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Intelligent Asphalt Compaction Analyzer

Project Team

Haskell Lemon Construction Company
University of Oklahoma
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Award

$200,000

A video-clip is available.

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The Intelligent Asphalt Compaction Analyzer Is a Roller Mounted Device

- **Continuously senses the amplitude and frequency of vibrations of the compactor**
- **Estimates, in real-time, the quality (compacted density, stiffness) during the construction of an asphalt pavement**
- **Key features are the real-time monitoring of the compaction progress over the entire pavement**

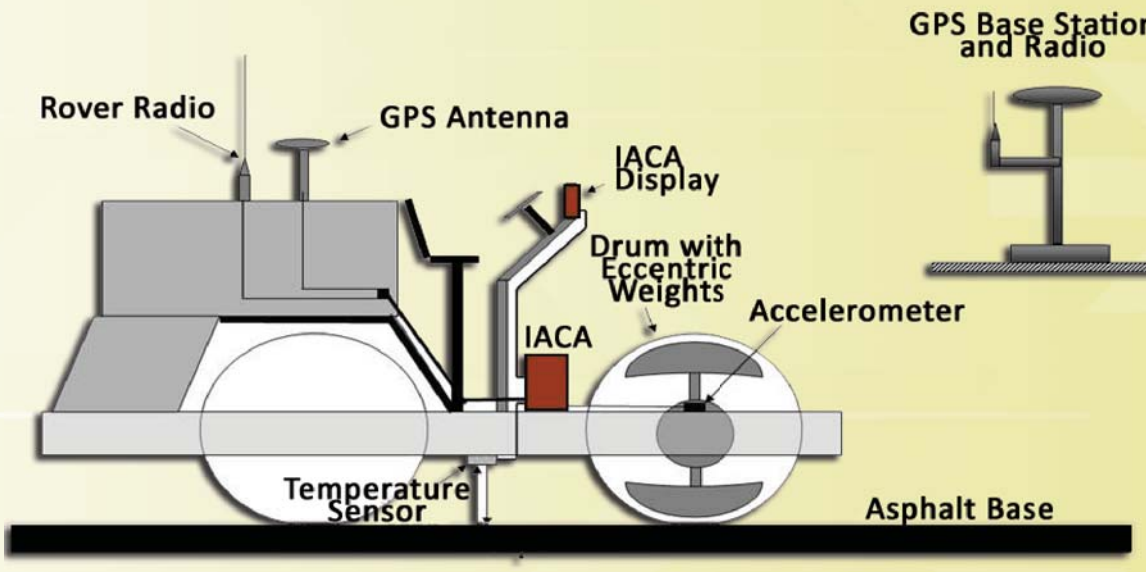
Need

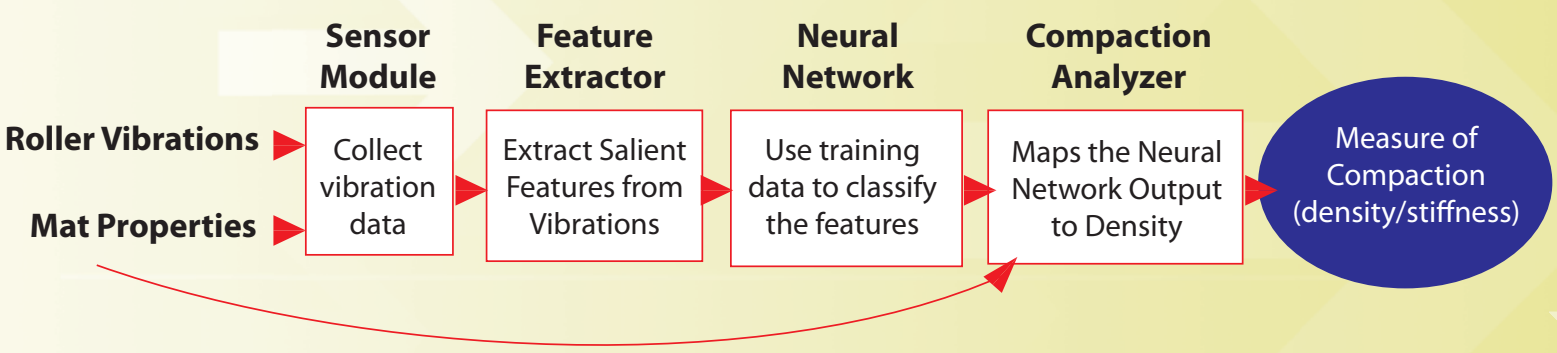
- Ruts, potholes, cracks and other forms of defects reduce the useful life of a pavement
- Improper or inadequate compaction is the most common cause of early degradation of asphalt pavements

