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The economic implications of safety and quality management systems [of] the ISM Code : case study : International Ship Management Company, Jordan

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THE ECONOMIC IMPLICATIONS OF SAFETY AND QUALITY MANAGEMENT SYSTEMS – THE ISM CODE

Case Study: International Ship Management Company - Jordan

By

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JORDAN

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OPERATION

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Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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ABSTRACT

Title of Dissertation: **The Economic Implications of Safety and Quality Management Systems - The ISM Code**

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This dissertation analysis safety and environmental demands that have progressively fallen on shipping and puts a price on the impact of legislation during the 1998 and beyond.

There has been a phenomenal growth in the volume of regulation being piled upon the shipping industry. This dissertation attempts to quantify the impact of the ever increasing avalanche of legislation on ship costs. In particular it highlights how the current regulatory environment is effectively coming together under the umbrella of a “quality management system”.

At its most basic the ship owner’s best defense against the current regulatory impost may well be an efficient up and running quality assurance system. But it should be said that a feature of the current quality scene is that significant scale economies are possible. This may in turn add other pressures which are inducing ship owners to merge their fleets or put them in the hands of large management companies.

Estimated increases in running costs serve to show how strongly safety and environmental protection regulations are impacting on the running costs of ships and how important is to bring costs under control.

The globalisation of ship management, the effects of economies in manning and maintenance in a climate of increased competition, together with growth in the size of ships and increasing complexity of shipping and its regulation, have also progressively revealed gaps in the quality of human input.

This dissertation evaluate how effective in real terms the ISM Code is likely to be in reference in my organisation “ International Ship Management Company” (I.S.M.). The dissertation also reveals the benefits of implementing management systems and

shows that in the long run today's costs will bring tomorrow's benefits, and how a pro-active approach needs to be adopted in the face of the regulations of the future.

KEYWORDS: Regulation, Safety, Environment, Quality, Management, Economies

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LIST OF ABBREVIATION

BIMCO	Baltic and International Maritime Council Organisation
B/L	Bill of Lading
CDG	Carl Duisberg Gesellschaft
CLC	International Convention on Civil Liability for Oil Pollution Damage, 1969
DOC	Document of Compliance
DPA	Designated Person Ashore
EC	European Commission
ETS	Emergency Team Set
EU	European Union
FSA	Formal Safety Assessment
GMDSS	Global Maritime Distress Service System
HBL	Hydrostatic Balance Loading
H&M	Hull and Machinery
HNS	International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1966
HSC	High Speed Craft
IACS	International Association of Classification Societies
ICS	International Chamber of Shipping
IGA	International Group Agreement
ILO	International Labor Organisation
ILU	Institute of London Underwriters
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organisation
ISF	International Shipping Federation
ISMA	International Ship Manager Association
ISM Code	International Safety Management Code
I.S.M.	International Ship Management Co.
ISO	International Standards Organisation

IT	Information Technology
LLMC	Convention on Limitation of Liability for Maritime Claims, 1976
LSA	Life Saving Appliance
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
MASSOP	The Management Structures of Shipowners and Operators
MOU	Memorandum Of Understanding
NCR	Non-Compliance Reports
OECD	Organisation for Economic Cooperation and Development
OPA	Oil Pollution Act (US)
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990
P&I	Protection and Indemnity
PMS	Planned Maintenance System
PSC	Port State Control
QA	Quality Assurance
R/C	Running Cost
R&M	Repair and Maintenance
SMC	Safety Management Certificate
SMM	Safety Management Manual
SMS	Safety Management System
SOLAS	International Convention for the Safety Of Life At Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
TQM	Total Quality Management
TQS	Total Quality System
USCG	United States Coast Guard
VLCC	Very Large Crude Carrier
WMU	World Maritime University

Chapter 1

Introduction

Safety and Quality Management Systems have become very important issues in the shipping industry. It can be seen through the performance of the company how far the management system will have effect on the operations of the company in terms of benefits.

There is a tendency to take an insular view of safety regulations and sometimes to place current moves towards a more systematic approach to safety and risk management on the top of the company policy. However, shipping is but one industry being forced down the path of quality assurance.

As industrial society has grown over the past hundred years, regulations governing safety, health and the environment, almost always responding to major safety failure experiences were imposed by government or third party involved, such as insurance underwriters or classification societies, from out side the company in a rather haphazard fashion. Moreover, a merging of quality and safety management systems started 20 years ago. This means that most companies of any today size have a quality assurance policy, which will normally embrace responsibility for insuring that mandatory requirements as well as production and quality standards are followed.

In the shipping industry, the quality of the human input is very important. Human behavior aspects of safety within the whole framework of a shipping company and the shipping

industry is now considered necessary by regulators to impose a systematic approach in form of the International Safety Management (ISM Code), perhaps supplemented by the ISO 9002 itself.

The ship owners may determine to use the ISM Code as a stepping stone to achieve higher efficiency, through Total Quality Management, within his organisation. He will therefor deliver higher standards of service to his customers, achieve economies in costs, and also prove his excellence in matters dealing with safety and environmental issues.

The development of a Safety Management System, in order to meet and comply with the ISM Code, requires financial support and in general if will have effect on the financial health of the company in the short terms. However, as we will see ahead, in the long term it will bring benefits to the shipowners in terms of reducing the running costs of the vessels.

The type of costs involved are developing, establishing, documenting and monitoring of the SMS and the costs of the external verification by the issuing of the certificates.

As we will see the impact on the company will depend on the following factors:

- The size of the company and the type of the vessels if is operating.
- The training required for shorebased and shipboard personnel to meet the different standards.
- Hiring extra staff.
- The existence of quality assurance in the company.

Most big shipowners, who can afford to pay the cost involved, will not have any problems in implementing the ISM Code in their company. Nonetheless,

*The ISM Code will force certain of the smaller self managed shipowners with less resources and those who mightily or wrongly have been identified more closely with the lower end of the Market, to sub-contract their technical safety management operations to the large and arguably perhaps more efficient international ship management companies (*Intertanko 1996, p.13).

In this dissertation, an attempt is made to analyse safety and environmental demands, that have fallen upon shipping and also to put a price on the legislative impact. The growth of quality systems in shipping industry is traced. The implications of safety and quality control are examined and the consequential opportunities that arise to make economies-examples are given.

Case study from the International Ship Management Co. (I.S.M.) is examined to show how the company has implemented the ISM Code and made benefits to the owners by reducing the running costs of their vessels.

This Topic, the economic implications for safety and quality management systems, was chosen because it reflects the author's concern an ship operation. To have asafe operation of a ship, three main factors have to be maintained:

1. Ship reliability in technical terms to be analysed.
2. A ship must be manned sufficiently, safely and efficiently, having full support from shorebased management.
3. Establishing and maintaining an effective safety management system including the commitment at the very top level of the organisation.

The author, having a technical and sea-going background and holding a certificate as Lead Assessor for the ISM Code and ISO 9000, was the designated person ashore for all vessels (13) under the company management, believes that the implementing of the

safety and quality management system is an advantage rather than just a burden regulation. In addition, the systematic approach, if handled properly, will provide the opportunity of overall savings. This belief, indeed, influences the author's decision in choosing this topic.

Many books and articles have been written about the implementation of the ISM Code and it's technical implications, but not many have formally written about the economic implications as a guide to the ship owners or the operators. The material that influences this work has been obtained through different sources, such as books from the WMU library, IMO Conventions and guidelines, texts from technical seminars, conferences (IMarE, WMU/CDG), field training notes and a verity of marine periodicals, magazines, reports (Lloyd's list press, Drewry shipping consultants, P&I clubs, …).

Supporting information / data for the research also comes from the International Ship Management company, Internet's, lecture notes and interviews with resident and visiting professors at the WMU.

The topic is difficult, to the author of course, because its scope is so general and wide. However, it is very interesting. His passion for the subject is to prove that the ISM Code is not just a peace of paper, it is a whole system, and by using it properly, off-course benefits will be gained.

Chapter 2

Safety and quality control in shipping

2.1. Safety and environmental pollution control.

2.1.1. Development

The dangers faced by ships and their crew are basically the same as they were long time ago. However, vessels and their equipment, and the world they operate in, have altered beyond recognition, bringing changes in risk exposure along with advantages of stronger and larger ships, powered and equipped as never before.

Merchant shipping acts, aimed at safeguarding ships, personnel and cargo were introduced in major maritime nations in the mid nineteenth century and the coverage of these grew with the development of ships and shipping.

The importance of international cooperation in shipping has been recognised for centuries, and the shipping industry had grown to such an extent in size and complexity that there is a need for an international body. Another reason was that the shipping industry was suspicious of any attempt to control its activities and restrict its commercial freedom. The International Maritime Organisation (IMO) was therefore, established with the following purposes

1. To provide machinery for co-operation among governments in regulation and technical matters.
2. To encourage the removal of discriminatory action and unnecessary restriction by governments affecting shipping.
3. To provide for the consideration of unfair restrictive practices.
4. To provide for the consideration of any matters concerning shipping safety of ships and its effect on the marine environment.
5. To provide for the exchange of information among governments.

Since the Convention creating IMO was adopted fifty years ago, shipping has changed more than in any similar period in history. IMO has responded by adopting and amending international treaties, codes and recommendations dealing with maritime safety, marine pollution and other subjects.

The mandatory requirements on safety and of safety equipment have bestowed great economic benefit on shipping-sometimes the threat of a new requirement has been enough. The improvements in communication equipment and other electronic navigation aids have led in turn to improvements in the economics of ship management.

The internationally accepted of rules and codes on the strength, construction and navigation of ships have come to play an indispensable role in trade between nations-by smoothing commercial movement of ships and their cargo as well as in improving safety matters. The rules governing standards of human input which are included in the ISM Code and revised STCW convention will be viewed in time as further benefits.

2.1.2. Legislation

2.1.2.1. Formulation and growth of legislation.

Ship losses and major casualties have the main influences on the formulation of safety legislation. There are many changes in safety and environmental protection legislation was conducted during the last decades. Some recent total losses and major casualties with changes in safety and environmental protection legislation are listed in appendix 1.

Table 1

Global fleet total losses (all ship types) and lives lost as a result

Year	No.	Lives
1990	244	389
1991	318	1204
1992	266	246
1993	273	504
1994	222	1552
1995	237	379
1996	221	690
1997	132	218

Source: LR World Casualty Statistics

There has been a decline in the number of lives, and ships lost over time as ships have become stronger and their machinery, equipment and emergency back-up systems have improved. Most improvements were introduced to rectify failures brought to light in the operation of ships often at the cost of lives.

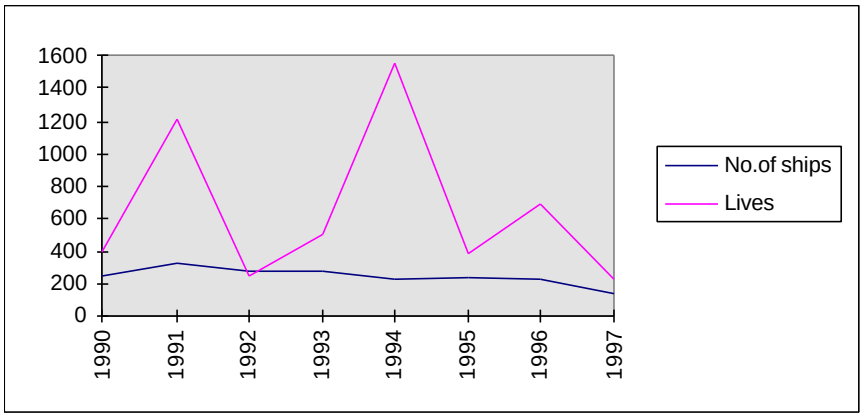
A succession of international conventions on safety of life at sea and on the prevention of pollution from ships, and other issues put the safety regulation of ships on an international basis and laid the foundations for the highly regulated scene which exists at the end of the twentieth century.

In recent years, although the trend of ships lost generally continues downward there have marked fluctuations from year to year in ships, gross tonnage and lives lost. Rises in the annual number of lives lost in 1991, 1994 and 1996 were largely due to passenger/cargo Ro Ro ship losses, whilst the marked rises in gross tonnage are a result of larger ship losses. (figure1)

In the past, total losses have been the main driver in the introduction of safety rules, particularly where high loss of life on passenger ships or extensive pollution from tankers has been involved. Although such quality failures will undoubtedly continue to play an important part in the regulatory scene, the tendency has, for some time been towards the adoption of an anticipatory stance following the doctrine that ”Prevention is better than cure”.

Figure1

Total losses (all ship types) and lives lost therefore



Source: LR World Casualty Statistics

The introduction of the International Safety Management (ISM) Code on ships and adoption of the “Precautionary principle” and “Risk assessment” methods by rule makers may be taken as logical steps in the progression to a global shipping quality system- the shipping industry has been brought rather late to this situation compared with many industries ashore.

According to the EU study which published in 1996 under the title Transport Research, APAS, Maritime Transport, VII-38, Ship nationality by flag and by ownership are significant factors when considering loss statistics.

Table 2 compares loss ratios of flags above the world average. It was noted from the EU study that the large number of losses referred to Panama fleet in terms of gross tonnage. These reflect to the large number of smaller and older ships registered under that flag.

Casualties, accidents and unease resulting from the increase in volume and complexity of sea borne trade over the past 30 years has led legislators to address the following issues:

- Growth in the size of tankers, and pollution potential.
- Dangers associated with the growth in the size and changes in design of passenger ships, particularly passenger/vehicle ferries.
- Increased traffic concentrations, particularly in coastal waters and port approaches, and the interaction of ships carrying hazardous cargoes and passengers.
- Failures to institute shipboard and shore-based systems appropriate to modern conditions.

Table2

Flags with losses above world average in 1997

	Tonnage lost as a percentage of flag fleet in 1997	Ships lost 1997
World	0.144	
Antigua & Barbuda	0.503	4
Belize	0.890	3
Cyprus	0.615	8
Germany	0.147	2
Honduras	0.787	6
India	0.602	2
Indonesia	0.385	3
Malta	0.224	3
Panama	**0.163**	**11**
Romania	0.287	2
Spain	0.162	1
St Vincent & Grenadines	0.398	4
Syria	0.702	2
Thailand	1.910	4
Turkey	1.655	6
USA	0.418	2

Source: ILU Casualty Statistics

- The increased probability of operation and accidental safety lapses and pollution incidents as a result of greater traffic volumes, particularly with a significant proportion of vessels under questionable management.
- Intensive employment and aging ships, and failure to maintain and repair ships properly.

- Growing commercial pressures affecting upon safety in navigation, cargo handling and other operational aspects.
- Extension of navigation to previously quiet ocean and coastal areas.
- Carriage of an increasingly wide range of hazardous and toxic cargoes.
- Poor practices in the port/ship interface concerning ships carrying dry bulk, oil, chemicals, containers and dangerous/toxic cargoes.
- Failures to keep uniform high standards in ship design, shipbuilding, ship repair and the survey of ships.
- Less tolerance of breaches of safety and environmental protection measures on the part of administrations and the public.
- Lack of standardization in safety aspects of ships and in equipment.
- Inadequate safety radio communications and electronic aids.
- Wider introduction of high-speed vessels and other advance types.

These issues have been the subjects of detailed discussion at IMO, as a result of which many internationally binding regulations have been passed into law.

2.1.2.2. Key legislation

International maritime legislation is but one sector of the huge mass of what is metaphorically called" international legislation", whereby nations, by way of treaties or conventions agree under international law to give effect, either on their own part or that of their subjects, to such additions or changes in select areas of societal behavior or practice as they see fit to endow with legal sanction.

In maritime activity regulatory conventions such as SOLAS, MARPOL, LOADLINE, etc. are the main keys of legislation concerning the safety of the vessel and the environmental protection but there are many other mandatory and advisory instruments covering pretty well the whole sphere of shipping safety and environmental protection as

it relates to shipping. Other international conventions involved are STCW Convention, ISM Code, GMDSS and INMRSAT, COLREG 1972 convention, etc. The conventions are supported and supplemented by many codes, manuals, guides and other documents.

2.1.3. Regulation and control

2.1.3.1. Flag state control

Control by national administration over ships flying their flags has tended to become more tenuous with the growth of open registry and the delegation of survey work to classification societies. However, the flag state remains ultimate responsible to ensure that they establish and maintain measures for the effective application and enforcement of the IMO instruments to which they are a party.

In addition flag state is responsible for promulgating laws and regulations and for taking all other steps which may be necessary to give the applicable conventions full and complete effect so as to ensure that, from the point of view of safety of life and pollution prevention, a ship is fit for the service for which it is intended and seafarers are qualified and fit for their duties.

Flag state have effective safety organizations which take a central role in implementing safety requirements through their own staff or by delegation to the classification society surveyors. Delegates from these safety organizations make a major contribution to technical discussions on IMO.

According to Paul Shields, MNI, Quality and safety manager, Zodiac Maritime, *"it should be remembered that it is the flag administration who have been given the responsibility by IMO to implement the ISM Code although it is widely accepted that the majority of*

administrations will delegate this authority to ‘ approved organization’ ". Any way administrations must be careful in their selection of approved organizations.

2.1.3.2. Port state control

Port State shall ensure the effective application of the Conventions provisions, and to be assured by control of foreign ships, calling at their ports, thereby discouraging the operation of sub standard ships. Concern at the quality of ships using their ports has led nations in Europe, the Americas, Asia-Pacific, Australia and elsewhere to introduce ship inspection procedures to ascertain standards of safety and environmental protection. These port state control measures are becoming increasingly integrated with the co-operation of IMO, and a worldwide safety net is fast developing.

According to the USCG’S, as the leading enforcement agency of the United States for commercial shipping, “ the US Coast Guard fulfills two roles. First, they are flag administration and must take responsibility for the implementation of the ISM Code for US-flag vessels ”. This responsibility is one of their highest priorities since they are directly responsible for ensuring that vessels under the US flag have implemented an effective safety management system.

Secondly, they are a port state and must act in a positive manner to ensure compliance with all applicable SOLAS and international conventions on foreign vessels that call at US ports. In the capacity they will check that foreign flag vessels calling at US ports have also implemented an effective safety management system.

Ships found deficient at port state inspections may be detained, fined or penalized. Fore instance, under the Paris Memorandum of Understanding it is policy to inspect at least 25% of ships calling at EU ports in the course of a year. Between the inception of the scheme in 1982 and 1991, more than 100,000 inspections were carried out and some

3,200 ships were detained. With reference to Table 3, the most common deficiencies were found to be:

- Life saving appliance (24% of all deficiencies).
- Fire fighting appliances (17%).
- Safety in general (13%).
- Navigational equipment (12%).

Table3

Paris MOU inspection activity

	1991	1992	1993	1994
Number of vessel inspections	13,955	14,379	14,783	17,294
Number of deficiencies	22,623	25,930	27,136	43,071
Ratio deficiencies/inspection	1.6	1.8	1.8	2.5
Number of vessel detentions	448	525	588	926
As a percentage of inspections	3.2 %	3.7 %	4.0 %	5.4 %
% Individual vessels involved	4.48 %	5.20 %	5.62 %	8.23 %

Source: Paris MOU

Vessels were only detained if considered unsafe to go to sea for that voyage. The increase in detentions in 1993 was attributed to:

- Further deterioration of the global fleet.

- Better targeting by various PSCs.
- Higher standards imposed by the PSCs.

With port state control, although SOLAS requirements are generally applied, different requirements and standards apply in different countries. The introduction of STCW 95 and ISM Code with variations in the manner in which they will be interpreted by different port states will cause added complications.

Additional statistics from the Paris memorandum are based on a concerted inspection campaign mounted in the three months following the introduction of ISM at the start of July 1998. Port state control authorities in the 18 Paris memorandum countries inspected 1,575 ships during the campaign.

A total of 81 were arrested for serious non-conformities with ISM, giving an average detention rate of 5.1%. Yet the detention rate for Bureau Veritas audited ships was 11.3%, and for Lloyds Register, audited ships 9.5%.

