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## Ecobridge - Railway Bridge Management System for the Future

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Jan Bien, born 1950, received his civil engineering and Ph.D. degree from the Wroclaw University of Technology. Since 1993 has been responsibly for elaboration of the BMS for the Polish State Railways. Since 1997 has been involved in the UIC ECOBRIDGE Project.

### Summary

The paper presents a preliminary conception of the ECOBRIDGE (ECONomical BRIDGE) System which is elaborated by the Technical Subgroup Bridges (7J22) of the International Union of Railways (UIC). The main objective of the project is a cost-effective bridge management system which could be adapted by all interested railway organisations for international integration of the railway transportation systems in the 21st century.

**Keywords:** bridges; management systems; expert systems

### 1. Introduction

The ongoing development of the railway infrastructure, its greater complexity and the growing expectations of its users require a higher standard of the RBMS. In addition to the technological advancement of the bridge engineering another urgent need arises, namely making the systems intelligent by equipping them with the ability of learning, recognising, concluding, and even choosing and achieving goals. To meet the needs of many railway organisations the Technical Subgroup Bridges (7J22) of the International Union of Railways initiated in 1997 the ECOBRIDGE (ECONomical BRIDGE) Project. The members of the group represent Banverket (Sweden), NS (Holland), PKP (Poland), Railtrack (United Kingdom), SBB (Switzerland) and SNCF (France).

Presented below a preliminary conception of the ECOBRIDGE System [7] is elaborated on the basis of 10-years experience of the Bridge Group of the Wroclaw University of Technology.

### 2. Objectives and scope of the project

The main objective of the UIC 7J22 project is elaboration of a system which could be adapted by all interested railway organisations for international integration of the railway transportation systems.

ECOBIDGE should provide the tools for:

- assessment, monitoring and prediction of technical condition and serviceability of existing railway structures;
- assurance of traffic safety and service parameters required by the customers;
- optimal use of available maintenance funds;
- collection and processing of administrative, technical and economic data;
- knowledge representation in the system.

ECOBIDGE tools should enable an individual treatment of each bridge structure on the basis of all data and knowledge collected in RBMS. Because of the international nature of the railway systems ECOBRIDGE should lead to a compatibility of all Railway Bridge Management Systems.

### 3. ECOBRIDGE architecture

Four main interrelated parts of the proposed ECOBRIDGE system can be distinguished:

- organisation of bridge management;
- scientific and technical basis of the system;
- knowledge-based computer system (Fig. 1);
- bridge staff (system users).

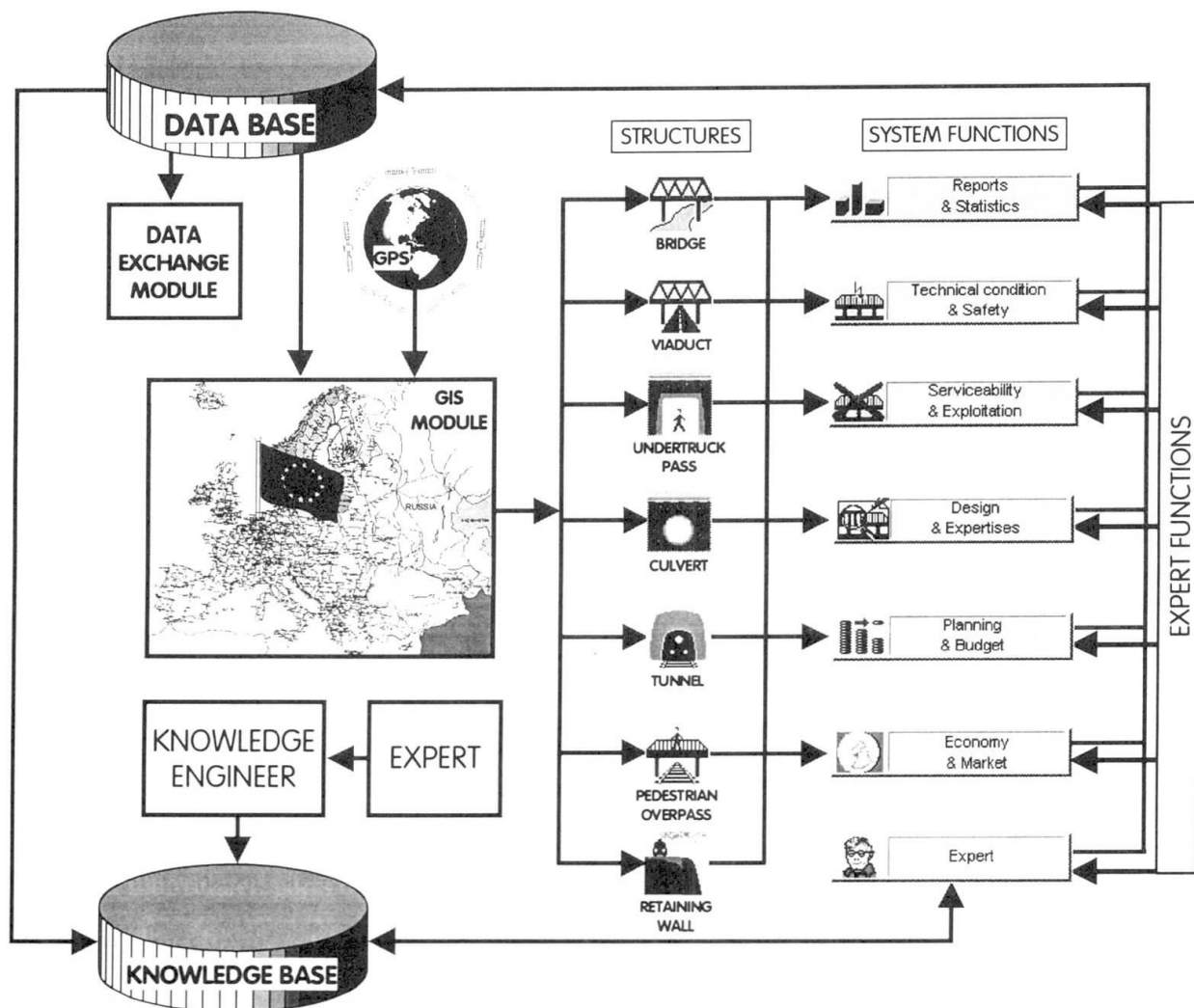


Fig. 1 Functional scheme of the computer part of the ECOBRIDGE System

### 4. Conclusions

Integration and unification of the bridge management systems are the most significant processes expected in the near future. Development of the systems should be stimulated by the international co-operation.