TECHNO TREND
knowledge is power

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FROM MANAGING DIRECTOR'S DESK ON SILVER JUBILEE YEAR

On entering the New Year 2013, I express my feeling of great satisfaction to you my dear well-wishers. Because on 1st March 2013, M/s Trivedi & Associates Tecknical Services (P.) Ltd. is completing 25 silver jubilee years of its inception in 1988.

On 1st March 1988, I started this venture from the scratch with a dream in the eyes to provide selfless technical services to the industries of Gujarat and India as well. This journey of 25 yeas was very exciting for me because it was full of "ups and downs" and "hits & misses" and ultimately it is found to be very glorious, successful and satisfactory.

During the process of achieving this milestone of successful completion of 25 years, we gained knowledge and experience through the company's various knowledge and expertise sharing activities of organizing frequently technical seminars and publishing useful technical reference books for the benefit of engineering fraternity.

We also published and distributed various books related to social, spiritual and health care purpose with no cost just to carry out social responsibilities.

Thus, we could able to earn the reputation as quality engineering and social service provider. So today, I have the great feeling of satisfaction of having done something for the society and the industries which have given me a lot during these 25 years.

But friends, we could achieve this milestone only because of your patronage, support and co-operation throughout the period. And at this juncture, I convey my deep sense of gratitude to one and all who have contributed bits and lots for achieving this milestone. In this regards, I thank to all my directors, staff members, business associates and off course my family members.

With this word of gratitude, I wish all of you and your family members a very happy and prosperous new year 2013.

With kind regards to all,

P. N. Trivedi
Managing Director
T&ATSPL

REPORT ON SEMINAR ON "Quality, Productivity & Value Engineering" (Part-I)

QUALITY

(I) What is Quality :

Quality can mean different things to different functional components,

Within the same organization. Thus, it can mean

- Engineering specification to design;
- Rejection and complaints, to production;
- Conformance to specification, to inspection;
- Demand for the product, to sales;
- Usability including visual appeal, to customers;
- All the above at lower cost, to management;

(II) Definition :

Quality : "Fitness for use "

The totally of features and notable definitions characteristics of a Product or service that bears on its ability to satisfy stated or implied needs.

- American society for quality "A subject term for which each person has his or her own definition. in Technical usage , quality can have two meanings :

  a The characteristics of a product or service that bear on its ability to satisfy Stated or implied needs.

  b A product or service free of deficiencies.

- Subir Chowdhury: ''Quality combines people power and process power.
- Philip B. Crosby : 'Conformance to requirement." the Requirements may not fully represent customer expectations; Crosby treats this as a separate problem.
- Peter Drucker : "Quality in a product or service is not what the supplier puts in, it is what the customer gets out and is willing to pay for."
- W. Edwards Deming : concentrating on 'the efficient production of the quality that the market expects," and he linked quality and management: "Costs go down and productivity goes up as improvement of quality is accomplished by better management of design, engineering, testing and by improvement of processes."
- ISO 9000 :" Degree to which a set inherent characteristic fulfills requirements. "The standard defines requirement as need or expectation.
- Joseph M. Juran : "Fitness for use. " Fitness is defined by the customer.
- Robert Pirsig "The result of care. "
- Six Sigma : "Number of defects per million opportunities."
- Gerald M. Weinberg : " Value to some person"
- Noriaki Kano and others, present a two –dimensional model of quality: "must-be quality" and "attractive quality." The former is near to fitness for use "and the latter is what the customer would love, but has not yet thought about. Supporters characterize this model more succinctly as : "product and services that meet or exceed customer's expectations.
- Genichi Taguchi, with two definitions :

  a. "Uniformity around a target value. "the ides is to the standard deviation in

  outcomes , and to keep the range of outcomes to a certain number of

  Standard deviations, with rare exceptions.

  b. "The loss a product imposes on society after it is shipped." This definition of

  Quality is based on a more comprehensive view of the production system.

Quality Policy :

The overall quality intentions and directions of organization as regards quality as formally expressed by top management.

Quality System :

The organizational structure, Responsibility, Procedures, processes and resources for implementing quality management.

There are five aspect of quality in a business correctly

1. Producing : providing something.
2. Checking : confirming that something has been done correctly.
3. Quality Control : Controlling a process to ensure that the outcomes are Predictable.
4. Quality Management : directing an organization so that it optimizes its Performance through analysis and improvement.

5. Quality Assurance : obtaining confidence that a product or services will be Satisfactory. (Normally performed by a purchaser).

(III) Measurement and analysis of quality costs

Background

1. Every company is incurring costs to achieve quality no matter whether it has

prevention oriented QC function or sorting-inspection type QC. Accounting of the quality costs is not done in most of the plants. In fact the experience shows that most of plants do not appear to have felt the need for accounting the quality costs as the selling prices 'allow' for major quality losses. This has to be got over, especially in the sectors exposed to competition.