2.1.3.3. Classification Societies

The main purpose of classification societies was originally found to meet the need of insurance underwriters to know whether a ship was a good risk (seaworthy), a small group of surveyors being employed to inspect ships and classify them according to their condition. The first Lloyds Register of ships was published in 1764 with the purpose of listing the condition and other details of ships which might require insurance.

Today, there are a great many classification societies in the world with thousands technical surveyors and other staff at ports, shipyards, industrial centers and in planning and consultative offices. A Classification societies provides independent attestation as to the structural integrity and mechanical ability of the vessel for the intended purpose. In

addition, they are certifying agent under a delegation of authority from a Maritime Administration for related requirements of international and national regulatory instruments. Further more, classification societies have in many instances taken human-related responsibility connected with the introduction of the ISM Code an STCW 95 convention

To address the problem of differing class rules leading classification societies, accounting for 90% of the world tonnage in shipping, formed the International Association of Classification Societies (IACS), which got observer status by the IMO, in 1969. In the interest of achieving its objectives of promoting the highest standards in ship safety and marine pollution prevention, IACS concentrates its efforts in the following primary areas:

- Establishment and maintenance of Unified Requirements, Recommendations and Interpretations.
- Prompt cooperative consideration of emerging technical issues of interest or concern.
- Consultation and cooperation with the International Maritime Organization.
- Consultation with recognized marine technical groups and related governmental organizations.

To reflect the growing importance of the Association and its influence in the world maritime industry and, to provide a focal point for coordinated activities and communications, IACS has established a Permanent Secretariat at IMO in 1992. Some measures in which IMO and IACS have cooperated closely are:

- Tightening of the Transfer of Class Agreement to halt flag hopping.
- Automatic suspension for vessels which do not complete surveys on time.
- Two yearly audits on class surveyors.
- Improving relationship between societies and port state control organizations.
- Transparency of information.

- Enhanced class surveys of tankers and bulk carriers.
- Stricter survey requirements on fire prevention, particularly on passenger ships and in machinery spaces, measures to improve watertight integrity, ship stability, ballasting and ship maintenance.
- Introductions of Unified Requirements on strength, damage stability and survey requirements.
- Harmonized training for surveyors with strengthening of the IACS Quality System towards ISO 9002 accreditation.

Outside the core 12 classification societies, which comprise the membership of IACS, are many smaller societies largely catering for smaller ships in particular parts of the world - it is virtually impossible for a classification society which does not conform to IACS requirements and procedures to play a significant part in the present - day global shipping market.

2.1.3.4. Insurance

The practice of selling parts in a ship or a trading adventure to spread risk was in vogue well before 1700 and records exist showing that insurance premiums formed part of the running cost of ships sailing in the 17th century.

By the early decades of the eighteenth century, in England at least, ship owners were taking out insurance as a matter of course - when they could get it, that is-at some times of the year in some trades underwriters were understandably reluctant to cover the risk.

Today, risk is more controlled and in its various forms remains the very element upon which shipping industry floats and marine insurance has grown to be a distinctly international business subject to business cycles and at times intense competition on the part of insurers. In addition, organizations capable of identifying risks within the scope of

their activities and able to control them more effectively than in the past are retaining more risks, either directly or through captive insurance.

In general, ship owner's insurance needs are catered for two means:

(a) Hull and Machinery (H & M) Insurance placed with commercial Insurance and Clubs, covering Loss/Damage to ship and Collision Liabilities in which the ship owner has a direct insurable interest.
(b) Protection and Indemnity (P & I) cover provided by “mutual”, placed with P&I Clubs, cover Third party Liabilities arising under a contract or in tort such as loss of earnings, oil pollution claims, injury to employees and others which cannot be covered in the insurance market or are more conveniently covered by mutual insurance between ship owners.

The methods of payment for the two types of insurance are different. Fore instance H&M insurance is premium dependent, whereas the cost of P&I insurance is met by advance and supplementary “calls” for funds. In addition, both forms of insurance cost are becoming increasingly dependent upon the ongoing management of the ship in question, as well as the company s past claim record.

P&I Clubs have become more stricter in evaluating the claim records of new entrants and in giving more consideration to the condition of an owner s existing fleet. P&I managers, along with underwriters of other insurance, have had to give close consideration to what impact the ISM Code will have upon their cover - in view of its mandatory nature it will not be a question that can be ignored- although some clubs have declares that ISM compliance will not be a condition of cover.

The international Group of P&I Clubs recommended that individual clubs should ensure that members maintain for each entered ship a valid ISM Code certificate and that they

should also include monitoring of general compliance with the code in their existing program of surveys or inspections. Nevertheless, ship owner's groups take the view that the role of the clubs-which are after all ship owners mutual-is to provide their members with third party cover.

It therefore does nobody any good and creates potential uncertainly all round if a significant number of vessels is suddenly denied cover for reasons which to some extent are beyond their control.

It is suggested that the clubs should devise a system whereby members are required to alert them when they have not got the necessary documents so they can make this distinction between those for whom cover should be withdrawn and those who should remain covered.

2.1.3.5. Commercial constraints

Through contractual obligations such as charter party or bill of lading or any other contract, a ship is often obliged to comply with certain conditions. Sometimes these conditions are referred in the contract, sometimes they are implied in nature. For instance, a ship might be required to meet certain standards in its condition such as ship speed, cargo capacity and handling or its operation.

Or a stipulation might be made in a B/L or otherwise by shippers or consignees that cargo is to be carried and delivered in a certain time and condition, or in accordance to the IMO recommendations or other recognized code of practice. The following example will give more pictures:

- The Bulk Carrier Code, now to be made compulsory under SOLAS, has long been a condition of some charter party.

- Shell and other oil majors, amongst other charters, have for years and establish procedures to check the condition, management and operating standards of chartered - in ships. These procedures anticipated and even exceeded the safety management system now demanded by ISM Code.
- In the event of loss of or damage to cargo carried on deck or to containers a carrier will face criticism or worse if the relevant IMO code has not be followed.

In short, contracts between ship owner and any other body in shipping industry such as charter, supplier, shipbuilder, ship manager, etc. make the vessel obliged to meet the conditions and requirements stated in the contract.

2.2. Controlling quality

2.2.1. Quality assurance and its influence on shipping

The term " Quality" refers to the fitness for use of a product or service. It is achieved when a customer s stated or implied needs are satisfied.

Whilst the shipping industry has been "informally" managing the safety of its operations for many years, the ISM Code is a formalized attempt to apply a structure approach to operation and environmental safety. The International Ship Management Code is a management system based on the requirements of the International Standard ISO 9002 (1994), which is a model for quality assurance system in production, installation and servicing.

Quality Assurance is a management system designed to give maximum confidence that a given acceptable level of quality is being achieved in a product or service with a minimum total expenditure. It is important to understand that a Quality System sets out to achieve an "acceptable level of quality". It is not the purpose of any quality system to achieve a

level of quality higher than necessary. Globally, quality management is taking on growing importance, basically, on the principle that prevention is better than cure.

Quality Assurance is concerned with the processes and procedures by which products or services are created. If the system can be standardized and controlled, then the results will be standardized also.

Regulations governing safety, health and the environment, mainly responding to major safety failure experiences, were imposed by government or quasi-official organization (such as insurance underwriters or classification societies). A merging of quality and management system has taken place over the past 25 years so that most companies of any size have a quality assurance department which will normally embrace responsibility for seeing that mandatory requirements as well as production and operational quality standards are followed.

There is a perception in many shipping organizations that the technical aspects of ship management, the human resources, hiring, firing and training etc., and the corporate company management, are distinct, only loosely connected and with quite different objectives. Shipping companies operate in watertight compartments with authority concentrated at the top. Quality requirements must gradually change this perception, and the resulting teamwork effects and integration can only be beneficial to the organization and the industry.

According to Professor David Mottram, WMU, Mall, Sweden, shipping needs new organizational forms. *The rigid "command and control" hierarchy, both at sea and ashore, may not be the best solution for today s shipping world. The ISM Code however, could be perceived as commanding and controlling by means of inflexible procedures.*

2.2.2. Quality Standards (The ISO 9000 series and ISO 14000)

A demonstration of quality is becoming a condition of doing business in the maritime industries and by this devising those that are competent from others. Those that can prove their competence will get work faster.

In the ISO system, standards are developed by national delegations of experts from business, government and other relevant organizations. They are chosen by the national standards institutes participating in the technical committee concerned and are required to present a consensus position based on the views of stakeholders in their country.

The ISO 9000 series of standards comprise internationally accepted formal management systems laying down principles of quality management and control. Adaptations of the principles are also to be found in marine safety organizations and shipping.

The implementation of ISO 9000 require the following:

1. Formally stating in writing how work will be proceeding through an organization.
2. Ensuring, through management and training, that the written procedures are followed and comply with the requirements.
3. Proving, through provide objective evidence, records, inspection and internal audits, that complete work has complied with the desired standard and has been accomplished in accordance with the laid down procedures.

Formal certification are required by a recognized bodies where a quality system meeting the ISO 9000 standard for obtaining critical contracts. For instance, freight-forwarding firms are in the forefront of transportation companies undergoing ISO certification. Certification is becoming a fact of forwarder life since so many companies now require it.

ISO 9002 is the standard for companies providing production, installation and servicing and lays down basic requirements for the following:

- Management commitment and responsibility.
- Contract review.
- Production process control.
- Methods of inspection and prevention of quality deficiencies.
- Training.
- Maintaining the system.

The ISO 9000 series is limited and required adaptation to different type of organization.

The ISO 14000 standard is based on how to use quality assurance in defining a new relationship between business and the environment in the presence of greater scrutiny by regulatory bodies and public at large. At the beginning of the 1998, more than 2500 companies across the globe had adopted the ISO 14000.

Public companies are suffered to prove their management system and benefit business at the same time. Not all-large environmentally conscious organizations have followed the ISO 14000 line, some of them preferred to adopt other forms of total quality management. This is depending on particular business needs.

2.2.3. The impact of quality system on shipping industry

The shipping industry is one of the most international industries in the world. It embraces virtually every nationality and culture, and the adoption of a recognized safety and quality

management system is crucial to provide the necessary assurance to authorities, the public and customers on a global scale.

The globalisation of shipping management, the effects of economies in manning and maintenance and the increasing complexity of shipping and its regulation have increased the awareness in the quality of human input. Although there have been continuing efforts to deal with the technical problems related to the safety and the environmental protection through the SOLAS and MARPOL Conventions and other international treaties, agreements and recommendations over the past of 40 years, control of human aspects have tended to languish.

Influenced by human behavioral aspects and the development of safety and quality management standards within the international shipping at large, including authorities, organizations and the individual shipping company, has during the last 8 years or so fully realized the needs for a systematic approach in the form of the International Safety Management (ISM) Code (perhaps supplemented by ISO 9002 itself) to control all these factors.

Chapter 3

Safety and Quality Costs in shipping

3.1. Costs arising at international level

There are substantial growth in the mandatory regulations and acceleration in the rule making process in shipping industry during the twentieth century. In addition, too many regulations relating to the safety and pollution prevention were issued by the IMO in this century through its conventions, agreements, treaties and recommendations. Moreover, flag state, classification societies, P&I clubs and other bodies involved in shipping industry have produced more regulations for ship owners to maintain acceptable level of safety on board their vessels.

Due to huge amount of regulations, the last few decades have witnessed the movement of ships to flags open registry and manned internationally. Therefor, cost economies have resulted in erosion of professional standards, managerial expertise and business ethics, whilst changes in market requirements and technological advances have led to development of more valuable and complex ships.

Today, safety regulators in industries of all types are working to a new systematic approach. Quality is the main important idea to solve all problems, which is focusing the shipping industry.

Extra cost falling upon the ship owner in the closing years of this century to maintain acceptable level of safety and quality on both side shipboard and shore based can be shown through the following:

SOLAS Convention

- **Fire protection, fire detection and fire extinction**

For passenger ships, extensive upgrading measures for fire protection were instituted and coming into force after July 1997. There are requirements for accommodation spaces, fire doors, fire detection, alarm system, and automatic sprinklers, etc.

Cost: constructional, electrical and plumbing work will be required in many instances on existing tonnage which will lead to some older ships being made redundant on economic grounds. New ships might be subjected to high costs. Extra expenses will be involved in crew training and maintenance of the new requirements.

For high-speed craft, The new requirements are required careful assessment of operational costs, and benefits in design criteria is particularly important with fast ferries. Protection against fire and “permit to operate” are major objective of the Code.

There will be extra costs in raising crew expertise in operational and safety procedures to meet the requirements of new regulations.

- **Constructional, stability, machinery and electrical installations**

Improved construction and stability standards for Ro-Ro passenger vessels were adopted after the “Estonia” casualty and coming into force 1 July 1997. To achieve improved and survivability, structural modifications are necessary and additional subdivision of the

vehicle deck is possibly an alternative. In addition, Ro-Ro passenger ships must be fit a helicopter pick-up area.

Cost: An analysis of each ship's stability, survivability and safety will be required, the outcome of which will dictate what structural and other modifications will be necessary. It may be found that an older ship cannot be modified at economic cost and scrapping is the only alternative.

Ro-Ro passenger ships built after 1 July 1999 are required to have an evacuation analysis, carried out early in the design process, aimed at identifying and eliminating possible congestion areas.

Cost: If the evacuation analysis does not meet certain criteria, evacuation and abandonment will require attention and entire structural could be changed.

Passenger ships of 130 m in length and over built after 1 July 1999 must be fitted with a helicopter landing area. The cost of fitting the helicopter landing area and providing the necessary ancillary equipment is estimated as $20-40,000.

For Bulk Carriers, New SOLAS Chapter XII will enter into force in 1 July 1999, new and existing bulk carriers must have sufficient strength to withstand flooding of any one cargo hold when carrying high density cargoes. Classification societies were accused of conducting insufficient and inadequate survey which allowed fatigued structure to continue trading without attention.

Therefor, classification societies have adopted class rules for new and existing bulk carriers that include the mandatory strengthening of bulkheads for possible accidental flooding of cargo holds. These new requirements for the existing bulk carriers are the first case where retroactive increases in strength standards have been introduced by IACS. In

fact, there will be greater emphasis in the future on ship maintenance and survey through the enhanced survey program and perhaps other measures.

Cost: Some owners estimate that a cost of $3m will be involved in making the necessary modifications. According to BIMCO, costs will be $50,000 for a Handymax. $75,000 for a Panamax. $150,000 for Capsize. With an estimated 76% of the bulk carrier fleet affected a bill of $150-400 m will ensue.

- **Life saving appliances**

For passenger ships, major enhanced safety measures adopted by the 1995 conference after Estonia and Herald of Free Enterprise casualties and coming into force after July 1997, such measures are:

(a) All ship s life rafts to be served by a marine evacuation system or by launching appliances.
(b) All life rafts to be provided with float free devices.
(c) Life raft boarding ramps to be fitted for people to board from the water.
(d) Life rafts to be of an improved design.
(e) At least one fast rescue boat to be provided, with two specially trained crews.
(f) Improved fast rescue boat launching/recovery devices.

Other requirements will be interred into force after July 1999 and July 2000 respectively such as (passenger name and gender must be recorded for search and rescue purposes, “decision support system” on the navigating bridge,) and some changes in life-saving requirements on Ro-Ro passenger ships constructed before 1 July 1998.

Capital costs facing passenger ship operators include those associated with fitting new life-saving system and service. In addition, cost involved in recording passenger details,

particularly on short trips. There will be extra costs in raising crew expertise in operational and safety procedures to meet the requirements of new regulations. More exacting technical and maintenance requirements will lead to extra cost.

For all types of ships, SOLAS chapter III has been reviewed and formulated and entered into force from 1/7/1998. The new chapter is required an updating of technical requirements to be taken and many of them has been transferred to the (LSA Code). More maintenance to meet the technical requirements will lead to extra costs.

- **Communication**

All vessels covered by SOLAS must be converted to the Global Maritime Distress System (GMDSS). Governments to provide suitable shore based radio facilities. Ships are required to carry equipment in the form:

1. A VHF radio installation capable of transmitting and receiving.
2. Digital selective calling (DSC) on certain radio frequencies.
3. Satellite emergency position-indicating radio beacons (EPIRBs).
4. Navtex equipment able to automatically receive internationally maritime safety information, navigational warnings, weather information and warnings, and search and rescue.
5. Search and rescue transponders (SARTs).
6. Radio watch keeping for broadcasts of maritime safety information. (SOLAS, Ch. IV, Reg.7, 8, 9, 10, 11, 12).

It was estimated in mid-1997 that only 30% of the world fleet complied with GMDSS. This means that there is doubt whether the suppliers of equipment will be able to cope with the surge to meet the 1999 deadline. However, rapid advances in technology and falling prices of equipment could mean that satisfactory alternative arrangements to those set

some time ago might be agreed by IMO. There is still argument centering upon continuation of VHF distress watch and the carriage of a radio operator.

Cost: Possibly $1,000-20,000 to cover new equipment, but with the rapid development of radio communications and the falling cost of messaging significant improvements in operational efficiency are possible. This will affect the cost immediately.

- **Safety of navigation**

For Tankers, the emergency towing arrangements required to be fitted at both side ends of the ship for tankers of 20,000 dwt and above after 1 January 1999 will cost the vessel approximately $8-25,000, according to existing fittings. (SOLAS, Ch. V, Reg.15-1)

For all type of SOLAS vessels, the mandatory carriage of a shipborne voyage data recorder will cost the vessel between $5000 and $25,000 according to the extent of the data recorded.

- **Cargo**

For bulk carriers, there is a new requirement for loading, unloading and stowage of bulk cargoes which is listed in regulation 7 of SOLAS chapter VI and entered into force in 1st July 1998. To complying with these requirement extra costs might be raised for Bulk Carriers.

For the General Cargo Ships, the requirements by the Maritime Dangerous Goods Code request a proper stowage and securing of dangerous goods which is lead to punitive costs.

- **The ISM Code**

The Assembly of IMO has adopted a series of resolutions dealing with guidelines on management procedures to ensure the safest possible operation of ships and maximum attainable prevention of marine pollution. These have culminated in the International Safety Management Code (ISM Code). In 1 July 1998, the Code becomes mandatory for passenger ships, oil and chemical tankers, bulk carriers, gas carriers and cargo high-speed craft of 500gt and above. At 1 July 2002, the ISM Code becomes mandatory for dry cargo ships and mobile offshore drilling units of 500 grt and above.

Safety management objectives of the company should, inter alia:

1. Provide for safe practices in ship operation and safe working environment.
2. Establish safeguards against all identified risks.
3. Continuously improve safety-management skills of personnel ashore and aboard ships, including preparing for emergencies related both to safety and environmental protection.

The company is required to develop, implement and maintain a suitable SMS with sufficient and qualified resources and shore based support. In addition, the company should designate a person or persons ashore having direct access to the highest level of management. All procedures, check list and fleet instructions must be documented and included in the Safety Management Manual, a copy of the SMM should be kept on each vessel.

IMO estimate at the end of 1997 that around 30 % of the world total fleet, (3500 ships) will not meet the implementation deadline. In addition, there have been agreed that some ship owners are unlawfully buying certificates without going through the required processes.

According to Mr O' Neil, the Secretary General of IMO, *publicly declared that failure to meet the deadline would have a "disastrous" impact on shipping companies*.
The US Coast Guard (USCG) has stated that all foreign-flag vessels of greater than 500 gt calling at US ports must be in complied with the ISM Code and the SMS are being properly used. No special ISM Code boarding will take place. There are many similar declaration have been made by safety agencies in European countries, Hong Kong, Australia and elsewhere.

IACS has published a "white list" of ships certified as complying with the requirements of the ISM Code. The list can be downloaded from the IACS website.

In Europe the matter was further discussed at the 30th Port-state Control Meeting in St Petersburg in June 1997. The meeting concluded that ships not certified on 1 July 1998 should be detained.

