

**King Fahd University for Petroleum and Minerals**

Mechanical Engineering Department

## **CLARIFYING OBJECTIVES**

Senior Design Project  
ME415

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## **‘WHY’, ‘HOW’ AND ‘WHAT’**

- When a client first approaches a designer with a product specs, it is unlikely that the ‘specs’ are expressed very clearly.
- An important first step in design is to try to clarify the design objectives.
- Some design objectives might be contained within the design brief; others must be obtained by asking the client, or by discussions of the design team.
- Typically, initial statement of objectives are brief and rather vague.

## **‘WHY’, ‘HOW’ AND ‘WHAT’** *Cont’d*

- **Example** “The product must be safe and reliable”
- To produce more precise objectives, you will need to expand and to clarify such statement.
- For example, an objective for a machine tool that must be *safe* might be expanded to:
  - Low risk of injury
  - Low risk of operator mistakes
  - Low risk of damage to work-piece or tool
  - Automatic shutdown in case of overloading
  - Complies with the tooling standards

## **‘WHY’, ‘HOW’ AND ‘WHAT’** *Cont’d*

- The types of questions that are useful in expanding and clarifying objectives are the simple ones: ‘why’, ‘how’, and ‘what’.
  - Why do we need to achieve this objective?
  - How can we achieve it?
  - What are the available solutions?
- Order the list into sets of higher-level and lower-level objectives.
- Draw a diagrammatic tree of objectives showing relationships and inter connections

## Example

Student design team selected the familiar “Jewel case” to improve CD Case as a product needs improvement.

- As a first step the team brain stormed to develop ideas for possible improvements to the CD case.
- The following ideas were generated in response to the question: What functions or attributes of a CD case need improvement?
  - case resistant to cracking
  - easier to open,
  - add color
  - better waterproofing
  - easier extraction of the CD from the circular fastener
  - hinge that does not come apart

## What's Next?

- Next the ideas of improvement are sorted out based on their priorities.
- Priorities must be identified based on the customer's needs.
- How can we know the needs of the customer?
  - Interviews with customers
  - Customer complaints
  - Customer survey