ABSTRACT

Bayraktar, Mehmet E. Ph.D., Purdue University, August, 2006. A Decision Model to Determine the Optimal Time-Cost Trade-Off in Highway Work Zone Projects. Major Professor: Makarand Hastak.

Highway maintenance projects are challenging for state Departments of Transportation and highway contractors due to their unique nature. Such projects are often located in urban areas and impact local traffic, community, environment, and businesses. The major need faced today in highway work zone projects is to optimize the dynamic relationship and competing interests of the state highway agency, contractor, and road users with respect to the main project performance indicators, i.e. cost, schedule, quality, and safety while taking the factors that can potentially impact the project under consideration into account.

The research presented in this thesis aims to understand and model at a macro level the dynamic relationship between the stakeholders to a highway work zone project, i.e. state highway agency, contractor, and road users, with respect to their influence on the cost, schedule, safety, quality, and public and motorist satisfaction of such projects through different variable factors commencing from the stakeholders. As a product of this research, this thesis presents a prototype decision support tool, which has been developed to evaluate the trade-offs among cost, schedule, quality, and safety for highway work zone projects under given constraints and assist the user in developing a suitable contracting strategy for a particular project under consideration.