

CIVIL ENGINEERING TECHNOLOGY 2

1.3.2 ROAD PAVEMENTS

ASSESSMENT OF EXISTING PAVEMENT



Main objective:

- Identify locations for maintenance work

Others:

- Supporting evidence for funding bids
- Claims against the Highway Authority
- Calculation of performance
- Etc.



Measurement techniques

Visual

Machine based

- Deflectograph
- Falling weight deflectometer (WFR)
- Ground-penetrating radar (GPR)
- Coring and testing pits



Visual surveys

Cheap and relatively quick

Reproducibility not always good

Will only identify surface defects

Cannot quantify pavement strength or life

Difficult to do at night

Increasing safety issues and delays to road users



Deflection measurement

Structural condition of a flexible pavement can be assessed by measuring its deflection under a standardised load

Depends on:

Pavement temperature

Pavement thickness

Traffic carried out since construction



Deflection measurement

Deflection beam (Benkelman beam)

1. The probe arm is inserted between dual tyres of a truck to provide a load of 3.175 tonnes
2. Initial value measured
3. The vehicle is moved forward just passed the beam tip
4. Again take a reading
5. Twice the difference in readings give the normal deflection
6. The vehicle is moved out of range of influence
7. A third reading is taken
8. Twice the difference between second and third readings gives the rebound deflection





Deflection measurement

Deflectograph

Travels at about 2.5 Km/h

Measures deflection under load of 6.35 tonnes with twin wheels

Analysis by comparison with charts showing deflection behaviour of documented sites

Requires knowledge of pavement thickness and traffic volumes

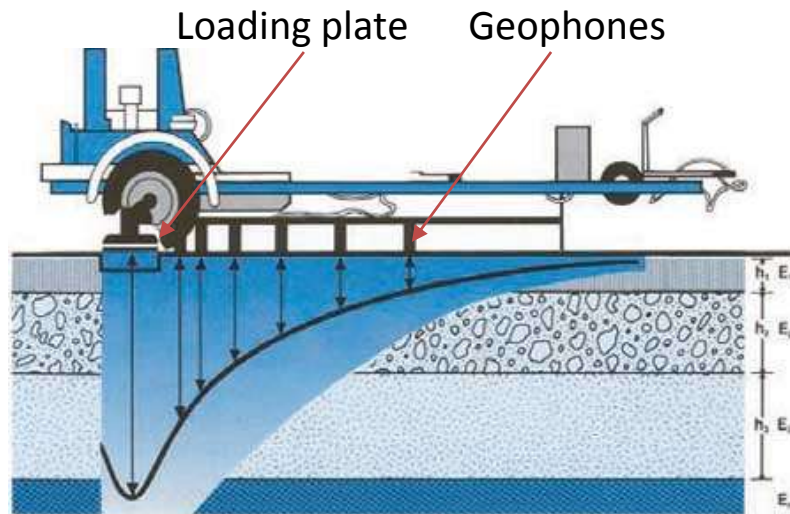




Deflection measurement

Falling Weight Deflectometer

Pavement deflection when dropping a mass
Can measure stiffness and capacity of
distributing loads





Ground-penetrating radar

Obtain information about a pavement construction and internal features

Enhance pavement condition information from other sources (visual, other tests, etc.)

Transmission of a pulse of electromagnetic radiation that penetrates as an energy wave

Through the different layers the velocity of transmission changes





Coring

- determination of layer and total pavement thicknesses
- determination of the material type and condition of the layers
- determination of the depth of cracking
- determination of the condition of rigid pavement joints
- provision of samples for compositional or physical tests



Testing pits

- obtaining bulk samples of the bound or unbound layers for laboratory testing;
- detailed examination of the unbound layers or subgrade including density measurement;
- investigating the causes of rutting;
- examination of joints in concrete pavements;
- investigating drainage problems within or beneath the pavement.