



Development of Bridge Maintenance Management System in GIS Environment

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Summary

As the allocated funds for the maintenance of the bridges are generally limited, so it is essential that the allocated funds for the bridge maintenance shall be used in such a way that they yield the highest possible benefit to society at the lowest possible cost. The actions to be carried out must be technically sound, object oriented and should take place at the right time. Considering the above, an initiative was taken to develop a GIS environment friendly Bridge Maintenance Management System (BMMS).

The bridge maintenance and management practices in India vary from Department to Department or State to State. No Indian State has a comprehensive management system consisting of various components viz. Inventory of bridges, Inspection and assessment of condition of bridges, Scientific analysis and bridge maintenance/repair needs, Assessment of requirement of funds at National/ State/ Project level, Maintenance scheduling, Identifying and prioritization of rehabilitation, Regular performance monitoring, Maintaining and constantly updating the Data Base, etc.

Ministry of Road Transport and Highways has prepared a Maintenance Inspection Manual in the form of IRC guidelines. But different interpretations of these provisions may lead to a wide range of rating assessment for similar conditions. Therefore, there is a need for a comprehensive framework that covers all bridge conditions, yet is flexible enough for the evaluation agency to consider its own needs and willingness to invest resources, when necessary, in the evaluation investigations.

Like many other developing nations, in India too, there is a need for introducing bridge management programs, which provide for a long range bridge evaluation process that covers bridge condition, site traffic, maintenance and inspection cost.

Indo-BMMS is an interactive software and has been developed using VISUAL Studio 2008 for Front end, MS-SQL Server 2008 for Data base management and CRYSTAL Report for report generation. For the development of bridge/culvert inventory in GIS environment, commercially available software (ARC-GIS, ARC-IMS and ERDAS) have been used.

Flow chart of the work of development of BMMS in GIS Environment for Maintenance of Bridges is given in Fig.1. In developing this system, a comprehensive methodology has been adopted on the basis of the actual condition of the different components of a bridge and possible cost effective solutions for maintenance/ rehabilitation/ strengthening for allocation of budget on priority basis. The methodology and software **Indo-BMMS** is validated with respect to the data collected from district Ghaziabad in U.P., India.

Bridge maintenance management system consists of various components viz. Inventory of bridges, Inspection and assessment of condition of bridges, bridge maintenance/repair schemes, Assessment of requirement of funds for each bridge and prioritization of rehabilitation/maintenance of bridges on the basis of safety, cost and socio-economic benefits. The developed bridge maintenance management system **Indo-BMMS** provides information on possible scheme of maintenance and



helps to allocate the budget to a particular bridge in a road network for its maintenance in a scientific manner.

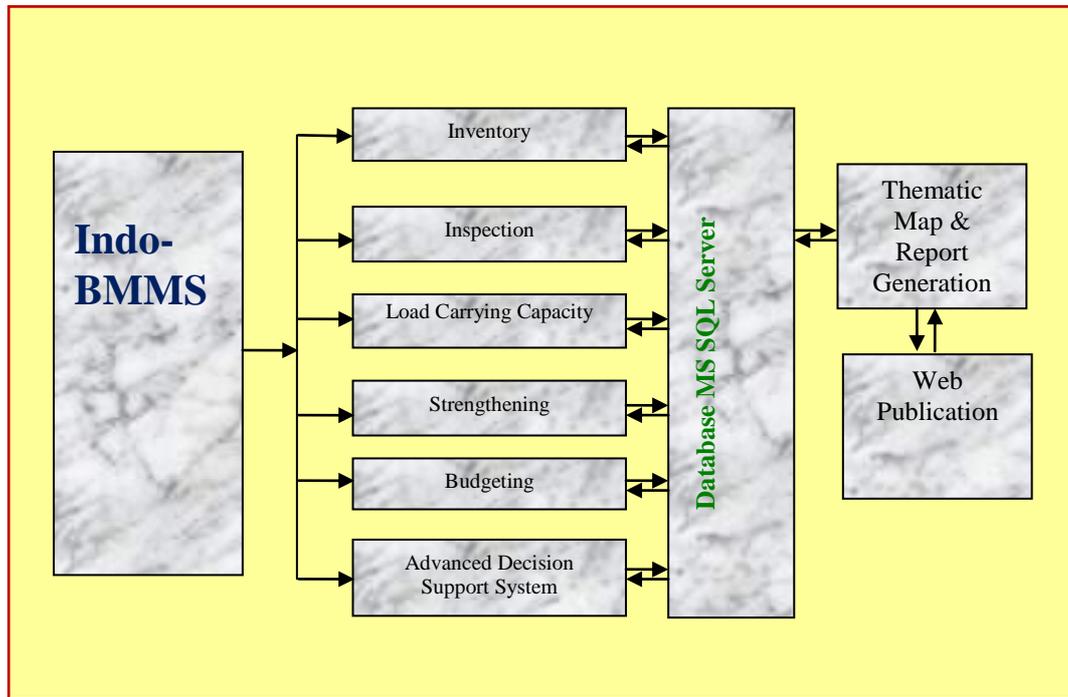


Fig.1 Flow Chart of Bridge Maintenance Management System in GIS Environment