DRISI
Caltrans Division of Research, Innovation and System Information

Research Results

Comparison of New and Existing Caltrans Hopper Body and Tailgate Sanders

This task evaluated new technology sander/spreader equipment and compared them to existing Caltrans standard sander/spreader equipment.

Equipment

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Project Title:
Comparison of New and Existing Caltrans Hopper Body and Tailgate Sanders

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WHAT WAS THE NEED?

Caltrans has continuously sought new methods and equipment that increase the safety and efficiency of winter maintenance operations. Winter maintenance operations represent a significant challenge to the Department, and by implementing improved methods and equipment, Caltrans can realize operational and safety improvements, cost savings, and reduced environmental impacts.

The Department currently has several different types of sanders/spreaders in the fleet. To determine the most efficient and cost-effective equipment to move forward with in the long-term, Caltrans needed quantifiable results via testing. The testing compared a tailgate spreader, a standard V-box spreader, an Epoke spreader with directional cast, and a Henderson FRS with Direct Cast.

WHAT WAS OUR GOAL?

The main goal of this research was to compare the four different types of sanders/spreaders and determine the most efficient and cost-effective sanders/spreader.

WHAT DID WE DO?

Caltrans worked with the Advanced Highway Maintenance and Construction Technology (AHMCT) Research Center at UC Davis to conduct this research.

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The first part of this research was to form an advisory panel that would guide the research. This research panel met four to five times a year to discuss progress and procedures to ensure a successful evaluation. This advisory panel consisted of staff from UC Davis and staff from Caltrans Division of Equipment and the Division of Research, Innovation and System Information.

The four spreader types were:
1. Henderson FRS 2020,
2. Henderson FRS 2018
3. Henderson FSH
4. Epoke S 4900.

The first phase of testing was completed in December of 2018. The second phase of testing was completed in September 2021. The tests included testing both sand and ice slicer, both materials are used to prevent ice from forming on the roadway. The test methodology was based on Section 6.4.2 Dynamic Test Method of the European Union (EU) standard CEN/TS 15597-2:2012.

The testing was performed at a closed facility where each piece of equipment was used to spread material over a section of roadway that had a grid pattern painted on it. Each section on the grid was 1X2 meter. The material from each section was weighed and a density profile was created for each piece of equipment at different spread rates. A total of 128 tests were performed for the four pieces of equipment.

WHAT WAS THE OUTCOME?

The testing provided a detailed understanding of the spreading capabilities and limitations of the modern spreader technology as demonstrated by the Henderson FSH, Henderson FRS and the Epoke designs.

Conclusion from the testing:
- Based on observations and test results, it is likely that air turbulence at the rear of the spreader is a significant factor in the resulting irregular material spread patterns.
- Sampling at the 2-m increments over much longer distances will be required to fully capture any patterns that might be used to understand the characteristics of the spreader operations, such as auger or spinner speed variations, which is likely to be impractical.
- The Epoke spreader operates more consistently than the Henderson spreaders.
- The FRS and FSH do not spread consistently below 300 lb/lane mile.
- Based on observations, it appears that the Henderson machines may require a longer operating distance before entering the testing grid. This change in distance would allow the control system to stabilize the auger and spinner speeds.
- Manufacturer technical support continues to be poor. To maintain the capabilities of these spreaders, significant in-house engineering support will be required.

The research also suggested to develop a sanders/spreader testing specification that can be used in the purchase process and by customers to verify the capabilities of modern spreaders.

WHAT IS THE BENEFIT?

The benefit of this research was that Caltrans was able to see which piece of equipment had the most efficient spread patterns. The Epoke design performed the best during the testing.

The Epoke design will help provide material savings by having a more efficient spread pattern that uses less material while providing a more even spread pattern. This will result in less ice formation on the roadway and a safer environment for the traveling public.

Another benefit of this research is that Caltrans will be a leader in developing test standards for sanders/spreaders equipment.

LEARN MORE

Once the final report is posted, the Task Manager will provide a link.

IMAGES

Image 1: Images of the four sander/ spreaders used in this research task.