Quality losses – avoidable ones

2. The total of all avoidable quality losses is termed as 'gold – in – the –mine '.

This gold –in –the- mine is evaluated by asking the question 'what present losses would disappear if all defects disappeared'? The individual major losses leading to gold-in-the-mine can be classified as follows:

Tangible : Materials scrapped or junked

Labour and overhead on product scrapped Labour, materials and overhead necessary to affect repairs on Salvageable product

Extra operations added because of presence of defectives

Excess inspection costs Discount on second

Charges on quality guarantee – free replacement Downgrading of product

Returned material repair and processing

Intangible : Delays and stoppages caused by defectives customer goodwill Loss in morale due to friction between persons in different departments within an Organization.

Delay in getting Payment on account of not meeting required Quality at first instance.

3. According to the experience of Dr. J.M. Juran, one of the world renowned figures in the field of QC. and the cost of a quality improvement programme 'is in the range of 10-40 % of the gains'.

This observation of Dr. J.M.Juran refers to industrially advanced nations like U.S.A. Hence, the scope for savings and cost reduction in our industry is much more. Thus, 'Gold-in-the-mine for our industry will turn out to be 'Diamond-in- the-mine'.

Objective of quality program

4. Therefore, the objective of quality program in your company can be sent as achieving the required quality at economic cost through minimizing quality losses. This is not an easy task. It calls for a new approach to QC touching such basic and fundamental issues like management policy on quality; objectives of quality program; organization of QC; manual on quality control procedures etc.

Quality cost categories

5. The four broad categories of quality costs are costs of prevention , appraisal, internal failure and external failures. Cost of internal and external failures generally represent avoidable quality losses. These four categories are recommended by the quality Cost Committee of the American society of quality control.

6. The definition of these four categories of quality costs are as follow:

a) Prevention : The costs associated with personnel engaged in designing, Implementing, maintaining and auditing the quality system.

b) Appraisal : The costs associated with measuring evaluating or auditing of products, components and purchased materials to assure Conformance with quality standards and performance Requirements.

c) Internal : The costs associated with defective products, components and Failures materials that fail to meet quality requirements and result in Manufacturing losses.

D) External : The costs due to supply of defective products to customers.

Failures

7. Generally, a slight increase in the cost of prevention and appraisal bring in Considerable reduction in costs of internal and external failures accomplished by a significant reduction in the overall quality costs.

8. In recent years many companies are taking steps to organise systematic and Effective QC measures in the plant. This has meant increased investment

and expenditure in the activities related to QC. Therefore, it is very essential for these plants to take to systematic accounting of the quality costs in order to assess the overall–cost-gains to the company.

9. Costs elements – enumeration

Prevention :

a) Quality planning and process control planning
   I) Quality planning –quality control engineering – type work
   II) Process quality control – that portion of compensation and costs associated with implementing the quality plans and procedures.
b) Design and development of quality measurement and quality equipment.
C) Quality planning by functions other than quality control.
d) Quality training.
e) Other prevention expense

Appraisal :

a) Receiving or incoming test and inspection
b) Laboratory acceptance testing
c) Inspection and test
d) Checking labour
e) Set – up for inspection and test
f) Inspection and test material
g) Quality audit
h) Outside endorsements or approvals
I) Maintenance and calibration of test and inspection equipment
j) Review of test and inspection data
k) Field testing
l) Internal testing and release
m) Evaluation of field stock and spare parts.

Internal Failures :

a) Scrap
b) Re-work And repair
c) Trouble – shooting
d) Reinspect, retest
e) Scrap and rework – fault of vendor
f) Material review activity
g) Downgrading

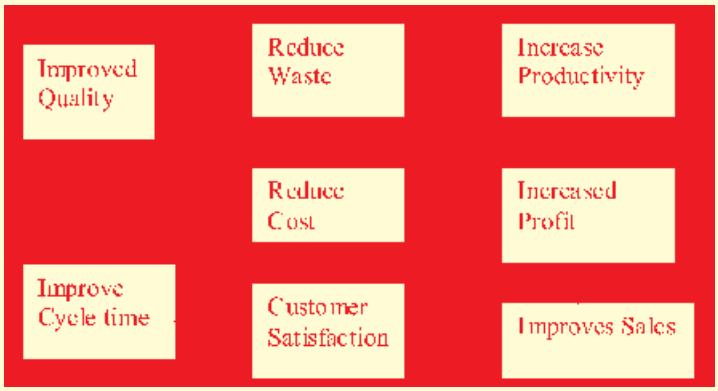
External Failures

a) Complaints
b) Product or Customer Service
c) Returned Material Repair
d) Returned Material Processing
e) Warranty Replacement
f) Engineering Error
g) Factory or Installation Error

(IV) Quality Attraction

Customer	Company
Suitability	Customer Satisfaction
Durability	Customer Confidence
Reliability	Decrease in warranty expenses
Safe Workability	Negligible Conflict
Affordability	Adding Goodwill
Contentment	Business Development

(V) Quality and Profitability Relation :



(VI) Employee's Needs :

Physiological Needs: Opportunity Increase Earning by Bonus for Good Work i.e. Minimum subsistence earning.

