UNIT III

PRODUCT DESIGN LIFE CYCLE II

DETAILED DESIGN

MANUFACTURING: STRATEGIES, PLANNING AND METHODOLOGIES

IMPORTANT DEFINITIONS

MANUFACTURING STRATEGIES

Vision and framework for accomplishing long-term corporate goals.

- Helps to focus manufacturing goals and provides plans for integrating the necessary functions and resources into a coordinated effort to improve production.

MANUFACTURING PLANNING

Roadmap that identifies the approach and tasks for all critical paths between design, production, and the tasks necessary to ensure a successful transition from design to manufacturing.

- Heart of the front-end production effort and the road map for the establishment of all production specifications.
- As the design develops, the comprehensiveness and thoroughness of the plan will increase.

PRODUCIBILITY

Discipline directed toward achieving design requirements that are compatible with the capabilities and realities of manufacturing. More specifically, producibility is a measure of the relative ease of manufacturing a product in terms of cost, quality, lead-time, and technical risk.

Design for producibility is often called by other names, including manufacturability, design for manufacturing, design for automation, design for robotics, and design for production. Regardless of the terms used, designing for producibility is the philosophy of designing a product so that it can be produced in an extremely efficient and quick manner with the highest levels of quality.

This is accomplished through an awareness of how design decisions affect the production process, including the capabilities and limitations of specific production equipment.

MANUFACTURING STRATEGIES

Vision and framework for accomplishing long-term corporate goals. The vision establishes the company's goals for manufacturing. The framework helps to focus efforts on meeting manufacturing goals by planning for integrating the necessary functions and resources into a coordinated effort.

- Communication of this strategy sets the right climate for the teamwork and long-term planning that are necessary to improve manufacturing capabilities.
- The strategy should be well known throughout the company, with regularly scheduled reviews to monitor progress toward the goals.
- Long range strategic plans allow sufficient emphasis to be placed on identifying and anticipating manufacturing technologies of the future. In this manner, manufacturing is prepared for new technologies with the expertise and equipment early enough to stay ahead of competitors.

A manufacturing strategy addresses the following concerns:

- Are future manufacturing technologies and requirements identified and essential expertise acquired in development efforts?
- Is the manufacturing strategy compatible with long-range corporate objectives and factory modernization initiatives?
- Is there a long-term commitment for continuously improving Manufacturing and vendor capability?
- Do the manufacturing, vendors and design functions interactively develop both product and manufacturing process designs?
- Are important vendors identified and long term partnerships established?
- Are the "make or buy" decision criteria/parameters for outsourcing established for determining whether to outsource or manufacture within the company?

MANUFACTURING PLANNING

Coordinates the various production planning elements, such as production readiness and qualification.

- Without the benefit of thorough manufacturing planning, major problems will occur when a product is first produced.
- The manufacturing plan identifies the approach and details all tasks necessary for accomplishing manufacturing's strategies. This includes all critical paths between design and production and the tasks necessary to assure a successful transition from design to manufacturing.
- Manufacturing plan continues in effect throughout an entire program. Although no standard plan exists that is adequate for all products, all manufacturing plans are concerned with meeting the cost, schedule, quality, performance, and environmental goals established for the product.

The outline of the manufacturing planning are,

1. Product definition and requirements planning:
   - (i) Product requirements and configuration
   - (ii) Procured technologies and vendors
2. Product schedule and quantities:
   - (i) Product development and release schedule
   - (ii) Production schedule and quantities
3. Product procurement and supply chain approach:
   - (i) Design guidelines and standards
   - (ii) Make parts in house or buy from vendors
   - (iii) Vendor benchmarking and selection
   - (iv)New technologies/vendors/services required and qualification plan
   - (v) Quality control
   - (vi) Supply chain requirements for shipping, packaging, and environmental issues

4. Manufacturing processes and prototypes:
   (i) Processes required and capabilities (precision and quality)
   (ii) Qualification plan including prototypes
5. Manufacturing functional plan:
   (i) Product cost (breakdown)
   (ii) Processes and equipment utilized
   (iii) New process development
   (iv) Make or buy criteria and decisions
   (v) Methods, training, skills required
   (vi) Manufacturing capacity and facilities
6. Test functional plan:
   Comprehensive test plan

References

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Thank you