

# LIGHTWEIGHT DEFLECTOMETER

MODEL LWD-1

## Meets ASTM Standard E2835

Exceeds standard with use of Impact Force Transducer



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**Measure Field Soil Modulus to Ensure Soil Compaction**



## Features & Benefits

- Non-nuclear Methodology – avoid higher operating costs & handling risks
- Immediate stiffness/Young's modulus (E) results (english/metric)
- Measure actual Impact Force with in-line load cell to reduce inherent error in stiffness/modulus
- Displacement measured by geophone (vs. accelerometer) requiring only a single integration reducing error
- Steel spring dampener embedded in drop weight creates clean impact
- Simple design
- Easy to use single-person operation:
  - Rugged
  - Portable with quick attach/detach 2-wheel cart
  - Lightweight
- User-friendly WinLWD Acquisition & Analysis Software
  - MS Windows 10 Pro™

## QA/QC of field base & subgrade compaction

### Applications

- Road Construction
- Airport Runways
- Railway Beds
- Overlot Fill Grading
- Parking Lots
- Earth Retaining Walls
- Earthen Dams



## Options



*Two additional radial geophones allow for two layer analysis by AASHTO Odemark Method of Equivalent Thicknesses approach*

- Add-On Impact Weights available as follows:
  - 5kg
  - 10kg
- Geophone arrangement for two layer analysis
- Base Plates available in the following diameters:
  - 100mm
  - 150mm
  - 200mm
  - 300mm



## Laboratory

The laboratory option is a compact apparatus with a lighter weight to match loading pressure and impulse duration time in Proctor molds to in situ field testing for determination of the target soil modulus ( $E_{LWD}$ ).

### Olson LWD QA/QC Implementation Procedure:

The Olson LWD-Lab unit is used along with a standard or modified Proctor mold compaction test to determine the optimum moisture content, the maximum dry density, and the Target  $E_{LWD}$  value. These three values should be established for each soil material. Once in the field, the compaction acceptance criteria is based upon adequate control of the moisture content (typically  $\pm 1 - 2\%$ ) and exceeding the threshold Target  $E_{LWD}$  value (typically 95% of the Target  $E_{LWD}$  value) during in situ LWD field testing.

From the DOT sponsored Pooled Fund Study at the University of Maryland, there are two methods of test presented suitable for DOTs to adopt. These methods are:

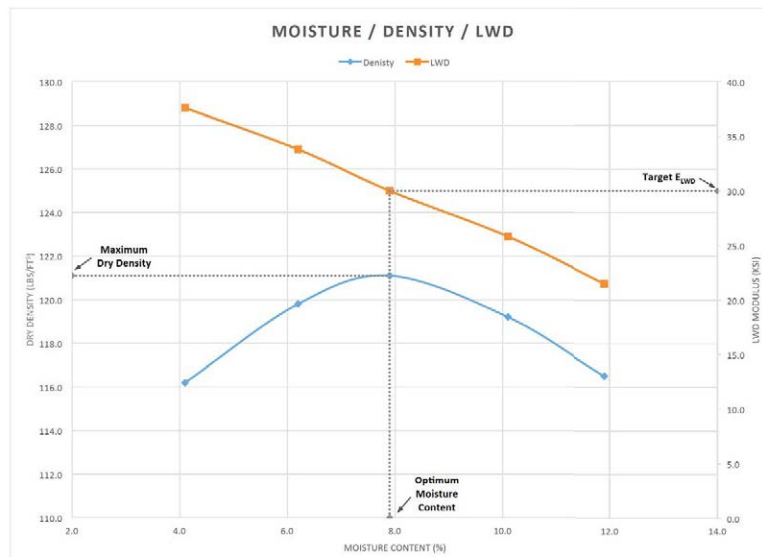
- I Laboratory Determination Of Target Modulus Using LWD Drops On Compacted Proctor Mold
- I Compaction Quality Control Using LWD

Alternative LWD implementation procedures typically use a field control strip with precisely controlled moisture and full compaction to establish the target or threshold  $E_{LWD}$  values.

The field measured  $E_{LWD}$  values can then be used to verify the adequacy of the pavement design by the pavement design engineers. Using LWD provided modulus and moisture content from field samples, our LWD plots ensure the Target elastic modulus was achieved.



WinLWD software provides force, displacement, stiffness, and modulus values in real time during field and laboratory testing.

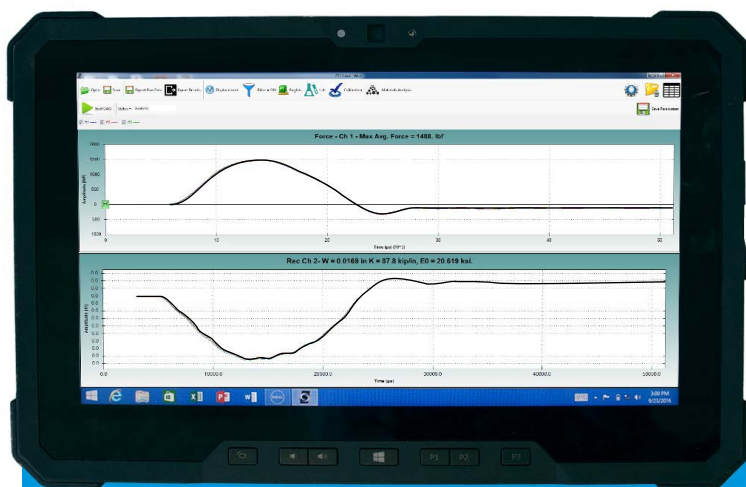


This plot shows how the optimum soil density/moisture content plot is used to establish the target soil modulus value,  $E_{LWD}$ , using the Olson LWD-Lab unit.



LWD-Lab unit is shown ready to test a sample in a Proctor mold.

# LWD-1 Specifications



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QUALITY ASSURANCE  
OF  
EARTHWORKS  
PROJECTS  
QUALITY CONTROL

## Specifications

	Field	Lab
Impulse Loading	6.9kN (1550lbs)	1.7kN (390lbs)
Total Weight	27kg (59lbs)	13.2kg (29lbs)
Height	1.25m (50in)	0.9m (36in)
Impact Weight	10kg (22lbs)	3.6kg (8lbs)
Drop Height	600mm (24in)	250mm (10in)
Impulse Duration	15-20ms	15-20ms
Two-Wheel Cart	5kg (11lbs)	N/A
Electrical		
Data Channels	2 or 4	2
Input Power	USB Powered Control Box	

## About Olson Instruments

Headquartered in Wheat Ridge, Colorado, USA, Olson Instruments specializes in **Nondestructive Evaluation** equipment for the civil engineering industry. We are an established manufacturer of sensors and data collection systems since 1993.

Olson Engineering Inc. specializes in **Nondestructive Evaluation and Internal Condition Assessment of Civil Infrastructure** throughout the world as well as **Geophysical Services** for engineering purposes.

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