QUALITY CIRCLES

John Ceballos
Industrial Engineer

Agenda

1. The History of Quality Circles
2. Western View vs. Japanese View
3. What is a Quality Circle
4. How a Quality Circle Work
6. Strategies for Effective Quality Circles
6. Case Study
7. Conclusions

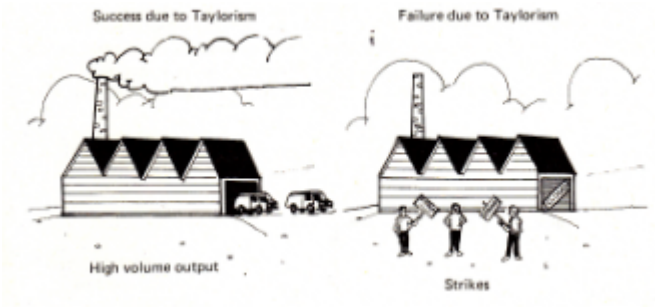
1. The History of Quality Circles

* During the early stages of the post-war reconstruction, the Japanese industries faced the following industrial problems:

1. Low job interest
2. Worker Indifference
3. Strikes
4. Absenteeism
5. Low motivation
6. Excessive sick leave

Consequences of the "Taylorism" in Japan

The Taylor Way



	"Old Way"	"Taylor Way"
Workers	500	140
Total Output	16 tons	59 tons
Wages	$1.15	$1.88

1. The History of Quality Circles

During the early stages of the post-war reconstruction, the Japanese industries faced the following industrial problems:

1. Low job interest
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Consequences of the "Taylorism" in Japan

The disadvantages of the Taylor System outweighed the benefits

QUALITY CIRCLES 

2. Japanese View vs. Western View

Japan:

- deals with quality of people
- customer-oriented
- upstream
- process-oriented, aimed at improving the total performance
- company-wide, everybody's responsibility

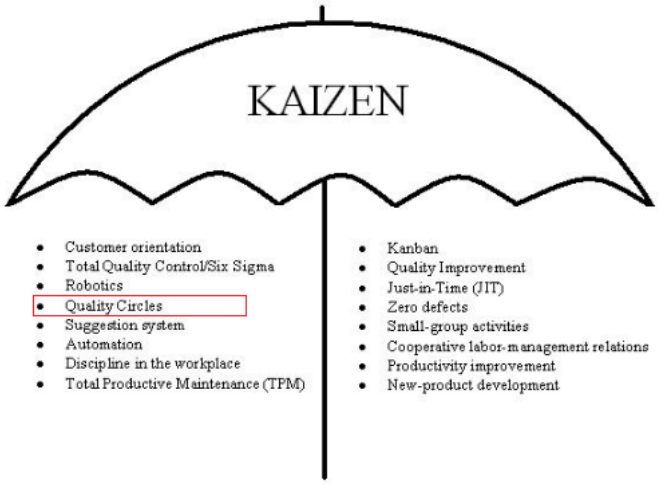
The West:

- deals with quality of products
- manufacturer-oriented
- downstream
- product-oriented, aimed at detecting and eliminating defective parts
- responsibility of quality control managers

3. What is a Quality Circle?

According to Burr and Agocs (1999) "Quality Circles is a group of employees that meets regularly to solve problems affecting their work area, generally comprising 6 to 12 volunteers"

According to Hutchins (1985) "Quality Circle is a small group of people between 3 and 12 people who do the same or similar work, voluntarily meeting together for about an hour per week in paid time, usually under the leadership of the own supervisor, and trained to identify, analyse and solve some of the problems in their work, presenting solutions to management"*



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3. What is a Quality Circle?

According to Hutchins (1985)

1. "Is a small group of people between 3 and 12 people who do the same or similar work"

- Comprise homogeneous people from the same area *
- Similar Background **
- Speak the same work language

2. "Voluntarily meeting together"

- People are free to join or leave the circle. ***
- In early stages of the Quality Circles people are invited to join the circles but not compelled.

3. "Meeting regularly for about an hour per week in paid time"

- Meetings at a time which causes least interference with work schedules****

3. What is a Quality Circle?

According to Hutchins (1985)

4. "Under the leadership of the own supervisor"

- The facilitator plays the role of the leader in the Quality Circle.*
- The facilitator helps the circle to work as a team, focus on priorities, solve problems and present solutions to management.

