

A Trip Through Time: It's Been a Bumpy Road



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SD Department of Transportation
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Three Sayings About Time

- It All Takes Time
- Time Flies
(when you're having fun)
- The Time is Now
- Sort of Like:
 - Where have we been?
 - Where are we now?
 - Where are we going?



AASHO Road Test (Ottawa, IL)



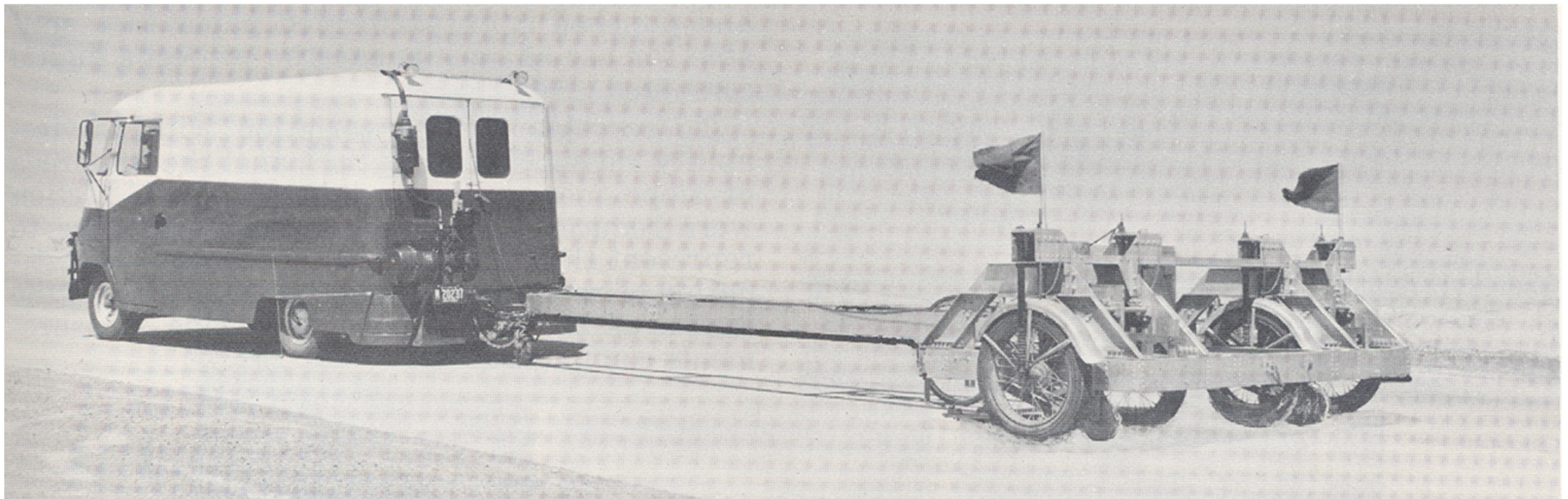
- Ottawa, IL
- 1956-1960
- Section of future Interstate highway

