

ABSTRACT

Scheduling the manufacturing operations in industries is a major activity of the production planning department. Scheduling studies can be broadly classified as flow shop and job shop scheduling. Further classification of job shop scheduling is based on the type of job shops. In the first category products without assembly constraints are manufactured. The other type of job shops are engaged in the manufacture of products having both manufactured and bought out components assembled at different levels. This kind of systems are known as multi-level assembly job shops. The present study has been conducted in a hypothetical multi-level assembly shop to study the effects of priority dispatching rules on various performance measures.

Three important aspects analysed in this thesis are mean manufacturing mean lead time, due date performance and the economics achieved by each priority dispatching rule. The shop is assumed to be a dynamic system where jobs arrive continuously.

The techniques used for solving scheduling problem can be classified as analytical and simulation based ones. In this thesis simulation methodology has been used since it is a commonly used technique for analysing the dynamic and stochastic industrial systems. The simulation model has been developed using Simple_1 (Ver 4.0) - a special purpose simulation language.

In order to observe the performance of due date procedures and priority dispatching rules in a real life situation a case study has been conducted in an industry manufacturing products involving assemblies and sub assemblies.

The results obtained through the simulation experiments have been subjected to ANOVA and Tukey multiple comparison tests in order to ascertain if there are any

statistically significant differences among the performance of the various priority dispatching rules.

An important impediment for the application of simulation methodology for analysing the production planning problems is the scarcity of skilled and trained simulationists who can develop and make use of valid and useful models. An attempt has also been made in this thesis to develop a system which would automatically generate the simulation code for alternate production scenarios by getting the system inputs from the users.