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WORLD MARITIME UNIVERSITY
Malmö, Sweden



**A STUDY OF THE ROLES OF CLASSIFICATION
SOCIETIES UNDER THE NEW MARITIME
ATMOPHERE**

By

SUN LAIHUI
China

A dissertation submitted to the World Maritime University in partial fulfilment of
the requirements for the award of the degree of

MASTER OF SCIENCE

In

MARITIME SAFETY AND ENVIRONMENT PROTECTION
(Operational)

1999

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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DEDICATION

TO MY PARENTS

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SUN Laihui

ABSTRACT

Title of Dissertation: **A Study of the Roles of Classification Societies under the
New Maritime Atmosphere**

Degree **M.Sc**

In order to respond to fast increasing maritime disasters, IMO has launched a series of initiatives. These initiatives have intended to force the shipping industry to change its culture in the human aspects, and have affected the maritime atmosphere.

At the same time, The Leading Classification Societies realise that their traditional roles of classification granting and statutory certification mostly concerning technical aspects can not successfully bring their abilities and capacities into full play. Instead, they should take hardware (the ship itself) *and* software (people and management) into integral consideration, although the human aspects traditionally have only belonged to flag state administrations and shipping companies.

In the course of the development of a focus by these Leading Classification Societies focusing on these human aspects, many issues of the roles of the Leading Classification Societies have been put forward. The issues include, for example, whether they will expand more, whether they will have more power and whether they should accept unlimited liability.

Through this dissertation, the relationships among the needs of flag state and port state administrations, the capacity of classification societies and the clout of IMO are discussed to explain why the roles of the Leading Classification Societies have been and are being improved. Lastly, the dissertation concludes with what the genuine roles and the direction of development of the Leading Classification Societies are, which will fulfil the aim of the Leading Classification Societies—to promote the highest standards in ship safety and prevention of marine pollution.

Key words: Classification, Certification, Service, Assistance and Co-operation

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LIST OF ABBREVIATIONS

ABS	American Bureau of Shipping.
BV	Bureau Veritas.
CCS	China Classification Society.
CL	leading Classification Societies.
CMI	Comite Maritime International.
CRS	Croatian Register of Shipping.
CSJWG	Joint Working Group on Safety Issues <i>re</i> Classification Society.
DNV	Det Norske Vewritas.
DOC	Document Of Compliance.
FOC	Flag Of Convenience.
GL	Germanischer Lloyd's.
GPG	General Policy Group.
gt	Gross Tonnage.
HSSC	Harmonised System of Survey and Certification.
IACS	International Association of Classification Societies.
IMO	International Maritime Organisation.
IRS	Indian Register of shipping.
ISM	International Safety Management.
KR	Korean Register of Shipping.
LL	International Convention on Load Line, 1966.
LR	Lloyd's Register of Shipping.
MARPOL	International Convention for the Prevention of Pollution From Ships, 1973, as modified by the Protocol of 1978 relating thereto.
MEPC	Maritime Environment Protection Committee.
MSC	Maritime Safety Committee.

NKK	Nippon Kaiji Kyokai.
PRS	Polish Register of Shipping.
PSC	Port State Control.
PSCO	Port State Control Officer.
QSCS	Quality System Certification Scheme.
R&D	Research and Development.
RINA	Registro Italiano Navale.
RS	Russian Register of Shipping.
SMC	Safety Management Certificate.
SMS	Safety Management System.
SOLAS	International Convention for the Safety of Life as Sea, 1960 and 1974.
STCW	International Convention on Standards of Training, Certificates and Watchkeeping for Seafarers, 1978, as revised in 1995.
TONNAGE	International Convention on Tonnage Management of Ships, 1969.
USCG	United States Coast Guard.
VLCC	Very Large Crude Carriers.

CHAPTER ONE

*To the wise man, there are no hopeless people, for he knows
how to educate them; and there are no useless things,
for he knows how to make use of them.*

Lao Tzu

1. Introduction

1.1 General

Leading Classification Societies (CL) have, for many years, carried a major responsibility for ensuring the safety of ships at sea. In recent times, in a number of ways, this task has become more difficult, and the problems affecting CL themselves as well as the shipping industry have been the focus of many public debates. If the problem is not resolved or satisfactory with the public, adverse effect to CL will become more and more serious.

In fact, classification is a very old process that had its origin more than two centuries ago. Although to have a class is not mandatory in theory, in fact, some kinds of factors such as the binding of international instruments, and the condition of measuring ships' insurance premiums, force shipowners to provide their operating ships with classes. As time goes by, classification performed by CL is being developed through the improvement of technology, i.e. Research and Development (R&D).

In the last few years, there has been several measures taken by maritime communities, such as the coming into force of the ISM Code (International Safety Management Code), the revising of the STCW-95 (the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (1978), revised in 1995) and the creation of PSC (Port State Control), in order to meet the requirement “Safety of Ships and Pollution Prevention.” CL, as one type of the maritime organisation regularly focusing on the safety of ships, are adapting and evolving to meet the challenges of the new safety culture and also looking at the initiatives which have substantially changed the framework within which the safety of merchant ships is managed. In the course of the change, they must play important roles in the changing situation, and be deeply involved in it.

As time goes by, everything changes. The roles of CL have become a very hot topic of discussion and debate. For the author, at least, the point that the initially traditional roles of CL have been changed is not agreed with. The traditional roles of CL are to help shipowners design their ships, supervise the construction and certify their ships to be able to sail on the high seas. CL also have to follow up ships through their lifetimes and carry out periodical inspections to reconfirm to the owners and their clients that the ships still remain in a seaworthy condition. In another words, the essential role of CL is to provide an independent technical assessment of a ship’s fitness to go out at sea.

But what and how roles are being played by CL now still has no crystal-clear answer in spite of fragmentary articles delivered in the media. Through the dissertation, the author would like to try to do his best to systematically analyse all the relevant aspects in order to give a profile of CL to the maritime field.

1.2 Systematic Approach and the Objective of the Dissertation

Actually the topic is a big project; it will take a great deal of time to understand the actual details of CL as well as of International Associations of Classification

Societies (IACS). The author has tried his best to contact some leading societies and other organisations by means of electronic tools or interviews to consult with them about the theme.

When the traditional roles are basically described and the present roles are analysed, no class service concerning the offshore mobile rigs will be mentioned. The reason is my focuses on the CL roles closely related to the maritime transportation field, and here this part, offshore mobile rigs, is not worth mentioning.

Recently the focus of the dispute on CL in the maritime field has been on its roles, which have been “hot talk” affecting the forward stride of CL.

Through this dissertation, the author would like to:

- Describe the traditional basic situation and roles
- Integrally analyse the situation of the maritime industry
- Identify present performances of CL within the maritime industry
- Make comparison between traditional roles and present roles of CL
- Furthermore come to the genuine roles played by CL

Furthermore, these demonstrate that the classification, certification and service in relevant aspects provided by CL is necessary and suitable for flag administrations, PSC, shipping industry, underwriters, etc. As a result, any criticism from other communities blocking the foregoing involvement of CL will not hold water. If flag administrations, shipowners and CL are thought of as three poles supporting the safety of ships sailing at sea, the absence of CL naturally will lead to the capsizing of the frame of ship safety.

Therefore, the evolution of the roles of CL intends to give assistance to establishing a safety culture in the shipping industry, which is changing from reactive regulating to proactive regulating, from knowledge-based people to skilled-based ones, from

performance behaviour to compliance behaviour. All of these are reasonable and realistic.

Summing up, hopefully the dissertation will open, enlighten and contribute to the healthy development of CL, and at the same time deny distortion, and furthermore be beneficial to CL, and advantageous to the whole maritime industry.

CHAPTER TWO

*He does not show himself, and so is conspicuous;
He does not affirm himself, and so is illustrious;
He does not brag, and so has merit; he does not
boast, and so endures.*

Lao Tzu

2. Review of the Basic Status of Classification Societies

2.1 Origin of Classification Societies

Before the present roles of CL are explained, it is necessary to trace back to the origin of CL. Compared to the past story, the new status of CL will be crystal-clear.

People will never forget Edward Lloyd, the great name closely linked with Lloyd's Register of Shipping, who ran a coffeehouse in the city of London in the late 1680s. At the same time, the ingenious coffeehouse keeper collected information on ships, their ages and characteristics, master, etc. This information was delivered to his customers by means of announcements made by a waiter from a pulpit. The coffee house became so attractive that the shipping businessmen of that day, the majority of whom were underwriters, gathered there to receive intelligence about ships offered for charter, and by the exchange of information among each other, they ensured for themselves a degree of protection.

In the following years, more and more underwriters came there to negotiate the terms of insurance for cargoes and ships on a less risky basis.

In order to respond to spreading European colonisation and insuring growth of world trade, underwriters formed a committee to develop lengthy and hand written registers of ships called “Green books”, in which ships were “classified” by letter and number according to their so-called general condition.

In reality, the book reflected the interests of underwriters with discrimination. The appearance of the register during 1797-1798, that while a ship built on the Thames could remain in the highest class for 13 years, a similar ship built elsewhere could only remain in the first class for eight years, provoked the members of shipping community. The members reacted by forming their own committee and setting up their own register book. So in 1799, a new register book appeared. This became known as the “shipowner register” or “Red book”.

There is no doubt that the “Green Book” and the “Red Book” naturally existed in opposition. The battle between the two registers continued for 35 years and almost led to financial ruin for both. Fortunately, good sense prevailed and the two registers merged and were reconstituted as Lloyd’s Register of British and Foreign Shipping in 1834, the title of which was later reduced to today’s well-known name ‘Lloyd’s Register of Shipping (Lloyd’s)’.

This single register was governed by a general committee, which was composed of both shipowners and underwriters, and published the first commonly recognised rules. Since then, the modern classification came into force.

A similar principle, at that time and later, guided other countries to develop their own registers. The reputable leading CL are listed in alphabetical order as follows:

- American Bureau of Shipping (ABS), New York, USA, in 1862
- Bureau Veritas (BV), Paris, France, in 1828
- China Classification Society (CCS), Beijing, China, in 1956
- Det Norske Veritas (DNV), hÆrik, Norway, in 1864

- Germanischer Lloyd's (GL), Hamberg, Germany, in 1867
- Korean Register of Shipping (KR), Seoul, Korea, in 1960
- Lloyd's Register of Shipping (LR), London, U.K., in 1760
- Nippon Kaiji Kyokai (NKK), Tokyo, Japan, in 1899
- Poliski Rejestr Statkow (PRS), Gdansk, Poland, in 1936
- Russian Maritime Register of Shipping (RS), St. Peterburg, Russia, in 1932
- Registro Italiano Navale (RINA), Genova, Italy, 1861

2.2 Classification

2.2.1 Classification Concept

From the traditional point of view, classification has been based on experience about measurement and mathematics, precise quantifiable scantlings and strengths, thickness and material quality, concerning the technical aspects. It makes sure that the ships are designed, built and maintained its whole lifetime to sound technical standards, established by CL.

The classification process of a new building has the following phases:

- Plan approval
- Supervision during the building, dock trials and sea trials
- Completion of the new building
- Class maintenance during the lifetime of the ship

The above mentioned steps indicate that the classification only covers the structural and mechanical strength of ships, and it does not consider safety of life and pollution prevention aspects, which are stipulated in the SOLAS Convention (International Convention for the Safety of Life at Sea) and the MARPOL Convention (International Convention for the Prevention of Pollution from Ships).

2.2.2 Necessity of Classification

It is well known that the classification performed by CL is not mandatory, but it can be said it is necessary.

Originally, when the term ‘class’ was created, the definite purpose of it was to evaluate the condition of ships, which underwriters needed to know to assess the risks they faced. However, even today, classification is still essential to ship insurance, and there are stark clauses in insurance agreements that non-classified ships are not insured by insurance companies.

Besides the above-mentioned reasons, when shipowners are contracting newbuilding with shipbuilders, they request the newbuilding to be classified by CL in order to comply with certain quality standards. Additionally, ships with a valid classification certificate are more valuable than others.

2.2.3 Distinction between Classification and Certification

Classification and certification often are the subject of lecture. But it is difficult to clearly distinguish one from others.