AASHO Road Test



- Military vehicles applied loads
- >1 Million axle applications

AASHO Road Test Longitudinal Profiler



AASHO Road Test Profile Charts

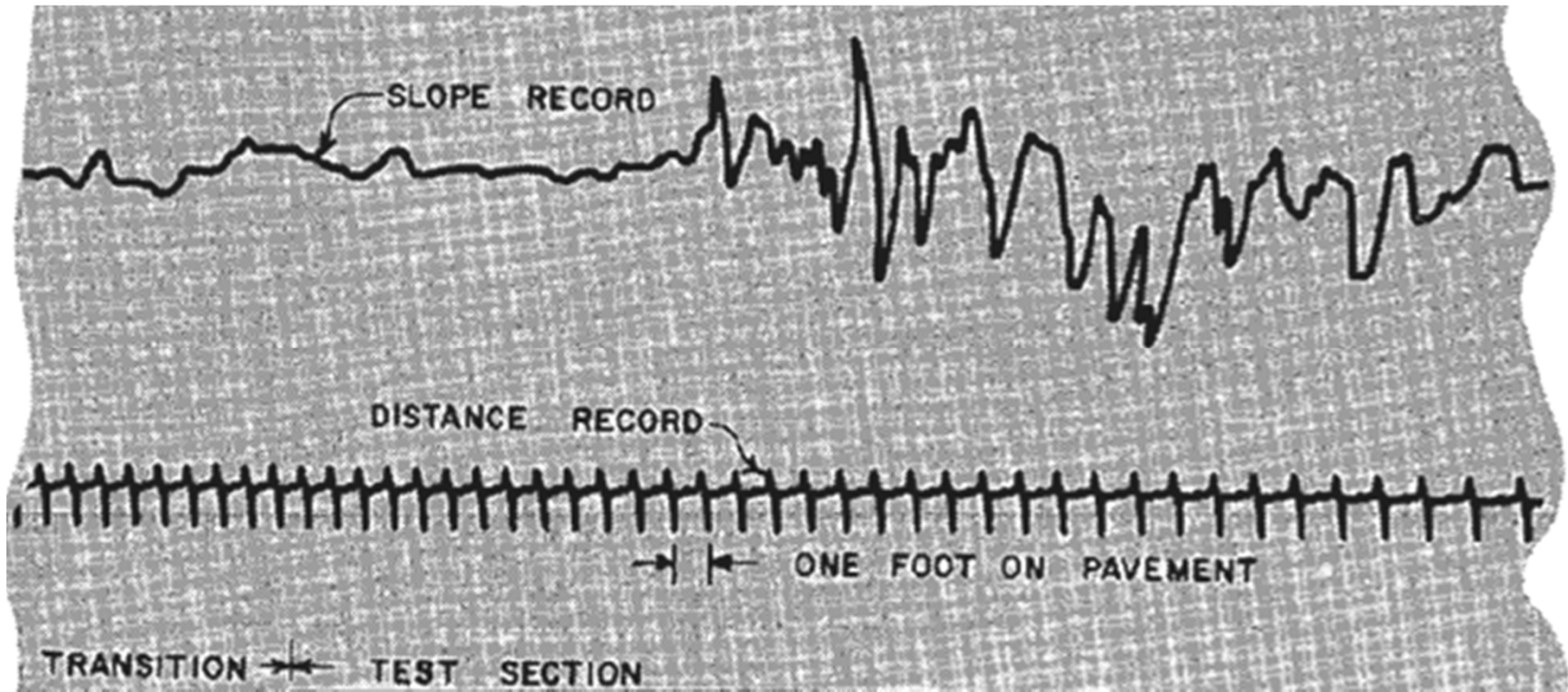
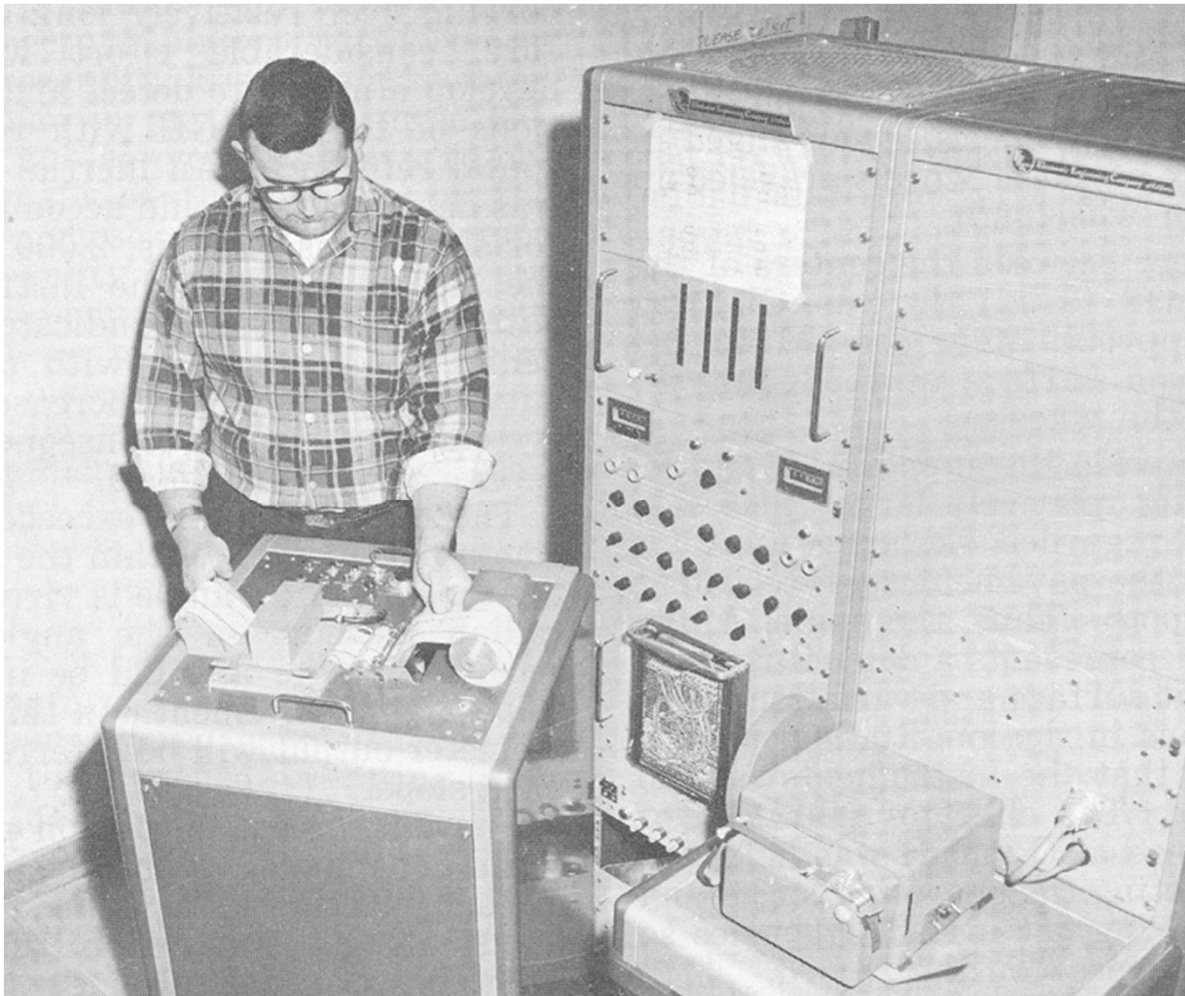


