K.S.RANGASAMY COLLEGE OF TECHNOLOGY
(Autonomous)

Tiruchengode – 637 215, Namakkal (Dt.), Tamil Nadu

Dr.G.MYLSAMI

Professor

Department of Food Technology

K.S.Rangasamy College of Technology

Tiruchengode – 637 215.

Email: mylsamig@ksrct.ac.in

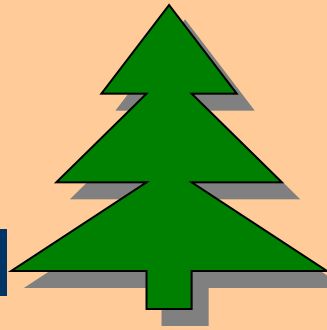
EVOLUTION of TQM

- **CRAFTSMEN & ARTISANS**(eg. Artists, Sculptors, working with metals & other materials who were very Quality-conscious.
- **TRADESMEN** (eg.Masons,Carpenters etc.)
- **ENGINEERING TRADES & PRACTICES** (eg.Foundry,Smithy, Die-making,Mould-making,Stamping,Forging,Turning,Milling, Drilling etc.)

TQM Evolution

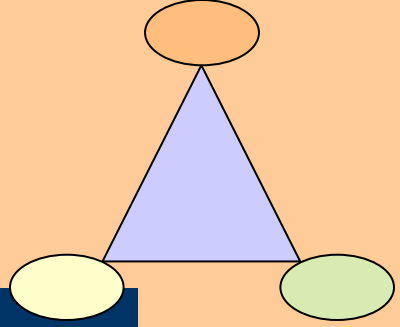
- **Custom-built** Articles/Products having considerable control over Quality.
- **Mass- Produced** Products with less control over Quality
- **Quality control** Department in Factories.
- **TQM-based Production** facility – enhancing the Organization through Quality techniques to better achieve organization's goals-eg. Productivity and Profitability with min.wastage.
- **ISO** Quality Management Systems.

QUALITY IS ….the QUALIFIER!



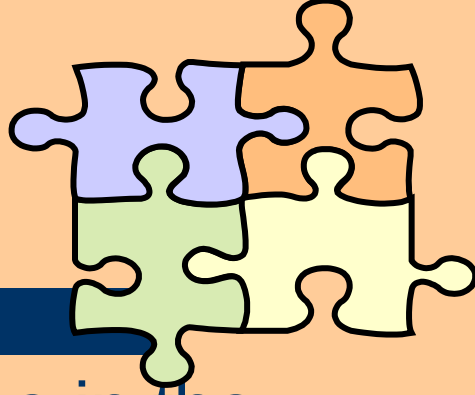
- **Doing it right first time and all the time.** This boosts Customer satisfaction immensely and increases efficiency of the Business operations.
- **Clearing the bar** (ie. Specification or Standard stipulated) Excellence that is better than a minimum standard.

Quality - Definitions

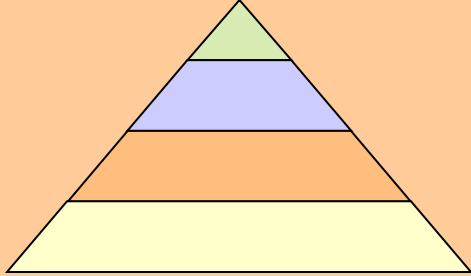


- Quality is *excellence that is better than a minimum standard.*
  It is ***conformance to standards*** *and* ***'fitness of purpose'***
- ISO 9000:2000 definition of quality-
  It is the degree to which a set of inherent characteristics fulfills requirements**.**
- *Quality is '* ***fitness for use*** *' of the product – Joseph Juran.*

Quality and customer expectations



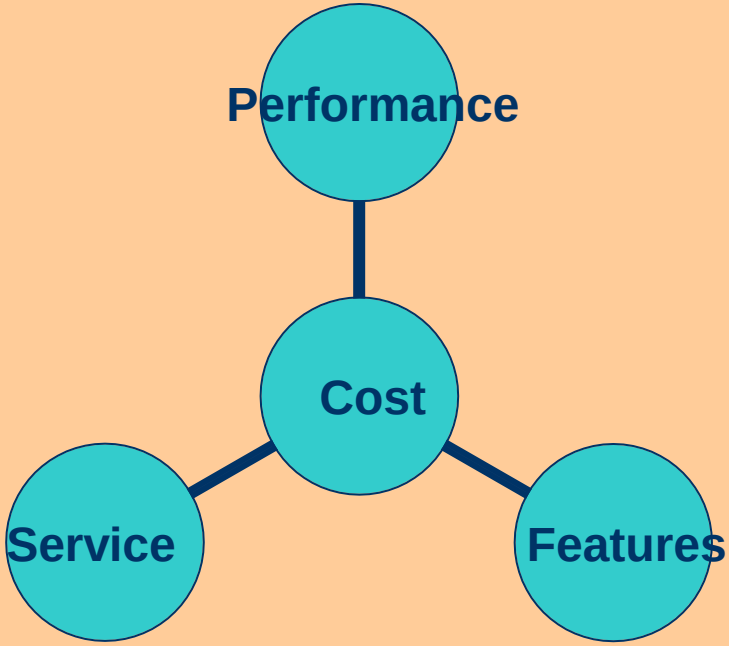
- Quality is also defined as **excellence** in the product or service that **fulfills or exceeds the expectations of the customer.**
- There are **9 dimensions of quality** that may be found in products that produce customer-satisfaction.
- Though quality is an abstract perception,it has a quantitative measure- **Q= (P / E) ,** where **Q=quality, P= performance(as measured by the Mfgr.), and E = expectations(of the customer).**



- Quality is **not fine-tuning your product at the final stage** of manufacturing,before packaging and shipping .
- **Quality is in-built into the product at every stage** from conceiving –specification & design stages to prototyping –testing and manufacturing stages.
- **TQM philosophy and guiding principles** continuously improve the Organisation processes and result in customer satisfaction.

The 9 Dimensions of Quality

- Performance
- Features
- Conformance
- ----------
- Reliability
- Durability
- Service
- ----------
- Response- of Dealer/ Mfgr. to Customer
- Aesthetics – of product
- Reputation- of Mfgr./Dealer