“Classification” is an ongoing process over the lifetime of a ship. It applies to a ship as a whole and involves verification of compliance with standards established by the class society.

“Certification” is a statement of fact for a particular time and can apply to the whole ship, an entire installation or a single piece of equipment. It involves compliance to a national, international, or industrial standard (Surveyor, 1997).

2.3 The Root of Classification Societies—Rules

The backbone of any CL, and the foundation of all its expertise and usefulness, is its individual rules. Though all CL share the same objectives of developing and

maintaining high technical standards and enhancing the safety of property and life at sea, each individual CL generates its own rules.

Since 1834 when the first rule was addressed by Lloyd's, the development of the rules has always been hand in hand with the evolution of ships from wooden ships to present iron and steel ships. The rules were produced on the basis of considerable research and development to keep abreast of advancing technology as well as reflecting the results of service feedback. They contained detailed requirements for:

- Materials
- Ship structures
- Main and auxiliary machinery
- Control engineering system
- Electrical installations

In the course of a ship's lifetime, after the building plan has been set out, the newbuildings are administered through a design view and survey process. After construction, a surveyor from CL, through conducting periodic surveys, determines if the ship is being so maintained that the ship condition is in accordance with the rules.

2.4 Traditional Survey for Satisfaction of Classification

The term "survey" is an activity that surveyors from recognised CL independently perform or supervise, like examination, inquiry, investigation, inspection, measurement and repair or recovery of the ship.

From the traditional point of the view, the class survey is the CL's unique activity through setting out their separate survey procedure. After completion of the newbuilding built and surveyed according to the CL's standards, the first class certificate is issued. In order to keep and satisfy the class throughout the lifetime of the ship, interval surveys required by class rules should be carried out (Table 1).

Types of Class Surveys

Type of Survey	Principal Content	Period/Year(s)
Special Survey	A thorough and complete survey of all the items: thickness measurements of the hull, pressure testing of the tanks, opening up and testing the running of the machinery; for tankers, especially tankers of more than ten years, it is more stringent and extensive	5
Annual Survey	A general examination of hull and appliance machinery, electrical plants, steering gear and fittings. It is mandatory for passenger ships.	1
Docking Survey	Required for the following items: the hull part below the deepest load waterline, rudders, thrusters, sea valves and overboard discharges	2.5
Boiler Survey	A survey containing external and internal visual survey of water/steam, drums and shell, casing and insulation, combustion chambers, oil burning units, etc.	2
Shaft Survey	A survey focusing on the shaft and bearings	At intervals

Table 1

Besides the above mentioned regular classification surveys, in the event of a ship running aground or other damage or modification and maintenance repairs which may affect class, an additional survey should be carried out. The survey is called an occasional survey.

2.5 Relationship between Leading Classification Societies and Maritime Administrations

2.5.1 Obligations of the Administration

It is the government's obligation to implement the international conventions, such as LL (International Convention on Load Lines, 1966), MARPOL, SOLAS and TONNAGE (International Convention on Tonnage Measurement of Ships, 1969), to which the government has become signatory.

However, it should be recognised that almost no government has the acceptable capacity extensive enough to perform all aspects under the requirements of the conventions. Furthermore, besides international instruments, national regulations are stipulated to administer the ships flying the state flag. The implementation and execution are very complicated, and demand large resources.

It has earlier been mentioned that CL took into consideration the requirements of various conventions when CL set out or updated their rules. But the philosophy to include various conventions in their rules has been difficult to realise in all cases. The coverage of the survey according their own rules, to a great extent, excludes life-saving appliances required by the SOLAS and the protection of the environment as regards the MARPOL, etc.

Anyway, it is possible that not only overlaps, but also supplements, exists in the relationship between the CL and administration (Table 2).

The Relationship between Class Rules and National Legislation

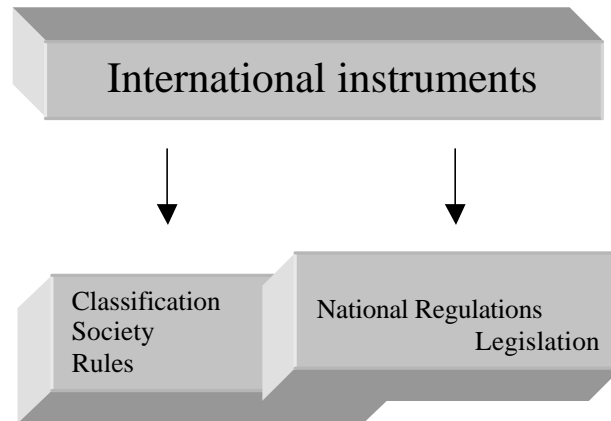


Table 2

What is ever more important is the abundant technical resources and world-wide network the CL generally have, as the only organisation being capable of meeting the needs of administrations and the requirements of IMO (International Maritime Organisation) in this respect.

2.5.2 Agreement on Delegating Authorities between Both Communities

2.5.2.1 International Basis for the Agreement

Actually, the legal contract or agreement is not a recent arrival. Before the First World War, it existed.

Under the provisions of Regulation I/6 of SOLAS 74, article 13 of Load Line 66, Regulation 4 of Annex I and Regulation 10 of Annex II of MARPOL 73/78 and article 6 of Tonnage 69, many flag states may delegate and authorise organisations to carry out the surveys and certification as required by these conventions on their behalf.

Recently, IMO Assembly Resolution A. 739 (18) and MSC Circ. 710/MEPC Circ. 307 on “Guidelines for the Authorisation of Organisations Acting on behalf of the Administration” were laid out. The mechanics of verification, monitoring and liability are included in the form of a formal written agreement. Additionally, CSJWG (the Joint Working Group on a Study of Issues *re* Classification Society), which was formed in 1992 in the Executive Council of the Comité Maritime International (CMI), also drafted the model clauses, referred to as Annex B/Model Clauses/Part I, for inclusion in the agreement between the CL and flag state.

2.5.2.2 Function of the Agreement

The agreement is a compromise. When the activity of delegation occurs, the administration, as the government of the shipowners, is responsible to protect the interest of the shipowners. It would like to transfer more authority to CL under the same conditions of fees and safety standards. On the other hand, the CL at least should ensure their basic interest for their needs of the development. As a result, both compromise in order to match their separate interests through negotiation.

The agreement is a document mainly including the execution of functions, legal basis of the functions, reporting and exchange of information with respect to development of rules/regulations and legal liability (Appendix 2 of Resolution A. 739(18)). It establishes the legal basis if some conflict happens.

In brief, after the building of the agreement, the administration should hold the responsibility to supervise the performance of the recognised CL to protect national interest, and the CL must duly do what they said in the paper and can not become the partners of the shipping company.

2.6 Statutory Surveys and International Instruments in Relation with Survey

2.6.1 Statutory Survey

The statutory survey is the foremost one in the aforementioned delegations of authority from the administration to the CL. A statutory survey is mandatory under the requirements of the national law and international instruments. There is no doubt that the class survey belongs to CL. At the same time, the statutory survey is undertaken by them too. When CL perform a kind of survey, under the situation of the integration between the class survey and statutory survey, the harmonised survey by CL is manifest and reasonable.

2.6.2 International Instruments in Relation with Survey

International instruments and guidelines, such as conventions, protocols and codes, set the lowest level of safety for adoption in different countries, some of which legislate more strictly than IMO. If the country is signatory to the instruments, the recognised CL shall act at least according to the international requirements, which depend on the agreement between them. Statutory surveys generally are bound by the following international instruments and guidelines:

- International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS 1974)
- Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974, as amended
- Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, as amended (MARPOL protocol 1978)
- International Convention on Load Line, 1966 (ILLC)
- International Convention on Tonnage Measurement of Ships, 1969 (Tonnage 1969)
- Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREG 1972)
- International Code of Safety for High-Speed Craft (HSC Code)

- International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code), Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)
- International Gas Carrier Code (IGC Code), Code for the Construction and Equipment of ships Carrying Liquefied Gases in Bulk
- International Convention for Safe Containers (CSC), 1972

2.7 International Association of Classification Societies

2.7.1 Creation of the International Association of Classification Societies

The establishment of IACS is as result of the advocating co-operation and unified rules. However it evolved facing difficult and arduous stage before the foundation of IACS.

IACS can trace back its history to the Load Line Convention of 1930. Under Article 9 of the convention, it is recommended that CL recognised by administrations should confer from time to time with a view to securing as much uniformity as possible in the application of the standards of strength upon which the freeboard is based.

The first such conference of international CL was hosted by RINA in Rome in 1939, and representatives from ABS, BV, DNV, GL, LR and NKK attended the meeting. The co-operation among the CL was agreed on and it was recognised that the co-operation should be further developed. Unfortunately, the next conference was not held until 1955. A decade later, in 1968, the establishment of IACS was agreed upon.

2.7.2 The Organisation of the International Association of Classification Societies

Over a 30-year period, the members of IACS have increased from the original 7 to 13 including three associate members, which are ABS, BV, DNV, GL, Lloyd's, NKK, RIN, CCS, KR, RS, PRS, CRS (Croatian Register of Shipping) and IRS (Indian Register of Shipping). The CL are fairly well reputable.

IACS is governed by a council, which consists of senior management executives from each member. The Council sets the policy, direction and future strategy, and the Council holds key meetings at least twice a year. The Council also reviews the work of its subordinate bodies and considers and adopts resolutions and technical issues, such as unified requirements and unified interpretation.

Generally, IACS is regarded as an integrated centre of technology and quality for the members, the main work is related to technical unification and includes much research and development. IACS has established more than 20 working groups, including specialist expertise from throughout the members. The accomplishment of these work programmes is through the working groups.

The General Policy Group (GPG), the representatives of which are from member societies, is the main subordinate body. The group processes emerging issues, directs the work programmes and outcomes of the technical working bodies and deals with IACS current affairs. The other groups are operational ones. They mainly develop and refine unified classification requirements and interact with IMO in the development and preparation of unified interpretations of IMO conventions, codes, resolutions and guides.

2.7.3 Achievement of the International Association of Classification societies

Before the foundation of IACS, the first working party on hull structural steel was established in 1957 and produced the first Unified Requirement (No.1). At that time, the working group was not very efficient. Since the late 1960s, extensive development has produced nearly 200 Unified Requirements on key ship hull structural and engineering systems standards.

Some important examples are the following:

- Minimum longitudinal strength standard

- Use of different steel grades for various hull members
- Loading and guidance information
- Cargo containment on gas tankers
- Inert gas-generating installations on oil tankers
- Machinery space fire protection
- Survey of hatch covers and coamings
- Diesel engine and propulsion shafting requirements

(<http://www.iacs.org.uk/brochure/initiati.htm>)

Additionally, the following figures can attest to the success of IACS as well:

- Over 400 million GT classed by members
- 40,000 ships classed by members
- 500,000 surveys per year
- Over 5,000 surveyors employed by members
- Around 3,700 supporting staff in offices
- 1500 offices, covering more than 100 countries
- 70 million USD used in ship design and safety research

(<http://www.iacs.org.uk/brochure/classif.html>)

In the future, to meet the gradually international demand for safe shipping and clean seas, at the heart of maritime safety and pollution prevention, IACS will continue to be the strong and dynamic voice of the classification societies.

CHAPTER THREE

*Is it not pleasant to learn with constant
perseverance and application*

Confucius

3. The Climate of the Maritime Field for the Past Few Years

3.1 Recent Efforts of IMO

Looking upon accidents within the maritime industry, accidents causing extensive loss of life and extensive pollution have been too frequent during the last decades. Some accidents have had a high impact on the society and public at large and resulted in some new international regulations and conventions as well as national regulation. Disaster is the motive for requiring management system and emphasising the human factor.

Besides the above-mentioned situation, based on conventional principles, the relationship between the flag state and shipowner should have the so-called “genuine link”. Unfortunately, economic considerations, to a large extent, have influenced the actions of the key industry participants. They are lured, by better tax and investment incentives and less stringent vessel inspection measures, to transfer their vessels from their traditional flag state to Flag of Convenience (FOC).

