



# THE QUALITY ENGINEER PRIMER

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## VII. CONTINUOUS IMPROVEMENT

**QUALITY IS NEVER AN  
ACCIDENT, IT IS ALWAYS THE  
RESULT OF INTELLIGENT  
EFFORT.**

**JOHN RUSKIN**



**VII. CONTINUOUS IMPROVEMENT  
QUALITY CONTROL TOOLS**

**V.A**

## **Control and Management Tools**

**Continuous Improvement is presented in the following topic areas:**

- **Quality Control Tools**
- **Management and Planning Tools**
- **Improvement Methodologies**
- **Lean Tools**
- **Corrective and Preventive Actions**

## **Quality Control Tools**

**Quality Control Tools are presented in the following topic areas:**

- **Cause-and-Effect Diagrams**
- **Flow Charts**
- **Check Sheets**
- **Histograms**
- **Control Charts**
- **Pareto Diagrams**
- **Scatter Diagrams**



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## **Basic Problem Solving Steps**

**The six basic problem solving steps are:**

- **Identify the problem (Select a problem to work on)**
- **Define the problem (If a problem is large, break it into smaller pieces)**
- **Investigate the problem (Collect data and facts)**
- **Analyze the problem (Find all possible causes and potential solutions)**
- **Solve the problem (Select from the available solutions and implement)**
- **Confirm the results (Was the problem fixed? Was the solution permanent?)**

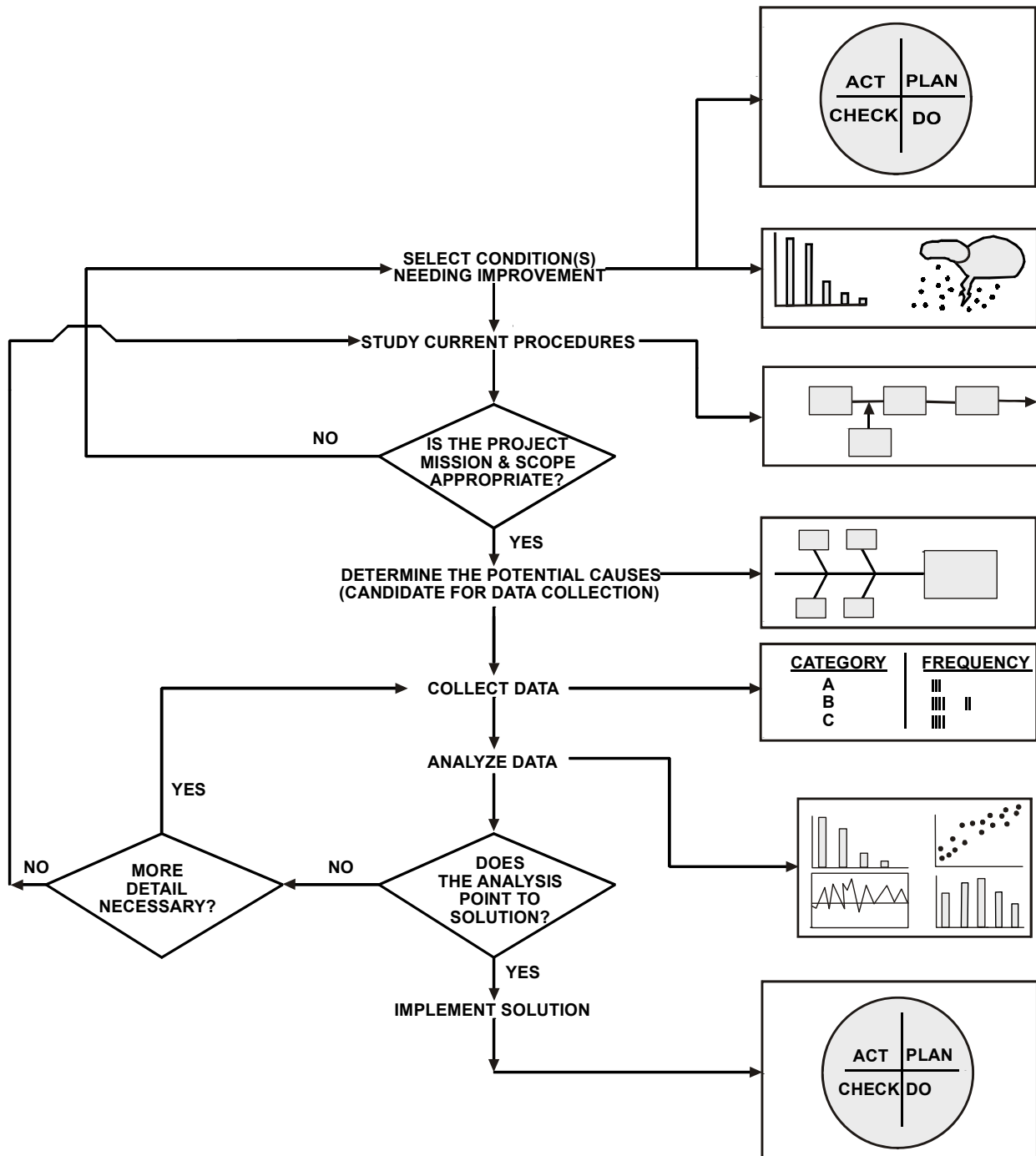
**Other problem solving techniques like PDCA and DMAIC can be used.**



