

Using quality systems in the maritime world

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Abstract:

The international competitiveness of Quality oriented industrial societies such as Japan and more recently the United States of America is compelling the rest of the world to become Quality accredited suppliers. The ISO 9000 series Quality standards are generic in form and have wide acceptance world-wide. They can be applied to all organisations to build Quality Systems that will reliably fulfil customer expectations of product or service. Discerning shippers are prepared to pay a premium for a quality transportation service that will keep their customers happy. The use of Quality Systems in the maritime world will ensure efficient, reliable, and safe shipping operations.

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Introduction

Until the last century, change was slow and hardly noticeable in our lives. During the last two decades however it has accelerated to the extent that it demands proactive responses if we are not to be disadvantaged by the changes that are impacting on every conceivable part of our environment.

In response, a number of governments have chosen to "sell off the family silver" and deregulate their economies. The over-riding opinion is that they would perform more effectively should they concentrate on the tasks that they are elected to perform. The greater market share of activity which has thus been generated and the higher expectations of the individual together with rapid hi-tech advancement have forced businesses to constantly review their positions and processes. There is also the consistent pressure from those international organisations such as Toyota, Nissan & Dupont that perpetually strive to better the way they do things and gain new markets.

This paper is about a new dimension called *Quality* which has invaded our lives and is important to each one of us in every transaction that we conduct. It is the same old word which we have used for a long, long, time but it now has a new perspective. It is about having satisfied customers and safe work-places. In this paper we examine the application of quality systems to servicing the needs of shippers and running and maintaining safe and efficient ships.

What is this thing called Quality?

The word *Quality* as we have understood it in the past has meant a product of superior standards. That is, we frame a high specification, much higher than that which is normally required for satisfactory performance. By doing so we achieve a high class product that outperforms others in its field, gives us the satisfaction of being luxurious and the comfort of unusual reliability. Unfortunately however when we do this we also have to pay a high price, often beyond our means. Such items therefore are the exception rather than the rule and the decision as to whether we buy a Rolls Royce or a Ford is not one of choice but of means.

In this new age *Quality* is taking on a different meaning. The new connotation probably started in Japan almost forty years ago and is only recently becoming more prominent in the western world. The ISO 9000 series (1987) Manual of Quality Systems defines *Quality* as *The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.*

To those not familiar with this new *Quality Era* some further explanation may be necessary. Professor W.E. Deming an American statistician tried hard after the second world war to sell his *Quality* philosophy to American business. Being unsuccessful he went to Japan - war-torn and suffering acutely from cheapness and poor quality. Japan was willing to try a new approach. It adopted an industrial reputation for the Deming philosophy which led Japanese industry into new principles

of management and productivity. Japan has for some time now been enjoying the rewards that have accrued.

The type of *Quality* that we are talking about in this paper is better explained as:

- fitness for purpose
- setting the appropriate specification and meeting it
- achieving zero defects
- fulfilling customer expectations at the least possible price
- doing things right first time round and all the time
- every individual in the organisation taking full responsibility for their own work processes in the organisation and fulfilling the expectations of his client be it internal or external.

To sum up it may be said that *Quality* is not absolute and there is no such thing as high *Quality* and low *Quality* per se. *Quality* can only be determined in relation to a customer's requirements. It lies in the eye of the beholder.

The ISO 9000 Series of Quality Systems

These standards provide a customer with the assurance that a quality product or service will be supplied. They also give the supplier the minimum guidelines to allow the development of an appropriate quality management system which can demonstrate product or service *Quality assurance* to the customers.

The majority of organizations produce a product or service that is intended to satisfy a user's needs or requirements. These are generally incorporated in *specifications*. Technical specifications however may not in themselves guarantee that a client's requirements will be consistently met. This may be due to deficiencies in the specifications or in the organizational system. Hence the development of quality systems, standards and guidelines.

Quality systems differ from organization to organization as they are affected by the objectives of the organization, by the product or service as well as by specific organizational practices. They are not an alternative but are complementary to the technical specifications. They require comprehensive documentation to the extent that whatever is not written down is not believed to happen. The very act of documenting work processes and systems brings its own rewards in the realization of weaknesses and shortcomings.

The *Quality standards* enforce a structured approach to the compiling of the documented organisational system:-

The ISO 9001 standard is the top level model for quality assurance used when conformance to specified requirements is to be assured by the supplier during stages which may include design/development, production, installation and servicing.

