

# IT MUST BE QUALITY AND MATERIALS MANAGEMENT

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## Introduction

What are the effects of growing quality pressures from the customer on the Materials Manager in the 1990s? First an awareness that a company cannot be isolated from the emphasis on world-wide quality systems. Secondly recognition that Materials Management systems must contain features supporting quality growth in the organisation. Thirdly the obligation of Materials Management to contribute to the quality objectives and policies of the business.

## Awareness and Understanding

World-wide consumers increasingly expect satisfactory product and service quality. A similar desire for free and competitive trade has led to demands that fiscal and artificial barriers to trade are eliminated. This has led to global agreement on how quality products and services can be managed and assured. In 1987, the International Standards Organisation (ISO) issued a series of standards ISO 9000-4, describing the basic requirements of a quality system. Currently over 50 countries throughout the world have adopted the ISO standard as the basis for their national quality system.

SOURCE	STANDARD
INTERNATIONAL	ISO 9002
AUSTRALIA	AS 3902
CHINA	BG/T 10300.3 - 88
FRANCE	NFX50 - 132
GERMANY	DIN - ISO 9002
INDIA	IS: 1020 1 PART 5
IRELAND	IS 300 PART 2 / ISO 9002
UNITED KINGDOM	BS 5750 PART 2/ISO 9002/EN 29002
USA	ANSI / ASQC 92
USSR	40.9002 - 88
EC	EN 29002

Figure 1

ACTIVITY	HOW NOT TO	HOW TO	ACTIVITY	HOW NOT TO	HOW TO
MARKETING	Accept results	Use to influence quality priorities	MANUFACTURING DOCUMENTATION	"How to" instructions only	"How to" and "how to check" instructions
PRODUCT DESIGN	Leave to engineers	Participate in design	DATA COLLECTION	Scrap and rework recorded for costing	Scrap and rework recorded for quality analysis and improvement
SALES ORDER ENTRY	Accept and try to make	Review capability before confirming	PROCUREMENT	Supply quality accepted and inspected	Supply quality assured and improved
ORDER ENTRY CHANGES	Accept and try to make	Try to anticipate	STORAGE	Secure and controlled	Eliminated
ENGINEERING CHANGE	Action as chore	Welcome to improve	PACKING	Provide on request	Design to protect
CONFIGURATION CONTROL	Bill of Material for Product and Parts	Bill of Material for Product, Parts and Documents	SHIPPING	Ends despatch	Ends on customer receipt and acceptance
TRACEABILITY	Only on customer request	To understand process	SPARES	Necessary nuisance	Usage monitored to improve design

Figure 3

The ISO standard consists of three parts, each part applicable according to the scope of the business. Percentages are based on UK experience.

STANDARD	SCOPE OF STANDARD	% USE
ISO 9001	Design, development, production, installation, and servicing	5%
ISO 9002	Production and installation	90%
ISO 9003	Final inspection and testing	5%

Figure 2

Just as relevant, largely due to the success of Japanese industry, there is a global perception of the benefits of Total Quality Management for both the supplier and customer.

What concern is this to the Materials Manager? At its simplest, systems for design, procurement, manufacturing, and delivery must satisfy the quality, safety, and environmental concerns of the customer and minimise the product liability risks of the business.

## How to and How Not to

"Quality is never an accident it is always the result of intelligent effort"

J. Ruskin

Intelligent response to quality demands is Material Management's greatest challenge. What response is appropriate?

## SHARED OBJECTIVES AND OBSTACLES TO PROGRESS

The involvement of Materials Management requires a cultural change reinforced by recognition of the shared objectives of Quality and Materials Management and the obstacles to progress.

### Reduction of Inventory

- obsolete stock
- excess stock
- scrap
- regraded stock

### Reduction of Lead-Time

- waiting
- queing
- moving
- variability
- batch size

### Increased Business Potential

- failure to satisfy customer needs
  - quality
  - price
  - delivery
  - product performance
- failure to meet commitments
- capacity
- flexibility

### Capacity Loss

- rework and scrap
- yield losses
- returns (customer/supplier)
- inspection/testing
- poor productivity
- absenteeism
- downtime on key facilities
- over production
- making the wrong product

### Reduced Administration Cost

- rush deliveries
- expediting
- duplicated effort
- errors and mistakes
- unused reports
- poorly managed change
- paperwork
- bureaucracy

### Service Improvement

- reliability
- response
- availability
- cost

## Systems for Controlling Quality and Materials

Given greater awareness of market-place pressures, and shared objectives for quality improvement the Materials Manager will perhaps recognise that Material Management systems may be contributing to quality problems. The Material Management system must include features which support the quality goals of the business. What specific features might a Materials Manager seek? One approach might be to study the requirements set out in the applicable standards ISO 9001/2/3. Compliance with a standard is not an end in itself. It marks the start of a journey. The astute Materials Manager, absorbing the quality culture in the standard, will seek to reinforce the commitment by adopting systems and procedures capturing the spirit as well as the letter of the ISO requirements. Requirements within ISO 9002 are used to illustrate this approach.

