

Non-Confidential Description - PSU No. 1718
**“An Automated Asphalt Density Meter for Asphalt Paving Operations
Based on the Vibratory Response of the Compaction Equipment”**

Keywords:

Asphalt paving, road compaction meter, density meter

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Links:

[Inventor website](#)
[US Patent 6,122,601](#)

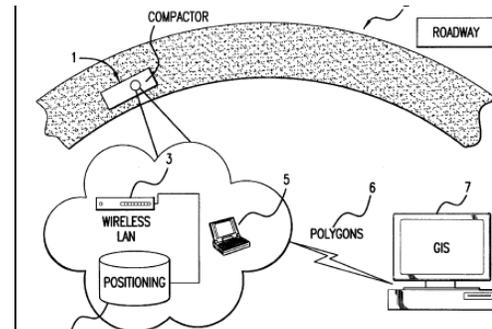


Fig 1: System of the invention

Background

In the construction of asphalt surfaces, the structural integrity of the asphalt directly corresponds to proper compaction. Surface undercompaction may lead to cracking, dropping off of shoulder, structural deformation, and poor resistance to moisture, while overcompaction may lead to pavement bleeding and softening. Successful compaction involves: the orientation of solid particles into a denser particle arrangement (thereby reducing the number of air voids); protecting the asphalt against further densification; improving sheer strength; and guarding the asphalt against water erosion. Various methods of determining proper asphalt compaction and programming equipment to yield optimal results began in the 1980s with the Compaction Documentation System (CDS). Superior technologies, such as laser positioning and GPS satellite readings, have since emerged, however these technologies are not without their own limitations regarding costliness, ease of use, and equipment alignment and accuracy. Because of the sensitivity of asphalt pavement integrity and the environmental stresses it must endure, precision methods of ensuring proper compaction are needed to optimize the longevity of constructed asphalt surfaces.

Invention Description

The disclosed invention is superior to existing roadway compaction technologies in that it produces uniform density of surface materials and employs a Geographic Information System (GIS) to record the location of each density measurement. The invention is equipped with a compaction density meter, a method for determining the density of the material during compaction, and a system for reading and recording density and physical location. The density meter includes a measuring device that generates signals representing a vibratory response produced by vibrations in the compacting equipment. These signals are then digitized and, along with the geographical positioning of the compactor, transmitted to a computer wherein the compaction of the surface is tracked according to its position and the number of coverages or passes. The components present in this invention can also be utilized for other compaction operations, such as roller compaction of concrete, pavement, soil, and landfills.

Advantages/Applications

- Produces more uniform density of compacted surfaces.
- Useful in applications including roller compaction of concrete, pavement, soil, and landfills

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