Anticipated Advantages to Conventional Practice

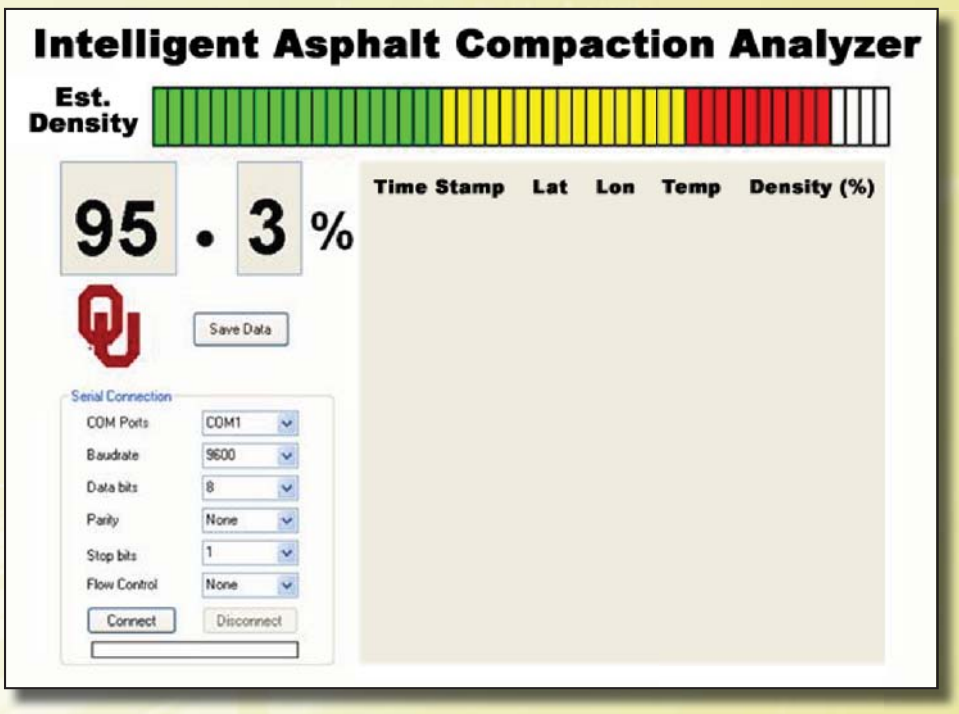
- Instantaneous and complete evaluation of the pavement being compacted
- Higher efficiency and increased productivity
  - Reduction in labor and fuel costs
  - Reduction in the number of conventional spot tests
- Higher adaptability of compaction process to suit thin/thick lifts, soft/stiff subgrades, etc.
- Better quality resulting from uniform and optimum compaction

Principle of Operation of the IACA



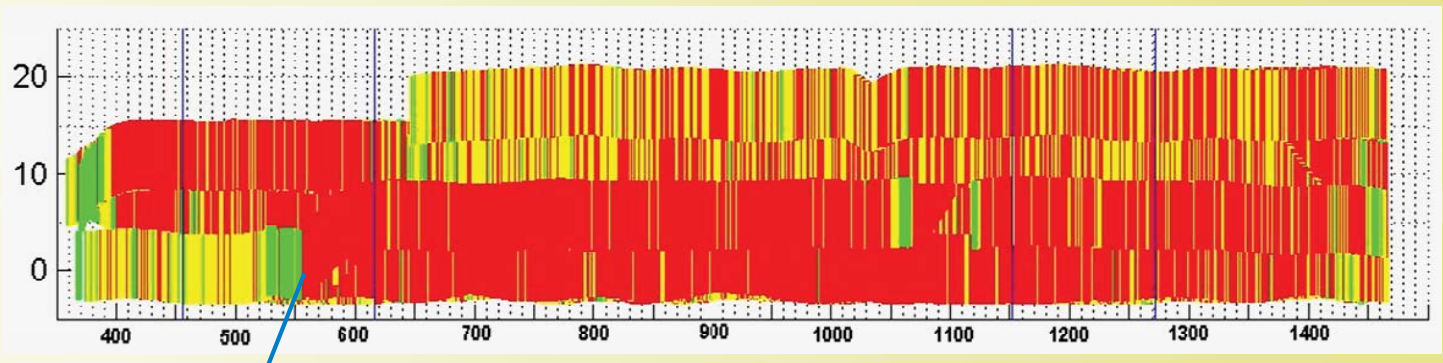


IACA User Display



The IACA display provides real-time information on the density and the mat temperature to the roller operator at each location on the pavement during each roller pass.