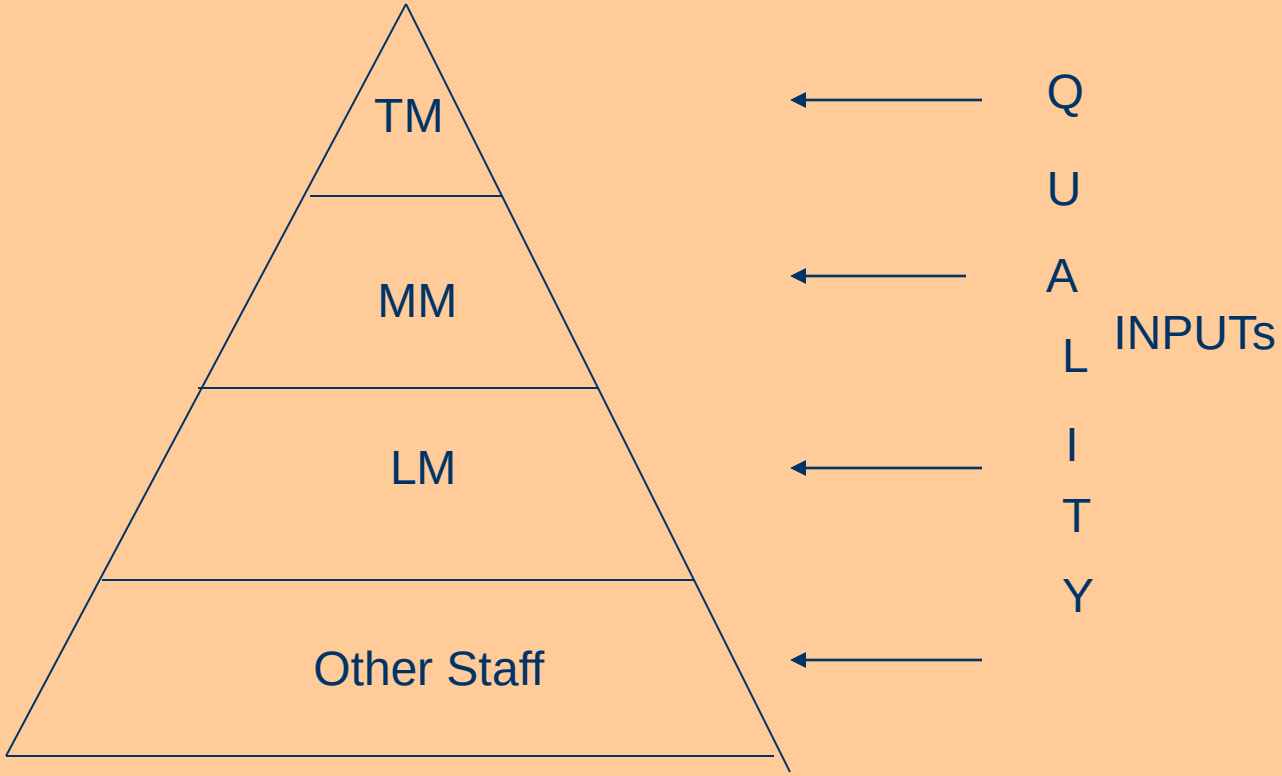


Market Changes

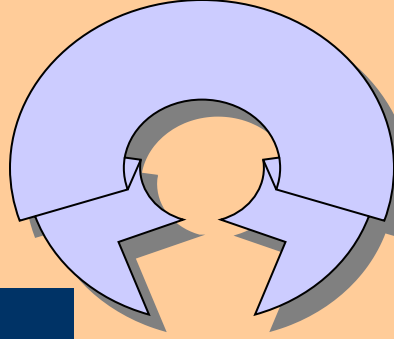
- **MONOPOLIST** markets → **GLOBAL** markets → Market more competitive → **Quality management** is a necessity for survival and growth of the organization in a global environment.
- **Seller's** market → **Buyer's** market → **Customer-oriented** market Demand is defined by Users.

The TQM Organization

- Quality infused Personnel and Processes.



TQM six basic Concepts

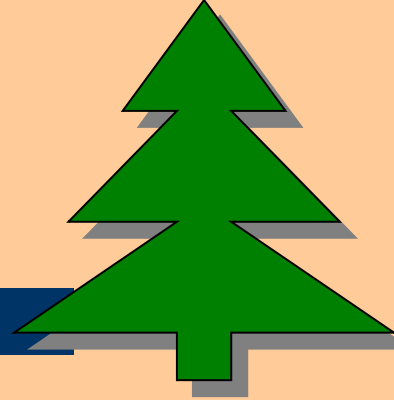


- Management commitment to TQM principles and methods & long term Quality plans for the Organisation
- Focus on customers – internal & external
- Quality at all levels of the work force.
- Continuous improvement of the production/business process.
- Treating suppliers as partners
- Establish performance measures for the processes.

Effects of poor Quality

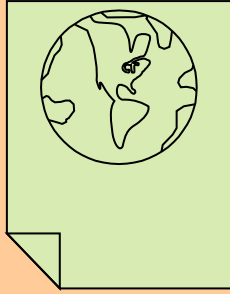
- Low customer satisfaction
- Low productivity, sales & profit
- Low morale of workforce
- More re-work, material & labour costs
- High inspection costs
- Delay in shipping
- High repair costs
- Higher inventory costs
- Greater waste of material

Benefits of Quality



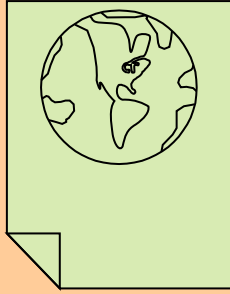
- Higher customer satisfaction
- Reliable products/services
- Better efficiency of operations
- More productivity & profit
- Better morale of work force
- Less wastage costs
- Less Inspection costs
- Improved process
- More market share
- Spread of happiness & prosperity
- Better quality of life for all.

Historical Review of Quality Control



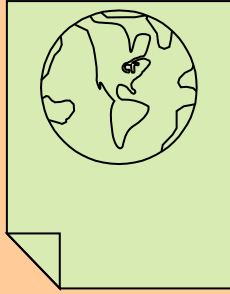
- Quality in articles and artefacts produced by skilled craftsmen and artisans from the B.C. era eg. goldsmiths,silversmiths, blacksmiths, potters,etc.
- Artists & Artisans Guilds in the Middle ages spent years imparting quality skills and the worksmen had pride in making quality products.
- Industrial Revolution brought factory manufacturing where articles were mass-produced and each worker made only a part of the product,and did not sense the importance of his contribution to the quality of the product .

Historical Review of Quality Control



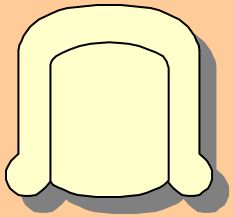
- In 1924, W.A.Shewhart of Bell Telephone Labs developed a statistical chart for the control of product variables – the beginning of SQC and SPC.
- In the same decade, H.F.Dodge and H.G.Romig of Bell Telephone Labs developed statistical acceptance sampling instead of 100% inspection.
- In 1946,the American Society for Quality Control was formed.
- In 1950, W. Edwards Deming,who learnt SQC from Shewhart,taught SPC & SQC to Japanese engineers and CEO’s

Historical Review of Quality Control



- In 1954,Joseph M.Juran taught Japanese managements their responsibility to achieve quality .
- In 1960, the first quality control circles were formed. SQC techniques were being applied by Japanese workers.
- 1970’s US managers were learning from Japan Quality implementation miracles.
- In 1980’s TQM principles and methods became popular.(also in auto industry)
- In 1990’s ,the ISO 9000 model became the world-wide standard for QMS.

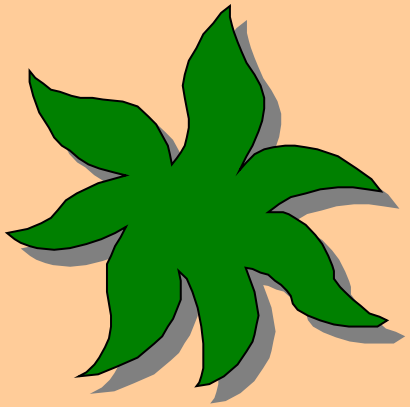
Leadership concepts



- 12 characteristics of quality leaders(refer pgs 30,31 Besterfield)
- 7 Habits of highly effective people (Pgs. 32-39 Besterfield)
- The Deming philosphy (Pgs. 39-43 Besterfield)

7 Habits of highly effective people (Stephen Covey)

- Be pro-active
- Begin with the end in mind
- Put first things first (ref.Covey's Time management matrix pg.35)
- Think win-win
- Seek first to understand,then to be understood
- Synergy
- Sharpen the saw



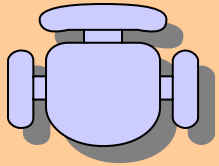
The Deming Philosophy

- Create and publish the aims and purposes of the organization
- Learn the new philosophy
- Understand the purpose of inspection
- Stop awarding business based on price alone.
- Improve constantly and forever the System
- Institute training
- Teach and institute leadership

The Deming Philosophy

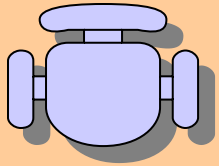
- Drive out fear,create trust,and create a climate for innovation
- Optimize the efforts of teams,groups,and staff areas
- Eliminate exhortations for the work force
- Eliminate numerical quotas for the work force
- Eliminate management by objectives
- Remove barriers to pride of workmanship
- Encourage education and self-improvement for all
- Take action to accomplish the transformation.

Role of TQM leaders



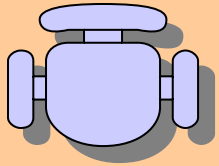
- All are responsible for quality improvement especially the senior management & CEO's
- Senior management must practice MBWA
- Ensure that the team's decision is in harmony with the quality statements of the organisation
- Senior TQM leaders must read TQM literature and attend conferences to be aware of TQM tools and methods
- Senior managers must take part in award and recognition ceremonies for celebrating the quality successes of the organisation
- Coaching others and teaching in TQM seminars
- Senior managers must liaise with internal ,external and suppliers through visits,focus groups,surveys
- They must live and communicate TQM.

TQM implementation



- Begins with Sr. Managers and CEO's
- Timing of the implementation process
- Formation of Quality council
- Union leaders must be involved with TQM plans implementation
- Everyone in the organisation needs to be trained in quality awareness and problem solving
- Quality council decides QIP projects.

