☒ 응용논문

A Study on the Introduction of Quality Management System for Improving the International Competitive Power of Shipping Companies in Korea [1)2)]

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Abstract

The paper reviews briefly of the codes above, together with the effects of the successful introduction of the QMS into the shipping industry. This paper suggests a conceptual prototype for a quality management system (QMS) of seafaring labour, which itself would be a sub-system of the total quality management (TQM) system in a shipping company, on the basis of the ISM and the ISMA Codes, ISO 9002, ISO 9004, and other quality management guidelines. The QMS is essential for the survival of the Korean shipping industry. It will contribute not only to assuring the quality of crew, but also, consequently, to increasing the international competitive edge of the shipping companies in Korea.

1. Introduction

The search for cost-effective or cost-saving options has always been in the forefront of the shipowners' and ship managers' minds, particularly in the bulk and low freight trades. The economics of running a merchant ship are closely related to the employment of competent crews at a low cost. In addition to this, the concept of the shipowner's responsibility for seaworthiness has been extended in

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case law and by implication to include not only the quality of the crew on board, but also the shore management systems that have some effects on the quality of the shipboard operations[Spruyt, J. (1994)]. In particular, as Korean shipping companies endeavour to compete strongly by utilising cheaper crew combinations and flagging out arrangements, there is the risk that the quality control aspects of the ship operation may be disregarded. Paradoxically the provision of cheaper crews from developing countries increases the need for greater control and monitoring performance. Under these circumstances, therefore, the concept of quality management for seafarers is rapidly becoming a vital element in the shipping industry.

The purpose of this paper is to suggest a conceptual prototype for the quality management system (QMS) to ensure quality assurance of seafaring labour, which would itself be a sub-system of the total quality management (TQM) system in a shipping company[Frankel, E. G. (1993)]. This prototype will be based on the 'International Management Code for the Safe Operation of Ships and for Pollution Prevention' (International Safety Management Code, ISM Code) by the IMO, 'International Ship Managers' Association Code of Ship management Standards (ISMA Code), and the quality management guidelines by various classification societies, such as the LR, the DNV, the ABS and the BV. Therefore, this paper also reviews briefly of the ISM and ISMA Codes and quality management guidelines, together with the effects of the successful introduction of the QMS into the shipping industry. The system may help shipowners and ship managers not only to reduce maritime casualties, but also, consequently, to increase their international competitive power in shipping business.

2. The Necessity for the QMS in the Korean Shipping Industry

In this section various reasons are given to explain why the Korean shipping industry urgently needs to develop the QMS.

Since the late 1980s it has been very difficult for Korean shipowners to recruit qualified seamen at the required time, owing to the deteriorating quality and the decreasing number of applicants for training at maritime schools. As far as the rating classes are concerned, Korea is rapidly changing from a supplying country to a demanding one. As a consequence, from 1991 onwards the Korean shipowners have been employing Korean-Chinese ratings to overcome the shortage of seafaring labour and to save crew costs. In the period between 1991 and 1994 they have recruited approximately 800 seamen, who came mainly from the Province of

Jilin in China[Lee. T. W. (1995)]. However, a recent survey showed that the effects of Korean-Chinese crew cost-saving were less than most Korean shipowners had expected partly because they were mostly unqualified seamen with low labour productivity and high crew turnover, and partly because there existed cultural conflict between Korean and Chinese crews and lack of of cost consciousness caused by the Chinese socio-economic system[Oh, M.S. et al.(1994)].

Meanwhile, the marine accidents and incidents which have occurred in the recent years, have served to focus the attention on the quality of the seamen in Korea. The problems associated with poor levels of communication, the consumption of alcohol, as well as inadequate training, have all been identified as the major causes of marine casualties. The alarmingly increasing rate of ship losses by Korean crews has caused Korean shipowners to pay additional insurance premiums, not to mention suffer operational losses. As a consequence, this has resulted in the increase in the total shipping costs and the deterioration of their international competitive edge. Furthermore, it is certain that the shipowners are suffering from an over-taxed system compared to that of their competitors[Korea Maritime Institute (1991)] and very limited accessibility to foreign capital markets with favourable financing terms[Lee, T. W. (1995)].