Safety Needs : Job security –Quality makes – Sales make jobs i.e. The need to remain employed at appropriate level

Social Needs : Appeal to the Employee as a member of team he or she must not let the team down i.e. the need to belong to a group and be accepted.

Ego Needs : Appeal to pride of workmanship, to achieve good score Recognisation through awards, publicity etc.

i.e. the need for self respect and the respect of others.

Self fulfillments : Opportunities to propose creative ideas, to participate in creative planning i.e. the urge for creativity, self-expression

Job Dissatisfaction

- Low Pay
- Poor Working Condition
- Unpleasant for promotion

Job Satisfaction

- Job Challenges
- Opportunities for creativity
- Identification with Groups
- Responsibility for planning
- Reasonable pay structure

(VII) Motivation

Job Design and planning

- Worker's self control
- Process control criteria rather than product criteria

Recruitment :

- An outward image of attention to quality.

Training :

- Technological information on specification, standards, facilities Processes, tools, materials, product.
- Reasons behind the instructions – orders to do good work are Despersonalised.
- Worker's responsibility for taking actions and making decisions.
- Knack – the answer to worker's logical question "what should I do different from what I am doing now?"
- Worker's participation in problem solving

Supervision :

- Seeing that facilities are kept in good repair.
- Giving adequate priority to quality in relation to other parameters.
- Listening to worker's idea with an open mind.
- Praising good work as well as criticizing poor work.
- Setting a good example.

Communication To Employees ;

- Manuals of procedures-which includes aids to doing good quality Jobs
- Journals, Bulletins, Slogans and Posters for general Communication direct to the work force - Meetings – to discuss quality of work
- Specific needs- Quality "Cues" to provide information about the Knack to be used in specific operation.

Quality Incentives :

- Recognisation through publicity, awards, prizes etc.
- Delegation of special responsibility e.g. Self inspection
- Presentation of certificates of qualification
- Training
- Participation in work projects, Planning etc.

(VIII) QC Activities by Different Functional Group

A) Design :

(a) For standard item of the company

1. Check – List on Sources of Information Aiding In design; Documentation system aiding in information recording and retrieval so valuable in preparing the proper design – brief.
2. Procedure for achieving standardisation regarding raw material sizes; component specification, fits and tolerances.
3. Procedure for standardisation in preparation of drawings (Prints) ; to prevent wrong reading and misinterpretation of drawings ; control of errors in drawing .
4. Design review procedure to ensure that all the know – how available in the entire plant (not design department only) is utilised ; to anticipate the possible flaws to be encountered during manufacture and thus avoiding them
5. Procedure for issuance and withdrawal of prints to ensure that the latest ones are used in the plant.
6. Procedure for seeking deviation from standards.
7. Procedure for seeking changes and or

modifications in standards.

8. Information feed-back system from all the different functional groups on all matters related to quality to progressively improve design.

(b) For Made to Order Item (Sub-Contracted by other organisation)

1. Ensure that clear and unambiguous drawings are available for each order.
2. Drawings are available to the operators during production.
3. Obsolete drawings are taken out from the shop or each work order accompanying latest drawings.
4. Design Change notice is communicated to the operators and inspectors quickly.
5. Procedure for seeking deviation from standards.
6. Procedures for maintenance of legibility of the drawings used in the shop.

B) Purchase :

1. Procedures for placing the orders with clear specification.
2. Procedures for systematic vendor development/ routine vendor control.

C.) Tool Room / Crib :

1. Inspection of tools.
2. Tool try – out and tool-providing
3. Procedure schedule to ensure that the right tools are issued to shop.
4. Feed-back on shop s difficulties in the use of jigs, fixtures.

D) Manufacturing :

1. Process control plans
2. Capability analysis
3. Procedure for resolving problems arising out of non- compatibility of process followed by various process recommended.
4. Information feed-back system on quality performance.

E) Inspection :

1. Inspection planning
2. Standardization of inspection regarding sensory characteristics like roughness, noise,etc.
3. Maintenance of inspection equipments, instrument and gauges.

