

R&D PROJECT



COMPANIES

COMSA
FHECOR Ingenieros
Consultores
TECNALIA
MAPEI

BUSSINESS AREAS

Infrastructure area
COMSA, S.A.

DURATION

2015-2018

BUDGET

1.029.534,30€

KEYWORDS

Management structures,
preliminary diagnosis, BIM
methodology

COORDINATOR

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EXTERNAL FUNDING



Title of the project

Sistema inteligente, sostenible e integrado de gestión de estructuras

Acronym

SISGES

Content of the project

In recent years, there has been a shift from a virtual absence of maintenance of structures to a situation where there is an awareness of the need for maintenance and where many administrations and concessionaires have systems in place to carry out such maintenance.

Current practice is based on establishing an inventory of structures and carrying out inspections. However, further improvements in the systems are essential in order to make the huge infrastructure stock sustainable.

The final objective of the project is to develop an integrated management system that facilitates rational decision-making for an adequate distribution and forecasting of the funds available for maintenance and repair of existing structures, with both technical and management profiles in mind and with a level of development far superior to the systems currently in operation.

General objectives

- Development of a tool to obtain preliminary diagnoses of the state of a structure from its 3-D scan.
- Integration of BIM methodology in infrastructure management.
- Definition of structural monitoring strategies with very low maintenance costs that make it possible to evaluate the state of infrastructures in real time.
- Development of specific software to obtain different information on the infrastructure depending on the profile that uses it (management or technical), in order to speed up the decision-making process.

Results and conclusions

Studying the state of structures is essential for safety. For this purpose, LIDAR scanning systems are used with different methods on different platforms such as aerial, vehicle, tripod and satellite. After scanning, a system for the identification of potential damage is carried out using two strategies; isolated point clouds and point clouds by comparison.

A very relevant aspect of this project is the use of mathematical algorithms and intelligent analysis of the available information in order to automate non-trivial tasks such as failure detection and structural health estimation.

Using the SISGES system, a field test has been carried out on a railway bridge in Bolueta. Different sensors have been used for this purpose. The sensor readings are displayed in real time on a web page. The results obtained are analysed and their normal distribution is calculated.

An example of how the SISGES system helps to better understand the structure is the study of the influence of one variable on another one, which in this case was between temperature and displacement and was 30%.

It has been possible to identify some improvements. These are protecting the sensor devices from climatic effects, dimensioning the solar system, improving the signal reception levels and restoring the activation threshold of the accelerometers.

In summary, the workflow of the SISGES system can be summarised as follows:

- Creation of record and definition of bridge characteristics in the database
- Exporting the information collected in the database to the FHp system
- Creation of the calculation model