

# Use of terrestrial 3D laser scanning technology for examination of transportation structures

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## Abstract

The article considers the possibilities of using ground-based laser scanning technology in solving problems of surveying transport structures (bridges, roads, tunnels, culverts, retaining walls, etc.) located on the territory of the Russian Federation.

Difficult access conditions to structures, often requiring the use of scaffolding or the use of a rope method of insurance (industrial mountaineering), significantly increase labor intensity and reduce labor safety when performing simple tasks. Existing models of laser scanners allow to collect data in the absence of direct operator access to both the measured objects and the scanner itself.

**Keywords:** structure examination, bridge inspection, survey, terrestrial 3D laser scanning, heavyweight vehicle

## 1 Introduction

3D laser scanning technology has become widely used as a data collection tool for building BIM models and is often considered from the point of view of building complex and extended high-precision 3D models in solving problems of architectural design, preservation and restoration of architectural heritage, building control, monitoring of structures, etc [1]. Actually, a significant reduction in the cost and availability of technology allow to talk about the possibility (and necessity) of its mass application when performing work on the inspection of artificial structures, including bridge structures, which are characterized by a remote location, lack of access for direct measurement due to height or the presence of a stream. When developing normative documents regulating goals and objectives, as well

as recommendations for laser scanning as a part of the survey of structures in transport, the experience gained earlier on real objects and in real conditions is very useful.

The article presents 3 examples of the successful use of ground-based laser scanning technology in solving problems of surveying transport facilities.

## 2 Used equipment

### 2.1 Measuring equipment

As the main means of data collection, a compact terrestrial laser scanner Leica BLK 360 G1 is used, additionally equipped with a tablet computer for controlling data collection process, previewing the results and preliminary stitching of the model. The installation of the instrument on the surface of the ground or a bridge is usually carried out using a