F) Personnel :

1. Quality training and motivation schemes.
2. Quality –based incentive plans.

G) Sales and services :

1. Customer education on product installation, use, maintenance.
2. Procedure for processing of customer complaints and feed – back to concerned departments to stimulate prevention activity.
3. Procedure for getting comparative quality information on products of own manufacture and competitor's including costs of maintenance etc.

H) Maintenance :

1. Proper up –keep of machines and equipments through preventive maintenance programme.
2. Proper up-keep of shop floor, material handling devices to facilitate material flow without damage to products.

I) Material Control :

1. Timely procurement of material of required quality in adequate Quantity.
2. Proper storage and handling materials.

(IX) Quality Control

Control : Process we employ in order to meet established standards

Steps :

- Choosing the control subject

- Choosing a unit Measure
- Setting a standard or goal
- Choosing a sensing device which can measure the control subject.
- Measuring actual performance
- Interpreting the difference between actual and standards.
- Taking action on the difference.

Operator controllable defects classification & action

1. The Classification of defects due to operators and their meaning are given below:

Classification	Definition
Lack Of Skill :	The Operator is unintentionally falling to comply. He is aware of the errors as he makes them, but he is unable to eliminate the errors; he is not skilful enough.
Willful errors :	The operator is deliberately failing to comply. He could comply, but he has no intention of doing so, for reasons which are good enough for him.
Inadvertence :	Not only is the error unintentional; the operator is even unaware that he has made the error.

2. For reducing the errors due to 'lack of skill' studies to identify.

a) the consistently 'best' and 'worst' operators:

b) working methods associated with the best and worst;

c) differences in the work methods between the best and worst termed as '

'Knack' and extending the 'Knack' to all operators need to be Undertaken.

3. Wilful failures are due to

a) the operator believing that quality standard is unimportant;

b) facing what he considers as a hopeless problem to meet all the multiple Requirements.

C) Conflicting standards, having grudge against the company or boss

d) Incentive schemes.

The remedy for willful errors is

- Quality Motivation – Zero defect programme – Quality Circle

Assessment of controllability

: Check List :

I. Does the operator know what he is supposed to be doing?

a) Are there specification or instructions which apply to this operation?

I) Are they written down? If written in more than one place, do all agree?

II) Is visual defects, are there standard samples?

b) Does operator have access to them?

c) Does he actually refer to the m in practice?

d) Does he really understand them?

e) Are those specific specifications the sole criterion of acceptability (i.e., no Longstanding verbal instructions which countermand them)?

f) Does operator know whom to consult to give official interpretation of the Specifications in doubtful cases?

g) Does operator know how the product is used? Has he seen it used?

h) Does operator know the full consequences of his failure to meet the specifications?

I) Does inspection usually inspect to the specifications?

I) Are deviations rare?

II) Do they require o.k. by higher authority?

J) Does foreman review specification with operator from time to time?

k) Does operator receive specification changes automatically and promptly?

l) Does operator know what to do with defective raw material?

m) Does operator know what to do with defective finished products?

II. Does operator know what he is doing ?

(a) Are gauges or measuring equipments provided?

I) Do they show how the process is doing rather than sort good from bad?

II) Are they available to the operator?

III) Are they adequately checked and maintained?

IV) Are the precise enough to give repeatable readings on the same unit of product?

(b) Is operator told how often to sample his work?

I) Is time allowed on the job rate for this sampling?

II) Is allowed time sufficient?

(c) Is operator told how many pieces (or readings) to sample?

(d) Is operator told the criteria on which he should decide to correct the process?

(e) Is there any independent check as to whether the operator actually follows the Specified sample size, frequency, and adjustment criteria?

(f) Is operator required to record the results of this check?

(g) Does anyone verify the accuracy of these records?

(h) Is operator always notified of inspection rejections?

(i) Are inspection data fed back to the operator for his use?

(j) Does foreman have a record of operator quality performance?

(k) is this record shown to and discused with operator?

III. Can operator regulate the processes?

(a) Is there a swift, sure adjustment operator can make to eliminate defects when they occur?

(b) Has the quality capability of this process been measured?

(c) Is the quality capability within the tolerance allowed by the specification ?

(d) Does operator make his own decisions as to when the process requires correction (as opposed to having them made by foreman or patrol inspector)?

(e) Does operator know what do to if criteria for action are exceeded?

i) Under what conditions he takes correction action?

ii) What Action?

iii) Under what conditions he shuts down and seeks help

iv) Whose help?

(f) Have the operator actions which cause the defect been written down and given to him?

(g) Have the operator actions which can prevent the defect been written down and given to him?

