

The Functionality Assessment of Geodetic Monitoring Systems for Analyzing Structural Elements

Krzysztof Karsznia, Janina Zaczek-Peplinska, Sławomir Łapiński and Waldemar Odziemczyk (Poland)

Key words: Deformation measurement; Engineering survey; Risk management; measuring systems; sensors; deformation measurements; integrated systems; structural monitoring

SUMMARY

Geomonitoring and structural monitoring systems currently play a crucial role in comprehensive facility risk management - both at their implementation and subsequent maintenance. Especially in the era of dynamic development of BIM (Building Information Modelling/Management) technologies, such systems allow for precise and systemic management of building objects and stand a part of the modern investment process. The knowledge base created during their practical implementation is the core of current systems, ensuring the safety of structures and a proper construction process of the erected buildings. This fact is of particular importance in construction works, sometimes very technologically advanced structures - high-rise, industrial or public objects. In addition to assessing newly constructed structures, it is also possible to research the impact of external conditions on the entire investment process - environmental, geological or geotechnical.

Structural monitoring systems are also a part of a thriving, dynamically developing industry in civil engineering. For many years, we have been observing an intensive increase in the number of available solutions, companies offering similar services, as well as tailor-made systems supplied by particular manufacturers. Nevertheless, such solutions are mainly limited to closed environments aimed at specific instrumental solutions and software. In this respect, there are practically no solutions with an open structure or open-source. Moreover, the possibilities offered by manufacturers - modules, functions and procedures are usually not in line with the real challenges posed by a specific facility. These factors create an actual demand for flexible, mobile and fully scalable systems best adapted to essential needs.

In the presented elaboration, the authors have analyzed the geoinformation solutions available on the geoinformation market and systematized them in terms of their functionality. The study allowed for developing a prototype solution integrating the work of sensors (mainly land surveying

instruments) within the frame of a newly developing geoinformation platform. The general assumption is to ensure the long-term operational stability of reflectorless total stations in terms of full laser-scanning and automatic triggering of measurements and data reception in the open transmission protocol.

The Functionality Assessment of Geodetic Monitoring Systems for Analyzing Structural Elements (11414)
Krzysztof Karsznia, Janina Zaczek-Peplinska, Sławomir Łapiński and Waldemar Odziemczyk (Poland)

FIG Congress 2022
Volunteering for the future - Geospatial excellence for a better living
Warsaw, Poland, 11–15 September 2022