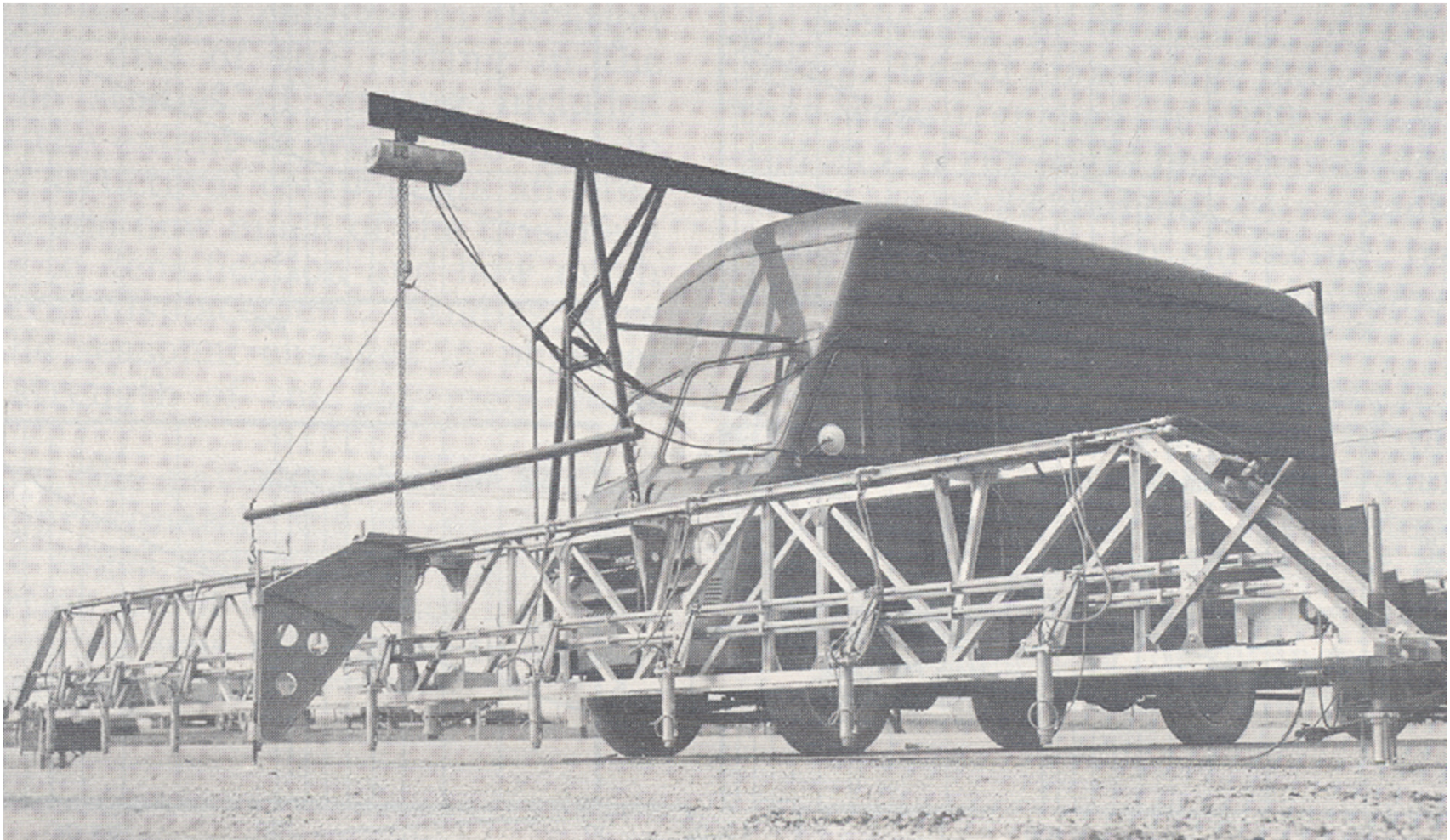
Chart Recorder Reader

AASHO Road Test



- Digitized paper & ink charts
- Manual interpretation persisted into the 1960's

AASHO Road Test Transverse Profiler

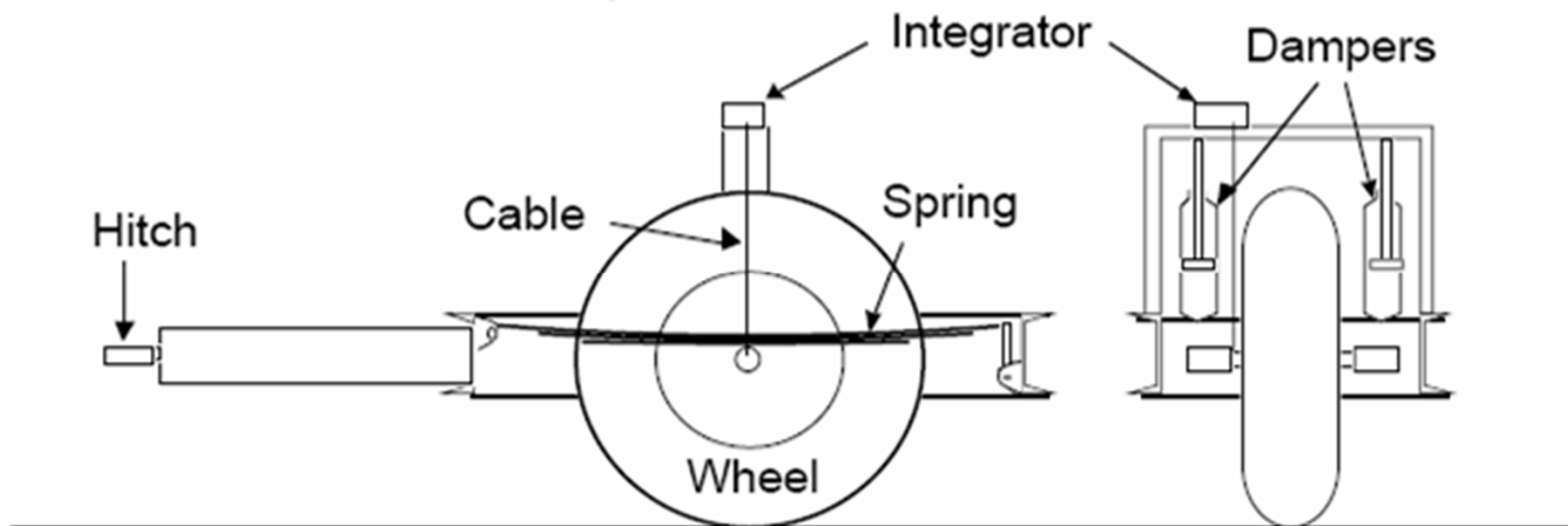




The Road Test Showed:

- Pavement condition (serviceability) deteriorated under traffic loading
- Most of the variance in condition could be related to variance in profile slope
- Measured roughness was a very good indicator of overall pavement condition
- Measuring roughness is demanding

