

GABM - Empowering the Micro Bridge Inventory Owners

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Abstract

World over Bridge Management [BMS] implementation is tilted towards owners having large bridge inventories. Implementing BMS is difficult for owners with less than 100 bridges. In certain pocket of India, most of the facilities and skills needed are available. The research was aimed to evolve BMS to suit the small inventory owners. The resultant application “Global Analytics for Bridge Management” [GABM] is aimed at empowering micro bridge inventory owners fulfilling the key objectives of BMS. Sustained research to provide thousands of micro-owners in India was a herculean task. GABM allows partial integration of BMS with the Bridge Information Model [BrIM]. Integration with Short term Structural Health monitoring allows risk-free monitoring of bridges in need of rehabilitation. Freedom to choose from the various functionalities in the GABM software does not result in the user losing any technical advantages of BMS. Software development for GABM was challenging. GABM renders operational ease in all operating systems.

Keywords: Global Analytics for Bridge Management [GABM]; Bridge Information Model [BrIM]; 3D geometric model; 3D photogrammetry model; Short term Structural Health monitoring [STSHM]; LCCA; Sustainability.

1 Introduction

A major role of any Bridge Management System (BMS) is to manage and organize data related to all the bridges on a particular network. BMS ensure to collate data regarding periodic inspection reports for a bridge. It keeps track of inventory records to facilitate better decision-making during maintenance and rehabilitation for the entire service life of the bridge. Bridges deteriorate over time, during their service life. Bridges, therefore, need continuous inspection and maintenance to ensure their structural integrity, and in turn, ensure user-safety during their travel on the bridge. Maintaining bridges is a multi-faceted operation that requires both domain knowledge and bridge analytics techniques over large volumes of data for multiple inspections and elements of the bridge. Although most existing bridge management

systems (BMS) have very efficient at data storage, they are not as effective at providing analytical capabilities or as flexible at supporting different inspection technologies. Without data and data analysis, bridge management would be little more than ad hoc reactions to the most urgent crises, rather than a well-planned, proactive process. It is also true that at times, data collection and analysis are performed in the required periodicity. Even missing one inspection cycle [rare but possible] can result in erroneous analysis.

Global analytics for Bridge Management [GABM] is a data-driven approach that has been used to improve the safety and performance of bridges. The use of analytics in bridge management dates to the late 20th century when engineers in the United States began using bridge data to analyse and control the structural integrity of bridges. In the early 21st century, bridge engineers used