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**ACCEPTABLE MERCHANT NAVY
DECK OFFICER EDUCATION AND
TRAINING SYSTEMS
FOR
ASIA PACIFIC
SHIPOWNERS/MANAGERS**

by

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DECLARATION

I certify that this dissertation contains no material which has been accepted for the award of any other degree or diploma in any institution, college or university, and that, to the best of my knowledge and belief, it contains no material previously published or written by another person except where due reference is made in the text of the dissertation.

Neil Stanesby

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ABSTRACT

The international merchant shipping industry is suffering from the poor safety standards of vessels and a lack of well trained seafarers. As almost all of Australia's sea-based export and import trade is carried on international vessels, the standard of these vessels, and their crew, is of particular concern to the Australian people and the Australian Government. With the much quoted statistic of 80% of all shipping accidents being caused by human error, the training of seafarers, particularly deck officers, is a major concern for the international shipping industry. The Commonwealth Government recognises that the improvement of vessel safety requires the provision of adequate education and training for international seafarers. In 1994 the Government encouraged the Australian Maritime College to diversify its sources of funding with the object of attracting an increased flow of students from the Asia Pacific region (House of Representatives 1994, p. 62).

The Australian Maritime College offers training for deck officer students through the Diploma of Applied Science (Shipmaster) and the Diploma of Applied Science (Nautical Science), and attracts a significant number of full-fee students from the Asia Pacific region. The majority of the international students are self-funded, with very little financial support from the shipowners/managers. The aim of this dissertation is to determine a deck officer education and training system which will encourage Asia Pacific shipowners/managers to enter into a contract with the Australian Maritime College to fund the training of their deck officer personnel.

The dissertation seeks the opinions of shipowners/managers in relation to the acceptability of training models, the acceptability of delivery methods, the willingness to financially support training and the factors that affect the education, training and certification of the deck officer students. The study also investigates the characteristics of the international shipping industry to provide insights into factors that may constrain or encourage the implementation of a deck officer

education and training systems. The research is focused through the following research questions:

1. Do the Asia Pacific shipowners/managers have difficulty obtaining adequately trained deck officers?
2. Do the Asia Pacific shipowners/managers wish to support deck officer training through an agreement with a maritime institution and/or funding to deck officers?
3. What are the acceptable deck officer Certificates of Competency education and training systems for the shipowners/managers in the Asia Pacific region?
4. What are the desirable/undesirable delivery methods for the deck officer education and training program for the Asia Pacific shipowners/managers?
5. What do the shipowners/managers see as the major influences on the education and training of deck officers in the Asia Pacific region?

The dissertation uses two descriptive research methods to collect data from shipping company personnel; face-to-face interviews and a survey questionnaire.

The results of the research indicate that the shipowners/managers are having some difficulty obtaining well-trained deck officers, with the deficit greater in the senior officer ranks than junior officer ranks. This suggests the training market in the Asia Pacific region is quite secure, as there is significant demand for well trained deck officers. The majority of shipowners/managers do not have, or want, a Certificate of Competency training agreement with a maritime training institution. Also, the shipowners/managers from the major shipping centres of Hong Kong and Singapore are of the opinion that an employer should contribute a relatively small amount, 0% to 20% (n=7), to the cost of a Second Mate student's training.

The shipowners'/managers' most expected, most desired and best training system is the Sandwich, Diploma of Applied Science (Shipmaster), model. The Front-end, Diploma of Applied Science (Nautical Science), model is regarded as one of the least expected, least desired and worst training models. For the Second Mate course the most agreeable delivery methods involve practical training and official

assessment by senior officers at sea and by simulation at a training institution. The use of a training institution to delivery lectures and tutorials was also supported. Distance education for Second Mate students is given marginal support; however, it is not supported for senior officers due to their at-sea workloads. The factors that strongly influence the education and training of Second Mate students are the Certificate of Competency government requirements, the International Maritime Organisation's requirements, the Quality Assurance of the shipowner/manager and increases in the regulation of shipping.

In order to encourage contracts with Asia Pacific shipowners/managers the Australian Maritime College may need to be able to prove the financial benefit of a training contract to the shipowners/managers. The basis of this proof could be the alleviation of a shipping company's concern of port State control detaining a vessel due to incompetent officers, which costs money, and the non-compliance to Quality Assurance due to poorly trained officers, which may affect insurance. The Australian Maritime College could alleviate this concern by the provision of a company approved education and training system that ensures deck officers meet the requirements of port State control and comply to the company's Quality Assurance. Such a system may need to have the following elements:

- Quality Assurance to recognised international standards;
- the Sandwich model course structure;
- competency based curriculum which concentrates on the training and assessment of practical skills as well as underpinning knowledge;
- official assessment of deck officer students by on-board senior officers;
- extensive use of simulators in the training and assessment of students;
- distance education option for the Second Mate students.

