

# **Scheduling Security Personnel for Multiple Security Gates**

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## **Abstract**

This paper presents a manpower tour-scheduling approach that involves determining the manning requirements and optimum employee work schedules for several security gates. The two-stage approach is used to minimize the total labor cost of security personnel. In stage 1, manning requirements are determined based on the results of a manpower workload study at the company. In stage 2, an integer programming model is formulated to satisfy each gate's staffing requirements during weekdays and weekends. The objective is to minimize the total labor cost of both Non-supervising and Supervising employees. The model proposed an alternative work schedule combination that resulted in annual savings of 24% in comparison to the schedule currently in use by the company.

## **Keywords**

Tour Scheduling; Integer Programming; Security Guards

## **Biographies**

**Abdulaziz S. Alzahrani** is currently working as Organization Performance Advisor at Saudi Aramco and has more than 4 years of total professional experience in various fields from IT Project Management, Business Process Re-engineering, and Management Consulting. He began his career as Business Process Manager in the National Commercial Bank where he contributed to the development and the standardization of IT Business Analysis and Business Process Improvement Methods. Abdulaziz earned his bachelor's degree in Industrial & Systems Engineering from King Fahad University of Petroleum & Minerals (KFUPM) in January 2013. He has also earned the Lean Six Sigma Black Belt designation from the International Association for Six Sigma Certification (IASCC) in January 2014. Abdulaziz also highlights his Professional Interests as Data Analytics, Manpower Optimization and Modelling, Operation Research, and Business Analysis.

**Hesham K. Alfares** is Chairman and Professor in the Systems Engineering Department at King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia. He has a PhD in Industrial Engineering from Arizona State University. He has more than 100 publications, including 50 journal papers and a U.S. patent. Dr. Alfares has been as a visiting scholar at MIT and the University of North Carolina in the USA, in addition to four universities in the UK. He won one research grant from the US Fulbright Foundation, and four grants from the British Council. He won the Almarai Prize for Scientific Innovation in Industrial Engineering. He has been a member in the editorial boards of three international journals and in the program committees of 27 international conferences.