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# Application of fiber-optic curvature sensor in deformation measurement process

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## Abstract

In this work an experiment performed in laboratory conditions, for the purpose of comparison of multiple methods for one-dimensional (1D) deformations detection, is described. The fiber-optic curvature sensor (FOCS) method was applied as the primary one. Geometric leveling, accelerometer measurements of acceleration, and angular shift measurements using tiltmeter were used for comparison and calibration. Static and dynamic tests were performed independently, followed by evaluation of the acquired results. Based on the presented results of sensor performance, new possibilities arise for geodetic profession and implementation of new technologies in structural monitoring of the buildings.

**Keywords:** Fiber-optic curvature sensor; Static and dynamic test; Digital level; Tiltmeter; Accelerometer.

## 1. Introduction

Deformations are the changes of:

- Building construction and its environment, occurring during the building construction and use which may jeopardize building stability,
- Ground (landslides, Earth crust displacement).

Deformations occur because of internal and external forces, such as changes in mechanical (physical) properties of construction elements due to the aging (material fatigue), wind influence, changes in groundwater temperature and level, tectonic and seismologic influences, dynamic and static building load,

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