Under these circumstances, Korean shipowners will have to find other alternatives to improve international competitive power. Flagging options aside[9, 12], the QMS has been positively considered since 1993. In the introduction of a QMS in association with foreign classification societies, the initiative is being forced upon, rather than taken by the major Korean shipping companies, e.g Hyundai, Yukong, Hanjin and Korea. However, interviews with the top executives and the QMS task-force teams from Korean shipping companies carried out by the author revealed the following problems associated with the development of the QMS:

- ◆ most owners were reluctant to become involved in developing the system, as it is described in the ISM Code, displaying the 'I am too busy to get involved' attitude.
- ◆ without understanding of its impacts and implications, they regarded the certificates of the QMS as a license to do business in the international shipping market.
- ◆ expecting the slimming effect[Spruyt, J. (1994)], they tried to utilise the QMS as an opportunity to restructure, or reengineer, their organisations.
- ◆ they understood that the QMS would merely generate costs with few short term benefits[2, 7, 10, 13].

- ◆ they had the misconception that if they get some so-called 'manual' distributed to them around the office and the ships, everything will be fine, it is a 'paper exercise' anyway.
- ◆ the QMS is not related to the sales and the general administration departments but mainly to the marine and the technical ones.
- ◆ if the ISM Code had not been adopted, they would not have seriously considered the development of the QMS as they are doing now.
- ◆ effective company-wide communication systems were not established.
- ◆ conflicts between shore-side management and shipboard management teams existed.

The above findings are the most common causes of problems associated with the installation of the QMS and they must be resolved in order to overcome the adverse current climate in the Korean shipping industry.

3. A Brief Review of Quality Management in the Shipping Industry

There are many documents available to assist organisations in the design and implementation of a QMS. These include: the ISM and the ISMA Codes, ISO 9000, ISO 9002, ISO 9004, ISO 9004-2, 'Guidelines on the Application of the IMO Code' developed by the International Chamber of Shipping and the International Shipping Federation, 'Guidelines for Administration on the Implementation of the ISM Code' by the IMO, the quality management guidelines of various classification societies, such as the LR, the DNV, the ABS, and the BV[1, 3, 6], and other shipping organisations, such as the ISF and the ICS.

The purpose of the ISM Code is to provide an international standard for the safe management and operation of ships and for pollution prevention and to establish a framework to improve implementation and enforcement of international standards and regulations. The code requires a company to include in its policy defined specific standards of safety and environmental protection and to ensure compliance with mandatory rules and regulations. It also requires the company to include safety management objectives that continuously improve the safety management skills of personnel ashore and onboard, and prepare emergencies related both safety and environmental protection. In other words, the ISM Code is designed to serve two purposes. One being to improve compliance and provide for more effective flag

state enforcement. The second being to support the development towards a safety culture in the shipping industry. However, the code is often criticised for being general and not specific. Furthermore, owing to its lack of detailed prescriptive requirements, it can cause an attitude of taking easy on the implementation.

The ISMA Code was developed by the group of five leading ship managers (e.g. Barber, Columbia, Denholm, Hanseatic and Wallem) in team-work with representatives from classification societies such as the LR, the DNV and the GL[Spruyt, J. (1994)]. Not only includes the code all those items which would be a part of ISO 9002 or the IMO Resolution 680 provision, but also it covers the subjects of safety and pollution prevention and the environment and includes a description of a quality management system. In addition, it addresses all aspects of the services which ship managers are required to provide. Therefore, it seems that the code and the methods of audit are the most practical and realistic.

Introduced in 1987, the ISO 9000 is a series of international standards for the quality control and quality assurance and includes three models or specifications for the quality assurance systems. It is an outcome of developments in the manufacturing industry and actually consists of five documents, numbered ISO 9000 to ISO 9004.

