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IMAGE-BASED DEFORMATION MONITORING OF STATICALLY AND DYNAMICALLY LOADED BEAMS

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Abstract. Structural health monitoring of civil infrastructure systems is an important procedure in terms of both safety and serviceability. Traditionally, large structures have been monitored using surveying techniques, while fine-scale monitoring of structural components has been done with instrumentation for civil engineering purposes. As a remote sensing technique, photogrammetry does not need any contact with the object being monitored, and this can be a great advantage when it comes to the deformation monitoring of inaccessible structures. The paper shows a low-cost setup of multiple off-the-shelf digital cameras and projectors used for three-dimensional photogrammetric reconstruction for the purpose of deformation monitoring of structural elements. This photogrammetric system setup was used in an experiment, where a concrete beam was being deformed by a hydraulic actuator. Both static and dynamic loading conditions were tested. The system did not require any physical targets other than to establish the relative orientation between the involved cameras. The experiment proved that it was possible to detect sub-millimetre level deflections given the used equipment and the geometry of the setup.

[Conference Paper](#) (PDF, 820 KB)

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