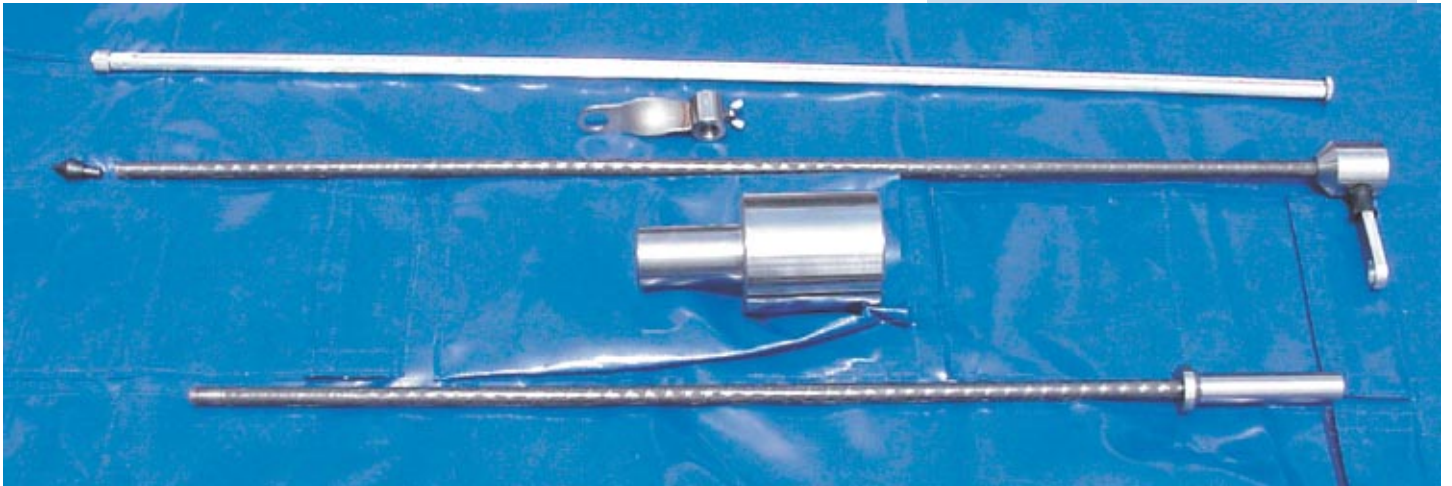


CSIR Licensed Products

Dynamic Cone Penetrometer

The **Dynamic Cone Penetrometer (DCP)** is a simple instrument widely used for non-destructive pavement evaluation as well as construction control. The instrument is low cost, portable and robust. It is, however, labour intensive and the readings are recorded manually.



The data captured in the field is fed into the DCP Analysis Software, the output of which includes pavement structural number, CBR, UCS and Elastic Moduli values, structural E80 capacity, deviation from standard pavement balance curve and redefined layer strength diagram.

Dimensions of DCP

Disassembled: 13x10x10in (110x25x25cm)
Approx. mass: 33lb (15kg)

Semi-Automatic Dynamic Cone Penetrometer (SA-DCP)

The **Semi-Automatic Dynamic Cone Penetrometer** enables a single technician to conduct non-destructive pavement evaluation associated with the traditional Dynamic Cone Penetrometer.

The instrument is mounted on a trailer and is computer controlled. Hammering is performed mechanically with the hammer lifted by a chain, which is driven by an electric motor. The rod is extracted by means of a hydraulic device. A rate of 24 blows per minute can be attained.

Data is captured automatically, the penetration depth being recorded for every blow. The data file created is compatible with the Division's DCP software, thereby reducing data-processing time. Outputs include pavement structural number, CBR, UCS and Elastic Moduli values, structural E80 capacity, deviation from standard pavement balance curve and redefined layer strength diagram.

The benefit of the SA-DCP is that it can be operated by a single technician, while maintaining the same testing standard as the manual DCP.

Dimensions:

Mechanical hardware: 100x20x24in (250x50x60cm)
Trailer: 126x63x28in (320x160x70cm)

Approx mass:

Mechanical hardware: 220lb (100kg)
Trailer: 510lb (230 kg)



THE SA-DCP CAN BE OPERATED BY A
SINGLE TECHNICIAN

CSIR Licensed Products

Road Surface Deflectometer (RSD)

Road surface deflection is a parameter of pavement structural response and is used to indicate the remaining structural life applicable to the test point.

Road surface deflection at the test point is measured by the Road Surface Deflectometer (RSD) beam to ascertain road surface deflection. The load used for testing is the standard 18kips (80kN) axle (9kips (40kN) dual wheel) and the test is performed at creep speed.

The encoder reads the distance traveled by the wheel in relation to the test point. Deflections can be measured to an accuracy of ± 10 microns (0.4mm).

Since the data collection is automated, the RSD can be used to obtain the entire surface deflection basin (256 data points per basin).

The RSD can be used in conjunction with a site data acquisition system or through portable interface capable of running off his own battery power or 12v cigarette lighter option. Data is stored on the coupled laptop computer.

Dimensions: 120x20x8in (305x50x20cm)

Approx mass: 23lb (10.6kg)



ROAD SURFACE DEFLECTOMETER (RSD)

The Multi-Depth Deflectometer (MDD)

Multi-Depth Deflectometers are used to measure “in-situ” elastic deflections and/or permanent deformations in the various pavement layers of a test section.

The basis of the patented MDD system is a series of Linear Variable Differential Transducer (LVDT) modules that are mounted on a rod in a 1.5in (39mm) diameter hole in the test section. Up to six LVDT modules can be mounted at various depths in the hole. The modules are anchored to the soil by way of small steel balls that are forced against the walls of the hole. The reference rod is anchored into the subgrade at approximately 10ft (3m) below the pavement surface. The LVDT module measures the displacement of the soil relative to the rod to an accuracy of 10microns. The top of the hole is sealed with a cap that contains the connector to the data acquisition system. The reference rod is connected to the anchor rod using a snap head connector so that the MDD modules can be removed for re-use.

Two or three MDDs, with modules at each layer interface, are normally placed in each HVS section. During a test the permanent deformation at each module is recorded, as are the elastic deformation basins under standard test wheel loads.

The plastic deformation data have been used to develop transfer functions relating load repetition to plastic strain in the road building materials. The deflection data can be used to determine the effective elastic moduli for each pavement layer.



MULTI-DEPTH DEFLECTOMETER (MDD)