ISO 9002 (*Quality System - Model for Quality Assurance in Production and Installation*) together with ISO 9004 (*Quality Management and Quality System Elements - Guidelines*) has been adopted by shipping companies such as JO Tankers, Sealink-Stena, Shell Tankers and Acomarit[6, 13].

The understanding of, and the familiarisation with, the ISM and the ISMA Codes, ISO 9002, and ISO 9004 are recommended to the Korean shipping industry for a variety of reasons. Compared to others, they are much more involved in ship management, the safer operation of ships and pollution prevention (see Table 1). In addition, they are closely interrelated in a variety of ways with the notion of profit by quality as put forward by Moir(1988) and Parker(1994) amongst others and inevitably international competitive power.

As can be seen in <Table 1>, both the ISM and ISMA codes are based very much upon the principles of the ISO 9000. Both codes are meant to prevent failures of ship's safety and/or losses of ships caused by marine casualties. They contain a set of rules to ensure that activities related ship's operation are planned and carried out according to requirements through determining the relevant personnel and their communication links for the activities.

< Table 1 > Links between ISO 9000, ISM Code, and ISMA Code

Major Contents of ISO 9000	ISM code	ISMA code
Management Responsibility	O	O
Quality System	O	O
Contract Review		O
Design Control		
Document Control	O	O
Purchasing		O
Customer-supplied Product		
Identification and Traceability	O	O
Process Control		O
Inspection and Testing	O	O
Inspection, Measuring and Test Equipment		
Inspection and Test Status	O	O
Control of Non-conforming Product		O
Corrective and Preventive Action	O	O
Handling, Storage, Packaging....		O
Control of Quality Records	O	O
Internal Quality Audits	O	O
Training	O	O
Servicing	O	O
Statistical Techniques		

Sources: ISM Code, ISM Code, and ISO 9002.

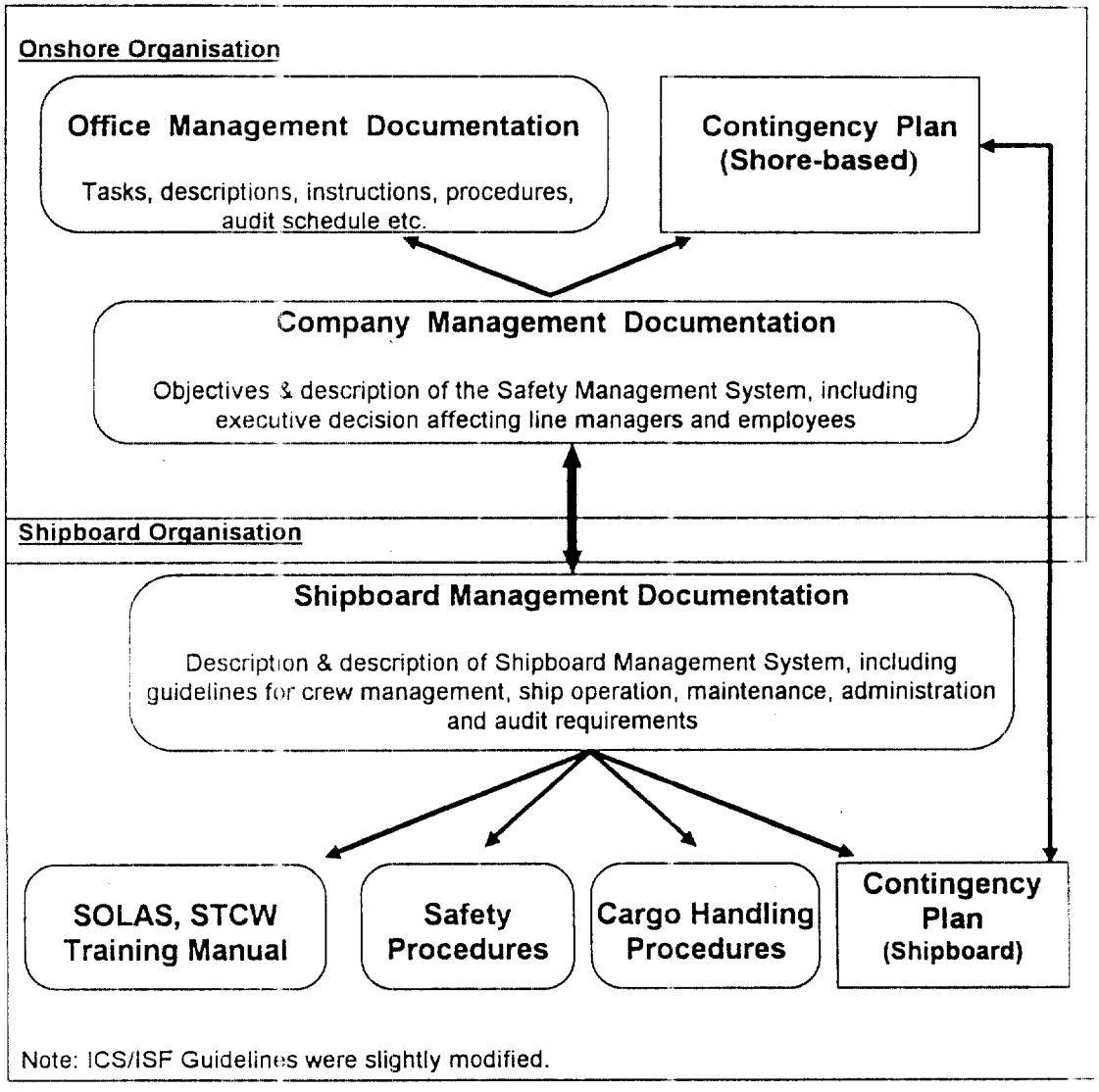
4. Effects of the Successful Introduction of the QMS into a Shipping Company

