

# **A Model for Turnaround Maintenance Planning for a Network of Plants**

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## **Abstract**

Turnaround maintenance (TAM) is a periodic event in which a plant is shutdown to perform inspections, repairs, replacements and overhauls to ensure plant reliability, availability and performance. This is practiced in many industries including petrochemical industries, refineries, power plants and chemical processing industries. TAM is a major event that is repeated every five to seven and takes away long time of production stoppage and high costs of material and workforce. In some industries it may take months of work and millions of dollars. It needs long time of planning and preparation to maintain a minimum level of efficiency and effectiveness. Research in TAM is mainly focused on planning of a single plant and rarely deals with network of plants within or across business units. However, in the era of globalization supply chains became a matter of business survival. This brings the issue of TAM planning and scheduling across supply chains to the top of research needs. In this paper a mathematical programming model for scheduling TAM activities within the supply chain is presented. The model incorporates realistic constraints such as the availability of internal and external manpower and material supplies, product demand, production capacity and inventory capacity of all units involved. The developed model is solved using GAMS model builder and CPLEX solver. The utilization of the model is demonstrated on a realistic example from process industry.

## **Keywords**

Turn around, maintenance, scheduling, supply chain

## **Acknowledgements**

The authors acknowledge the support of King Fahd University of Petroleum and Minerals through project RG1121

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**Umar Al-Turki** is a professor in the Department of Systems Engineering, at King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. He Obtained his Ph.D. in Decision Sciences and Engineering Systems from Rensselaer Polytechnic Institute, Troy, New York, USA. He obtained a M.Sc. in Industrial Engineering and Management from Oklahoma State University, Stillwater, Oklahoma, USA. He received his B.Sc. and M.Sc. degrees in Systems Engineering KFUPM. His research interests are in the areas of optimization, supply chain, productivity improvement and maintenance engineering and management. His research in maintenance planning and scheduling is presented in many international conferences and published in highly prestigious international scientific journals. His current research interest is integrated planning of production and maintenance as well as long term strategic maintenance planning.