ENERGY BUSINESS ACADEMY

QUALITY MANAGEMENT

Presenters:
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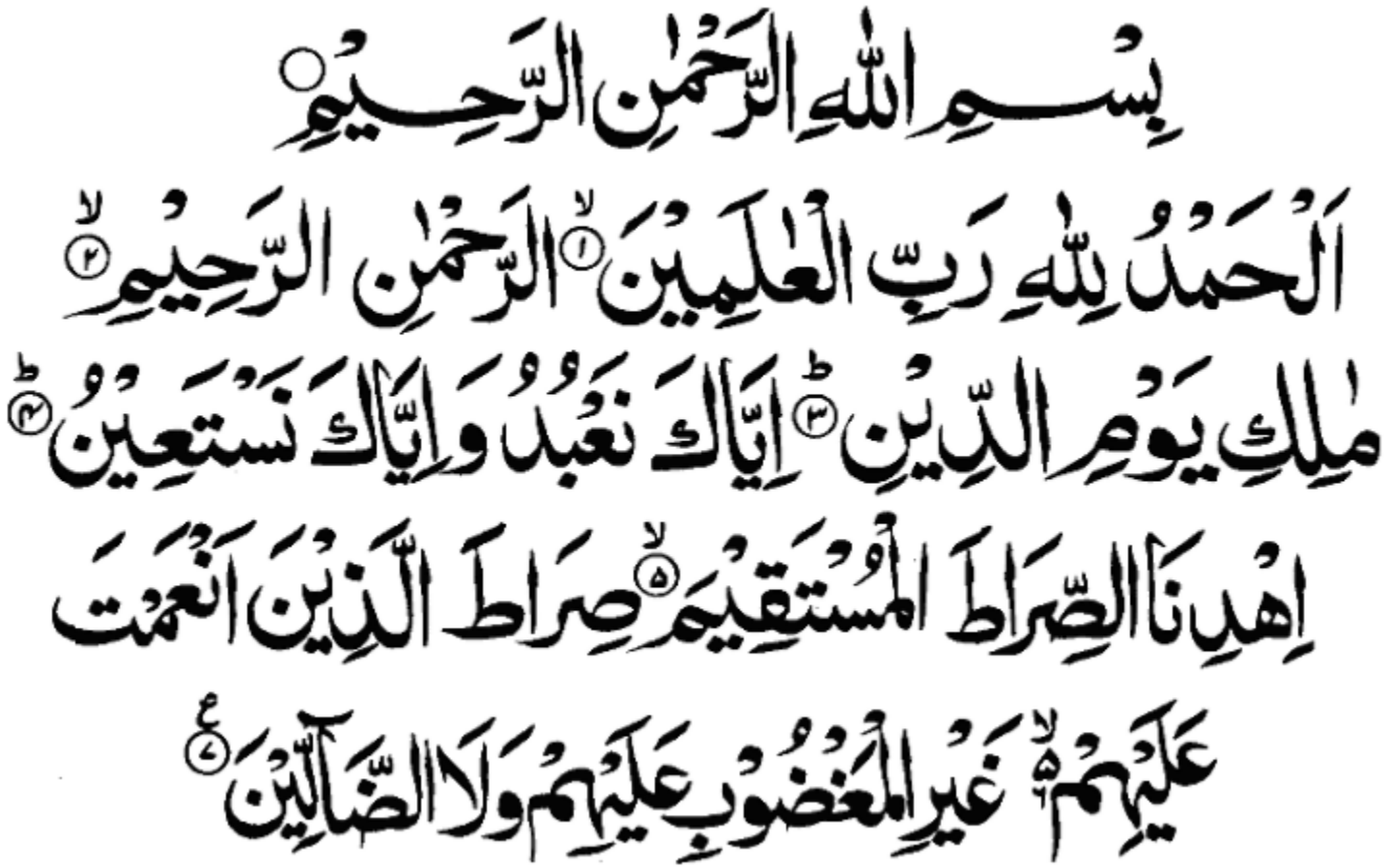
Date: Aug 2020

Venue: Pungguk East Building, NIA. Seria.

Programme & Agenda

- 08:15am Recitation of surah Al-Fatihah & Safety briefing
- 08:35am Introduction
- 09:00am Presentation 1: What is Quality and its fundamentals?
  Presentation 2: Quality Management System & Audits
  Presentation 3: ISO 9001 Quality Standards
  Presentation 4: Quality Requirements in Tenders & Contracts
- 11:30am Q&A
- 12:00am End of session