The shipping industry in common with the manufacturing industry seems to be obsessed with the issue of quality. Quality management has became a primary issue for the 1990s as the problem of low standards of operational control are addressed. There are two primary incentives for this development of the QMS. First, there is the competitive advantage which the quality operator will gain over his competitor. Second, the impact of major items of international and national legislation particularly concerning liability is being profound on the industry and is a major reason for the desire by shipping companies to be seen to be quality operators.

The most important resources of a shipowner company is its personnel and its ships. A successful balance between a vessel managed safety programme and fleet managed safety one consolidates the personal desire to avoid injury with the company's desire risk profile. In this context, for example, the prime quality objectives for a competitive tanker company should be:

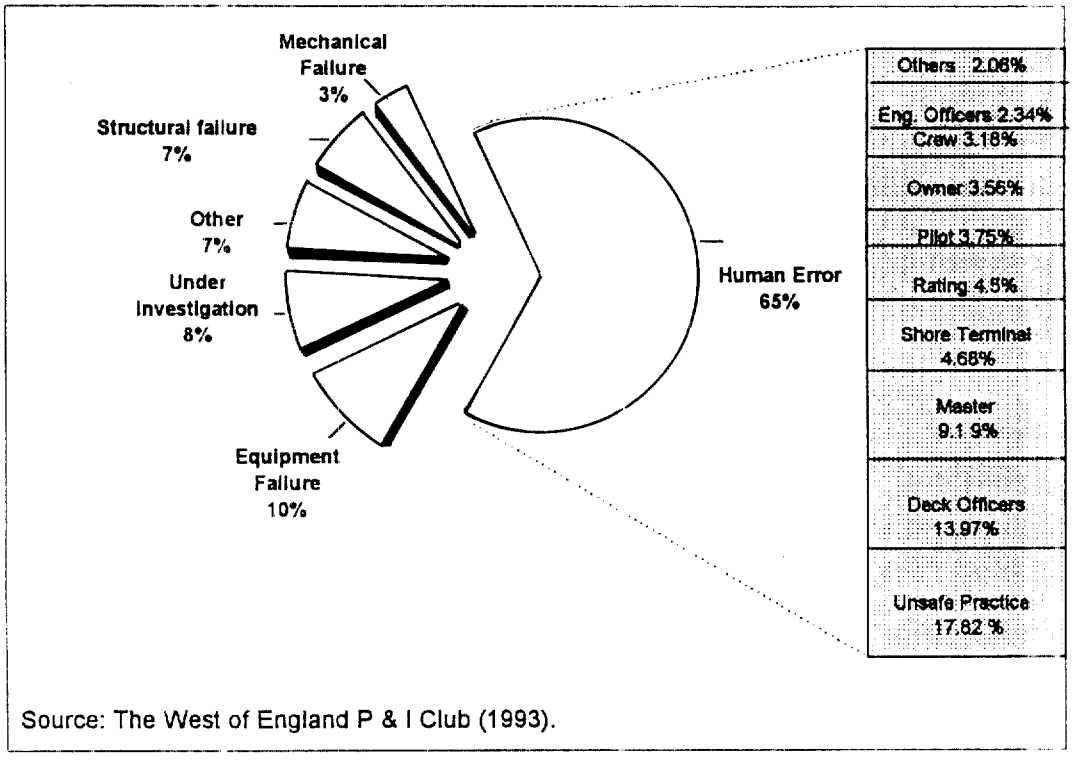
- to create and maintain an environment for office employees and sea going-staff that encourages teamwork, co-operation in solving any problem, and quick decision making, always striving for continuous improvement
- to implement, review and improve systems and procedures and to ensure consistency of work and services performed through out the fleet, at all levels and world wide
- to establish and promote safety and management philosophies, through the onshore and shipboard management, which are focused on a charterer's satisfaction
- to fulfil the company's contractual and other agreed obligation and respond properly to the needs of its clients within the spirit of goodwill and understanding
- to achieve and maintain a quality certification.

The above objectives can be achieved through a QMS and the result of a good balance is improved by quality control (see Figure 1). The achievement of company's objectives demands co-operation and good contact between onshore and shipboard quality management organisations. The two organisations require well established communications in order to ensure a successful inrtoduction and implementation of the QMS within the company.



< Figure 1 > Company Structure for Quality Control

The statement that 'human factor' is the most significant factor that involves in marine casualties is strongly supported by the West of England P&I club. In 1993 the club completed an extensive analysis of major claims incurred during the six year period from 1987 to February 1993. As shown in <Figure 2>, the overall human factor was found to have caused 65% of the claims. The biggest share of claims involving human factor were the result of the crew participating in the category of 'unsafe practice'.



