

# **BENKELMAN BEAM TEST APPARATUS**

## **BE 98**

The Benkelman Beam is a widely used, portable device in civil engineering for evaluating the structural integrity of flexible pavements (such as asphalt roads) by measuring deflection under simulated traffic loads. Developed in the 1950s during the Western Association of State Highway Organizations (WASHO) Road Test, it operates on a simple lever-arm principle to quantify how much the pavement rebounds after a load is applied and removed. This helps assess pavement strength, identify weak spots, and inform maintenance or rehabilitation decisions.

## **PURPOSE**

- **Primary Use:** Measures rebound deflection of pavement surfaces under a standard wheel load (typically from a heavy vehicle like a truck) and tire pressure. This deflection data indicates the pavement's load-bearing capacity and potential for fatigue cracking or rutting.
- **Applications:** Non-destructive testing for roads, highways, and airport runways. It's cost-effective for field surveys but is labor-intensive compared to modern automated devices like Falling Weight Deflectometers (FWD).
- **Limitations:** Provides only a single-point deflection measurement (not a full deflection basin) and requires manual operation, making it slower for large-scale testing.

## FOLLOWING STANDARD

AASHTO T256, CNR No. 141, and NF P98-200-2

## KEY COMPONENTS

The apparatus is lightweight (often made of aluminum alloy for portability) and typically weighs around 15-20 kg. Here's a breakdown of its main parts:

Component	Description	Typical Specifications
Beam Arm	Long, rigid lever (fulcrum ratio usually 4:1 or 1:4 for amplification). One end contacts the pavement; the other measures deflection.	Length: 2.5 m (250 cm) Pivot in center.
Fulcrum/Pivot	Central support point that balances the beam, allowing it to rock freely	Adjustable height with stabilizing feet.
Dial Gauge/Indicator	Precision instrument to read vertical deflection at the beam's end.	Resolution: 0.01 mm; Digital or analog (horizontal/vertical reading).
Probe/Tip	Pointed end that rests on the pavement surface between vehicle tires.	Extendable; Back extension 1.22 m
Spirit Levels	Two bubble levels for ensuring the beam is horizontal during setup.	Integrated for alignment accuracy
Accessories	Carrying case, adjustable feet, and sometimes a vehicle load frame	Optional: Bearing plate for sub grade testing