The ISO 9002 is the level two model for quality assurance in production and installation used when conformance to specified requirements is to be assured.

The ISO 9003 standard is the level three model for quality assurance in final inspection and test when conformance to specified requirements is to be assured by the supplier solely at final inspection and test.

Let us select ISO 9001 (as it is the most comprehensive and has the widest scope) and examine its structure and the type of management systems it compels us to build.

ISO 9001 Quality Systems- Model for Quality Assurance in design/development, production, installation and servicing

Quality policy

This is the overall intention and direction of an organization regarding *quality* as expressed by top management. It should form one element of the corporate policy of an organization. Management should ensure that it is understood, implemented, and maintained at all levels in the organization.

Organization

- The responsibility, authority, and interrelation of all personnel whose duties affect *quality* must be clearly defined
- Adequate resources and trained personnel are to be assigned to verification activities at every stage and independent personnel used for design reviews and audits of the *quality system*.
- A management representative is to be assigned specific authority and responsibilities for compliance with the ISO standard.

Quality System

The preparation of documented quality system procedures and instruction in accordance with this standard and their implementation.

The following needs to be considered in detail:

- quality plans and quality manual
- skills and resources
- quality control, inspection and testing
- measurements
- clarification of standards
- compatibility of all processes
- quality records

Contract review

To ensure that contractual obligations are being met.

Design control

Maintaining documented procedures for design, development, control, verification and changes.

Document control

Establishing a system which controls the approval, issue, changes and modifications of documents and data that relate to the requirements of the ISO standard.

Purchasing

Ensuring that all purchasing is done only from accredited suppliers, has the correct documentation, the purchased product is verified, can be identified and is traceable.

Process control

To ensure that all processes and special processes are monitored and carried out in controlled conditions and appropriate records maintained.

Inspection and testing

Incoming product to be inspected and tested or otherwise verified as necessary

- In process; to establish product conforms at various stages of the process.
- Final; to ensure finished product conforms.

Inspection measuring and test equipment

To ensure that inspection measuring and test equipment is calibrated and performing to determined accuracy.

Inspection and test status

Proper identification of inspection and test status to be maintained through all stages.

Control of nonconforming product

Nonconforming product to be disposed and prevented from inadvertent use

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Corrective action

Procedures to ascertain causes for non conforming product and provide for corrective action to prevent recurrence.

Handling, storage, packaging and delivery

Procedures to be laid out and implemented to safeguard the condition of the product through all these stages.

Quality records

Maintenance of quality records to demonstrate achievement of the required quality and the effectiveness of the quality system.

Internal quality audits

To verify that quality activities comply with planned arrangements and determine effectiveness of quality system.

Training

Training needs to be established and training provided as required and recorded.

Servicing

Supplier must establish and maintain servicing procedures to meet the specified requirements.

Statistical techniques

Appropriate statistical techniques for verifying the acceptability of process capability and product characteristics.

This is a summary of the types of responsibilities that *Quality systems* compels us to address. When fully documented it amounts to sound and structured common sense. We probably have informal means of dealing with these responsibilities in an ad hoc and fragmented manner, relying on our memory, assuming that each person knows his job and generally placing our trust on good luck rather than on a formalised system with documented procedures and records.

Product versus service

Quality in manufactured goods is more easily recognisable. When we buy a television set we expect a clear picture and realistic sound each time it is switched on and from every channel. If it does not perform consistently at the touch of a button we recognise poor *Quality*.

In the service industry, however, the concept of *Quality* is a lot harder to grasp. When we go into a bank for instance a whole sequence of events comprise the service we receive and as we walk out of the door we get the feeling of either being satisfied or otherwise, in respect of that service. Much of it depends on the expectations we had as we entered and whether these were fulfilled by the time we left.

Maritime customer servicing

In Japan particularly and more recently in most other countries shippers are increasingly using *Quality* as a determinant for choosing their carrier. They are willing to pay more providing the service is regular, reliable, predictable and adheres to schedule. Factors like these are considered to contribute to premium *Quality* and from the shipper's viewpoint the better service represents almost a cash advantage.

Major shippers are no longer willing to accept substandard service from shipping lines. They have demonstrated they will choose a carrier on the *Quality* of service provided. Price is still an important factor but they are willing to pay a premium for *Quality*.

