Falling Weight Deflectometer (FWD)
Structural Pavement Evaluation

Structural Evaluation is a proactive study of pavement that enables clients and road owners to produce more realistic and accurate works programs, to better manage resources and to project more accurate budgetary requirements.

**Description**

Structural (FWD or HWD) Evaluation is the warning of failure for a section of pavement prior to it being detected visually.

A heavy vehicle bends the pavement introducing some permanent distress into the pavement structure, causing it to fatigue in bitumen and cement bound materials and deform plastically in unbound granular materials, including the subgrade.

The Falling Weight Deflectometer is the world standard dynamic plate bearing test for the non-destructive testing of the structural capacity of flexible pavement. The equipment uses up to nine seismic geophones to measure the deflection of the road pavement under the application of a known load from a predetermined height.

**Data Generated**

Provides a 7 point deflection bowl as a function of load. This is used to calculate layer moduli (stiffness), deflection, curvature and sub-grade CBR to Austroads Design Guide specification.

**Usual Operations**

Recommended network level study is a minimum of three test points per section at 75m intervals for both sides of the road - (normally 15-20 drops/km). Project level studies are conducted at 10-25m intervals or as directed by the client.

The FWD (or HWD) survey is a moving survey with a short duration stop at each test point location. The survey is normally conducted by one Senior Technical Officer supported by a traffic control crew. Typically each three-drop cycle takes approximately 70 seconds where the data is collected and recorded via an on-board computer system.

**Characteristics**

- Load Range: 70 - 240 kN
- Number of Deflectors: Seven (7)
- Resolution: 0.001 mm = 1 micron
- Duration of Test: 35 sec (typ. 3 drops)
- Max distance from load: (2.1 m)
- Single person operation
- Day or night operation
- High rate of collection

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Application in Pavement Studies

FWD / HWD equipment is used to:

- Assess the structural capacity of the road
- Assess the remaining life of the pavement under certain temperature, precipitation and traffic information
- Conduct ‘whole of life’ costs, Net Present Valuations (NPV) and economic cost benefit analysis of alternate pavement design
- Report layer moduli (stiffness), deflection, curvature and sub-grade CBR
- Produce pavement designs and rehabilitation strategies for selected rehabilitation sites
- Provide Quality Assurance assessment of recent works to ensure that they meet design life criteria
- Assess the impact of increasing road volumes, traffic types or load capacities on the life and quality of the pavement.

Falling Weight Deflectometer (FWD)

The FWD unit is designed for network and project level assessment of roads subject to daily vehicular and commercial transport.

FWD Load Range: 70 - 120kN

Heavy Weight Deflectometer (HWD)

The Heavy Weight Deflectometer is used for rigid pavements, airports and port authorities. Units are air-portable for movement to and from remote airstrips. It can be set up for assessing concrete slabs, interlocking blocks, in addition to heavy pavements including full depth asphalt.

HWD Load Range: 70 - 240kN

To meet clients’ requirements, we combine:

- Backanalysis of the deflection bowl data
- Residual Life of Airfield Pavement
- Increase Load Capacity

Dilapidation Surveys
(Pre and Post Construction Inspection)

A Road Dilapidation Survey is an inspection of roads prior to construction work commencing on the adjoining sites. It is an important risk management tool on major infrastructure projects.

Such projects may include highway widening projects where residential roads will be affected, major commercial development, rail works, airport upgrade projects and any other construction projects where roads will experience increase in the construction traffic and are likely to deteriorate or need major repair at the completion of the project.

PMS offers a cost effective package solution to assist major construction companies, road agents and owners, as well as Local Government in reducing risk and meeting the contractual obligations.

- **Stage 1: Pre Construction Inspection**: Records the existing condition of the pavement and forms the basis for future comparison.
- **Stage 2: Post Construction Inspection**: Records any observable change in the pavement condition.