

Engineers Shovel Their Way through Snow-Plowing Problem

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The average person probably doesn't realize that snowplowing is a complex operation involving the interaction of several variables. To simplify this process, two University of Missouri engineers have developed models that integrate all the factors in an effort to make the service more efficient, while reducing time and resources.

The pilot study focused on the local plowing winter maintenance operations in Boone County, Mo. The county has 23 snow-plow trucks parked in five depots across the county.

The target plowing time is two hours. Using engineering principles and assuming an average Missouri snowfall of three to four inches, the MU engineers optimized the snow-plowing service using five depots and only 16 trucks and beat the target time by a half-hour. This new method has the potential to cut costs by up to 30 percent.

“There's been a lot of work on the individual components of snow-plowing routes, but never has there been a study that connected all the components,” said James Noble, associate professor of industrial and manufacturing systems engineering in the College of Engineering. “We developed a mathematical model for the snow-plowing problem, but it is so complex that it would take a computer many years to solve it for realistic-sized problems. We then developed a simplified approach to the mathematical model so we could create a solution for this problem.”

This method could be used for scenarios other than Missouri

snowplowing. Other states could apply this method with their own individual variables to optimize the operations for their particular state. The routing problem is generic, and similar models could be used to optimize highway stripping, mowing and herbicide operations, Noble said.

“This study focused on an average snowfall for Missouri,” said Wooseung Jang, associate professor in the department of industrial and manufacturing systems engineering in the College of Engineering. “A bigger or smaller snow would be a different issue. This method may not apply to California or Canada, but will work for other Midwestern states.”

The next phase of the project is currently underway and is expanding the model to other counties in Missouri. The Midwest Transportation Consortium and the Missouri Department of Transportation provided funding and participated in this study.

Source: University of Missouri

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