

A close-up photograph of a person's hands in a dark jacket gripping a white steering wheel on a boat. A thick white rope with blue markings is visible, running across the frame. The background shows the blue sea and a clear sky. The image is overlaid with a white rectangular box containing text.

Quality control and assurance

Meaning and Use

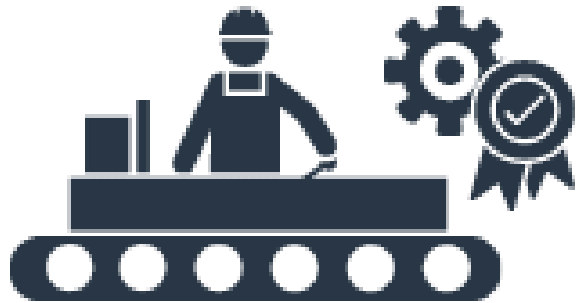
summary



1. Introduction
to quality
control and
assurance:

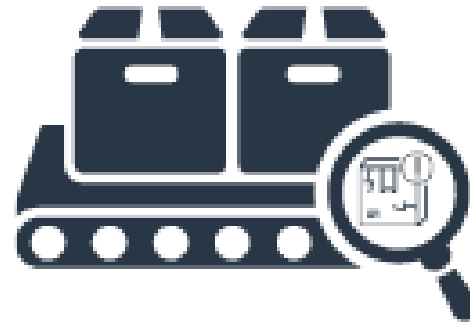


Quality Assurance VS Quality Control



Quality Assurance

Quality Assurance (QA) is the proactive approach of quality which focuses on **preventing the defects** at the process level.

