

1990: The Snowplow Problem

The solid lines of the map (see **Figure 1**) represent paved two-lane county roads in a snow-removal district in Wicomico County, Maryland. The broken lines are state highways. After a snowfall, two plow-trucks are dispatched from a garage that is about 4 miles west of each of the two points (*) marked on the map. Find an efficient way to use two trucks to sweep snow from the county roads. The trucks may use the state highways to access the county roads.

Assume that the trucks neither break down nor get stuck and that the road intersections require no special plowing techniques.

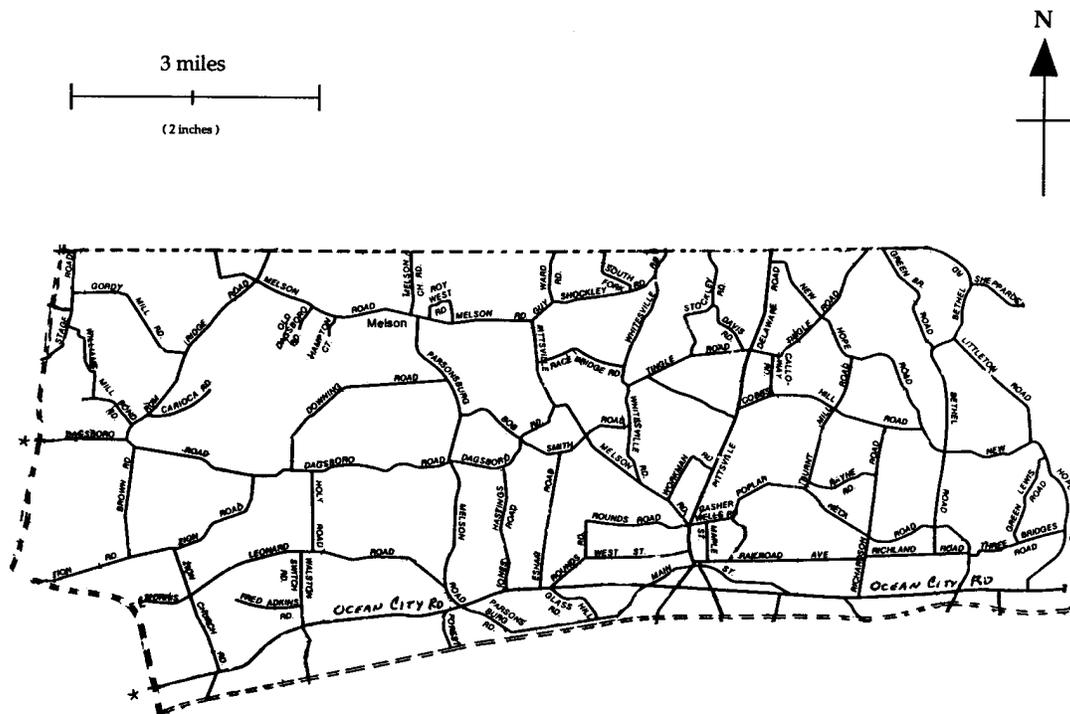


Figure 1. Roads in Wicomico County, MD.

Comments by the Contest Director

Most of the Outstanding teams characterized the problem as the construction of two Euler circuits with lengths as equal as possible.

The source of the problem was Kirk Banks, Roads Engineer and Head of Wicomico County Roads Division, Salisbury, MD. He had noticed that his crews took different times and wondered if there was a method that was superior to their “turn right” method. The county actually uses three snowplows, but the MCM problem statement modified this number to two because of the greater difficulty in solving and judging the problem with three plows. The MCM results show, however, that the students would have been able to handle three plows.

The Outstanding papers were by teams from Rose-Hulman Institute of Technology, Southern Oregon State University, U.S. Air Force Academy, and University of Alaska Fairbanks. Their papers, together with a commentary, were published in *The UMAP Journal* 11 (3) (1990): 231–274.