Surah Al-Fatihah



Safety Briefing

Emergency exits

Contact numbers

Fire drills

Assembly point

Accountability Sheet

First aid kits

Alarm sirens/bell

Restroom facilities

Refreshments

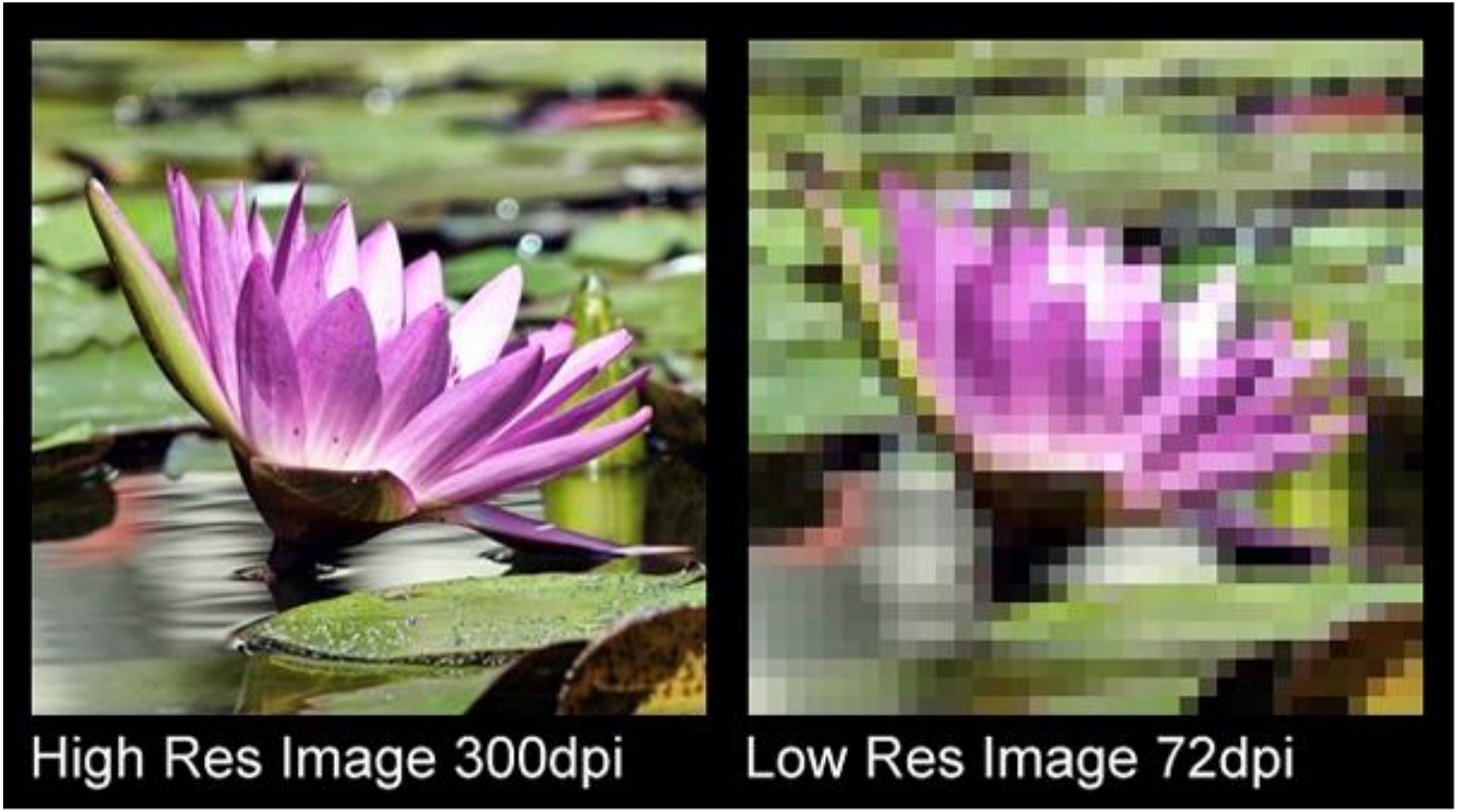
HSE Moment

changing_tyre.wmv

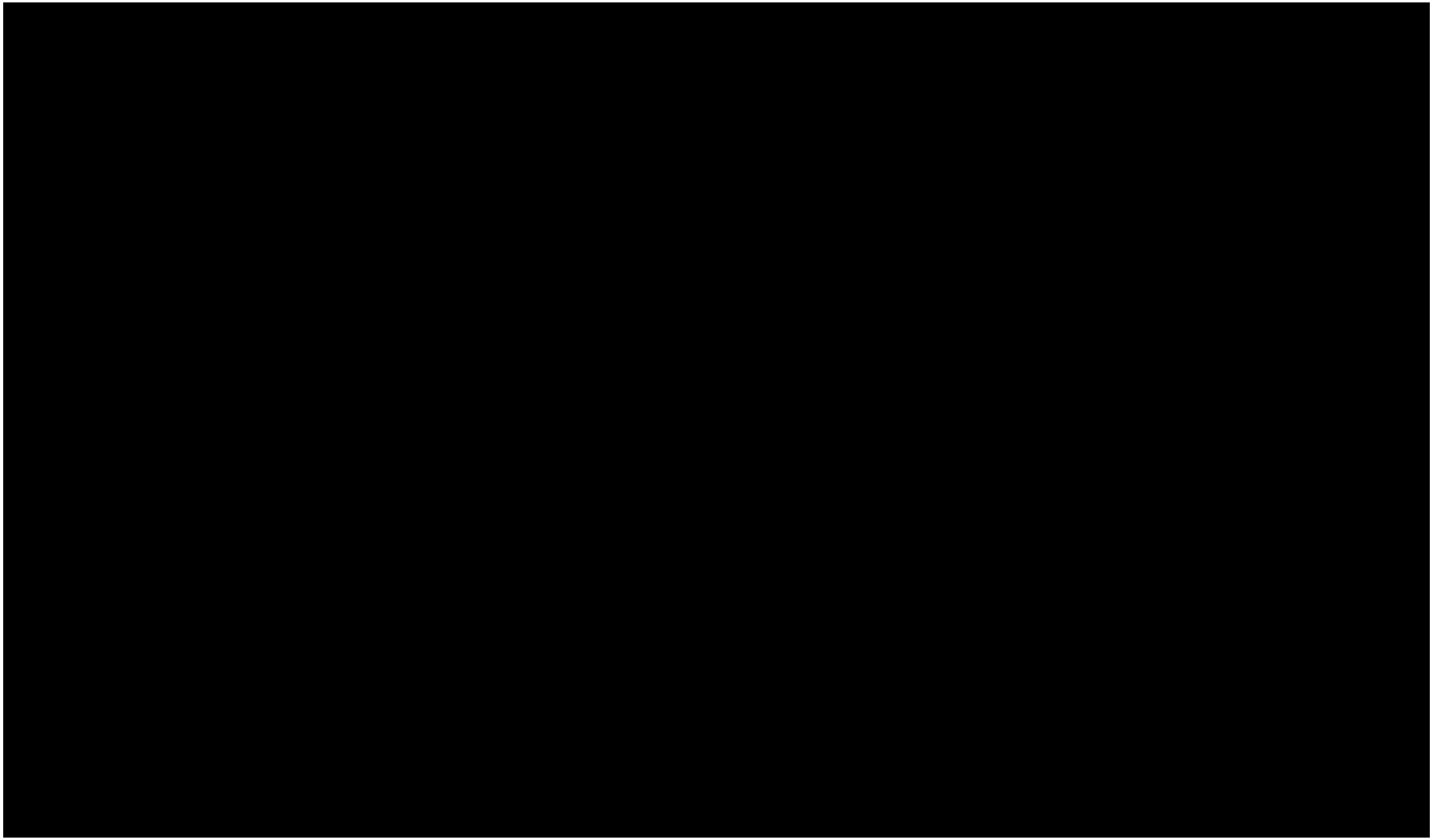
Introduction

What is Quality and its fundamentals?

What is Quality?



What is Quality to BSP?



Definitions of Quality - General

- Oxford Dictionary:

[mass noun] The standard of something as measured against other things of a similar kind; the degree of excellence of something: *an improvement in product quality .*

[count noun]: these colleges provide a better quality of education

- ISO 9000:2005

Quality is a degree to which a set of inherent characteristics fulfils requirements.

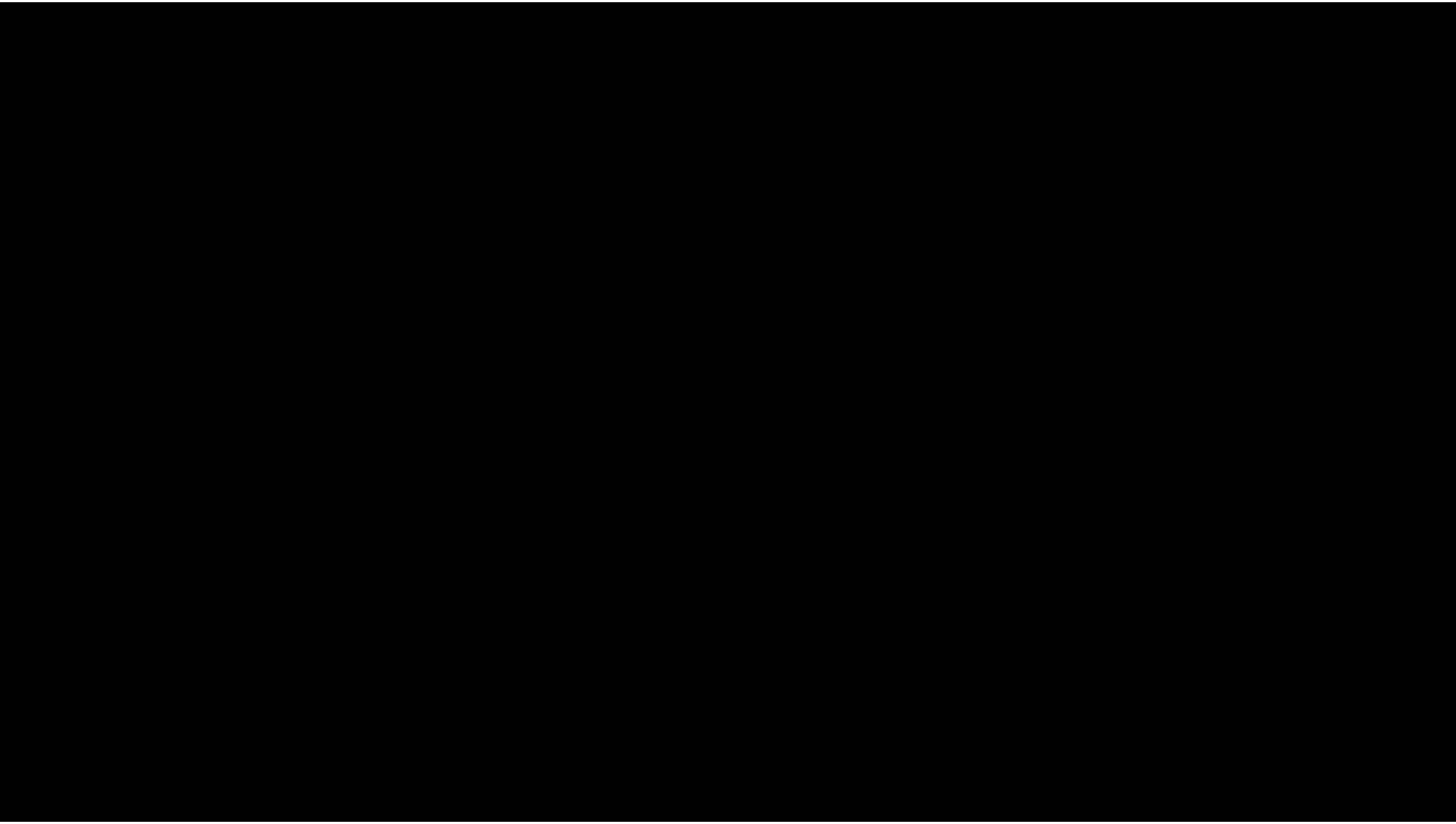
- ISO 9001:2015:

Quality is the degree to which a set of inherent characteristics of an object fulfils requirements.