DOMINANT SYSTEM

Typical Operations

&

Control Systems

Set – UP dominant	Machine dominant	Operator dominant	Component dominant
	Typical Operation		
Punching drilling cutting to length	Packaging staking screw machining	Are welding Hand soldering, grinding	Watch assembly Auto assembly other mechanical assembly
Broaching Die cutting Moulding Coil Winding Labeling Sheet-metal bending Flame Cutting Heat Sealing Printing Mimeographing Die Drawing	Automatic Curring Volume filling Weight filling Paper making Wire enameling Wool Carding Resistance welding	Steel rolling Turret – lathe running Spray painting Electronics "trimming" Hand packing Repairing Adjusting Inspecting Card punching Filing order Filing Shoe lasting	Plastics Assembly Electronics assembly Tube making Food formulation Vegetable packing

Typical Control Systems During Manufacture			
Set – Up approval Inspection	Set –up approval inspection Periodic Inspection	Acceptance Inspection	Vendor rating Incoming Inspection
Lot plot Pre – control	X Chart, median chart	P Chart C Chart	Prior operation control
Narrow –limit gauging Attributes Visual Inspection	X and R chart pre – control Narrow limit gauging P chart Process variables check Automatic recording	Operator scoring	Acceptance inspection

(X) Inspection:

Definitions :

Dr. W.R. Spriegel: Process of measuring the quality of a product or service in terms of the established standard.

Kimball : Art of comparing materials, products or performance with established Standards.

Alford & Beatly : Art of applying tests. Preferably by the aid of measuring appliances to observe whether a given form of product is within the specified limit of variability.

Qualification of Inspector :

- Know his job thoroughly
- Knowledge and skill
- Intelligent, capable and good grasping power.
- Understanding responsibilities and able to work with patience
- know statistical quality control techniques.
- Cost conscious – not set unnecessary strict and narrow limits.
- Prevent or minimize wastage by using a substitute to the material already in use.
- Working knowledge of the general quality standards.
- know the reasons of standards through an understanding of materials and process.

Inspection standards :

- Raw materials
- Working process
- Work in process.
- Finished Products.
- Completed mechanism.

Chief Inspectors or manger's Responsibility

- Organize and supervise the work of inspecting staff.
- Train the staff.
- Reject the products which are below standard.
- Inspection reports/ Analysis
- Rejection reports / Analysis
- Quality costs.
- Care of costly inspection equipments.

Functions / Areas of inspection department

- Raw Material inspection.
- Metallurgical and metallographic inspection.
- Purchase parts' Inspection.
- Work in process inspection.
- Tools' Inspection.
- Periodic gauge and other measuring instruments' inspection.
- Finished products' inspection
- Salveging
- Complaint's Analysis & Corrective measures.

Kinds of Inspection :

1) Tool Inspection (Trial-run inspection)
2) First piece inspection
3) Working process inspection
4) Sample inspection
5) Operation inspection
6) Final inspection
7) Pilot piece inspection
8) Key operation inspection

9) Functional Inspection

10)Endurence inspection

11)Floor or patrolling inspection

12)Centralized inspection

Method of Inspection :

1. Screening or 100%
2. Lot by lot – Sampling
3. Process inspection

Defects :

1. Critical – Which effects the performance
2. Major – which may or may not effect performance but easily noticeable with appearance or effects subsidiary functions.
3. Minor – Which is neither effect the performance nor the appearance but against the drawing dimensions or established requirement.

Acceptable quality level: it is must to decide the acceptable variation in basic Specification

Inspection Concept	Quality Control Concept
Acceptance of material after subjecting them to inspection at inward goods store.	To take early steps to ensure the material supplied is going to be manufactured to the plant's requirement so as to ultimately eliminate the inward goods inspection.
Discovering that the components Produced are not as per the required dimensional specifications due to wrong tools, improper setting, or use of obsolete drawing, after the production is over.	To prevent the issue of a wrong tool, obsolete drawing, and to have a set – up approval procedure prior to taking to continuous production and keeping a sample checking during production.
To reprimand or to inform an operator about his poor performance at the end of the shift.	To inform the operator about his performance required prior to his commencing the work.
To resort to additional operations of removal of rust, pitted surface, dent, etc in metallic sheets.	To store and handle the sheets properly to avoid damage.
To change the component specifications to a better level after premature failure is reported from market.	To resort to "DESIGN REVIEW" to ensure the available know-how (not design dept, only) in the plant.
To ask for acceptance on deviation from buyers.	To negotiate with buyers to resort to better process

QUALITY CANNOT BE INSPECTED INTO A PRODUCT .
IT MUST BE MANUFACTURED INTO THE PRODUCT.