Cost: Possible costs are as follows, varying widely depending upon the safety management system already in place on the ship and in the company, and upon the method of implementation of the code:

- Introduction cost: $30,000-400,000
- Annual cost: $10,000 (Costs associated with the issue and renewals of Document of Compliance and Safety Management Certificate and supporting work).
- Annual cost: $15,000 (Crew training and other costs resulting from new requirements of ISM Code and the STCW Convention).

Additional costs will be raised to train and up grade the skills of the port state control officers.

- **STCW Convention**

Signature of the final act of the conference of parties to the International Convention on Standards of Training Certification and Watchkeeping for Seafarers on 7 July 1995 left less than 19 months for governments to take all action necessary to give full and complete effect to the revised Convention on 1 February 1997.

A single governments department or agency must be made responsible for administering the convention and must be given the necessary regulatory and administrative authority to ensure that all government department and agencies, education and training institutes, shipowners, ship management companies and seafarers within the party's jurisdiction give full and complete effect to the revised convention.

Many new approaches and changes in training and assessment methodologies result from the revised STCW convention` What will these changes demand of the training institutions and how will they implement them? How can modern teaching methods, supporting instructional media and technology, assist the training and assessment processes both ashore and onboard ship? How will institutions ensure that teaching personnel have appropriate qualification and experience? These questions require answers and action by those involved in the training and assessment processes leading to the issue of marine certificates of competency.

Problems have arisen in some crew-sources nations in achieving sufficiently high standards. (Standards in the Philippines- given that almost 20% of the world's seafarers come from the Philippines, have been reviewed and number of training establishments is being reduced with upgrading of the reminder-upgrading is being assisted by funds from international shipowners organizations). In addition, variable reports about progress being made by the Philippines authorities prompted ISF to send a mission to Manila in February

1998 at the invitation of the late Secretary for Transportation, Arturo Enrile, in order to witness the preparations for the implementation of STCW 95. Chinese officials are confident that they are capable to achieve STCW Standards and they will monopolize the crewing market in the future.

There is a close correlation between the relevant provision in the ISM Code and the requirements of the revised STCW Convention. The procedures established as required by the ISM Code will be facilitated and carried out more effectively by personnel competent in accordance with the revised STCW Convention. Conversely, planned adherence to the responsibilities of the shipping companies within the revised Convention, in terms for instance of certification, manning, record keeping, familiarization and training, provides a framework for adherence to required ISM Code procedures.

Ship owners may find themselves put to expense in ensuring that training and certification standards are met in crew supply nations. There will be onboard training costs to enable the personnel needs of the ISM Code, SOLAS, STCW and MARPOL to be met.

Governments issuing STCW certificates will be required to submit documentary evidence of compliance with standards of the Convention to IMO. Flag states will be required to accept responsibility for checking competence of seafarers with certificates issued by another state.

The mandatory periods of rest and working hours for seafarers were brought into force under STCW in 1997 and the requirement will be strengthened by ILO legislation. In addition, there are special training requirements for service on tankers and passenger ships and. An effective means of monitoring compliance must also established.

Guidelines on Medical Examination will be later IMO legislation and will take place in 2002. With the granting of permission for Port States to assess the competence of seafarers, compliance with the STCW convention will be of growing importance.

The ITF hopes that in time the revised STCW Convention will be seen as one of the measures which led to a fundamental change of attitude within the marine industry and began the moves to the adoption of a safety culture.

Cost: Direct expenditure may be needed to cover company administration and training as shown in the ISM Code costs. There will also be fewer direct charges from crew supply nations and agents. In addition, Maritime Administrations will face extra cost in training their staff and surveyors to meet the STCW requirements.

- **MARPOL 73/78 & OPA 90**

The aims of MARPOL convention are to prevent the pollution of the marine environment by the discharge of harmful substances and other pollutants.

Extra cost in-house administrative will be required to be complied with the new requirements relating to the Intervention on the High Seas in Cases of Pollution by Substances other than Oil under the 1973 Protocol Amendments (amendments to the appended lists of substances), and the requirements regarding to the reports on incidents involving harmful substances under the Protocol I amendments.

Oil Pollution (Annex I of MARPOL 73/78 & OPA 90)

Requirements for the control of discharge of oil in some cases required more attention. For example**,** North West Europe waters become a “special area” under Annex I of MARPOL, the requirements for the control of discharge of oil within special area for oil

tanker and other ships of 400 tons gross tonnage and above that any discharge of oil or oily mixtures is prohibited. Thus required ports to improve their oily waste reception facilities to receive all wastage from the vessel calling their ports.

The intact stability of double hull tankers during loading and discharging of cargo is a cause of concern. New tanker designs have taken all precaution arrangements and measures for avoiding any danger during the loading and discharging operation such dangers are threatening damage to vessels and to shore facilities, with the added danger of oil pollution.

To avoid the danger it is necessary to adopt carefully planned and co-ordinate loading/discharge procedures for cargo and ballast water. On new buildings, some structural adjustments may be necessary to minimize the problem. However, new standards for intact stability criteria for double-hull tankers come into force.

Cost: Extra expense arises associated from possible structure modifications to meet new standards of environmental protection and stability, also for purchase of equipment, training, planning and administration.

When first introduced the price differential of a double hull over a single hull new building was some $10m. In addition, there are extra ongoing costs for the maintenance of void double hull spaces and in precautionary measures to ensure such spaces are kept gas free, and these may amount to $0.5m per annum.

Extra cost to cover enhanced surveys and consequential work might amount to $300-500,000 per annum, depending upon condition and previous standards of maintenance.

New equipment to meet OPA 90 requirements could cost $4,000 with annual maintenance cost of OPA 90 equipment might be $1,000.

Additional expenses arise from contingency planning, training and safe operations, which include the following:

- Vessel response plan (OPA 90), initial cost $20,000 with annual recurring cost of $1,000. Appointment of a qualified individual (OPA 90) at a cost of $10,000 plus $1,000pd in event of a crises.
- Subscription to a 24 hour damage assessment service at a cost of $4,000 plus a recurring annual cost of $800 and $5,000pd during the incident.
- Registration with an Oil Spill Clean-up Contractor (OPA 90) at cost of $3,000.
- Shipboard Oil Pollution Emergency Plan (SOPEP) (MARPOL73/78) at cost of $8,000 plus recurring cost of $1400.
- Registration with a Salvage Contractor-optional- (OPA 90) at a cost of $1,700.
- Crew training (OPA 90 and MARPOL 73/78) annual cost per involved person $1-2,000.
- Official staff training and back-up costs (OPA 90 and MARPOL 73/78)-annual cost per involved person $1-2,000.

Pollution by Noxious Liquids (Annex II)

Measures to ensure avoidance of pollution by ballast water containing harmful substances or organisms are required under Annex II to MARPOL 73/78.

Annexes I and II are currently under review to bring the requirements of both annexes closer together, and remove inconsistencies between them. One inconsistency is that new oil tankers must be built with a double hull, while it is still possible to build a dedicated IMO Type 3 chemical tanker with a single sink.

The surge of VLCC new buildings in the early seventies means that many tankers have now reached twenty-five years of age. Subsequent regulations, including those adopted in 1993, require new tankers to be of double hull construction and existing tankers to be phased out when they reach twenty-five years of age. However, an existing ship may operate for a further five years of life by adopting an alternative and environmentally friendly operational method that offers protection equivalent to that of the double hull. For many owners Hydrostatically balanced method of loading (HBL) provides that alternative.

Extra expenditure in complying with new ballast water requirements will be involved in the administration within the company, and structural and equipment changes may be involved. Crew training, organization and safety consciousness is important issues.

Pollution by Packaged Harmful Substances (Annex III)

The International Maritime Dangerous Goods Code (IMDG Code) is an essential reference for ships carrying anything but the simplest of cargoes.

Hazardous cargo packed in containers has become a major matter of concern. Sometimes the cargo is declared wrongly on bills of lading and other documents, or it may be stowed inappropriately or near other incompatible cargo. Control at loading point, carrier and port levels varies greatly. If containers are lost at sea, it will present a danger to navigation and to those attempting to recover them. Securing of cargo in containers or any kind of carrier is an important factor in safety and there are a guidelines on cargo securing published by IMO.

More expenses will fall shipping companies who have no efficient loading and securing system. In addition to the securing of cargo at the loading port, continuing attention by the crew is necessary at sea.

Pollution by Sewage (Annex IV of MARPOL 73/78)

The Annex IV of MARPOL convention has not yet entered into force probably due to the lack of interest of its regulations for many countries. However, some countries have adopted regulations on sewage discharge in their ports and territorial waters.

Restrictions on the discharge of sewage in ports and in contiguous sea areas are becoming tighter throughout the world and ships not already fitted with an adequate system will face costs in catching up under the threat of national laws.

To control the discharge of the sewage from the vessels will be more restrictions, extra cost to cover structural changes and fitting of new equipment are expected. Proof of disposal method may be expected to become a more stringent requirement. This is already required for ships calling at US ports and some others

Capital cost for sewage treatment plant might be $100,000 with annual recurring cost of $5,000 or more, dependent upon ship's fittings, and ports of call.

Pollution by Garbage (Annex V)

This annex requires all ships of 400gt and above and every ship certified to carry more than 15 persons must have a garbage management plan in place with written procedures for collecting, storing, processing and disposing of garbage. A garbage record book must be kept up to date.

In fact, there are still many vessels dumping garbage at sea. In some countries, extremely high penalty may be expected for any vessel shown dumping garbage at sea.

Under the ISM Code provisions, section 2 it is required that a ship owner should establish a safety and environmental protection policy, and this policy should be implemented and maintained at all levels of the organization both, ship-based and shore-based. This introduction will make ship owner more liable.

To comply with the requirements and regulations ship owners have to find acceptable alternative to store and dispose ashore measures such as onboard incinerators and waste compression units.

Investment in equipment or machinery to dispose of garbage or compress it may be necessary (perhaps $2-10,000, or more). An approved shipboard incinerator is required, onboard garbage storage space may have to arranged. The ship crew have to separate the different types of garbage, to store it such as plastic and to dispose it such as food, record for evidence should be kept and supervised.

Air pollution (Annex VI)

The Annex covers a variety of types of emission, including ozone depleting substances volatile organic compounds and shipboard incineration, but it was the regulations dealing with the emission of nitrogen oxides (Nox) and Sulphur Oxides (Sox) that proved to be the most contentious, giving rise to a lengthy and somewhat unsatisfactory debate about the entry into force criteria. There are two tier standards in this annex, accepting a high global cap of 4.5% sulphur content in fuel oil, and the establishment of emission control areas in which fuel oil with a maximum 1.5% sulphur content will be required. For instance, in Baltic sea a 1.5% limit will apply 12 months after annex comes into force.

To control such requirements ships will be required to have a “bunker delivery note” and a sample of the fuel must be kept on board vessel one year after delivery.

Diesel engines installed on or after 1 January 2000 will be required to meet specified nitrogen oxide emission limits. Ships will be required to hold a valid International Air Pollution Certificate.

To Limit Sulpher Oxide Emission extra cost will be expected. With careful attention most ships should be able to meet the global cap of 4.5% sulphur content without too much of a burden; More expensive ”cleaner” fuel must be burnt when vessel operate in an area where the maximum 1.5% sulpher requirements applies. Problems will be increased when more areas become “special sulphur oxide emission areas”.

Approximately $5-15,000 may be required for some structural changes to oil tanks and to upgrade oil separators and oil transfer machinery/equipment. There will be extra cost in burning cleaner fuel (High quality fuel).

To limit Nitrogen Oxide from vessels extra cost of new or converted engines might be expected to achieving the exhaust level required in different areas. The exhaust of nitrogen oxide is dependent upon engine design and speed. Approved exhaust cleaning system may be required to be fitted.

New engines may be expected to incorporate clean technology to meet the new standards at moderate cost-particularly as engine builders claim that economies in fuel consumption may also be incorporated. Modification of existing machinery may prove expensive as emission standards are tightened and speed reductions to reduce the pollution may be called for in some contiguous sea areas.

Other Conventions

In addition to previous regulations and requirements, there are many requirements, which is related to the marine environment, the ship owners have to comply with. Such requirements under the following conventions:

- 1969 CLC Convention
- 1974 Athens and LLMC Convention
- 1971 Fund Convention
- 1966 HNS Convention
- 1990 OPRC Convention

Extra cost will falling upon ship owners to complying with the above requirements and conventions. Such cost arising through the precautionary measures, equipment required and staffs training.

3.2. Costs arising at national level

3.2.1. Port State Requirements

As mentioned in chapter 2, port state control is a means of checking whether visiting foreign ships comply with the requirements of international conventions on standards of safety, pollution prevention and crew conditions. The port state can require defects to be remedied and detain the ship to do so if necessary. It is a port state's defense against the operation of substandard ships by owners that are intent on profit at the expense of safety.

In considering the impact on ship costs now and on the immediate future perhaps the most important features are the powers bestowed on port states to check the qualifications and competence of ship's crews and on ships' structures. We have seen that some countries have decided that vessels not complying with the ISM Code will not enter their ports. Japan, for instance, has recently passed into law a requirement that single hull Vlccs entering the Bay of Tokyo will be subject to inspection by two inspectors and two official observers.

There are many requirements, which gives the power to the port state in doing their function. Such requirements as following:

- The double hull concept required by MARPOL 73/78 Annex I, Regulation 13F and 13G as a safeguard against damage and other types of grounding and from collision. More than half the tankers navigating in Tokyo Bay are of Single hull-Japanese companies have now replaced all 1970 built Vlccs and are in the process of replacing 1980 built vessels, whilst many European owners are still thinking about 1970 replacement. However, more than 80% of the Japanese fleet is single hull although less than 10 years old.

- Ship board Oil Pollution Emergency Plan (SOPEP) approved from the administration is required to be carried on board vessel under MARPOL 73/78, Annex I, Reg.26 for oil tanker of 150 tons gross tonnage and above and every ship other than an oil tanker of 400 tons gross tonnage although SOPEP is required by the OPRC Convention.

- There is a good example of the power of port state in the Europe Union. To improve the safety of passengers on Ro-Ro and high speed ferries operating between ports in European Union irrespective of vessel flag intervention is proposed legislation from the European Commission to support port state control to make sure that vessels are

complied with the requirements. Such vessels will be required to carry voyage data recorders and will require permission to operate, which will only be granted on condition that the highest possible international standards are applied. Port states will also be guaranteed the right to investigate accidents on voyage from or to EU ports.

- Since 1994 ships carrying oil to the United State have been required to have new certificates of financial responsibility. Evidence that ships crew has received appropriate training must be provided. In addition, ship operators must have a contract with a recognized oil response company showing the area in which the ship operates for any advice response may be needed in case of emergency.

- The following additional requirements are placed under the requirements of OPA 90

- Ship owners and operators to be jointly and severally responsible for oil spills and liable for meeting clean up costs.
- Liability to pay damages is unlimited if negligence or violation of regulations can be proved.
- Individual states remain free to override federal law and impose unlimited liability.
- Every vessel entering US waters is required to be in possession of a certificate of Financial Responsibility and to comply with regulations devised by the USCG under Federal authority.
- Every new tanker must have a double hull.
- The right of single hull tankers to enter US waters is phased out according to year of build. Any way all tankers will be required to be double hull by the year 2015.

Costs: To comply with the international requirements of port state control and marine pollution contingency arrangements in most countries a method of funding may be necessary needed. Most nations seek to make full cost recovery through port dues. In the year 1995, in the UK a provision of $7m was made for strategic stand-by towing facilities,

with an additional $8m to cover counter-pollution capacity-All these costs will be covered by the ship owner in such a way. However, the total cost falling upon the ship owner from the port state cannot be separated from the overall safety management cost.

3.2.2. Flag State Requirements

Its clear for every body that flag states are fully responsible for ensuring that its vessels comply with international requirements and they may apply their own requirements on that ships. An extreme case of this is to be found in the United States, under the Federal Code of Regulations, where specific requirements apply on navigational and environmental protection aspects.

Certainly things have changed over the years. Many traditional shipping nations, with their long-established maritime administrations, are a shadow of their former selves, their leading positions as flag states overtaken by open registers that are generally reliant on the classification societies of technical support. Some of the newer flags-national as much as open registers-have grown quickly, perhaps too quickly, taxing their ability to keep up with the pace of new regulation and raising questions about their commitment to international standards. A vacuum has undoubtedly been created, and PSC has expanded to fill it.

In principle that may be so, but surely ship owners have a responsibility too. The economic inevitability of the open registry system is now generally understood, and governments permit owner's considerable freedom in their choice of flag. There is no denying, however, that not all flag states display the same resolve to meet their international obligations, and there can be no benefit to the industry in helping to perpetuate the existence of sub-standard ship registers.

Cost: According to a recent EU study, crew cost and corporate tax are the most important criteria in flag selection-crew costs on EU flag ships may be up to three times more expansive than on lower-cost open registry flag. In addition, the ISF wages survey for 1997 which is covered over 300 collective agreements applying to 50 different nationalities of seafarers was shown that the wage rate of the highest paid Chief Officer is ten times that of the lowest paid, and the highest paid Able Seaman receives over twenty times more pay than the lowest paid.

Although some flags have a poor name as regards safety and attract ship owners who are seeking the lowest available flag deal. However, if any owner is using a poor flag to conceal his own poor performance, it must be in the interests of the industry at large that his freedoms are curtailed.

3.2.3. Extra Cost fall upon ship owners

Based on the ISM Code requirements, the cost of financing shore-based safety and environment protection measures applicable to ships might be expected to fall ship owners. The method of payment may be in the form of taxation or port dues. To maintain the requirements and over this obligatory payments, a ship owner is faced with costs in taking precautions against accidents, claims and penalties arising from the commercial operation of their ships.

To control these costs, ship owners are required to provide safe operation and good practice for his vessels. There are many resolutions and recommendations made by IMO on many aspects of shipping to assist ship owners for providing these. The following resolutions, which are related, passed by the IMO Assembly in December 1997.

- Recommendations for entering enclosed spaces aboard ships.

- Minimum training requirements for personnel nominated to assist passengers in emergencies on passenger ships.
- Guidelines on dealing with stowaways.
- Guidelines for facilitation of response in an oil pollution incident.
- Guidelines for preventing drug smuggling.

Additional costs will fall upon ship owners through the following:

- Taking measures to protect ship and crew in loading and discharging cargo.
- New building or upgrading work accomplished to meet new safety requirements may affect ship profitability in addition to direct cost more.
- Modification of a ferry to meet new stability and fire rules may result in loss of vehicle capacity unless planned carefully.

Under the ISM Code and STCW convention new responsibility and additional costs will fall upon the ship owner. These will include the setting up and maintenance of a safety management system, an organization to verify crew qualifications, and ongoing training arrangements.

3.3. Increased Insurance costs

3.3.1. Hull and Machinery (H&M) insurance

Changes in the insurance market during the 1990s have been described by one brooking source as" the most severe turnaround in the marine insurance market that any active underwriter or broker has ever seen ". These changes can be attributed to:

1. The rising level of claims in the late 1980s and early 1990s.
2. The shrinking capacity of the insurance market.

The combination of these two factors has certainly hardened attitudes in the insurance market in the 1990s, rapidly increasing number of insurance taking the view that owners had been buying cover “on the cheap” for too long.

The outcome of these changes on H&M cover has been twofold: (I) underwriters have been able to be far more selective in the business that they take and (ii) premiums have risen substantially. It is tentatively estimated that average increases in H&M cover for operators with good track records were of the order of 30-40% (per annum) in the period 1990-1992. In this climate “quality owners” have become more highly valued by insurers.

However, the insurance market is cyclical and retroactive and the ILU was expecting higher marine insurance claims for 1997 despite a fall in the number of total losses-a big conversion of partial to total losses is expected before final settlement, and there have also been a large number of casualties where salvage and repair costs will be very high. Table 4 shows the premiums in different years.