5. "To identify, analyse and solve some of the problems in their work"

- Quality Circles identify problems in their work area and present solutions to management.

4. How Quality Circles work?

Problems are generally solved by using ***problem-solving techniques***.

These are techniques to **identify** problems, to **collect** and **analyse** data, **examine** causes, **suggest** solutions, **evaluate** the solutions, and to **implement** them.*

The techniques include:

- Brainstorming
- Data Collection
- Data Analysis
- Pareto Analysis
- Cause and Effect analysis
- Histograms
- Control Techniques

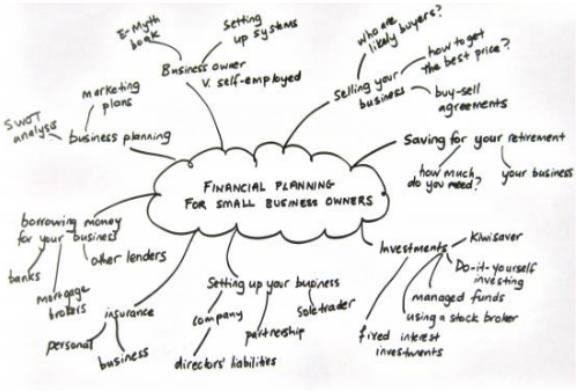
4.1-Brainstorming

The idea of brainstorming is to use the collective thinking power of a group of people to come up with the ideas they would not think of by themselves*

Brainstorming is commonly used in Quality Circles:

- To identify problems
- To analyse causes
- To highlight possible solutions**

“No discussion is allowed at this stage”***



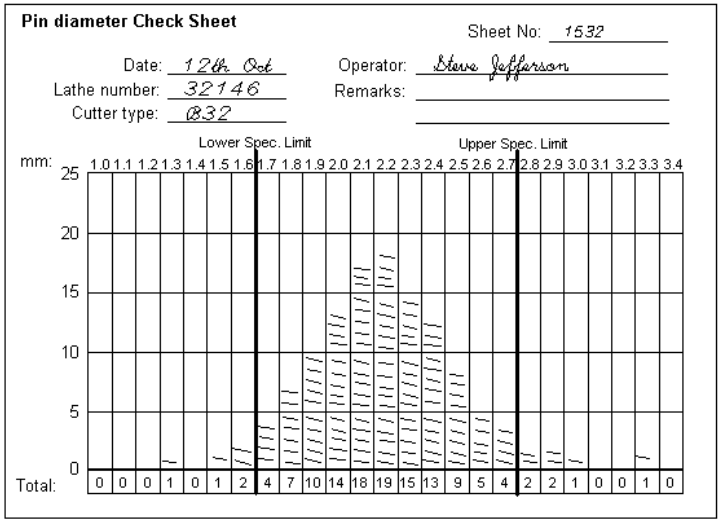
1. Non Circle controllable
2. Partially Circle controllable
3. Totally Circle controllable

****

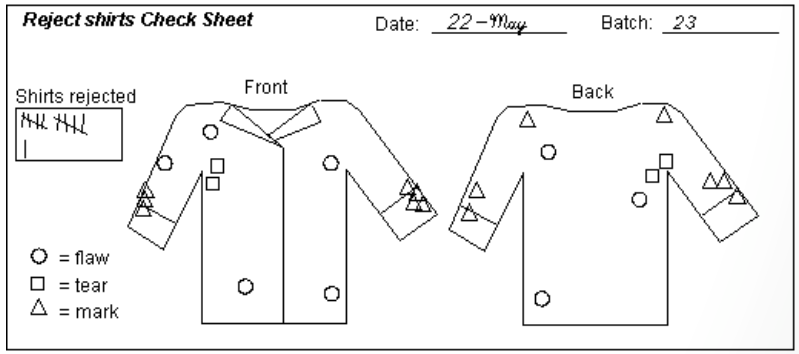
4.2-Data Collection*

The most common tool used to gathering data by Quality Circles is the **Check Sheet**.

