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# Scheduling in Press Shop of a Motor Industry

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An important aspect of industrial control is to decide the precise use of manufacturing facilities at each instant of time. In this thesis, a real problem of such kind, as a scheduling problem in a press shop of a motor industry is discussed from various point of view. Several factors must be taken into account in making these decisions such as the availability of resources, facilities, number of workers, amount of inventories, due dates, many kinds of cost, and so forth.

In this car maker, they produce about 40 kinds of cars, and about 100 kinds of pressed parts for these cars. They decide a monthly production schedule and a daily production schedule once in a month. And the press shop, the engine shop, etc., must supply their parts to the assembly line at proper time to accomplish that production schedule. In the press shop, they calculate demands of each parts, and from this they decide lotsizes of each parts.

The problem under consideration is to decide lotsizes and production dates of each parts, subject to the amount of initial inventories, number of workers, the ability of facilities and the availability of ware-house's space.

There are several ways for formulating such a scheduling problem. The author tried to approach this problem by integer linear programming, but there are many variables that we can't obtain optimum solution mathematically. In general, such a scheduling problem becomes combinatorial problem, and it hasn't been found the strict mathematical method for solving combinatorial problem.

In this thesis, the author developed two algorithms to obtain optimum or sub-optimum solution approximately. One of them is as follows. We make a job list at first and each job will be given a priority according to its due date and duration time. Then we schedule each job compliance with its priority and condition of resources. The other one is as follows. At first we make several schedules of  $m$  days by Monte Carlo method, then we choose the schedule which optimizes some functions (for example, total schedule time). From this schedule we decide the schedule of first  $n$  days ( $n m$ ).

Finally the author examined the behaviour of the press shop scheduling by changing the condition of resources. We used computer languages FORTRAN and SIMSCRIPT for programming and IBM 7090 for computation.

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