In order to achieve its objective, IMO has, in the last 35 years, promoted the adoption of some 40 conventions and protocols and adopted well over 700 codes and

recommendations concerning maritime safety, the prevention of pollution and related matters.

During the 1990s, the most recognised contributions to the maritime industry are the ISM Code, STCW-95 Convention and PSC boom, the combination of which forms an integrated safety system. They require the establishment of a safety culture from reactive regulation to proactive regulation, from knowledge-based people to skilled-based ones, from performance behaviour to compliance behaviour.

3.2 The Causes of Accidents

Generally speaking, the background to accidents includes human error, technical failure and threats of nature (unforeseeable events). When analysing maritime accidents, the proportion of 80%-20% is mentioned; that is, 80% of accidents are labelled as human error, which also can be named substandard practice, and only 20% fall into the category of technical failure, known as substandard conditions.

When rules and conventions are taken into account, the ratio is opposite (Figure 1). 80% of the conventions, such as SOLAS, MARPOL, LL Conventions and class rules, deal with technical matters, and only 20% or below deal with the human aspects. It was and is obvious that the shipping industry needs to address the human aspects of ship management in a new and better way, emphasising the influence of the human factor in safety.

Comparison Between Human and Technical Aspects

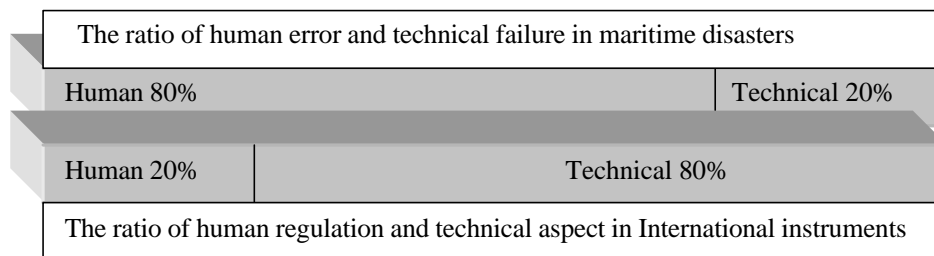


Figure 1

There can be doubt about how many percent depend on threats of nature, because the figure above shows the only ratio of human and technical aspects. By the notation “unforeseeable event”, it is well known that the threat of nature lie beyond our ability to think. But this does not mean that human being is at the mercy of chance. Once they have happened, unforeseeable events often appear logical. In the short term, there is perhaps not much human being can do because of the limitation of human intellect. But human being can take greater precautions through careful risk analysis. From that point of view, it can not be denied the unforeseeable events are not a part of the human aspect.

3.3 The Human Being Is the First Factor

Generally, it is assumed that the figure of 80% represents, approximately, the human factor influence in maritime safety casualties, and poor precautions exist in this area

too. Furthermore, all industrial products are created and originally made by people. If no people were involved, no achievements would be made. Under the guide of this, when considering the human factor in ship projects, design, construction, maintenance, managing and operation totally, the figure probably increases to almost 100% control over these factors. This confirms that the human being is the first factor.

3.4 Concentration of ISM Code on Human Error

3.4.1 The Birth of ISM Code Responded to Urgent Need

Some industries argued that there were already more than enough regulations around, and the existing international instruments, by and large, represented an adequate foundation for national legislation. But it was only regretted that there was no one systematic international operating management instrument existing to bind shipping companies in the event that the administration and shipowner had not regulated and executed their ships duly.

ISM Code, which was adopted in November 1993, and enacted under the SOLAS Convention in May 1994, was the response to the lack. The underlying objectives of the ISM Code are to establish both a mentality and a standard of operation in the shipping industry which leave no opportunity for substandard companies to continue to trade.

3.4.2 The Effect on the Maritime Industry

There is no excuse for not complying with the ISM Code. Shipowners have been given ample warning and those who think the code do not mean anything to them are deluding themselves. The following statements will point out how stringent and integrated the code is.

Ships not carrying ISM certification face the following consequences:

- They will be banned from Ports in Europe, North America, the Far East and many other ports of the world, including virtually all of the biggest trading nations.
- They could find their insurance coverage has been withdrawn; many insurance companies and P&I Clubs have announced that compliance with the ISM Code will be regarded as an essential condition of insurance.
- They may find it impossible to get cargo; most shipowners will inevitably make ISM certification a condition of charter.
- They will be forced to try to make a living in the handful of countries where the code is not strictly enforced. Even if they are able to find some cargo to carry, they will be forced to accept very low rates because the vast majority of shippers will opt for shipping companies that have ISM certification. (Fareplay, 1998, pp.14)

By 1st July 1998 when the ISM Code came into force, a total of around 12,000 ships covering 70% of the world fleet, met the requirement. This is a good deal. But it still meant that about 30% percent of the world fleet would be covered in the following years until 1st July 2002, except the possible increase of world fleet.

3.4.3 Perspective of the ISM Code

The ISM Code was not established to bring about an overnight change. The implementation of the Code is not the end; it is the means in an ongoing process which has no end. If the implementation of the ISM Code is considered, then it is doomed to failure. The objective of the Code is to achieve continuous improvement of safety and protection of the environment through a proactive approach to an ultimate safety aim.

3.5 Strict Requirements of the Revised STCW Convention

3.5.1 Impact of the Revised Convention

According to chronology, perhaps the emergence of the revised STCW Convention should be prior to the ISM Code, but in order to make the integrated chapters logical the sequence is changed.

It is not to be forgotten that some shipping disasters caused by human error, such as the “Aegean Sea” in December 1992 in Spain and the “Braer” in January 1993 in the UK, increased public criticism and pressure for radical change. A comprehensive revision of STCW-78 was, therefore, started in March 1993 and given top priority by IMO.

The convention called “STCW-95” and holding the same status as the ISM Code, was probably one of the most important IMO’s contributions to safety at sea since the signature of the first SOLAS by 13 countries in 1914.

The implementation of STCW-95 follows an agreed deferred schedule. Administrations were permitted to follow the education, training and certification procedures in accordance with STCW-78 until 1st August 1998. In addition, they may still allow those seamen who started their education, training and certification before 1st August 1998 to continue according to STCW-78 requirements until 1st February 2002. After 1st February 2002, all the requirements of STCW 95 will be implemented in full. STCW-95 has a serious impact on the administrations, shipowners and maritime institutions (Muirhead, 1998).

Furthermore, an important new element of the revised STCW is the requirement for countries that issue seafarers’ certificates to verify to IMO by 1 August 1998 that their laws, training facilities, examinations and assessment systems conform to the new standards. IMO will then publish a list of the countries that have satisfactorily proven their compliance with the STCW-95. This list will be used by countries to

decide whether to recognise certificates issued by other countries. It will also be used by Port State Control Officers (PSCO) to help them to target ships for inspection purposes. After 1 August 1998, countries have no obligation to recognise certificates issued by countries that have failed to satisfy the requirements of the revised STCW.

Obviously, countries, especially labour-supplying countries, will have to make sure that the certificates issued by them will be accepted internationally. There is no doubt that there is difficulty for some countries imposed by the revised convention.

3.5.2 Relationship of the Revised Convention with the ISM Code

Another important impact of the revised STCW Convention is in relation to another IMO instrument on the human factor, the ISM Code. Although there is no specific reference in the ISM Code included in Chapter XI of SOLAS 74/78, in order to comply with point 6 of IMO Resolution A. 741(18), adoption of the ISM code, shipping companies should ensure full compliance with the STCW-95. One direct consequence of management responsibility imposed by the ISM Code is that if in any casualty managing negligence is found, the shipowner will not be able to avoid responsibility or receive the benefit of his insurance coverage.

3.5.3 Responsibility of Shipping Companies

Companies should develop adequate training programmes for seafarers on board seagoing ships and are responsible for the assignment of the seafarers for service in their ships in accordance with the provisions of the present convention. This means that before employing seafarers, the basic in-service specific training and instructions must be given to seafarers.

The procedures established by the ISM code will be facilitated and carried out more effectively by competent personnel in accordance with the revised STCW 95 Convention. The close relationship between STCW-95 and the ISM Code means that modification in the first will affect the second and *vice versa*. Therefore, STCW 95,

as one of the most important marine safety conventions, has caused the same shock as the ISM Code in administrations and shipping and maritime institutions.

3.6 Boom of Port State Control

3.6.1 Port State Control as Second Defence

Since the first SOLAS Convention came into force in 1948, more than 50 years have passed. Chapter I, in principle, of the convention is the same, and also there are printed words concerning PSC. In addition to the SOLAS Convention, the other international instruments also mention that aspect. From this point of view, the term PSC is not a new notion. But the genuine meaning of PSC started at the beginning of the 1980s, when the Paris Memo was implemented in Europe.

The confidence in PSC as an effective enforcement mechanism is widespread. Many flag states are unfortunately unable to fulfil their obligations under the international instruments, despite the efforts of IMO to make them more accountable. PSC is regarded as an essential safety net, to minimise sub-standard ships calling at ports.

A rather new definition of substandard ship is seen in Chapter 1.6.9 in IMO Resolution A. 787 (19) and it is as follows: “A ship, whose hull machinery, equipment or operational safety is substantially below the standards required by the relevant convention or whose crew is not in conformance with the safe manning document” (Resolution A.787 (19), 1995).

If the flag state is called the front for regulating and administering shipping companies, PSC should be regarded as second defence to assist the flag state.

3.6.2 Tendency of Enlargement of Regional Nets

PSC, as a second defence compared to the flag state, is booming. After the establishment of the Paris Memo, the Tokyo Memo followed and came into effect on 1 April 1994. Additionally, in the Caribbean region and Indian region, etc. This

initiatives have formed or are preparing Memo on PSC. So far, it still is regional co-operation. But many initiatives have been taken to make a big stride towards co-operation in pursuing the goal. Some recent and forthcoming concentrated campaigns are listed as follows:

- 1996: Oil record books
- 1997: Living and working conditions
- 1998: ISM code implementation
- 1999: bulk carrier safety

The activity is a very competitive mechanism to mobilise PSC by respective Memos.

3.6.3 Current Condition of Administration for Exercising Port State Control

The success of PSC is conditional on surveyors around the world being able to apply their professional judgement in a consistent manner. Although most of the surveyors for whom PSCO certificates were issued are performing their work very well in a professional manner, there is doubt that they are all qualified for the exercise of their duties.

Furthermore, the ISM Code and STCW-95 have become the major part of PSC. In order that the PSCO can exercise his right duly, the appropriate training of PSCO is a priority, and efforts for enhanced training should be in process for administrations.

CHAPTER FOUR

*I have three treasures. Holding and cherishing them;
the first is compassion; the second, frugality; the third,
shunning to be the first in the world. Compassion
for human beings gives one courage in safeguarding life;
frugality means one's resources will not be exhausted;
and if one does not contend for the first place,
he will find himself in the first place.*

Lao Tzu

4. The Challenge and Achievements of Classification

4.1. Trend of Increasing Disasters in 1990s

4.1.1 Attention to Disasters

Just in the recent years, great sea disasters have caught our attention. Of course, hopefully the disasters list will not go on longer and longer, in which very many lives and a great deal of property was lost and the original beautiful ocean environment was put in very serious condition because of the accidents. When the reasons causing the accidents are analysed, the direct results are more or less relevant to the technical aspects. At the same time, the feedback from the disasters reminds CL to develop or update class rules.

In 1990, the trend of increasing disasters was dramatically emerged. 20 bulk carriers sank with 94 lives lost, and in 1991, 24 sank with 154 dead. At the beginning of the 1990s, some authoritative sources indicated as much as one quarter to one third of the total tanker fleet was substandard in some aspect. This development was so dramatic and so unexpected that alarm bells began to ring throughout the whole shipping world.

4.1.2 Contribution to the Issues

In December 1994, the MSC of IMO agreed that a great deal more remained to be accomplished and decided to establish a correspondent group co-ordinated by Australia, concentrating on six key areas:

- Survivability standards
- Design and construction standards
- Operational standards
- Survey requirements
- Ship/shore interface and
- Management and training

Different countries or organisations acted as the lead in each case. IACS undertook the design and construction standards. In fact, during the period between 1992 and 1994, IACS took a series of important bulk carrier initiatives. In 1995, these were followed by the launch of a major wide ranging study into bulk carrier design and in service experience. CL also worked separately to improve bulk carriers safety.