< Figure 2 > Primary Causes in Maritime Casualties, 1987-1993.

The predominance of 'unsafe practice' claims indicates that crew quality and operational standards are inadequate. This will be influenced by:

- ◆ existing regulations
- ◆ the division and organisation of work
- ◆ the ship's technological level
- ◆ the crew's educational & training level
- ◆ features relative to work and recreational areas
- ◆ psychological aspects
- ◆ influences of environmental conditions.

In order to define of what actually depended the 'human factor', and according to the above survey the crew training system should be taken into consideration. Therefore, the shipping company needs trained seafarers which have the necessary qualifications through a QMS. The benefits of using the QMS are; firstly, the ship's safety organisation can be developed and practised; secondly, response time

to emergencies is greatly improved: thirdly, the company can build a common quality control system on all its vessels; and, as a consequent, finally, it can avoid the direct and indirect costs caused by maritime accidents.

However, quality will not be achieved unless people do certain things. Doing things require time and time costs money, therefore, in this sense, quality has a cost. However, according to Crosby(1979), the real cost of quality is the cost of doing things wrong and the cost of waste. In contrast, the cost of doing things right is not a cost at all, but an investment. The following evidences could support considerably this argument.

The DNV has been issuing the SEP/SBM certification since 1990. 41 companies have received their certificate equivalent to the ISM's Document of Compliance and 187 ships and the MOU's have received the SBM certificate equivalent to the ISM's Safety Management Certificate[Eriksen, H. (1994)]. Over the last 4 years statistical data from companies with safety management systems facilitated and certificated by the DNV indicated the effects of the systems as follows: 10% reduction in company liabilities insurance; 6-8% reduction in P&I insurance; 37% reduction in lost man-hours; 22% reduction in hospitalised personnel; 40% reduction in medical sign-off; and considerable reduction in fine from pollution and claims in connection with damaged containers[Eriksen, H. (1994)].