Quality Council



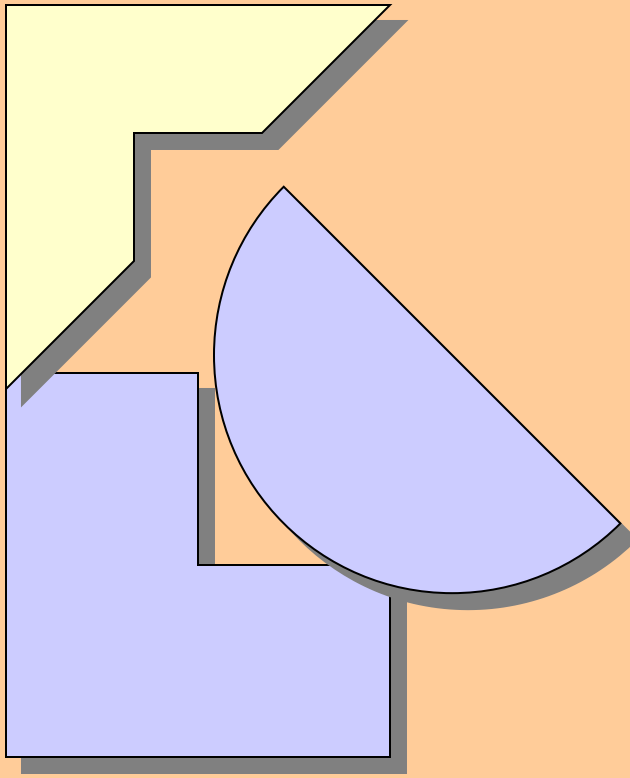
- The quality council includes CEO and Senior managers of the functional areas -research,manufacturing,finance,sales ,marketing etc. and one co-ordinator and a union representative.
- Duties- To develop the Quality statements eg. Vision, Mission, Quality policy statements, Core values etc.
- To develop strategic long-term plans and annual quality improvement programme.
- Make a quality training programme
- Monitor the costs of poor quality.
- Determine the performance measures for the organisation
- Always find projects that improve the processes and produce customer satisfaction.
- Establish work-group teams and measure their progress.
- Establish and review the recognition and reward system for the TQM system

Quality statements

- **Vision statement – a short declaration of what the organization hopes to be tomorrow.**
- **Mission statement – a statement of purpose –who we are,who are our customers,what we do , and how we do it.**
- **Quality policy – is a guide for everyone in the organization ,how they should provide products and services to the customers.**

Strategic Planning

- Strategic business planning is similar to strategic quality planning.
- 7 steps to strategic planning
- Customer needs
- Customer positioning
- Predict the future
- Gap analysis
- Closing the gap
- Alignment
- Implementation.



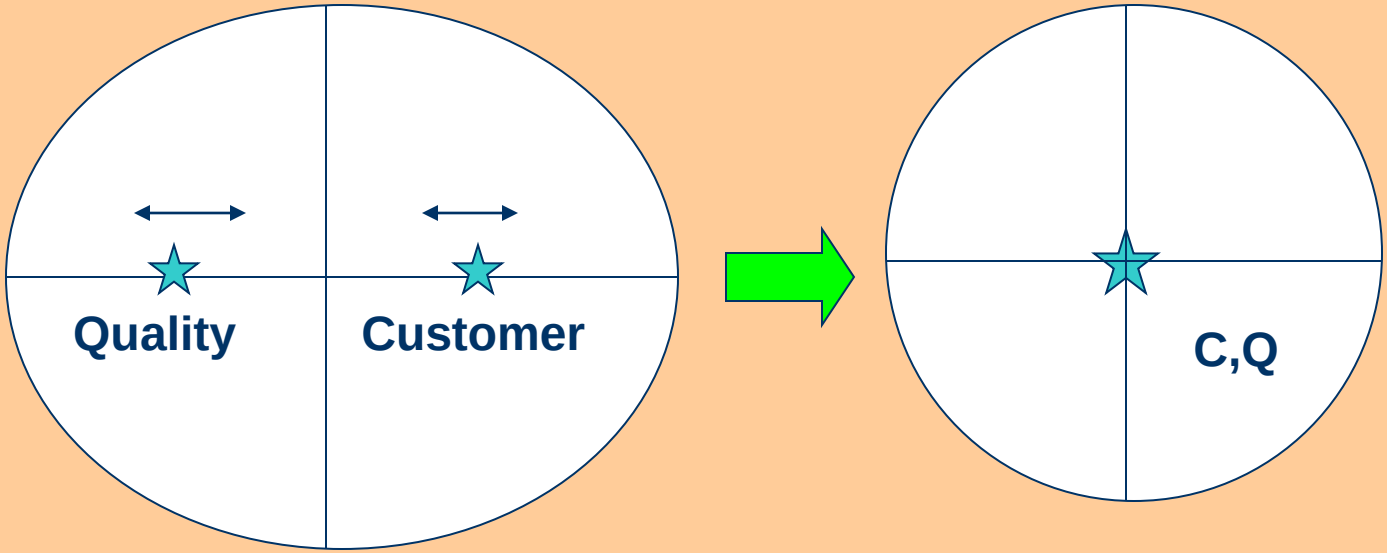
Strategic Quality Goals and Objectives

- Goals must be focused
- Goals must be concrete
- Goals must be based on statistical evidence
- Goals must have plan or method with resources
- Goals must have a time-frame
- Goals must be challenging yet achievable

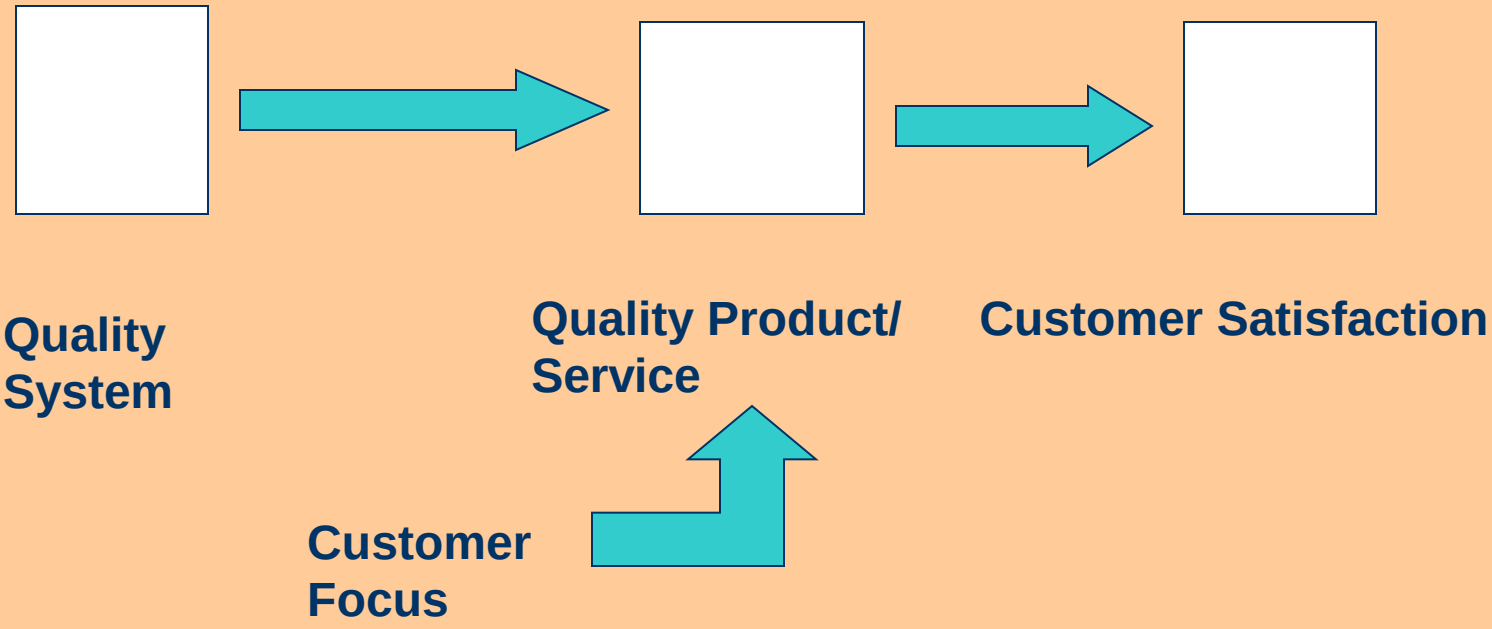
Customer satisfaction

- Customer is the Boss or'King'
- Customer dictates the market trends and direction
- Customer not only has needs to be supplied(basic performance functions)
- Also he 'wants what he wants!'(additional features satisfy him and influence his purchase decision)
- Hence the Suppliers and Manufacturers have to closely follow at the heel of the customer.