Table 4

Indicative H&M insurance cost trends-Aframax tanker and Panamax bulk carrier

Year	Aframax tanker 80-110,000 dwt. ($ p.a.)	Panamax bulk carrier 63-73,000 dwt ($ p.a.)
1995	210,000	155,000
1996	205,000	150,000
1997	210,000	155,000
1998	215,000	160,000
1999	225,000	165,000
2000	235,000	175,000

Note: These figures based for relatively modern ships of 5-9 years of age.
Source: Drewry Shipping Consultant Ltd

Due to the increased competition in the insurance industry between H&M insurance and P&I clubs, some clubs offering comprehensive cover, probably with an overall cost advantage. In 1985 around 20% of the fleet entered with the Swedish Club was covered for both H&M and P&I risks; this had risen to 32% in 1996. Many Norwegian insurers are to make compliance with ISM a warranty under all insurance contracts and are trying to persuade other insurers to do the same.

The Institute of London Underwriters (ILU) has urged marine insurers to monitor clients' progress towards implementation of the ISM Code. It has been claimed that underwriters who knowingly insure ships not ISM Code certified may find themselves criminally liable.

Cost: The combined annual cost of H&M insurance and P&I clubs for different types of vessels may be expected as follows:

- $ 625,000 total for vessel of 2-3,000 teu container ship, and perhaps $ 750,000 for a 4,000 teu vessel.
- $ 1-1.5m or more for older ships.
- $ 430-630,000 total for reefer ships depending on vessel size.
- $ 360-580,000 total for general cargo of over 4,000 dwt multi-purpose depending on vessel size.

3.3.2. Protection & Indemnity (P&I) insurance

The protection and Indemnity market is fundamentally different from its H&M counterpart in three key areas:

1. The majority of vessels are entered with P&I clubs, which are non-profit-making bodies.
2. All policies are started/renewed on the same date, February 20th.
3. Payments are phased over period of time. At the beginning of each year (February 20th), each club will announce its rate for the forthcoming year. This is known as the "Advance call".

Based on the quality terms, insurers will insure anything at a price, but the price for over-aged vessels, badly maintained, inadequately crewed, and managed by management companies with poor safety records is likely to be huge.

The P&I Club system is one of the great success stories of the maritime community. In an industry better known for independence of mind than of purpose, nobody disputes that the mutual insurance arrangements provided by the clubs are both efficient and cost effective.

The 14 members of the International Group of P&I clubs operate a pooling system whereby the cost of larger claims is shared by reinsuring through a claims-sharing pool. The International Group Agreement (IGA) contains a number of rules, which in effect restrain the ability of ship owners to change Clubs and which Club managers regard as essential to the operation of the claims-sharing arrangements.

Similar to the H&M underwriters, the management of P&I clubs has great changes during the last decades; these include the following issues:

- How the introduction of the ISM Code and revised STCW convention will affect their cover and responsibilities.
- How the books (records) may be balanced in the light of growing claims for pollution damage, personal injuries and cargo damage.

- How to rebut accusations from the EC that the 15 clubs forming the International Group comprise a cartel not in the best interest of free trade. If the International Group was broken up, a battle for the most desirable ship owners would ensue and any benefits from such action would be short lived, the club claim.
- How to balance increasing demands for compulsory insurance cover with present day practice.
- How to cope with the ship owner is increasing pollution exposure in the United States in the light of recent moves at national, state and administrative levels.
- How accidents are to be avoided and good working practices maintained on board ships.

In the autumn of 1997, the ISM code was a subject for discussion in the International Group of P&I clubs. The international Group of P&I clubs pool claims over a certain layer and are effectively re-under-writers for each other. It is logical therefore, that the Group wanted to reach an agreement with respect to the extent of that cover in relation to the ISM Code. The agreement reached was that the group would not cover claims where there was a causal link between a loss and non-conformity by the member.

According to the chairman of the International Group's Ships Standards sub-committee, *Ship owners are unlikely to be able to renew existing P&I cover with an International Group club at the February 20th, 1999 renewal unless they have the required ISM Code certification.*

Mr Nigel Carden, director at Thomas Miller P&I, manager of the UK Club said that with their various different structures of rules and in their various different ways, the International Group clubs had achieved a minimum standard on ISM Code and in many cases exceeded this minimum standard, so that in practice the possession of valid ISM certificates had now become a condition of cover.

The view taken on cover under the ISM Code has split P&I Clubs. However, all of them will have to come to terms with its impact and probably have to change their rules to deny cover to owners who fail to comply with the Code.

P&I Clubs are worried at recent mergers in the spill clean-up sector and their affect on prices. However, some of the P&I Clubs have taken further step to cover the claims. Fore instance, P&I Club GARD has set a new limit on over spill calls to cover catastrophe claims of 2.5% of the property damage limitation fund for each ship under the 1976 Convention.

There are many circulars were issued by the P & I Clubs regarding safety and good practice to their members. Fore example, the Swedish Club, worried at the high cost of engine room fires-an average of $20m per case-has circulated a check list setting out safety measures to all chief engineers of entered ships. The Swedish Club also offers special fire fighting courses for seafarers. Another circular warns of the hazards of fire in shipyards.

Table 5 Summary of net claims paid during the financial years 1989 to 1997.

Claim	1989	1990	1991	1992	1993	1994	1995	1996	1997
	$ m.	$ m.	$ Mill.	$ Mill.	$ Mill.	$mill.	$mill.	$mill.	$mill.
Crew	15.8	18.9	23.8	32.3	31.1	15.9	33.7	27.0	27.5
Cargo	22.2	17.3	21.1	26.5	15.3	24.3	26.9	31.5	14.5
Death & Pers. Inj	5.1	7.3	11.1	9.1	8.4	6.5	12.1	9.7	4.4
Coll.	0.7	3.5	2.1	2.8	10.7	13.7	7.6	9.5	5.9
Oil Sp.	1.6	12.1	6.3	5.3	2.3	11.6	13.0	16.7	19.7
Others	4.3	13.5	15.3	13.9	14.0	8.1	12.9	12.3	22.3
TOTAL	49.7	72.6	79.7	89.9	81.8	80.1	106.2	106.7	94.3

Note: Collision figures include Dock damage**.**

Source: GARD P &I Club

Cost: Table 5 shows the summary of net claims paid during the financial years 1989 to 1997 by risk type. As shown in the table, the majority of the claims are for cargo, and it was in 1996 with total of over $31.5m. In 1995 the majority of the claims was for the crew with $ 33.7m. This figure include all vessel type.

Table 6 Indicate P&I cost trends-

Aframax tanker and Panamax bulk carrier

Year	Aframax tanker 80-110,000 dwt $ p.a.	Panamax bulk carrier 65-73,000 dwt $p.a.
1995	165,000	75,000
1996	175,000	80,000
1997	185,000	85,000
1998	190,000	90,000
1999	200,000	90,000
2000	215,000	95,000

Note: These figures are for relatively modern ships of 5-9 years age.

Source: Drewry Shipping Consultants Ltd

The cost of P&I insurance is rising (Table 6) due to numerous influences, which include the following:

- The necessity for the tanker sector to incorporate extra costs related to pollution costs including OPA 90 requirements.
- Increasing liabilities and litigation in respect of claims involving third parties, particularly for personal injury and cargo damage.

3.4. Increased Running costs

3.4.1. Risk Assessment

Risk Assessment is defined as the evaluation of the likelihood of an undesired event (hazard), and of the resulting harm or damage caused.

The principle stages of any risk assessment are:

- Identifying the potential hazard.
- Analyzing how this may occur.
- Considering the extent of its effect(s).
- Considering the likelihood of its occurrence.
- Making judgments about the significance of the identified hazard.
- Incorporating actions that will reduce the likelihood or consequence of the hazard (Risk management).

Whilst the ISM Code states: (1.2.2) that a company should “establish safeguards against all identifiable risks”, and (10.3) “establish procedures in the SMS to identify equipment and technical systems the sudden operational failures of which may result in hazardous situations”, it does not impose any detailed requirements upon the company. For compliance, the company itself must address those risks inherent in its own specific operations.

Risk Assessment of a safety Management System requires four key activities:

1. Development
2. Implementation
3. Monitoring

4. Review

Cost: To achieve the above activities, extra cost will fall upon ship owners. These could be through the following:

- Documentation of the system.
- Recruitment, selection and training of personnel.
- Procedures for identifying the risks.
- Promotion of safety through a variety of communications channels.
- Implementing regular audits and inspections.
- Cost of preventable accidents arising from failures of management control.

3.4.2. Manning

Manning cost is a major constituent of operating costs, often accounting for 40-50% operating costs. Probable future trends in the cost of manning ships give cause for concern. After the shortage of seagoing professional staff of past years, there is a growing realization that the qualifications of the personnel manning the world fleet is the single most important issue in achieving higher safety standards on board ships.

There are many studies carried out by the ISF during the last few years. Comparing the result of the 1997 survey with the past five years it is possible to detect trends in wage rates. The studies carried out indicate the following:

- There is clear evidence that pay rates for different nationalities of officers have been steadily narrowing, as the lowest pay rates in the survey have progressively increased while the highest rates have barely increased at all.
- Wage rates for officers appear to be increasing faster than those ratings.

- There is a current 4% shortage of officers which, dependent upon factors such as shortage in world trade, fleet expansion and changes in technology, may be expected to grow to 10% shortage of officers by 2005.
- The major source of marine labor supply is the Philippines, with almost 20% of the world's seafarers.
- More than half the senior officers currently employed to man the world fleet are national of Organization for Economic Cooperation and Development (OECD) countries-their age profile is high and their numbers will inevitably decline.
- There is a changing geographical pattern of supply away from OECD countries to the Far East.
- The needs of the marine shore-based community for marine experience must be considered.
- There are problems of quality as opposed to quantity-especially in officer supply.

Cost: As result of these factors and demands for higher quality throughout the shipping industry, cost impacts are likely to be felt through increased training costs but with the resultant pay back of improved standards and international acceptance of higher quality manning.

Employment costs may be expected to rise by 3% in 1998 and 5% in 1999 with manning costs for officers on more specialized tonnage rising by 6% to 8% over the next five years.

3.4.3. Repairs and Maintenance

Repairs and maintenance (R&M) costs rose sharply during the late 1980s and early 1990s, a response to:

- The aging of the world fleet.

- The absence of long-term preventive maintenance in the depresionary years of the 1980s.
- The reductions of global repair capacity.

Many of the older ships in service today were originally built with a low expected life span, and with high tensile steel to reduce scantlings, reduce cost, and optimize the ship's weight. Ballast tanks had no protective internal coating and corrosion has been, and is, a major problem.

To comply with the new requirements and specially under the ISM Code, and the requirements of the enhanced surveys, additional costs will include provision for coatings in ballast tanks and cargo holds, also extra repair work, required to meet the increased requirement for environmental protection and to increase measures for the prevention of fire in machinery spaces.

Cost: Expenditure on stores and spares is a major consideration ranging in total between $220,000 and 380,000 for a ten year-old Suezmax tanker- a steep rise in spares with age of ship is to be expected, which may be accentuated if there has been a period of neglect in maintenance.

Significant savings are possible where spares are purchased in bulk and where block bookings are made for periodic docking overhaul. Higher survey and superintendence standards imposed by new safety and environmental protection regulations might be expected to add to technical costs, perhaps raising annual technical cost increases by 1% to 4%.

3.4.4. Health and Safety

To meet the requirements under the ISM Code and other quality standards, the protection of health and safety of the passengers and ships crew might be required capital investment in equipment which will improve work environment, ventilation system, water supply and provision (food) preparation, also the removal of identified physical or other hazards to passengers. In addition, there will be recurring costs in training crew in proper working procedures to avoid health and safety incidents and in contingency training; also in implementing a drug and alcohol policy.

3.5. The millennium bug problems

Extra cost might arise from the incapacity or failure of electronic equipment at the turn of the century-microchips which are an integral part of equipment on ships, might fail as a result of the problem.

Computerized equipment which controls the essential machinery and safe loading of ships is subject to approval of the appropriate classification society and might be expected to be the subject of class scrutiny by the society.

The millennium problems will have had by the time any casualty occurs, it will not be safe for a ship owner to assume the ability to limit liability if either problem is a cause. Here are a few examples of problems that might occur:

- A GPS receiver gives a wrong position, causing a casualty.
- The control system fails in an unmanned engine room.

- Onboard cargo-care systems go wrong, e.g. reefer system fails, damaging food cargo; LNG gas cooling system fails-gas boils.
- Control systems on passenger ship fail.
- Smoke-fire alarms cease to function.
- Passengers are stuck in lifts.
- The local electricity supplier is unable to supply electricity to the port, which is paralyzed as a result.
- Port's cargo/container management system fails; cargo cannot be found.
- Chartering broker's computers fail; fixing ships becomes harder.
- Telephone utilities unable to deliver long-distance communications.

Cost will fall upon ship owners in case of chartering for example lack of GPS or millennium compliance may affect the operation of the ship and the operation of shore facilities. Locks may not open, cranes may not work, shipboard systems may fail and cargo-handling systems may break down. Conversely, charterer may be exposed to substantial demurrage claims if there are delays for which they are responsible, for example defects in port facilities that delay the vessel berthing or delay the loading of cargo.

3.6. The ship manager

Ship managers are playing a vital role in shipping industry. *Mr William O'Neil, IMO's Secretary-General,* saying that they are rising quality: *"While much of the maritime industry tries to ignore the approaching the deadline for compliance with the ISM Code, top ship managers are behaving like paragons virtue".*

Based on the ISM Code itself it uses the term "Ship manager" as the responsible body even if the ship owner and ship operator are the same. Ship Managers are there fore, in a

position to contribute to Safer Shipping and Cleaner Oceans and to economic benefits through performance of ships.

Ship Managers are expected to have an adequate theoretical and practical knowledge of the technology of ships relevant to work.

Cost: Remuneration for managing a vessel for a ship owning client is the management fee as agreed between the ship manager and the ship owner which depends on the age, type, trade, class, etc., of the vessel. The usual form of agreement between ship managers and owners is the BIMCO standard ship management agreement “SHIPMAN”.

The growth of the quality demands including the introduction of the ISM Code is making the contractual agreement between ship owner and ship manager of increased importance, with size economies playing an important part in the argument. The ISM Code places firm responsibility for the safe management of the ship on the ship manager, making the terms of the contract between owner and manager of increased importance.

3.7. Other costs

There is no doubt that operational costs will be raised over the period 1998-2002. This is shown in table 7 and table 8 which are predicted the rise for an Aframex tanker and a Panamex bulk carrier, rising levels due to inflation and aging of ship being augmented by the financial impact of new regulations. Estimated capital costs are annualized over the five-year period and are added to annual recurring costs for this exercise. This has the effect of showing a steep rise in 1998 followed by a steady year-on-year rise of 1.5% over and above an assumed annual inflation rate of 2%.

Rising disbursement levels are not confined to operating costs-many arise which depends on the voyages will fall upon the ship owner according to the term of the contract or charter party under which he is working.

Table 7

Rising operating costs (annualized capital and recurring costs) for Aframax Tanker.

Subject	1997	1998	1999	2000	2001	2002	
Manning	834,025	875,726	919,513	965,488	1,013,763	1,064,451	+5%p.a
H&M ins.	209,875	214,073	218,354	222,721	227,175	231,719	+2% p.a. inflation
P&I ins.	184,325	188,012	191,772	195,607	199,519	203,510	+2% p.a. inflation
R&M	549,325	565,805	582,779	600,262	618,270	636,818	+3% p.a. *
SOLAS	-------	36,000	36,000	36,000	36,000	36,000	New req.
MARPOL	-------	30,000	30,000	30,000	30,000	30,000	New req.
Stores & Lubes	279,225	287,602	296,230	305,117	314,270	323,698	+3% p.a.
Admins.	262,800	270,684	278,805	287,169	295,784	304,657	+3%
Quality (ISM, etc)	-------	30,000	30,000	30,000	30,000	30,000	New req.
Total	2,319,575	2,497,901	2,583,451	2,672,364	2,764,781	2,860,853	
Increase on year	2%	7.7%	3.4%	3.4%	3.5%	3.5%	

Source: Drewry Shipping Consultants Ltd

Table 8

Rising operating costs for Panamex Bulk Carrier

Subject	1997	1998	1999	2000	2001	2002	
Manning	720,875	756,919	794,765	834,503	876,228	920,040	+5% p.a.
H&M ins.	155,125	158,228	161,392	164,620	167,912	171,271	+2% p.a.
P&I ins.	85,775	87,491	89,240	91,025	92,846	94,703	+2% p.a.
R&M	379,600	390,988	402,718	414,799	427,243	440,060	+3% p.a.*
SOLAS		52,000	52,000	52,000	52,000	52,000	New req.
MARPOL		10,000	10,000	10,000	10,000	10,000	New req.
Stores & Lubes	169,725	174,817	180,061	185,463	191,027	196,758	+3% p.a.
Adminis.	209,875	216,171	222,656	229,336	236,216	243,303	+3%
Quality (ISM, etc)		30,000	30,000	30,000	30,000	30,000	New req.
Total	1,720,975	1,876,613	1,942,832	2,011,746	2,083,472	2,158,133	
Increase on year	1,8%	9.0%	3.5%	3.5%	3.6%	3.6%	

***** *inflation and aging*

Source: Drewry Shipping Consultants Ltd

From the above tables calculation of daily running cost was made for Aframex Tanker and for Panamex Bulk Carrier. It was resulted that there is steady year-on-year rise of almost 3.5% of the total cost , this will be seen from figure 2.

Table 9

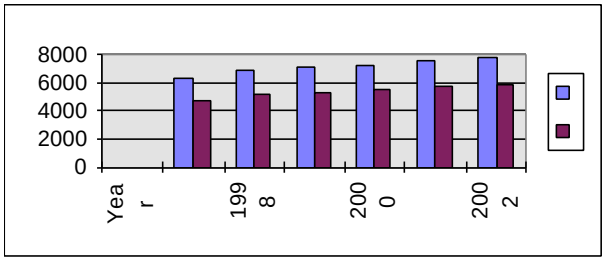
Daily operating costs ($)

Year	Aframex Tanker	Panamex Bulk Carrier
1997	6355	4715
1998	6844	5141
1999	7078	5323
2000	7321	5512
2001	7575	5708
2002	7838	5913

Source: Extracted from the previous tables

Figure 2

Daily Operating Costs ($)



All cost increases arising from safety and environmental protection measures are shown in table 10. Assuming that voyage costs is equal to operating costs on a Panamex bulk carrier over the period 1998-2002, about 5% in running costs will be increased to meet safety and environmental requirements.

The estimated 5% rise in running cost serves to show how strongly safety and environment protection regulations are impacting on the running costs of ships and how

important it is to bring costs under control. Additional cost will fall upon ship owners which depends on ship age, trade, type, class and flag.

Table 10

Indicative safety and environmental protection cost rise by ship type

(Average annual recurring costs($'000) plus annualized capital costs over period 1998-2002)

subject	Tanker (1)	Bulker (2)	Cont'r (3)	Gen'l (4)	Ferry (5)	Cruise (6)	Chem (7)	HS ferr. (8)
SOLAS	66	88	51	26	160	150	86	44
MARPOL/ OPA 90	106	6	6	6	14	14	10	4
Class	10	10	10	10	18	18	19	3
Port & Port St.	5	6	6	4	8	8	6	5
Flag St.	2	2	2	2	3	4	2	1
Insurance	16	11	11	9	14	16	13	3
Comm.	4	4	6	2	6	4	3	2
Company	78	77	79	58	145	155	84	30
Average incr. per. Ann.	288	202	168	113	363	363	216	84

Note 1: Column Headings:

(1) Tanker-Suezmax (150,000 dwt) 12 years old.

(2) Bulk Carrier-Panamax (60,000 dwt) 10 years old.

(3) Containers ship (2,000 teu) 10 years old.

(4) General Cargo Breakbulk Ship (15,000 dwt) 20 years old.

(5) Ro-Ro Passenger-Vehicle Ferry (10,000 dwt) 14 years old.