### Contract Review

The requirements of Contract Review demand an order and contract entry system which

- a) Captures the full requirements of the customer (ie. technical requirements, installation needs, applicable standards and regulations, packing, and quality assurance/verification)
- b) Checks the requirements against the supply capabilities of the business
- c) Compares requirements received with any prior quotation
- d) Checks order entry details against a reference product or feature catalogue
- e) Communicates the original requirements and changes to these requirements to those who need to know

System responses may include:

- a) Intelligent front end systems to check and configure customer requirements
- b) Electronic transfer of orders and order acknowledgements between the Customer and company
- c) Electronic mail facilities for reviewing new contracts — including technical and quality requirements, price delivery, and service
- d) Visibility of customer order requirements and requirement changes by Master Planning
- e) Stock and allocation visibility at order entry
- f) Time fence and master schedule visibility at order entry
- g) Communication of customer order requirements to those who make, inspect, test, pack, ship and install
- h) Net change MRP to ensure rapid response to changed customer needs
- i) Visibility of the individual accepting the order and other changes

### Document Control

The standard requires that documents must be made available where used, obsolete documents are promptly removed from points of issue or use and only the right documents are used. Documentation includes, drawings, blueprints, work instructions, operational procedures, specifications, inspection instructions, operation sheets, and test procedures. Documentation can be seen as a chore and nuisance but failure to control documentation and information will inevitably lead to the wrong products being made, the wrong manufacturing procedures being followed and the wrong quality checks being carried out.

System issues might include:

- a) Engineering change request and authorisation visibility
- b) Visibility of effectivity status and change note authorisation
- c) Visibility of the reasons for change
- d) Visibility of document authorisation and effectivity control of drawings, routings, specifications, and any other relevant documents.
- e) Engineering change management facility
- f) Interfaces with tool and gauge management
- g) Security and back-up of electronic documentation
- h) Electronic archiving of documentation and data
- i) Computer aided acquisition and logistics support (CAL S) interface

### Purchasing

The requirements within ISO 9002 imply

- a) A mechanism by which suppliers are qualified to provide products and services
- b) A process for monitoring supplier performance
- c) An effective means for providing the supplier with full and accurate purchasing requirements every time an order is placed

Purchasing systems often do not satisfy these requirements and the supplier is held accountable for poor quality deliveries even though inadequate information has been provided.

System enhancements suggested include:

- a) Checks to ensure orders can only be placed with acceptable suppliers
- b) Visibility of supplier qualification data
- c) Visibility of current quality, price, delivery and service performance
- d) Order content controls to ensure purchase data is complete (including supplier quality requirements and, inward inspection activity). Order controls must ensure that order amendment changes and change status are transmitted to the supplier.
- e) Visibility of the identity of the order creator and review authority
- f) Electronic transfer of purchasing data (including electronic drawings, machine instructions, and inspection programmes) and supplier acknowledgements.
- g) Bar coded receipt documents to minimise receipt errors
- h) Visibility of supplier inventory and capacity
- i) JIT supply and delivery facilities
- j) Linkage with supplier engineering change processes
- k) Systems to manage parts concurrently purchased, made in-plant, or sub-contracted with free issue material
- l) Linked purchasing and quality receiving records providing both qualitative and quantitative data
- m) Clear visibility of past and current order status
- o) Control and visibility of material in-transit
- p) Electronic transfer of supplier inspection and test data
- q) Electronic control of company document and information files held by the supplier to ensure that no order is ever placed against incorrect supplier information held by the supplier

### Purchaser Supplied Product

ISO 9002 requires the supplier to establish and maintain procedures for verification, storage, and maintenance of customer supplied product. The customer, for example, may be able to obtain product from the supply source giving commercial or quality advantages. If the same product is bought by the company for use by other customers, customer supplied material must be assigned unique part numbers.

