

Decision Making Framework for Transportation Infrastructure Selection

U. Attanayake¹, A.W. Mohammed², Y. Hu³, O. Abudayyeh⁴ and H.M. Aktan⁵

The world transportation system matures day-by-day wherein the congestion growth rate is alarming while its infrastructure growth has slowed down, which affects the quality of life. Developing highway infrastructure by utilizing modern technology and knowledge is vital for successful completion of the projects with least impact to traffic and local economy. Accelerated construction technology is developed to minimize construction duration; hence, to mitigate congestion, reduce on-site environmental impacts, and to improve the safety of stakeholders. Selection of construction methods and technology is based on available funding, proposals from contractors or design-bid-build contracts that lack many of the factors which should tangibly control the decision of type of facility to be constructed. The decision group comprising of representatives of owner agency and contractor with differing preferences, experiences and background requires a framework to negotiate among them to arrive at an optimal decision for a particular project. The available decision making frameworks include several simple "Yes"/ "No" answer questions that do not consider relative importance among the factors providing a transparent methodology or a tool to arrive at the decision. In addition, potential constraints are not addressed to identify structural systems/configurations with respect to their performance and construction techniques/technologies for implementation at specific sites. A multi-criteria decision making framework is presented in this paper using highway bridge construction as an example. The framework is developed using Analytical Hierarchy Process (AHP) and accommodates many quantitative and qualitative factors identified through interviews and review of literature including post-construction and lessons learned reports.

Key words: *Transport, Decision Making, Infrastructure*

Authors Details;

1. Assistant Professor, Department of Civil & Construction Engineering, Western Michigan University, USA. upul.attanayake@wmich.edu