(6) Cruise Ship (15,000 dwt) 11 years old.
(7) Chemical Carrier (20,000 dwt) 10 years old.
(8) Fast Ferry.

Note 2: SOLAS figures: Include ISM Code and new STCW Convention requirements-for bulk carriers the cost of strengthening forward structure is included.

Source: Drewry Shipping Consultants Ltd

3.8. Financial considerations of quality systems

It is important that the effectiveness of a quality system be measured in financial terms. The impact of an effective quality system upon the organization's profit and loss statement can be highly significant, particularly by improvement of operations, resulting in reduced losses due to error and by making a contribution to customer satisfaction.

Such measurements and reporting can provide a means for identifying inefficient activities, and initiating internal improvement activities. By reporting quality system activities and effectiveness in financial terms, management will receive the results in a common business language from all departments.

3.8.1. Approaches to financial reporting of system activities

Some companies find it useful to report the financial benefits using systematic quality financial reporting procedures. The approaches to financial reporting selected and used by particular organizations will be dependent upon their individual structures, their activities, and the maturity of their quality systems.

There are various approaches to gathering, presenting and analyzing the elements of financial data. The following approaches are found useful:

(I) Quality- cost approach:

This approach addresses quality-related costs, which are broadly divided into those arising from internal operations and external activities. Cost elements for internal operations are analyzed according to the PAF (prevention, appraisal, and failure) costing model. Prevention and appraisal costs are considered as investments, while failure costs are considered as losses. The components of the costs are:

- Prevention: Costs of efforts to prevent failures.
- Appraisal: Costs of testing, inspection and examination to assess whether requirements for quality are being fulfilled.
- Internal failure: Costs resulting from a product failing to meet the quality requirements prior delivery (e.g. re-performing a service, reprocessing, rework, retest, and scrap).
- External failure: Costs resulting from a product failing to meet the quality requirements after delivery (e.g. product maintenance and repair, warranties and returns, direct costs and allowances, product recall costs, liability costs).

(II) Process-cost approach

This approach analyzes the costs of conformity, and the costs of nonconformity for any process, both of which can be the source of savings. These are defined as:

- cost of conformity: costs to fulfill all of the stated and implied needs of customers in the absence of failure of the existing process.
- cost of nonconformity: cost incurred due to failure of the existing process.

3.8.2. Quality related costs

In additional to the operating quality cost mentioned in 3.8.1.(a), there is another type of quality related costs called External assurance quality costs which is described as follows:

External assurance quality costs are those costs relating to the demonstration and proof required as objective evidence by customers, including particular and additional quality assurance provisions, procedures, data demonstration tests and assessments (e.g. the cost of testing for specific safety characteristics by recognized independent testing bodies).

Chapter 4

The Implications of safety and quality control in shipping

4.1. The ISM Code and STCW convention

The important of human input and training in the safe operation of ships is the most significant factor in maintaining the quality standards. It is also important in the requirements of maintaining adequate intact stability on tankers, in damage control plans, in ballast water management, in oil pollution prevention plans and in every things related to safety and environmental. Both Flag State and port state are limited with the rules, but the most important is the ship owner himself. Without his commitments and co-operation, no amount of official intervention will fill the competence gap.

The ship owner's already have a complex burden of ship operation, and the safety management system is adding further responsibilities on personnel, on planning and organisation of shipboard working practices and on restriction of working time.

By introducing the ISM Code the ship owners are being forced to adopt a safety management system. Furthermore, if efficiency and savings are to be gained in the longer terms, quality control is necessary. The system should be developed and introduced in good way to achieve its objective and to be used to advantage, rather than being just another regulatory burden.

A recent press release of Paris MOU nations relating to the ISM Code, directed at lawyers and others, stated that a Safety Management System (SMS) set up to achieve the ISM Code objectives requires that the responsible party needs to know:

1. The rules and regulations which apply.
2. The Codes, guidelines and standards recommended by flag states, port states, classification societies and the industry in general.
3. The risks involved in the business.
4. The skills possessed by staff on shore and by crews.

Only then can the appropriate procedures, checks and policies that make up the SMS be designed to fit the company.

4.2. The ISM Code and ISO 9002 / ISMA

It is well known that the ISM Code is producing broad standards for safe management and operation of ships and for pollution prevention only. The good ship owner should go further and adopt a safety management system to comply with the other universal quality standards, such as ISO 9002 And the ISMA code, which makes benefits to them in terms of economic value in the longer terms. However, ship managers may implement the ISMA Code which covers both standards (ISM Code & ISO 9002).

Under the ISM Code there are no requirements dealing with the contracts, while the ISMA code covers the question of the contracts especially between the owners and the managers and between managers and suppliers of services or equipment. The importance of the contract, is that the obligations and the liabilities for each party are clearly stated and included.

4.3. Risk Management

Risk management may be defined as a field of activity seeking to eliminate, reduce and generally control pure risks (such as from safety, fire, major hazards, environmental hazards) and to enhance the benefits and avoid detriment from speculative risks (such as financial investment, marketing, human resources, commercial and business risks).

One of the main objectives of the ISM Code is to “establish safeguards against all identify risks”. What are these risks, how will they manifest themselves and how can they be guarded against?. In addition to risks threatening safe operations, which the Code is referring to, is there an advantage in making provision for risks which threaten everyday commercial activity, too?. Unfortunately, many companies do not know how to identify the risks following a bad reporting system in these companies. What you have to do is mitigate those risks you can, and value the rest-if that yields a net present value, then go ahead.

There are many publications written to found out the principles of risks management and many of them also suggest how risks should be managed. In summary, this is as follows:

- Identify “risk events”.
- Assign probabilities to each identified risk.
- Price the risk (possible cost x probability).
- Map the risks as a whole.

Detection of risks is an important aspect of safety and quality management. Encouragement of the reporting of near misses and incidents has made it more likely, that safety related incidents are detected and rectified. However, some risks may be insured against, others must be managed by the company itself.

4.4. Using a quality system to advantage

4.4.1. Quality control

To produce and monitor quality, some sort of control activity is necessary. Quality control is the regularity process through which product and service quality performance is measured, and its object to ensure that a product or service is fit for purpose and able to meet the customer's need. However the ISM Code have another purpose, and has outstripped the original purpose, which is to provide proof that certain standards of management are in place and are being followed (with respect only to the safety in the case of the ISM Code) which will improve safe operations on the ship and within the company.

If, however, incorporated into a Total Quality System (TQS) or combined with ISO 9000 quality certification or ISMA code within the company, benefits should be possible in the form of improved efficiency and cost savings.

An advantage gained by having adopted and implemented a quality system such as (ISM Code / ISO 9000, ISMA) is, that it creates good possibilities for better understanding of the function of the organisation. It also makes it easier to measure efficiency and to exercise greater control over the costs.

4.4.2. Economies in operating costs

Economies may take the form of increased efficiency within the company as well as through external cost savings. The benefits of some measures to effect savings might however only be realised in the medium to longer term. The compulsory movement towards quality control in many areas of ship safety has made the ship owners more obliged to adopt a systematic approach towards many cost elements.

4.4.2.1. Manning & Training

Since its earliest beginnings , the maritime industry has found itself occupied with the question of how to ensure that the ships trading the oceans not only stay afloat, but also are continually able to carry out their objective-the delivery of goods on time and intact. Therefor, the quality of human input into the shipping industry emphasis on safety management, training and ship operation. Some flags, due to crewing shortages, are allowing international personnel and crew, to serve on their fleet if they are able to provide convincing proof that they are maintaining high standard of safety and environmental protection.

An example of benefits derived from the introduction of a quality system is shown in table 11, from which the cumulative effect of cost savings will be apparent, directly and through insurance costs.

Table 11: Benefits derived from implementation of a quality assurance scheme

comprehensive premiums	**: Reduced by 10-15%**
loss of man hours	**: Reduction by 25-35%**
hospital hours	**: Reduction by 15-25%**
sick leave	**: Reduction by 35-45%**
environmental fines	**: Reduction by 30-40%**
damage to cargo	**: Reduction by 50-90%**

Source: Extracted from DNV publications

Training and development are considered to be paramount in providing a consistent quality service. With the impact of the ISM Code and STCW Convention, training, both ashore and afloat, will became a major factor to be taken into account by managers of

shipping companies. Improved training and higher, more consistent, crew standards are at the core of the STCW Convention. By its very nature, STCW aims to ensure that certification standards are equal across the boarders, regardless of the issuing authority, enabling the ship owner or operator to be assured that his crews are properly trained and experienced.

4.4.2.2. Health

According to the statistics shown in table 11, savings of about 20% are possible in costs associated with bad health and injuries, when introducing a quality system.
Crew health has became a very important factor after introducing the new IMO and ILO requirements. The ISM Code objectives state that the company SMS should:

1. provide for safe practices in ship operation and a safe working environment;
2. establish safeguards against all identify risks; and
3. continuously improve safety-management skills of personnel ashore and abroad ships, including preparing for emergencies related both to safety and environmental protection.

Crew members are required to have medical examination before they join the vessel. It was shown in table 11, that by improving health the P&I club claims will be reduced. Companies will need to have policies covering such major health dangers as:

- Drugs and drink.
- Infectious diseases, resurgence of malaria in many parts of the world, hepatitis.
- Psychological problems.
- Cancer.
- Eye, ear, nose, throat disorders.
- Skin diseases.

4.4.2.3. Repairs and Maintenance

An early need for every shipping organisation is to carry out an honest internal analysis of the existing ship maintenance system and to make a realistic assessment of the strengths and weaknesses of all factors and processes involved with ship reliability. Some companies keenly focus on the importance of maintenance for their business viability. Some unfortunately, either due to economic situation or due to bad management, still operate ships of a substandard level.

The ISM Code specifically suggests incorporating measures for improving reliability (item 10.3 of the Code) as follows:

" The company should establish procedures in the SMS to identify equipment and technical systems, the sudden operational failure of which may result in hazardous situations. The SMS should provide for specific measures aimed at promoting the reliability of such equipment or systems."

To cover repairs and maintenance of their fleet*, Stolt Parcel Tankers,* which has 25% market share of the seaborne world chemical trade, has developed a Planned Maintenance System (PMS), which is continuously being modified in some areas by input from a Condition Monitoring System. The company introduced the new PMS in parallel with ISMA quality assurance code. This resulted in savings of about $27m in 1994 as compared with 1992 on an average company annual profit of $27.7m over the years 1992-1994. The PMS is based on scheduled maintenance, the aim being the elimination of emergency corrective measured.

4.4.2.4. Insurance

The owner's good record is important in obtaining reasonable insurance premiums rates. The premiums paid out to the underwriters depends much on how safe the ship owner performs his operation. In addition, it will also depend on the flag of the ship, classification, trading, etc. Marine insurance mainly consists of H&M, P&I, and cargo cover. But insurers can limit their risks by asking for additional cover such as war risk, strike, etc.

Despite the intentions of FSA, ISM Code, ISO 9000 series and Port State Control, maritime insurance have their basic rules and principles for self regulation-which are often overlooked-and where legal defences and responsibilities are clearly defined by background laws. Provisions requiring strict compliance with the ISM Code has been added to the insurance policies and charter parties.

Ships' seaworthiness as contemplated by the operators' "exercise of due diligence" implies that vessels are properly manned with well trained crew.

The benefits of using a quality standards based on the ISM Code is that the spirit of the code is clear: to improve the safe operation of ships and prevent pollution. Much depends on how the implementation is put into practice, but it is commonly acknowledged that the training and awareness of shorebased staff and seafarers are crucial for reducing the number of maritime accidents and casualties. So, by reducing the accidents, the company record will be improved, and therefor the insurance premiums will be reduced.

4.4.2.5. Accident prevention & Near misses

The main function of safety management or quality system is to minimize and reduce major accidents and casualties despite the cost. When the ISM Code and other legislation standards related was formulated, the circumstances of such major accidents became very important. SMS should be based upon the company commitments, and encourage the crew to report the near misses to learn from the mistakes.

It is clearly stated in the ISM Code, section 9 that " *the SMS should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the company, investigated and analysed, with the object of improving safety and pollution prevention*. The requirement to report incidents and non-conformities brings into play a number of very important human conflicts, of which one is to report the faults of other.

"*In a culture where there is usually an attempt to attribute blame and a person's career might be put on the line after a mistake leading to an incidents or non-conformity, it is asking quite a lot to report".*

And even if there is no attempt to punish the person who has made the mistake, it is likely that there will be a "black mark" lodged against him in some records. As the Swedish P&I club asks-"Can a master who reports a mistake rely on the company's continued support?" the answer would have to be very carefully given after much thought.

The onus then falls firmly on the company to develop and maintain a system that actually encourages people to report incidents and non-conformities. The company should agree that the non-conformity report is a good things in terms of continuous improvement. As the Swedish Club points out, "An implementation of company policy to report and investigate therefore has to include support for the people involved. When a mistake has occurred

and been reported, the report has to be appreciated by the people reading it and, thereafter, joint measures to be taken to avoid re-occurrence.

Without complete information and following measures, near accidents will surely develop in real accidents. A properly functioning quality system should serve in a proactive manner to increase efficiency and reduce quality cost.

4.4.3. Administrative aspects

4.4.3.1. Management Structure

Due to development in trade and through commercial pressures, management structure has been changed in many shipping company in recent years. Today, further changes must be made to follow the introduction of quality standards via ISM Code and STCW revision.

A survey was made by MASSOP project (the Management Structures of Shipowners and Operators), in which WMU is a member, to analyse the situation. The MASSOP project aims to create workable new organisational structures for the shipping companies. It is based upon the idea that the traditional rigid “Command and Control” hierarchy, both at sea and a shore, may not be the best solution for today’s shipping world.

The result of the survey shows an analysis of 237 shipping companies. It was decided to catagorise the companies as ‘Small’ - i.e. less than 5 ships operated. ‘Medium’ - i.e. between 6 and 20 ships operated, and ‘Large’ - i.e. more than 20 ships operated. The result of the survey can be seen in the following:

- Whilst 30% of the world’s shipping companies are ‘small’ companies, these companies control only 6% of the world’s ships.

- It was shown that the ‘medium’ company operate 48% of the total world’s ships.
- The survey analyses the office staff employed by the shipping companies. It was shown that even the average ‘large’ company is relatively small with an office staff of around 90 people.
- The benefits of the scale are clearly shown. Whereas the average ‘small’ company requires only around 3.3 shore staff per ship, the average ‘large’ company requires only around 1.9.
- Regarding to the development of the companies in terms of Information Technology, the survey asked if the companies’ ships had computers and how these were used. Then it was asked if the computers on board were linked to those ashore. Whereas only 25% of the smaller companies had linked the IT system between ship and shore, 70% of the larger companies had progressed to this.
- The survey asked whether the company believed IT development would influence shipmanagement ‘significant’ over the next five years, or would it only affect it ‘to a certain extent’ or would it have ‘not much effect’. The larger companies clearly see IT as having a more significant impact.
- With respect to the requirements in the ISM Code, the survey asked if the companies believed that it would be necessary for “small” companies to subcontract technical management to the “larger” shipmanagement companies; 68% on average believed this.
- The survey asked how many of the company’s shore staff had formerly been sea staff- the result was only 29% on average. The questionnaires further asked if the company believed this number would increase in the future - 56% on average believed it would.

In brief, the result of the survey has proven that the introduction of the ISM Code have a significant effect upon the industry and the changes resulting from this may take years to appreciate.

4.4.3.2. Communications and Information Technology

A corporate communications infrastructure is an important strategic decision. It requires senior management understanding of the requirements, as well as appreciation of the technology available both now and in the future. The GMDSS, the ISM Code and the revised STCW Convention have all entered into force. To fulfill the intentions of these three acts of legislation, in order to become integrated parts of a cost-effective and modern shipping industry, senior management will increasingly have to rely upon Information Technology (IT).

In fact, a rapid advance in Satellite and specialist shipboard systems will provide users with great opportunities to cut costs and to enhance fleet management. Facilities offered include voice, fax, data and data high speed capabilities on a global basis. Competitive pricing and single billing system offer significant advantages. SATPOOL and other providing organisations offer services to maritime and land mobile customers. Some 40,000 Inmarsat shipboard terminals are now in service. Shipping services users include ship owners and ship managers, agents, brokers, charters, etc.

The savings in communication costs can be achieved with imaginative use of Satellite communication by use the Internet. Many managers regard this as the way ahead. However, not all shipowners, Managers and brokers have found the use of the Internet useful. The problem is how to be familiar with such systems, became things are changing rapidly in the communication and much could be lost through wrong positioning or ignorance. Therefore, although the revolution in information technology offers probably the greatest a venue to success and eventual lower cost, it is also fraught with danger and must be a major item on the planning agenda in any organisation - Communication and computer software are improving and merging at breakneck speed.

4.4.3.3. Millennium bug and Information back-up

Problems concerned with millennium bug, computer viruses and information back-up should be addressed on the top level of the management to safeguard the company. In addition, risks associated with the millennium bug are so much related to the management and procedures to avoid such problems will be strongly required.

An internal audit of automation systems used should be carried out, and a list of vendors, packages, integrators, software writers and hardware manufactures is certainly required. Overall, there is a need to increase management awareness of the problem, to test systems and equipment, examine the results, liaise with suppliers and last, but not least, consider all the various legal aspects of Millennium Bug related incidents.

According to Richard William's of Ince & Co in London, failure to achieve compliance is likely to render operators of ships more vulnerable to claims and attempts to exclude or limit liability, “The Courts would not approve of turning a blind eye”, he says. It is, after all, not a theoretical issue any more. A number of key shipping systems have been found to be non-compliant. These include radar systems, mapping, ballast monitoring, cargo loading, ship performance monitoring, engine room vibration monitoring, ship control and custody transfer systems.

4.4.4. Ship Management

Shipping plays a vital role in the economics of most countries. It is important as commercial enterprise, it contributes to balance of payments, and its size, efficiency and type influence the location of industries and other economic activities. If costs in shipping are allowed to rise as a result of inefficiencies, this can result not only in lower returns on investments but also increases in the prices of exports and imports to the detriment of producers and consumers and national development projects.

A high level of safety and efficiency in shipping and related enterprises is thus vital, but is not always attained. On the other hand, investigations have proved the considerable influences of ship managers organisation on efficient and economic operation of ships. Ship Managers are therefore in a position to contribute to Safer Shipping and Cleaner Oceans and to economic benefits through performance of ships.

Ship Managers are expected to have an adequate theoretical and practical knowledge of the technology of ships relevant to their work. They should be familiar with the various aspects of transportation economics including liner trade, tramp trade, chartering practice and cargo brokerage. They should also have a good understanding of the principles of management and of the various managerial skills required of personnel serving in such an industry.

A ship owner may choose to delegate certain aspects of the running of his ships to a ship management company to gain the benefit of specialist technical and management expertise, to gain on economies of scale in purchasing ship consumable and spares and in employing crew. The delegate of responsibility and costs, is depend on the company policy and might be ranged from the delegation of operating costs to the retention of all costs within the company, and it should be clearly stated in the management contract.

Chapter five

Case study

The International Ship Management Co. (I.S.M)

5.1. Company profile

The International Ship Management co. (I.S.M) was established on 1/1/1996. Today the company has the management of 15 ships of various types, ages, flags and trading areas. This reflects the diversified expertise the company has been able to accumulate. I.S.M Co. is a member of the ISMA and was certified for the ISM Code and a proper Document of Compliance was issued in May 1997. Further more the company complies with the requirements of the ISO 9002 and proper certificate was issued in May 1999. I.S.M Co. has its head office in Amman, Jordan with a branch office in Beirut/Lebanon, which was established after having the DOC for the Head office.

5.2. Developing and Establishing of the Safety Management System (SMS).

According to Mr. Massad, Managing Director of the I.S.M Co. ***"We don't just want certification, we want the system".*** Based on this statement I.S.M Co. made a sound decision and adopted the choice to have its own SMS In-House built and developed, rather than going for an off- the shelf ready made system. Both shore-based and ship-board personnel were participating to their specific roles in developing the system.