(XI) PROCESS OF QUALITY CULTURE DEVELOPMENT

1. Identify Quality competitors and their attributes. Determine whether the organization is primarily competing on :
   - Tangible product Quality attributes
   - After sale service and support
   - Customer interface
   - All of the above
2. Identify necessary organizational quality values to suit the competitive environment.
3. Identify target group that must have the desired values listed in step 2.
4. Identify current Quality value of the target groups and compare them to the desired Quality values.
5. Decide formal and informal mechanism to introduce the desired quality values in the targeted groups.
6. Review each target group's quality performance and repeat appropriate steps.

AN ILLUSTRATION OF QUALITY CULTURE GAP ANALYSIS

Desired Quality Value	Targeted Group	Current Quality Value	Gap	Corrective Interventions
MANAGEMENT				
Upper Management should believe that quality is a strategic variable	Upper Management	Upper Management compromises Quality to meet output	Yes	Increase quality awareness. Define Quality policy goals.
EMPLOYEE				
Employee must take responsibility for quality (defect free output)	Production	Employees indifferent to Quality	Yes	Provide proper recruitment, training recognition and incentives
SUPPLIER				
Supplier should be selected based on price, quality and capability	Purchasing	Supplier are selected based on price alone	Yes	Provide training for supplier Quality. Provide proper incentives and recognition.
CUSTOMER				
Customer service is top priority	Customer Service	Customers are viewed as a nuisance.	Yes	Provide sensitivity training

EXAMPLES OF UNIVERSALLY DESIRED QUALITY

VALUES

MANAGEMENT VALUES

- Managers must believe in continuous Quality improvement
- Managers must consider Quality to be a strategic business variable
- Quality must be a central organizational value for managers
- Line managers rather than the Quality staff organization, are ultimately responsible for Quality.

EMPLOYEE VALUES

- Every employee is responsible for the Quality of his or her output
- Every employee must strive to do things right the first time by understanding internal and external customers requirement
- Zero defects should be every employee's goal
- Every employee is authorized to stop production when it is not upto the Standards
- Employee Participation is very important in the quality improvement Process
- Continuous problem solving should be the norm

SUPPLIER RELETED VALUES

- The supplier's process is the extension of the manufacturer's process deserving the same level of attention and scrutiny as the manufacturer's internal process
- A Supplier relationship should be based on mutual trust and capabilities, there should not be an adversarial relationship between the manufacturer and supplier
- Zero defect should be the supplier's Quality goal
- The supplier should not be judged solely on price but also on other factors such as Quality Manufacturing. Capability and Delivery.

CUSTOMER RELATED VALUES

- Customer satisfaction is of primary importance to the organization
- Understanding internal and external customers requirements through all sources (Distributors, Market Research, Sales, Customer Service and Plant employees) is crucial

(XII) QUALITY CIRCLES

In Japan the quality movement is geared up with involvement of each individual. One of the attracting approach is quality Circles.

- 10 workers and work leaders within a single company department form a group. They are conducting studies to improve the effectiveness of work in their department not only restricted to quality. It is purely voluntary activity on the part of workers.
- It can be said good success if 50% of workers are involved in QUALITY CIRCLES.

TRAINING COURSE

- Data collection and analysis techniques, statistical tools parato analysis etc.
- Cause – Effect diagram.
- Study of successfully working project report by other QC.
- Practical completion of an actual project using external assistance.

Limitation of QC :

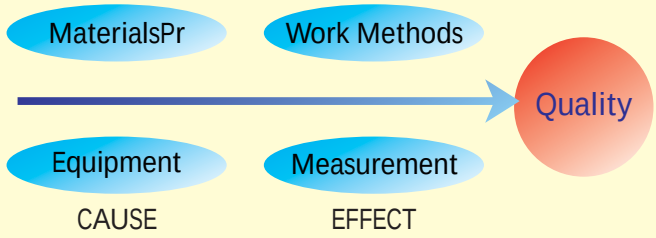
LIMITATION IS NOT TECHNOLOGICAL- CULTURAL

- Managers and Engineers are reluctant to delegate to the work force the functions and prerogatives to which they have been doing tenaciously in the past.
- The work force doses not consider that it has responsibility to help the Managers to improve the Company's performance.

(XIII) CAUSE AND EFFECT DIAGRAM

Raw materials differ slightly in composition according to the source of supply and there are size differences within the permitted limits. Machines may seem to be functioning in the same way. Work methods differ slightly although they appear to be the same.

In this way. When there is slight dispersion in raw materials equipment and work methods, these differences can add up to a great deal of product quality dispersion. The causal factors of dispersion are the raw material, equipment, work method etc.. result in the dispersion of quality. The relationship between cause and effect is quite clear.



MAKING CAUSE-AND-EFFECT DIAGRAMS

The factors involved in problems with quality at our factories are almost uncountable. A cause-and effect diagram is useful in helping us to sort out the causes of dispersion and organize the mutual relationships.