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# Problem Solving Using Control Tools





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## Cause-and-Effect Diagrams

The relationships between potential causes and resulting problems are often depicted using a cause-and-effect diagram which:

- Breaks problems down into bite-size pieces
- Displays many possible causes in a graphic manner
- Is also called a fishbone, 4-M, or Ishikawa diagram
- Shows how various causes interact
- Follows brainstorming rules when generating ideas

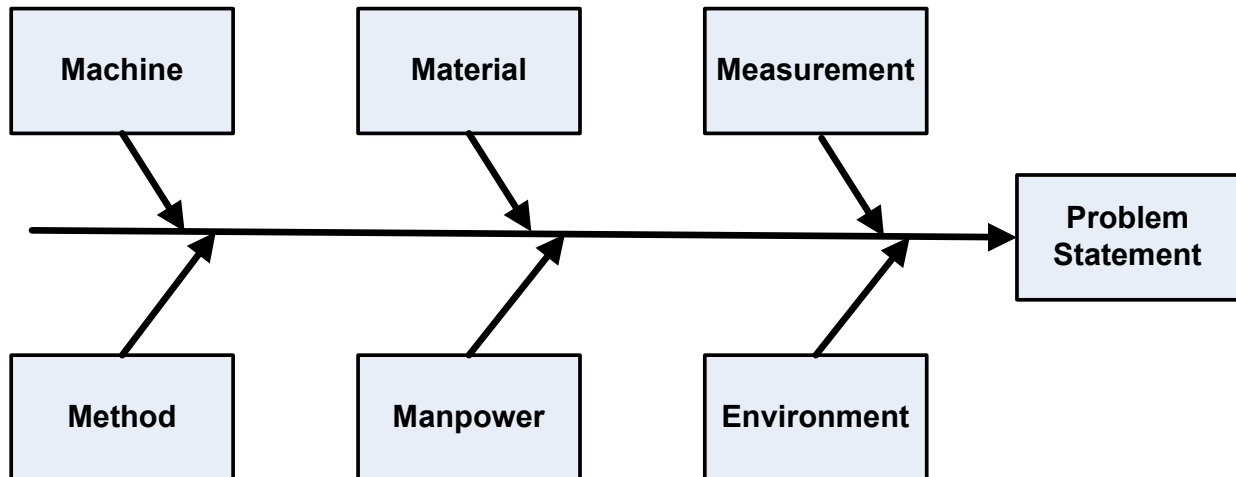
A fishbone session is divided into three parts: brainstorming, prioritizing, and development of an action plan. The problem statement is identified and potential causes are brainstormed into a fishbone diagram. Polling is often used to prioritize problem causes. The two or three most probable causes may be used to develop an action plan.



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## Cause-and-Effect Diagrams (Continued)



**Basic Fishbone 5 - M and E Example**