

## OPTICAL STRUCTURE GAUGING

Accurate measurement of structure clearance is required to ensure that adequate clearances exist, and are maintained after track relaying, to guarantee safe running of existing services. The present manual and semi-manual surveying techniques are both expensive and slow. If continuous automated recording of structure clearance can be made at service train speeds, then sufficient data about existing clearances may allow the design of improved and new rolling stock by relaxing the current restrictions of length, width and height. The data will also assist in the movement of abnormal loads.

Previous investigations of non-contacting methods have considered ultrasonics and high-frequency radar, both rejected because of their inability to detect continuously all the surfaces found at the trackside. Other railway administrations use optical methods but almost invariably with cameras which are set up manually to photograph each trackside object.

This report investigates optical techniques with electronic recording of the data. A system based on readily available television cameras has been developed capable of consistently detecting all trackside objects within the range of interest. A duplicated-camera version has shown that a practical solution is possible without using laser light sources. It is, however, necessary to restrict operation to the hours of darkness. Further development may allow operation to be extended to the twilight hours, and most tunnels can be measured during daylight.

The results achieved are most promising, as consistent detection of all trackside objects has been obtained. Having proved the principle, further development is justified on camera selection, quantifying accuracy, and making corrections for vehicle roll.