

Modern approach to control and nondestructive testing methods

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Abstract

The paper briefly describes modern methods and systems for precise deformation measurement and monitoring applied to bridges, high-rise buildings, tunnels and undergrounds, land-slides, mines, ski-lifts and nuclear power plants. The most space is dedicated to modern cable-supported bridge monitoring. With a structural monitoring system, including appropriate software, risks are reduced as data analysis can be used to more fully understand the current and future implications of structural movements.

The other described set of modern NDT methods, applicable to various structures and materials, is based on contactless ultrasonic technique, that do not require traditional ultrasonic coupling and contact requirements. The non-contact sensor technologies are of special importance to process control and for defect detection e.g. in fiber placed composite structures, weld inspection and pipeline in-service corrosion inspection. The new non-contact ultrasonic testing methods using laser ultrasound and air/gas coupled ultrasonic transducers enable in-situ evaluation of composite process such as fiber placing.

In paper is presented Raman scattering too, the well known and diversified spectroscopic method. It is used for impurities identification and their mapping and damages detection in industry and transportation. It is also useful for mechanical stresses measurements in integrated circuits, where X-ray diffraction is not applicable. It is an irreplaceable method for stresses measurement in silicon and stresses mapping in composites and carbon materials.