Members of the circle must be aware of the limitations of the techniques they are using to collect data. "If they need to be more certain about the accuracy of their data, they should enlist the services of a trained statistics specialist to work with them". (Hutchins, 1985)



Process Distribution Check Sheet



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4.2-Data Collection

CHECK SHEET OF DAMAGED PARTS

DESCRIPTION								
PART A								
PART B								
PART C								
PART D								
PART E								
PART F								
OTHERS								

Name of Group _____

Date _____

Part Nos ...../ Description .....

*

FAULTFINDERS Q.C. FIREFLASH TILES DATA GATHERING

DATE MACHINE Nº

TILE	COLOUR	PRESS	P	L	1	2	3	4	5	6	7	8	9	10
D														
L														
L														
D														
NO FLASH														
?														

Typing test analysis

Date: 12th Oct

Typist: Kelly Hall Test: R324

Examiner: Jay Brown

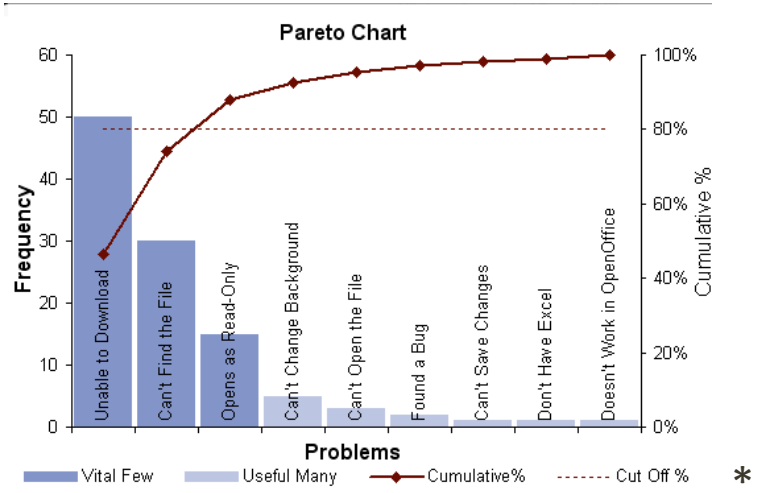
Type of error	Count	Score
Reversed letters	𝍸	5
Missing letters	𝍸 |||	8
Extra letters	𝍸	5
Wrong letters	𝍸 𝍸	10
	Total errors:	28

4.3-Pareto Analysis

With the data collected in the Check Sheets, the Quality Circles may analyze it with Pareto Diagrams, to conclude that 80% of the problem is caused by only 20% of the causes.

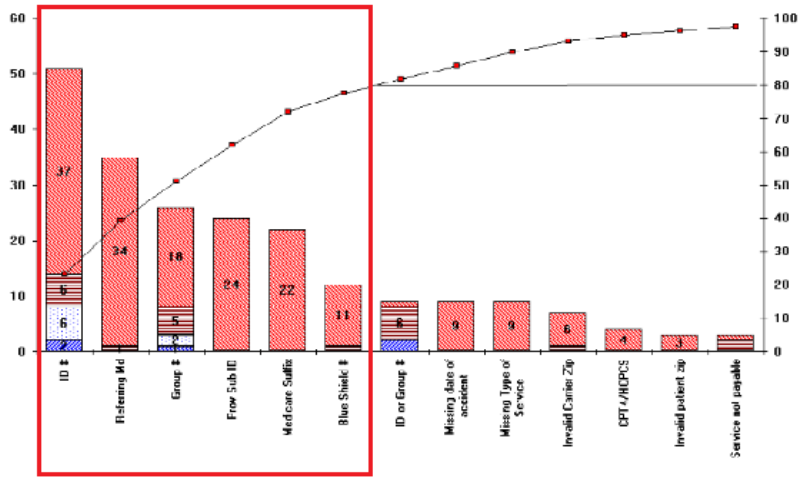
Benefits of using Pareto Diagrams

1. It is a useful way to present information to management.
2. It is a good tool to analyse the main causes of the problem
3. Can be used to compare results after improvement
4. Focus the goals of the Quality Circle