  - ✓ *An object is anything perceivable or conceivable, meaning it can be anything e.g. a car*
  - ✓ *Characteristic is a (distinguishing) feature e.g. red (colour)*
  - ✓ *A requirement is a need or expectation that is stated, generally implied or obligatory e.g. the colour of the car is red.*

- *Simply, **Quality is conformance to requirements (standards).***

Let's watch a video...



Different Types of Quality (based)

- User or Customer based:
  - ✓ In the eyes of the beholder
  - ✓ Fitness for use, meeting customer expectations
- Manufacturing based:
  - ✓ Right the first time
  - ✓ Conforming to design, specifications, or requirements – Zero defects
- Product based:
  - ✓ Precise measurement
- Service based:
  - ✓ Customer satisfaction
- Value based:
  - ✓ Best combination of price and features.

Why is Quality Important?

- To maintain customer satisfaction and loyalty towards quality products or services.
- To manage cost and risk of replacing faulty goods due to poor quality workmanship.
- To manage and build company reputation by gaining international accreditation e.g. ISO 9001
- To meet customer expectations.
- To meet industry standards.
- To provide Business competitiveness.

What is the difference between Quality Assurance (QA) & Quality Control (QC)?

Difference between QA and QC _HD.mp4

What is the difference between Quality Assurance (QA) & Quality Control (QC)?

- **Quality Assurance** (QA) refers to administrative and procedural activities implemented in a quality system so that requirements and goals for a product, service or activity will be fulfilled.
  - Focused on process, proactive, prevent defects, Quality audits etc.

- **Quality Control** (QC) involves activities or techniques used to achieve and maintain product, process, and/or service quality by finding and eliminating causes of quality problems through the use of tools and equipment so that customer's requirements are continually met.
  - Focused on product, reactive, find defects, testing etc.

Quality Management System & Audits

2

What is a Quality Management System (QMS)?

- A Quality Management System is a management system by which an organization or project aims to reduce and eventually eliminate nonconformance to specifications, standards, and customer expectations in the most cost effective and efficient manner.

  - **What is Quality?** Conformance to a set of requirements free from defects
  - **What is a Quality Management System?** The Quality Management System is a set of processes, tools, and resources that ensures quality
  - **How does Quality support Process Safety?** QMS helps ensure the requirements for Process Safety are met
  - **QMS application?** QMS applies to all ORP phases and the earlier the application the more likely we are to prevent quality incidents in Execution

Where can Quality go wrong and impact Process Safety?

- Did not involve the right people
- Changes
- New procedures
- Incorrect specifications
- Workmanship
- Handoffs
- Counterfeit
- Specification not clear
- Non conformance missed
- Issues forgotten
- Lessons – not learned
- Qualifications
- Poor SAP system
- Not following procedures
- Failure to recognize novelty
- Specification not read
- Human error
- Contract terms
- New sub-suppliers / employees
- Time constraint

Quality Management in our industry today

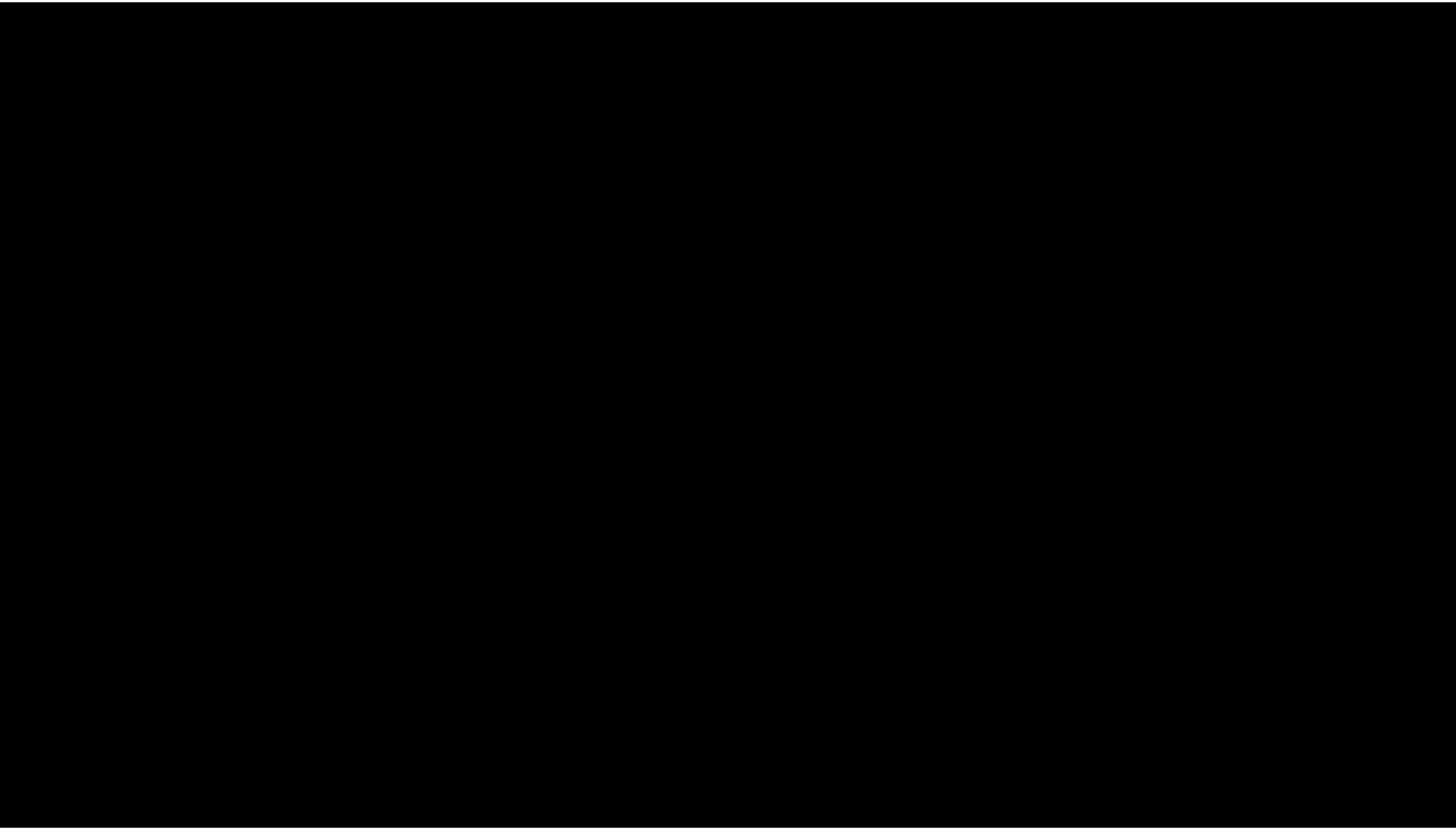
- Even today our proven Suppliers still have incidents due to many factors.
- The Quality Management System's goal is to provide assurance and to not allow missed requirements.