5. A Prototype for the System of the Quality Assurance of Seafaring Labour

In this section, a prototype for the QMS of seafaring labour in the Korean shipping industry will be suggested on the basis of the ISM Code, the ISMA Code, ISO 9002, and other quality management guidelines as discussed in section 3 above.

The major items enumerated in the two codes above and ISO 9002 (see Table 1) need to be taken into consideration in designing the TQM. To satisfy the requirements of quality management, a useful approach for understanding the training process is to consider the process to be a system whose boundaries interact with the rest of the business operations. Training needs and requirements are identified, training is provided to meet them, the output is compared with the requirements and any necessary changes are made to the system to obtain the desired output. While this approach helps crew managers to understand how training process operates[Wills, M. (1994)]. However, it must be emphasised that

it should be considered within the boundary of the TQM so that training is an integral part of the whole system.

A common approach to the evaluation of training is to assume that the relationship between training investment and improved organisational effectiveness is a straightforward case of linear cause and effect[Thomas, B. (1992)]. However, in the vast majority of instances, the training must be considered in relation to its role as a causal agent in the process of generating a quality culture. In this respect a quality trainer must have a wider outlook than a linear model allows and seek to influence not only the individual performance, but also the development of improved communications and team work[Thomas, B. (1992)] (see Figure 3). This figure illustrates the basic concept of the quality loop of seafaring labour, and was taken originally from ISO 9004 and modified for this study. Starting with market needs, the IMO and other quality requirements, these constitute the activities essential to the quality of seafaring labour.

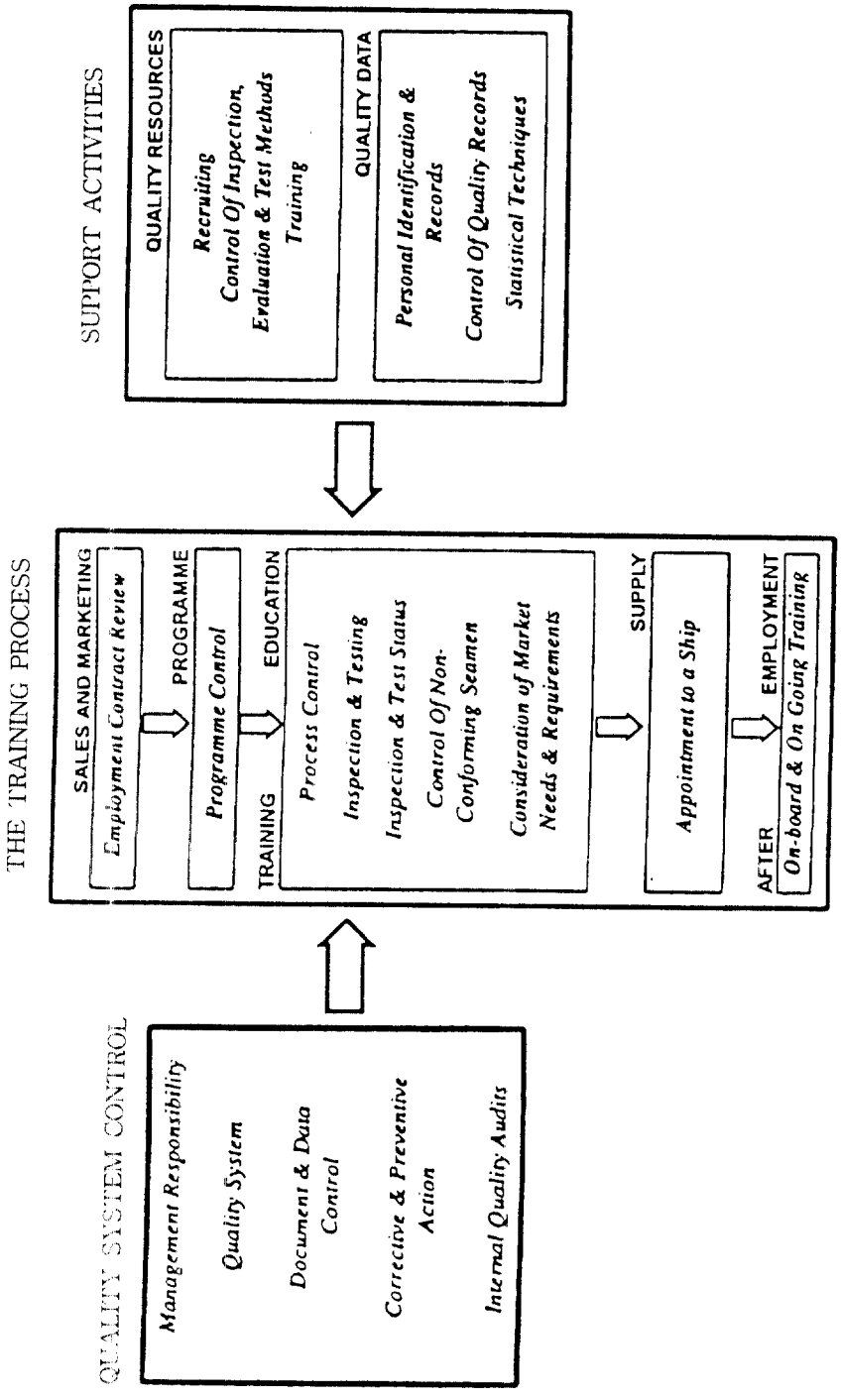
< Figure 3 > Quality Loop of Seafaring Labour