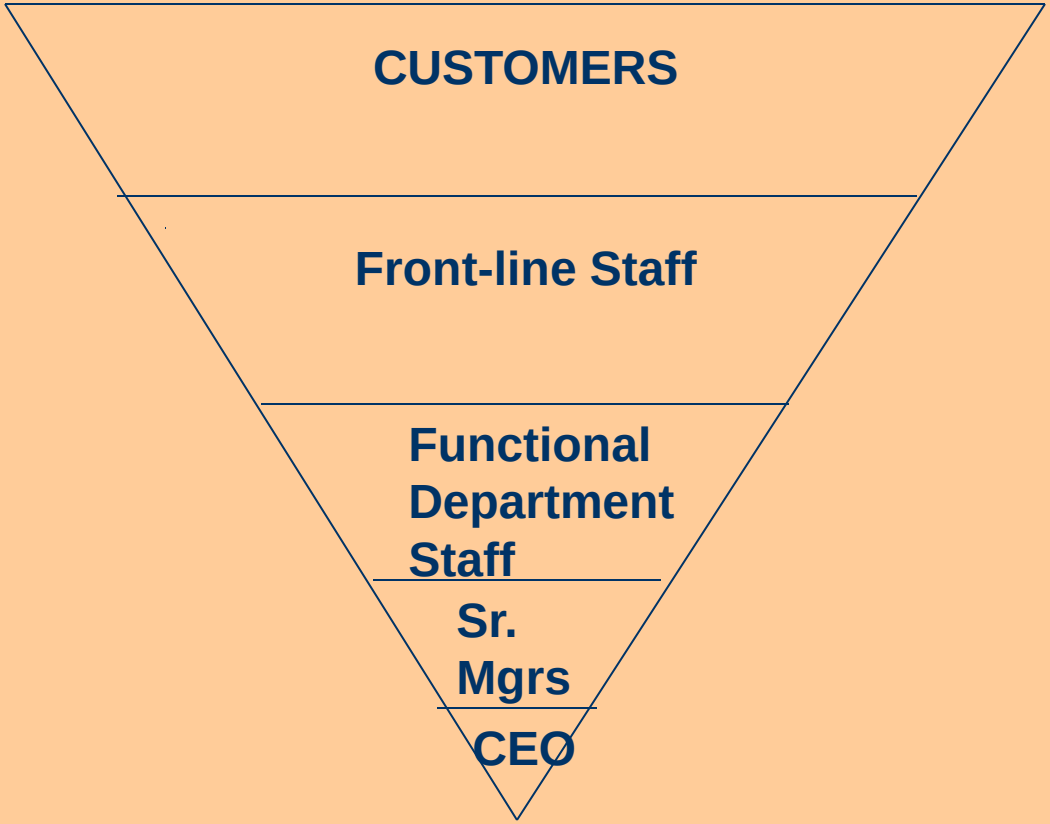
Norman's Customer satisfaction model



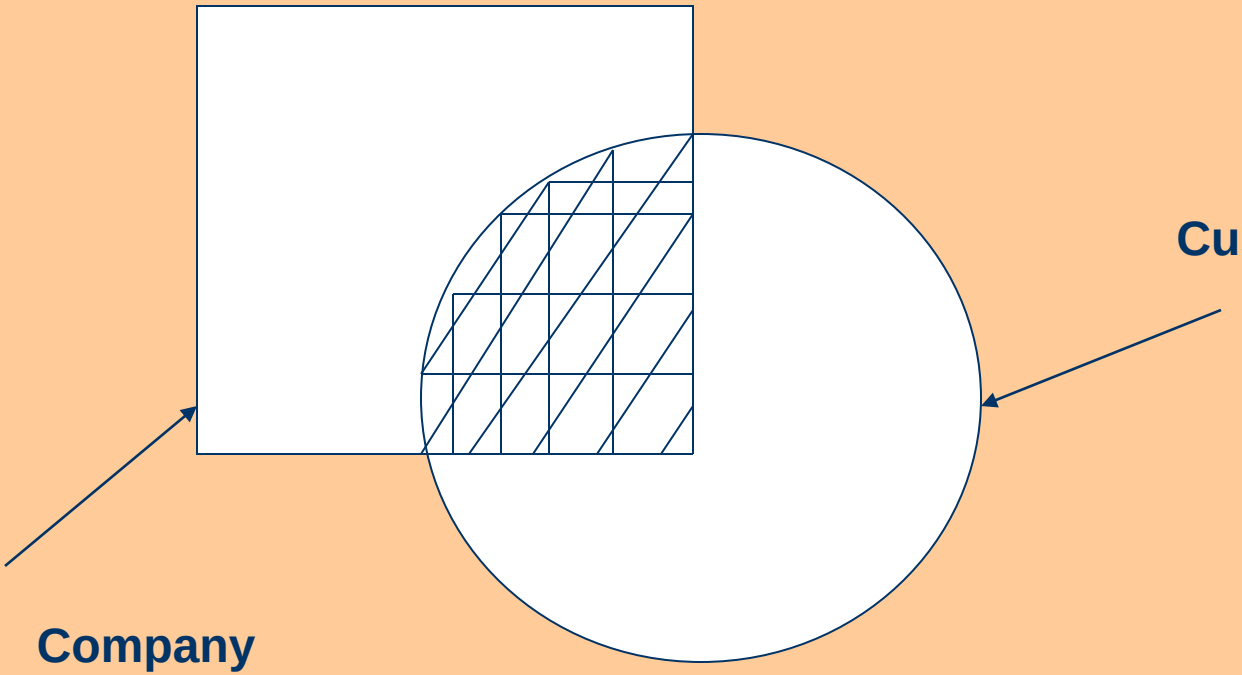
Customer Satisfaction



Customer Satisfaction Organisational Diagram



Teboul Model of Customer Satisfaction



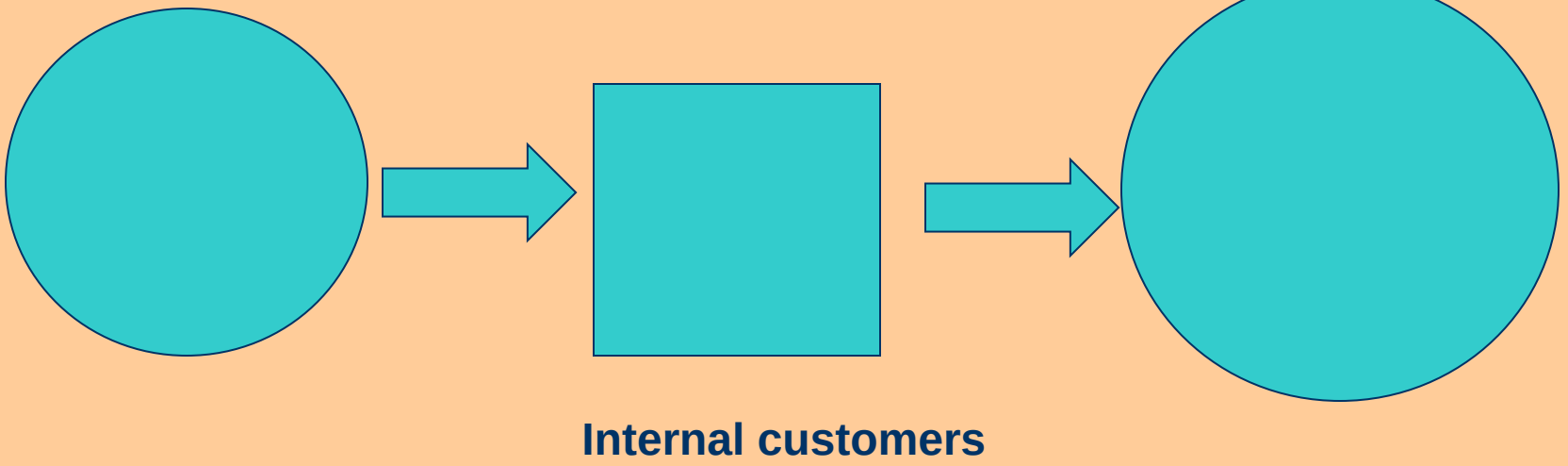
What is customer satisfaction?