This system implies that the Australian Maritime College may wish to consider undertaking the following developments:

- obtain Quality Assurance to an international standard as a matter of urgency;

- develop a Competency Based Training curriculum that takes into account the requirements of Standards Training Certification and Watchkeeping 1995 and the Australian Vocational Education and Training sector;
- implement Competency Based Training education for the Australian Maritime College staff;
- develop a senior officer train-the-trainer and assessor course;
- develop an on-board deck officer assessment system which ensures all assessments are carried out validly, fairly and consistently to the satisfaction of the Australian Maritime College and the Australian Maritime Safety Authority;
- investigate the development of distance education learning packages for Second Mate students;
- develop constructive relationships with shipping companies and shipowner organisations in the Asia Pacific region.

CHAPTER 1

INTRODUCTION

PROBLEM STATEMENT

The Australian Maritime College (AMC) is Australia's national maritime education and training institution. The AMC provides education and training to national shipping companies and international seafaring students. The Australian Government acknowledges that the improvement of the safety of the world's merchant shipping requires the provision of adequate education and training for seafarers, and has recommended the following:

The government encourages the AMC to explore opportunities to diversify its sources of funding with the object of attracting an increased flow of international students and thus enhancing its activities, particularly those of relevance to the Asia Pacific region (House of Representatives 1994, p. 62).

The greatest number of international students at the AMC are enrolled in the merchant navy deck officer courses. The curriculum which services these students is the Diploma of Applied Science (Shipmaster) (Dip. Shipmaster), which incorporates the Advanced Certificate in Marine Operations (Second Mate) (ACMO) curriculum. The Dip. Shipmaster is attended by the deck officer students wishing to become senior officers. The ACMO is attended by deck officer students wishing to become junior officers.

At present the international deck officer student market revolves around the AMC meeting the needs of self-funded students who travel to the AMC. The junior officer students (Second Mates) pay approximately \$5 000 to enrol in the six month long ACMO, and the senior officer students (Shipmasters) pay approximately \$9 000 to attend the 12 month long Dip. Shipmaster. The AMC could diversify its funding by obtaining training contracts with Asia Pacific shipping companies who would pay for deck officer students to undertake an

AMC Certificate of Competency course. This would mean the market would then revolve around satisfying the needs of the shipping companies through acceptable education and training systems for their deck officers and cadets.

This study forms the first step in a feasibility study to determine the type of education and training system that could be marketed to the shipping companies of the Asia Pacific region.

AIM

The aim of this project is to determine a deck officer education and training system that will encourage the establishment of training contracts between the AMC and the Asia Pacific shipowners/managers.

RESEARCH APPROACH

The research approach for this dissertation was influenced by a Work Research Institute (WRI) Ship Study. Researchers in the Study discovered that to develop the professional role of the merchant navy officer, it was necessary to reorganise the officers' duties and training. However, this necessary reorganisation met resistance from the 'system' and the officers. The WRI project was abandoned after 20 years when the Norwegian shipowners replaced the high quality national crew with cheap developing nation crew (Lahn 1992, pp. 13-14). The researchers determined how to make the Norwegian crew more efficient and competitive, but the implementation failed because the underlying system and the external economic situation had not been considered as part of the implementation. Therefore, this dissertation will not solely study the maritime education and training methods and systems, it will also consider the present 'situation' of the international shipping industry. The characteristics of the international shipping industry and the needs of the shipping companies will provide insights into

factors that may constrain or encourage the implementation of deck officer education and training systems.

Chapters 2 and 3 provide background information about the state of international shipping and deck officer education and training methods. Chapter 4 explains the research methodology. Chapters 5 and 6 explain the design of the interview and questionnaire surveys, reporting the research results separately. Chapters 7 and 8 discuss the results and provide the conclusions of the dissertation. Appendix A is a copy of the survey questionnaire with covering letter. Appendix B is the survey questionnaire responses and appendix C provides a summary of the facilities at the AMC.

