjustment clauses contributes to the variations of contractors' submitted bid prices for major asphalt line items in highway projects. It is expected that this work contributes to the transportation planning community by helping capital planners of transportation agencies and owners of major capital projects systematically evaluate the effect of their price adjustment clauses on the submitted bid prices for their capital projects.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>Unprecedented uncertainty in the price of asphalt cement over the last decade has been a source of major concern for state Departments of Transportation (state DOTs) and highway contractors. This uncertainty may lead to price speculation and inflated bid prices by highway contractors, in order to secure their financial positions against possible rising prices. One of the most common risk sharing strategies widely used by transportation agencies is price adjustment clauses (PACs) that shift potential upside and downside risk of material prices from contractors to owners. PACs are aimed at eliminating extra risk premiums and therefor, reducing contractors' submitted bid prices. However, the actual effect of offering PAC on submitted bid prices for major asphalt line items in transportation projects is not clear. The research objective of this paper is to examine the effect of PACs offered by state DOTs on the variations of</p>



	<p>contractors' submitted bid prices for major asphalt line items in transportation projects. Multivariate linear regression analysis was used to create appropriate statistical models that can explain the variations of contractors' submitted bid prices for five major asphalt line items. Data on 981 transportation projects were collected for the purpose of creating these regression models. Several potential explanatory variables, such as duration of the project, quantity of the item, asphalt cement price index at the bid date, number of bidders, and eligibility for the PAC program were considered in creating the regression models. The results show that a linear combination of several variables can properly explain the variations of the submitted bid prices for the five major asphalt line items. Eligibility for the PAC is not statistically significant in all models except the one developed for one of the asphalt line items in which this variable has a positive coefficient indicating that expected bid prices for this line item in PAC-eligible projects are higher than those in PAC-ineligible projects. Thus, no evidence was found to support the argument that offering PAC would reduce the submitted bid prices.</p> <p>The results were presented in an implementation session that was organized by the GDOT Office of Research. Correspondents from several offices attended the implementation session, Office of Materials, Office of Construction, and Office of Contracts and Bidding Administration. Implementation consideration was considered by GDOT in their discussions and the PI expressed that he is willing to provide any assistance to GDOT for the success of his implementation plan.</p> <p>The findings were also presented in the PI's graduate course in Economic Decision Analysis to Building Construction and Civil Engineering students.</p> <p>The GDOT Office of Research nominated this research project as one of their projects for the 2013 AASHTO Best Research Award.</p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project website</li> </ul>	<p>Final research project report was submitted to the GDOT Office of Research for their review.</p> <p>1 journal paper was submitted to the Journal of Construction Engineering &amp; Management (under review). The NCTSPM support was acknowledged in the paper.</p> <p>1 more journal paper is in production and will be submitted to the Built Environment &amp; Project Asset Management soon.</p> <p>2 Quarterly Progress Reports were submitted to GDOT.</p>



Two conference papers were presented in the 2014 ASCE Construction Research Congress (CRC) that will be held in May 2014 in Atlanta. The NCTSPM support was acknowledged in these papers.

In a competitive process, the GRA's poster submission was accepted for presentation in the 2014 CII Annual Conference in Indianapolis.