- Is it due to Product quality?
- Is it due to pricing?
- Is it due to good customer service ?
- Is it due to company reputation?
- Is it something more?

Customer types

- **External and Internal** customers
- **External – current, prospective and lost customers**
- **Internal** – Every person in a process is a customer of the previous operation.(applies to design,manufacturing,sales,supplies etc.) [Each worker should see that the quality meets expectations of the next person in the supplier-to-customer chain]
- **TQM** is commitment to **customer-focus** - internal and external customers.

Customer/supplier chain



Internal customer/Supplier relationships

- Questions asked by people to their internal customers
- What do you need from me?
- What do you do with my output?
- Are there any gaps between what you need and what you get?
- Good team-work and inter-Departmental harmony is required. Also the leaders role in supervising the internal customer-supplier chain.

TQM and customer quality percepts

- TQM is quality management and management of quality – there is no full stop and no break in the chain!
- Continuous process (quality) improvement is all its about.
- Why? One important reason is the customer quality level is not static and his expectations keep changing and his demands too!
- Also plant process dynamics- how to achieve maximum efficiency , optimizing cost and performance in the process operations, minimizing waste etc.

User purchase perceptions- from survey

- Performance
- Features
- Service
- Warranty
- Price
- Reputation
  (refer pgs.72 and 73, Besterfield)

Customer satisfaction/ dissatisfaction feedback

- Customer feedback has to be continuously sought and monitored - not one-time only!(Pro-active! Complaints are a reactive method of finding out there is a problem)
- Customer feedback can be relayed to Mfgr.
- Performance comparison with competitors can be known
- Customers needs can be identified
- Relative priorities of quality can be obtained from the horses' mouth!
- Areas for improvement can be noted.

Customer feedback methods

- Comment cards enclosed with warranty card when product is purchased.
- Customer survey and questionnaire
- Customer visits
- Customer focus groups
- Quarterly reports
- Toll-free phones
- e-mail, Internet newsgroups,discussion forums
- Employee feedback
- Mass customization.

Customers- Handle with care!

- Employers don’t pay wages but it is the **customer who pays the wages!**
- So take **good care** of your customers.
- Customer-care centres not just profit-centres!
- The entire organization must in effect revolve around the customer – whether the customer is being well served and if he is really pleased,contented and satisfied with the service you have to offer.

Service Quality

- **(i)Organisation**
- Identify each market segment
- Write down the requirements
- Communicate the requirements
- Organise processes
- Organise physical spaces

Service Quality

- **(ii) Customer Care**
- Meet the customer’s expectations
- Get the customer’s point of view
- Deliver what is promised
- Make the customer feel valued
- Respond to all complaints
- Over-respond to the customer
- Provide a clean and comfortable customer reception area.

Service Quality

- **(iii) Communication**
- Optimize the trade-off between time and personal attention
- Minimize the number of contact points
- Provide pleasant,knowledgable and enthusiastic employees
- Write documents in customer-friendly language.

Service Quality

- **(iv) Front-line people**
- Hire people who like people
- Challenge them to develop better methods
- Give them the authority to solve problems
- Serve them as internal customers
- Be sure they are adequately trained
- Recognise and reward performance

Service quality

- **(v)Leadership**
- Lead by example
- Listen to the front-line people
- Strive for continuous process improvement (Pgs. 88-93 Besterfield)

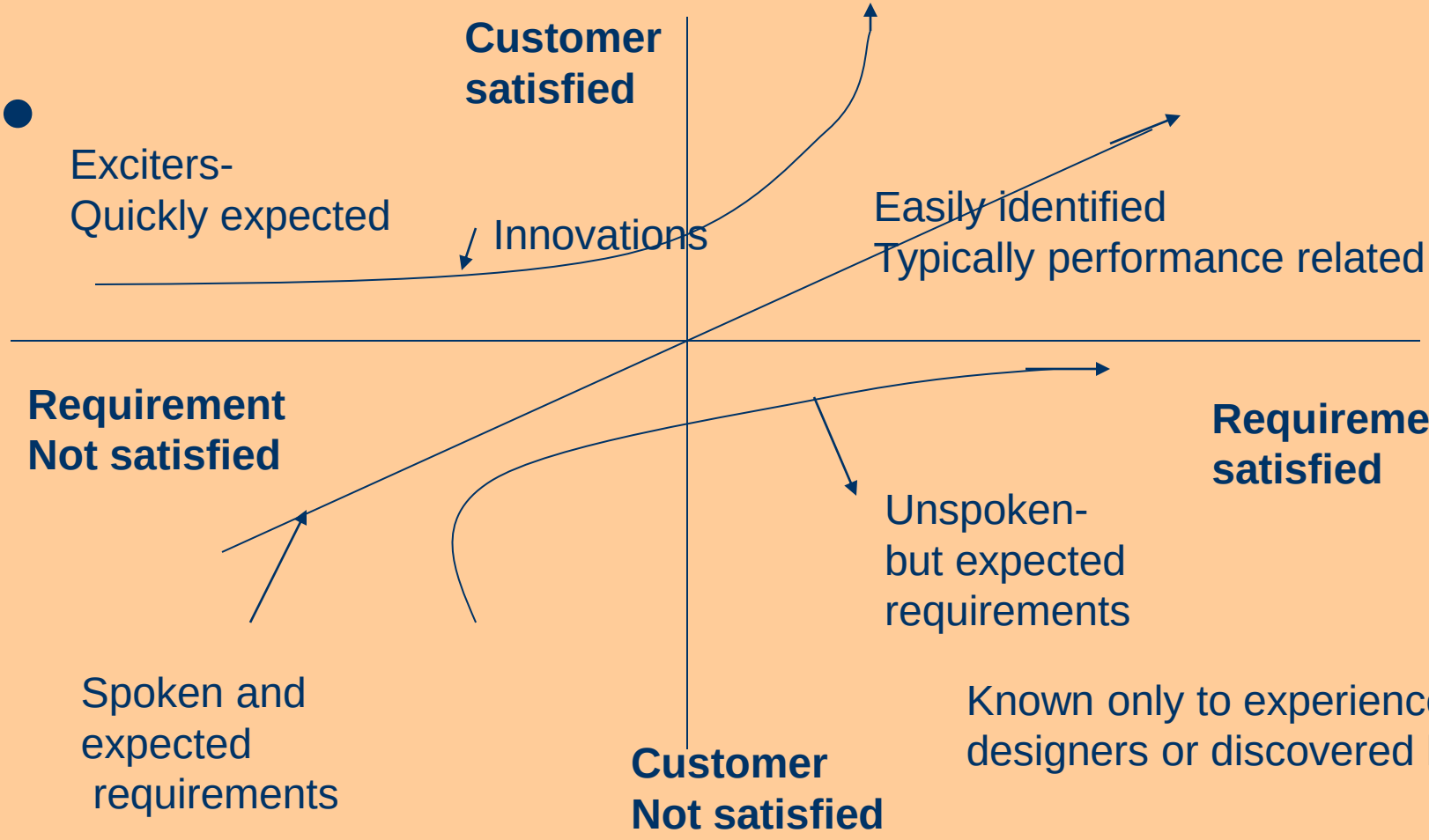
Customer Care

- Keep promises to customers
- Return customer calls promptly
- Allot staff to handle customer problems
- Treat customers with courtesy,respect and professionalism always
- Evaluate customer satisfaction regularly
- Search for customer-related improvements continuously
- Deliver Products/Service promptly and efficiently
- Give every customer complete and personal attention.

Customer Care

- Maintain a neat and clean appearance of self and work-place,at all times
- Review and implement customer feedback and suggestions into current procedures when needed
- Training and education to enhance job performance and commitment to customer care
- Treat every customer as we would treat ourselves. (Pg. 90, Besterfield)

Kano Model-conceptualises customer requirements



Customer Retention

- Customer satisfaction should lead to customer loyalty and customer retention.
- This is the acid test and bottom line- when the customer repeatedly comes back to you for repeat orders and to purchase new products mfgrd. by you. (In spite of stiff competition and multiple Suppliers/Sources!)
- Firm orders received or cash payments registered , market share, customer referrals and customer retention are an indication of your customer success and penetration .