CHAPTER 2

THE INTERNATIONAL SHIPPING 'SITUATION'

INTRODUCTION

The AMC has primarily served the Australian merchant shipping industry's need for the education, training and certification of officers and crew. The Asia Pacific shipping companies do not enjoy the high level of government protection experienced by the Australian shipping companies. Hence, the system of education and training the AMC uses for the Australian shipping companies may not meet the requirements of the Asia Pacific shipping companies.

The purpose of this chapter is to establish the industrial milieu in which the international shipping companies operate. A good understanding of the present 'situation' of the shipping industry will provide an understanding, or baseline, of what the Asia Pacific ship managers will accept within the operational constraints of the industry. The purpose of the chapter will be achieved through the analysis of information from published and unpublished international conferences and meetings, United Kingdom and Australian Government investigations and published maritime sector journal articles from 1982 to October 1996.

OVERVIEW OF INTERNATIONAL SHIPPING

The world's merchant fleet totals over 80 000 vessels plying the ocean routes and ports of the world (Bell 1994, p. 1) employing 1.25 million seafarers. Vessels are owned by companies, corporations, governments, individuals and, in some cases, communities. A vessel is owned and operated by a shipping company or placed with a ship management company. The ship management companies ensure the vessels are crewed, maintained and equipped to an owner's requirements. As with

most commercial ventures, the company strives to make a profit through competitive advantage.

During the late 1980's and early 90's the increasing number of maritime disasters has indicated that the international shipping industry has some problems. Some examples of recent maritime casualties are as follows:

1. On 24 March 1989 the three year old, 214 861 deadweight tonnes (dwt), American registered tanker, the *Exxon Valdez*, hit Bligh Reef in Alaska's Prince William Sound spilling nearly 11 million gallons of Alaskan crude oil. The pollution destroyed prime fishing areas, killed thousands of sea birds and sea mammals and covered almost 10 000 square miles of coastline and sea (Hooke 1990, p. 145).
2. On 5 January 1993 the 18 year old, 89 730 dwt, Liberian registered tanker, the *Braer*, sustained engine breakdown when seawater entered her fuel supply. The vessel drifted onto Sumburgh Head on the Shetlands and spilt the entire cargo. The spill affected an area of spectacular natural beauty, polluting the sea, beaches and coastal farm land (Hooke 1995, p. 64).
3. On 29 September 1994 the 14 year old Bureau Veritas classified passenger ship, the *Estonia*, sunk in heavy seas within 15 minutes when her bow doors gave way in the Baltic sea. More than 900 passengers and crew perished in the disaster.

These well known merchant navy accidents are vivid in the memory of many people, but the fact is that many vessels are lost each year with an unacceptable loss of life, loss of property and damage to the environment. In 1993, 121 vessels over 500 gross registered tonnes were reported totally lost, costing US\$590m and 592 lives (Hooke 1995, p. 61). Bolitho, Chief Executive Officer of Australian National Line, quoting Peters of the World Bank, at the ships of shame conference in September 1993, highlighted the serious problems in the international shipping community:

The world's ocean transport faces an unprecedented crisis...the international fleet has become critically over-aged and suffers from a deteriorating safety record...It is now just a question as to when the bubble will burst. At that point a large portion of the international merchant fleet will be unfit for transport. The implications for world trade will be devastating (Bolitho 1993, p.4).

The Australian Government's *Inquiry into Ship Safety - Ships of Shame* report (Ships of Shame Report) has become internationally well known and referenced, making important observations about the international merchant shipping industry. The Ships of Shame Report stated that the global economic downturn of the 80's and early 90's, combined with the operation of 'cheap' substandard ships, has forced some freight rates down to a level where a ship's operational costs are under considerable pressure (Ships of Shame Report 1992, p. 28; Peters 1994, p. 11). The Report suggests that the hirers of vessels, the charterers, are happy to accept the lower freight rates and condition of vessels which the cheaper substandard operators offer. The competitive nature of merchant shipping has forced the more expensive high standard fleets to cut costs in order to make their operations more efficient. The economic downturn and the reduction in profit has not encouraged new ship building, and as a result, the world fleet of merchant vessels is ageing (Ships of Shame Report 1992, pp. 27-28). The Ships of Shame Report described the international shipping industry as:

...a world of too many ships that are over-aged and under maintained chasing too little freight for too little return (Ships of Shame Report 1992, p. 157).

REGULATION OF THE INDUSTRY

World shipping is supposedly governed by national and international regulations which help ensure the safety of shipping and the environment. The main agency that develops international regulations for merchant shipping is the United Nation's International Maritime Organisation (IMO). The fundamental role of the

IMO is to protect life, property and the marine environment. The IMO develops conventions for its 135 member states that provide international standards, as a minimum base, to which all members must comply.

