"STUDY OF TWO SIDED ASSEMBLY LINE BALANCING USING GENETIC ALGORITHM"

A

THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF TECHNOLOGY

IN

PRODUCTION ENGINEERING

BY

GORAD SAGAR RAMCHANDRA

(ROLL NO- 2K12/PRD/06)

GUIDED BY

DR. RAJIV CHAUDHARY **DR. RAMESH CHANDRA SINGH**

Department of Mechanical, Production, Industrial and Automobile Engineering

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DECLARATION

I hereby declare that the thesis entitled "**STUDY OF TWO SIDED ASSEMBLY LINE BALANCING USING GENETIC ALGORITHM"** which is being submitted to the Delhi Technological University, in partial fulfillment of the requirement for the award of degree of Master of Technology in Production Engineering is an authentic work carried out by me.

Gorad Sagar Ramchandra

(2K12/PRD/06)

CERTIFICATE

This is to certify that the report entitled, **"Study of two sided assembly line balancing using genetic algorithm"** submitted by **Mr. Gorad Sagar Ramchandra** in partial fulfillment of the requirements for the award of **Master of Technology Degree** in **Production Engineering** at **Delhi Technological University**, **Delhi** is an authentic work carried out by him under our supervision and guidance.

To the best of our knowledge the matter embodied in this report has not submitted to any other university / institute for award of any degree.

Dr. Rajiv Chaudhary **Dr. Ramesh Chandra Singh**

Date: **Date:**

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Gorad Sagar Ramchandra

INDEX

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Two-sided assembly lines are common industrial practice in the assembly of large-sized products. It provides shorter line length, reduced throughput time, lower cost of tools and fixtures, and less material handling. In a two-sided assembly line, the products wait during the cycle time at each mated-station where there are two operators working at the opposite sides of the line simultaneously performing the different tasks on the same individual product.

Genetic algorithms have received an increasing attention from the researchers since it provides an alternative to traditional optimization techniques by using directed random searches to locate optimum solutions in complex landscapes.

In this thesis various features of genetic algorithms proposed for balancing of two sided assembly lines are studied and discussed.

Initial population is one of the key feature in the genetic algorithm. Performance of algorithm and early convergence is dependent on the initial population. The diverse initial population helps to check all areas of solution space and prevents the trapping in local optimum. The effect of direction of generation over diversity in initial population is studied. A new method is developed to generate initial population to increase the diversity. The proposed method is applied on small sized problems to measure the performance.

It is evident from the results that though diversity in population largely depends upon the precedence relations of the tasks in problem, it can vary to a great extent with the use of random direction of generation.