

Chapter 1

Case Study on a Maintenance and Reliability Management Model Proposal: A Third Set of Locks Project in the Panama Canal

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ABSTRACT

The purpose of this chapter, is to provide a Maintenance and Reliability Management Model for the project: Design and Construction of the Third Set of Locks in the Panama Canal, with the approach of the process of asset management optimization. A practical vision of the maintenance and reliability management process and framework is presented with the idea of: Structuring the maintenance management process by grouping management activities within a series of so-called management building blocks; Structuring the framework grouping techniques that can be used to support decisions to be taken within each of these building block. This chapter presents not only a process but also the framework and techniques to manage and improve maintenance and reliability effectiveness and efficiency. This report will be used to assist different plant teams to elaborate the optimal strategies for maintenance and inspection for the assets, specified for the project: Third Set of Locks in the Panama Canal.

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1. MAINTENANCE MANAGEMENT MODEL PROPOSED FOR THE PROJECT: THIRD SET OF LOCKS IN THE ACP (AUTORIDAD DEL CANAL DE PANAMÁ)

1.1. Introduction to Maintenance Management Model

The Maintenance Management Models are frequently associated with a wide range of difficulties. Why is this function, at least in appearance, so difficult to manage? We have carried out a review of literature to find out some of the reasons:

- Lack of maintenance management models (Parra and Crespo, 2012). There is a lack of models that could improve the understanding of the underlying dimensions of maintenance. Maintenance is somewhat “under-developed” with a lack of effective prevention methodologies and the integration of said methods in manufacturing companies in most continents;
- Wide diversification in the maintenance problems. Maintenance is composed of a set of activities for which it is very difficult to find procedures and information support systems in one place to ease the improvement process. Normally, there is a very wide diversification in the problems that maintenance encounters, sometimes a very high level of variety in the technology used to manufacture the product, even in businesses within the same productive sector; therefore, it has been difficult to design an operative methodology of general applicability;
- Lack of plant/process knowledge and data. Managers, supervisors and operators typically find that the lack of plant and process knowledge is the main constraint, followed by the lack of historical data, to implement suitable maintenance policies;
- Lack of time to complete the analysis required. Many managers indicate how they do not have the required time to carry out suitable maintenance problems analysis. Day to day actions and decision making activities distract them from these fundamental activities to improve maintenance;
- Lack of top management support. Lack of leadership to foster maintenance improvement programs, fear of an increase in production disruptions, etc., are other common causes of maintenance underdevelopment in organizations;
- Exigent safety and environmental factors. In addition to process and technology related issues mentioned above, new and more exigent safety and environmental factors such as emerging regulations put pressure on a maintenance manager and add complexity to this function.

Some authors (Parra & Crespo, 2012) have worked on the characterization of the complexity found in managing the maintenance function in a production environment, creating tools where we are able to value each one of previously reviewed factors for a certain organization (with a degree of fulfilment – DFi), and evaluate them according to environmental aspects (with a relevance factor – RFi). The maintenance management complexity index can be helpful as one way of comparing across different production environments to help decide the relative effort and resources required to maintain them.

1.2. Proposal for a Generic Model of Maintenance Management for the Project: Third Set of Locks in the ACP

The generic model proposed for maintenance management that will now be proposed and defined integrates other models found in the literature for built and in-use assets, and consists of eight sequential

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