The major shipping conventions and recommendations, relating to shipping safety, to which vessels must comply are as follows:

1. International Convention for the Safety of Life at Sea, 1974 (SOLAS); is a set of minimum standards for the construction of ships and the safety equipment to be carried on board. SOLAS contains operational instructions for procedures on board.
2. International Convention for the Prevention of Pollution from Ships, 1973, 1978 (MARPOL 73/78); contains measures designed to prevent accidental and operational pollution.
3. Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS); contains the rules to govern the action of vessel in collision situations.
4. International Convention on Load Lines, 1969; sets minimum freeboard according to regions and seasons.
5. International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW 1978); sets minimum training, certification and qualification requirements of seafarers.

(ICS & ISF 1993, p. 28)

These conventions and others, like the Merchant Shipping (Minimum Standards) Convention, 1976 (ILO Convention 147), if adhered to by shipowners/managers, officers and crew should provide adequate vessel safety and protect the environment.

The difficulty the industry faces today is not a lack of rules, but a lack of adherence to the rules by shipowners/managers (Raeng 1993, p. 4) and a lack of the enforcement of the rules by countries. The decline in ship safety can be seen, in part, as the failure of shipowners/managers and countries to observe the international conventions (Ships of Shame Report 1992, p. 27). The lack of observance of the conventions can be seen as an economic decision to cut costs (Thorstensin & Shield 1994, p. 105). Compliance to the conventions cost the ship operators money in the form of personnel, capital equipment, systems and procedures. Non-compliance to the conventions has been seen as a result of the IMO's powerlessness to enforce its conventions (Ships of Shame Report 1992, p. 27; Morrison 1994, p. 6) and the lack of shipowner's/manager's due regard for human life and the protection of the environment (Bolitho 1993, p. 4).

REGISTRATION OF VESSELS

The IMO sets the minimum standards that are designed protect life, property and the marine environment. However, the control and regulation of ocean-going vessels is determined by the country that accepts the registration of a vessel. The country of registration takes responsibility for ensuring a vessel complies with international and national regulations. This country is called the flag State. Under the Geneva Convention of the High Seas, each country has the right to sail vessels under its own flag (Thorstensin & Shield 1994, p. 104). A vessel with a Panamanian registration (flag) is controlled and regulated by the Panamanian Government and its laws. Each country has its own rules, regulations and laws, with the international conventions setting minimum standards.

Countries can and do exceed the international convention requirements and, as a result, a country like Norway may have a higher standard of compliance to maritime safety regulations than Liberia. Under the laws of the country Norway may, however, have a higher requirement for taxes on shipowners than Liberia. But the shipowner's nationality need not be the same as the flag State. For

example, an American shipowner may legally register vessels with the country of Panama, thus coming under the control of the Panamanian laws. There are justifiable economic reasons for a shipowner to register a vessel in a less regulated country (Thorstensin & Shield 1994, p. 105). The less regulated countries are often called 'flags-of-convenience' or 'open registries'. These flags-of-convenience can provide benefits to shipowners, such as less tax, ability to employ international crews and pay local wage rates, freedom to build vessels to international standards rather than higher national standards and politically unrestricted trade (Chapman 1992, p. 61).

The flags-of-convenience, such as Liberia and Panama, are without an indigenous maritime fleet and they lack the infrastructure, skill and willingness to ensure all ships on their register comply with the international conventions (Springall 1993, p. 2; Thorstensin & Shield 1994, p. 103). The lax enforcement of the regulations has encouraged the general lowering of ship standards and the presence of the 'Ships of Shame'. Springall, at the 1993 Maritime Technology 21st Century Conference, sums up the phenomenon very well:

It is perhaps not surprising that in the ever competitive freight market, flags of convenience...prove attractive both to reputable shipowners seeking a competitive edge by hiring cheaper third world crews and less reputable owners of sub-standard ships wanting to capitalise in the lack of regulations alike (Springall 1993, p. 3).

The shipowner is responsible for the seaworthiness and operation of the vessel at all times, so the flag-of-convenience does not necessarily mean a vessel is of a poor standard. However, if there is no enforcement of minimum international standards in a climate of economic hardship, the standard of shipping will reduce to its lowest possible level and problems will arise as the industry becomes self regulating (Thorstensin & Shield 1994, p. 105).