QUALITY MANAGEMENT
PREVENT HOLES FROM LINING UP

Safety or Quality Incident

What is the ultimate QMS goal that we want to achieve for Process Safety?

Let's watch another video...



QMS Framework

- The structure and content of the QMS are based on the requirements and guidance from several documents:

  Examples:

  - ✓ **ISO 9001: 2015** Quality Management Systems – Requirements
  - ✓ **ISO/TS 29001:2010** Petroleum, petrochemical and natural gas industries – Sector-specific quality management systems – Requirements for product and service supply organizations
  - ✓ **Design & Engineering Practice DEP 82.00.10.10-Gen.** Project Quality Assurance

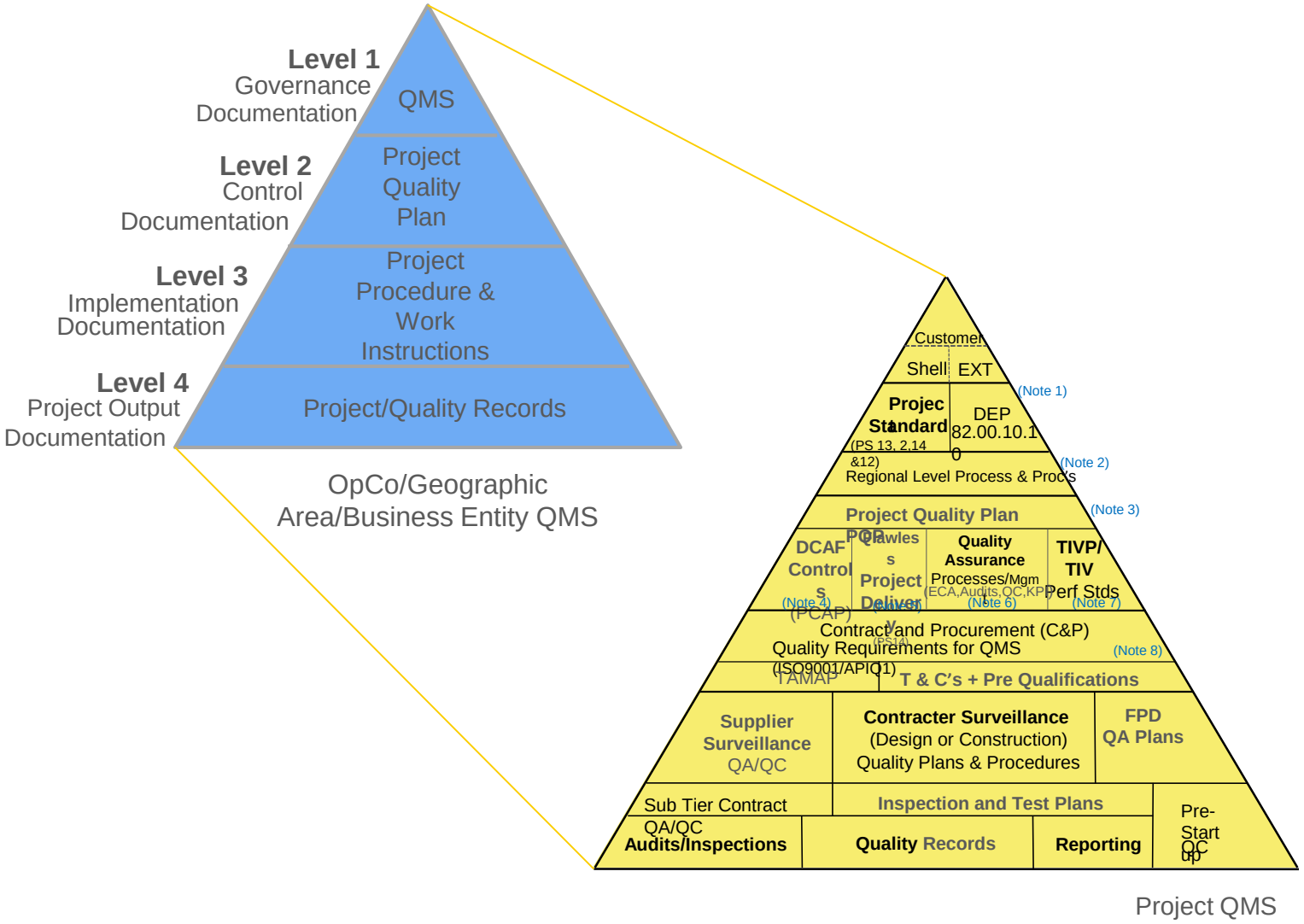
Benefits of Quality Management System

- The goal of quality management system (appraisal + prevention) is to:
  - ✓ reduce deviations and rework (failure),
  - ✓ thus reducing the overall cost of quality (cost of failure + appraisal + prevention).
- A Construction Industry Institute study of large US projects in the late 80's found:
  - ✓ Rework accounted for 12% of total installed costs
  - ✓ total cost of quality for these projects ranged ~20% - 30% of total costs

Do you know what is the Cost of Quality in your company?

How much does cost being spent on Quality Issues?

Shell's Quality Management System



Project QMS

What is an Audit?

- A systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which an established criteria is fulfilled.
  - ✓ Auditee: organization or person being audited.
  - ✓ Auditor: person with the demonstrated personal attributes and competence to conduct an audit.

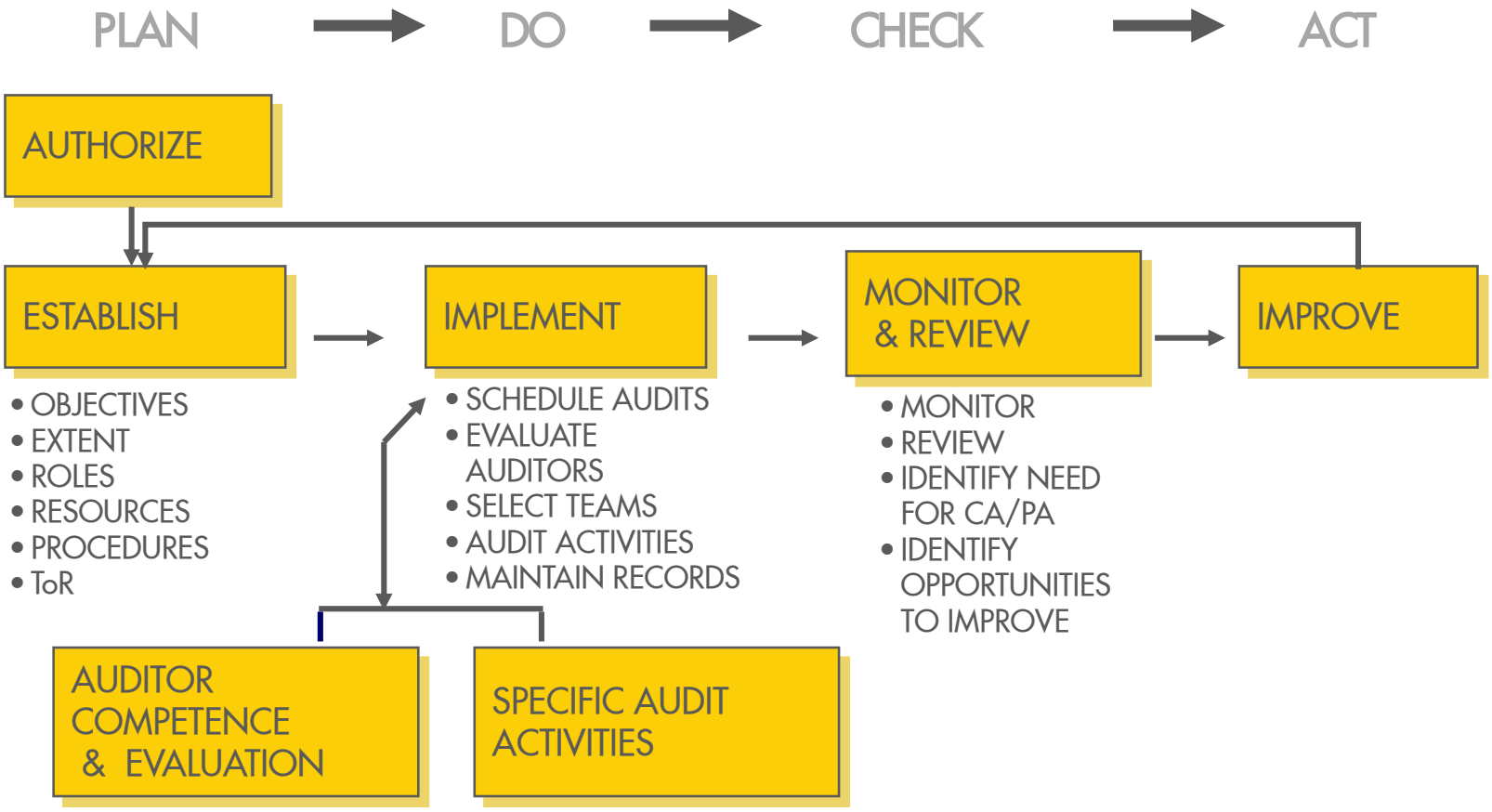
- ISO9001 requires that we audit ourselves to demonstrate adequacy and compliance to our management system.

