



SNS COLLEGE OF TECHNOLOGY

COIMBATORE-35



DEPARTMENT OF MECHATRONICS

DESIGN PARAMETERS

The design of mechatronic systems can be divided into a number of stages.

The Need:

- The design process starts with the need of a customer.
- By adequate market research and knowledge, the potential needs of a customer can be clearly identified. In some cases, company may create a market need but failures are more in this area. Hence, market research technology is necessary.

Analysis of the Problem:

- This is the first stage and also the critical stage in the design process.
- After knowing the customer need, analysis should be done to know the true nature of the problem. To define the problem accurately, analysis should be done carefully.

Preparation of a Specification:

- The second stage of the mechatronic process involves in the preparation of a specification
- The specification must be given to understand the requirements and the functions to be met.
- The specification gives mass dimensions, types, accuracy, power requirements, load, praying environments, velocity, speed, life etc.

Conceptualization:

The possible solution should be generated for each of the functions required

- It is generated by verifying the old problems or some newly developed techniques may be used

Optimization:

- This stage involves in a selection of a best solution for the problem
- Optimization is defined as a technique in which a best solution is selected among a group of solutions to solve a problem.

- The various possible solutions are evaluated and the most suitable solution is selected.

Detail Design:

- Once optimizing a solution is completed, the detail design of that solution is developed.
- This may require a production of prototype etc.
- Mechanical layout is to be made whether physically all component can be accommodated.
- Also whether components are accessible for replacement / maintenance are to be checked.
- The selected design or solution is then translated into working drawings, circuit diagrams, etc. So that the item can be made.
- Drawings also include the manufacturing tolerances for each component.

POSSIBLE DESIGN SOLUTIONS

Wind Screen – Wiper Motor:

- Wind screen wiper is a device which is used to clear from the front glass of the vehicles, during rainy season.
- It consists of an arm which oscillates back and forth in an arc like a wind screen wiper.

Mechanical Solution:

- It works like a four bar mechanism, when the crank rotates, the arm 1 rotates.
- This makes the arm 2 to oscillate the arm 3.

Mechatronics Approach:

- The mechatronics approach uses a stepper motor with microprocessor for controlling it.
- The input to the stepper is required to cause it to rotate a number of steps in one direction and then reverse to rotate the same number of steps in other direction.
- Transistors are used as a switch for controlling the stepper motor.
- To start and rotate the motor, the coils of the stepper motor are to be energised in a proper sequence. Stepper motor can be operated in two configurations.
 - Full step Configuration
 - Half step Configuration

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