In 1994, IACS submitted to IMO copies of a manual on guideline for survey, assessment and repair of hull structures of bulk carriers, and in 1996 the new structural safety standards were announced.

Not only bulk carriers are eye-catching to CL, also Ro-Ro passenger ships are a typical example to challenge CL. However, when accidents occur, it is important that

the cause or causes of marine casualties are clearly understood and lessons learnt from them in order to launch suitable rules for the future.

4.2 Classification Societies Achieving More Legal Clout

The role of CL in ascertaining ships' seaworthiness is rapidly gaining in legal status as a result of the decisions of IMO.

Chapter II-1 of SOLAS Convention (1997 edition) covers ship construction, subdivision and stability, machinery and electrical installations. Through the chapter, basic technical standards of class for hull strength and shipboard mechanical and electrical system has been granted by the effective lawmaking of IMO.

IMO adopted Resolution A. 789 (19) concerning surveying and certification functions of CL, which entered into force on 1st July 1998 under an amendment to the new SOLAS Chapter XI. There is no doubt the resolution has become statutory.

Additionally, IMO Resolution A. 739 (18), "The authorisation of recognised organisations acting on behalf of administrations" was first adopted in 1993 (Appendix 2). Although they are primarily concerned with improved flag state performance, these guidelines also have an impact on CL as they lay down audible, internationally harmonised criteria for the way in which flag administration work is carried out with or through CL (LSM, 1997*a*). The resolution itself is non-binding, but the fact that the resolution incorporated into the Regulation 1 of Chapter XI of SOLAS Convention gives them legally delegated authority.

Even so, we can not say CL have been transferred into statutory bodies in their own right, however, we can say that IMO gives CL legal clout.

4.3 Harmonised System of Survey and Certification

About ten years ago, the International Conference on the Harmonised System of Survey and Certification (HSSC) was held in IMO, which led to the adoption of the

1988 protocol relating to SOLAS 74 Convention and the International LL Convention 1966.

The Protocol 88 brings major modifications in the survey and certification system, and it allows administrations to keep an adequate quality control system of inspection of their fleet. It provides administrations with a unified approach to ships, incorporating safety and protection of the environment into an integrated Quality of Operation System. In other words, administrations, which have delegated the system of survey and certification to recognised CL, can have effective control and oversight of those agencies, such as CL authorised by the administrations.

Ten years, during which Protocol 88 has not entered into force, have passed. The maritime industry has been worried about its advantage, and no more attention has been paid to it although most traditional maritime countries have ratified the protocol 88.

The maritime field has been disappointed by when Protocol 88 will come into force. Good news published by IMO was the accession to Protocol 88 by the Republic of Malta and the Commonwealth of the Bahamas, effected by deposit of instruments on 28th January and 2nd February this year respectively. The combined gross tonnage of the contracting states as at 2nd February 1999 constituted 54.31% of the world's merchant shipping fleet satisfying the requirement for entry into force. Therefore, in accordance with the provisions of article V, Protocol 88 will enter into force on 3rd February 2000 (IMO Circular 30).

So far, CL, as executor of statutory survey and certification on behalf of administrations, perform the work on the basis of the contract agreed by both. In the contract, systems of survey and certification depend on SOLAS, LL, MARPOL, etc. As a result of the protocol, CL must change the system of survey and certification to meet the new requirements. Otherwise, it will be impossible for CL service, to meet

their clients needs on efficiency and quality assurance. There is no doubt that plenty of change and co-ordination in class service need to be done to avoid internal and external conflicts.

4.4 Involvement in the Administration's Implementation of the ISM Code

4.4.1 The Necessity of Implementation of the ISM Code

The code is a unique platform on which to build a safer maritime industry. And it is also a good opportunity for shipowners, operators and regulators to work together for their common goals of safety of ships and seafaring. The initiative to be met demands the international communities' obligation to work towards zero loss of life and minimal impact on the environment.

To comply with the ISM Code, shipowners are required to develop, implement and maintain a Safety Management System (SMS) with compliance of shore-based management operations to standards validated by Document of Compliance (DOC). The SMS also requires audited compliance of the vessels to retain the mandatory Safety Management Certificates (SMC).

4.4.2. The Estimation of the International Association of Classification Societies

Tracing back to 1996, the people in the maritime field worried about how to meet the general requirements of the ISM Code. Totally there are about 39,300 ships in the world, on the basis of estimation of the IACS, almost 19,000 of them, passenger ships. Tankers, Gas Carriers, Bulk Carriers and High Speed Craft need to have the SMC by the "phase one" deadline i.e. 1st July 1998. Near 20,000 vessels are subject to the 1st July 2002 "phase two".

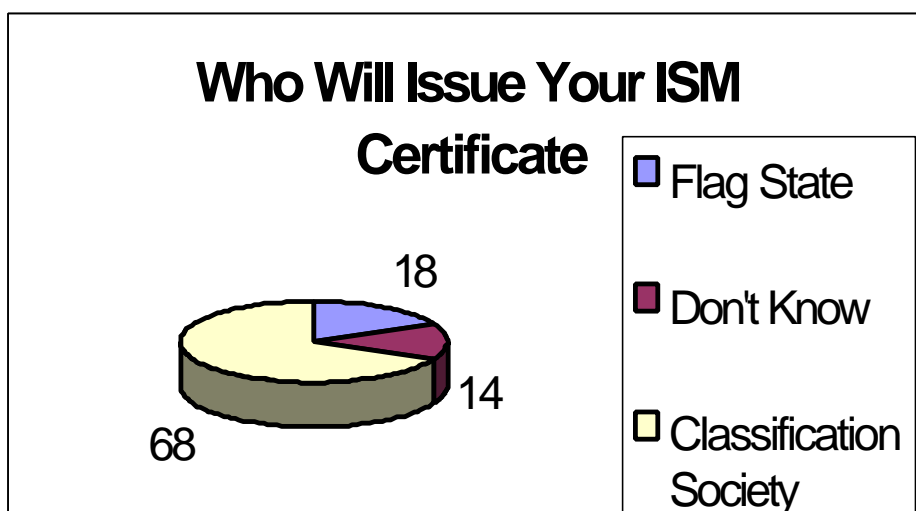
But by the end of September 1996, IACS members had certified just 4.8% of "phase One" ships. At the year-end, the figure increased to 6.5%, while until March of 1997, in total, just 8.24% of the world fleet had reached. Although it is pre-conventional period, the slow progress was pessimistic.

The concern is what will happen in the future. Late or not, the shipping industries will reap the rewards. The great restraint, inconvenience and cost to themselves will be coming. Additionally, frankly speaking, perhaps severe penalties will be imposed under national legislation, and will cause the shipowners and operators, who thought it would not happen, serious trouble.

4.4.3. Classification Societies, the Suitable Community to be involved in the Implementation of ISM Code

4.4.3.1 Who will Do the Auditing

The press of Telegraph gave a quiz asking who a qualified body to perform ISM Code auditing is. After collecting the quizzes, the resulting statistics were published in Telegraph in August 1998 (Figure 2). 68% of people agree on CL to perform it.



Source: Telegraph, August 1999, Page 28, Grahpic: ALAN SLINGSBY.

Figure 2

4.4.3.2 Experience of Classification Societies in Quality Assurance

4.4.3.2.1 Comparison between ISM Code and ISO Series

The ISO 9000 family of standard represents an international consensus on good management practices, with the aim of ensuring that the organisation can always deliver the products or services that meet the client's quality requirement. These good practices have been distilled into a set of standardised requirements for a quality management system.

ISO 9000 series lays down what requirements a quality system must meet but does not dictate how they should be met in the organisation. This leaves great scope and flexibility for implementation in different business sectors and business culture... as well as different national cultures (Activities, 1998).

So the ISO 9000 family includes standards that gives organisations guidance and requirements on what constitutes an effective quality management system.

The family also includes models against which the system can be audited, to give the organisation and its client assurance that the system is operating effectively.

The family includes standards on terminology, and other standards, which can be described as "supporting tools" that give guidance on specific aspects, such as auditing quality systems.

4.4.3.2.2 Experience of Classification Societies

Before the ISM Code was adopted, CL launched their quality assurance system and performed auditing work to assist companies according to ISO 9000 series. The ISM Code emphasises safety and quality and the ISO series mainly focuses on quality assurance. When items from the ISO 9002 series are taken into consideration compared to ISM contents, by and large, they are similar (Appendix 1). Certain requirements are common to both. These include the system maintenance disciplines

such as document control, internal auditing and management review, together with other common principles such as the need for clearly defined management responsibilities, authorities and interrelations. The experience of incorporating and performing quality assurance system assessment is a pretty good resource for the CL to provide assistance to shipping companies.

4.4.3.3 Initiatives of the International Association of Classification Societies and Its Members

When shipping companies implement the ISM Code, the issuance of the DOC is for the shore part of the company, and the SMC is for the offshore part. For the latter, only the persons who have experience on board ships or survey experience can do it. This gives an advantage to the CL.

IACS policy is to ensure a common approach for ISM Code certification by individual members. It established a new working party on the human element in 1994.

During 1995, the IACS members formally adopted Procedural Requirements (PR9) for certification according to the code, which entered into force on 1 January 1996. Guideline for IACS auditors' understanding, certification and a mandatory series of model courses for auditors have also been launched. The model course comprises five modules:

1. Basic knowledge of quality management system criteria
2. Knowledge and understanding of the ISM Code
3. Outline of mandatory rules and regulations and applicable codes, guidelines and standards
4. Basic knowledge of shipping and shipboard operations
5. Procedures and instructions for planning and performing ISM code audits

Aside from above mentioned training, candidates will need to perform a certain number of initial or periodical verifications under the supervision of a qualified auditor, in order to acquire the necessary experience before being an auditor in charge of the verification.

IACS also encourages flag administrations to enforce the key IMO Resolutions, which, together, will enforce consistent application of this major step forward in maritime safety. These resolutions are Resolution A. 739(18) “Guideline for the Authorisation of Recognised Organisations Acting on Behalf of the Administrations” and Resolution A. 788(19) “Guideline on the Implementation of the ISM Code by Administrations”.

4.4.4. Avoidable Conflict between the Survey and Audit Activities

Under the mandatory IACS PR9, an IACS member verifying ISM Code compliance must ensure that independence exists between personnel providing class survey and audit activities. Furthermore, compliance is checked through the periodical audit of member CL under the Association’s Quality System Certification Scheme (QSCS). So they are consistent.

The ISM Code requires that a safety management system should be effectively functioning to ensure compliance with mandatory rules and regulations on safer operation of ships and protection of the environment. The fulfilment of these requirements also depends on the ship and its equipment design structurally and mechanically being fit for purpose.

When an auditor assesses whether the SMS established by a company complies with the ISM code, he expects to see procedures and instructions defining the processes, which ensure compliance with mandatory requirements. The company should

provide a auditor with relevant statutory and classification records, and these records may be examined by the auditor to substantiate their authenticity and veracity.

4.4.5. Comparison between ISM Code Audits and Class or Statutory Surveys

Some comparisons between them are listed as follows:

- The ISM Code audits concentrate on the safety management system to determine the effective functioning afloat and ashore, and to verify compliance with mandatory ISM Code requirements and the effectiveness in meeting specified safety management objectives.
- The SMS focuses on the safe and environmentally responsible operation and maintenance of the ship and its hardware by ship's personnel according to mandatory rules and regulations. The scope of the ISM Code audits is therefore to verify that the company is operating under a system that effectively implements all measures needed to ensure compliance with mandatory rules and regulations.
- Traditionally speaking, class or statutory surveys concentrate on the fitness for purpose of the ship and its hardware, such as hull, machinery and equipment. They verify compliance with specific requirements of safety and pollution prevention, or other applicable codes and guidelines.
- Furthermore, ISM Code certification requires profound maritime experience. The certifying organisation must possess sufficient knowledge and expertise in mandatory classification and statutory requirements as well as in the processes and procedures to ensure complete and accurate application of mandatory rules and regulations ([Http://www.iacs.uk/publications/Briefing/brief3.html](http://www.iacs.uk/publications/Briefing/brief3.html)).

