Industrial Automation

GHULAM MAHMOOD MUJTABA
Roll NO: - 04083054
The Realities of Modern Manufacturing

- Globalization - underdeveloped countries (e.g., China, India, Mexico) are becoming major players in manufacturing
- International outsourcing - Parts and products once made locally are now being made offshore (in China or India) or near-shore (in Eastern Europe)
- Local outsourcing - Use of suppliers locally to provide parts and services
More Realities of Modern Manufacturing

- Contract manufacturing - Companies that specialize in manufacturing entire products, not just parts, under contract to other companies
- Trend toward the service sector
- Quality expectations - Customers, both consumer and corporate, demand products of the highest quality
- Need for operational efficiency - manufacturers must be efficient in their operations to overcome the labor cost advantage of international competitors
Automated system

- Basically Industrial automation is the use of robotic devices to complete manufacturing tasks.
- Use of computerized or robotic machines which are capable of handling repetitive tasks quickly and efficiently
Automated System

Examples:
- Automated machine tools
- Transfer lines
- Automated assembly systems
- Industrial robots
- Automated material handling and storage systems
- Automatic inspection systems for quality control
Automation Principle

1. Understand the existing process
   - Input/output analysis
   - Value chain analysis
   - Charting techniques and mathematical modeling

2. Simplify the process
   - Reduce unnecessary steps and moves

3. Automate the process
   - Analysis of requirement different machines for different processes
   - Replacement of manpower from robots and machines
Three Automation Types

- Programmable Automation
- Flexible Automation
- Fixed Automation

Variety

Quantity
Fixed Automation

Sequence of processing (or assembly) operations is fixed by the equipment configuration.

Typical features:
- Suited to high production quantities
- High initial investment for custom-engineered equipment
- High production rates
- Relatively inflexible in accommodating product variety
Flexible Automation

System is capable of changing over from one job to the next with little lost time between jobs

Typical features:
- High investment for custom-engineered system
- Continuous production of variable mixes of products
- Medium production rates
- Flexibility to deal with soft product variety
Programmable Automation

Capability to change the sequence of operations through reprogramming to accommodate different product configurations

Typical features:
- High investment in programmable equipment
- Lower production rates than fixed automation
- Flexibility to deal with variations and changes in product configuration
- Most suitable for batch production
- Physical setup and part program must be changed between jobs (batches)
Reasons for Automating

1. To increase labor productivity
2. To reduce labor cost
3. To mitigate the effects of labor shortages
4. To reduce or remove routine manual and clerical tasks
5. To improve worker safety
6. To improve product quality
7. To reduce manufacturing lead time
8. To accomplish what cannot be done manually
9. To avoid the high cost of not automating
THANK YOU