



ROOT CAUSE ANALYSIS

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Overview

- Definition
- History
- Methods
 - 5 Why's
 - Magnificent 7
 - Barrier Analysis
- Industry Examples
- Activity

Definition

Root Cause Analysis (RCA) encompasses a wide range of approaches, techniques, and tools used to determine and isolate the true root cause(s) of a problem.^[1]

History/**Background**

RCA expands on engineering quality management and can be accredited to **Sakichi Toyoda**, founder of Toyota Industries.^[2]

- ▶ Began with the 5 Why's in the 1930's
- ▶ In the 1980's, US joined and created 6 Sigma, a practice of quality control^[3]

Methods

5 Whys

- ▶ Help Identify the root cause
- ▶ Determine Relationship Between Root Causes
- ▶ Write down Specific Problem
- ▶ Ask Why and List Answer
- ▶ Continually Asking Why until Find Root Cause
- ▶ Loop Asking Why until Get a Consensus

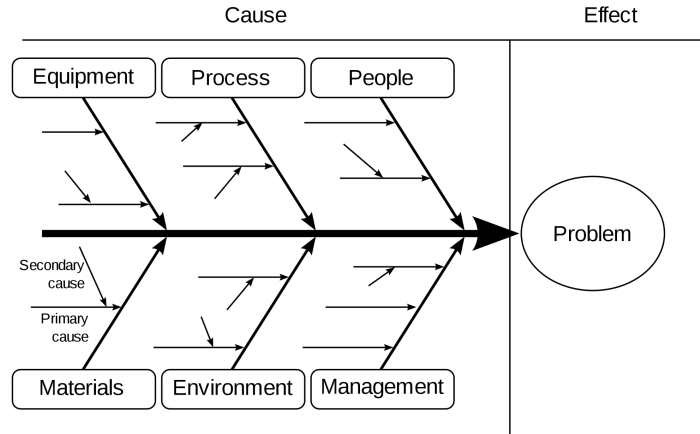
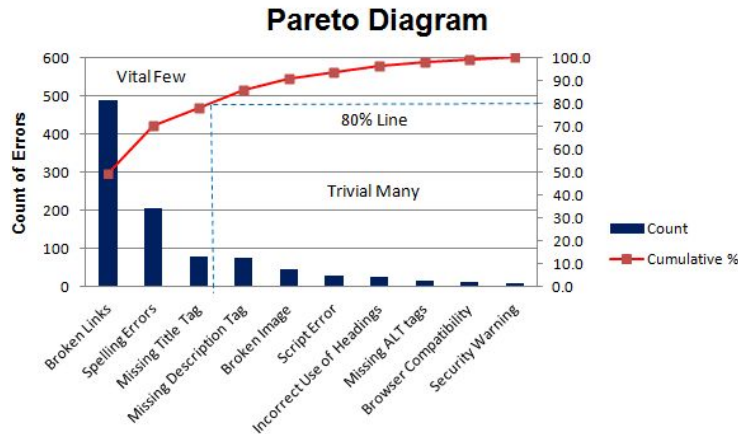
Magnificent 7

► Pareto Analysis

- ▷ Pareto Principle → the 80:20 rule
- ▷ Gather data, sort data points as %'s in decreasing order and compute cumulative frequency

► Fishbone diagram

- ▷ Cause-and-effect analysis with categorized causes



Barrier Analysis

- ▶ Target & Hazard^[4]
- ▶ What countermeasures help maintain the target?
- ▶ Barriers vs. Controls^[5]

Industry Examples

Burst Pipe



On/Off valve

Burst location

Control valve



Image from [6]

Analysis

- ▶ Visual Inspection^[6]
 - ▶ Failed By Bulging Rupture
- ▶ Material Analysis
 - ▶ Wall Became Too Thin
- ▶ What Reduced Wall Thickness?
 - ▶ Creep
 - ▶ Ratchet Effect

Patient Injury and Death Post Fall From Patient Bed



- ▶ Patient Fell from Bed^[7]
- ▶ Neck Fracture
- ▶ Failed to Rescue
- ▶ Died the Next Day

Meeting
→ Create initial flow diagram
Analyse by RCA method
- 5 Whys



Image from [7]

4 Root Causes

- ▶ Missing Immobilization Protocol^[7]
 - ▶ Make Standard Plan
- ▶ Human Error
 - ▶ Organize Personnel Training
- ▶ Not Using Morse Fall Risk Scale
 - ▶ Use it
- ▶ Wrong Mattress Model
 - ▶ Use Only One Brand of Products

Overview

Activity

Introduction

Activity

You are the manager of a department store with great inventory. Your goal is to prevent theft from happening. What are some countermeasures the store can take to prevent this?



Pair up and come up with potential countermeasures.

Discussion

- **Barriers:** Things that prevent the hazard through normal operation
- **Controls:** Things that prevent the hazard through nonstandard action

ACTIVITY SUMMARY

- ▶ Alternative RCA Method
- ▶ Conducted before a problem occurs
- ▶ Categorizes countermeasures into Barriers and Controls



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