4.5. The Market Aspect

4.5.1 Transferring Substandard Ships to Avoid Strict Survey and Inspection

Many initiatives have been taken by the leading members of IACS, in order to meet the spirit "safer shipping and cleaner oceans". But some "clever" shipowners transfer their ships from the leading CL to relatively small societies outside IACS, which are

less rigorous registers, to avoid costly upgrading work. From the number of ships (Figure 3) leaving BV in the last few years, it can be seen that many ships have left the society, but only a relatively small percentage have transferred to another IACS member. They continue trading, their operating costs are lower, invariably they are manned with a substandard crew and they are able to undercut the freight rates.

The Number of Ships Leaving BV

Year	Number leaving BV	Number leaving BV to another IACS
1993	268	47*
1994	736	81
1995	1019	121
1996	576	109
1997	258	52**

*from 1/3/93 to 31/12/93

**from 1/1/97 to 30/6/97

Source: Shipping World & Shipbuilder, July/August 1997, page23

Figure 3

Although Lloyd's suggested IACS that it should not be helpful for individual societies to counter substandard ships leaving alone. After that, within IACS, Transfer of Class Agreement (TOCA) was made and further reinforced in 1995, under which the losing societies must advise the gaining societies if there are any outstanding surveys or conditions of class overdue on the ship before class can be confirmed. The IACS initiative is very effective for limiting the ships transferred to another IACS member.

The problem is the ships transferred to non-IACS members. However, it is the shipowners' right to choose which CL their ships should be classified with. If their new class complies with the required international mandated safety standards, these shipowners will be confident to perform their regular work. Otherwise, shipowners

or operators operating sub-standard ships must encounter many limitations, in which PSC action is a vital defence to stop their operation.

For instance, in the case of NKK, there are a small number of ships leaving the society for other organisations outside IACS. The main reason is the low average age and high standard of ships classified by NKK-9.8 years as opposed to a world average of over 18 years. Similarly, if CL do not provide a flexible class survey for older ships at the beginning, and they actively and regularly review the status of ships under strict class for their proper adherence to rule requirements, shipowners intending to transfer their ships to another society outside IACS will prefer to keep up the old ships in good condition on the basis of the reliable maintenance. This can help shipowners to safely prolong their ships' life expectancy.

4.5.2 The Healthy Mechanics of Competition

At present, there are more than 40 classification societies in the world, which are in competition with each other. Most of them, except the leading CL, belong to national registers, which have no international network formed beyond their own country. In other words, they are not meeting present international class levels. They can not lead the trend of service provided by classification societies.

What needs to be remembered is that shipping companies and flag states make a clear distinction between the leading and reputable CL and other national and comparatively small so-called classification societies. The lower fees should not be the motive in preferring the reduction of safety of life and property at sea and environmental protection.

As for internal competition in the scope of CL, it is on the grounds that some builders will always seek class of new construction with the CL, which costs them the least, and owners will usually seek class with the CL, which costs them the least in terms of maintenance, repair and renewal. This kind of competition must be avoided.

However competition is good if it is not on the basis of cheap fees and decreased standards. The healthy competition between CL in service, technical expertise and additional services is very good for the industry; it tends to raise standards overall and be advantageous to continuous application of state-of-the art knowledge and encouraging innovation and development.

4.6 The International Association of Classification Societies as a Quality Based Community

4.6.1. Quality System Certification Scheme

To ensure integrity and the highest standards in ship classification practice and to create and maintain the uniformity and consistency of members' internal operations, IACS "Quality system Certification Scheme (QSCS)" was launched in 1991. And in 1993, the random vertical contract auditing was added. This is much more than just a system audit, Although it can be defined as a self-regulation tool of the IACS. The QSCS has contributed to raising standards. Additionally, the IACS has established an advisory committee on quality in conjunction with QSCS, which oversees the functioning of the scheme and give advice on its development. Now the service delivery element--including surveyor visits to vessels, shipyards and manufacturing facilities--has become a formal system practice.

4.6.2. Lessons from the Polish Register of Shipping

The suspension of the Polish Register of Shipping (PRS) from its membership in the International Association of Classification societies (IACS) in October 1997 is the embodiment of the IACS and its members upholding their highest standards. The reason was that the PRS did not inform the IACS and its members of the number of leaving ships; this did not comply with the IACS Transfer of Class Agreement (TOCA) (ISM, 1997). This severe sanction was taken against the PRS just because it had fallen below what were regarded as basic quality standards. Fortunately, the PRS completed its own review and reorganisation of quality-related systems including surveyor training at the branch and head office levels at the beginning of last year.

4.6.3 Some Other Communities Assessing Leading Classification Societies

During PSC inspections, if any deficiency is found in class or statutory matters, PSCO may request a surveyor to attend on board: ‘In addition, nominated surveyors or recognised organisations responsible for the issue of the certificates shall be notified’ (SOLAS, Part A, Reg. 19).

Surveyors are also responsible acting as liaison between a vessel’s flag state and owner’s representative to ensure that both parties are aware of any safety-related action taken in either a class or statutory context.

The port state detention statistics (Figure 4) related to classification societies will have much more influence than other control bodies, which are a very long distance away from the survey. From that point of view, CL themselves are not out of control; they are gradually assessing themselves in order to meet the requirements of customers.

1998 Classification Society Performance Statistics

(United States Coast Guard) USCG Evaluates CL on Their Performance

Classification Society	Distinct Arrivals			PSC Detentions			Detention Ratio
	1995	1996	1997	1995	1996	1997	
PRS	78	85	100	4	4	6	5.32%
CCS	160	164	133	6	12	3	4.60%
BV	617	623	620	18	12	8	2.04%
KR	179	184	192	4	5	2	1.98%
GL	494	506	628	17	10	2	1.78%
RINA	139	146	158	4	2	1	1.58%
LR	1616	1559	1578	24	22	16	1.30%

NKK	1524	1539	1586	27	18	14	1.27%
ABS	1050	970	989	19	6	4	0.96%
DNV	1142	1191	1186	6	16	5	0.77%

Source: <http://www.uscg.mil/hq/g-m/psc/psc.htm>, 8th June 1999

Figure 4

4.7. Co-operation, Surveillance and Assistance

4.7.1 The Hindrance in the Implementation of Port State Control

Traditionally, the concern over the training needs of PSCO has focused on their familiarisation with the relevant PSC procedures since the IMO adopted minimum criteria for the training and qualification of PSCO as part of its guidelines in Port State Control Procedure Resolution A. 787 (19) of 1995. But now the effective performance should incorporate the ISM Code and STCW 95 into the PSC procedure. The governments of port states are perplexed by them. Before this work was done by CL on behalf of them. However, now they are facing encounter of the implementation of the instruments with flag state is acting as port state.

Furthermore, there is no international detailed guideline available and there are no legal mechanisms in place to ensure that PSCO receive appropriate training in the inspection of on board safety management and assessment of seafarers' competence.

Briefly, needs for assistance in some regions are noted as follows:

- Lack of appropriate national legislation for the implementation of international instruments
- Lack of trained personnel
- Inadequate administrative infrastructure

4.7.2. Contribution of the International Association of Classification Societies and Its Members

The task naturally left to CL is that the CL either open a training course on behalf of the administration, or give a hand to support them in setting up the course.

In addition, the level of information exchange and feedback must be increased. The commitment by IACS members to increase dialogue and co-operation with PSC has been underlined. They consider it their duty to co-operate fully with PSC in effective identification of sub-standard ships and in the process of corrective action for any safety deficiencies within the remit of class.

To improve the dialogue and co-operation with PSC, IACS has taken some initiatives to meet the commitment. Improved access to class data and a wide range of assistance available to PSC are two maritime safety initiatives introduced by IACS which fully entered into force from 1 January 1996. Additionally, through its unrivalled technical knowledge of the world fleet, IACS agrees that its members would like to provide PSC authorities with training support to clarify and review in detail the vital relationships between international safety conventions and class rules.

4.7.3 Details of the Co-operation between Port State Control and Leading Classification Societies and Assistance by the International Association of Classification Societies and Its Members

Above has been mentioned the range of co-operation between the CL and PSC, and the following will describe the details of the relationship.

CL will co-operate fully in the process of correcting any class-related safety deficiencies. The members can only represent the vessel's flag administration on safety deficiencies related to those statutory services.

Port states may request surveyors to attend on board ships to assist with rectification of reported deficiencies or other discrepancies. Prior to attendance on board, the surveyor will inform the owner or owner's representative of the surveyor's function.

CL will co-operate during PSC inspections by:

- Ensuring that a class surveyor attends the ship when deficiencies related to class and statutory matters are found, and liaising to ensure uniform interpretations of class and statutory requirements,
- Providing PSC inspectors with relevant information and details of outstanding conditions of class and statutory items, and
- Liaising with the flag state, in accordance with prior agreement, and the owner's representative, to ensure that both are fully aware of actions being taken that affect class-related or statutory-related matters.

Port states need to list deficiencies in relation to the specific conventions, giving details of the relevant certificate, including the issuer. Generally listings should include:

- All relevant deficiencies in the PSC inspection report,
- All deficiencies dealt with, and details of actions taken for each—including deficiencies related to class items and statutory certificates issued,
- Any deficiency which remain outstanding on the ship with the agreement of the surveyors and PSCO, is subject to special re-examination and attention as necessary by a specified date.

Reported deficiencies are promptly analysed, and the following actions taken:

- Surveyors concerned will provide detailed comments on any deficiency of either a class or statutory nature within the purview of CL or authority delegated to it,

- The flag state is to be provided with an updated summary of any deficiencies and the actions taken.

4.7.4 The Assessment of Responsibility of Leading Classification Societies

Some time after a ship has been surveyed, the condition of the ship may not equate to her condition at certification. This can not be said to be the responsibility of the CL; it may be attributed to bad maintenance by the shipowner. It should be borne in mind that the condition of a ship largely depends on whether regular maintenance and the necessary repairs have been carried out. The seafarers on board ships will generally have a clear idea of the condition of their ships. Therefore, care should be taken in establishing a factual linkage before blaming CL.

IACS has agreed to use and support the criteria of the United State Coast Guard. The basic principle of the criteria determines the range of the responsibility of CL, as follows:

That Voyage damage will not be regarded as class-associated, unless other Class-related deficiencies are noted during a damage survey. Furthermore, in the case of an intervention, outdated equipment will not be associated with a class non-conformity unless outdated at the time of the last survey conducted by Class on behalf of the flag administration..... In all cases of Class non-conformities, the CL will be notified in writing. If reasonable, maybe also face appeal by the shipowner or other relevant communities (Mathieson, 1998).

4.8 Implementation of STCW-95

4.8.1 Need for Assistance

Shipowners have many new training responsibilities under the requirements of STCW-95. They can not just stand by and hope that there will be a ready supply of qualified seafarers to operate their ships when they need them. In addition to fulfilling their own responsibilities, they also need to pressure maritime nations to

fully implement their responsibilities. Administration needs to train and maintain their own crews and supports quality training institutions.

4.8.2 Pressure from Main Communities

The port state inspections, almost all over the world, themselves enhance and provide a more regular checking system, which puts crew competence to the test on a more regular basis under the requirements of the revised STCW and ILO conventions. If any insufficiency or inefficiency in manning is found, the ship which employs these seafarers will encounter detention. Furthermore, if in violation of port state law, the shipowner or operator will be punished with penalties.

Ship insurance has been closely linked to safe manning (sufficiency and efficiency of the crew). The result of widely-recognised fact of human error causing 80% of disasters reminds underwriters to take new measures to minimise their compensations. So, if seafarers are not qualified for their post, the shipowners will get less, or even lose their compensations from insurance companies, when an incident or an accident happens. The restriction is vitally important for shipowners.

If by 1998, administrations and shipowners did not discover that they are inadequate, or until 2002, they will learn that there are not enough properly certified seafarers to run their ships. The shipowners and administrations will be in trouble.

