



SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF AEROSPACE ENGINEERING

19MEE304 Total Quality Management

Topic: Industrial Examples

1. Automotive Industry 🚗 (Toyota, Ford, Tesla)

📌 **Application:** Monitoring defects in **car body painting process**

📊 **Control Chart Used:** c-Chart (Count of Defects Per Unit)

✅ **Example:** Toyota uses c-charts to track **surface imperfections** (scratches, bubbles) on car bodies.

Impact: Reduced repainting costs and improved first-pass yield quality.

📌 **Application:** Controlling **engine component dimensions** (e.g., piston diameter)

📊 **Control Chart Used:** $\bar{X}$ and R Chart

✅ **Example:** Ford measures **piston diameters** every hour and uses $\bar{X}$ -R charts to detect deviations.

Impact: Ensures engines run smoothly, reducing recalls due to faulty components.

2. Semiconductor & Electronics Industry 🏢 (Intel, Samsung, TSMC)

📌 **Application:** Monitoring **silicon wafer thickness** in microchip fabrication

📊 **Control Chart Used:** $\bar{X}$ and S Chart

✅ **Example:** Intel ensures consistent **wafer thickness (within ± 0.1 mm)** using control charts.

Impact: Prevents defective chips, improving semiconductor yield.

📌 **Application:** Checking failure rates in **printed circuit boards (PCB)**

📊 **Control Chart Used:** p-Chart (Proportion of Defective PCBs)

✅ **Example:** Samsung monitors **the percentage of defective PCBs** to detect supplier quality issues.

Impact: Early defect detection prevents mass recalls and maintains customer trust.

3. Pharmaceutical Industry 💊 (Pfizer, Merck, Johnson & Johnson)

📌 **Application:** Ensuring the **correct dosage of active ingredients** in tablets

📊 **Control Chart Used:** $\bar{X}$ and R Chart

✅ **Example:** Pfizer uses $\bar{X}$ -R charts to verify the **consistency of drug formulation**.

Impact: Prevents **overdosing or underdosing**, ensuring regulatory compliance (FDA).

✧ **Application:** Tracking **defective medicine batches** during quality inspection

📊 **Control Chart Used:** p-Chart

✓ **Example:** Merck tracks defective drug batches in production lines.

Impact: Quick identification of faulty batches prevents market recalls.

4. Food & Beverage Industry 🍪 (Nestlé, Coca-Cola, PepsiCo)

✧ **Application:** Controlling **moisture content in biscuits**

📊 **Control Chart Used:** I-MR Chart (Individual Moving Range)

✓ **Example:** Nestlé ensures that **cookies have the correct moisture level** to prevent spoilage.

Impact: Extends shelf life and maintains taste consistency.

✧ **Application:** Checking the **number of defective soft drink cans** per batch

📊 **Control Chart Used:** p-Chart

✓ **Example:** Coca-Cola tracks **leaky or misprinted cans** in production lines.

Impact: Reduces customer complaints and improves packaging efficiency.

5. Textile & Apparel Industry 👕 (Nike, Adidas, Raymonds)

✧ **Application:** Monitoring **thread tensile strength in fabrics**

📊 **Control Chart Used:** $\bar{X}$ and S Chart

✓ **Example:** Raymonds ensures **thread durability** using control charts.

Impact: Reduces fabric rejection rates, improving overall production efficiency.

✧ **Application:** Tracking **stitching defects in T-shirts**

📊 **Control Chart Used:** c-Chart

✓ **Example:** Nike counts **stitching errors per batch** using control charts.

Impact: Helps identify faulty sewing machines, leading to improved production quality.

6. Aerospace Industry ✈️ (Boeing, Airbus, SpaceX)

✧ **Application:** Ensuring **wing panel thickness consistency**

📊 **Control Chart Used:** $\bar{X}$ and R Chart

✓ **Example:** Boeing monitors **aluminum panel thickness** for aircraft wings.

Impact: Prevents structural failures, ensuring flight safety.

✧ **Application:** Checking the number of **faulty rivets per aircraft fuselage**

📊 **Control Chart Used:** c-Chart

✓ **Example:** Airbus monitors **defective rivets during assembly**.

Impact: Reduces rework and maintains aircraft strength.

7. Steel & Heavy Engineering Industry 🏭 (Tata Steel, ArcelorMittal, JSW Steel)

✂ **Application:** Controlling **steel sheet thickness** in rolling mills

📊 **Control Chart Used:** $\bar{X}$ and S Chart

✓ **Example:** Tata Steel ensures **uniform thickness of steel sheets**.

Impact: Reduces waste and meets client specifications.

✂ **Application:** Checking the **number of surface cracks** in steel beams

📊 **Control Chart Used:** u-Chart

✓ **Example:** ArcelorMittal inspects beams for **surface cracks per 10-meter section**.

Impact: Ensures structural integrity and prevents failures in construction.

8. Service Industry 🏢 (Banks, IT, Healthcare, Retail)

✂ **Application:** Tracking **errors in customer billing** (Banking & Telecom)

📊 **Control Chart Used:** u-Chart

✓ **Example:** Banks use u-charts to **monitor incorrect transactions per 1,000 transactions**.

Impact: Reduces financial losses and improves customer satisfaction.

✂ **Application:** Monitoring **patient wait time** in hospitals

📊 **Control Chart Used:** I-MR Chart

✓ **Example:** Hospitals track **average patient wait times** in emergency departments.

Impact: Helps optimize staff allocation and improve patient care.

✂ **Application:** Ensuring **consistent customer service response time**

📊 **Control Chart Used:** p-Chart

✓ **Example:** Call centers track **the percentage of calls answered within 30 seconds**.

Impact: Helps meet SLAs (Service Level Agreements) and maintain customer satisfaction.

Conclusion

- **Control charts are widely used across industries** to improve product and service quality.
- $\bar{X}$ -R charts help maintain **dimensional accuracy** in manufacturing.
- **p-charts and c-charts** ensure **low defect rates in mass production**.
- **Modern industries use AI-driven control charts** for real-time quality monitoring.