A SMS is going to be implemented and maintained by the people concerned, and therefore it is far better that the system is developed by those people as well. The responsibilities and authorities of the different persons involved in the system, and the lines of communications between persons affected by it, form its basis.

The fact that successful implementation of the ISM Code requires commitment from everybody at every level within the company was of high concern. The shipboard personnel with responsibility played a major role, particularly in preparing for the Shipboard Operational Procedures, (Checklists), and also for the functions they have direct relations with throughout their daily routines.

Considering the company's system, which has been in practice for the daily routines of ship-board operations and activities, documentation with some additions and alterations were the main elements needed to set out the system on the track of having a Safety Management System (SMS) in place.

A SMS means a structural and documented system which enables the company personnel to effectively implement the company's safety and environmental protection policy.

The safety Management Manual of the I.S.M. Co. was structured in four main sections to facilitate references and implementation to their relevant areas of activities; these are:

1. The ISM-Code Manual.
2. The Operational Procedures.
3. The vessel Operation Manual (checklists)
4. Contingency Plans Parts A, B, C. (see 5.4.7.)

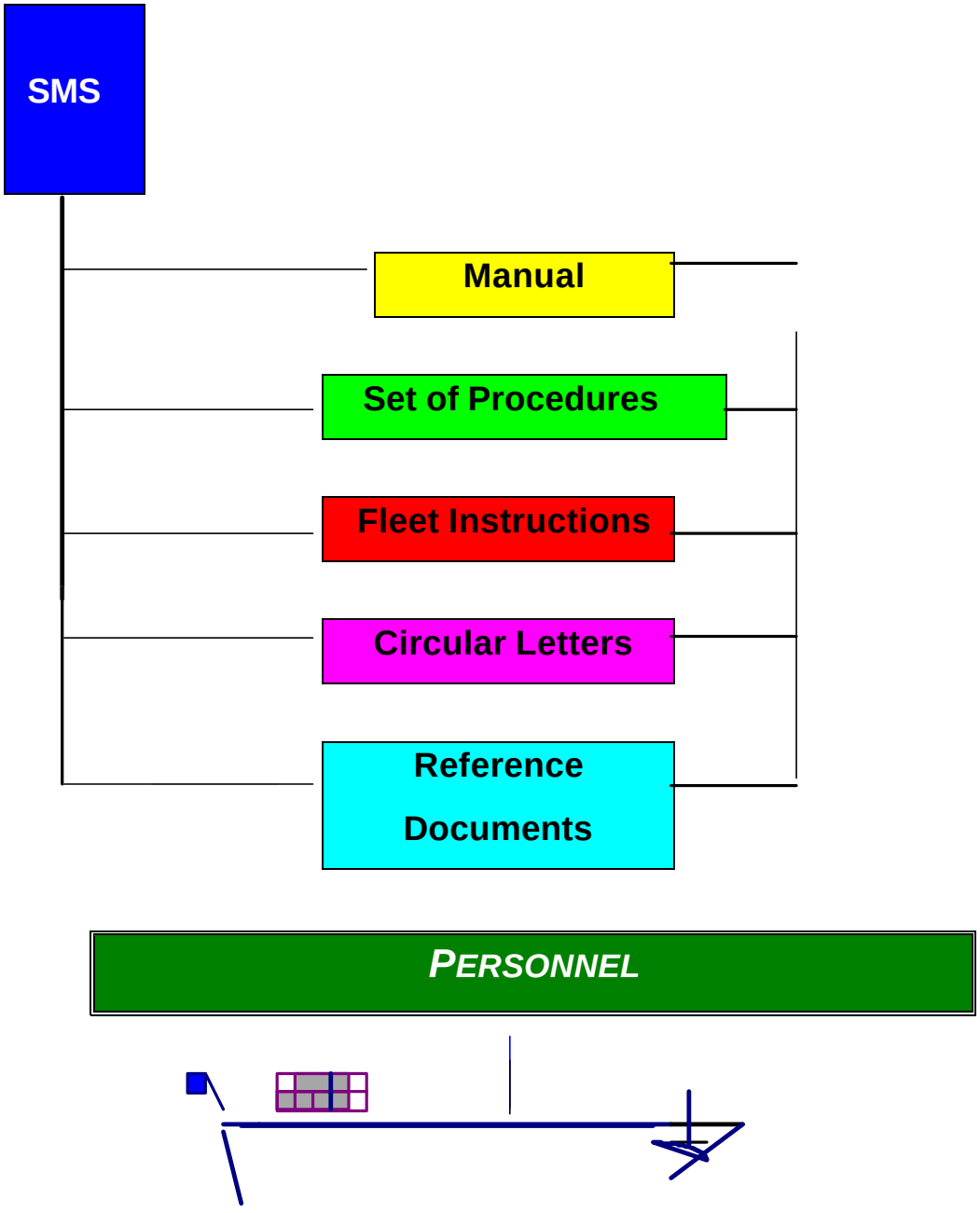


figure 3: Safety management structure

To add to the integrity of the system, “Forms” for shipboard and shore based management activities were also constructed. These were in such a way to reflect a documented scenario of the actual practices, thus avoiding ambiguity and misinterpretation.

Masters and officers on board the company’s vessels were requested to write down their “description” of the daily practice of performing routine shipboard functions and activities. Reports were sent to office staff to be reviewed and refined. This way included within the frame work of the management, systems issued under authorisation of the management personnel concerned and the approval of the Designated Person Ashore (DPA).

The whole system was dispatched to the company’s personnel onboard the ships. Masters were urged to review such a system to assess its applicability to their types of ships. Their amendments, suggestions and modifications were reported to the office for documentation and re-issue as to the applicability of the specific vessel type.

The system on board the vessels now forms the guidance to the ship-board personnel in such a way, that they have trust and confidence in performing duties they had gone through long enough. The system turned to be a daily routine practice.

The I.S.M Co. in developing its SMS has insistently focused on the enhancement of safe practices in ship operations, emergency preparedness and commitment to preservation of a clean environment, in particular, the marine environment.

The goals for which the company set a course to follow and achieve when establishing its SMS are, among others, as follows:

- An improvement in the safety consciousness and safety management skills of personnel.

- The establishment of a safety culture that encourages continuous improvement in safety and environmental protection.
- Greater confidence of the clients.
- Improved company morale.
- It is also believed that over time there will be commercial benefits, including:

    1. Cost savings resulting from improved efficiency and productivity (such as minimization of disruptions of the operation of the ship, that may cause delays).
    2. Favorable insurance premiums relative to the market.

5.3. The Role of the Consultants In Establishing the Company's SMS

A system will require monitoring to insure soundness and coherence. The company's personnel had a vital role in preparing, establishing and building up the system as to their routine practice of ship operations.

On the course of time of implementation and performance monitoring of the system within our organisation, the monitoring proved that the company has elected the right track.

The I.S.M. Company did not need to think twice when the choice was to select an "IACS" member for their well known role and experience in such regards. Drafts were exchanged back and forth between the company's DPA in office and the assigned coordinator in the consultant organisation.

The most important considerations when building up our system was to ensure that the SMS, in its policy, procedures and instructions does suit the nature and culture of our shipping business and our personnel; both ship-board and shore-based, who as a matter of fact, is the "motivating power" of the system.

With the system in place, reference is yet frequently made to our consultants for any newly out-coming issues in connection with rules and regulations governing the Shipping Industry.

5.4. Implementing the Safety Management System

5.4.1. The I.S.M Co. Policy

The commitment of the company's top management towards achieving the objectives set out in terms of Safety and Protection of the Environment can't be better displayed than stressing on such principles within the management's policy and included within the system itself.

The top level of management has the belief that without this commitment, efforts will invariably be wasted. The practical implementation of principle was clearly evident in the active involvement in the establishment of the company's SMS and the motivation of personnel to contribute towards the achievement of its objectives.

The Safety and Environment Protection Policy, and further more a Quality Policy authorized and displayed with the Managing Director's initials, is governing the principles of all activities and functions performed by the company's personnel; ashore and afloat.

The company's Managers, Superintendents, Masters and all other ship's personnel have an understanding of the need to act safety at all times and, convinced of its purpose and need, they find this policy very useful in their jobs.

The company's safety objectives are those established by the overall principles of ISM-Code and will be reflected within the company SMS:

- To provide for safe practices in ship operation and a safe working environment.
- Establish safeguards against all Identified risks.
- Continuously improve the safety management skills of personnel ashore and aboard ships and for emergencies related to both safety and environmental protection.

The above objectives were achieved by Developing, Implementing and Maintaining the company's SMS. The effectiveness of the system, suitability to the specified functions of relation and the extent of awareness of personnel involved, has been set for by means of Internal Audits, Inspections and Masters' reports of the performance of the system on board their vessels.

A copy of the company's policy and the stated objectives as in the SMS is shown in appendix 2.

5.4.2. Company Responsibilities and Authorities

The SMS of the I.S.M. Company defines in a clearly worded, unambiguous definition the responsibilities and authorities of its personnel who are of direct concern to the system, both ashore and afloat. This measure assisted in motivating them to understand the vital importance of their performance in the success of the Safety Management System.

A diagrammatic chart of the organisational structure was considered and documented to ensure how the defined responsibilities of shore and sea personnel inter-relate to achieve the system's objectives.

A similar concept is applied to establish and define a safety management structure for ship-board personnel, which is of high concern in the efficient implementation of the SMS of the company.

Being included in the system and applied to all company's fleet vessels, ship-board personnel find their guidance to the inter-relation of Ship-Shore based personnel and activities.

5.4.3. The Designated Person Ashore (DPA)

Not withstanding the vital role the ISM Code has assigned to the DPA in the efficient performance and implementation of a SMS, the I.S.M. Co. has further more given special attention to the DPA in terms of responsibilities, authorities and support in performing his duties.

The company assures and maintains adequate resources and shore-based support to enable the DPA to carry out his functions. In ensuring that the management system is adequately maintained, the following means are used:

- The system's effectiveness and degree of implementation has to be certified.
- Deficiencies are to be reported to the responsible level to be identified.
- Persons responsible for rectifying the deficiencies are to be identified.

The selection of the Designated Person Ashore is based on the following criteria: DPA should be:

- Suitably qualified and experienced in the safety and pollution control aspects of ship operations.
- Fully understand of the environmental protection policy.
- Fully independent and have full authority to report observed deficiencies to the highest level of management.

A sample document being an extract from the “Safety and Quality Management Manual” of the company, as found in Appendix 2, is showing the actual role assigned to the “DPA” and also the responsibilities, authority and qualifications needed for appointing a DPA.

As a corrective action to an “Observation” issued by an Auditor during an external audit, the procedure for appointing a Deputy DPA has been decided and introduced into the system.

5.4.4. Master’s Responsibility and Authority

The I.S.M. Co. has, in view of the provisions in section 5 of the ISM Code; the Masters responsibility and Authority, identified and addressed clearly the Master’s significant role in the implementation of the SMS as a whole and in verifying that the company’s policy of Safety, Pollution Prevention and Quality is observed at all levels of activities on board his vessel. The masters of the company’s fleet are continuously urged to aim towards achieving the objectives of the SMS as provided in the aforementioned policy.

Regular Safety Meetings on board, Preparation for ship-board activities, Motivation of the ship’s crew through Training, Emergency Drills Plans, Safety Lectures and Videos, Inspections and Defect Reporting Systems….etc. are all elements of a mechanism to be used by Masters to enable them performing their functions and maintain a high degree of conformance of their vessels with the requirements of the International and National rules and regulations concerning the safety of the ship and the environment.

The company’s SMS has further identified the Master’s responsibility to review the SMS on board his vessel and ensure its compatibility and effectiveness to the specific operations on board his vessel and reporting to the management any deficiency for correction and appropriate action.

Nevertheless, with the SMS on board a vessel, it is only the Master who has the ability to assess whether to follow a certain instruction provided to him or not if a specific emergency situation should arise. Masters are continuously advised of their overriding authority within the SMS to the benefit of the safety of Passengers, Ship's Crew, Marine environment and the property.

5.4.5. Resources and Personnel

The I.S.M. Co. has, in view of the provisions in section 6 of the ISM Code, identified and established procedures for ensuring that the vessels are manned with qualified, certified and medically fit seafarers in accordance with national and international requirements.

The Company ensures that the Master is properly qualified by verifying that his certificate of competency is up to date and in compliance with ships flag administration requirements and STCW'95 Convention as well as verification of experience from adequate sea time in command on board comparable vessel.

The company, by Hand over periods and Hand over notes, ensures that new personnel and personnel that are transferred to new assignments are properly familiarized with their duties related to Safety, Quality and Protection of the Environment.

The Company has established a special form for ship's crew familiarization, which is called "Crew safety checklist", and requests all crew members to complete and return this form to the master prior sailing or within 24 hours of joining the vessel.

In addition, there are many other forms being designed for familiarization. Deck officers have to comply with "checklist A1" Familiarization with bridge equipment. Engineers have to comply with "checklist B7".

I.S.M. Co. has well-established training courses for all sea-going personnel to supplement normal on-board training, together with comprehensive courses for crews deployed on specific vessel types. All senior officers receive a full briefing at our office. At sea, all crew members are kept informed on ISM's policy and health and safety matters, through our company circulars.

For Shorebased Management Familiarization, a proper introduction to the SMS will be given to all newly employed who are involved with the company SMS by the DPA who will provide the information, documents and any other issues needed in this regard.

To ensure that all personnel involved with the SMS have an adequate understanding of relevant Rules, Regulations, Codes and Guidelines, the I.S.M. Co, has established a procedure for distributing and circulating any amendments/updates of such documents, and latest editions as received from various parties involved in shipping industry. A technical Library has been installed in the Head Office to be used by technical staff.

Training requirements for all personnel in supporting the SMS has to be identified yearly by the head of each department.

By following the requirements of the ISM Code, and within a very short period of time, I.S.M. CO. gained a reputation for supplying high quality crews, carefully selected for their experience and skills appropriate to the type of vessels being managed by I.S.M. Co.

We do believe, that by providing each man with real career prospects, both we and our clients are rewarded with loyalty, commitment and reliability.

5.4.6. Development of plans for shipboard operations

The I.S.M. Co. has developed a Vessel Operation Manual (checklist) which is prepared to be in compliance with section 7 of the ISM Code provisions and covers operations associated with daily routines of the vessel and reflects the trade and the specific vessel type operated within the SMS.

The plans and instructions contained there in are meant to define and control those key activities critical to the safe and pollution free operation of the vessel. Therefore, the primary objective of this manual is to include measures essential to prevent hazards occurring from any identified risk.

The various activities involved, are assigned to senior ranks on board, who on their own part, and with the approval of the master, may assign certain tasks to qualified and experienced personnel of the ship's staff, as the need may arise.

With sea staff familiar and complying with most of the contents of the checklists, the intention is that they shall be an aid to memory for senior officers or a training tool for joiner officers. Checklists are only guidelines which are to be conducted in combination with other Rules, Regulations, Codes and Guidelines, which are applicable to an operation.

The Vessel Operation Manual (checklist) consists of three parts; part A is related to Deck operations; part B is related to Engine operations and part C is related to Cargo operations. Evidences of the use of the checklists are maintained by entries in the deck and engine log books.

A copy of the vessel operation manual (checklist) contents is shown in Appendix 2.

5.4.7. Emergency Preparedness

The company has prepared specific contingency plans to deal with potential shipboard emergencies. The plans have been prepared to cover both ship and shore response to any one incident. In addition, each vessel of course also has the compulsory Shipboard Oil Pollution Emergency Plan (SOPEP), which is referred to in emergencies. The plans are verified by exercises on board the vessel and on the shore side. The specific contingency plan is showing how the shore management assists and supports the Master during emergency incidents. The specific contingency plan consists of three parts:

- Part A: Shorebased Contingency plan which includes the following:

    1. Shorebased Emergency Team “SET”.
    2. Emergency Preparedness.
    3. Action plans
    4. Guidelines for shorebased emergency team
    5. Documentation
    6. Cancellation of an action
    7. Emergency situations.

- Part B: Shipboard contingency plan which includes the following:

    1. Ships’ Preparedness
    2. Emergency Manual
    3. Emergency and Safety Communication
    4. Casualty Reports
    5. Reporting loss of Life-Saving Appliances
    6. Reporting deviations
    7. Emergency Stations

8. Musters at the assigned station

- Part C: General requirements for both shipboard and shorebased activities in case of emergency.

The company has established and maintains procedures for shipboard and shorebased emergency drills. Each drill is carried out at regular intervals and as appropriate. The programme of drills is conducted to develop and maintain confidence and proficiency on board.

The Shipboard Emergency drills include but are not limited to:

(a) Fire and life boat drills
(b) Man Over board drill
(c) Oil spill
(d) Abandonment
(e) Grounding
(f) Helicopter Operations
(g) Collision
(h) Personnel accidents
(i) Machinery break down
(j) Evacuation
(k) Medical emergency response
(l) etc.

The Shorebased Emergency drills include but are not limited to:

(a) Distress message from ships

(b) Casualty message from ships
(c) Injuries and fatalities message
(d) Loss of life saving appliances
(e) Emergency deviation message
(f) Abandon ship
(g) Man over board / missing personnel
(h) Injury / Illness on board
(i) Accident with dangerous goods
(j) Deaths on board
(k) Collision / Hull damage
(l) Grounding / Stranding
(m) Salvage
(n) etc.

The frequencies of the above drills are based on the international requirements, company instructions, vessel types, etc. All such drills and training are recorded and analysed. The feed back received from the management ashore at accidents, incidents, safety committee meetings, near misses and emergency drills are analysed and corrective actions taken to keep continuous improvements of safety management skills of all personnel ashore and onboard ships.

In fact, the company has assigned Emergency Team Set (ETS) from staff in the office, headed by the Managing Director who has an overall control and has the authority to make decisions on behalf of the company. The specially selected team ensures that as much expertise can be utilized as quickly as possible, to assist the master of a ship on a wide variety of requirements in a time of stress.

To ensure that adequate communications are constantly available, a directory has been developed containing all telephone contact numbers(office, home, mobile etc.) of all relevant personnel, and relevant bodies and institutions, a copy of which is included in the SMS. The directorate is kept up to date and reviewed regularly.

5.4.8. Reports and Analysis of Non-Conformities, Accidents and Hazardous Occurrences.

In fact, the I.S.M. Co. do believe that non-conformities are good things to improve their SMS. To maintain that, the company has established procedures for controlling of non-conformity and corrective actions. The purpose is to document the method and action to be taken for any function, material or process found to be non-conforming to the pre-specified Standards, Regulation, Requirements as to the company procedures or due to damage.

This Procedure defines the controls and activities required to ensure that Non-conformance, Accidents, Hazardous situations and non-conforming Materials are to be discussed during safety meetings on board and reported to the company in order to take the appropriate corrective action to improve safety, quality and pollution prevention.

Non-conformity means a deviation from the Safety Management System requirements, or lack of plans or instructions, which could endanger or has compromised the safety of people, the vessel and/or the environment. For instance, Personnel injury, Grounding, Collision, Pollution, Fire, Berthing damage, near misses, etc. are all non-conformities. Any recommendation or conditions imposed by class, port state control and P&I club surveyors are also to be treated as Non-conformities .

The shorebased Safety Committee, is chaired by the Managing Director and includes the DPA, Tech. Supt., Marine supt., Fleet personnel supt. Those and any other personnel

involved will meet to analyse and review all reports received. Investigations will be conducted immediately, corrective actions will be taken and follow up for closing out the Non-conformities will be required from DPA to make sure that every thing is brought back to compliance with the requirements. Circulars to all company fleet will be forwarded to learn from mistakes.