SETP 1 : Decide the quality characteristic. This is something we would like to improve and control. To do this we must find its causes.

STEP 2 : Write the quality characteristic on the right side. Draw a board arrow from the left side to the right side.

Quality Characteristic

STEP 3 : Write the main factors which may be causing the quality characteristics. It is recommended to group the major possible causal factors of dispersion into such items as raw materials (materials), equipment (machine or tools), method of work (workers) and measuring method (Inspection) Each individual group will form a branch.

STEP 4:- Now onto each of these branch items write in the detailed factors which may be regarded as causes. These will be link twigs. And onto each of these, write in even more detailed factors, making smaller twigs.

STEP 5: Finally, one must check to make certain that all the items that may be causing dispersion are included in the diagram. If they are, and the relationships of causes to effects are properly illustrated, then the diagram is complete.

HOW TO USE A CAUSE-AND-EFFECT DIAGRAM :

Cause and effect diagrams are drawn to clearly illustrate the various causes affecting product quality by sorting out and relating the causes. Therefore a good cause-and-effect diagram is one that fits the purpose.

1) Making a cause-and-effect diagram is educational in itself. When making a causes-

and-effect Diagram, One ask everyone, what is the cause of the dispersion"? and "what relationship and effect that have on quality "? These consultations with others mean presenting one's experience and techniques. Everyone taking part in making this diagram gain new knowledge. Even people who do not yet know a general deal about their jobs can learn a lot from making cause-and-effect diagram or merely studying a completed one.

2) A cause and effect diagram is a guide for Dispersion

A discussion cannot be purposeful when the speakers stray from their topic. When a cause and effect diagram serves as a focus for the discussion everyone knows the topic and how far the discussion has advanced. Straying from the topic and repetitions of complaints and grievances are avoided. The conclusion on what action to be taken is reached faster. In view of this, a cause-and-effect diagram can be said to be the guide in carrying out discussions.

3) The causes are sought actively and the results are written on the diagram.

Whenever an unusual quality characteristic is discovered actively seek the factors behind it. This is one of the fundamentals of QC. If you find the real factor repeat the steps you look to find the cause on the cause-and-effect diagram. If you get lost in the diagram for the factor or you cannot tie the real factor down this show that the diagram causes are not the real causes of dispersion-so reconstruct your diagram in accordance with the actual steps you took. If the true factor is not written on the diagram, be sure you write it in.

4) Data are collected with cause-and-effect Diagram.

When a change occurs in quality, it is important to find the defect percentage, dispersion range etc. But these figures only show what has happened. They do not provide any solution. In case of quality changes seek the causes thoroughly and once you have found the true causes check and record them in cause-and effect diagram.

5) A cause-and-effect diagram shows the level of technology.

If a cause-and-effect diagram can be drawn up thoroughly, it means those doing it know quite a bit about the production process. In other words, the higher the level on technology of the workers, the better the cause-and-effect diagram turns to be.

6) A cause-and-effect diagram can be used for any problem.

Since the diagram illustrates the relationship between the cause and the effect in a rational manner, it can be used in any situation.

A cause and effect diagram can be made not only for quality matters but for quantity, material amounts and even for safety, work attendance or any kind of personnel problem. Our aim is for the actions to be taken against the cause, if we do not know the relationship between cause and effect of a problem then we can't take any action to solve it. A cause and effect diagram shows us most clearly the causes so we can take action quickly.

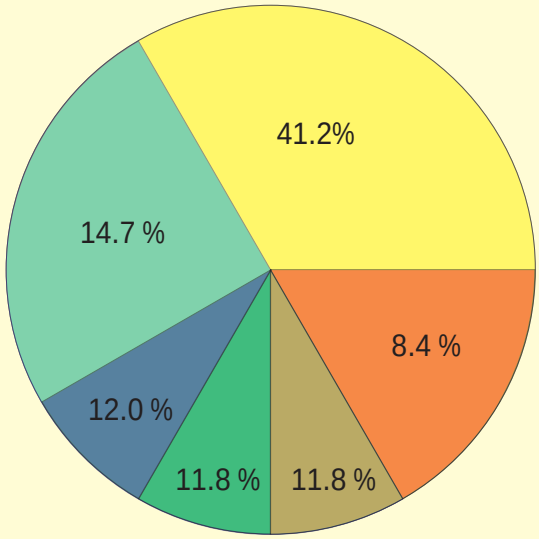
7) Bad cause-and-effect diagram :

A cause generally consists of many complex elements. There fore, cause-and-effect diagram usually turn out tobe rather complicated like the one fig. below. If one turns out like this, it means that your knowledge of the manufacturing process is still too shallow. Also, if your diagram only lists five or six causes, even though the form is correct, it can't be considered a good diagram.