Motivation

- **Maslow's Hierarchy of Needs**
- **Herzberg's Two-Factor Theory**
- **Achieving a motivated task-force**
  (Pgs.104-105 Besterfield)
  Know thyself,Know your employees, Establish a positive attitude, share the goals,Monitor progress,Develop intersting work,Communicate effectively, Celebrate success.

Empowerment

- To invest people with authority –to tap the potential in every worker (avoid the wastage of unrealised capacity)
- People have the ability,confidence and commitment to take the responsibility and ownership to improve the process, and initiate the necessary steps to satisfy customer requirements within well-defined boundaries in order to achieve organisational goals.

Conditions for empowerment

- Everyone must understand the need for change
- The system needs to change to the new paradigm
- The organisation must enable its employees.

- Teams (Pgs. 109-124 Besterfield)

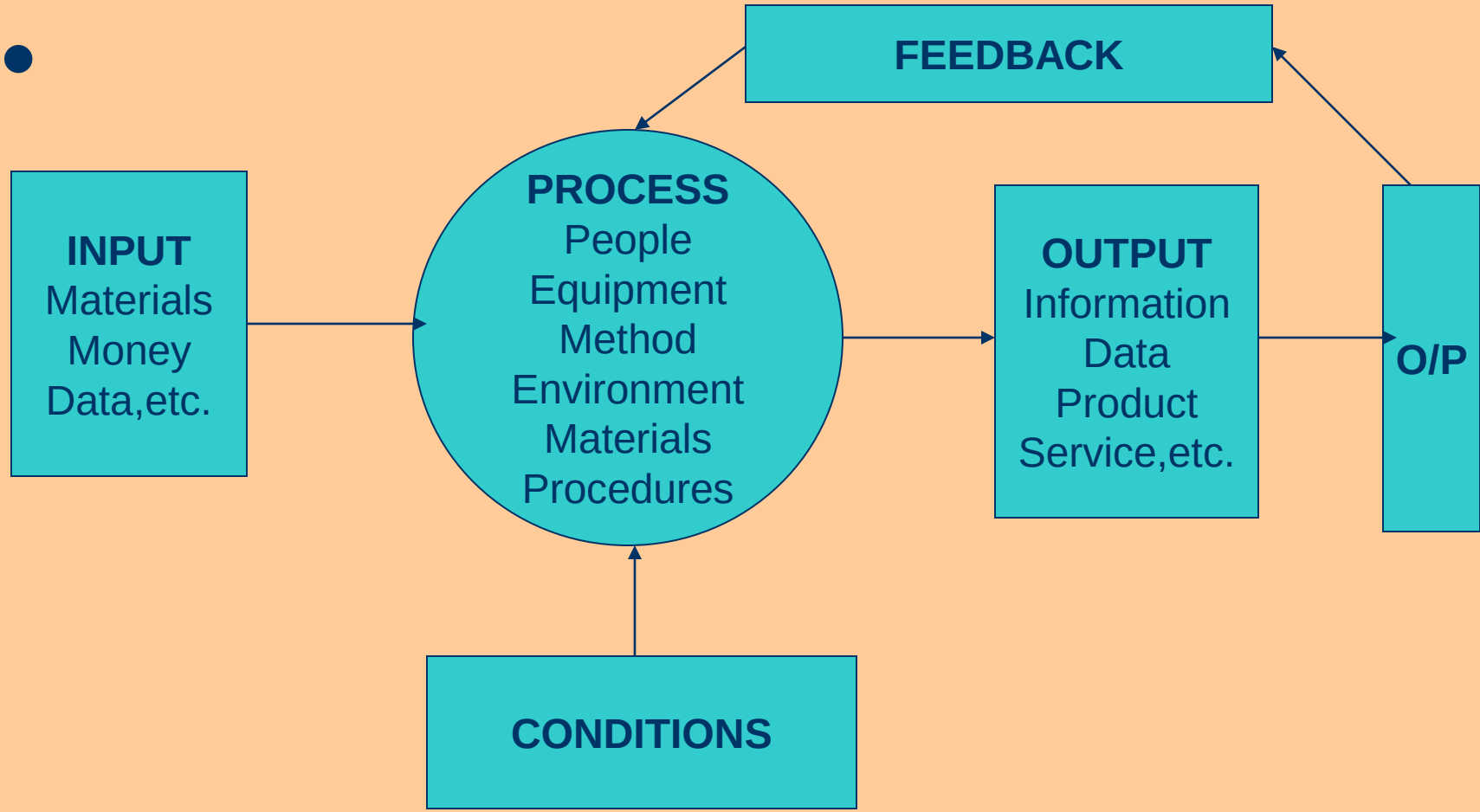
Continuous Process Improvement

- **Process** refers to business and production activities of an Organisation.
- **Processes for improvement-** eg. Design & Manufacturing,Marketing,Stores & Purchase,etc.
- **Inputs of the Process-**
  Manpower,materials,money,data,etc.
  Outputs- Products,Services,data etc.
  Outputs need performance measures – main outcome being customer satisfaction.(**feedback** is used to improve the process)

Continuous Process Improvement

- **Process** refers to business and production activities of an organisation
- **Business processes**-Manufacturing,Design, Sales,Purchase,Stores etc.are areas where non-conformance can be reduced and processes improved

Continuous Process Improvement



Five ways to Improve a Process

- Reduce resources
- Reduce errors
- Meet or exceed expectations of internal/external customers
- Make the process safer
- Make the process more satisfying to the person doing it.

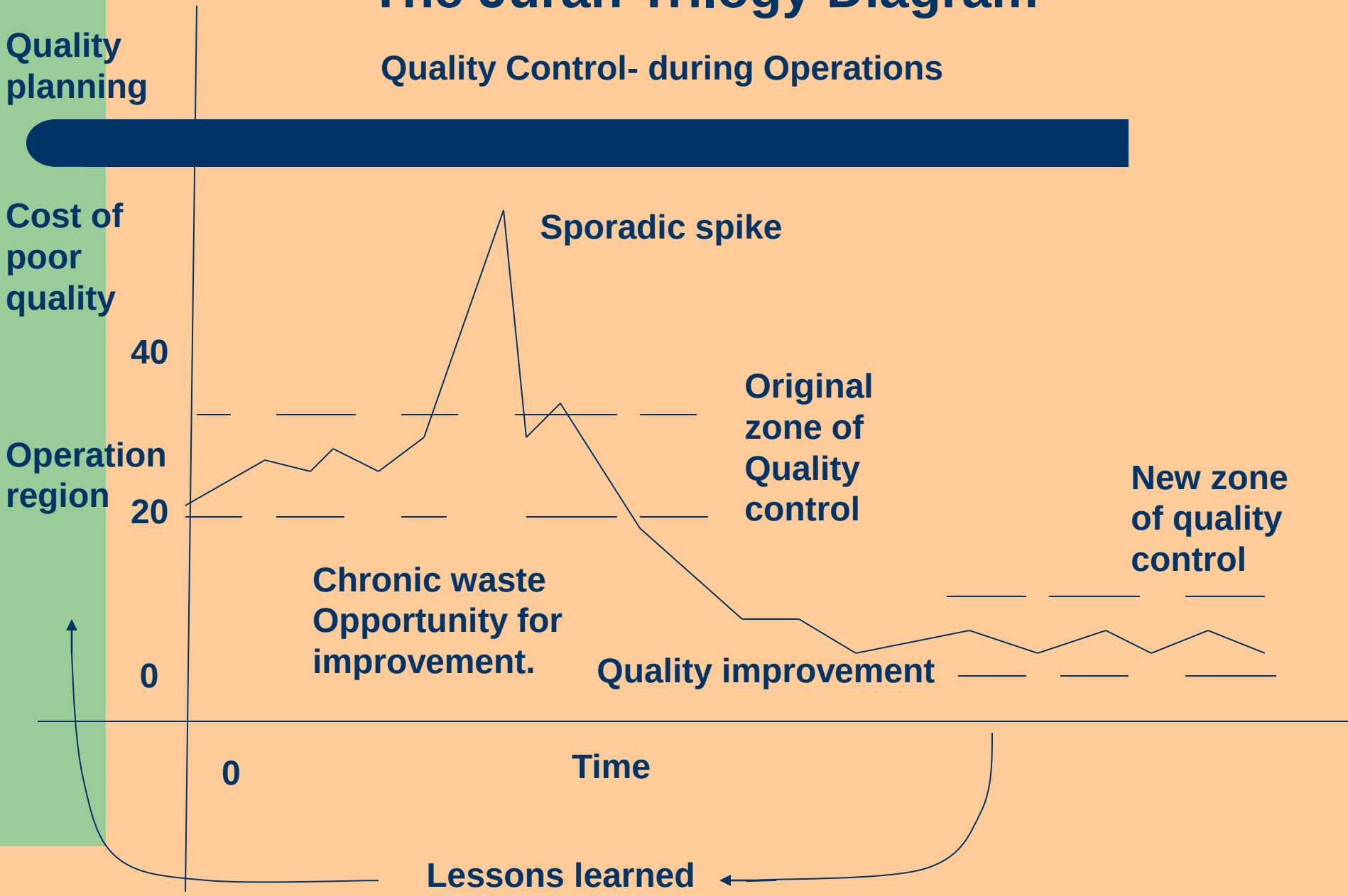
Continuous Process Improvement

- **Juran's Trilogy**
- **Shewhart's Plan-Do-Study-Act cycle**
- **Kaizen- making small incremental improvements to the individual and the organisation.**
  (Pgs. 140-160,Besterfield)