The differing quality of vessels within a flag-of-convenience is facilitated by the Classification Societies. As stated, the government of the flags-of-convenience nations may be incapable of carrying out the most basic international regulatory inspections and requirements. The shipping industry gets around this problem by

employing Classification Societies that basically inform the government of compliance to the international and national regulations. Proof of compliance (called 'Class') is obtained through surveys and inspections to Classification rules. Classification Societies originated in London 230 years ago to fulfil the need of insurers of a vessel to know if the vessel was a worthy risk (Bell 1994, p. 4). The Classification Societies' rules are the standards against which the world's merchant fleet is measured (Bell 1994, p. 5). As vessels 'flag-out', the Classification Society is under pressure from the shipowners to reduce its standards to what is acceptable to the flag State rather than its own classification rules (Ships of Shame Report 1992, pp. 51-52). If a Classification Society refuses to Class a vessel it will lose a customer, and after years of economic pressure Classification Societies have generally dropped their standards and significantly contributed to the proliferation of poorly operated and maintained vessels. However, Bell (1994, p. 7) the Permanent Secretary of the International Association of Classification Societies (IACS), at the September 1994 ship shape conference made the point that criticism of the Classification Societies is a 'convenient scapegoat for shipowners who do not take responsibility for their ship's condition'.

The shipping industry is often paralleled with the airline industry. They both transport cargoes internationally, have officers in charge of the craft, the craft is registered with a country and the craft must meet international standards. The difference is that the airline industry has no flags-of-convenience (Terrell 1992, p. 2). The Certificates of Airworthiness and operator licences are firmly the responsibility of a country's government. Aviation standards are unilaterally enforced, whereas shipping standards are not unilaterally enforced (Terrell 1992, p. 4). If an aircraft breaks down it falls out of the sky, if a ship breaks down it usually floats about until repaired or towed. If an aircraft crashes everyone notices, if a ship goes down, and there are no passengers, very few people notice (Terrell 1992, p. 8) - provided there is no pollution. Today, the media gives environmental damage caused by vessels similar attention to that of a passenger aircraft accident. This international focus, with the help of the 'Green Lobby' (Moreby 1993, p. 3), is a

significant cause of governments' present preoccupation with increasing national and international maritime safety and operational standards.

CREWING AND TRAINING

Demand for seafarers

In 1989/1990 a study was carried out by the University of Warwick's Institute for Employment Research, under funding from the Baltic and International Maritime Council (BIMCO) and the International Shipping Federation (ISF), which researched the labour requirements of the merchant shipping industry. Its findings were as follows: in 1990 there were 1.25 million seafarers, comprising of 400 000 officers and 840 000 ratings. In 1990, to cover seafarer demand, the world fleet needed 450 000 officers and 600 000 ratings. In 1990 there was a worldwide shortage of 50 000 officers and a 240 000 oversupply of ratings. Based on a forecast 33% growth in the industry and a 10% wastage of personnel, the need exists to train approximately 40 000 officers per year to balance supply and demand by the year 2000. In 1990, 12 000 officers were trained worldwide. The conclusion the report made was as follows:

These figures suggest that a very substantial recruitment and training effort will be required over the decade (1990-2000) if the commercial fleet is to be properly manned (sic)...Industry will have to expand the number of trainees significantly if serious problems are to be avoided (University of Warwick 1991, p. 6).

The policy of developed nations registering their vessels with flag-of-convenience states has also altered the seafarer 'market'. As shipping companies from developed nations flagged-out, shipowners/managers gained access to cheaper crews from developing nations. This is particularly attractive to developed nations shipowners/managers who can cut more than 50% off national crew costs when they employ crews from developing nations (Springall 1993, p. 2). Therefore, the

demand for these cheaper crews has increased more than the traditional maritime nations' crews. In the Asian region the largest international maritime labour market has been India and the Philippines, with Pakistan, Bangladesh and Sri Lanka augmenting the supply. Other Asian countries such as Indonesia, the People's Republic of China and Myanmar (Burma) are also looking for international shipowners to employ their nationals (Sien 1994, pp. 4-7).

Quality of seafarers

Seafarers of the developing countries see an economic benefit in going to sea (Grey 1995, p. 60). However, as pointed out to the Tripartite Seminar on Maritime Labour Standards for selected Asian Countries in Bangkok in 1994, the Asia Pacific region can supply the quantity of labour but can not easily supply the quality (Sien 1994, p. 4).

