
A real-world routing and scheduling problem of employees with different skills in multiple working locations

Alina-Gabriela Dragomir^{*1}, Pamela Nolz^{†2}, Ulrike Ritzinger^{‡2}, and Karl Doerner^{§1}

¹University of Vienna – Vienna, Austria

²AIT Austrian Institute of Technology – Austria

Abstract

We address a real-world routing and scheduling problem motivated by the difficulties in the Austrian tourism sector. Due to insufficient private and public mobility there occurs an imbalance between the demand for workforce and for employment. Although the demand is high on both sides, it appears low because of little possibility for people to reach potential workplaces. In our solution employees are flexibly scheduled to work in shifts of different skills and locations while all necessary transportation is provided. All schedules comply with detailed time constraint requirements of both employees and employers. The routing is modeled as pickup and delivery problem with time windows comprising inconvenience constraints and route duration constraints. Transportation is provided by multiple homogeneous vehicles that share a common depot. The overall objective of the problem is to create good schedules for the employees that comply with an efficient transportation, while fulfilling the requirements of the employers. The problem is presented and two different working time models are compared. The restrictive model corresponds to the traditional approach with rigid person and hour requirements per shift. The flexible model corresponds to an innovative approach using gliding time, and person and hour range requirements. A metaheuristic based on large neighborhood search is developed and solutions for both working time models are presented.

*Speaker

†Corresponding author: Pamela.Nolz@ait.ac.at

‡Corresponding author: Ulrike.Ritzinger@ait.ac.at

§Corresponding author: karl.doerner@univie.ac.at