

## RESULTS SUMMARY

A new decision support tool lets state DOTs compare efficiencies and life cycle costs of different snowplow types for specific plow routes, providing valuable information leading to real cost savings.

## PROJECT DETAILS

**Project Title:** Measuring the Efficiencies of Tow Plows and Wing Plows

**Project Number:** CR19-03

**Project Cost:** \$138,986

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# COMPARING COSTS AND EFFICIENCIES OF TOW PLOWS AND WING PLOWS

## Need for Research

Winter maintenance is resource-intensive, and finding efficient and effective plowing equipment is a priority for transportation agencies. While front-mounted snowplows are a staple of many fleets, the range of plow types and configurations has expanded to include alternatives such as wing plows and Tow Plows. A wing plow is an additional plow blade that extends to the vehicle's side, while a Tow Plow is a proprietary trailer-mounted plow that is towed behind a plow truck.

Designed to clear more snow than front plows alone, Tow Plows and wing plows can help agencies provide an increased level of service. However, these accessory plows add to a vehicle's cost, so agencies typically deploy them strategically based on road type, geometry, traffic volume and other factors. To get the most value from their investments, Clear Roads member states needed a way to quantify and compare the efficiencies of more advanced plow configurations on different types of roadways.

## Objectives and Methodology

The goal of this project was to provide winter maintenance managers with a comparative understanding of the costs and benefits of Tow Plows and wing plows as well as guidance on purchasing, deploying, and maintaining this equipment.

Investigators first reviewed relevant research and product information about Tow Plows and wing plows. They then surveyed state DOTs about the types of plows they use, their operating costs, and operational considerations including truck requirements, equipment storage needs, and repair frequency. Working closely with the Clear Roads project subcommittee, researchers developed a test plan, identifying plow configurations and roadway types and geometries to evaluate. Finally, they developed a sophisticated decision support tool to simulate the efficiencies of different plow configurations based on actual operational factors.



This Tow Plow has a 22-foot snow clearing path, about twice as wide as that of a standard front plow. Some Tow Plows are bidirectional, providing additional options for clearing the roads. (Photo courtesy of Caltrans.)

## Results

The researchers' efforts culminated in a spreadsheet-based tool that state DOTs can use to compare the efficiencies and life cycle costs of deploying different plow types on a specific plow route. Users input details such as route length, number of lanes, lane width, and presence of elements such as ramps, merge lanes, and roundabouts. The tool calculates comparative measures of plowing efficiencies and the average life cycle costs of these plow types and configurations:

- Conventional-width front plow or underbelly plow (base case for comparison).
- Front plow with a right- or left-side wing plow.
- Double wing plow.
- Single-direction Tow Plow.
- Bidirectional Tow Plow.
- Single-direction Tow Plow combined with a wing plow.
- Telescopic head plow.

The spreadsheet tool was developed using real-world cost and plow performance information from state DOTs. Users can adjust the tool's default values to better match their own equipment, and then input details about a specific plow route to be evaluated. The resulting efficiency comparison is based on time to execute the chosen route, level of service, labor costs, and width of pavement cleared in a single pass. The life cycle cost comparison includes maintenance, operational, and storage considerations.

Because equipment costs and service lives vary, the tool does not provide specific cost and performance calculations for individual plows. Instead, the tool provides average values for each plow type. This allows state DOTs to more generally compare cost and performance across a spectrum of plow types and configurations for specific roadways.

To help agencies get the greatest benefit from the decision support tool, researchers developed an interactive user's guide. In addition, a companion [Best Practices Guide](#) will help agencies understand the considerations for purchasing, deploying, and operating specific plow types.

## Implementation and Benefits

The decision support tool provides a strong starting point to help state DOTs make investment decisions on snow clearing equipment. Agencies can use the tool to compare cost-efficiency across multiple plow types for a specific route, or to identify the routes (and roadway geometries) where cost-efficiency is highest for a specific plow type. These quantitative comparisons can help agencies visualize and simplify complex investment decisions.

Agencies can download the tool and user's guide on the [Clear Roads website](#). Researchers also created a [webinar](#) to help agencies understand and implement the tool.

"This tool will help states identify the most efficient snowplows for specific roads, potentially saving significant resources. It's a great first step toward putting the right equipment in the right place."

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