System responses suggested include:

- a) Separate warehouse and "purchase" controls for customer owned material
- b) Electronic call-off of purchaser supplied material and access to customer inventory and inventory orders
- c) Electronic access to customer Engineering Change processes

### Traceability

Prefaced by the words "Where appropriate" traceability refers to the ability of the supplier to identify the end product to either one or a combination of the following

- a) Supply source
- b) Individual (inspector, tester or producer)
- c) Tooling (tool number)
- d) Process (machine, shift)
- e) Design (status)
- f) Product (lot, batch, unit or serial number)

System, needs may include:

- a) Serial number assignment and control during final assembly testing and shipment
- b) Inspector/tester/producer identification to operation within shop order
- c) Inventory management lot/batch/unit segregation
- d) Pick control and history of traceable components
- e) Serial number controls for final assembly and shipping
- f) Process traceability to equipment, gauging and tooling

### Process Control

Processes must be carried out under controlled conditions. Controlled conditions include, documented work instructions, process and product monitoring, approval of processes and equipment, traceability, equipment maintenance, process change control, and control of verification status.

Systems responses may include:

- a) Routing data including (or referring to) quality related instructions
- b) Means for ensuring that work does not proceed until verification activities are completed and the results recorded
- c) Maintenance scheduling of key equipment to improve quality capability.
- d) Traceability of material producer, equipment, and verification activities
- e) Load scheduling optimising the use of equipment with superior quality capability
- f) Effectivity and revision level control for routing and shop order data.
- g) Variance controls on order closure
- h) Bar coded data entry to minimise transaction errors
- i) Quality data and quality cost collection
- j) Transaction editing, error prevention and reporting

- k) Tool and gauge management with control of refurbishment and recalibration
- l) Just-in-Time, and Repetitive Manufacturing support

#### Inspection and Test Status

ISO 9002 requires systems which maintains inspection and test status and ensures that only product which has passed the required inspections and test is despatched, used, or installed.

System requirements suggested include:

- a) Extended controls to include despatch and installation processes
- b) Visibility of inspection and test status (passed, rejected, held) in current and historical records

#### Control of Non-conforming Product and Non-conformity Review and Disposition

Control must provide for identification, evaluation, segregation, (where practical), disposition (repair, rework, re-grade, scrap or concession) of non-conforming product and notification to the functions concerned. The guide line emphasises correction action to eliminate the cause.

Systems may include:

- a) On-line logging of suspected non-conformity including, cause, source of defect and location of defect material
- b) On-line recording of disposition decision
- c) Reporting of product awaiting review and disposition
- d) On-line preparation of rework, repair, re-grading, concession and scrap documentation
- e) Electronic mail system for corrective action

#### Handling Storage Packing and Delivery

ISO 9002 requires methods and means of handling, storage, packing and labelling, and delivery which protect the quality of the product.

Systems may include:

- a) Control of container definition, inventory and movement throughout the supply pipeline.
- b) Product labelling
- c) On-line packing instructions and specifications
- d) On-line shipping instructions
- e) Stores maintenance routines for stock and location accuracy
- f) Cycle count facilities for monitoring stock and location accuracy
- g) Bill of Material auditing facilities for monitoring stock issues or backflushing
- h) Stock lifting and material traceability
- i) Stores verification facilities for spot inspection of stored material
- j) Bar coding of stock receipts and issues
- k) Backflushing controls for repetitive manufacture
- l) Internal handling and external transport control

#### Quality Records

ISO 9002 emphasises the need to maintain accurate quality records. Materials Management can contribute with systems providing:

- a) History of as-built, as tested, and as-shipped configurations
- b) History of product inspection, test, non-conformity, and traceability

- c) History of transaction records, errors, and editing actions

### *A Quality System is not Total Quality Management*

ISO 9000-4 provides a starting point to the creation of improved quality.

Materials Management should also:

- a) Eliminate all waste in its own operation — errors, paperwork, duplication etc.
- b) Train staff to be proficient and flexible
- c) Welcome involvement in quality improvement programmes.

#### Summary

Ability to provide quality products meeting a wide variety of customer needs is the key to international success in the 1990s. In ISO 9004, a successful company is defined as one whose products and services:

- a) Meet a well defined need, use or purpose
- b) Satisfy customer expectations
- c) Comply with applicable standards and specifications
- d) Comply with statutory (and other) requirements of society
- e) Are made available at competitive prices
- f) Are provided at a cost which will yield profit

To which might be added:

- g) Are the end product of continually improving processes
- h) Are consistently superior to the competition
- i) Are safe to make, use and dispose
- j) Are a matter of pride for those who produce and those who consume them

How does your company rate? Is it your aim to ensure the customers come back not the products?

#### References

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#### About the Author

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