

## 基于线结构光传感器的公路平整度测量系统

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摘要：

研制了基于线结构光传感器的公路平整度测量系统，用于测量铺设完成但未凝固之前的水泥路面平整度。该系统利用四套线结构光传感器来测量路面特定点的三维数据，通过激光测距仪获得距离信息，提出了一种测量系统运动颠簸误差修正方法，设计并研制了颠簸误差传感器。设计了一种新型全局平面靶标，可一步同时完成多个传感器摄像机内、外部参数和光平面位置参数的快速标定与坐标系统一。对系统进行了标定实验、精度验证实验及实际测量实验，实验结果证明该系统测量精度可达到0.2mm以上。

关键词：线结构光传感器；公路平整度；传感器标定；全局平面靶标；颠簸误差传感器

## A System Based on Structured-light Sensors for Measurement of Pavement Evenness

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**Abstract:**

The highway evenness measuring system based on the structured-light sensors was developed, which is applied to detect the evenness of the cement road that had been paved completely but not solidified yet. The system used four structured light sensors to achieve three-dimensional data of specific surface points, and got the distance information by laser distance meters. A method with a new turbulence error sensor was proposed to correct the turbulence error of the system. The system designed a new global plane target, which allowed multiple sensors to get their intrinsic and external camera parameters and light parameters just by one calibration. The coordinates was unified at the same time. Calibration experiment, precision experiment and actual measurement experiment were done. Those experimental results prove that the measuring precision of the system is better than 0.2 mm.

**Keywords:** Structured-light sensor; Pavement Evenness; Sensor Calibration; Global Plane target; Turbulence error sensor;

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