International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 04, 2020
ISSN: 1475-7192

# Simultaneous Scheduling of Assembly and Production Shops Using GA based Heuristic

S. Saravanakumar, M. Muthukannan, S. Srinivasan and
P. Sankar Kannan

***Abstract***--- *This paper addresses a scheduling problem in an industry that manufactures machines. The manufacturing facility of the industry consist of two sections namely production shops and assembly shops. Production encompasses four subsections in it. Production shop is commonly shared by the components of different machines. But the assembly shops have independent section for each machine. Due to the sharing of production shops the components are not delivered in time to the assembly shop which delays the assembly of a product. The above problem is addressed by simultaneously scheduling the production and assembly shops with an objective criterion of minimum penalty cost. The production environment is of job shop in nature. The schedule generated accounts the alternative routing as it increases the flexibility in scheduling. Job shop problem are combinatorial optimization problems, account of alternative routing increase the complexity of the problem. The above problem becomes NP hard in nature. Meta heuristics are evolving as a promising alternative to address the NP hard problems. Genetic algorithm one among the Meta heuristic is used to evolve the simultaneous schedule of production and assembly shops and it is illustrated with the different products models developed to represent the machines of the company.*

***Keywords***--- *Scheduling, Meta- heuristic and Genetic Algorithm.*

## I. INTRODUCTION

Manufacturing industries of today need to produce quality products with economy and to deliver with out any delay; this situation has leaded to the companies to focus on every activities or operation. An overall plan is needed to follow the operations effectively and it is a result of decision taken at various levels of operation. Good decision provide good plans and hence increased productivity .Production schedule is an important decision making process at shop floor operation level. This paper addresses a scheduling in manufacturing industry which produces capital goods. Industries of such nature have production and assembly shops. The components or parts that make up a assembly are manufactured in production shops and assembled to form a product in assembly shops. The general job shop problem is one of the well known machine scheduling problems, in which the operation sequence of the jobs are fixed that corresponds to their optimal process plans or resource availability . However the use of other possible process plans in addition to optimal one could provide better schedules resulting through reduced bottlenecks and increased flexibility. Jawahar et al[1], proposed a GA based heuristic for scheduling problem of flexible manufacturing systems associated with alternate routing. They have shown that GA based heuristic search procedure is suitable for FMS scheduling problems and is capable to handle alternative route choice and to revise the

*S. Saravanakumar, Assistant Professor, Department of Mechanical Engineering, M.Kumarasamy College of Engineering, Karur.*
*M. Muthukannan, Assistant Professor, Department of Mechanical Engineering, SSM Institute of Engineering & Technology, Dindigul.*
*S. Srinivasan, Assistant Professor, Department of Mechanical Engineering, SSM Institute of Engineering & Technology, Dindigul.*
*P. Sankar Kannan, Assistant Professor, Department of Mechanical Engineering, SSM Institute of Engineering & Technology, Dindigul.*

**DOI: 10.37200/IJPR/V24/I4/PR202042**
**Received: 12 Mar 2020 Revised: 25 Mar 2020 Accepted: 10 Apr 2020**