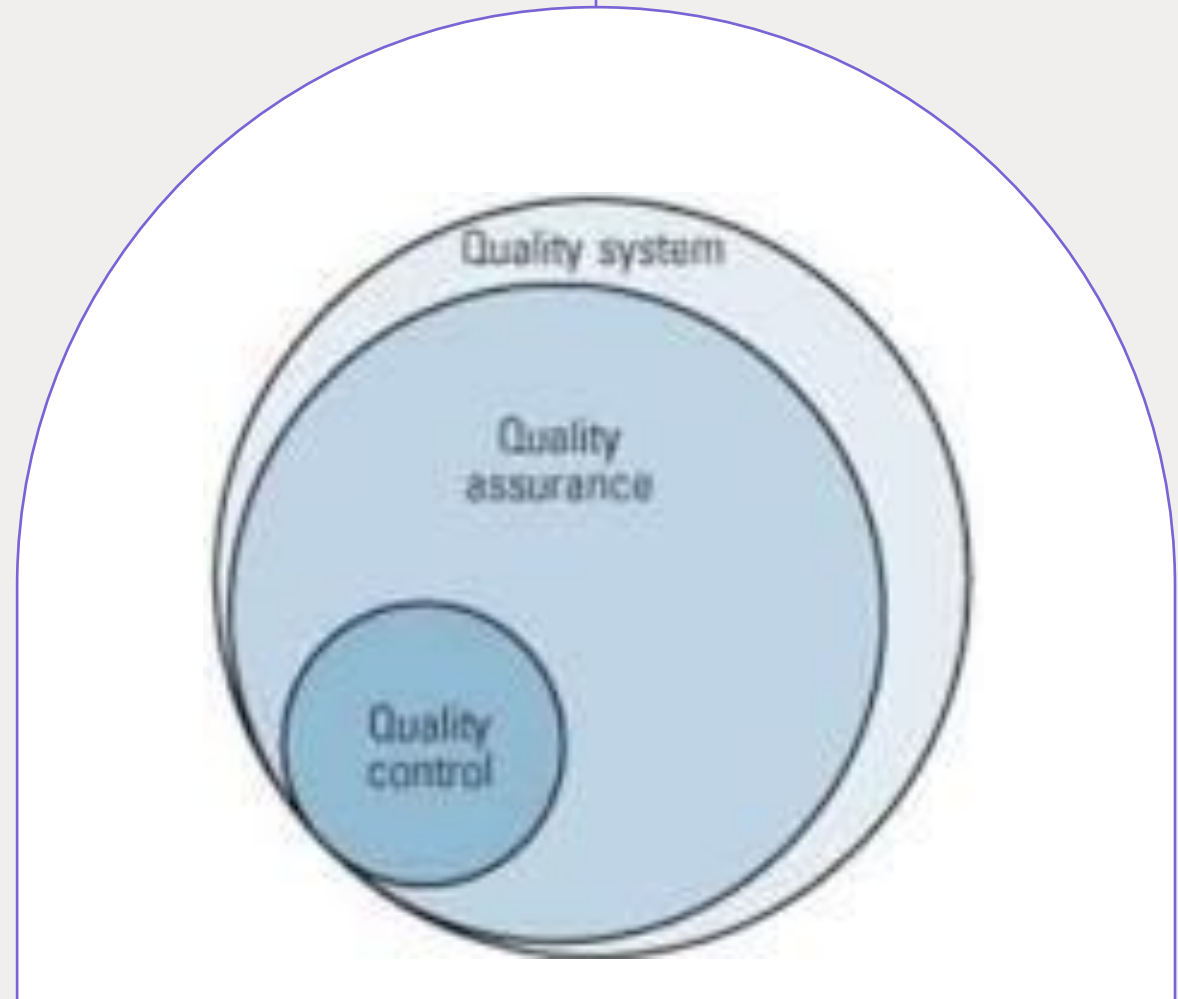


Quality Control

Quality Control (QC) is the reactive approach of quality which works by **finding the defects** of the product itself.

1.1. definitions:

Quality control can be defined as "part of quality management focused on fulfilling quality requirements." While **quality assurance relates to how a process is performed or how a product is made, quality control is more the inspection aspect of quality management.**



1.2. Difference between QA and QC



1.3. goals:

1. Meeting customer requirements: to ensure that the product or service meets the requirements and expectations of the customer. This includes not only the product's functional features but also its safety, reliability, and durability.

2. Ensuring consistency: ensure that the product or service is consistently produced to the same level of quality, regardless of production conditions or other variables.

3. Reducing defects and errors: to reduce the number of defects, errors, and other issues that can occur during production or delivery, which can result in increased costs, lower productivity, and customer dissatisfaction.

4. Improving efficiency: By reducing defects and errors and streamlining production processes, quality control and assurance can help improve efficiency, reduce costs, and increase productivity.

5. Enhancing reputation: High-quality products and services can enhance a company's reputation and lead to increased customer loyalty and repeat business.



