

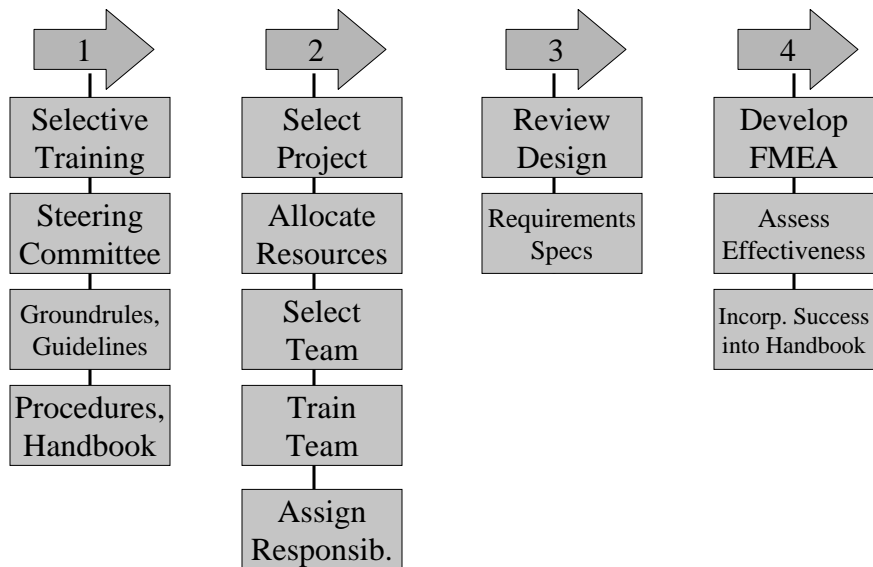
# Failure Mode and Effect Analysis

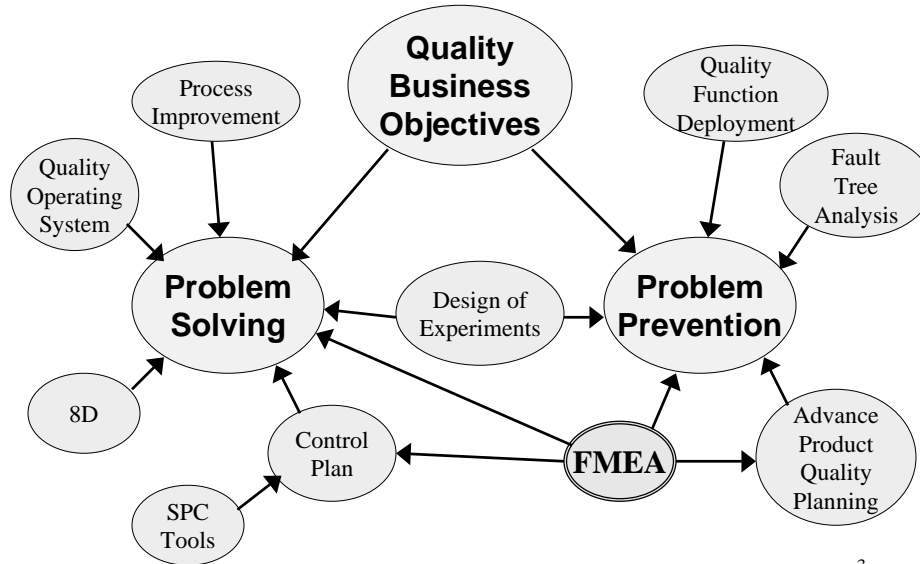
## Lecture 5-3

### FMEA Deployment

#### FMEA Linkage with other tools and initiatives

### Deploying FMEA in the Organization <sup>[1]</sup> *FMEA*





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## Tools

## FMEA

### To plan, support and analyze FMEA

- Quality Function Deployment (QFD)
- Root Cause Analysis
- Fault Tree Analysis
- Process Flow Diagram
- Block Diagram
- Responsibility Matrix
- Area Chart
- Cost/Benefit Studies
- Statistical Tools
  - Pareto diagram
  - Scatter plot
  - Statistical comparison
  - Histogram
  - Control Chart
  - Process capability study
  - Planned experiment