I.S.M Co. do believe that near miss reports have a significant role for avoiding any deviation from the requirements. Therefore, the company started from the beginning to encourage the crews to report all near misses with advises how we can avoid such in the future. Then all near miss reports, with appropriate preventive actions, are circulated to the other vessels. This procedure has improved the crew safety culture and increased their awareness and the number of accidents has been reduced. During the year of 1996, 15 accidents were reported from 7 vessels over a total of 15 vessels. In 1997, 12 accidents were reported and in 1998, only 8 accidents were reported.

5.4.9. Maintenance of the ship and equipment

The I.S.M. Co. has, in view of section 10; Maintenance of the Ship and Equipment, of the provisions in the ISM Code, established and maintains procedures to ensure that vessels, machinery and equipment are maintained in accordance with all relevant rules and regulations.

The purpose of the procedures is to keep all vessels managed by “I.S.M. Co.” running safely and also to ensure that vessels are being maintained in conformity with classification societies and statutory requirements. Procedures are defined for the activities and necessary controls to monitor all operations and maintenance on board the vessels and to provide reports for analysis in case of any break down or preventive maintenance for hull and machinery.

Machinery and equipment are maintained on routine basis and according to manufacturer's advise. Where a manufacturer's data is considered deficient, the company has developed procedures to ensure compliance with high standards. Such procedures will cover routine inspection of the vessels and reporting any non-conformity as a result of these inspections.

Each vessel is preparing its own planning and preventive maintenance monthly, which is based on international and national requirements and to meet the company instructions. The Planned maintenance is approved by the company technical superintendent, who is required to follow up the maintenance procedures. Maintenance records, detailing routine and unscheduled maintenance carried out, are maintained for each vessel.

The company has identified all critical equipment and systems which may, in the case of failure, result in a hazardous situation. Procedures / checklists including frequency of testing of such systems have been prepared. The most important systems identified for programmed testing are, the following but not limited to: Emergency steering, emergency flaps, smoke detector and fire alarm system, emergency generator, lighting/navigation lights, life boat engine, emergency air compressor, engine room bilge alarm, Co2 system and ventilation fans tripping, quick closing valves, remote emergency stop switches, etc.

The I.S.M. Co. has , in view of monitoring all operations in the vessels, established and maintained inspection procedures, which define the necessary activities to ensure that all vessels fulfill the quality standards. In fact, there are three types of inspection, which are to be considered to keep the vessels under control;

(a) Monthly Inspection

All vessels to be inspected by master, chief engineer and chief officer. The inspection report to be forwarded to the technical superintendent, who will review the report and take corrective actions if required.

(b) Quarterly Inspection

This inspection will be carried out by Tech. Supt in accordance with the “Superintendent Quarterly inspection report” which covers:

- Emergency and safety equipment
- Surveys and ships certificates
- Officers and crew
- Engine room and machinery status
- Performance and consumption
- Log books(Engine, Deck, chart corrections, etc.)
- Deck maintenance and equipment
- Electrical and Radio / Navigational equipment
- Stores and spares
- etc.

(c) Annual Inspection

If vessels are not inspected quarterly, for any reason, the annual inspection will be performed. There is a special form for annual inspection report, which the Tech. Supt have to follow it.

All reports will be reviewed by the Managing Director, who has an overall control and full authority (technical and financial) to take decisions on behalf of the company.

5.4.10. Documentation

The I.S.M. Co. has, in view of the provisions in section 11; Documentation, in the ISM Code, established and maintains procedures which describe the methods used to ensure the review, authorisation and the controlled issue of all SMS manuals as well as the control of reference documents.

It is the responsibility of the DPA to ensure that all documents and relevant data are kept up to date before issuing. All copies of the SMS are issued under a control system, which ensures that all personnel have an up to date copy of all relevant documents available . Controlled copies are stamped and numbered and may not be photocopied. Issue of new or amended SMS documentation is controlled by the DPA, who shall maintain a register of all controlled copies. He shall also record that all copies have been updated and all personnel notified of the changes by using the Controlled Document Distribution List.

DPA is responsible for ensuring that obsolete documents are promptly removed. This is done by asking all personnel to retain any old document to him, and it can be monitored when internal audit is conducted. Each ship is carrying on board at least 5 copies of the SMS, which is supervised by the master and located in various area such as: Master office, Chief engineer office, Bridge, Mess room and Engine room. Furthermore, all documents relevant to that vessel are to be found onboard.

External documents are controlled in two ways: Charts and all marine publications are controlled by sub-contraction to Kelvin Hughes. As subscribers to BIMCO the company is made aware of changes to more substantial documents such as international instruments “Conventions” and all other mandatory requirements.

5.4.11. Company Verification, Review and Evaluation

To meet its obligations under the provisions of the ISM Code, the I.S.M Co. has ensured the foundation of the Internal Audit System to measure and assess the effectiveness of its SMS. In addition, it has established a procedure for periodic management review, to ensure that the Company SMS itself is subject to the same drive for continuous improvement that is being applied to other I.S.M. activities. Management Review is to be conducted twice a year by the shore based management committee (Steering Committee).

It is the task of the company's Internal Auditors (DPAs) to assess the effectiveness of the SMS, whether ashore or on board, and to establish how close it is to meet the required standards. Results of internal audits, being analysed, categorised and summarised. Corrective actions to be taken as necessary to close out any non-conformity raised during the internal audit.

To assist in achieving the objectives set out by the ISM Code, and similarly by the SMS, the I.S.M. Company has laid down and prepared audit procedures in accordance with accepted principles.

Among others the followings were ensured to be taken into consideration:

- An Audit is a measure of performance of the SMS in meeting its stated objectives.
- On completion, the conclusions drawn from the audit are fed back into the SMS for corrective action.
- Each Audit is dealt with as being " External Audit ". In some cases our internal auditors conduct their audits under a Role-play of being external auditors

- Each audit is carried out by personnel who, at the time of the audit, are independent of the area, office or ship boarded department or activity being audited.

The I.S.M. company provided, the necessary courses or seminars as needed to personnel who are actively involved in internal SMS auditing are competent to do so. Therefore, appropriate competency standards were set out when selecting the company's (DPA)s.

The following were considered in such selection.

- Practical experience of Marine Operations.
- Practical knowledge of appropriate ship type.
- Practical Knowledge of the ISM Code.
- Good Knowledge of Company's and shipboard SMS.
- Audit Experience and Training .

The I.S.M Co. had extensively acted towards the training of personnel in connection with the daily implementation of the Safety Management System and further to other quality aspects of the system.

Shore based management personnel and DPA, Tech. Superintendents, Fleet Personnel Superintendents, operations as well as some of Finance Department Personnel were given possibility to attend an appropriate Internal Audit courses, which organized by international expertise.

The shipboard staff was also of concern, due to their essential role in the final performance and effectiveness of the SMS on board their vessels. Masters, Chief Engineers, Chief Mates and second Engineers were of the management's first concern.

Personnel who are members of the Shipboard Safety Management Committee, were when an leave from the ship arranged to attend Quality Systems Internal Audits, thus adding theoretical basics to their practical skills. The prospects were fruitful : a large number of Marine Professional Quality Customized Sea-going Personnel.

The I.S.M. Co. did not hesitate in deciding what criteria to set up for Internal Auditors. This is natural in an organization where the personnel is fully conversant and familiar with the implementation of the SMS. Hence Internal Auditors were selected to be of the following professions:

- Shore based: Managers, Technical / Operations Superintendents , Fleet Personnel Superintendents and DPA.
- Shipboard: Masters ,Chief Engineers and Senior Officers .

It is now quite common in our Organization to see Shipboard Internal Audit Reports with the Master signed as the auditor and Chief Engineer as the auditee or Department Representative, similarly another Audit Report can be with the Technical Superintendent as the Auditor and the Fleet Personnel Supt., for instance, as the Department Representative. This process has created a sound and coherent bondage between the management system and personnel effecting its activities though out the routine ship-related operations.

The I.S.M. Co. realizes that Trial audits is another tool to look into the SMS and locate any non-conformity which may not appear during Internal Audits. Trial Audits including shipboard operations and activities:

- The personnel responsibilities and authorities, lines of communication among the staff and with the shore-based management personnel.

- The awareness and familiarization of personnel with the system, the implementation and extent of compliance on board. The system was working on board but that doesn't prevent Non - Conformities to exist.

5.4.12. Certification, Verification and Control

The system was brought out and needed to be certified to operation and function. This required certification under the authority of the government of Jordan by the issuance of a "*DOCUMENT OF COMPLIANCE* " which was sought through External Audits.

Preliminary audits were conducted and the system was evaluated with some Non-conformities (NCRs) and observations raised. These were used as key elements in the review of the system before final audit for certification.

With the confidence that the company's SMS is as close to compliance as only one step further .. it is time to call in the External Auditors of the administration or an organization, which is acting on their behalf, for the final assessment. The external Audit covered the company's activities of Technical Department, Marine, Operations, Training Fleet Personnel and DPA.

The system was evaluated against the provisions of the clauses of the ISM-Code. The Audits were strict and punctual by pinpointing any gaps or deficiencies that may exist .

The maturity of such audits was reflected within the non-conformities or observations raised, and these were tools for improvement and brooding the system.

The system was recommended for certification and a D.O.C. was issued on behalf of the Government of the Hashmite Kingdom of Jordan.

Certification, on May 1997, included bulk carries, passenger ships, and other cargo ships, the types available at management at that time.

Non-conformities were studied, discussed and investigated among all management activities. Corrective actions were decided with time schedule for implementation. Follow up ensured action was in progress in such a way that it concluded with rectifying any other deficiencies that might exist.

A vessel operated with a Safety management System needs to be certified. This resulted in the issuance of a Safety Management Certificate (SMC).

Among other types, the fleet of the company comprises five vessels that were required to meet the deadline of the first stage of implementation, the 1st of July, 1998. Three bulk carriers, one Ro-Ro passenger ship and a passenger high speed craft, were to start the process to obtain their SMCs.

External verification by an “IACS” member, acting on behalf of the administration, was arranged for two bulk carriers. The result was recommendation to issuance of SMC. A couple of minor (NCRs) or observations in each case were analyzed, discussed and utilized as key elements to further probe of the system.

A few weeks later, auditors of an “IACS” member audited the Ro-Ro passenger ship and recommended the flag administration to issue a SMC. The Safety Management System applied on the Passenger High Speed Craft implied the requirement to meet the provisions of the High Speed Craft Code (HSC Code), which now is made compulsory by SOLAS. The HSC code was analyzed and made the basis for which the SMS of the craft was formulated. The system was internally audited, NCRs. raised and corrective action decided.

External Auditing was arranged again by an IACS member, extension of the scope of the company's (D.O.C) was sought through an external audit. The scope was extended to include the passenger High Speed Crafts and the craft was recommended for a SMC.

5.5. Introducing Quality Standard ISO 9002

In way to achieve its ambitions for continuous attaining the above standards, the decision was made to consider the ISO:9002 standards at the beginning. The system being audited during the second annual verification of the ISM Code, not many changes had to be performed.

The Quality Manual, is the only document that was added to the manuals. The Quality Policy was re-stated to indicate the consideration of the standards of the ISO 9002 for Quality Management Systems. Quality procedures were re-arranged to be compliance with the standard. The system was prepared for external assessment with the ISM Code second year assessment. As a result, the company was ISO 9002 certified in may 1999.

5.6. The ISMA Code of Ship Management

Safety, Quality and Environmental Protection Systems got to be more than only a "certification target" for the I.S.M. Co. It developed further to be an aim to achieve and further to acquire.

ISMA Organisation had voluntarily set out its scheme towards perfection in Quality Systems in a reflection to self motivation that the company's business is the customers satisfaction and even will exceed his expectation .

I.S.M. Co. needed not to think twice to work on the ISMA Code. The additional clauses and requirements were made up and incorporated within the Safety Management System.

Work procedures were in place documented for Marine insurance activity, purchasing, Operations and Accountancy .

The company has set the plan to undergo final Audit for full membership in the forthcoming future.

5.7. The Cost of Developing, Implementing and Monitoring of the SMS

5.7.1. SMS Preparation cost

Developing the SMS of the company in accordance with the provisions of the ISM Code has urged the need for the following preparations and arrangements.

1. Assign the Designated Person Ashore (DPA)

The “DPA” was selected from the company’s sea going staff.

A. Training to the familiarization of the ISM -Code and Quality standards in general was performed in the following procedures :

I . Attending Internal Audit courses.

This was achieved locally at a cost of USD 500
for one course.

II. Lead auditor course, to quality Management Systems , ISO 9000 conducted locally a cost of USD 1500

III. ISM / ISO standards training course by (Ferriby Marine). This course is not available in Jordan and was held abroad, cost as follows (5 days)

Course fees	USD 1600
Travel expenses, residence	USD 1400

IV. Account is made to keep DPA updated with the latest developments in implementation and audit techniques of the ISM-Code, by attending seminars. Courses in this regard, at average cost

USD1500

V. The DPA, dealing with documentation of the system which relies mainly on electronic systems, i.e. computers, needed to attend training courses in this regard at a cost

USD 500

B. Annual wages and expenses

- Annual wages paid to DPA	USD 11’500
- Numeration’s	USD1000
- Medical and life insurance	USD 1200
- Social security	USD 1300
- Total	USD 15000

2. Assign deputy DPA

As to make account for cases when the DPA is traveling abroad, or in case of any emergency, one of the company’s management staff was appointed to act as DPA.

The above necessitated preparation of the concerned staff member as follows:

Internal audit course on Quality Management Systems, locally held in Amman USD 500

Auditor / lead Auditor training course, conducted local in Amman USD 1000

5.7.2. Consultation cost

To develop and establish the SMS in a proper way the Company used a consultant for advising the staff in establishing the SMS. A total of 10,000 USD were the cost for consultation.

5.7.3. Documentation of SMS

1. The SMS in association with vessels on board operations:

The DPA had to travel to Aqaba to visit company vessels arriving there to liaison with ship's masters and head of departments in establishing the procedures for shipboard operations.

Average annual cost:

Year 96: first stages of building up the system , with a rate of three visits per month and USD 100 /Visit USD 3600

Year 97: two visits / month USD 100/Visit USD 2400

Year 98: Regular visits to the ships for Internal Audits, follow up ....familiarization of ship's personnel with the SMS at the rate as per year 97 USD 2400

2. Issuance of manuals and printed material

prepared at the office , other than external publications,

for initial year of 96	USD 200
Year 97 and 98 together	USD 3000

5.7.4. Training courses for shore based Management

ISM Code / Quality:

All the shore based management team were, at different occasions attending courses locally in Amman for familiarization with the Quality systems. This included :

Technical superintendents and 2 assistants
Marine Superintendents
Operations Superintendents
Fleet Personnel Superintendents and Assistant
Purchasing officers (2)
Chief accountant (!)
Executive secretary (1)
Total 13 persons at a rate of USD 375 Person

Total cost	**USD 4875**

5.7.5. Training Courses for Crew

To maintain Emergency preparedness, to upgrade knowledge and to improve crew skills, Training courses were arranged locally at the Company head office for familiarisation with the SMS. Such courses are:

- First Aid
- Fire Fighting and Prevention.
- Personal Survival At Search And Rescue

Total number of persons to attend the courses is between 40-50 per year, at a rate of USD 300 for each person for all courses. **A total of 12000-15000 USD annually.**

5.7.6. Certification of Competency

I.S.M. Co. is managing vessels under Panama flag, Crew serving on these vessels need to have re-issued and endorsed their certificates to comply with STCW' 95 requirements and Panama requirements.

A total of 50 officers and 30 ratings need to have Panama certificates and Discharge book pear year. A rate of USD 350 for each certificate and USD 250 for each Discharge Book is charged by the Panamanian Administration.

A total of USD 25000 for issuing the required certificates and Discharge Books to comply with Panama requirements per annually with assumption that these crew will serve 12 month a year on that vessels.

5.7.7. External audit

Audit for certification to a (D.O.C.)

Required audit for the shore based Management Activities .

Trial Audit . at the rate of Per auditor /day .	USD 850
one auditor attended for one day .	
- Additional Travel expenses /communications per visit	USD 600
- Sample vessels, two vessels visited for two days	USD 850

Final audit for certification

Audit for issuance of (D.O.C.)	USD 1500
Travel expenses /communications	USD 600

Annual certification

For D.O.C. annual verification	USD 1800
carried out on May 1998	

Certification of vessels

Issuance of a Safety Management Certificate (SMC)

M.V. Al Safi / Bulk Carriers/ Jordan flag

The audit carried out at Aqaba	USD 2500
Charges for two days	

Travel /Communications USD 600

M.V. Concord / Passenger-Car ferry / Panama flag

Passenger vessel which needs two full day for audit according

Audit carried out in Aqaba

One -man day USD 1250

Travel /communication expenses USD 600

M.V. Bridge I / HSC / Panama flag

Audit carried out at Aqaba USD 1250

One man-day at one visit with F/B Concord

5.8. The Impact of the ISM Code on Vessels Running Costs

There is no doubt that by introducing the Safety Management System the Running Costs for the vessels will be increased specially for the first year of implementation. This increasing results from training of people and improving environment working conditions, both of which one precautionary measures to meet the requirements.

In fact, the increasing running costs mainly depend on the type, age, flag and class of the vessel. Fore instance, Passenger ships need more care in the Life Saving Appliances while Bulk Carriers need more care in the Maintenance and repairs.

Advantages stemming from the more systematic approach to Safety Management will be seen in longer term planning.

The following tables will illustrate the benefits on the Actual running costs for the vessels, which have a Safety Management Certificates.

Table 12. Actual Running Costs analysis for 1997 during the implementation of the SMS. Three different type of ships involved.

Account Name	M.V. AL-Safi R/C USD	F/B Concord	M.V. Bridge I
Dry Dock	130,000	3955	37,650
Repairs	53,021	139,628	52,878
Spares Parts	146,653	58,882	33,467
Deductible	0,0	0,0	0,0
Lub Oil	94,852	142,790	14,347
Stores	107,472	70,768	14,179
Provisions	58,578	101,000	160
Crew	329,909	318,401	131,548
Insurance	151,335	175,950	69,190
Sundries	39,614	17,954	6,266
Management Fees	27,000	23,400	9,000
Report Total	1,138,434	1,052,727	368,684
Daily R/C	3,119	2,884	1,010

Source: International Ship Management Co.

Table 13. Actual Running Costs Analysis for 1998.
Three different type of vessel involved.

Account Name	M.V. AL-Safi R/C USD	F/B Concord	M.V. Bridge I
Dry Dock	37,500	58895	80,000
Repairs	68,671	89,009	30,752
Spares Parts	70,336	43,537	26,963
Deductible	0,0	0,0	0,0
Lub Oil	62,068	136,462	10,863
Stores	70,848	46,982	12,056
Provisions	47,021	101,000	0,0
Crew	335,740	287,116	110,511
Insurance	146,358	113,417	63,077
Sundries	41,812	7,951	4,480
Management Fees	42,000	36,000	18,000
Report Total	922,355	920,369	356,703
Daily R/C	2527	2,522	977

Source: International Ship Management Co. Papers.

By comparing the actual running costs for the same vessels during and after implementing the SMS (Table 12&13), it is clearly seen that there is an significant money saving for the ship owners. This saving results from decreasing insurance premiums as shown in the figures because of the performance of the vessels. In addition, the crew expenses, which includes the training issues have a positive effect on the daily running costs as you can see.

As a result, even if you pay more money to improve safety to protect human life, to protect the environment and to avoid property damages, it is still an advantage.

Chapter six

Conclusions and Recommendations

6.1. Conclusions

By following a systematic framework such as the ISM Code, ISO 9002 and the ISMA Code, the author believes that the whole spectrum of the subject, from its development requirements to its applications, has been reached and developed through five previous chapters. This dissertation 1) reflects the author's view on safety and quality control in shipping, 2) points out safety and quality costs in shipping, 3) examines the economical implications of the safety and quality control in shipping and 4) provides practical techniques on how to develop, establish and implement the safety management system.

Safety and Quality Management Systems should be controlled and verified by the flag State. However, there are another parties involved in insuring that the system is implemented in proper way such as port state control, insurance underwriters and classification societies.