What should be done? Different communities need to be working together now to ensure that, by 2002, all seafarer's certificates will be universally recognised as conforming to uniform qualification and competence standards. For CL, the scheme's assessors, available to customers locally through the network of CL offices located around the world, are all professionally qualified, and many are ex-masters or ex-chief engineer officers.

4.9 Enlargement of Communication and Transparency

With the development of computerised technology, more and more communities are now benefiting from the Internet, databases and so on. This really makes things convenient and has come true by means of electronic tools. CL have favourably made use of the tools and, linked to any interested organisations, a genuine network has been released.

IACS members have had more initiatives set up through the Internet, such as ships' compliance with ISM Code and the list of "leavers" from its members to other national classification societies. A number of organisations with a legitimate interest in these aspects can access the proper address for ascertainment of these doubtful ships. As a result, the greater transparency of information will isolate and then effectively penalise sub-standard ships.

What needs to be mentioned is that most of the CL have created different kinds of database package installed on board or located on shore. Some of them are self-managed and some are directly connected to CL offices as follows:

- ABS SafeNet system
- BV VeriStar Info. system
- DNV Nauticus Hull software system
- GL POSEIDON, software program
- LR ClassDirect and FLEET software system
- NKK PtimeShip BOSUN, PC-based program (LSM, February 1997)

All of these databases are concerned about class rules, ship maintenance and ship design, etc. Any time, if seafarers want, they can check rule standards and find the condition of ship maintenance through inputting the ship's life relevant data. VeriStar and SafeNet enable owners and class surveyors on-line access vessels and

regional offices, where all the details of the vessels exist. Any updated rules and information can be obtained immediately.

4.10 Liability of Leading Classification Societies Involved in Incidents or Accidents

4.10.1 The Tendency to Involvement

Before, liability and CL never were close bedfellows, and taking CL in a court of law did rarely come out on top in the past. In what could prove to be a landmark case, Lloyd's Register pleaded guilty in the unprecedented criminal prosecution brought against it under the Health and Safety Act, following the collapse of a passenger walkway involving the ro-ro Prins Filip at the port of Ramsgate in September 1994.

For the oldest, largest and most prestigious class society to admit responsibility in such a case is a major development. Facing the wolf at the door in the shape of unlimited liability towards third parties, CL find their role once more under close scrutiny. Traditional liability of CL is based on a multiple of fees; each of the CL is free to fix its limit. Today, this system still works well for the CL under the contract between shipowners and CL. Unfortunately, in the legal war of attrition, it is widely held that each lawsuit now brings closer the day when CL will be sued successfully in a major case.

4.10.2 Simple Analysis of Unlimited Liability's Feasibility

Shipowners have expressed fears that a limit which is too generous would make CL less cautious. There would be disastrous results if CL did not enjoy limited liability. At least, unlimited liability could force CL to withdraw some of their services, which are of essential importance for the majority of flag state governments. Some vital reasons why CL can not receive unlimited liability are listed as follows:

- CL works with the assets of very high value are dramatically adventurous. No matter what size ships are, surveyors always need to inspect construction and

equipment, which procedure is the same for all size ships, and make the same charge. In comparison with the asset, the fees for ship's survey charged by CL are comparatively smaller. Of course, CL always carefully provide services for clients to minimise the risk,

- The purpose of class was not to guarantee safety during the period between surveys. To a great extent, classed ships permit shipowners to take advantage of insurance rates. Anyway, class can not replace other players.
- Ships are operated by shipowners, not by CL. The maintenance of the classed ships is done by shipowners; bad operational management will undoubtedly cause incident or accident. As a result, the shipowner is totally responsible for the casualty; nothing can be relevant to CL.
- If CL are really forced to assume unlimited liability, when an accident happens, CL are exposed to many third party' lawsuits, such as by shipowners, underwriters, charterers, vessel purchasers, government authorities and so on. This raises the potential level of failure for CL, due to the number of parties they are linked with.
- The recent explosive development of fragile and very expensive high-speed crafts, and the potentially dangerous processing and storage of oil in converted tankers possibly causing environmental pollution, would make CL bankrupt under the condition of unlimited liability (Chaves,1998).

The working group of CMI concerning the issue had made endeavours to arbitrate the issue over several years. Before a harmonious state is reached, there is still much discord to be resolved. The days when the word "unlimited" emerges in the contract between shipowners and CL will never come.

CHAPTER FIVE

When a gentlemen wants to establish himself, he also helps others to establish themselves; when he wants to be successful himself, he also helps others to succeed; he judges others by what he knows of himself.

Confucius

5. The Analysis of the Roles of Leading Classification Societies under New Atmospheres

5.1 Ship Class Survey

5.1.1 Technical Research and Development

Collectively, the IACS members invest more in research and development (R&D) into ship structural and engineering design and other safety aspects than any other single maritime-related organisation. With more than 100 R&D projects in progress at any one time, IACS Members are continuously carrying out or sponsoring research into ship structures, essential shipboard engineering systems, ship construction, maintenance, operation, communication and navigation.

This continuous process of development, together with essential feedback from service experience, results in a rolling update of classification rules to meet new demands in sea transport and marine technology and to keep classification at the forefront of technical standards.

Through IACS working groups, R&D results are shared by IACS Members and contribute to the work of IMO and the maritime industry.

Examples of R&D projects include:

- Three-dimensional and non-linear ship hydrodynamic
- Fatigue damage assessment procedure
- Advanced fracture mechanics
- Structural performance of bulk carriers
- Smart structure development
- Hull condition monitoring
- Sloshing in partly filled tanks
- Hull vibration and torsion analysis
- Maintenance-friendly Very Large Crude Carriers (VLCC) designs
- Safe and efficient use of composite materials

So the basic duty of CL will never stop.

5.1.2 Continuously Developing Its Rules

Classification rules are produced on the basis of considerable research and development to keep abreast of advancing technology as well as reflecting the results of service feedback, which is received continuously through survey reports of hull, machinery, equipment and so on.

The rules for ship structure are based on sound technical principles and they have been thoroughly tested against service performance. Compliance with the rules will ensure the provision of adequate overall or global strength, together with adequate local strength of individual components. The rules for main and auxiliary machinery, control engineering systems, electrical installations and refrigerated cargo installations cover a broad range of details. The rules also define requirements for survey during construction and periodical surveys on an annual basis to ensure that the prescribed standards are satisfied.

Over the years, responding to the developments in ship design or functions, which result in arrangements, loading and so on, but these are not envisaged by the existing rules, for instance, the advent of the double hull of VLCC and accommodation of use on new materials. Rules for this kind of ship structures have been progressively developed by means of theoretical investigations of the behaviour of materials and structures, by direct observations and measurements and by the analysis of service experience on the basis of a scientific approach to meet the requirements of ship developments.

5.1.3 Publishing of Rules

When new rules are introduced and rules are updated, the CL make any information available which customers need about any change. This is the most obvious way of helping shipowners to meet their regulatory obligations. CL must immediately circulate the information by means of circular letters, notices, and so on, to customers. If necessary, seminars will be held in the headquarters or somewhere else to give clear explanations in detail. This can assist the customers in achieving smooth implementation of these regulations.

5.1.4 Accelerating Uniformity of Standards

From survey or inspection practice, it is clear that misunderstandings often happen. The reason is, that separate CL still utilise their own standard system. As a result of this, a great deal of poor understanding is brought to surveyors and inspectors. For instance, the marks on a class list are all of different kinds, and if there is no know-how to explain them, it is really too difficult to recognise them. It really is the urgent time to harmonise them.

5.2 Co-operation with Other Communities

5.2.1 Acknowledgement by the International Maritime Organisation

IACS and its members have good co-operation with IMO, PSC regimes, INTERTANKO, ISC, ITF and so on. The CL have the duty to co-operate fully with

other communities in the process of corrective action and R&D for any safety issues within the remit of class and additional services. Most of this has been mentioned before. Here the co-operation with IMO will be definitely analysed.

LR has the world's largest maritime database. Each ship is identified by a unique LR number, and in 1996 the International Maritime Organisation (IMO) adopted these LR numbers for its international identification system. From then on, all merchant ships of 100 gt and above have been required to carry the LR number aboard for identification at PSC.

It is emphasised that IMO conventions do not address hull structural and essential shipboard machinery systems in any detail. Nevertheless, the 1966 LL requires, *inter alia*, that before a Load Line Certificate can be issued to a ship, the ship must be of adequate strength. The convention states that ships built and maintained in conformity with the requirements of a CL recognised by the flag administration may be considered to possess such strength. SOLAS 74 requires that every cargo ship of 500 gt and over engaged in international trade must have a Cargo Ship Construction Certificate, and all passenger ships intended for international voyage must have a Passenger Ship Safety Certificate.

The only detailed authoritative rules for these vitally important items are those of the CL. Dependence on compliance with class rules as a prerequisite for the issue of these convention certificates gives the class rules an implicit statutory status. In other words, the status of CL is naturally recognised.

5.2.2 Successful Launch of an Enhanced Survey on the Basis of Common Efforts

An iron demonstration of co-operation between the IACS and IMO, as well as IACS members, is the speedy introduction of an enhanced survey of bulk carriers and tankers, designed by IACS to improve safety standards, which has been incorporated into the Chapter XI of SOLAS, where it is stated: Bulk Carriers as defined in

regulation IX/1.6 and Oil Tankers as defined in regulation II-1/2.12 shall be subject to an enhanced program of inspections in accordance with guideline....

Besides the co-operation between IACS and other communities, the internal co-operation within IACS is also vitally important. A launched initiative is diligently implemented depending on a consensus of CL on this restriction. If CL want to delude it, they are easily found by shipowners willing to avoid rigorous inspection of his vessel. Therefore, at least, responsible CL need to help each other to prevent shipowners from going on sailing their substandard ships.

IACS has set up guidelines for the enhanced survey for the two high adventurous types. It is crucially important that these new standards are applied. If this is realised, it will help to restore confidence not only in individual societies, but in the whole concept of class.

5.3 Discussion about Some Criticisms of Leading Classification Societies

5.3.1 Analysis of the Relationship between the Technical and Human Aspects

It prevailed in the past that CL were technical organisations. They did not concern with more human aspect, which has been left to the Administration and shipowner.

Now, as a safety system includes human beings and technology, the CL should adopt a integrated strategy to research machinery as well as human factors. On the one side, technology is developing rapidly, and the technical systems have become more complicated (BIMCO BULLETIN, 1999*b*). To minimise the role of the human weakness, the system should be designed to correct for the human error, so technology is adapted to people. On the other side, people often can not understand the complicated technology; it is a reality. After researching the human factor and grasping the capacity of people, the CL can confirm in which extent people can accept the new technology, and then take measures to train them and make them competent for the correct operation and maintenance of technical types of equipment.

In the CL development of technology, the interface between people and technology is being given the highest priority. As a result, the grey zone between them will be minimised; genuine dialogue will be realistic.

The involvement of CL in safety management, the safety of ships and the protection of environment, no doubt, is benefiting and will contribute to it.

5.3.2 Statutory Status of the Flag State

The flag state authority is responsible for exercising administrative control through certification, crew (including the training of crew) and implementation of international maritime convention requirements.

Under the Geneva Convention of the High Seas, each country has the right to sail vessels under its own flag. The flag then is defined as the country in which a commercial vessel is registered and which undertakes the responsibility of implementing international conventions relating to the safe operation of that ship. The flag state has the fundamental and paramount regulatory responsibility for the ship safety, and therefore, the conceiving and initiating of internal systems and procedures to detect and possibly eliminate substandard ships is intrinsic upon its authority.

5.3.3 Necessity of the Involvement of Classification Societies

It has been suggested that the services offered by CL should include the regulation of the operational safety of ships. As sensible proposal, bearing in mind that some 80 percent of all marine accidents result from human errors. At present, the responsibility for good day-to-day operation lies entirely with companies. However, as a result of commercial pressures, shipowners are not always willing to face up to their responsibilities. In this situation, statutory regulations dealing with them are necessary. In contrast, responsible shipowners or operators themselves would not want to be relieved of their responsibilities, but they are not able to successfully

assume the responsibilities for their shorts of expertise. CL intervention on behalf of administrations at the operational level is necessary on the basis of their expertise resources, to give assistance to bring about improvement in operational safety management.