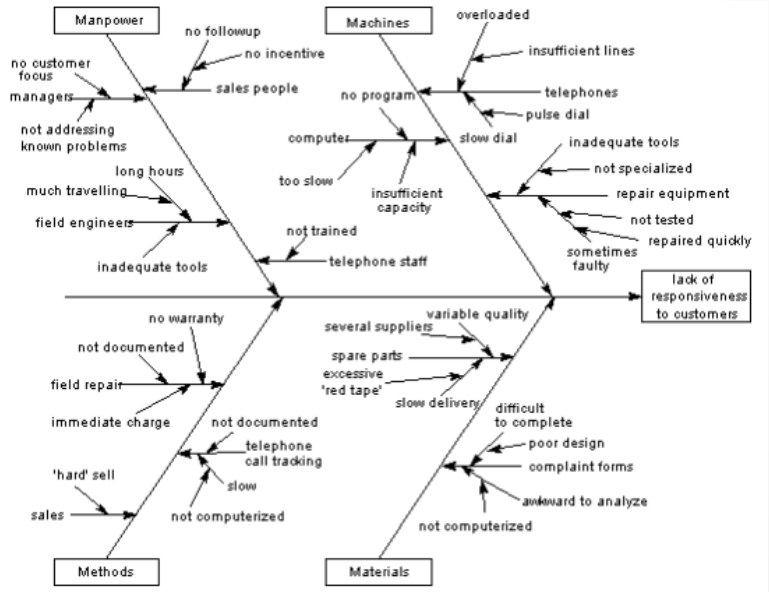


4.4 - Cause and Effect Analysis

When the principal problem has been selected by Pareto Diagrams, the next stage is to classify the most probable causes. To do this the members of the Quality Circle may use the Cause Classification Diagram



Main Causes of the Problem Identified



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4.5-Presentation

Then next stage of the Quality Circle program includes the presentation of the analysis and the solutions to the specific problem. This presentation should includes the highlight of their activities and the final conclusions of the problem

If the solution of the problem is accepted by management the solution is implemented, otherwise the solution is discarded. However, rejection by management of circle proposals is fortunately extremely rare. (Hutchins, 1985)

5. Strategies for Effective Quality Circles

The success of a Quality Circle depends on ten important characteristics (Burr and Agocs, 1999):

1.Objetives:
Objectives of QC should be well defined. Japanese view: quality of people; Western view: quality of products*

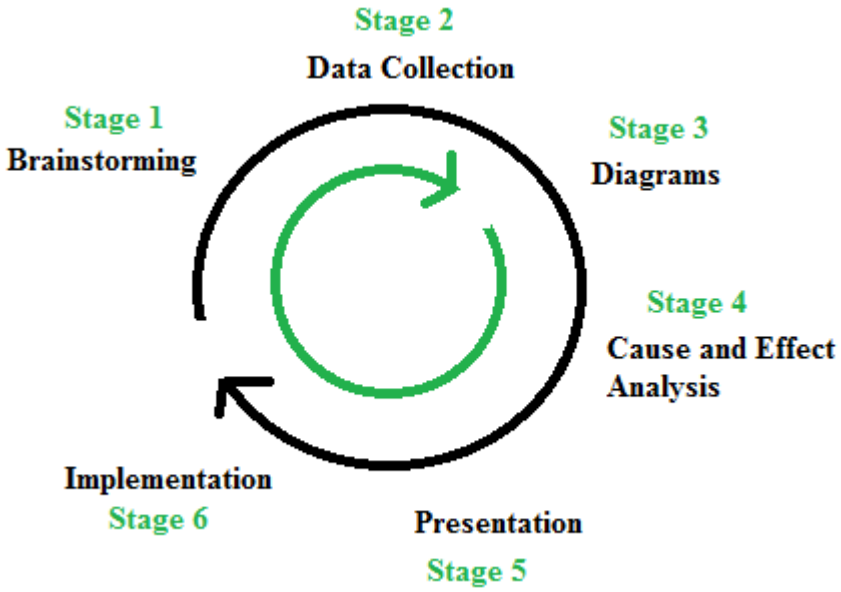
2.Meeting frequency:
The more meetings the QC makes, the less time require to the members of the circle to solve a problem.