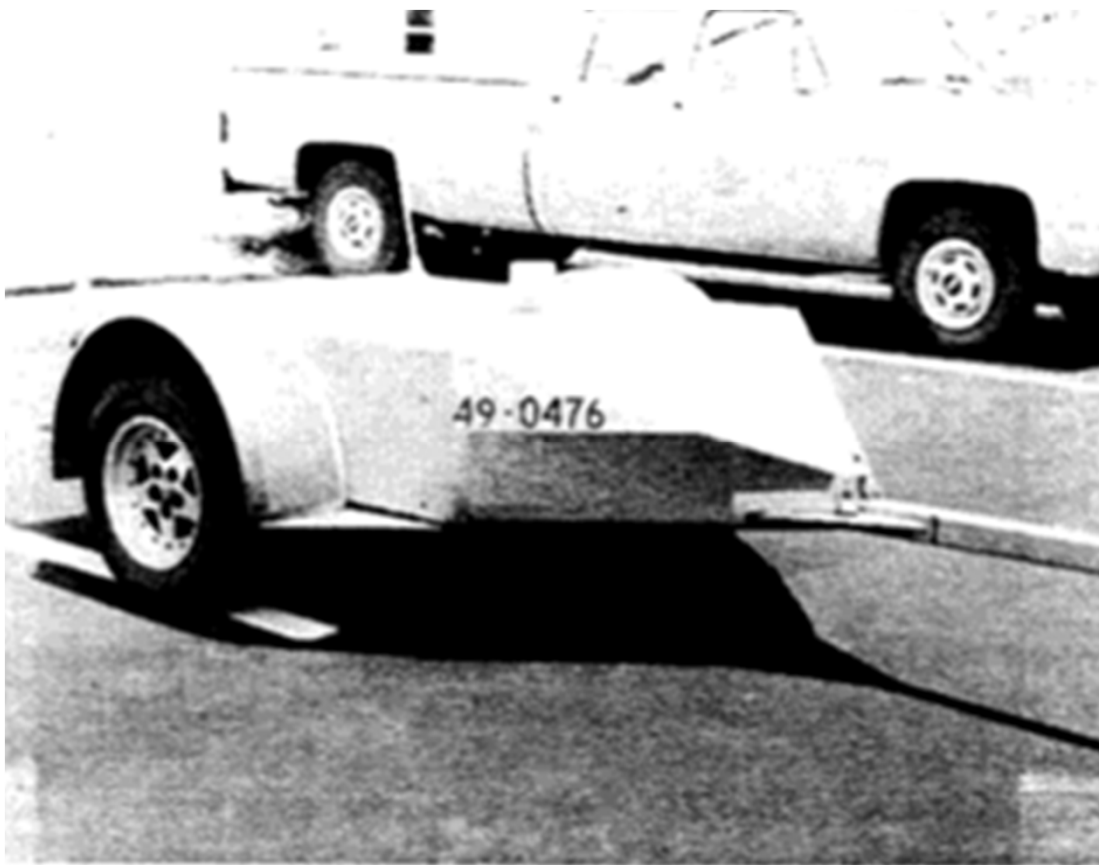
BPR Roughometer (1940's)



BPR Roughometer (1940's)



Mays Meter



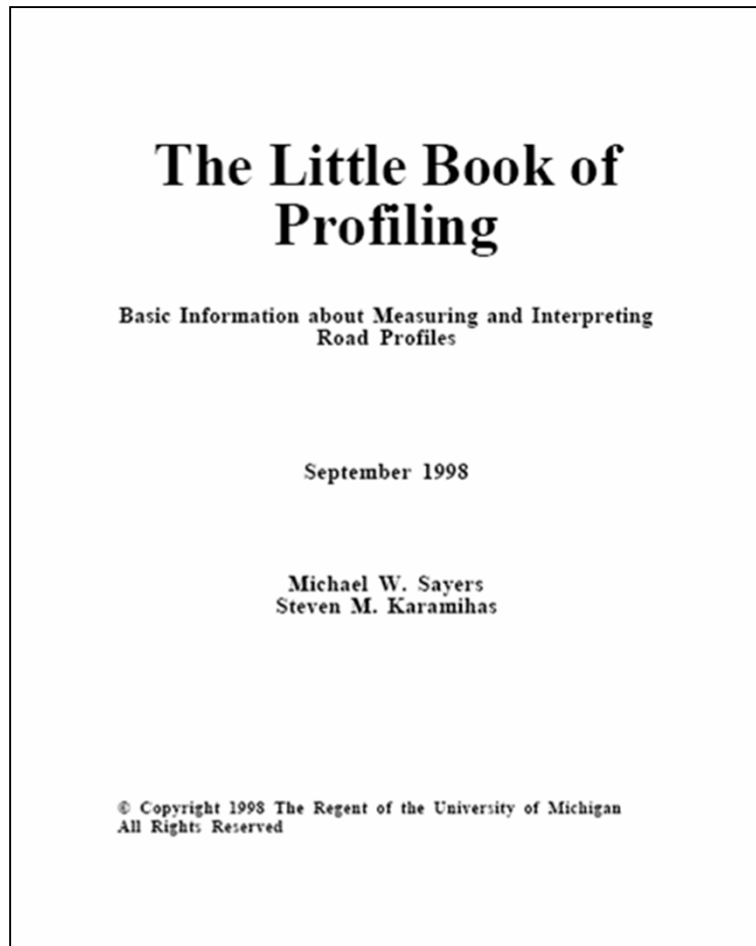
- Response-Type
- Annual (or more frequent) calibrations
- Labor-intensive

