

# Towards a Geometry-Oriented Construction Process in Structural Engineering

Wolfgang Niemeier, Germany

**Key words:** Laser scanning, construction process, quality requirements, real-time geometry information, terrestrial laser

## SUMMARY

At present, in a typical construction process for an office building the role of geometric quantities is limited. Of course the task of setting-out main axis, individual positions and elevation information in different levels are tasks for surveying engineering, but during the construction process itself the surveying engineer is not involved adequately. During the last years there is a tendency to require higher quality standards, to ask for more automated processes and to use intensively prefabricated elements. All these requirements ask for better and continuously available geometry information and by this for a stronger participation of the surveying engineer, who has to be part of the construction team. But the surveying profession is not prepared for these tasks. Therefore, efficient and innovative geodetic methods have to be developed to make complex geometry-information available in real time on a construction site. At first new concepts have to be developed together with civil engineers, to define the geometrical requirements and the specification of "real time" in a construction process. In this paper the concept of "Reference Points" will be introduced, already known in other industries as adequate tool for a common geometry basis. More automated processes require the development or adaptation of geodetic sensors and processing procedures. Within this paper a first concept is presented to use a Terrestrial Laser Scanner for "Simultaneous Positioning and Setting-Out", which allows to position this surveying instrument within a build environment almost automatically and then to give adequate information for the next construction steps continuously.

## CONTACT

Prof. Dr.-Ing.  
Head

Institute of Geodesy and Photogrammetry  
Technische Universität Braunschweig  
Wolfgang Niemeier  
Technische Universität Braunschweig  
Gaussstrasse 22  
Braunschweig  
D-38106  
Germany  
+ 49 531 391 7474  
[w.niemeier@tu-bs.de](mailto:w.niemeier@tu-bs.de)