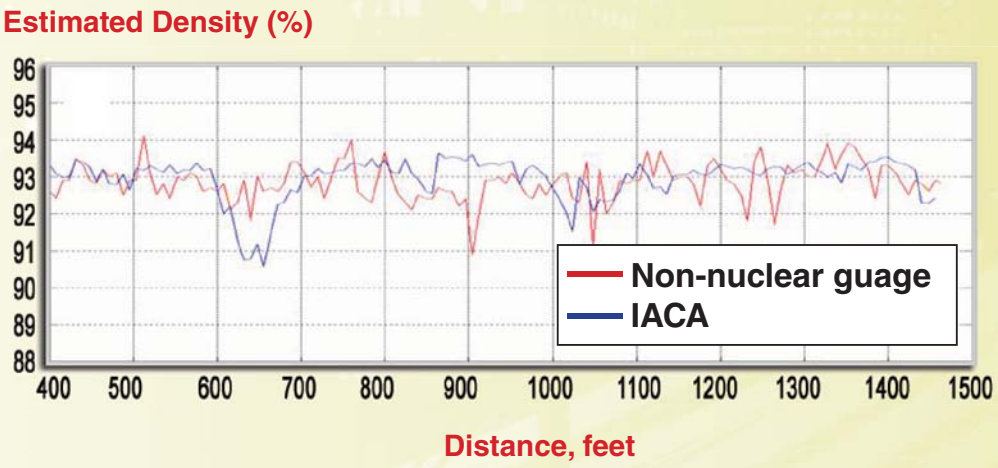
IACA "As-Built" Density Map



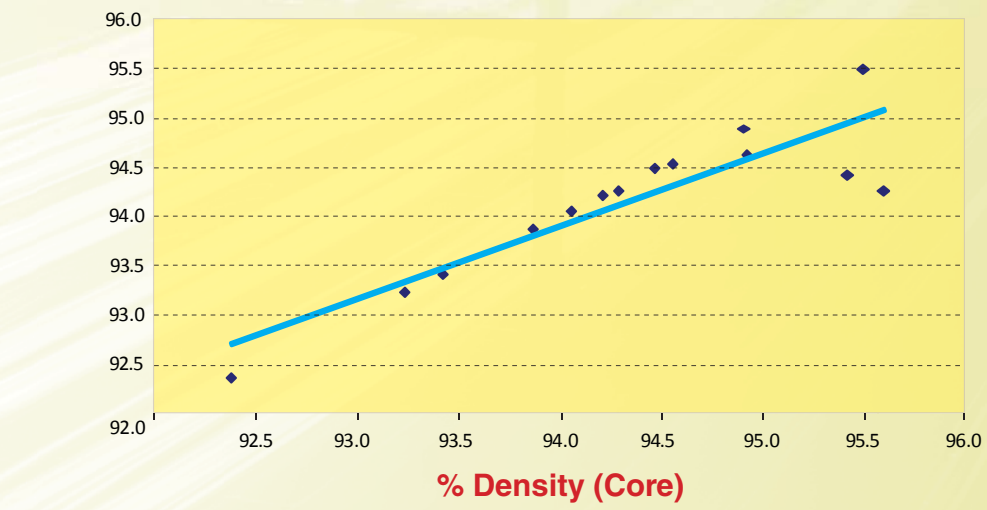
Concrete manhole covers

- **Density information from the final pass of the roller can be used to compile the final density of the entire pavement. The color-coded map (90%, 92%, 94%,) portrays the uniformity of compaction that was achieved.**
- **Areas in green indicate inadequate compaction or uncompacted areas resulting from relief features on the pavement surface).**
- **Uneven compaction can be investigated to determine the cause. In this case, soft subgrade had resulted in uneven compaction.**

Comparison of IACA and Non-nuclear Density Measurements



The density estimates of the IACA are comparable to those obtained by point-wise measurements using a non-nuclear gauge.



IACA vs. Core Density

The density estimates obtained using the IACA compare very favorably with density measured from roadway cores.