

A GIS-Based Integrated Infrastructure Management System

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SUMMARY

The infrastructure departments of the Portuguese municipalities need to make great efforts in beginning or continuing to use advanced information technology tools to increase institutional productivity and effectiveness in managing their municipal infrastructures. Nowadays they use or are beginning to use independent management systems for each type of infrastructure, i.e., road pavements, bridges, signs, water pipelines, sewer pipelines, parks, etc. In the future, they need to begin the development of an Integrated Infrastructure Management System (IMS). This paper focuses on the issues and needs that emerged from some studies developed by the authors involving the implementation of transportation management systems in local municipalities. This paper first introduces and discusses the functions of various participating divisions inside a municipal department of infrastructures. Then, the paper identifies the issues and needs that must be fully understood and considered in the development of an Integrated Infrastructure Management System. Doing so involved determining and standardizing an effective base linear referencing system (LRS) to meet its needs, standardizing data terminology, determining the shared data needs of the several divisions inside the department of infrastructures, and developing a comprehensive database design with focused attention given to the types of data analysis functions performed by each division. The paper includes the application of the IMS in road maintenance management and road safety management. The two sub-systems, a road maintenance management system and a road safety management system use the same base linear referencing system. In both sub-systems, in order to handle dynamic segmentation, the road network model is composed by road segments with (x, y) coordinates and measure (m) values.

The final section of the paper comprises a synthesis of the conclusions reached so far and a statement of prospects for future research.