- Internal audits check that business documentation defines the business needs and that the quality requirements are practical, understood and followed.

- Our internal audit effectiveness is examined closely by the external auditors.

- Audits can be used to identify best practice and identify/share improvement.

Audit Approach – Process Flow



What is an Audit Non-Conformance (Report)?

- A non-fulfillment of a specified requirement.
- A non-conformance is highlighted to:
  - ✓ Determine root cause
  - ✓ Plan and execute corrective action
  - ✓ Implement preventive measures
  - ✓ Document lessons learned
  - ✓ Tool for continual improvement
- NCR – document highlighting non-conformance and actions taken
- Classifications:
  - ✓ Minor – single or isolated non-conformances not amounting to a system breakdown
  - ✓ Major – single or series of non-conformances pointing to a breakdown in the quality management system

ISO 9001 Quality Standards

3

What is ISO?

- ISO stands for the "International Organization for Standardization".
- It is not an acronym.
- ISO is the world's largest developer and publisher of international standards and consists of a network of national standards institutes from 160 countries.
- Formed in 1947, headquarters in Geneva.
- The first series of ISO 9000 was released in 1987.
- Phase one revision in 1994, phase two revision in 2000, then 2008.
- Latest version of the standard issued in 2015.

What is ISO 9000 family?

- ISO 9000 family of quality management system standards was initially issued in 1987.
- ISO 9000 outlines the fundamentals and vocabulary of quality management systems.
- ISO 9001 is the actual quality management standard. Versions of the ISO 9001 standard appear as 9001:2000, 9001:2008, 9001:2015 where the last 4 digits indicate the year the standard was revised.
- ISO 9004 is the guidelines for performance improvement. ISO 9004 is NOT a certifiable standard; instead, it is a document that provides a wider focus on quality management (continual improvement) of an organization's overall performance, efficiency, and effectiveness.

ISO 9000 - Key Vocabulary

- Controlled Document: A living (or changeable) document that describes, supports, or is associated with a management system, a management system process description, a business process, a support (work) process, a policy, procedure, practice, manual, standard, specifications, form, etc. A controlled document is managed using the following criteria:
  - ✓ approval for adequacy prior to use,
  - ✓ changes and current revision status identified,
  - ✓ maintenance in a controlled manner, so that it can be replaced or removed from use when it is superseded.
  - ✓ A controlled document can be in either paper or electronic form.
- Customer Satisfaction: Customer's perception of the degree to which the customer's requirements, stated or implied, have been fulfilled.
- Product: Result of a process. The word "Product" is interchangeable with word "Service".

ISO 9000 - Key Vocabulary

- Process: Set of interrelated or interacting activities which transform inputs to outputs.
- Quality Policy: Overall intention and direction of an organization related to quality as formally expressed by top management. The quality policy provides a framework for establishing and reviewing quality objectives.
- Quality Objective: Something sought, or aimed for, as related to quality. The quality objectives need to be consistent with quality policy and the commitment to continual improvement, and their achievement needs to be measurable.
- Top Management: Person, or group of people, who direct and control an organization.
- Record: An auditable document that represents the status of information at a point in time, to provide evidence of conformity to a specific work process. A record is 'frozen' and cannot be updated. Examples include, but are not limited to: certificates, audit/inspection reports, test reports

What is ISO 9001?

- ISO 9001 specifies requirements for a quality management system. It's the actual 'standard'.
- Any company/organization can use this standard to demonstrate its ability to meet customers', regulatory agencies', and its own internal standards.
- ISO 9001 is flexible and does not imply uniformity of quality management systems. The design of an organization's quality management system is influenced by varying needs, particular objectives, the products/services provided, the processes used, and the size and structure of the organization.
- ISO 9001 promotes the use of the 'process approach' when developing, implementing, and improving the effectiveness of a quality management system.
- Top Management is considered to be responsible for a quality management system.
- Emphasis is on Customer Satisfaction and Continual Improvement. Customers may be either internal or external.
- Measurable quality objectives are a requirement of the standard. Objectives can include items such as meeting customer deadlines, budgets, and technical requirements.

ISO 9001:2015 overview


INTERNATIONAL STANDARD

ISO 9001

Fifth edition
2015-09-15

Quality management systems — Requirements

Systèmes de management de la qualité — Exigences

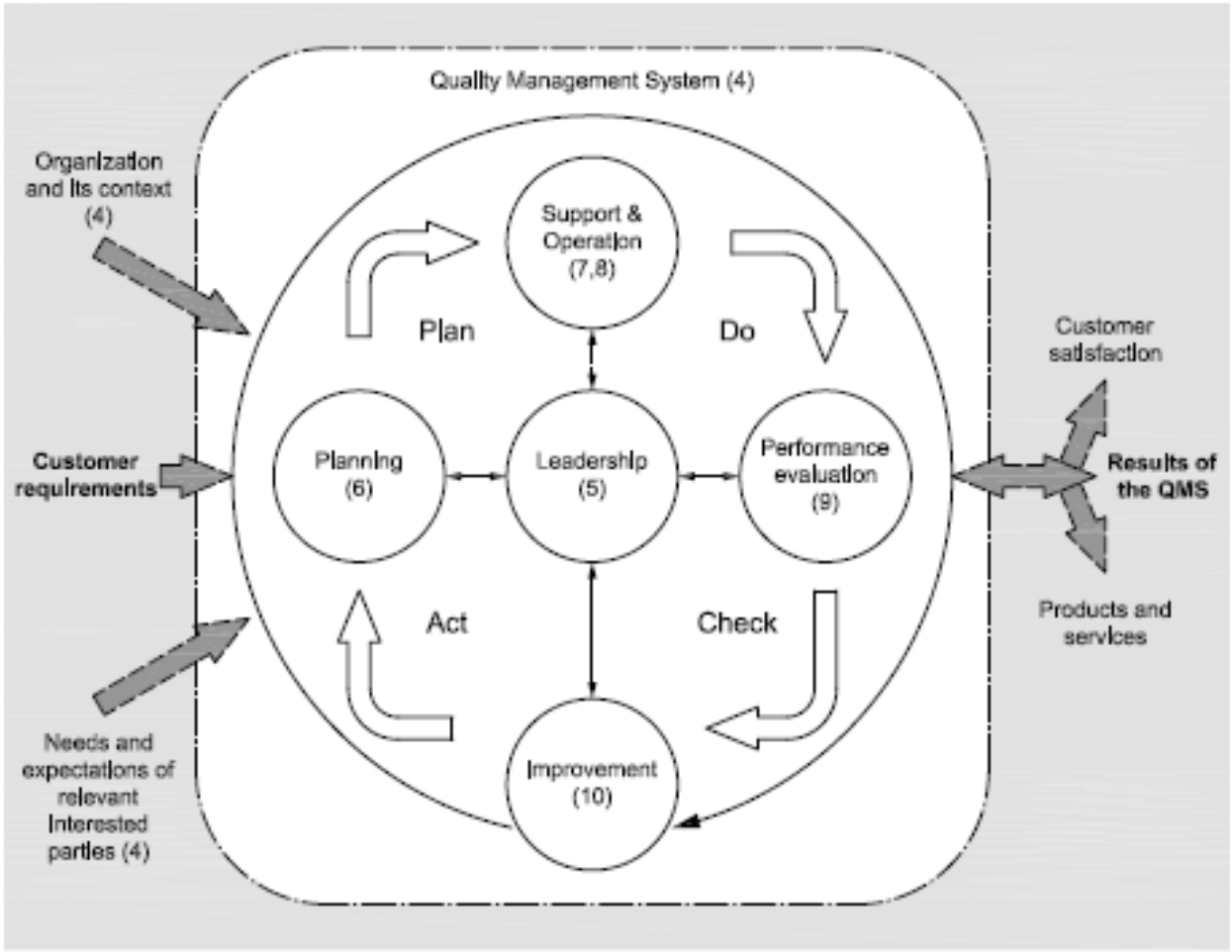
Reference number
ISO 9001:2015(E)

