

School of Mechanical Engineering

Course Code : BAUT4001

Course Name: CAD/CAM

Unit - 4

Group Technology

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Name of the Faculty: Mr. Shrikant Vidya

Program Name: B.Tech (Auto)

School of Mechanical Engineering

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What will be Covered?

- An introduction to group technology.
- Group technology coding structures.
- How group technology will help improve quality.
- The benefits and obstacles for managers using group technology.

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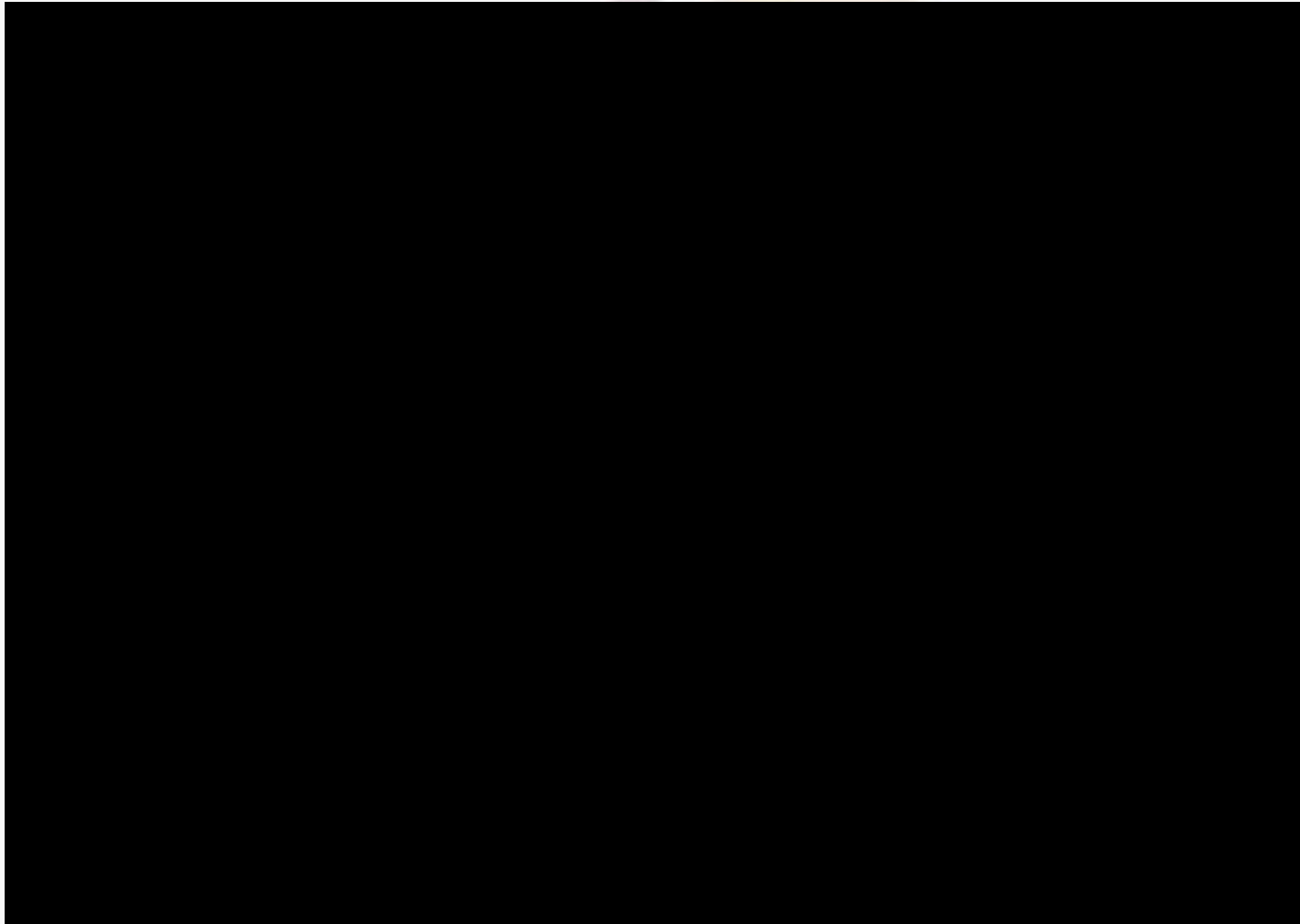
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Introduction

- Group technology was introduced by Frederick Taylor in 1919 as a way to improve productivity.
- One of long term benefits of group technology is it helps implement a manufacturing strategy aimed at greater automation.

What is group technology?

