

Maintenance

**MAY 2019**

**Project Title:**

Evaluation of the Tow Plow Trailer System

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**Task Manager:**

Larry Baumeister

Transportation Engineer (Electrical)

[larry.baumeister@dot.ca.gov](mailto:larry.baumeister@dot.ca.gov)

## Evaluation of the Tow Plow Trailer System

This task purchased 2 Tow Plow Trailer systems for the purpose of evaluation. VikingCives, the TowPlow manufacturer, advertises that operating Tow Plow systems reduces the number of vehicles and drivers needed in multiple lane highway plowing operations.

### WHAT IS THE NEED?

Effective snow and ice removal is essential for keeping Caltrans roadways open and safe for the traveling public. Also, snow removal operations can be resource intensive for Caltrans. There is a need to investigate new equipment with potential for improving the efficiency of seasonal snow-fighting operations.

### WHAT WAS OUR GOAL?

The main goal of this research was to conduct an in-service evaluation, and determine the most beneficial configuration and application of the Tow Plow technology for Caltrans operations.

### WHAT DID WE DO?

Caltrans Division of Research, Innovation and Systems Information (DRISI) in partnership with the Advanced Highway Maintenance and Construction Technology (AHMCT) Research Center at UC Davis purchased two TowPlows from Viking-Cives for purposes of evaluation.

AHMCT worked with Caltrans Division of Equipment to purchase the first Tow Plow (TowPlow 1) for use in the 2012-2013 Winter Snow Season. TowPlow 1 came with a 1025 gallon tank for use with brine salt. AHMCT installed a Precise IX-101 data telemetry unit in the electrical enclosure on TowPlow1. The GPS system provides the TowPlow's location and speed information. In addition to the GPS data, the IX-101 has 2 input/output channels.



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One indicates whether the moldboard is in the retracted position and the other input registers when the trailer axle is in its stowed position. TowPlow 1 was paired with a 425 horsepower (HP) standard Caltrans plow truck.

AHMCT worked with Caltrans Division of Equipment to purchase the second TowPlow for use in the 2014-2015 Winter Snow Season. The Research Technical Advisory Group (TAG) for this research task recommended to purchase the second TowPlow (Tow Plow 2) along with a new 550 HP plow truck to ensure adequate power for use of the TowPlow on steep grades. This new truck was equipped with a hydraulic system that was more compatible with the Tow Plow than the standard Caltrans plow truck. TowPlow 2 came with a 7.8 yd hopper to spread material as well as a 225 gallon pre-wet tank. The new plow truck came equipped with a 9.5 yd slip in sander. A camera system was added to the plow truck to help with visibility when the TowPlow is in use. A laser visualization tool also was added to give the operator a visual cue if the Tow Plow trailer deviates from the stowed position for any reason.

## WHAT WAS THE OUTCOME?

TowPlow 1 was field tested for three winter snow seasons. Complications arose during the first season offfield testing. It was determined that changes were needed to both TowPlow 1 and the Caltrans Standard 425 HP plow truck. Hydraulic modifications to Tow Plow 1 were needed as well as a more powerful plow truck to help pull the trailer on the steeper grades. After hydraulic modifications were done, Caltrans was able to pair TowPlow 1 with a 475 HP truck for the second snow season. The second year of field testing showed that a complete overhaul of the hydraulic system on the standard Caltrans plow was needed to ensure proper operation of the TowPlow. For this reason in preparation of the third year of field

testing, TowPlow1 was transferred from AHMCT to Caltrans Division of Equipment (DOE). DOE made hydraulic modifications to both TowPlow 1 and the 475 HP truck. The Tow Plow and truck would now operate on a closed center hydraulic system replacing the Caltrans standard open center hydraulic system. Tow Plow 1 did not get a complete evaluation because of both truck/trailer modifications that were needed and minimal snowfall due to the drought in California.

Caltrans Division of Equipment staff performed an inspection evaluation upon receipt of TowPlow 2 and the new truck in January of 2015. It was determined that the new truck/trailer combo would exceed the maximum axle weight limits if fully loaded and modifications to both the truck and trailer were needed. The slip in sander was removed from the new truck. On the TowPlow 2 trailer the 225 gallon pre-wet tank was removed and the hopper was shifted forward almost 4 feet. These changes were completed in June of 2015. Because this research task ended before any field testing was done on Tow Plow 2, there was no evaluation done on TowPlow 2.

AHMCT has recommended to continue the evaluation of the Tow Plow Trailer System under a future research task. The future task would address modifications needed to the Tow.Plow system to ensure axle load limits are legal, as well as complete the evaluation of both TowPlow 1 and TowPlow 2.

## WHAT IS THE BENEFIT?

The potential benefit of the Tow Plow is the possibility it has to improve the efficiency of snow clearing operations. A more efficient snow clearing operation will help improve safety for both Caltrans and the traveling public.

## LEARN MORE

The final report documenting this research is available at

<http://ahmct.ucdavis.edu/pdf/UCD-ARR-15-09-30-01.pdf>

## IMAGES



A TowPlow system in its deployed configuration

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