Increased customer satisfaction: By ensuring that products and services meet or exceed customer expectations, quality control and assurance can increase customer satisfaction, leading to repeat business and positive reviews.

Reduced costs: By identifying and addressing quality issues early in the production process, quality control and assurance can help reduce costs associated with rework, scrap, and customer returns.

Improved efficiency: Quality control and assurance can help identify inefficiencies in production processes and streamline them, leading to improved efficiency, increased productivity, and reduced costs.

Enhanced reputation: High-quality products and services can enhance a company's reputation and lead to increased customer loyalty and repeat business.

Compliance with regulations and standards: Quality control and assurance can help ensure that products and services comply with regulatory requirements and industry standards, reducing the risk of fines, penalties, or legal action.

Better decision-making: By providing data and insights into the production process, quality control and assurance can help inform decision-making and lead to more effective problem-solving.

1.3. QA and QC Benefits

2. Quality standards and regulations:



Quality standards:

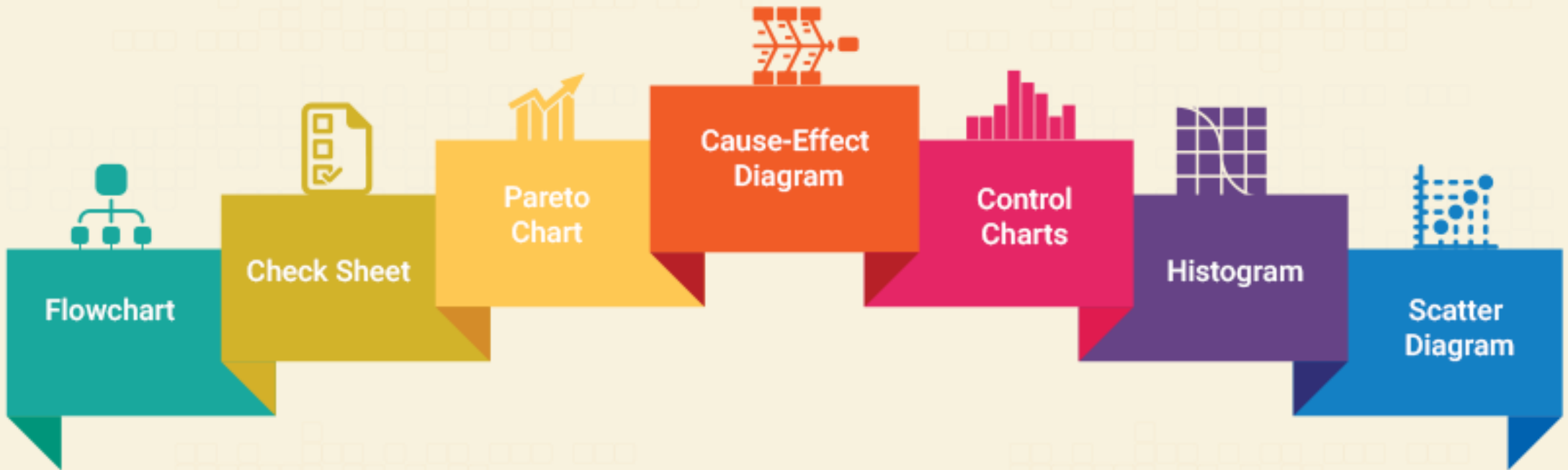
- documents that provide requirements, specifications, guidelines, or characteristics that can be used consistently to ensure that materials, products, processes, and services are fit for their purpose.