Juran’s Trilogy

- Three components - PLANNING,CONTROL AND IMPROVEMENT
- Based on financial processes ,such as budgeting(planning), expense measurement(control), and cost reduction (improvement)

The Juran Trilogy Diagram



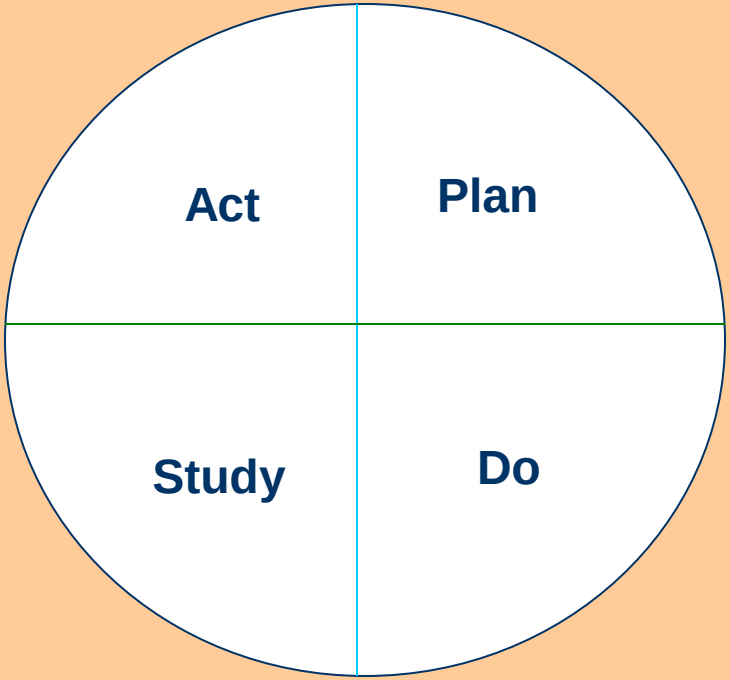
Four Improvement Strategies

- Repair
- Refinement
- Renovation
- Re-invention

Five types of Problems

- Compliance
- Unstructured
- Efficiency
- Process Design
- Product Design

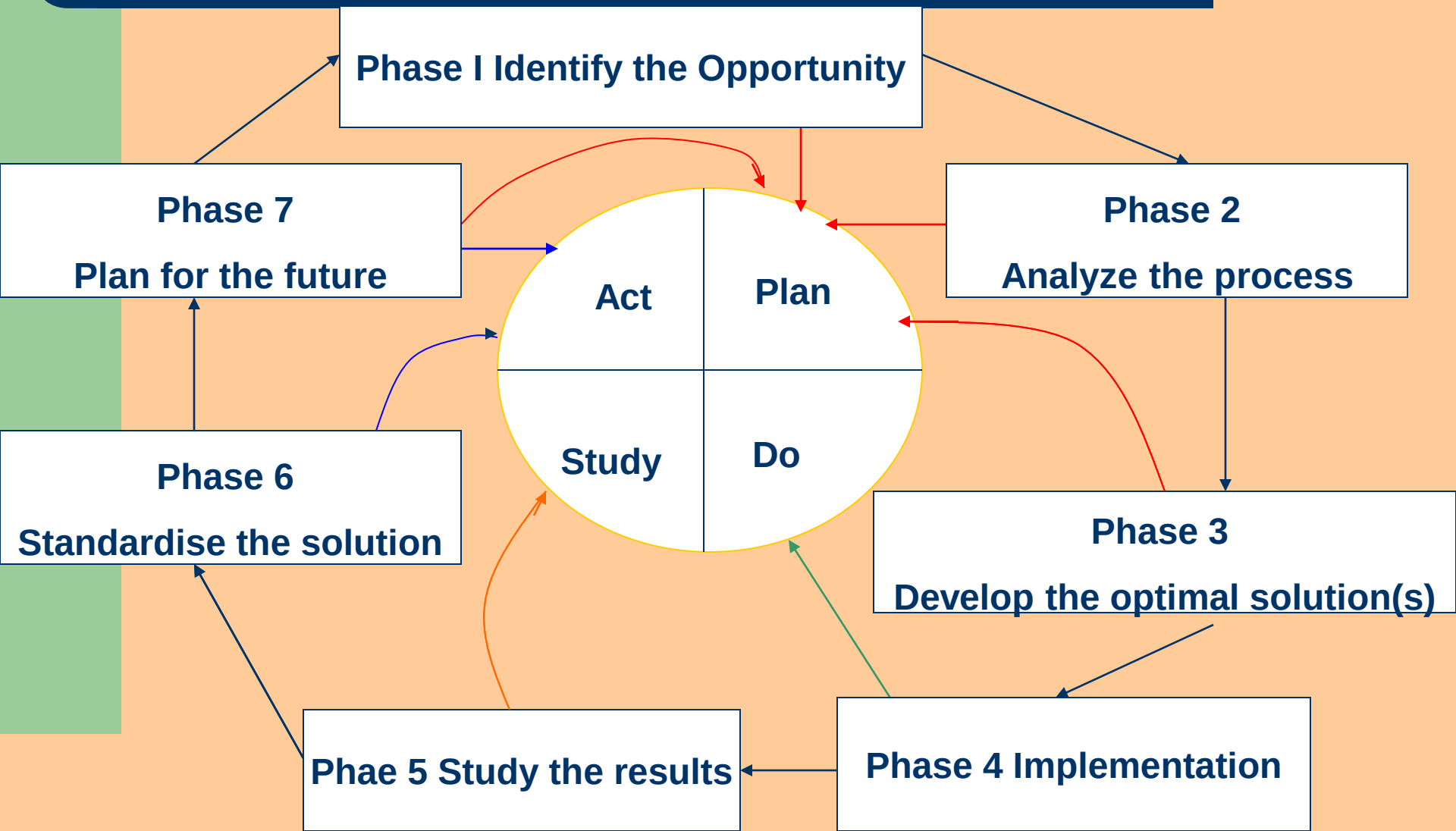
THE PDSA cycle



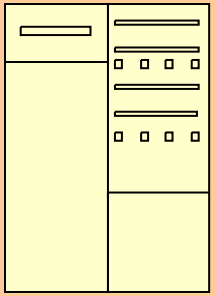
PDSA cycle- seven steps or phases

- Identify the opportunity
- Analyze the current process
- Develop the optimal solution(s)
- Implement changes
- Study the results
- Standardise the solution
- Plan for the future.

Continuous Process Improvement cycle

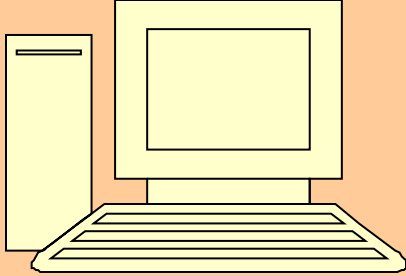


TQM principles from the Japanese



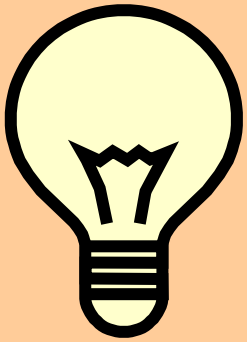
- **The 3 K Method**
- **Kimerareta Kotoo –** What has been decided
- **Kimerareta Tori – must be followed**
- **Kichim to Mamorukoto** – as per standard.