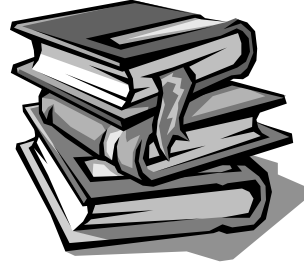
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## **Other Documentation**

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***FMEA***

- Quality plan / contract
- Test plan
- Final design print
- Manufacturing control plan
- Standard operating procedures
- Process flow diagram
- Preventive maintenance schedule
- Design repair procedures, customer assembly instructions



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## **Summary**

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***FMEA***

- FMEA is a tool that must be applied with other reliability and quality tools during the design and process development
- The design concept should be selected before developing the FMEA
- Quality Function Deployment is one tool that can provide inputs to the first column of an FMEA

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## **Summary**

## ***FMEA***

- Coordinating and tracking FMEA can be supported by Process Mapping and Responsibility Matrix
- Common analytical tools that assist in the development of FMEA include:
  - Fishbone (Cause-effect diagrams)
  - Root Cause Analysis
  - Fault Tree Analysis
  - Planned Experiments

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## **Summary**

## ***FMEA***

- Output from the FMEA process may influence:
  - Quality plans
  - Design prints
  - Concurrent engineering plans, tasks
  - Manufacturing control plan
  - Standard operating procedures
  - Process flow diagrams
  - Preventive maintenance schedule
  - Design, assembly and repair procedures
  - Service procedures

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## **You are an Agent of Change<sup>[4]</sup> FMEA**

- When contemplating getting involved in a new initiative, you have a moral obligation to assess the situation carefully and objectively
- Avoid encouraging the organization to attempt more than it can accomplish

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## **Must Have's FMEA**

- A compelling reason for change
- Suitable sponsors
- Informed commitment of the sponsors
- An adequate mandate for the Team Leader / Change Agent

**You need all of these to succeed. Don't even think of compromising on these.**

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## **Wish List**

***FMEA***

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- Top management credibility
- A cohesive top management team
- Informed commitment of top management team
- Ready access to expertise
- Some good improvement initiatives already underway

**If some of these exist, lucky you! Use them to the fullest. If they don't exist, develop them**

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## **Mixed Blessing**

***FMEA***

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- The organization is not autonomous
- Some other major forced change is in progress

**If either of these exist, find out whether they are opportunities or threats, and determine if they can be turned to your advantage.**

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## **Potential Major Barriers**

***FMEA***

- Massive success
- Full delegation of the process
- A superficial “window dressing” motivation
- Extreme dysfunction in the organization

**If any of these exist, go back to the Must Haves and see if any of them really exist.**

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## **Set Realistic Objectives**

***FMEA***

- Build Steam
  - Spend time getting educated
  - Select and train a facilitator
  - Develop a first draft manual
  - Select an initial product or process
- Start execution
  - Initial plan is agreed
  - Team and facilitators are in place
  - Management is getting regular updates

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## **Set Realistic Objectives**

***FMEA***

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- 6 months
  - Targeted education for early participants well underway
  - Initial FMEA's complete and used as examples in class
  - Some early results and success stories but few tangible results
- 1 year
  - Some teams report significant progress. Several FMEA's complete and some tangible results

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## **Set Realistic Objectives**

***FMEA***

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- 18 months
  - Completed design cycle using FMEA on selected items
  - Some results are significant but not easily translated into bottom line results
  - Opponents making last stand and arguing that the process is not accomplishing much and is not worth the effort
- 2 years
  - Significant change is apparent in the style of working in many parts of the organizations
  - Several accomplishments and recognition. Some impact on results and time-to-market

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**Questions?**