5.3.4 The New Class Concept

This concept embraces every aspects of the ship operation, in addition to design and construction. From the traditional point of the view, this is inconceivable, because classification has traditionally been about measurement and mathematics, precise quantifiable scantlings and strengths, thicknesses and material quality concerning hardware aspects, i.e. technical parts. In the new concept, CL are approaching the human factor, which, it is broadly accepted, governs so much of maritime safety and was totally left in the hands of the flag state authority and was left up to the sense of responsibility of shipowners in the past.

Measures concerning “software” (human aspects) must be immediately taken by respective organisations to deal with operational aspects. A series of initiatives were given birth by CL. CL, as a body of rich experience and abundant knowledge, are capable of taking on the burden to conduct human beings in shipping. Recently the acquirement of auditing safety management and being consultants are distinctive evidence.

5.4 Safety Is Priority, and Service Is Theme.

5.4.1 Subjective Will of Leading Classification Societies

It can not be denied the fact that how to meet customers’ needs has become a compass that decides the developing direction of CL. Customers’ good response to CL service often encourage them. Under the pressure of new international initiatives, customers are seeking more cost-efficient ways to comply with mandatory requirements. So CL, of course, hope their service can be a perfect fit. The natural rich experience, profound knowledge and human resources employed or non-

employed all over the world can not be compared to other communities. Furthermore, perhaps the CL may think of itself as a weak body lacking competition, in which case the joint venture may happen to fulfil the needs for experts and experience. Separate or integrated actions have made CL deeply involved in the administrations, shipping industry, etc. It can be said that CL have become one leg of some communities.

5.4.2 An Auditor or Assessor in the Shipping Industry

It must be remembered that CL are acting as delegated agents for flag administrations. The flag administration is responsible for the technical and operational requirements launched by IMO or national legislation. From an analysis of the relationship between administrations and CL, it can be found that CL are playing a part in the implementation of ISM Code in the shipping industry on behalf of flag administrations.

So far, the great number of SMC certificates issued by CL demonstrate successful performance in the implementation ISM Code in first stage, all of which is based on the IACS procedural guidelines and unified interpretations covering the certification of the ISM Code and its training courses for auditors for ISM Code certification.

Most marine accidents are the consequence of the hardware (the ship itself) and the software (people and management). CL have to be involved into the software part since one of their objectives is the safety of life and property at sea and environmental protection.

5.4.3 Assistance to Parties' Implementation of STCW-95

Reliable co-operation is necessary to improve the implementation of the STCW Convention. The impact on the future supply of seafarers could be very tough unless the industry acts quickly. The warning bell is ringing to take care of this point.

The development and update of all courses and training will need a long time. Not only is the time urgent, but also economic and technical efforts are encounters for shipping companies, maritime institutions and maritime administrations. And the consideration of technology must be incorporated in the process of the implementation of the convention. Shipowners have many new training responsibilities under the revised STCW-95. They can not stand by and hope there will be a ready supply of qualified seafarers to operate their ships when they need them.

CL provide training courses and assess the quality assurance system in shipping companies, maritime institutions and maritime administrations, which is a good access to punctual implementation of the revised convention. The outstanding CL performing this kind of service is DNV.

So agreements are made with training organisations, such as CL, to be able to design, develop and implement the programmes without diluting their focus on their own business.

5.4.4 Co-operation and Assistance with Port State Control

Traditionally, the concern over the training needs of PSCO focuses on their familiarisation with the relevant PSC procedures since IMO adopted minimum criteria for the training and qualification of PSCO as part of its guidelines in Port State Control Procedure Resolution A. 787 (19) of 1995. But now the effective performance should incorporate the ISM Code and STCW-95 into the PSC procedure. The governments of port states are perplexed by them. The reason is they are facing the implementation of the instruments when the port states are regarded as flag states.

Furthermore, there are no international detailed guidelines available and legal mechanisms in place to ensure that PSCO receive appropriate training in the

inspection of on board safety management and assessment of seafarers' competence. The task is naturally left to CL; the CL either open the training course for them, or give a hand to supporting the administration in setting up the course.

In addition to increasing levels of information exchange and feedback, the commitment by IACS members to increase dialogue and co-operation with PSC has been underlined. They consider it their duty to co-operate fully with PSC in effective identification of sub-standard ships and in the process of corrective action for any safety deficiency within the remit of class.

5.5 Technical Advisor or Consultant

In November of 1997, the IMO adopted a new chapter to the SOLAS Convention tightening safety requirements for existing and new bulk carriers. The tightened requirements which the IACS previously decided to introduce are now largely copied by IMO in the international requirements, intending to guarantee the necessary standard of ships classified in societies other than IACS members. Some CL experts are invited to special committees of IMO and other communities to collaborate on projects, which is a good demonstration as well.

5.6 Involvement of Liability

The CL take centre stage when it comes to monitoring the fitness and safety of the vessels which ply the world's oceans. Their certificates are relied on by governments, underwriters, charterers, purchasers and others as evidence that the vessels are fit, and, by and large, the CL have a commendable record.

However, CL are not immune from mistakes, and there is an increasing concern that compromises between shipowners and CL will be reached. The pressure of unlimited liability on CL is bound to limit the range of CL service. This is not a good thing, as a result of the need for CL by governments, shipowners, underwriters and others.

Based on custom, the maritime industry should at least provide living space to CL. However, before a clear answer is given, a long way lies ahead.

5.7 If Leading Classification Societies Have Exercised More Power or Not

New SOLAS convention regulations will come into force. It stipulates that:

In addition to the requirements contained elsewhere in the SOLAS regulations, “ship shall be design, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a recognised classification society (SOLAS amended 1996, ChapterII-1, Regulation 3.1)’.

It must be remembered that all CL service is based on the contract agreed on by both the flag government and CL. CL act concerning the safety of ships and the prevention of pollution in the maritime field on administration’s behalf. Furthermore, all the communities are integrated bodies. The image that should come into mind is what the genuine responsibilities of the flag state, the shipowner, the port state, the officer and crew and even the Maritime Insurers should be should be. Their only objective is ‘Safer Shipping and Cleaner Oceans’.

CHAPTER SIX

Where there is a will, there is a way.

Proverb

6. Conclusions and Recommendations

6.1 Conclusions

This paper has described and analysed the requirements of the maritime industry under new maritime atmospheres. It can not be denied that all sectors of the industry—insurers, charterers, shipowners, operators, flag states and port states—have sought to protect or promote their own commercial or political interests. CL intend to survive among them, and the fact that the roles of CL are revised is reasonable and necessary.

The evolution of the roles of CL is intended to provide the desired improvement in maritime transportation by significantly reducing the incidence of casualties, which result in the loss of life at sea, the loss or damage of property and the pollution of the marine environment.

Ship class originally came into being as a voluntary activity, promoted by self-interest on the part of marine underwriters. It was not long before shippers and shipowners realised the advantage to themselves of such an independent assessment of a ship's condition and quality of construction.

The CL is one of the three pole, i.e. administration, shipowner and operator and CL. If any one of these entities fails to fully undertake its responsibilities for a ship's safe operation, that ship is likely to become a sub-standard one. Therefore, CL must tightly hold their basic roles: to secure for the benefit of communities high technical standards of design, construction and manufacturing for the purpose of enhancing the safety of life and property both offshore and onshore, taking advantage of an advanced R&D approach to realise the change from an empirical approach to a scientifically based approach.

In the past, maritime safety regulations intended to focus on the hardware-the technical aspect. Since then it has been recognised that that 80 percent of all marine casualties are due to human error. All marine accidents are the consequence of a chain of events related to the hardware (the ship itself), the software (people and management). The two factors to safety at sea must be dealt with in an integrated manner. Human factor, as a part of the chain, must be taken into integral consideration.

Therefore, the maritime field including CL have transferred their eyes to that aspect, following a series of initiatives: ISM Code, STCW-95, PSC and technical improvement which were launched by IMO.

CL are not statutory bodies, but they are recognised by IMO and other communities. CL have been given more legal clout in several IMO initiatives and given legal authority to be involved in the safety regime of administrations. All of these have encouraged CL to go forward (see chapter 4). So IACS and CL have developed procedures to undertake certification for compliance with the ISM Code's requirements through their auditing. Most governments have authorised CL to undertake this on their behalf. Successful work done has been demonstrated by the achievement of their large proportion SMC certificates.

No matter what CL confront, CL must be impartial organisation arbiters if they want to develop well in the long run. CL can never be viewed as the handmaidens of shipowners; and can never be cast in the role of bargainers with shipyards; neither can they ever be the lap-dogs of any single sector of the industry, nor the watch-dogs answering only to the underwriters, nor the watch-dogs of the regulators.

The change in philosophy of CL classification, certification and service is essential to meet the requirements of clients, match the forward tendency of the maritime field and contribute to the maritime field and healthy self-development. Several changes are as follows:

- The making of new rules based on new concepts
- The making of associated new survey system, also based on new concepts
- The change from empirical research to scientifically-based research methods
- The change from the reactive concept to the proactive concept
- The change from the knowledge based way to the skilled based way
- The change from the compliance concept to the performance concept

6.2 Recommendations

Several recommendations are summed up as follows:

1. The surveyor must developed continuous training and updating of skills, appropriate quality systems and regular audits, and a culture of thoroughness and determination. Only the best will do.
2. CL must maintain increasing extensive technical resources so that they can update and improve their class rules reflecting advances in materials, take advantage of the latest methods of technical analysis and make a correct assessment of operational performance. Generally speaking, in the climate of the maritime field, CL is a service organisation to keep up with the trend of maritime development. The initiatives of safety adequacy and efficiency done by CL are successfully ahead of the trend, and this author will sincerely admire the realisation of proactive performance.

3. It is important to understand the fundamental difference between classing and assessing. A surveyor does not equate to an auditor or assessor, and excellent surveyors are not necessarily qualified for both types of work; it is not an essential prerequisite to perform audits. In spite of persons from CL being involved in the same company for both surveys and quality audits, it is not reasonable for the same person to perform both survey and audit work simultaneously, because doubt about bureaucracy and compromise happening inside CL would rise.

4. Where do credible and reputable organisations come from? They rely on recognition by the public. The intangible capital is the key factor in the healthy development of CL. There is no access to the destination but qualified people diligently performing CL services in compliance with relevant international and national instruments and class rules. However, it is not enough with only a single organisation for the safety of shipping. Shipowners and operators, charterers, flag states and port states also have a role to play. Each has to know what the others do. As a result, making class and other services available to internal members and other interested communities needs to be borne in mind.

5. In order to continuously develop and improve technology and provide better service to customers, and the acquisition benefit from CL service should not be debatable. CL must remind themselves to consciously keep balances between safety of life and property and commercial reality. Although it can not be precisely calculated, the balance should be reasonable enough for satisfaction of customers and to keep up their reputation.

6. CL should be conscious that challenges from all directions will come in the future, and be aware that their integrity and high standards must be continuously demonstrated to the whole shipping world-not only to administrations and underwriters, but also to shipowners, P&I Clubs, charterers and all other parties

concerned. At the same time CL should focus on the need for effective dialogue with other sectors when something wrong happens.

7. As for international criticisms, internal co-operation in IACS should be effective. By virtue of its achievement in the safety of life and property, it is naturally confirmed that the misdirected criticisms by world critics can not hold water. Just like military carriers, the co-operation is beneficial to them and protects them from torts by other communities and serving as the scapegoats of others.

8. CL must have three 'Is'-independence, integrity and impartiality-ingrained in everything they do, otherwise their efforts are of limited or no value (Patrick, 1996). They must implement their rules strictly on the basis of technical judgements, without being influenced by the commercial or political consequences of their decisions.

Briefly, the more than two centuries of experience and expertise owned by CL are unique and admirable. The changing maritime industry and recent phenomena are telling that CL, with foresight and sagacity, should be well equipped to meet the challenge of the 21st century in the long run.

At last, where there is a will, there is a way!