© ISO 2015

- Customer Focus
- Leadership
- Engagement of People
- Process Approach
- Improvement
- Evidence-based decision-making
- Relationship management

Adobe Acrobat Document

ISO 9001:2015 Process Approach (P-D-C-A cycle)



Note: Numbers in brackets refer to the clauses in this International Standard.

ISO 9001:2015 QMS P-D-C-A?

PDCA cycle can be briefly described as follows:

— Plan: establish the objectives of the system and its processes, and the resources needed to deliver results in accordance with customers' requirements and the organization's policies, and identify and address risks and opportunities;

— Do: implement what was planned;

— Check: monitor and (where applicable) measure processes and the resulting products and services against policies, objectives, requirements and planned activities, and report the results;

— Act: take actions to improve performance, as necessary.

Quality Requirements in Tenders & Contracts

4

Examples of Quality Requirements in Tenders & Contracts

2. Quality Assurance Planning

2.1 The Inclusion of Quality Requirements at the Contract Preparation Stages

= Input/Output
= Task
= Decision

The PE will have previously outlined the contract strategy in the project execution plan (PEP). This will have described any intentions to contract-out all, or part, of the work (via EPIC type contracts for design and construction).

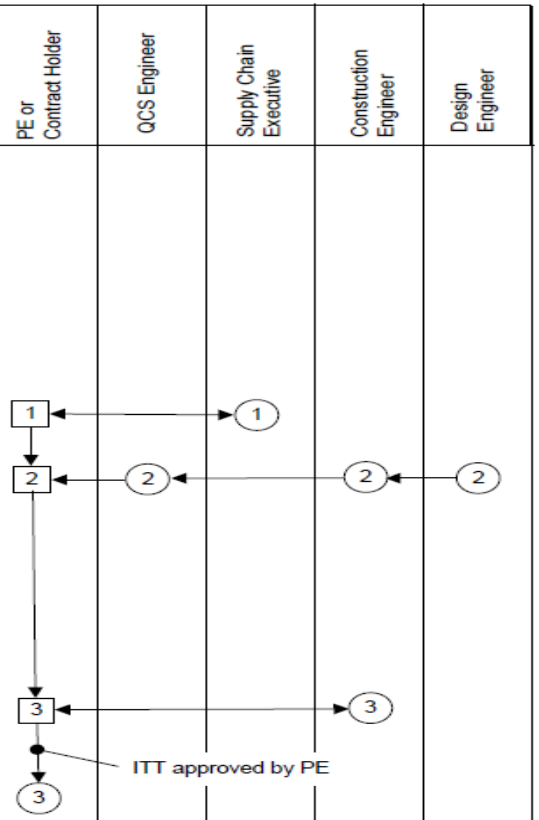
QA personnel will have already contributed, in broad terms, to the QA requirements contained in the PEP.

INCLUSION OF QUALITY RQUIREMNTS IN THE INVITATION TO TENDER (ITT).
This process applies to both "project specific" and "service contracts". For service contracts replace "PE" with "Contract Holder".

1. PE prepares the ITT in conjunction with the Supply Chain Executive (SCE).
2. The PE will provide the quality clauses to be used in the ITT. These will be based on the content described in Chapter 5, but tailored to suit the particular project.

   The PE will prepare these in liaison with the design engineer (for design contracts) or the construction engineer (for construction contracts). The QCS engineer will also be asked to contribute if for a construction.

   The parties concerned will contribute estimates of their effort during the project design, procurement and construction phases and plan their internal resources accordingly.
3. Once agreed, the PE in conjunction with the SCE shall incorporate the quality clauses in the ITT. The PE shall approve the final invitation to tender.



Examples of Quality Requirements in Tenders & Contracts

2.2 The Inclusion of Quality Requirements at the Requisition Preparation Stages

= Input/Output
= Task
= Decision

The PE will have previously outlined the contract strategy in the project execution plan (PEP). This will have described the major equipment to be.

QA personnel will have already contributed, in broad terms, to the QA requirements contained tin the PEP.

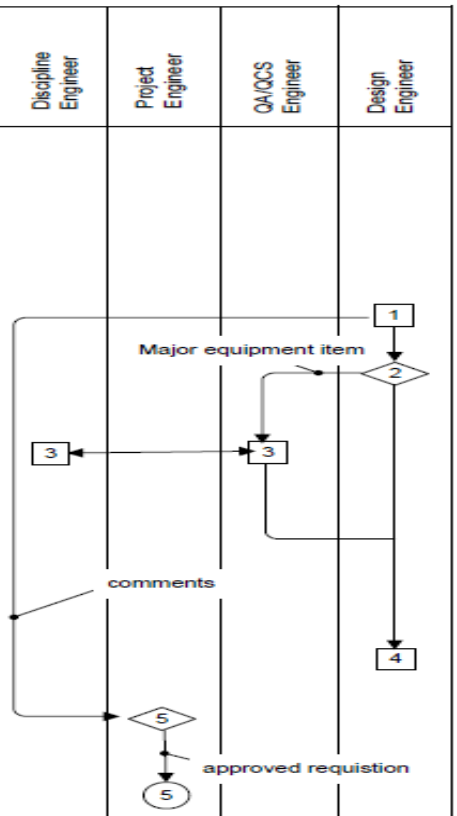
INCLUSION OF QUALITY REQUIREMENTS IN REQUISITIONS.

1. The design engineer prepares the material requisition.
2. If for a major equipment item, the design engineer requests the PE contribution to the material requisition and confirms details of the firm work scope. This is in reference to the Discipline Delivery Plan (DDP).
3. The Project QA Engineer will provide the quality requirements to be included in the material requisition. These will be based on the content describe in BSP-12-Procedure-019 – Request/Obtain Materials and Equipment and other relevant DEPs.

   The Project QA Engineer will ensure that this is included in MR ITP Plan. QA/ QCS engineer also verifies quality clauses are adequately captured in the requisition, including TPI requirements.