As manufacturing companies apply *Quality standards* to their products so also do they demand similar *Quality* in the service they receive from shippers. Shipping companies therefore have to provide the *Quality* of service required or be prepared to lose business to those who are. The more discerning shippers are choosing transportation companies that can look after all the detail, take full responsibility and thus provide the shipper with the confidence of receiving a *Quality* of service that removes the worry of getting the goods to the customer.

United States shippers such as Monsanto Chemical Company of St Louis, Dupont, Ford, General Motors, Caterpillar, Dow, and Proctor and Gamble are investing in *Quality assurance*. They are narrowing down the list of eligible carriers that they use. The core group that is retained is usually small and selection is based on a large number of items of service. New carriers are not considered unless they pass the selection criteria test.

Australian companies and New Zealand companies like the New Zealand Dairy Board are also considering going this way.

Australia New Zealand Direct Line (ANZDL)

ANZDL is tending to pick up the US example. Director Elliott Schwartz feels that *Quality* in shipping services represents a cash advantage. Like the US shippers he feels the days of substandard service are past. Shippers are now requesting that bills of lading be returned on time and as promised. If this is not done then operators run the risk of being dropped in favour of a competing carrier.

ANZDL are now well into *Quality* control. They captured good market share in the US-Australasian trade late in 1987 but lost ground in the following quarter. Listening to the customer soon highlighted that these were agency problems which had to be addressed. Implementing the *Quality* philosophy incorporates customer feedback and process improvement on an ongoing basis.

They believe that *Quality* control gives better revenue returns. Satisfied customers give continuing business. Also operational costs are reduced because less time is spent chasing problems. Most organizations spend around 30% of their resources correcting mistakes and attending to complaints (this is the basis on which Dr. W.E. Deming sold the *Quality* philosophy to Japan in 1953. See his book *Out of the Crisis*, MIT, 1986). Therefore there is much scope for reducing costs.

ANZDL'S *Quality* control programme is named ASAP (ANZDL shipper assurance Programme). It began towards the end of 1988. They set minimum service levels for handling cargo claims, box fumigations, documentation clearance and schedule integrity. The service levels are measured, monitored and corrected if they fall below specified limits. Sub contractors such as agents, trucking firms and railways are made partners in the *Quality* control system. Because rework and therefore costs are also reduced by the *Quality* system, not only are they able to offer competitive pricing but also better *Quality* service all round.

The role of Quality Systems in ship construction

Quality assurance procedures have probably always been used in ship construction, mostly loosely and often only at critical stages. Thus the organizational system is broken down into subsystems, and checks and balances used only at these points. Mistakes, rework, waste, therefore still occur but are not permitted to proceed further.

By using the ISO 9001 standard the system is divided into processes. Each process is documented. Each person involved in each process has documented procedures detailing what is to be done and is trained to do it right. An attitude is adopted that the next link in the construction chain is the customer. Each internal "customer" checks that only conforming product is received and worked on, and passed to the next stage.

All in-coming material too is purchased from only *Quality* accredited suppliers who guarantee that it meets the specifications. It is then checked against the documentation, verified against the specifications, and accepted only if it conforms.

Individuals take full responsibility for what they do and because every person in the organization has a demanding customer (a fellow worker) it is done right. An efficient document control maintains positive traceability. The entire system thus operates on an open, known, identifiable, responsible, effective and efficient basis.

Upper and lower control limits are established at the start. Measuring is part of the process and thus conformity is assured. If measurement indicates that the product is not within the control limits the reason is immediately ascertained and the process modified unless the discrepancy is due to special causes.

The old inspection orientated approach has given *Quality* an expensive price tag because we have been used to understanding *Quality* as strict inspection control at the end of the product line. The quantity of discarded product has been high. In the *Quality systems* approach each tiny process is being done consistently and correctly every time. Also the developing product is checked, monitored and then incorporated into the system on a continuing basis. The reliance and emphasis on final inspection is thus reduced. Hence defects are kept to a minimum and conformance to standards remains at a high level.

Quality management systems involve everyone in the organization and this involvement stimulates the human ego compelling each individual to perform and take a pride in their output. Motivation therefore increases, people feel themselves to be an important part of the chain and contributing in a meaningful manner. Because waste, rework, and scrap are eliminated productivity is increased and costs are reduced. Therefore not only is *Quality* free but it soon begins contributing to the productivity of the system.

The role of Quality Systems in ship operation and maintenance

In almost every shipping mishap which has occurred in recent times it is not the integrity of the ship or its equipment that have been at fault. The causes have invariably been identified to be failures in the operational procedures due mainly to the absence of an effective, systematised, and consistent approach.