3. Quality control tools and techniques

7 QUALITY CONTROL TOOLS



An aerial night view of a dense urban landscape, likely a city like Hong Kong or New York. The image shows a vast number of high-rise buildings packed closely together. Many windows are lit up, creating a warm, golden glow that contrasts with the dark night sky. The perspective is from a high angle, looking down on the city's grid and the intricate patterns of the buildings. The lighting is a mix of the cool blues and greys of the night and the warm yellows and oranges of the city lights.

4. Quality management systems:

TOTAL QUALITY MANAGEMENT SYSTEM

Customer Requirement & Expectations

Customer Satisfaction

Plan

Act

Do

Check

Strategy Planning Process:

- Technical Development
- Risk Management
- Strategy Planning
- Organization Plan

Monitoring & Analysis:

- Data Analysis
- Process Performance
- Supplier Performance
- Customer Satisfaction

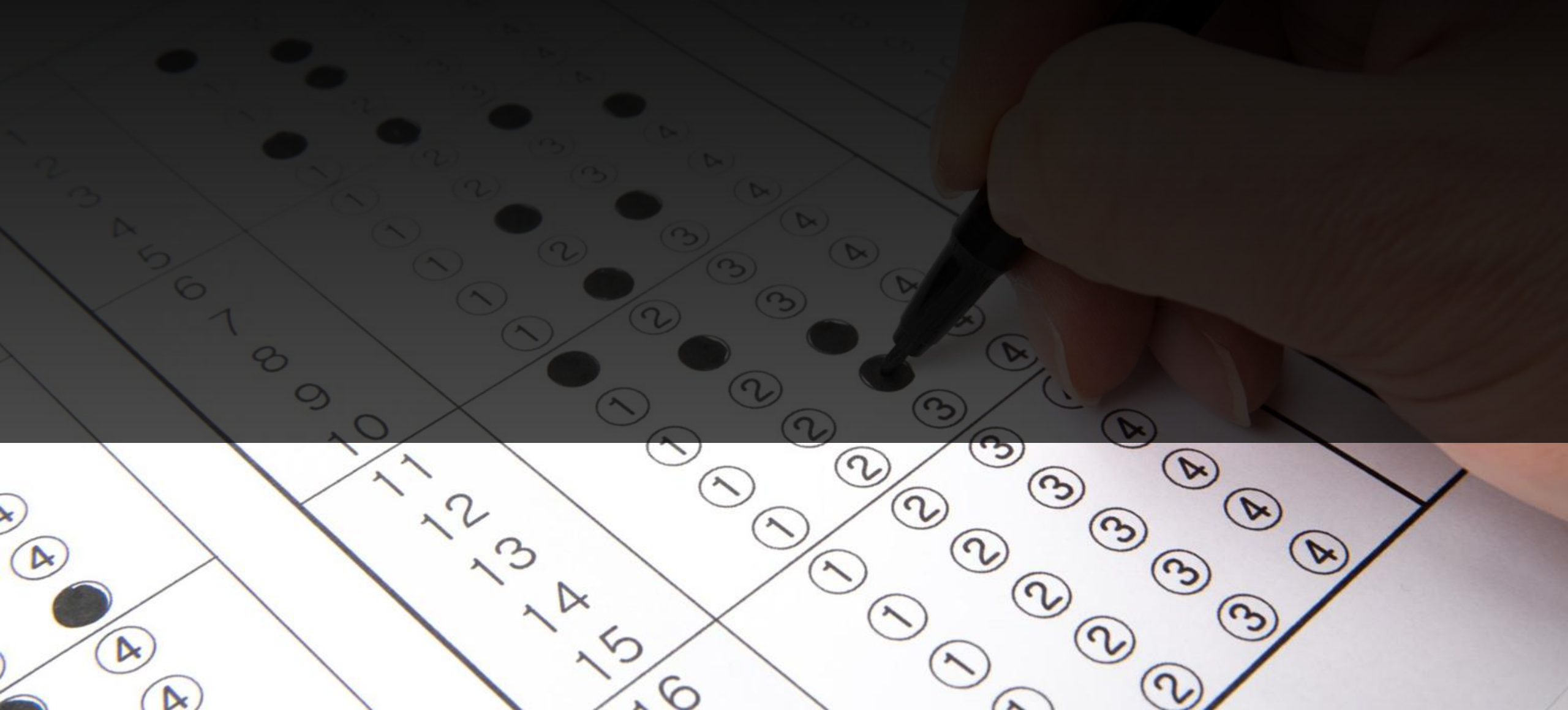


Input

Output



5. Quality auditing



WHAT IS AUDITING?

- Auditing is defined as the on-site verification activity, such as inspection or examination, of a process or quality system, to ensure compliance to requirements. An audit can apply to an entire organization or might be specific to a function, process, or production step. Some audits have special administrative purposes, such as auditing documents, risk, or performance, or following up on completed corrective actions.



THE THREE DIFFERENT TYPES OF AUDITS

- [ISO 19011:2018](#) defines an audit as a "systematic, independent and documented process for obtaining audit evidence [records, statements of fact or other information which are relevant and verifiable] and evaluating it objectively to determine the extent to which the audit criteria [a set of policies, procedures or requirements] are fulfilled." There are three main types of audits:



Process audit:

- This type of audit verifies that processes are working within established limits. It evaluates an operation or method against predetermined instructions or standards to measure conformance to these standards and the effectiveness of the instructions. A process audit may:
 - Check conformance to defined requirements such as time, accuracy, temperature, pressure, composition, responsiveness, amperage, and component mixture.
 - Examine the resources (equipment, materials, people) applied to transform the inputs into outputs, the environment, the methods (procedures, instructions) followed, and the measures collected to determine process performance.
 - Check the adequacy and effectiveness of the process controls established by procedures, work instructions, [flowcharts](#), and training and process specifications.

Product audit:

- This type of audit is an examination of a particular product or service, such as hardware, processed material, or software, to evaluate whether it conforms to requirements (i.e., specifications, performance standards, and customer requirements).

System audit:

- An audit conducted on a management system. It can be described as a documented activity performed to verify, by examination and evaluation of objective evidence, that applicable elements of the system are appropriate and effective and have been developed, documented, and implemented in accordance and in conjunction with specified requirements.
 - A **quality management system audit** evaluates an existing [quality management program](#) to determine its conformance to company policies, contract commitments, and regulatory requirements.
 - Similarly, an **environmental system audit** examines an [environmental management system](#), a **food safety system audit** examines a food safety management system, and **safety system audits** examine the safety management system.

6. Quality improvement

- Quality improvement is the framework used to systematically improve care. Quality improvement seeks to standardize processes and structure to reduce variation, achieve predictable results, and improve outcomes for patients, healthcare systems, and organizations

