

FWD and GPR

Integrated data collection and storage provides the most accurate road assessments available



Integrated System:

FWD manufacturer Foundation Mechanics has integrated the GSSI RoadScan™ GPR system into their truck-mounted JILS FWD vehicle.

GSSI's 2 GHz air-launched horn antenna is used to resolve thin overlays, providing the highest resolution road data available.

The Benefits:

- **Cost Savings** – Coring costs are dramatically reduced. The dual purpose vehicle allows for simultaneous FWD and GPR data collection.
- **Safety** – Less time for personnel operating in dangerous traffic environments.
- **Data Integration** – FWD and pavement thickness data are integrated into a single database.
- **Data Quality** – Pavement thickness at each FWD location provides designers with the data they need to determine accurate design criteria.
- **Flexibility** – The FWD vehicle may be used for independent GPR surveys at highway speeds without the need or expense of traffic control.

GPR system is completely FCC certified for use in the U.S.



GSSI RoadScan System



Geophysical Survey Systems, Inc.
www.geophysical.com



Foundation Mechanics
JILS FWD System

The Need: To obtain and store accurate asphalt thickness at each FWD location

FWD's (Falling Weight Deflectometers) are used worldwide. This necessary tool provides the data required by design engineers to establish proper strategy for achieving desired load capacity.

Existing asphalt thickness data is essential to complement FWD information in order to provide the full picture of road structure. Asphalt thickness can not be determined by the FWD system alone and is typically obtained by sporadic coring.

Limitations associated with destructive coring include:

- **Accuracy** - The actual asphalt thickness under the FWD load plate is unknown and the thickness is assumed to be constant between cores. Using inaccurate layer thickness results in either under- or over-designed roads.
- **Expense** - Typical cost for a coring crew is \$2,000 a day.
- **Safety** - Coring requires traffic control and the personnel to work in a potentially dangerous environment.
- **Low data density** - It is common for a DOT to obtain FWD data every 2/10 of a mile, while only obtaining asphalt thickness data via coring once per mile. Only a point location is obtained.
- **Data integration** - The FWD and asphalt thickness data are not stored together.

The Solution: Integrate GSSI's RoadScan GPR system

Foundation Mechanics customized their FWD software program "JTest" to import the GPR information. JTest also displays and graphs the GPR data, performs statistical evaluations to confirm data integrity, calculates the layer thickness directly under the FWD load plate, and stores the FWD and GPR results in a single database that may be easily imported into other programs. The GPR data may be imported into the FWD database either during or after data collection.

GSSI simplified GPR data processing by developing an innovative technique called EZ Tracker. With this unique point and click method, the operator simply points and clicks in the desired area of the GPR data to construct a layer and obtain depth results.



Accuracy: 24 separate core locations tested

In a recent evaluation, 24 individual cores and 24 individual GPR scans were performed on two separate highways. In 12 of the locations, the asphalt was overlaid with a thin friction course (ACFC).

The asphalt thickness obtained from the actual core data ranged from 2.88 to 7.13 inches. The average difference in asphalt thickness between the measured cores and GPR calculated thickness was less than 4%.

Although occasional coring is still required to obtain material properties, the evaluation study concluded that GPR is a reliable method for obtaining accurate asphalt thickness without coring.



Robert Parrillo
Geophysical Survey Systems
North Salem, NH
800-524-3011
www.geophysical.com

Gary Sanati
Foundation Mechanics
El Segundo, CA
310-322-1920
www.jilswfd.com