The 5S Method



- Seiko - Sort (Proper arrangement)
- Seiton - Set (Systematic or Orderliness)
- Seiso - Shine (Sweep or clean-up)
- Seiketso - Standard (Personal cleanliness)
- Shitsuke - Sustain (Self-discipline)

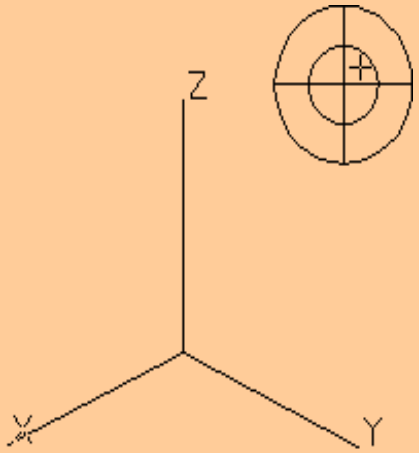
Kaizen Technique



- Kaizen- defines the managements role in continuously encouraging and implementing small improvements in the individual & organization.
- Break the complex process into sub-processes and then improve the sub-processes.
- Continuous improvements in small increments make the process more efficient ,controllable and adaptable.
- Does not rely on more expense,or sophisticated equipment and techniques.

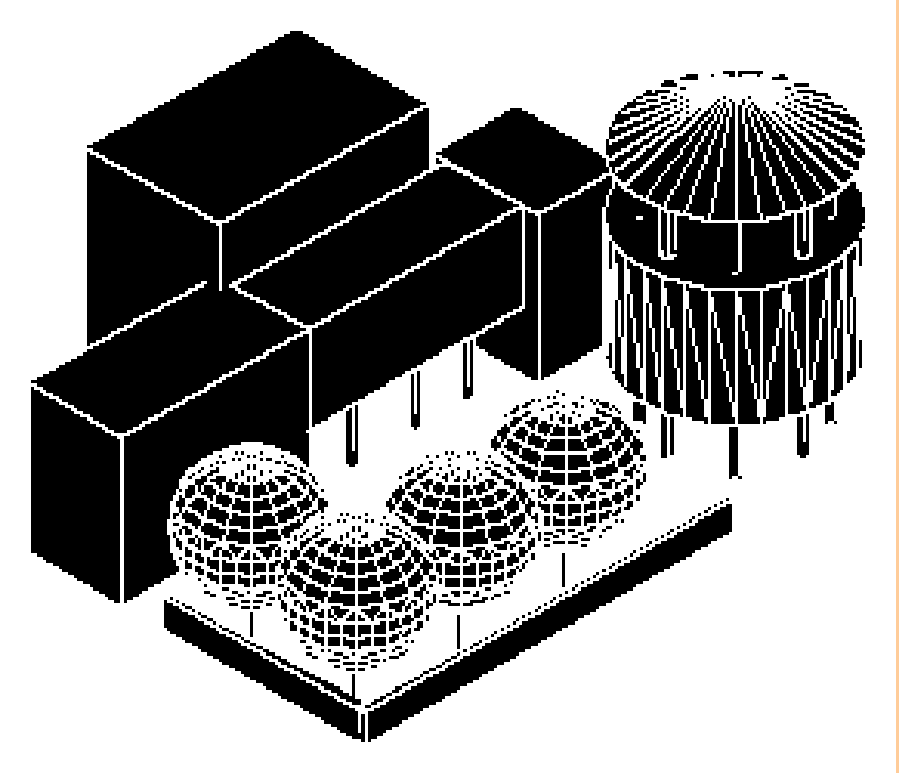
Kaizen

- Value and non-value added work activities
- Muda-seven classes of waste
- Principles of motion study and work-cell use
- Principles of materials handling and use of one-piece flow
- Documentation of standard operating procedures
- The 5S's
- Visual displays for communicating to factory personnel
- JIT- to produce right quantities at right time and with right resources
- Poka-yoke to prevent or detect errors
- Team dynamics – problem solving ,comm.,conflict resoln.

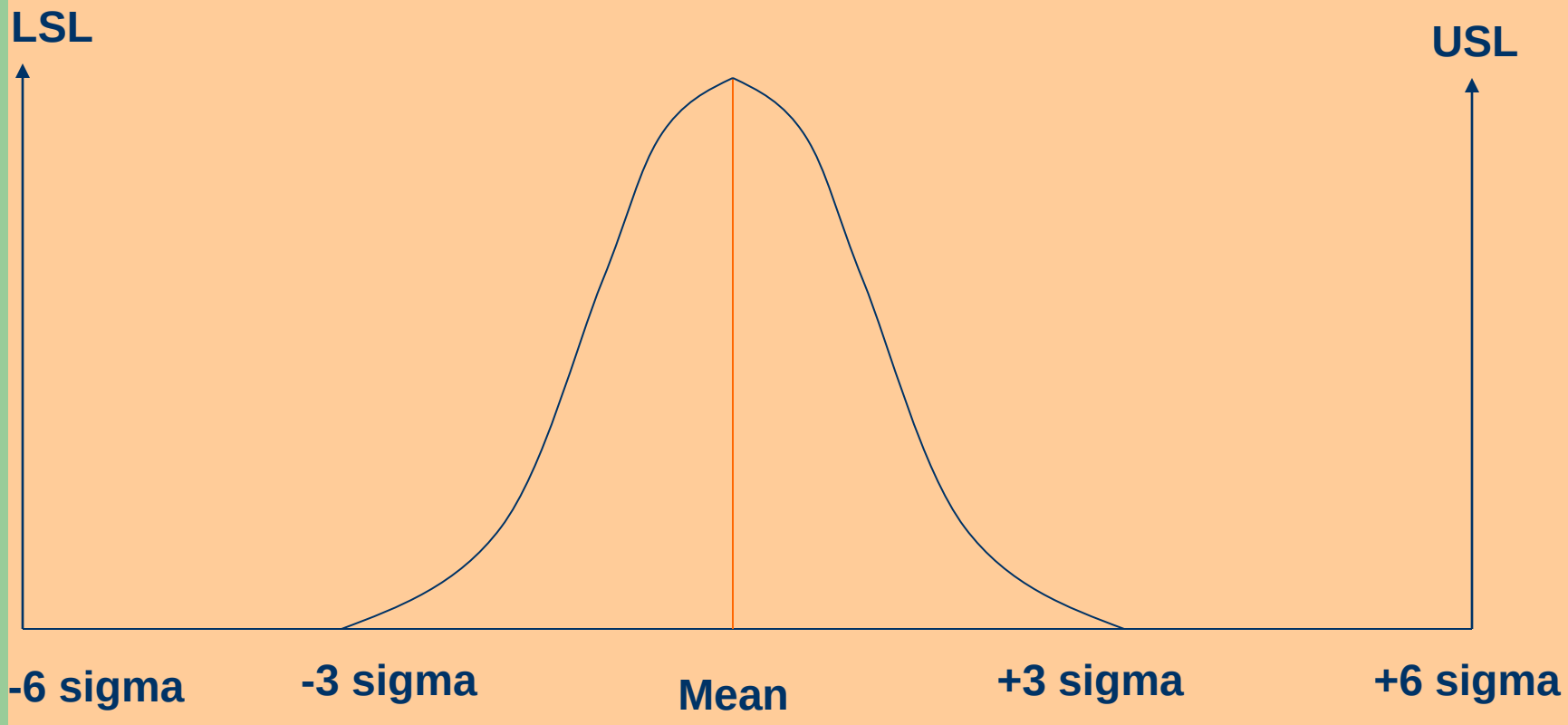


Kaizen Technique- change for good

- Kaizen
- Heijunka
- Kairetsu
- Kokusunka



Non-conformance rate when Process is centred



Six sigma method

- Six sigma method is a TQM process that uses process capability analysis as a means of measuring progress.
- The smaller the standard deviation, the lesser the deviation of the product characteristic from its mean value. If the process has a normal distribution,the upper and lower specification limits are +/- 6 sigma from the mean u. The non-conformance is 2ppb and the process capability Cp is 2.0(1.33 Cp is de facto standard.)
- A normal process with mean shifted +/-1.5 sigma from the target value desired has non-conformance of 3.4ppm and process capability index Cpk= 1.5, with 1.0 being the de facto standard.

References

- Total Quality Management - Dale H. Besterfield et al. ,Pearson education LPE

- Total Quality Management - R.S.Naagarazan and A.A Arivalagar, New Age International Publishers.