The majority of the passenger ships, gas carriers, tankers, bulk carriers and mobile offshore units achieved compliance with the ISM Code well before the deadline of 1st July 1998. But the way, in which some shipowners were able to achieve their own compliance by "buying manuals from consultants" and use of classification societies and consultants to certify ISM-compliance, has caused unease among ship managers.
A Safety Management System (SMS) set up to achieve the ISM Code objectives requires that the responsible party needs to know:

- The rules and regulations which apply.
- The Codes, guidelines and standards recommended by flag states, port states, classification societies and the industry in general.
- The risks involved in the business.
- The skills possessed by staff on shore and by crews.

Only then can the appropriate procedures, checks and policies which make up the SMS be designed to fit the company and then the benefits will be gained.

It has been shown that economies in the operating costs may be gained by having adopted and implemented a SMS in proper way and in compliance with quality standards (ISM Code / ISO 9002). Economies may take the form of increased efficiency within the company as well as through external cost savings. The benefits from introducing quality assurance systems may be seen in the long terms.

The set of minimum standards required by the ISM Code has been taken and manipulated by various elements of the industry-legal, corporate, commercial, and others. The responsibilities already exist under IMO, classification societies and other organisations. Parties involved should view the Code as a yardstick of excellence for the clean-up of the industry, to push out the unscrupulous owners and operators, to eliminate the substandard vessels and to exclude from the market the non-professional shipping outfits.

The implicit nature of the ISM Code will lead to inconsistencies in the certification process, particularly regarding the quality of the inspectors; there is also the question of conflict of interest within a classification society or other accreditation organisation. Flag States have an obligation in this regard . Numerous companies and organisations have

emerged offering quality assurance expertise for the institution and certification of the Code.

Shipbrokers are nervous about the implementation of the ISM Code - few long term charter parties contain a clause covering the ISM Code - H&M and P&I insurance could be difficult, fines or other penalties could delay ships - non entry into port too - an IACS database is being complied of compliant ships - on Internet http://www_iacs_otg_uk- will cargo insurers pay up - port state control at bunker ports.

Finally, the ISM Code and STCW 95 have built a bridge, linking Formal Safety Assessment from the end of this century to the twenty-first. FSA will be there to stay when it becomes mature and fully recognised by the maritime industry. It will deal with all risk characteristics by assessing them and treating them reasonably. Its purpose is to answer the urgent desire for a new concept of risk assessment. Its function is to safeguard the complexity of the new development of marine technology. Its aim is to provide the safety to lives at sea and to enhance the image of world shipping.

6.2. Recommendations

The introduction of the ISM Code is likely to be only the beginning of a struggle to improve the human role in shipping. Beyond the ISM Code and the revised STCW convention, IMO is committed to look in depth at the human element; but perhaps even more important is the fact, that the cost of human error is likely to become more and more expensive.

Training courses related to the improvement of staff in charge for verification and certification should be conducted as a basic Safety training, GMDSS training, etc., which are presently conducted to meet the STCW 95.

If the application of the ISM Code shall be practicable and reliable in the future, the importance of the following main points, the author believes, should be considered:

- The ISM Code is not just designed to add another type of control, but shall comprise a wider range of aspects than currently is the case**. A worrying number of single technical and operational controls** burdening the ship's crew shall - in the long run - be replaced by auditing in depth all technical, operational and managerial aspects of the company and the vessels over a longer time, thus giving the proof of a Safety Management System being within the ISM Code limits.

- In order to **avoid unfair competition** following cultural and traditional various ways to approach shipping, emphasis should be laid on the standards of education and training of government civil servants and class surveyors / auditors working on behalf of Administrations, be it flag States or port States.

- Therefor, **a sound evaluation of entrance requirements** has to be the starting point, which must be followed by additional training in fields where this seems to be appropriate: language capabilities, professional experience and quality management / auditing.

- The sense of the ISM Code is, inter alia, to **strengthen the link between Company and Ship,** but also between flag state administration and companies operating ships under its flag.

To avoid economical implications for the Safety and Quality Management systems, the system must be handled and implemented properly. Therefor, the author believes that the following are areas where the running cost economies might be improved:

Repairs and Maintenance

The following arrangements should be taken into account in making savings:

1. Analysis of requirements, improved planning and organisation, control and timing of maintenance and surveys;
2. Planned maintenance, condition monitoring, improved crew productivity;
3. Budgeting and inventory control of spares;
4. Optimisation of spare part inventory and delivery system

Stores and Lube Oil

The following main points should be taken into consideration in making savings:

1. Improved budget and inventory control;
2. Improved purchasing procedures;
3. Effective onboard management relieving shore-based costs
4. Wider use of computerisation;
5. International purchasing agreements; and
6. Economies in use and re-use of lube oil.

Training

1. Training will be required up to ISM and STCW standards which will cause a new cost element .
2. Wide use of onboard training systems and equipment should improve the economy.
3. Full involvement and use of personnel will be required.
4. There should be more emphasis on recruitment, professional training and career planning.

H&M and P&I Insurance

1. Improved ship and fleet safety records, effective work safety and health organisation and records; also improved cargo out - turn and other quality improvements should provide good arguments in negotiations with insurers;
2. Consideration of more selective insurance by using risk analysis and with possibility with some self-insurance.

Cargo related

1. Terms of Bill of Lading, charter party, stevedore contracts, port dues, etc.;
2. Improved handling methods and reduction of damage claims;
3. Adjusting itineraries and schedules;
4. Increased load factors;
5. Improved stowage to achieve quicker turnaround, customer satisfaction and less damage;
6. Avoidance of waiting time.

Administration

1. Modification of management structure, staff and other costs, in light of new quality demands;
2. Improved use of computers, information technology and communications;
3. possibly contracting out of some aspects of management;
4. Integration and making more use of sea-staff in the shore based;
5. Review of office premises and location and administrative costs;
6. Ongoing improvements in management

The good establishment of the Safety Management System and the good monitoring and the continuous improvement of the system can only be obtained by meeting the previous expectations. Furthermore, Formal safety assessment and strict quality assurance procedures will have the same result on the benefits.

Bibliography

Alan W and Glendon A (1998). *Managing risk - critical issues for survival and success into the 21st century.* ITP, International Thomson Business. London Press

Barker, W D (1998). 'How far should risk assessment go developing a working approach to safety management?'. *Seminar on Safety Risk Assessment in Shipping, 19-20 February 1998, London.* London: International Institute of Research Ltd.

BIMCO (1998). Millennium bug put under the spotlight. BIMCO Bulletin. Volume 93, No.5 Pp.55-56.

BSI (1995). *Quality Management Handbook: part 1.* London: British Standards Institution.

Dale, B G & Oakland, J S (1994). *Quality Improvement through Standards*. Cheltenham, England: Stanley Thornes.

Det Norske Veritas (1996). *International Safety Management Code - Development & Implementation Course, Piraeus, September 25-27, 1996*. Oslo: DNV

Dombey, Peter (1995). How ship managers and owners can benefit from the ISM Code. - In: *ICMT'95: Innovations in Safety and Environmental Protection: conference Papers, 15 - 18 Nov. 1995, Singapore.* Sponsored by Institute of Marine Engineers, Singapore. London: Institute of Marine Engineers, Pp.311-330.

Drewry (1994). *Ship costs in the 1990s: the economics of ship operation and owner ship.* London: Drewry Shipping Consultant

Drewry (1998). Cost of Quality in Shipping: *The Financial Implications of the Current Regulatory Environment.* November 1998. London: Drewry Shipping Consultant

Eriksson, Per (1998). Classification Societies and its work. *Lecture notes*, World Maritime University, Mall, Sweden

Felsted, A (1998). P&I clubs warn clients on ISM verification. Lloyd's List, September 18, Pp.5.

Ferriby Marine (1997). *Auditing Maritime Safety Management System. Training course, 19th-20th October 1997*, Cairo, Egypt. Cairo, Egypt: Ferriby Marine

Fitzsimmons, A (1999). Strange days: the millennium bug and the GPS glitch*. BIMCO Review 1999,* (Pp. 95-97). London: Stroudgate Plc.

Guldenschuh, C F (1998). The port state's role in ensuring the ISM Code. *BIMCO Review 1998, (P*p. 28-29). London: Stroudgate Plc.

Horck, J (1998). Quality Management (ISO 9000 Series). Lecture notes, World Maritime University, Mall, Sweden

Hunter, C (1997). "The Revised STCW Convention". *BIMCO Review 1997*, (Pp.89-91). London: Stroudgate Plc.

International Chamber of Shipping (1998a). What role for the flag state? ICS 1997/1998 Annual Review. (Pp. 9 -10). London: Edward Moritimer Ltd.

International Chamber of Shipping (1998b). MARPOL - Its revision and application - New controls on atmospheric pollution. ICS 1997/1998 Annual Review. (Pp. 12). London: Edward Moritimer Ltd.

IMO (1994). *International Safety Management Code (ISM)*. London: IMO

IMO (1996). *FSA: Safety assessment of passenger/ro-ro vessels.* 'Submitted by Denmark, Finland, Norway, Sweden and the United Kingdom'. (MSC 66/INF.23). London: IMO.

IMO (1997). *SOLAS, Consolidation Edition.* London: IMO.

IMO (1997). MARPOL 73/78 Convention, Consolidation Edition. London: IMO.

IMO (1998). IMO 1948-1998: *A process of change*. Focus on IMO, September, Pp.1

INTERTANKO (1996). *Legal Implications of the ISM Code*. OSLO: INTERTANKO.

International Shipping Federation (1998). Implementation of STCW 95. The ISF Year 1998. London: ISF. Pp.12-14.

John, M D (1982). Ship Management Series: *Running Costs.* London: Fairplay Publication, 1982.

Jönsson, J ÅKE (1998). *ILO Convention 147 - Port State Control*. Lecture notes, World Maritime University, Mall, Sweden.

Joyce, M E (1995). *How to lead your business beyond TQM: making world class performance a reality: (beyond total quality management).* London: Financial Times / pitman publishing

Levy, H (1998). The ISM Code - Impact on P&I cover. BIMCO BULLETIN. Volume 93. No.6, Pp.36-41. Copenhagen.

Lloyd's Register of Shipping (1995). *Quality Management System Assessments - Training Course,* (10th-14th December 1995 Amman). Amman: LR, Jordan

Lloyd's List (1998). Bureau Veritas shrugs off ISM Code detention record. *Lloyd's List*, November 17, 1998. Pp. 1. London

Lloyd's Shipping Economist (1998). Close Inspection: Banks are walking up to the implications of the ISM Code, finding that, among other things, non-compliance may affect vessel incomes, sales and insurance*. Lloyd's Shipping Economist,* September 1998, Pp.21

Ma, S (1998). Maritime Economics. Lecture notes, World Maritime University, Mall, Sweden

Massad, M (1998). Ship manager spreads its wings into neighboring countries. *Lloyd's List*, September, 24 Pp.6.

Massad, M (1998). The ISM Code; Steering the World of Shipping. *CDG/WMU follow-up seminar for WMU graduates on ISM Code - Maritime Safety Management Systems and Compliance, 07 - 12 Dec. 1998, Mall.* World Maritime University Mall, Sweden.

MER (1996). Do not let the ISM Code be just another 'paper tiger': Report from the 3rd International Summit on Safety at Sea, Oslo 14-15 May 1996*. MER* July, Pp.18.

Mottram, D J (1996a). Quality - one more time. BIMCO Bulletin, v. 91, No.5. Pp. 14-18.

Mottram, D J (1998b). 'Effectively incorporating risk assessment into safety management systems: Risk Assessment and the ISM Code'. *Conference on Safety Risk Assessment in Shipping, 19th February 1998; London.* London: IIR Ltd.

Mottram, D J (1999). The management structures of shipping companies. BIMCO Review 1999, Pp.64-65. London: Stroudgate Plc.

Mukerjee, P K (1998). *Implementation of IMO Conventions through National Legislation.* Lecture notes. World Maritime University, Mall, Sweden

Mukerjee, P K (1998). Rights and Duties of Flag States. Lecture notes, World Maritime University, Mall, Sweden

Nair, J K M (1998). ISM Code - The Profitable Partnership. *CDG/WMU follow-up seminar for WMU graduates on ISM Code - Maritime Safety Management Systems and Compliance, 07 - 12 Dec. 1998, Mall.* WMU, Mall, Sweden.

O'Neil, WilliAm (1997). The rising value of quality. In: David Hughed. *Ship Management no turning back from ISM Code. (* Lloyd's List focus, Feb. 1997). London: Lloyd's List Pp. 2

Osler, D (1998). Bureau Veritas shrugs off ISM Code detention record. Lloyd's List. 17 Nov. Pp.1.

Pardo, F (1998). *International Pollution Discharge Standards. Main requirements on pollution discharge for MARPOL 73/78 Convention.* Lecture notes, World Maritime University, Mall, Sweden

Paul, S (1995). ISM Code Implementation. *Seaways,* December Pp.1

Petersen, S S (1999). The human element. BIMCO Review 1999, (p. 66.) London: Stroudgate Plc.

Prasad, R (1998). The ISM Code and STCW 95. *CDG/WMU follow-up seminar for WMU graduates on ISM Code - Maritime Safety Management Systems and Compliance, 07 - 12 Dec. 1998, Malmö .* WMU, Malmö, Sweden.

Pressly, S.J (1991). Ship *Operations and Safety Management in a ship management company.* The Management of Safety Shipping: Operations and Quality Assurance. The Nautical Institute, London

Smith, J R G (1996). IACS and IMO: The essential relationship. IMO, Oct. 1996,

Svensen, S-H (1998). Introduction to P&I club insurance. GARD-Norway. *Lecture notes*, World Maritime University, Malmö, Sweden

Wadmark, Olle (1998). The ISM Code and Port State Control and The Swedish Way - National Implementation by Flag States. *CDG/WMU follow-up seminar for WMU graduates on ISM Code - Maritime Safety Management Systems and Compliance, 07 - 12 Dec. 1998, Malmö .* WMU, Malmö, Sweden.

Appendix 2-1

2.1 Safety and Environmental Protection Policy.

- International Ship Management Company (ISM) would like to emphasize to all company employees both ashore and at sea that Safety and Environmental protection have its highest priority.

- The company policy in this regard is to achieve and maintain its objectives as described thereunder and ensure its implementation at all levels by both ships and shore staff.

- The company's Safety Management System (SMS) describes the above policy in details and its contents have been reviewed to indicate compliance with the requirements of IMO resolution A741(18);the ISM-Code and ISO:9002 as defined with the ISMA-Code , Administrations and classification societies and will be reviewed regularly for their continuing relevance and effectiveness.

- It is of an extreme importance that all shore-based and shipbased staff understand the company policy as far as it effects them, and all new juniors to study the policy as part of their familiarization.

Company Safety Objectives:

a) The company's safety objectives are those established by the overall principles of ISM Code and the ISMA-Code and will be reflected within the company SMS:

- To provide for safe practices in ship operation and safe working environment.
- Establish safeguards against all Identified risks.
- Continuously improve the safety management skills of personnel ashore and onboard ships and for Emergencies related to both safety and environmental protection .

b) The above objectives will be achieved by Developing, Implementing and Maintaining the company's SMS which includes the following functional requirements:

- Define safety standards to be implemented aboard vessels for all aspects of operation.
- Provide a Healthy and Safe working Environment to all individuals.
- Identify all the risks and hazards associated with working practices, which may threaten safety in the day to day operation of the vessel.
- Upgrade individual skills, specially pertaining to safety on board ships & ashore.
- Improving individual skills, especially those relating to safety and the environment.
- Reviewing all mandatory rules, regulations, industry codes and guidelines that are relevant to specific vessel types and trades.

The above will be carried out and Implemented under the umbrella of the Hashimite Kingdom Of Jordan legislation as well as International Maritime Organization, classification society and any other pertinent rules.

2.2. Drug and alcohol policy

It is the policy of the company to prevent drug and minimize Alcohol consumption of vessels for the safety of life at sea by :

1. Stop selling alcohol on board sea going vessels.
2. Selling alcohol for passengers only on board passenger vessels.
3. Crew is not allowed to bring alcohol on board unless permitted by master in a very small quantity.
4. Crew is not permitted to attend their duties if they have been clearly noticed drunk; if so they are subject to maximum penalties.
5. Crew is not allowed to drink in saloons, mess rooms, recreation rooms or on deck, but only in their cabins.
6. Any crew member seen drunk on board is subject to a full medical report, including Alcohol test, prior to joining any of the company vessels.

This policy is implemented through the company's Safety Management System. All personnel within the organization are required to comply with the company policies at all times.

MANAGING DIRECTOR.

Appendix 2-2

The Quality Assurance Engineer is the **D**esignated **P**erson **A**shore (DPA) and he is the company's Management Representative. His duty is to ensure that all personnel involved are compliance with the S.M.S as defined in the Safety & Quality Management Manual as required by the ISM Code, the Quality Standards of ISO 9002:1994 and the ISMA Code of Ship Management which incorporates the fore mentioned standards.

4.1 DPA Responsibilities

- Liaise with vessels' Masters on routine issues of the S & Q M. System.
- Ensuring the S.M.S is understood by sea staff and office employees.
- Reporting directly to the General manager on significant issues.
- Carry out both ship board and shore based audits of S & QM System.
- Investigation of reported Non-Conformities in cooperation with the vessels' masters and superintendents.
- To ensure that adequate resources and shore based support are applied.
- To ensure that all requirements of the ISM Code, ISO 9002 standards and, therefore, ISMA Code and other matters affecting quality are implemented and maintained .

4.2 Authority

Monitoring the Safety, Pollution Prevention and Quality Assurance aspects of the operation of vessels, including the review of the following documents:

1. The Vessel's Monthly, Quarterly and Annual Inspection reports as received.

2. The minutes of Ship's Safety Committees Meetings Reports.
3. Ship Safety Inspections.
4. Ship and Shore drill records.
5. Safety / Pollution Prevention Equipment Maintenance Reports.
6. Defect / Damage/ Incident/ Accident/ Near-miss/Non-Conformity reports.
7. New Legislation and Industrial guidelines.

4.3 Qualifications Required for a DPA:

The DPA, being the Internal Auditor of the Safety & Quality Management System, and appointed by I.S.M. Co, is to be a formerly seagoing Chief Engineer Officer with related certificate and a min. of four years sea experience on board ships. If having no audit experience, he would be arranged to attend an approved Internal Audit and Lead Auditor courses.

4.4 Deputy of (DPA):

In case of absence of (DPA) or traveling abroad on company's business, the Managing Director will assign his Deputy from the office. If DPA absence is sudden or an emergency, the Assist Tech. Supt. (A) will be in charge to perform his Duties.

Appendix 2-3

VESSELS OPERATING MANUAL
"CHECKLIST"

INDEX

CL.B6 Safety equipment checklist.
CL. B6.1 Emergency Generator Starting procedure
CL. B6.2 Emergency Fire Pump Starting procedure
CL. B6.3 Emergency Air compressor Starting procedure
CL. B6.4 Life boat Engine.
CL. B6.5 Emergency Flaps
CL. B6.6 Emergency Lighting / Batteries
CL. B6.7 Quick closing valves

CL. B7 Familiarization with Engine Room Machinery
CL. B8 Safe working practice.
CL. B8.1 Working Aloft
CL. B8.2 Lifting cranes while vessel at sea.
CL. B8.3 Working over side
CL. B8.4 Working on monkey island.
CL. B8.5 Entering into an enclosed space
CL. B8.6 Permit to carry out hot work
CL. B8.7 Working on lathe Machine/0
CL. B8.8 Transfer of D.O/F.O
CL. B9 Vessel's Security check list.
CL. B10 Cargo securing check list.
CL. B 11 Water tight integrity Checklist
CL. B 12 Procedure for loading/discharging reefer containers

PART C

CL.C1 Preparation for loading.
CL.C2 Loading.
CL.C3 Stability.
CL.C4 Hazardous cargo operation.
CL.C5 Ballasting.