In the case of the *Herald of Free Enterprise* for instance the ship relied totally on a single individual to close the bow loading door. The one time when he lay asleep in his cabin the vessel sailed with the door open, took in water and sank. There were also other less significant contributing causes.

Again with the *European Gateway*, damage occurred in a single watertight compartment but because the watertight doors in the ship were left inadvertently open the entire ship flooded and sank. Instances such as these are numerous and will continue to happen until sound documented procedures for operations and maintenance are put in place and form part of the culture in shipboard operations

Quality systems compel us to do the right things not just now and again but as a matter of course each and every time. In the case of the *Herald of Free Enterprise* incident for instance a documented procedure would insist that there was a feedback loop to confirm to the ship's bridge control that the door was closed and the ship made watertight. The development of a documented procedure would most probably have also exposed the fundamental weakness of the absence of a simple and reliable electronic warning alarm system on the bridge.

When operational procedures are documented in a systematic and structured manner the omissions of the most fundamental and common sense steps in the system become apparent along with all the other vast number of processes in the system together with their strengths and weaknesses.

Ship maintenance plays a vital part in ship performance as well as in ship safety. Generally maintenance is done in accordance with a plan and fitted in with the schedule of the vessel. Manufacturers' maintenance manuals exist but are generally stored carefully in the Engineer's office. Procedures are handed down from experienced staff. Management systems in a formalised and documented form do not exist. Things normally go without incident but not always. Safety drills are held but mostly only to the extent necessary to make the appropriate entry in the ship's log. Accordingly, when serious casualties do occur chaos often results and a greater amount of damage and loss of life occurs.

Hands on training receives particular emphasis in *Quality systems*. Commitment to resources is made and utilised. The professional's role is redefined and clarified to place emphasis on training at all levels. Comprehensive training for new employees is established and enforced. Systems rather than incidents are measured and the necessary modifications made if the end result does not satisfy specifications. This is because it is the system as a whole that creates the defects rather than the individual, who is only a victim of the system which is provided by management.

Conclusion

Both Australia's and New Zealand's positions in the maritime sector are under threat from growing competition from foreign-flagged ships some of which may be operating with flags of convenience and/or third world crews. Initiatives to introduce greater efficiencies via reduced manning levels and integrated crews are well advanced and the outlook on this type of savings looks promising (the Australians have reduced crew numbers to 25 - a 24% reduction compared to 1984. The Report of the New Zealand Maritime Task Force will be published shortly. Many expect a reduction from 28 to 19). While these moves will reduce costs, further reductions are possible by the introduction of *Quality Systems*.

Shippers are becoming increasingly discerning about their choice of carrier and are tending to repeatedly use a small number of companies who have proved that they

can fulfil their expectations in every respect and provide a *Quality* service. Business is therefore no longer being allocated on cost alone.

For ships to provide the type of service that satisfies the customer, they need to be built, operated, and maintained in accordance with a comprehensive management system that assures us of the efficacy, efficiency, and safety that guarantees the ability of the system to deliver the *Quality* of service that will fulfil customer expectations. *Quality Systems* enable us to do this.

The ISO 9000 Series Quality Systems standards have wide universal acceptance and are sufficiently generic to be adopted into the management systems of businesses regardless of their particular speciality. There is a growing demand for the internationally recognized credibility that working to these standards bestows on the organization and the confidence that it instils into customer perception of the supplier and the product or service. Market trends indicate that *Quality* is fast becoming the cornerstone of industrial competition and that only *Quality* accredited suppliers will survive in the long term.

Quality Systems need a long lead-in time, say two to five years and therefore those who do not act today could be severely disadvantaged tomorrow. Ninety percent of what we have been talking about in this paper deals with attitudinal change and ten percent with effort. Perhaps that will indicate to us why prompt action is necessary.

References

Deming, W E (1986) *Out of the Crisis* Cambridge Mass: MIT

D'Souza, K L (1985) pp 79-84 of *Organisational Development in Response to Change in Shipping* (Symposium, Improving Efficiency for the New Zealand Marine Industry) Wellington NZ

ISO 9000:(1987) series, *Manual of Quality Systems*

MacIntyre, D (1990) pp 7-9 of *Quality - new era of leverage between shippers and carriers* The New Zealand Shipping Gazette No 2/90

Peters, T J and Austin, N (1986) *Passion for Excellence - the leadership difference* New York Random House: Warner Books