

Bridge Management Analytics Focused On Sustainability And Economic Growth

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Abstract:

The transportation sector in various countries are facing the daunting challenge of sustainable development. In recent times, bridges on the network are experiencing failure. Sufficient data is available for analysis and comparison between different bridges. Very little data is available on the contribution of the existing bridge towards economic growth over the years. Life cycle cost analysis [LCCA] for bridges is carried out before actual construction to decide on the commercial viability of bridge construction. LCCA also needs to be carried out to reflect the changes in the scenario emerging from dynamic behaviour in bridge structure. This dynamism of the bridge is captured within Global Analytics for Bridge Management [GABM]. GABM is oriented towards fulfilling the objectives of sustainability, the process also ensures economic growth. GABM has maintained the focus on rehabilitation intervention which helps in evaluation of impact on sustainability. Tangible and intangible IRR ensures sustainability is maintained without compromising economic growth.

Keywords: Global Analytics for Bridge Management, Unified Bridge Management System, LCCA, Sustainability.

1 Introduction

The life-cycle cost analysis (LCCA) approach is used to calculate the overall cost of infrastructure ownership. Bridges, within the array of infrastructure projects are the focus of this research. LCCA includes all expenditures associated with purchasing, owning, and disposing of a bridge structure. It is notably beneficial for comparing project options that meet the same performance criteria but differ in terms of initiation and operation expenses; to choose the one that optimizes net savings. The goal of LCCA is to evaluate the total costs of project choices and to select the design that ensures the infrastructure has the lowest overall cost of ownership while maintaining quality and function.^[1,2] To reduce life-cycle costs, LCCA should be performed early during the design process, when there is still time to alter the design. The first and most challenging task of an LCCA, or any economic evaluation technique, is to assess the economic implications of alternative structure and its system designs and to quantify and describe these impacts in monetary terms. One

of the primary objectives of the Bridge Management System [BMS] is to optimize expenditure utilization by maintaining a balance between preserving a sustainable environment and managing the economic benefits of bridge constructions with a longer life length. It should ensure that the sustainability qualities of any bridge project are maintained throughout its life cycle, including maintenance, rehabilitation, restoration, and replacement.^[3,4] The application of Life-Cycle Cost Analysis [LCCA] provides sustainability management throughout infrastructure design and maintenance. LCCA is used to analyze the overall financial cost of bridge project choices and to select the design that ensures the bridge has the lowest cost of ownership consistent with its quality and function. If the advantages of Social, Economic, and Environmental aspects of the bridge project are also considered, LCCA becomes more viable. Global Analytics for Bridge Management [GABM] enables bridge management teams to achieve the delicate