(XIV) Pie Diagram :

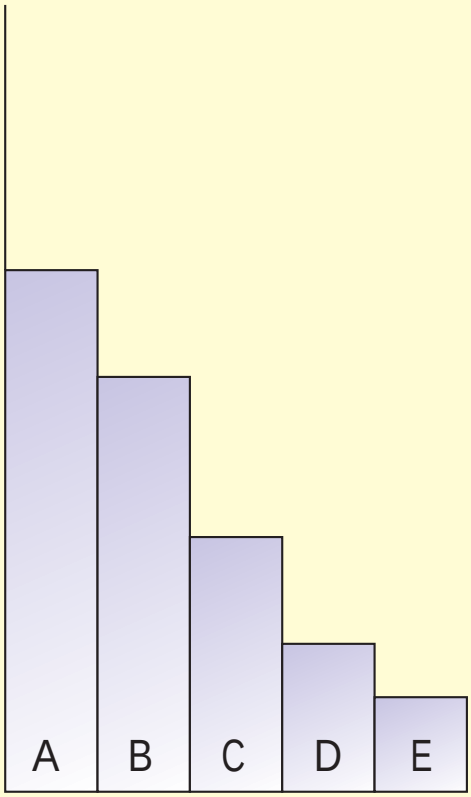
When the values of a variable are given for a number of category, we may be interested in the percentages for the different categories rather than in the absolute values, for the percentages are expected to give a better idea of the relative importance of each class. This chart is drawn with the help of a circle. The area enclosed by it is taken as 100. It is then divided into a number of sectors by drawing angles at the centre, the area of each sector representing the corresponding percentage.

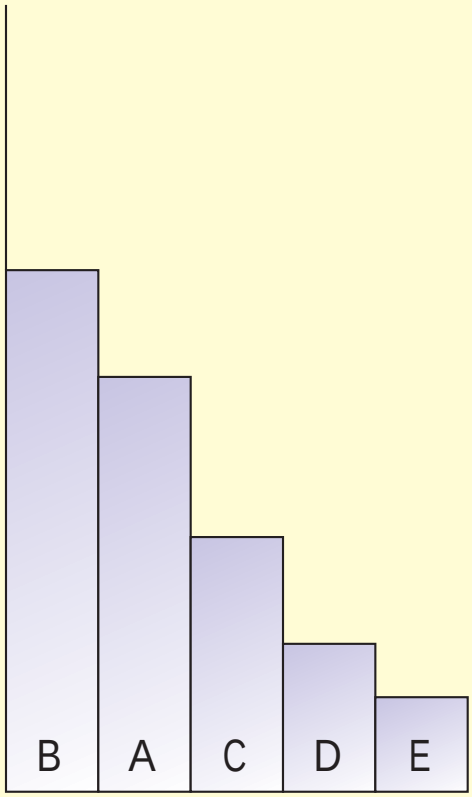
Since the total angle is 360º, it is clear that for any particular category the angle should be of (360/100) X corresponding percentage.



Pareto Diagrams show whether your attempts at improvement procedure results.

Pareto diagram can be used to confirm the impact of improvement. If effective measure has been taken, the order of the items on the horizontal axis will usually shift. Fig. show diagram before and after improvements were made. On the basis of the before improvement diagram on the left, the problem of defectives due to improper rotation was selected for improvement. The items for inspection in the major process were determined to eliminate the possible factors causing improper rotation. The worker engaged in these tasks were asked to check the results of their work. In this way the diagrams on the right was obtained.





UPCOMING EVENTS IN JANUARY 2013

A seminar has been jointly organized by Indian Institution of Plant Engineers (IIPE) /The Institution of Engineers (India)/Trivedi & Associates Tecknical Services (P.) Limited on "Statutory Compliance In Industries" on 18.01.2013.

Contents of the Programme are as under :

a) IBR Regulation Act. b) Factory Act & Rules c) Electricity Rules & The Electricity Act -2003

The seminar will benefit to middle and senior level Managers and Engineers from Chemical, Refineries, Petrochemicals, Fertilizers, Pharmaceutical, Heavy Chemicals and many Affiliated Industries.

UPCOMING EVENTS IN MARCH 2013

M/s. Trivedi & Associates Tecknical Services (P) Ltd. is organizing one day seminar on "INDUSTRIAL SAFETY – NEED OF THE HOUR" at Vadodara on 1st March' 2013, Friday, as a part of silver jubilee year celebration.

Contents of the Programme are as under :

a) Disaster Management Plan b) Statutory Compliance and its Impact on Safety

c) Compliance of PESO Rules for Safety

The seminar will benefit to Supervisor/Engineers/Officer/Managers from all disciplines in manufacturing and service industries involved in operation, maintenance project management and safety management.

For registration please contact

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