

Quality Engineering and Management

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Continuous Improvement (Kaizen)

Lecture IX (a)
[Chapter 3 in textbook]

Sporadic vs. Chronic Quality Problems

Sporadic problems

Short term with generally dramatic, identifiable results

Addressed by traditional quality "control" methods

- control charts, Pareto analysis, etc.
- sampling inspection methods

Solutions are usually already in the arsenal

Sporadic vs. Chronic Quality Problems

Chronic problems

Systematic "waist" in the system

Requires traditional and more complex analysis

- time and resources (people involved)

Requires new approaches (DOE, failure mode analysis, etc.)

Kaizen

Means "continuous improvement"

Kai – change

Zen – good

Continuous Improvement

"Western" approach

Innovation and results oriented thinking

reliance on technology
often higher costs

Continuous Improvement

“Japanese” approach

Kaizen “process” oriented way of thinking

**if the process is well designed and run, the
“results will come” gradual, orderly and
continuously**

often lower cost approach

Kaizen

**Applicable to both
direct-labor (production)
and
indirect-labor operations**

Kaizen

Two kinds of Kaizen

**Flow Kaizen
Process Kaizen**

Kaizen

Focus on teams

Involves “all” parts of the company

(CEO to line operators)

Kaizen

**Team makeup for a Kaizen on a
particular operation**

- **members of the operation being studied**
- **members from the previous operation**
- **members from the subsequent operation**
- **support members (engineering, purchasing,
accounting, maintenance, quality, supervisors)**

Kaizen

Resources provided

**For changing a workplace
(air, electrical, water, etc.)**

**“work orders” with immediate response
(night shift maintenance)**

Kaizen

Implementation as part of the Kaizen

often a week-long event, not months

ideas that “don’t work out” are not a negative

Kaizen versus Traditional Approach

Kaizan

Small improvement

Existing or conventional knowledge

Personal involvement

Many people

Improve the process

Even in a slow economy

Gradual, orderly continuous

Traditional

Major improvements

Technology or new equipment

Financial investment

Few people involved

Improve the results

Mainly in a good economy

Short term fire-fighting

Important Kaizan Principles

Process creates results

Process components

people

machines

methods

materials

environment

Important Kaizan Principles

Focus on the total system rather than a departmental focus

A departmental optimum may not be a system optimum

Problem solution at one location causes a problem somewhere else

Important Kaizan Principles

Non-blaming and non-judgmental

**Determine “what is wrong” not
“who is wrong”**

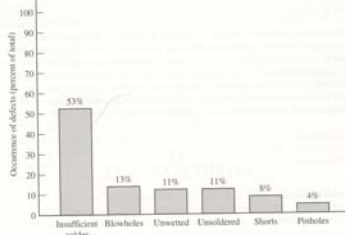
Don’t kill the messenger

Identifying with “Vital Few” – Pareto Principle

Problem identification and solution techniques

Frequency versus cost

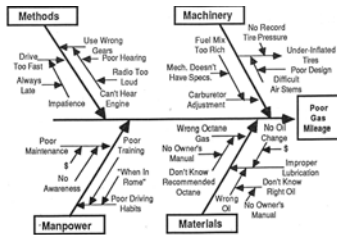
Identifying with "Vital Few" – Pareto Principle



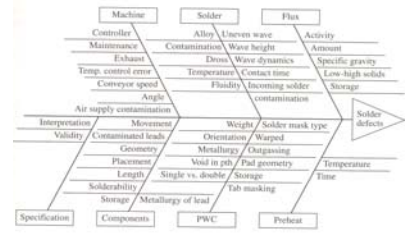
Cause and Effect Diagram

- Method
- Manpower
- Material
- Machinery
- Environment

Cause and Effect Diagram



Cause and Effect Diagram



Ergonomics and Kaizen Events

- Matching people capability and task requirements
- System "balance"
- Underutilizing human leads to lower productivity
- Over stressing human leads to quality, safety problems

Shewhart Cycle (PDCA)

P – Plan – pick a project

- Gather data (check sheets, histograms, scatter diagrams, control/run charts, etc.)
- Find the potential cause (process flow diagrams, cause/effect diagram)
- Pick likely causes (data analysis)
- Try solution (5W2H – who, what, why, when, where, how, "how much")

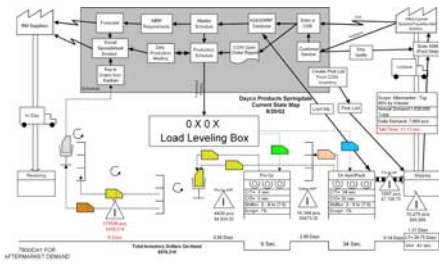
Shewhart Cycle (PDCA)

D – Do – implement solutions
C – Check – monitor results
A – Act – standardize on new process (train, fool-proof)

Deming Cycle (PDSA)

Plan a change or a test aimed at improvement
Do the change or the test
Study the results – what was learned, what went wrong
Act to adopt the change or abandon it
CYCLE - run through cycle again

Value Stream Mapping



Value Stream Mapping