Group technology (GT) is a manufacturing philosophy that seeks to improve productivity by grouping parts and products with similar characteristics into families and forming production cells with a group of dissimilar machines and processes.

Background

The introduction of GT techniques in:

- General Electric
- Lockheed Missiles and Space Co.
- Boeing

GT viewed as:

- An essential step in the move toward factory automation.
- A necessary step in maintaining a high quality level and profitable production.

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Brainstorming



How can group technology be used in your organization?

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Group Technology

- Group technology implementation can be broken down into 3 different phases:
 - Actions on the manufacturing process
 - Changes to the production process
 - Results for the organization
- Examples of the impacts group technology has had on the production process.

Implementation Phases



Group technology has the following actions on the manufacturing process:

- Part Simplification
- Process Standardization
- Production Control

Implementation Phases

The changes group technologies can have on the production process.

- Tighter Parts Control
- Close physical layout of machine groups
- Orderings tied to production

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Implementation Phases

The results that group technologies have at the organizational level.

- Systematic design and redesign
- High-quality level
- Less process planning time and setup time

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Impacts of Group Technology

Different impacts group technology has on the production process:

- Reduced purchasing cost
 - Less redundant purchases.
- Accurate cost estimation
 - A more efficient process
- Quicker design changes
 - Standardized Parts
- Improved customer service
 - Classification builds customer relationships

A Classification Scheme

Coding Structures for Purchasing

- GT coding is the process of assigning symbols, numerics, and letters to a particular attribute of a particular item
 - There are 3 different coding structures
 - Monocodes
 - Polycodes
 - Hybrid(mixed-mode) codes

Effects of Classification

The automated GT coding system using bar-code technology can:

- Improve accuracy and productivity in identifying similar purchased items
- Facilitate communication between the buyer and the vendor

Improving Quality

The cluster algorithms of Group Technology can be classified into two major classes.

- Design-oriented approach
 - Relies on the design features of parts to perform the necessary analysis
- Production-oriented approach
 - Based on routing information to group parts or machines

Improving Quality

The production-oriented approach can be divided into two phases:

- A design phase
 - The number of completely new designs can be kept to a minimum
 - Workers are more familiar with the parts.
 - Quality can be maintained at a high level by using proper design
- A manufacturing phase
 - The grouping of parts based on similar characteristics
 - » Geometric features
 - » Processing Requirements

Implementing a Classification Scheme

The three steps of implementing Group Technology in the process based approach:

1. Analyzing the flow of parts through the shop
2. Coding parts and then grouping them into families based on their manufacturing processes
3. Making machine group selections.

A Real World Example

Using GT to improve quality.

- Peony Corporation, in Japan
 - Currently: Produces television sets
 - Problem: Customers requested different sizes and functions
 - Challenge: To maintain a high level of quality due to many new parts
 - Implementation: At the design phase
 - Results: Peony kept the number of parts small by increasing part standardization → lowered costs

Managerial Benefits

The Benefits of Group Technology Classification:

1. Reduced Purchasing Cost Through Volume Purchasing
 - Can purchase fewer different items at higher volumes
2. Faster Lead Time
 - Can quickly identify the materials or materials needed
3. Better Negotiation Leverage
 - Value Analysis

Managerial Benefits

The Benefits of Group Technology Classification (cont.):

4. Accurate Cost Estimation
 - Estimate the future price range with a standard cost database
5. Quicker Reaction to Design Changes
 - Quickly identify newer material or parts that conform to newer designs and specifications
6. Better Communication Between the Buyer and the Supplier
 - Eliminate the human errors with GT classification

Potential Obstacles

The Obstacles of Group Technology Classification:

1. Management Resistance to Change
 - Unwilling to devote the time and energy
2. Extensive Data Requirements
 - The proper identification needs detailed item descriptions → extensive purchase records/data
3. High Start-Up Cost
 - Item characteristics are not available without the aid of automated information storage and retrieval systems which usually incur high expenses until GT is in place

Exercise

- Reflecting back, each person write down:
 - How group technology can improve your organization?
 - List potential obstacles an organization might face when implementing a group technology system and explain how each obstacle can be overcome?

- How does this exercise relate to your organization?

- Discuss your answers with the group.

Exercise Discussion

Improvements Group Technology can make on an organization:

- Improve quality levels
- More profitable production
- Reduces costs

Ways to overcome obstacles an organization might face:

- Promote the change from within the organization
- Properly train the individuals who work with the system

Summary

There are many benefits and obstacles toward the use of group technology in an organization.

All things considered, GT is viewed as:

- An essential step in the move toward factory automation.
- A necessary step in maintaining a high quality level and profitable production.

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