Pavement deflection measurements using DMS

Dynamic, high-quality measurements of displacements and strains can be made by using video-monitoring technology, even in situations that do not allow access or instruments.

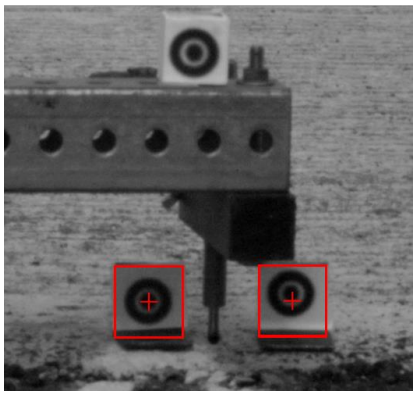
Imetrum's Dynamic Monitoring System (DMS) was used to record pavement deflections at the Minnesota Department of Transportation (MnDOT) pavement test facility, MnROAD. LVDT measurements are limited to vertical deflection and the pavement edge, whereas Imetrum's DMS system was able to measure the pavement deflection in the centre of the lane of travel (i.e. under the test vehicle).

Benefits:

- Accessible - quick and safe to set up with advantage of measuring hard to access areas
- Adaptable - measures multiple points without complicated installation or re-siting of sensors

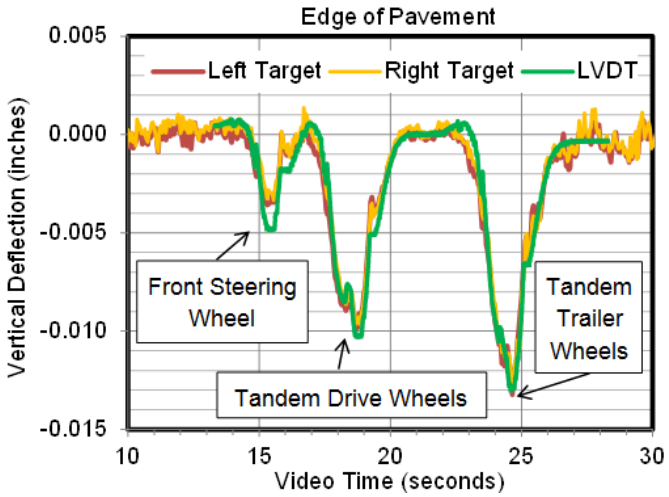
Equipment and Setup

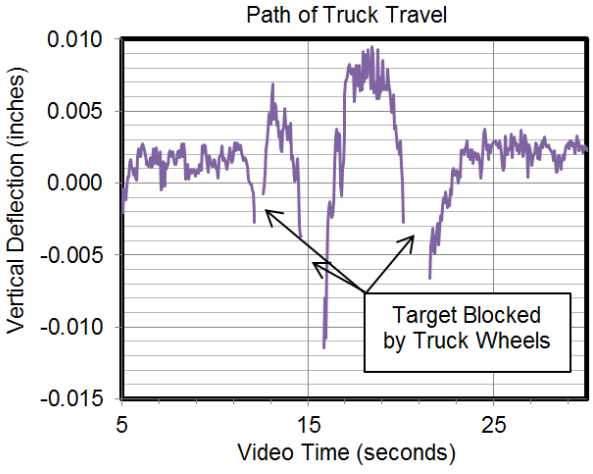
The DMS-measurements consisted of recording videos of the pavement under an LVDT as an 80,000 pound 5-axle tractor-trailer caused the pavement to deflect. Man-made targets were used to optimize measurement resolution. The targets were angle-iron sections with attached paper targets of pixelated bullseye patterns.The angle-iron sections were stuck to the pavement using two-sided adhesive tape. The paper targets provide a distinct pattern (even in changing lighting) with adequate area to track even small deflections of the pavement at the point of contact . The targets were distributed along the pavement edge next to the LVDT and along the test lane centerline to measure the pavement deflection under the truck. The video-measurment resolution was 0.0002 in (0.005 mm).



Testing and Results

Imetrum's DMS is capable of measuring the pavement response to the same accuracy as the conventionally used LVDT. It also has field advantages over the LVDT fixture in terms of field setup procedure and processing the video to interpret displacements. The system allows for virtually unlimited measurements to be made at any location in the video's field of view, even in the path of truck travel (as long as a suitable target exists). Measurement locations can be repositioned after the video is recorded and saved.





Perfect for…

a quick set up and unlimited measurements , even in the path of truck travel

Acknowledgement: DiRienzo A.L and Olson S.C *Pavement Deflection Measurements Using Video Monitoring Technology.*