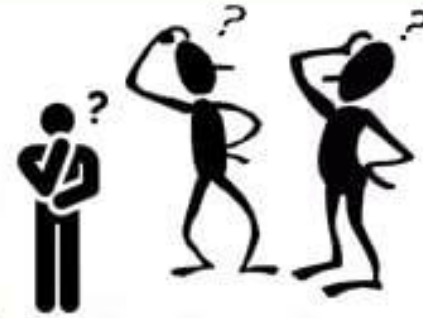




7. Implement System Wide



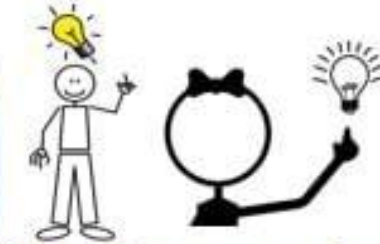
1. Identify & Select Problem



2. Analyze Problem

6. Evaluate Test Implementation

Product Improvement



3. Generate Potential Solutions



5. Test the Solution

4. Select & Plan Solution



QUALITY



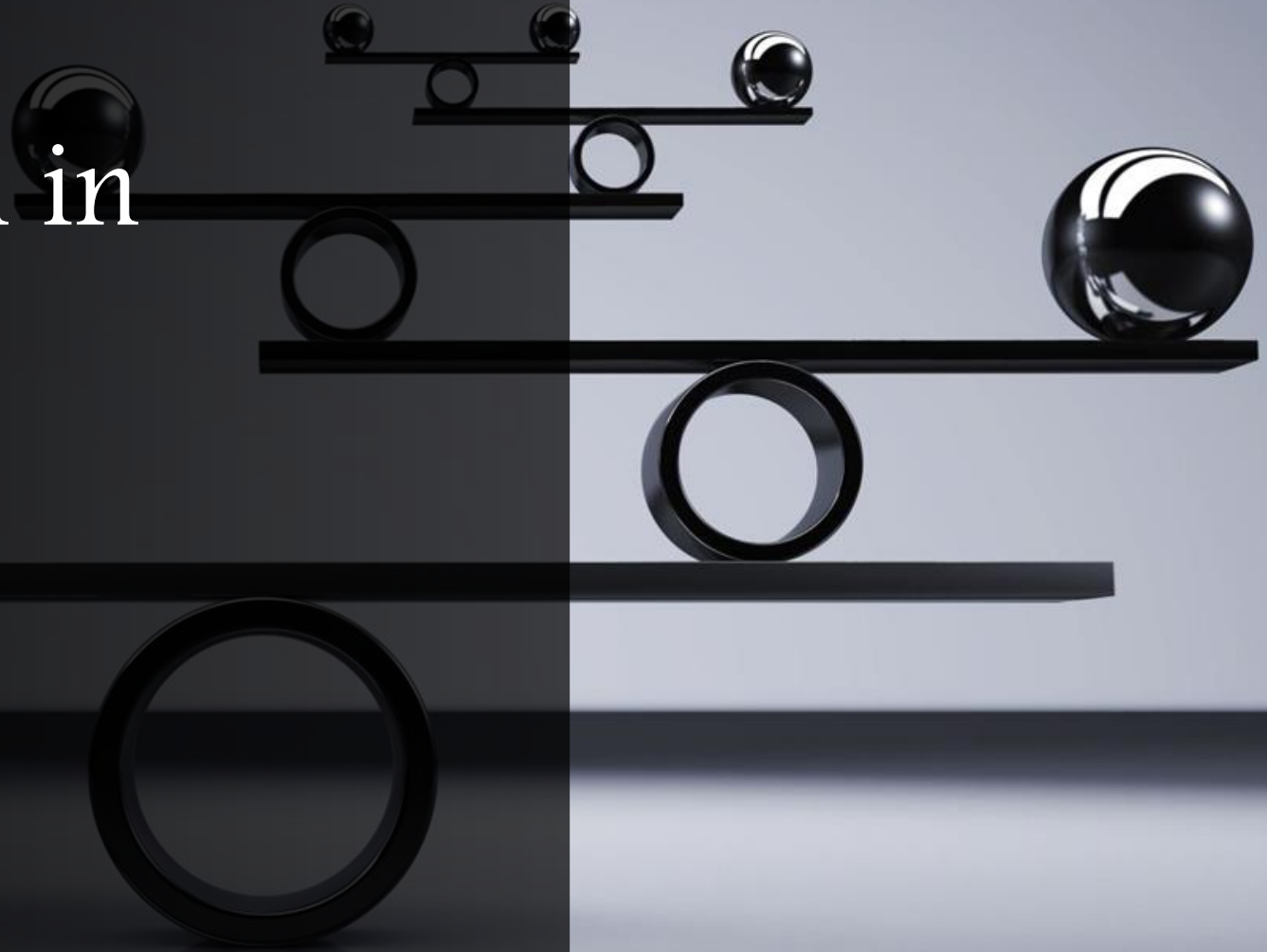


7. Quality metrics and measurement

- Quality metrics can be used to help assess customer satisfaction levels, identify areas for improvement within your company, and track the overall quality of your products or services.



