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Computerized capacity planning

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NORTHERN ILLINOIS UNIVERSITY

COMPUTERIZED CAPACITY PLANNING

A project submitted to the
University Honors Program
in partial fulfillment of the
requirements of the Baccalaureate Degree
with Upper Division Honors

Department of
Operations Management and Information Systems

by

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DeKalb, Illinois

May, 1990

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Department of: OPERATIONS MANAGEMENT & INFORMATION SYSTEMS

Date: 5/7/90

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HONORS THESIS ABSTRACT

Author: John C. Stemke
Thesis Title: Computerized Capacity Planning
Thesis Advisor: Dr. Thomas Galvin
Advisor's Dept: Operations Management & Information Systems
Date: May 7, 1990
Honors Program: Northern Illinois University Honors Program
Name of College: Northern Illinois University
Length: One Diskette and Instructions
Subject Headings: Computerized Capacity Planning Techniques

Abstract: The purpose of this project is to apply the concepts and techniques of capacity planning. The specific technique used is known as Capacity Requirements Planning. To avoid complication, this program is designed to be only part of a more complex manufacturing information system.

Capacity planning aims to plot the required resources to produce a certain amount of product against the resources available. This is accomplished by calculating, in hours, the the required time to produce a product and the available machine time. The major inputs used to accomplish this task are the part routings, work center files, and the part requirements per period. The outputs are detailed comparisons of required hours and available hours at each work center for each time period.

Program Instructions

To Load Program:

- 1 - Load GW-BASIC
- 2 - type LOAD"CP",R

Valid Part Numbers

- A1000
- A2000
- A3000
- A4000
- T1000
- T2000
- T3000
- T4000

Valid Work Centers

- 11
- 22
- 33
- 44
- 55
- 66
- 77
- 88
- 99

Program Overview

Primary Inputs to Capacity Planning:

- Parts Routing File
- Work Center File
- Requirements for each part

Primary Outputs of Capacity Planning:

- Required hours for each part
- Required hours for all parts
- Required hours at each work center
- Required hours for all work centers
- Required hours vs. Available hours for each work center
- Available hours after requirements are satisfied for all work centers
- Load Profile for all work centers

Program TechniquesHours Required

Hours required is defined as the number of hours to produce a single part or the total number of hours to produce a batch of parts. Hours required is calculated using the formula presented below:

$$\text{Hours required} = \text{Set-up time per piece} + \text{Run-time per piece} \\ * \text{Number of pieces per period}$$

Hours Available

Hours available is defined as the number of hours available per period at each work center. Hours available is calculated using the formula presented below:

$$\text{Hours available} = \text{Number of machines} * \text{maximum hours per day} \\ * \text{work center efficiency} * \text{work center} \\ \text{utilization} * \text{number of days per period}$$

Load Profile

A Load Profile shows the percentage of available hours at a particular work center that are accounted for by the current requirements.