

## **MULTI-CRITERIA CLASSIFICATION OF SPARE PARTS**

### **ABSTRACT**

Spare parts are parts of an equipment those can replaced when its performance decreases. Manufacturers of capital goods keep several parts in inventory for their production and also to supply their customers with spare parts. ABC Classification is a common practice for inventory management. However, the classification of inventoried items by monetary value alone could be dangerous. This work presents a multi-criteria classification with the Analytic Hierarchy Process. The proposed model was implemented in a plant of capital goods located in Brazilian state of Sao Paulo.

Keywords: ABC classification, inventory management, spare parts.

### **1. Introduction**

Spare parts are parts of an equipment those can replaced when its performance decreases. Manufacturers of capital goods keep several parts in inventory for their production, as Work in Process (WIP), and also to supply their customers with spare parts. Spare parts inventories are not intermediate or final products to be sold to a customer. Policies to spare parts inventories may be different from WIP or other inventories (Kennedy, Patterson & Fredendall, 2002).

ABC Classification is a common practice for inventory management. Inventories of Class A items, the more valuable items, may be better controlled, on a daily basis, for instance. On the other hand, inventories of Class C items may not be not controlled, with stock out replenishments. However, the classification of inventoried items by monetary value alone could be dangerous.

This work proposes a multi-criteria classification with the Analytic Hierarchy Process (AHP). The proposed model was implemented by a Brazilian plant of capital goods located in Brazilian state of Sao Paulo.

### **2. Objectives**

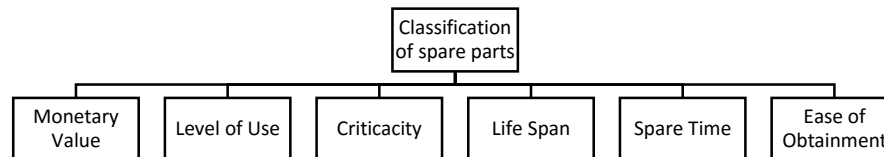
The main objective of the research is to improve the method of classification of inventoried parts in a real company. To achieve this main objective, one specific objective is to determine criteria for inventory classification other than the monetary value.

### **3. Methodology**

The classification of spare parts with a multi-criteria approach is the main contribution of this work. Then, Analytic Hierarchy Process (AHP), a method for multi-criteria decision

analysis is applied. In AHP, the three main elements of decision are arranged in a hierarchical structure (Saaty & Hshih, 2009).

A plant of capital goods, located in Brazilian state of Sao Paulo, adopts the mono-criterion approach for the classification of spare parts. Fig. 1 presents a multi-criteria model for spare parts classification including five more criteria obtained from international literature (Bacchetti & Saccani, 2012).



**Fig. 1.** Hierarchical structure for classification of spare parts.

#### **4. Model Analysis**

Plant managers were consulted for AHP application. According to their prioritization, Criticality is the most important criterion. As a result, a mid-priced part, previously classified in Class B, but also classified in Class A for Criticality, Level of Use, and Life Span will be now overall classified in Class A.

#### **5. Conclusions**

Plant managers validated the results. They considered the AHP based model as a better practice for classification of spare parts.

#### **6. Key References**

Bacchetti, A., Saccani, N. (2012) Spare parts classification and demand forecasting for stock con-trol: Investigating the gap between research and practice. *Omega*, 40, 722-737.

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