Minicomputer Era (1970s)

- ❑ Sped interpretation of measurements
- ❑ Originally lab-based
- ❑ Migrated to vehicle as size, power demand dropped



Little Book of Profiling



- Developed by Sayers & Karamihas (UMTRI)
- Provided clear, solid guidance to practitioners

Road Profiler Users Group (RPUG)

- ❑ Originally SD Road Profile
- ❑ Quickly included all technology and vendors
- ❑ Valuable forum for learning, sharing, advancing technology



Announcement

South Dakota Road Profiler Users' Group Meeting

Ramkota Inn
Pierre, South Dakota
November 14-16, 1989

What is the Road Profiler?

The South Dakota Department of Transportation developed a low cost, high speed road profile measurement system in 1982. Since then, SDDOT has used the Road Profiler to conduct statewide surveys of pavement roughness. In 1986, the Road Profiler was improved to measure rut depth as well as road profile.

Why Meet?

Several other states have built or purchased Road Profilers for their own use. This meeting will allow them to exchange technical information with each other and with other interested states. A Users' Group will organize and recommend future directions of Road Profiler development.

Who Should Attend?

Pavement managers and engineers responsible for measuring and reporting road roughness and condition should attend. States which own Road Profilers and states which need new road roughness equipment to meet HPMS requirements will benefit.

Where and When is the Meeting?

The meeting will be held in Pierre, South Dakota on November 14-16, 1989. Technical sessions will be at the Ramkota Inn and Convention Center. Field tests will be conducted on highways near Pierre.

How Do I Get to Pierre?

Pierre is served by Northwest and Continental Airlines. Service is limited, so make reservations early. SDDOT will operate a shuttle from and to the airport.

How Do I Register?

To register, contact Virginia Ripley at the Research Program of SDDOT. Call (605)773-3292, or mail the return portion of this announcement to the address indicated. Room reservations should be made directly with the motels. We encourage early reservations.

What is the Registration Fee?