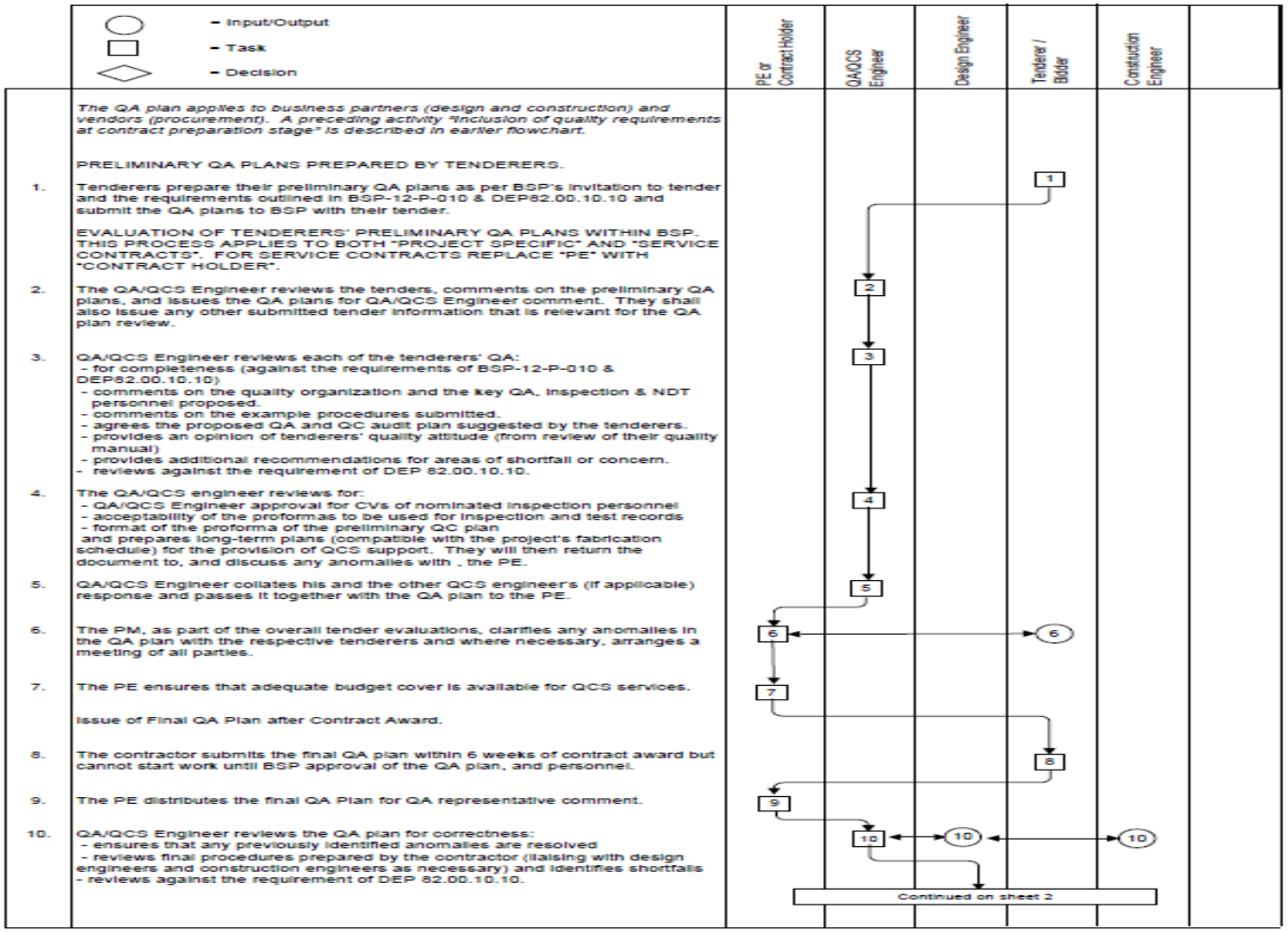
   The parties concerned will contribute estimates of their effort during the project design, procurement and construction phases and plan their internal resources accordingly.
4. The design engineer will incorporate the quality clauses in the material requisition.
5. The PE approves the final material requisition.

   The incorporation of agreed deviations to material requirements at the "Requisition for Purchase" stage is covered in BSP-12-Procedure-019 – Request/Obtain Materials and Equipment.



Examples of Quality Requirements in Tenders & Contracts

2.3 The Preparation and Approval of Quality Assurance Plans



Examples of Quality Requirements in Tenders & Contracts

2.4 Procedure Description

Planning for Quality Assurance (QA) in Facility Design and Construction Activities

The QA requirements to be applied are fully integrated in the relevant BSP-12 Work Instructions and Procedures, PG13 and DEP 82.00.10.10.

There is no specific document named the Project QA Plan as the BSP-12 MS documentation and the approved PEP can also be the overall project QA plan.

However, where work is done entirely or partly out-house then business partners (for design and/or construction) and vendors (for procurement of materials and equipment) will be required to produce their own QA plan for their particular part of the project scope.

Vendors / subcontractors shall comply with the same QA/QC controls as that of the main business partner, including the requirement for the submittal of QA/QC documents and relevant staff CV's for BSP review.

2.4.1 Quality System

Business Partners for BSP works shall operate a Quality System in accordance with the latest revision of the ISO 9000 series & DEP82.00.10.10, and shall be in possession of a Quality Assurance Manual which describes their Quality System.

The Quality Assurance Manual shall detail the general quality management goals and strategies, and shall include as a minimum, the organisational structure, personnel responsibilities, resources, specific objectives, QA/QC controls, policies, plans, standards for the specific elements of ISO 9000:2000 Series. It shall indicate all working QA/QC procedures, work instructions and resulting documentation. The QA system shall have procedures for ensuring conformance, recording deviations and correcting them if they occur, plus avoiding recurrence.

2.4.2 QA/QC, Inspection, & NDT Personnel Qualifications for Construction phase

The business partner shall indicate their intended QA/QC structure & organisation for the implementation of the WORK including the numbers, and positions of QA/QC, inspection and NDT personnel. This shall include the provision of QCS Engineer to monitor their subcontractor / vendor fabrication activities.

Refer to attachment 5.4 of this Work Instruction for the minimum qualification requirements for QA, QC Inspection, QCS Engineer and NDT personnel.

The BUSINESS PARTNER shall submit the CV's of all QA personnel, QC Inspectors and NDT personnel (BUSINESS PARTNER and SUB CONTRACTOR) to COMPANY for approval prior to mobilisation and commencement of the actual WORK.

(Submission at the tender stage does not mean COMPANY approval of the personnel)

The CV's of any subsequent replacement or additional QA/QC, Inspection and NDT personnel shall be submitted to COMPANY for approval, prior to mobilisation.

No QA, QC, inspection or NDT personnel shall be utilised/demobilised without prior approval from the COMPANY.

The BUSINESS PARTNER shall supply "full-time" and "sufficient numbers" of quality personnel to perform QA/QC activities in the contract.

Note:

"Full-time" shall be defined as dedicated to the project and that personnel is not "shared" among other projects operated/executed by the same or other Business Partners UNLESS granted in writing by the relevant Asset or Major Project's Head of Engineering QA or his nominated deputy.

"Sufficient numbers" shall be agreed by relevant Asset or Major Project's Head of Engineering QA in liaison with QCS Engineer assigned to the project in question and that requirement of "sufficient QA personnel' may vary as workscope increases or decreases. It is expected that the ratio of QC Inspectors to welder is 1:15 i.e. one inspector to fifteen welders.

A Senior Welding Inspector shall be present on all sites during construction works. One inspector shall NOT cover more than one site if fabrication is being carried-out.

2.4.3 Quality Control – Inspection and Testing

The BUSINESS PARTNER shall supply all necessary facilities, including inspection and test equipment to be utilised by the QA, QC inspectors, and NDT personnel during the execution of the work, for ensuring compliance to COMPANY specification requirements.

