

ABSTRACT

Development of a planning and control system for major plant shutdowns.

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The purpose of this thesis is to develop a system that will allow the user to be able to effectively plan and control all activities that are to be done during a shutdown. The need for such a system was established after a survey of the local petrochemical industry revealed that no logical step-by-step system for planning and control which included a method for cost optimization existed.

The system was developed from information collected from; (i) secondary sources (i.e. text books, journals etc.) (ii) discussions held with management personnel of petrochemical industries in Trinidad, (iii) participation in several plant shutdowns and (iv) from the attendance of maintenance seminars both in Trinidad and the United States.

The developed system focuses on a mathematical model for minimizing cost. However other facets of the system are extremely important for the utilization, and the realization of the benefits, of the developed model. The model takes into account not only direct costs but also the indirect costs of the planned shutdown, namely the loss production costs. It includes the cost optimization of the shutdown project network which is achieved by the application of the linear programming techniques. In addition the use of the linear programming techniques allows for the risk analytic treatment of the shutdown activity network.

Using the linear programming problem that is derived from the project network one is able to identify the high risk activities both in terms of duration and cost and hence be able to effectively control overall cost.

The model is successfully tested by the application to a small process plant shutdown and the results are presented and analysed herein. A critical analysis is also done on the developed system.

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