



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

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COIMBATORE, 641 035, TAMIL NADU



## DEPARTMENT OF AEROSPACE ENGINEERING

### 19MEE304 Total Quality Management

**Topic:** New Seven Management Tools

#### 1. Introduction to New Seven Management Tools

- **Definition:** Advanced problem-solving tools for **quality management and decision-making**.
- **Origin:** Developed in Japan during the **1970s and 1980s**.
- **Objective:** Improve **process control, problem-solving, and decision-making**.
- **Application:** Used in **Total Quality Management (TQM), Six Sigma, and Lean methodologies**.

#### 2. List of the New Seven Management Tools

1. **Affinity Diagram (KJ Method)**
2. **Interrelationship Diagram (ID)**
3. **Tree Diagram**
4. **Matrix Diagram**
5. **Prioritization Matrix (Analytical Hierarchy Process - AHP)**
6. **Process Decision Program Chart (PDPC)**
7. **Activity Network Diagram (Arrow Diagram/PERT & CPM)**

#### 3. Explanation of Each Tool with Industrial Examples

##### 1. Affinity Diagram (KJ Method)

- ✂ **Purpose:** Organizes **large sets of ideas and data** into meaningful categories.
- ✂ **Application:** Used in **brainstorming, problem-solving, and market research**.
- ◆ **Example:**
  - **Toyota:** Used Affinity Diagrams to group **customer complaints** and identify improvement areas in vehicle safety.

##### 2. Interrelationship Diagram (ID)

✧ **Purpose:** Identifies cause-and-effect relationships between complex factors.

✧ **Application:** Helps **determine root causes** of a problem.

◆ **Example:**

- **General Electric (GE):** Used ID to **analyze supply chain disruptions** and identify the **main cause of delays**.

### 3. Tree Diagram

✧ **Purpose:** Breaks down a broad goal into detailed, actionable steps.

✧ **Application:** Used in **quality planning, project management, and decision-making**.

◆ **Example:**

- **Boeing:** Used the Tree Diagram to **decompose aircraft design** into sub-systems like wings, fuselage, and avionics.

### 4. Matrix Diagram

✧ **Purpose:** Shows the relationship between different elements using a **structured table**.

✧ **Application:** Used in **Quality Function Deployment (QFD), HR planning, and risk analysis**.

◆ **Example:**

- **Samsung:** Used a Matrix Diagram to **align customer needs with product features** when designing a new smartphone.

### 5. Prioritization Matrix (AHP - Analytical Hierarchy Process)

✧ **Purpose:** Helps **rank options** based on weighted criteria.

✧ **Application:** Used in **supplier selection, process optimization, and investment decisions**.

◆ **Example:**

- **Amazon:** Used a Prioritization Matrix to **select the best warehouse locations** by evaluating factors like cost, proximity, and transport efficiency.

## 6. Process Decision Program Chart (PDPC)

✚ **Purpose:** Identifies potential failures and preventive actions.

✚ **Application:** Used in **risk management, crisis handling, and contingency planning.**

◆ **Example:**

- **SpaceX:** Used PDPC to **anticipate rocket launch failures** and plan backup solutions.

## 7. Activity Network Diagram (PERT & CPM)

✚ **Purpose:** Helps **plan and schedule complex projects** by mapping dependencies.

✚ **Application:** Used in **project management, production scheduling, and logistics.**

◆ **Example:**

- **Tesla:** Used an Activity Network Diagram to **streamline Gigafactory construction** timelines.

## 4. Benefits of the New Seven Management Tools

- ✓ Improves **decision-making and strategic planning.**
- ✓ Enhances **problem-solving efficiency.**
- ✓ Helps in **identifying root causes and relationships.**
- ✓ Facilitates **better resource allocation.**
- ✓ Reduces **risk and failure rates** in projects.

## 5. Conclusion

- The **New Seven Management Tools** provide a **structured approach** for problem-solving and quality improvement.
- These tools are widely used in **manufacturing, IT, healthcare, and service industries.**
- Integrating these tools with **AI and data analytics** can further enhance **business performance.**