3.Membership:
The circle membership is characterized in literature as voluntary and conformed of a group of people who do similar kinds of work.

5. Strategies for Effective Quality Circles

The success of a Quality Circle depends on ten important characteristics (Burr and Agocs, 1999):

4.Installation Process:
This characteristic defines the stages of the Quality Circle. The installation process should be done by the facilitator.



5. Strategies for Effective Quality Circles

The success of a Quality Circle depends on ten important characteristics (Burr and Agocs, 1999):

5.Leadership:
The facilitator plays the role of the leader in the Quality Circle. Is not necessary that the leader has the knowledge or the specific procedures of the topic or problem analyzed. The facilitator`s job is process oriented. *

6.Member preparation and training

Training of Facilitators
External management consultants are used for planning and initial information on circles, but not for analyze the problem itself. **
Training of members of the quality circle
Consultants are often used to train circle members.

5. Strategies for Effective Quality Circles

The success of a Quality Circle depends on ten important characteristics (Burr and Agocs, 1999):

7. Agenda for Meetings
The leader must define the activities for each meeting.

8.Rewards
There are not financial rewards for people involved in QC; however, there are some symbolic, psychological and social awards for the members of the circle.*

9.Outcomes and Evaluation
Japanese models use anecdotal data and intuition to analyse the results. Western models try to quantify the costs and benefits of circles

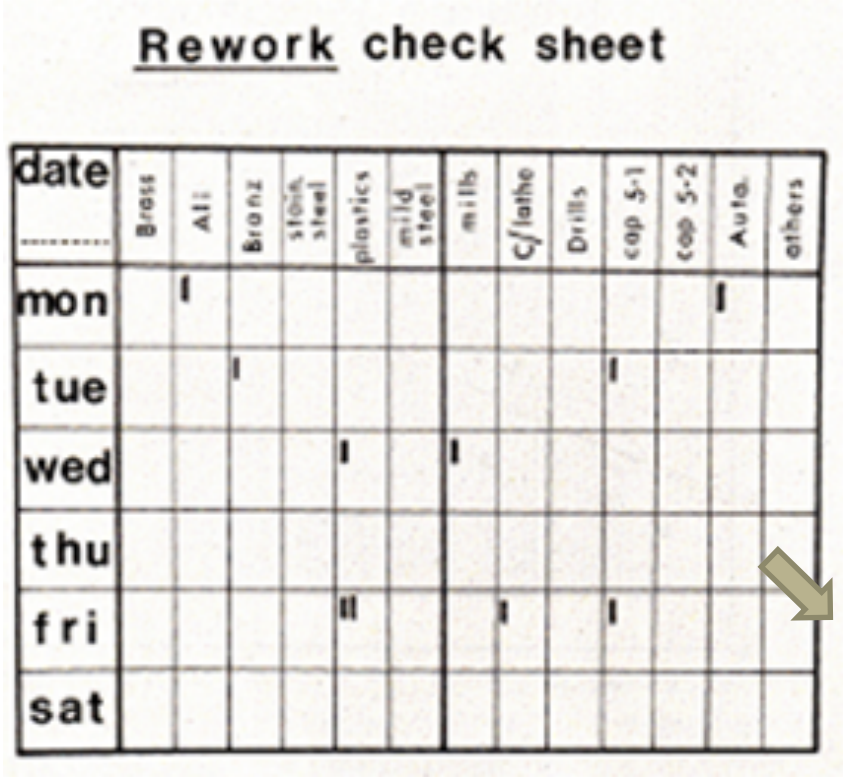
10.Life Cycle
Members of the circle need to define the life cycle of the quality circle. **

6. Case Study

I.Q.A Corning Medical, Corning Ltd, Sudbury, England (1983)

- ✓ Trying to solve some of the problems that the Machine Shop I.Q.A had, the company decided to use Quality Circles to solve some of them.
- ✓ The Quality Circle was called ENGINEERS Q. C.
- ✓ With the use of the Brainstorm technique, ENGINEERS found that the main problems to solve were the rates of rejection and rework.
- ✓ I.Q.A had reject rates of 12.6% for the first two periods of 1983

