G-SCOP
SCIENCES POUR LA CONCEPTION, L'OPTIMISATION ET LA PRODUCTION

THESIS G-SCOP 2020

Title: Integrated logistics support in a context of distributed maintenance

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Brief Description :

The availability of equipment is essential in certain fields of activity, such as aeronautics or naval [4]. It is in these areas that the concept of maintenance workshop (MW) has more particularly developed: a MW is made up of a set of resources necessary for maintenance actions, such as maintenance operators, workstations 'intervention for the various phases of repair, tools and spare parts for replacement [3]. The role of the MW is to detect the origin of a failure on failed equipment and restore its functionning (corrective maintenance). In addition, in order to reduce the occurrence of failures, regular interventions (preventive maintenance) are scheduled according to a pre-established schedule.

A methodological approach on the application of centralized maintenance to production systems has been developed. It relates more particularly to the design of a maintenance workshop integrated into a production system. The maintenance workshop is then integrated and dedicated to the maintenance of certain equipment. The repair process includes several phases like diagnosis or disassembly. Actual repair depends on the type of failure, component assembly and test. The objective of this approach is to minimize the periods of unavailability of faulty equipment, which therefore corresponds to the average residence time of equipment in the ADM [2].

Recently, this approach was applied to the design of a multi-site maintenance workshop. In fact, in order to reduce the occurrence of failures, the MW provides real-time monitoring of the condition of the equipment at the various sites. Regular interventions (preventive maintenance) are scheduled according to a pre-established schedule with resources from this MW [1]. Maintenance activities are therefore carried out by two structures:

- A structure that carries out the repair process; the central Maintenance workshop (CMW)

- A structure that performs inspections and replacement; it's a mobile Maintenance workshop (MMW)

Models of the different production sites, central and mobile maintenance workshops were proposed.

The subject concerns integrated logistical support in a context of distributed maintenance. The objective is to highlight the contribution of centralized maintenance in this case of multi-site structure by an evaluation of the performance of MW locally, at the level of each site. It is therefore a question of taking into account different types of hazards such as breakdowns of the breakdown type (corrective maintenance) or of the unavailability of resources type for:

- Schedule preventive maintenance tasks,
- Size resources (both spare parts in fixed or mobile MW and maintenance operators)
- Propose robust routing of mobile MW to the various production sites.
- Optimize maintenance costs

Knowledge of operational research for the implementation of optimization algorithms is required.

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