Problem

The implementation of warranty provisions in construction contracts is considered an innovative contracting practice that is used by many highway agencies including the Ohio Department of Transportation (ODOT).

The major underlying benefits of warranty provisions from the perspective of state DOTs include increased quality of the products, lower maintenance and project life-cycle costs, protection against early project failures, and reduction in site inspection. However, there are several problems that arise from the use of warranty provisions such as an increase in the initial bid price as compared to similar but non-warranty projects, a reduction in the number of small contractors bidding on these projects, the unwillingness of surety companies to issue long term bonds, and the possible increase in contract disputes and litigation.

This study was carried out to establish the state-of-practice of warranty contracting in the US and analyze its pros and cons in conjunction with current ODOT practices. The report provides a complete description of the research approach, implementation, and results.
Objectives
This research addresses several objectives:
• Establish the state-of-practice of warranty contracting in the US, analyze its pros and cons, and determine its future prospects.
• Prepare a reference document on warranty contracting that addresses all the issues associated with the major components of a project including cost, quality, time, bonding, and disputes and litigation.
• Provide a philosophical discussion on the effectiveness of warranty contracting.
• Propose methods and formats for data collection on warranty projects.

Description
The objectives and deliverables of the research were achieved through three modes of data collection: (i) literature review of academic publications, technical reports and online resources, (ii) questionnaire surveys targeting state DOTs, the 12 ODOT districts, contractors and bonding companies, and (iii) personal interviews of selected parties and individuals.

The literature review helped in identifying a list of variables associated with the major project components to differentiate warranty projects from non-warranty projects. As such, four sets of questionnaires were compiled and mailed to 170 organizations including state DOTs, 12 ODOT districts, contractors and bonding companies, and (iii) personal interviews of selected parties and individuals.

The study presents many important results on the pros and cons of warranty provisions including:
• The increase in the initial bid prices due to warranty provisions are estimated to be somewhere between 0-15 percent, while the changes in maintenance and project life cycle costs are expected to be minimal. The expected variation in project life cycle cost due to warranty provisions according to the responses received from state DOTs is shown in Figure 1.

• About 46% of the state DOTs indicated that there is only a slight increase in quality on warranted projects as compared to similar but conventional projects (Figure 2).

• Contractors, because of the associated risks, do not favor innovative technologies and methods, new materials, or better equipment on warranty projects. Figure 3 illustrates the innovations preferred by the contractors who responded to the survey.

• The current practice of warranty provisions is worthwhile if its role is considered mainly as an insurance mechanism against the unexpected and a protection from early contractor defaults. The optional warranty and a combination of warranty provisions with other contractual methods are two alternative approaches that could provide ODOT with a better way of utilizing warranty provisions on its contracts.

• A comprehensive data collection system and decision tool that is compatible with the data available at ODOT could be established according to the criteria and framework provided in the main report. Such a system would help the agency evaluate future projects to determine how, where, and when to use warranty provisions and the best warranty duration for the project.

Implementation Potential
For the warranty-contracting program in the State of Ohio, this study will provide a comprehensive source record document to address the impact of warranty provisions on major project components as well as a data collection framework for continued observance of warranty performance. The study proposed items to track and possible methods and formats that ODOT can use in developing a tracking system that builds on its in-house data system.