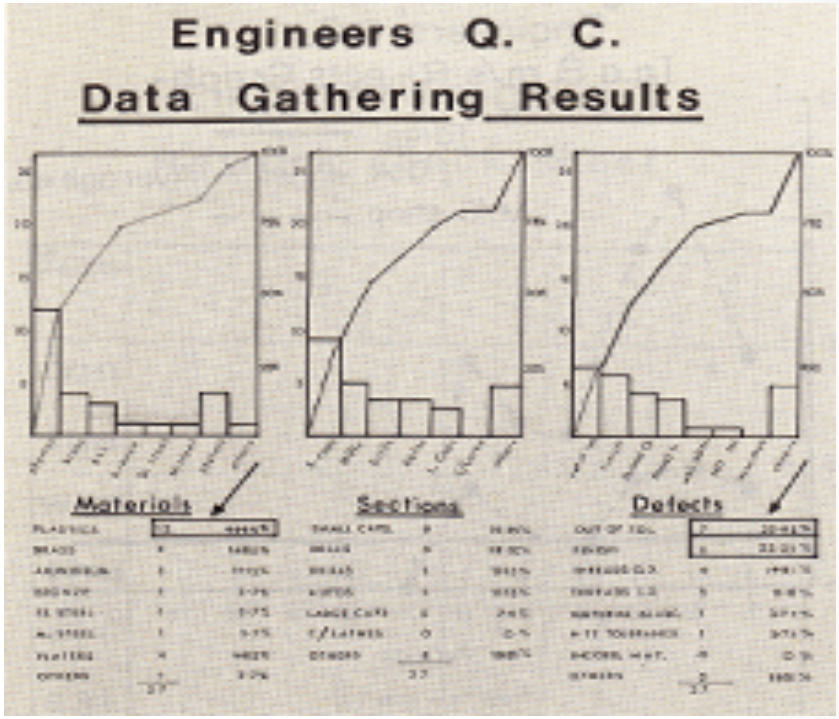
6. Case Study



Rework check sheet

date	Brass	Ali	Bronz	stain. steel	plastics	mild steel	mills	C/lathe	Drills	cap 5-1	cap 5-2	Auto.	others
mon		I										I	
tue			I							I			
wed					I		I						
thu													
fri					II			I		I			
sat													

Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London. *

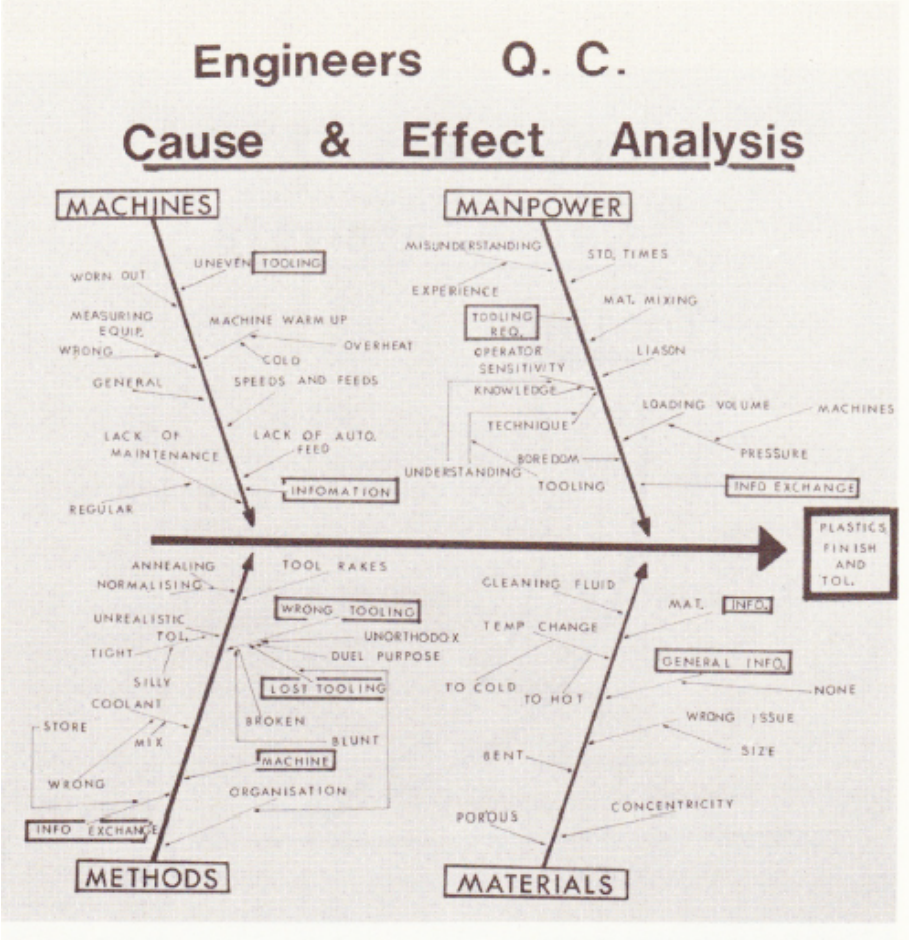


Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London. **

"Participation by all machining personnel was critical for this stage"

Main Causes : "Plastic, Finish and Tolerance"

6. Case Study



Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London.

It was concluded that the main causes on the effects of PLASTICS, FINISH and TOLERANCE:

1. TOOLING
2. INFORMATION EXCHANGE
3. MACHINES

6. Case Study

CIRCLE EXPENDITURE

902 REF. BLOCK FIXTURES	
2″ × 2″ × 18″ GROUND STOCK	£30.00
50 – 5.0 mm DOWEL PINS	£3.30
LABOUR – 9 HRS × £5.14	£46.26
902 N.A. BLOCK FIXTURES	
3″ × 0.5″ × 18″ GROUND STOCK	£15.00
75 – 5.0 mm DOWEL PINS	£4.95
LABOUR – 7 HRS × £5.14	£35.98
TURNING FIXTURES	
2 TURNING FIXTURES FROM SCRAP MATERIAL AND MADE IN CIRCLE MEMBER'S OWN TIME	
COST TO COMPANY	ZERO
STATIONERY	£20.00
PRESENTATION SLIDES AND PHOTOGRAPHS	£12.25
MEETINGS	
154 HRS × £5.14	£791.56
PROPOSED SOLUTIONS	
ZERO	
TOTAL COSTS =	£959.30

Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London.

6. Case Study

DIRECT SAVINGS – 1984

ALL COSTING AT LABOUR RATE £5.14

902 N.A. BLOCK: MILLING

TIME SAVED TO MACHINE ONE BLOCK = 0.46 HRS
ESTIMATED NO. OF UNITS FOR 1984 = 1560

SAVING: 0.46 HRS × L.R. £5.14 × 1560 = £3688.46

902 REF. BLOCK: MILLING

TIME SAVED TO MACHINE ONE BLOCK = 0.32 HRS
ESTIMATED NO. OF UNITS FOR 1984 = 780

SAVING: 0.32 HRS × L.R. £5.14 × 780 = £1282.94

902 K BLOCK: TURNING

TIME SAVED TO TURN ONE K BLOCK = 0.04 HRS
ESTIMATED NO. OF UNITS FOR 1984 = 780

SAVING: 0.04 HRS × L.R. £5.14 × 780 = £160.36

902 REF. BLOCK: TURNING

TIME SAVED TO TURN ONE REF. BLOCK = 0.05 HRS
ESTIMATED NO. OF UNITS FOR 1984 = 780

SAVING: 0.05 HRS × L.R. £5.14 × 780 = £200.45

480 ROTOR HOUSING: PROTOTYPE TAPS

ESTIMATED NO. OF ROTOR HOUSINGS 1984 = 520
NO. OF NORMAL TAPS REQUIRED
= 104 AT £1.48 EACH = £153.92

NO. OF PROTOTYPE TAPS REQUIRED
= 10 AT £5.25 EACH = £52.50

SAVING: £153.92 – £52.50 = £101.42

TOTAL DIRECT SAVINGS = £5433.63

Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London.

6. Case Study

QUALITY IMPROVEMENT SAVINGS

All calculations are based on:

1. A department hourly rate of £5.14.
2. Broadload figures and estimates provided by Planning.
3. Reject data and year end estimates provided by I.Q.A.
4. An assumption that 80% of rejects involve rework.

