

Nondestructive Evaluation of Road Surface Defects with Infrared Thermography Technique

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The needs for road maintenance are becoming an important issue since the roads must bear heavy loads. In order to secure the driving safety of various vehicles, efficient management of roads and management of road surface defects is required. In this investigation, we studied how to effectively detect and manage defects on the road surface by applying various nondestructive evaluation (NDE) technologies centered on infrared thermography technology. Infrared thermography is a technology that provides a two-dimensional temperature profile by detecting infrared radiation emitted from an object, and may detect an abnormal state or a defect appearing on a road surface. In addition, by using infrared thermography technology, there is an advantage of knowing the presence of a substance causing a temperature difference or moisture present in the road. Moreover, it is possible to infer a potential road defect. In this research, infrared thermal imaging technology, vision image and line laser technology were also applied to improve the reliability of defect detection on the road surface. The line laser technique was used to analyze the road surface profile and to extract information about surface defects. In addition, the presence of defects could be confirmed by comparing the thermal image with the vision image. In this paper, we introduce algorithms and software production results for defect detection and the verification process. Finally, the validity of each NDE technology was verified through road tests, and it was found that the precise detection and analysis of road defects was possible.