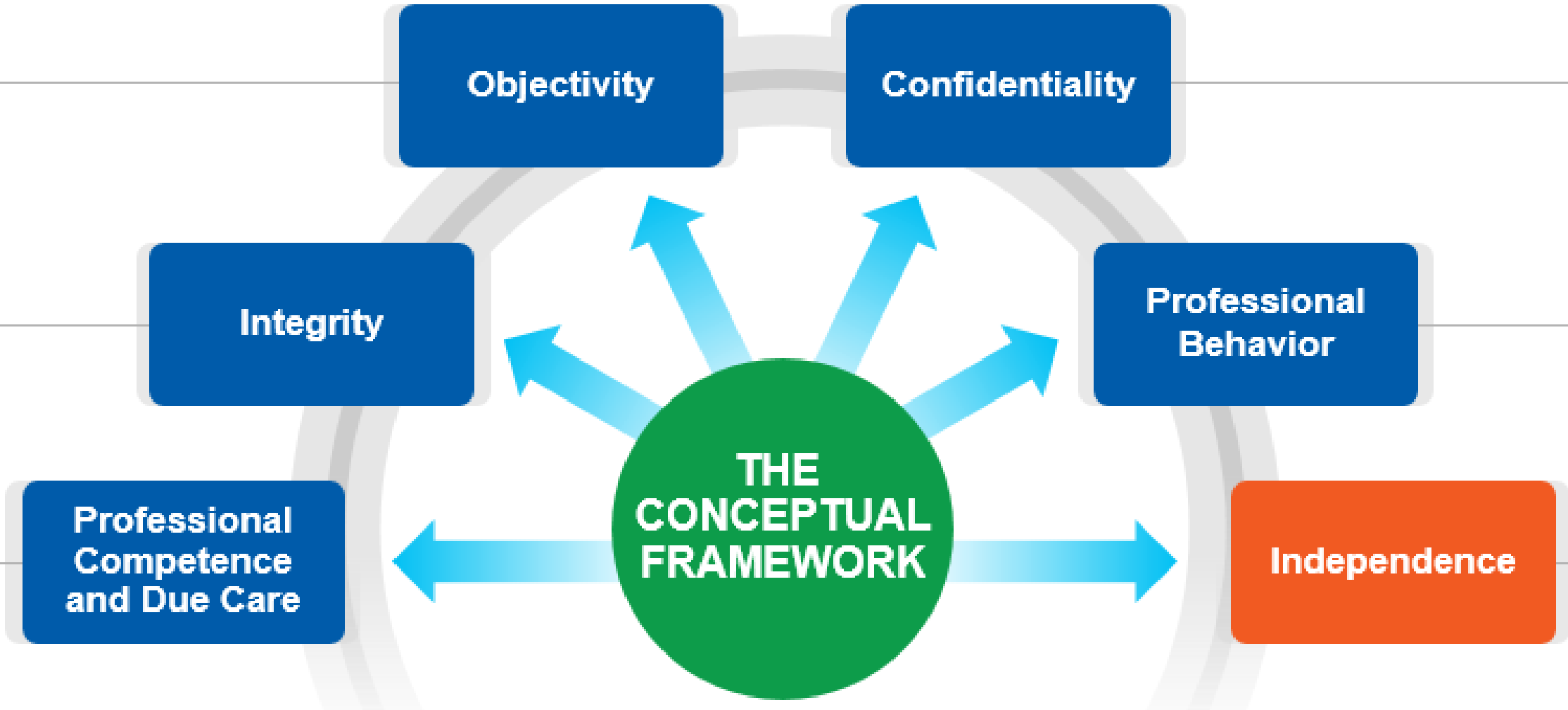
8 Ethics and
professionalism in
quality control
and assurance:



Ethics and Morality

Ethics – values and beliefs that direct how we behave in our (working?) lives
cf. morality (imposed), laws (proscriptive/ penalised)

- Ethics is a personal character trait in which an individual understands the difference between “right” and “wrong” and acts accordingly
 - Whitten et al (2001) p. 27
- Common usage is that the terms are interchangeable, but one is private and manifests itself when nobody is directly watching our behavior



Objectivity

Confidentiality

Integrity

Professional Behavior

Professional Competence and Due Care

THE CONCEPTUAL FRAMEWORK

Independence



Topic for discussion

What the role of industrial engineers in ensuring quality and how it relates to their ethical responsibilities?