ACTUAL DATA FOR 1982

Broadload hours including contract and O.E.M.	43000
Year end rejection rate at 7.1%	3053
Given 80% of rejects involve rework	2442
Rework costs based on £5.14/hour	£12.6K

ESTIMATED DATA FOR 1983

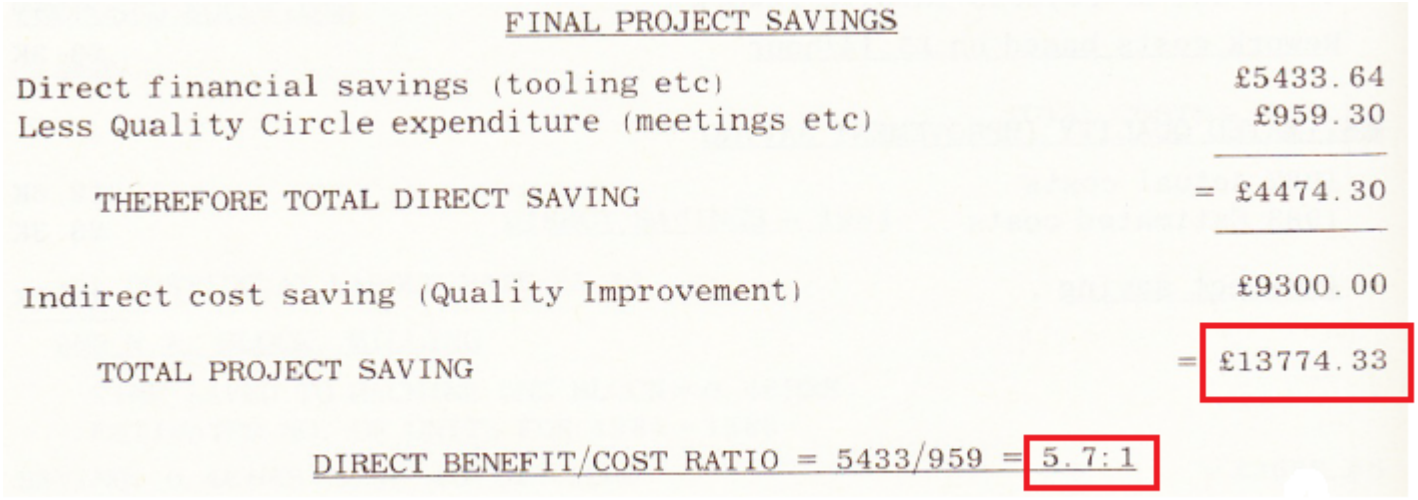
Broadload hours including contract and O.E.M.	40000
Year end reject rate 2.0% (P1 − 10 = 2.08%)	800
Given 80% of rejects involve rework	640
Rework costs based on £5.14/hour	£3.3K

ESTIMATED QUALITY IMPROVEMENT SAVING

1982 Actual costs	£12.6K
1983 Estimated costs	£3.3K
Indirect saving	£9.3K

Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London.

6. Case Study



FINAL PROJECT SAVINGS

Direct financial savings (tooling etc)	£5433.64
Less Quality Circle expenditure (meetings etc)	£959.30
THEREFORE TOTAL DIRECT SAVING	= £4474.30
Indirect cost saving (Quality Improvement)	£9300.00
TOTAL PROJECT SAVING	= £13774.33

DIRECT BENEFIT/COST RATIO = 5433/959 = 5.7:1

Source: Hutchins, David. (1985) Quality Circles Handbook, Long Acre, London.

Summary and Achievements

1. Greatly improved quality
2. Increased motivation within the machine shop
3. Improved working relationships with other departments through QC.
4. Reduced material costs of scrap
5. Increased customer confidence as a result of all the achievements.

7. Conclusions

"Japanese management philosophy, which supports Quality Circles is responsible for some 16% of the total profit of Japanese industry, and in one large company it is claimed that Quality Circle successes contribute 25% of the profits" (Hutchins, 1985)

"Quality Circles are the most excitement and profound approach to management to have become established in the world since the advent of scientific management" (Hutchins, 1985)

"Any tool with this potential needs to be implemented"

Thanks