Abstract: There has been considerable research in vehicle routing and scheduling algorithms and software packages to apply these results in practice. However, most of the research published is based on models where the time between nodes on a road network is regarded as fixed. In practice, this is generally not the case and the time taken for any journey may vary significantly by the time of the day, the day of the week, and the season of the year in which the journey takes place. This is an issue that may have important consequences for the use of the results from fixed-time models by vehicle fleet managers.

Working with ITIS Holdings plc, a Road Timetable™ has been created that provides the time and distance between locations for a journey starting at a particular time on a particular day of the week. The data for the Road Timetable™ has been obtained from a large sample of freight and other vehicles that send details of their position and speed to the ITIS database from which average speeds can be estimated for different roads and different times of day and day of week.

This paper presents a heuristic for the Vehicle Routing Problem with capacity and time constraints that can work with time-varying travel time data such as is provided by the Road Timetable™. The heuristic is based on a tabu search algorithm to perform the routing and scheduling.

Results of tests are given using a road network in the northwest of England and actual time-varying travel times using Road Timetable™ information from ITIS Holdings plc. The results demonstrate the potential benefits of routing and scheduling with time-varying travel times, such as the reduction of driver overtime and the reduction of missed service time windows.

Key words: Vehicle Routing, Real World Scheduling