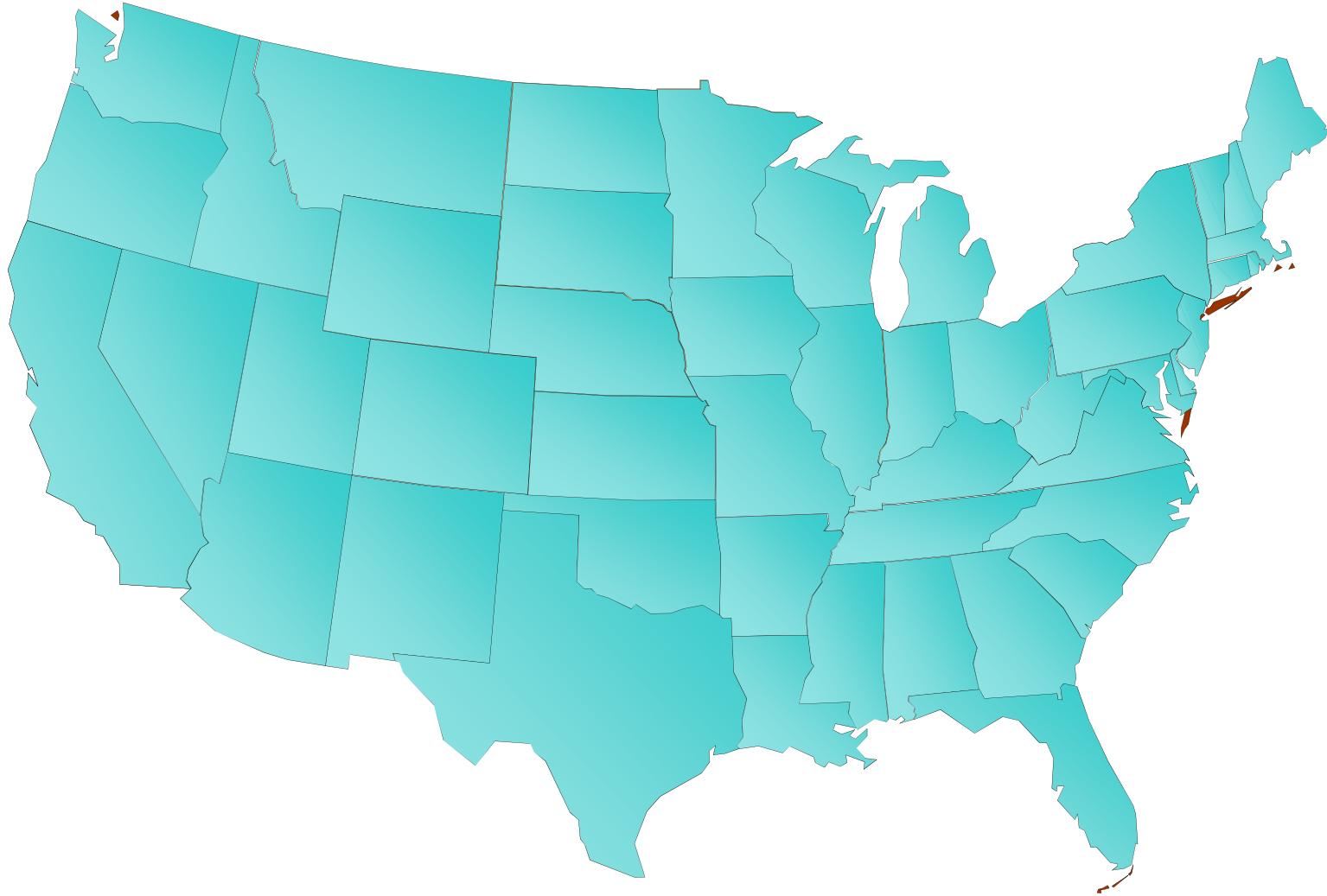
To encourage states to attend, no registration fee will be charged. The meeting will be supported by the South Dakota Department of Transportation and the Federal Highway Administration.

Any Questions?

Call the SDDOT Research Program at (605)773-3292.



A Team Effort—US & International



Inertial Profilers





Significant Accomplishments

□ Technology

- Sensors
- Multi-function Vehicles
- Sensor “Fusion”

□ Standards

- ASTM E950, others
- Indexes (IRI, RN)
- AASHTO

□ Active Vendor Base

□ Tools & Software

- Little Book
- ProVAL

□ Practical Application

- Emphasis on Pavement Smoothness & Quality
- State and National Network Assessment
- Construction Quality Control



Today and Tomorrow

- ❑ Limited Resources
- ❑ High Accountability
- ❑ Aging Infrastructure
- ❑ Preservation
- ❑ Sustainability
- ❑ Privatized Operation



Proposed State Performance Measures (to AASHTO Board of Directors)

- Highway fatalities
- Pavement smoothness on the NHS
- Square footage of structurally deficient bridges on the NHS
- Speed-based metric
- Speed and reliability on significant freight corridors



What We Need: Assured Measurement Quality

- Assured Measurement Quality
 - Among Agencies
 - Among Machines
 - All Surface Types & Textures
 - Consistent Over Time
- Definitive Reference Device
- Validation Facilities

Assured Quality: Benchmark Profiler



Assured Quality: Benchmark Profiler



Assured Quality: Potential Reference Profilers





What Else We Need

- Innovation
 - Technology (Inertial, Image-Aided, Other?)
 - Research: Pooled Efforts Required?
- Standards Updates
- Meaningful Analysis
 - Rural/Urban
 - More Data Elements
- Next Generation Workforce
 - People & Time
 - Expertise (Development, Operation, Application)

Questions?

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