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Appendix 1

Comparison between IMO ISM Code and ISO 9002 Series

Procedure	ISO 9002	IMO ISM Code
Management Responsibility and authority	?	?
Quality Management System	?	?
Contract Review	?	?
Document and Data Control	?	?
Purchasing	?	
Customer Supplied Product	?	
Identification and Traceability	?	?
Process Control	?	?
Safety Management System	?	?
Contingency Plan and Environment Protection	?	?
Vessel Certification and Trading Readiness	?	?
Maintenance and Repair/Dry Doking	?	?
Manning	?	?
Communication	?	?
Insurance	?	
Inspection and Testing of Vessels and Equipment	?	?
Control of Inspection, Measuring and Test Equipment	?	
Inspection and Test Status	?	?
Control of Non-conformances	?	?
Corrective and Preventative Action	?	?
Handling Storage, Packing, Preservation and	?	?

Delivery		
Control of Quality Records	?	?
Internal Quality Audits	?	?
Training	?	?
Health Safety and Environment Policy		?
Alcohol and Drug Policy		?

Source: Ferriby Marine, October 1995

RESOLUTION A.739(18) adopted on 4 November 1993

**GUIDELINES FOR THE AUTHORIZATION OF ORGANIZATIONS
ACTING ON BEHALF OF THE ADMINISTRATION**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organisation concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECOGNIZING the importance of ships being in compliance with the provisions of relevant international conventions, such as SOLAS 74, Load Lines 66, MARPOL 73/78 and STCW 78, to ensure prevention of maritime casualties and marine pollution from ships,

NOTING that the Administrations are responsible for taking necessary measures to ensure that ships flying their States' flags comply with the provisions of such conventions, including surveys and certification,

NOTING FURTHER that, under regulation I/6 of the 1974 SOLAS Convention and regulation 4 of Annex I and regulation 10 of Annex II of MARPOL 73/78, the Administration may entrust the inspections and surveys to nominated surveyors or recognised organisations and further that the Administration shall notify the Organisation of the specific responsibilities and conditions of the authority delegated to nominated surveyors or recognised organisations,

DESIRING to develop uniform procedures and a mechanism for the delegation of authority to, and the minimum standards for, recognised organisations acting on behalf of the Administration, which would assist flag States in the uniform and effective implementation of the relevant IMO conventions,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its sixty-second session and by the Marine Environment Protection Committee at its thirty-fourth session,

1. ADOPTS the Guidelines for the Authorisation of Organisations Acting on behalf of the Administration, set out in the Annex to the present resolution;
2. URGES Governments as soon as possible to: (a) apply the said Guidelines; and (b) review the standards of already recognised organisations in the light of the

Minimum Standards for recognised organisations acting on behalf of the Administration set out in Appendix I to the Annex to the present resolution;

3. REQUESTS the Maritime Safety Committee and the Marine Environment Protection Committee:

(a) to review the Guidelines and Minimum Standards with a view to improving them as necessary; and

(b) to develop, as a matter of urgency, detailed specifications on the precise survey and certification functions of recognised organisations;

4. REQUESTS the Secretary-General to collect from Member Governments information on the implementation of the present resolution.

GUIDELINES FOR THE AUTHORIZATION OF ORGANIZATIONS ACTING ON BEHALF OF THE ADMINISTRATION

General

1. Under the provisions of regulation I/6 of SOLAS 74Y article 13 of Load Lines 66, regulation 4 of Annex I and regulation 10 of Annex 11 of MARPOL 73/78 and article 6 of Tonnage 69, many flag States authorise organisations to act on their behalf in the surveys and certification and determination of tonnage as required by these conventions.

2. Control in the assignment of such authority is needed in order to promote uniformity of inspections and maintain established standards. Therefore, any assignment of authority to recognised organisations should:

2.1 determine that the organisation has adequate resources in terms of technical, managerial and research capabilities to accomplish the tasks being assigned, in accordance with the Minimum Standards for the Recognised Organisations Acting on behalf of the Administration set out in appendix 1;

2.2 have a formal written agreement between the Administration and the organisation being authorised which should as a minimum include the elements as set out in appendix 2 or equivalent legal arrangements;

2.3 specify instructions detailing actions to be followed in the event that a ship is found not fit to proceed to sea without danger to the ship or persons on board, or presenting unreasonable threat of harm to the marine environment;

2.4 provide the organisation with all appropriate instruments of national law giving effect to the provisions of the conventions or specify whether the Administration's standards go beyond convention requirements in any respect; and

2.5 specify that the organisation maintains records which can provide the Administration with data to assist in interpretation of convention regulations.

Verification and monitoring

3 The Administration should establish a system to ensure the adequacy of work performed by the organisations authorised to act on its behalf. Such a system should, *inter alia*, include the following items:

- 3.1 Procedures for communication with the organisation
- 3.2 Procedures for reporting from the organisation and processing of reports by the Administration
- 3.3 Additional ship's inspections by the Administration
- 3.4 The Administration's evaluation/acceptance of the certification of the organisation's quality system by an independent body of auditors recognised by the Administration
- 3.5 Monitoring and verification of class related matters, as applicable.

Appendix I

MINIMUM STANDARDS FOR RECOGNIZED ORGANIZATIONS ACTING ON BEHALF OF THE ADMINISTRATION

An organisation may be recognised by the Administration to perform statutory work on its behalf subject to compliance with the following minimum conditions for which the organisation should submit complete information and substantiation.

General

1. The relative size, structure, experience and capability of the organisation commensurate with the type and degree of authority intended to be delegated thereto should-be demonstrated.
2. The organisation should be able to document extensive experience in assessing the design, construction and equipment of merchant ships and, as applicable, their safety management system.
Specific provisions
3. For the purpose of delegating authority to perform certification service of a statutory nature in accordance with regulatory instruments which require the ability to review applicable engineering designs, drawings, calculations and similar technical information to technical regulatory criteria as dictate by the Administration and to conduct field survey and inspection to ascertain the degree of compliance of structural and mechanical systems and components with such technical criteria, the following should apply:

- 3.1 The organisation should provide for the publication and systematic maintenance of rules and/or regulations in the English language for the design, construction and certification of ships and their associated essential engineering systems as well as the provision of an adequate research capability to ensure appropriate updating of the published criteria.
- 3.2 The organisation should allow participation in the development of its rules and/or regulations by representatives of the Administration and other parties concerned.
- 3.3 The organisation should be established with:
- 3.3.1 a significant technical, managerial and support staff catering also for capability of developing and maintaining rules and/or regulations; and
- 3.3.2 a qualified professional staff to provide the required service representing an adequate geographical coverage and local representation as required.
- 3.4 The organisation should be governed by the principles of ethical behaviour, which should be contained in a Code of Ethics and as such: recognise the inherent responsibility associated with a delegation of authority to include assurance as to the adequate performance of services as well as the confidentiality of related information as appropriate.
- 3.5 The organisation should demonstrate the technical, administrative and managerial competence and capacity to ensure the provision of quality services in a timely fashion.
- 3.6 The organisation should be prepared to provide relevant information to the Administration.
- 3.7 The organisation's management should define and document its policy and objectives for, and commitment to, quality and ensure that this policy is understood, implemented and maintained at all levels in the organisation.
- 3.8 The organisation should develop, implement and maintain an effective internal quality system based on appropriate parts of internationally recognised quality standards no less effective than ISO 9000 series, and which, *inter alia*, ensures that:
- 3.8.1 the organisation's rules and/or regulations are established and maintained in a systematic manner;
- 3.8.2 the organisation's rules and/or regulations are complied with;
- 3.8.3 the requirements of the statutory work for which the organisation is authorised, are satisfied;
- 3.8.4 the responsibilities, authorities and interrelation of personnel whose work affects the quality of the organisation's services, are defined and documented;
- 3.8.5 all work is carried out under controlled conditions;
- 3.8.6 a supervisory system is in place which monitors the actions and work carried out by the organisation;
- 3.8.7 a system for qualification of surveyors and continuous updating of their knowledge is implemented;
- 3.8.8 records are maintained, demonstrating achievement of the required standards in the items covered by the services performed, as well as the effective operation of the quality system; and
- 3.8.9 a comprehensive system of planned and documented internal audits of the quality related activities in all locations is implemented.

3.9 The organisation should be subject to certification of its quality system by an independent body of auditors recognised by the Administration.

4. For the purpose of delegating authority to perform certification services of a statutory nature in accordance with regulatory instruments which require the ability to assess by audit and similar inspection of the relevant safety management system attributes of shore based ship management entities and shipboard personnel and systems, the following should, in addition, apply:

4.1 the provision and application of proper procedures to assess the degree of compliance of the applicable shore-side and shipboard safety management systems;

4.2 the provision of a systematic training and qualification regime for its professional personnel engaged in the safety management system certification process to ensure proficiency in the applicable quality and safety management criteria as well as adequate knowledge of the technical and operational aspects of maritime safety management; and

4.3 the means of assessing through the use of qualified professional staff the application and maintenance of the safety management system both shore based as well as on board ships intended to be covered in the certification.

Appendix 2

ELEMENTS TO BE INCLUDED IN AN AGREEMENT

A formal written agreement or equivalent between the Administration and the recognised organisation should as a minimum cover the following items:

1. Application

2. Purpose

3. General conditions

4. The execution of functions under authorisation

4.1 Functions in accordance with the general authorisation

4.2 Functions in accordance with special (additional) authorisation

4.3 Relationship between the organisation's statutory and other related activities

4.4 Functions to co-operate with port States to facilitate the rectification of reported port State control deficiencies or the discrepancies within the organisation's purview.

5. Legal basis of the functions under authorisation

5.1 Acts, regulations and supplementary provisions

5.2 Interpretations

5.3 Deviations and equivalent solutions

6. Reporting to the Administration

6.1 Procedures for reporting in the case of general authorisation

- 6.2 Procedures for reporting in the case of special authorisation
- 6.3 Reporting on classification of ships (assignment of class, alterations and cancellations), as applicable
- 6.4 Reporting of cases where a ship did not in all respects remain fit to proceed to sea without danger to the ship or persons on board or presenting unreasonable threat of harm to the environment
- 6.5 Other reporting

- 7 Development of rules and/or regulations - Information
 - 7.1 Co-operation in connection with development of rules and/or regulations - liaison meetings
 - 7.2 Exchange of rules and/or regulations and information
 - 7.3 Language and form

- 8 Other conditions
 - 8.1 Remuneration
 - 8.2 Rules for administrative proceedings
 - 8.3 Confidentiality
 - 8.4 Liability
 - 8.5 Financial responsibility
 - 8.6 Entry into force
 - 8.7 Termination
 - 8.8 Breach of agreement
 - 8.9 Settlement of disputes
 - 8.10 Use of sub-contractors
 - 8.11 Issue of the agreement
 - 8.12 Amendments

- 9 Specification of the authorisation from the Administration to the organisation
 - 9.1 Ship types and sizes
 - 9.2 Conventions and other instruments, including relevant national legislation
 - 9.3 Approval of drawings
 - 9.4 Approval of material and equipment
 - 9.5 Surveys
 - 9.6 Issuance of certificates
 - 9.7 Corrective actions
 - 9.8 Withdrawal of certificates
 - 9.9 Reporting

- 10 The Administration's supervision of duties delegated to the organisation
 - 10.1 Documentation of quality assurance system
 - 10.2 Access to internal instructions, circulars and guidelines
 - 10.3 Access by the Administration to the organisation's documentation relevant to the Administration's fleet

- 10.4 Co-operation with the Administration's inspection and verification work
- 10.5 Provision of information and statistics on, e.g. damage and casualties relevant to the Administration's fleet.

Appendix 3

Some other IMO resolutions and circulars concerning the Authorisation of recognised organisations acting on behalf of maritime administration as follows:

IMO Resolution A.789(19) “Specifications on the survey and certification functions of recognised organisations acting on behalf of the Administration”.

IMO Resolution A.847(20) “Guidelines to assist flag states in the implementation of IMO instruments”.

IMO MSC/Circ.710/IMO MEPC/Circ.307 “Model agreement for the authorisation of recognised organisations acting on behalf of the Administration”.

IMO MSC/Circ.788/IMO MEPC/Circ.325 “Authorisation of recognised organisations acting on behalf of Administration”.