The box on the left in <Figure 4> includes five requirements that concern management of a formal quality system. These requirements are closely related to the ISM and the ISMA Codes, ISO 9002. Not only will the accessors need evidence that all the system control requirements are met but they also need to understand that the system cannot work for any given time without the mechanisms covered in this part of the international training standards. The middle box in the figure indicates the nine requirements which relate to the training process. This is closely related to the conceptual model of the quality loop in <Figure 3>. Each requirement is titled according to the quality management guidelines. Anyone planning this system must also read the relevant information published and is also advised to consult any available interpretation document for the shipping industry. The box on the right in <Figure 4> concerns the support activities carried out to enable the training process to work effectively. As shown in the figure, these include those relating to the provision of the key resources and those concerned with the data arising from the operation of the quality assurance. Therefore, the combination of the figure above and a modified quality system of ISO 9002 can be suggested as a prototype for the quality control and the quality assurance of seafaring labour because it satisfies the requirements of international safety standards made by the UN International Maritime Organisation (IMO), e.g. the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 (STCW), the ISM Code, and the ISMA Code.

Although it is developed to match the requirements of the international legislation, it is important to note that a QMS has to be dedicated to its own organisation and must meet the quality assurance needs of seafarer qualification and ship operation. For example, the system utilised by a liner shipping company[Frankel, E. G. (1993)] is likely to be different from that of a passenger shipping company. Moreover, the systems of crews practice of the former type will probably be different in detail from one another vessel because working conditions and cargoes are likely to be different.

6. Concluding Remarks

On the basis of the ISM and the ISMA Codes, ISO 9002, ISO 9004 and other quality management guidelines, a prototype for the quality management system was designed for quality control and quality assurance of seafaring labour from



< Figure 4 > A Prototype for the Quality Management System of Seafaring Labour

both Korea and developing countries. Benefits of the introduction of quality management system into a shipping company were also reviewed. In this paper it has been argued that the quality management system, as a subsystem of total quality management system, is essential for the survival of the Korean shipping industry. It will contribute to assuring the quality of seamen and, consequently, to increasing the international competitive edge of shipping companies in Korea.

To establish a continuous competitive edge, Korean shipping companies will have to commit resources to a quality management system that results in reliable quality control and quality assurance regardless of the crew combinations and other factors.

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