This shall include, but not be limited to:

Inspection & test equipment for all QC disciplines (Welding, Painting, Electrical, Instruments etc) NDT equipment (X-ray & Gamma Ray equipment, Ultrasonic, MPI and Dye Penetrant equipment) All consumables associated with the inspection and test implementation.

The business partners shall provide QC inspection to monitor all their subcontractor / vendor fabrication work. This may be by the provision of their own QCS Engineer or by assigning a third party inspector from an inspection agency approved by BSP. This provision shall be independent of the subcontractor / vendor QC personnel.

In case of any ambiguity / dispute related to inspection / test requirement or acceptance criteria etc., the specifications in BSP (contract, standards, DEP's, applicable international standards, etc.) shall be followed and mandatory for BUSINESS PARTNER.

2.4.4 Award of Contract

The BUSINESS PARTNER shall submit as a minimum, the following QA/QC documents for BSP approval prior to commencement of construction activities:

- ISO 9001 accreditation certificate, or evidence that the system complies with the ISO 9001 standard, such as an independent audit report.
- Project specific QA Plan if applicable

Examples of Quality Requirements in Tenders & Contracts

4. Quality Requirements in Tenders and Contracts

4.1 Invitation to Tender (ITT) – Part III

Quality Engineers shall work with the Contract Holder (CH)/Supply Chain Engineer (SCE) to provide inputs to tenderers in Invitation To Tender (ITT) document to clearly stated what are the required quality documents during tender submission. This will enable the tenderers to prepare and submit necessary documents for the tender evaluation purpose.

The standard write-up for the various scope of Invitation To Tender (ITT) are available in attachment 5.1.

4.2 Quality Assurance/Quality Control Scope of Works in Tenders and Contracts – Section 4B

It is essential that the requirements for quality are identified at the early (preparatory) stages of all contracts ("project specific" contracts or "service" contracts) and requisitions. Early input will:

- ensure that QA engineer / QCS engineer are involved and can be planned for, by requesting contribution via the line division head
- ensure that quality requirements are identified at either the Invitation to Tender stage or Requisition for Enquiry stage
- avoid later contract variations and costs resulting from late inclusion of quality requirements
- avoid later costs resulting from having to rectify bad quality products or services

The quality requirements in contracts are stipulated in DEP 82.00.10.10 Project Quality Assurance.

Attachment 5.2 is a Standard template of QA/QC Requirements to be used in Tenders Scope of Works and subsequent Contract, unless otherwise specified. Users of the attachment 5.2 is advise to take particular attention to the clauses embedded in this template to ensure only applicable scope and requirements are selected in the Tender documents.

It covers:

- a request to view, with the tender submission, the contractor's Quality Manual, so as to evaluate the contractor's quality system, attitude to quality, and competence to perform the work
- a preliminary QA plan, so as to determine contractor's understanding of the scope of work and the related quality requirements. A finalised project specific QA plan will be required later, prior to the contract commencement
- QA/QC documentation requirements (including proformas for QC plan, and inspection and test records)
- the need to provide a timely quality control data package at the end of the work as evidence that the specified quality has been achieved
- QA and QC personnel qualifications ie. manager, co-ordinator, inspector and NDT operators. (Refer to Attachment 5.4 for the minimum qualification requirements.)
- requirement for a contractor's audit plan for the work (if deemed applicable)
- access by BSP for the purposes of carrying out any technical audits of the work (if deemed applicable)

4.3 Other Quality Requirements for Tenders and Contracts – Section 4B

Attachment 5.3 are samples of quality narratives that shall be taken in to account during the Tender and Contract preparatory phase. When applicable, the user is advise to consult the SCE and/or the Project Engineer to consolidate these requirements in its appropriate section of the document.

- Flange Management
- Hazardous Area Equipment and Compliance
- Materials & Equipment Preservations
- Applicable Design & Engineering Codes and Standards
- Vendor Selection and Qualifications Questionnaire

4.4 Specifications and Drawings – Section 4B

It is critical for Quality Engineers to provide relevant standards, specifications, procedures and reference documents to tenderers as part of the tender. The documents listed in attachments 5.4 are quality and project delivery related specifications that will enable tenderer to have a better overview of the required work scopes and further to prepare and submit a quality tender to BSP for evaluation.

4.5 Quality Personnel Qualification requirements – Section 4B

Attachment 5.4 is the requirements and qualifications of the various Quality positions required in contract. Quality engineers shall refer to the positions required in tender scope of works, and list out the personnel qualifications required in Section 4B.

4.6 Quality Report & Meetings – Section 8

Quality Engineer shall refer to tender document Section 8 and provide inputs on the requirements for Quality meeting/reporting depending on the type of contract scope. It has to be specified whether is it a joint meeting with contract team or a specific Quality Meeting. The frequency of the quality meeting and reports submission shall also be defined in Section 8.

4.7 Tender Evaluation Plan and Contract Quality KPIs

Attachment 5.6 stipulates the Quality Criteria during Tender Evaluation process that shall be taken into consideration when evaluating bidders' Quality stand point and current performance.

Attachment 5.6 is the Quality Clauses in Tender Plan that will decide the overall scoring of the Tenderer's Quality Section after the tender evaluation.

Attachment 5.6 is the Contract Quality KPIs for the tenderer to take into consideration in the tender preparation and submission. This will eventually become the Contractual Quality KPIs to measure Contractor's quality delivery and performance. Quality Engineer shall base on the contract scope of works to deploy the relevant template of the Contract Quality KPIs.

Classroom Exercise #1

10 mins discussion in small groups

Ready for feedback to share your answer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ISO 9001:2008 QMS requirements?

REQUIREMENTS	SCOPE
QUALITY MANAGEMENT SYSTEM	General requirements & documentation requirements
MANAGEMENT RESPONSIBILITY	Commitment, Customer Focus, Quality Policy, Objectives, planning, Responsibility, Authority, Communication, Management Reviews
RESOURCE MANAGEMENT	Provision of resources, HR, Infrastructure, Work Environment
PRODUCT REALIZATION	Planning of product realization, customer related processes, purchasing, production & service provision, control of measuring & monitoring devices.
MEASUREMENT, ANALYSIS & IMPROVEMENT	Monitoring & measurement control of non-conforming product, analysis of data & improvements.

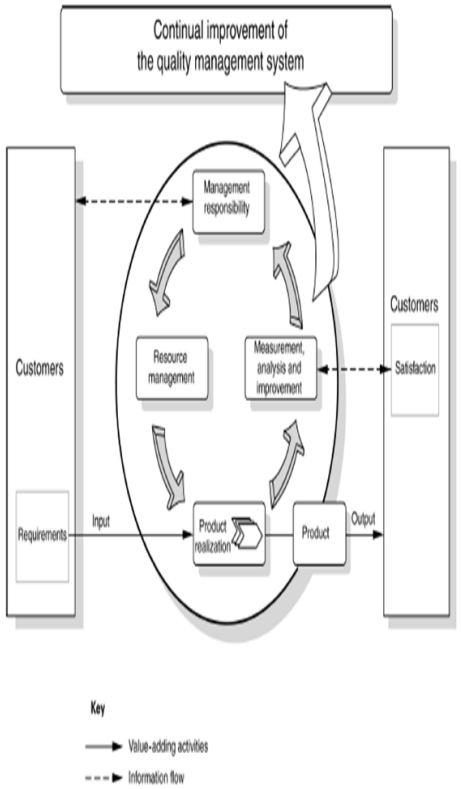

Figure 1 – Model of a process-based quality management system

ISO 9001:2008 - 8 Quality Management Principles

1. Customer Focus
2. Leadership
3. Involvement of People
4. Process Approach
5. System Approach to Management
6. Continual Improvement
7. Factual Approach to Decision Making
8. Mutually Beneficial Supplier Relationship