The main workers on a vessel are the ratings, or crew, and the officer. The ratings' work and skill is based around the maintenance and basic operations on the vessel and does not require a high level of institution-based training. The deck officers and engineer officers, however, are responsible for the control and operation of the vessel, and it is the officers' errors that will most likely cause an accident or disaster. The officer requires good quality training, education and experience, in order to become a competent operator. The officer is required to have a Certificate of Competency issued by a flag State in order to operate a vessel. To obtain a Certificate of Competency an individual must complete seetime, a course and/or examination. Most, if not all, seafaring nations have their own certification system.

As mentioned, in order to ensure a standard of competence, the IMO developed an international standard of competency called the Standard of Training, Certification and Watchkeeping 1978 Convention (STCW). The STCW Convention reflects the highest standard of competence that was practicable and technologically achievable by the developing nations at the time of inception (Morrison 1994, p. 6). Many

developed nations far exceed the minimum requirements of the STCW Convention, leading to a situation where the world has varying qualities of certification. As a result of the global economic downturn, considerable pressure has been placed on the cost of running a vessel. This pressure has meant that the better trained seafarers, who are usually more expensive to train and employ, are being replaced by the cheaper lower quality developing nation crews.

For vessels registered in developed nations, for example United Kingdom, France, Australia, Japan, Norway, Germany etc, the education and training of the deck officers is usually of a high standard. The governments of these countries funded the training of seafarers to serve on their vessels, setting up expensive institutions and programs to cater for the requirements of the shipping industry. As a result of flagging-out and the employment of crews from developing nations, there has been a reduction in the merchant navy education and training activity of the developed nations. But the nations from which the new seafarers are being employed do not have the ability to deliver the quality of training required. Uwe Zellmer, Director Fleet Personnel & Maritime Training - Hanseatic Shipping & Marine Training School, expressed concern in 1994:

The traditional maritime governments are closing their training institutions in Northern Europe. Those in the Far East are often neither manifold nor qualified enough to cope with the recruitment (Zellmer 1994, p. 5).

This reduction in training activity is not limited to Northern Europe. Sien (1994, p. 6) stated that it was unfortunate that Asian countries with well established traditional maritime training institutions, such as Japan, Hong Kong and Singapore, had reduced the number of programs or courses offered. This was due to the high cost of maintaining equipment and the falling recruitment of nationals.

Maritime education and training is expensive, and there is little point in having the highest standards and qualifications unless the personnel holding them can be economically employed within the industry (Mackie 1992, p. 3; Grey 1995, p. 60). Raeng, sums up the situation as follows:

The fierce competition in the shipping industry in the 80's forced owners to look for reductions in operating costs. As most cost elements, except for crew costs, tend to be internationally on the same level, focus was particularly put on crew costs. The shift of recruitment from traditional maritime countries to the new labour supply countries and simultaneously drastically reducing investments in training, resulted in a strongly felt lack of professional competence on board (Raeng 1993, p. 1).

With the increase of flags-of-convenience vessels, officer incompetence has become a major concern. An excellent summary of the situation was made by the editor of *Lloyd's List International*:

...paper qualifications, which were required by the convention (STCW) have in many cases been of low standards, the training system which has been developed has been inadequate, and as a result there are many people operating ships who are frankly dangerous and bear qualifications which are practically worthless, although they fulfil the requirements of the convention (27 Sept. 1991, editorial, p. 4).

In an attempt to compete with the flags-of-convenience vessels, some companies have reduced the number of personnel required on merchant vessels. Ten years ago it was common for vessels to have a complement of approximately 30. Today a common vessel complement is approximately 17 - 20, with Japan reducing crew numbers to 11 on some vessels. This reduction of crew size has been achieved by increased automation and increased workloads and skill levels of the crew (House of Commons Employment Committee 1993, p. 3, para. 17). Because of reduced crew size and increased workloads, stress and fatigue are now becoming a significant issue for ship operators (House of Commons Employment Committee 1993, p. 4, para 27). As freight competition continues, we are now seeing the predictable phenomena of vessels with reduced manning being crewed with poorly trained people (Raeng 1993, p. 1) This trend has been highlighted as a potentially serious problem for ship safety (Ships of Shame Report 1992, p. 27).

Government and industry support for the education and training of seafarers

The maritime labour crisis has two main elements. The first is the lack of deck officers and the second is the lack of competence of the deck officers. A conclusion that many in the shipping industry are arriving at, or focusing on, is that safer people equate with safer ships and that substandard people equate with substandard ships. However, Aldanese, the President of the Filipino Association for Mariners Employment, made the point, in the following statement, that the lack of well trained people is not the root cause of the shipping industry's problems:

It is very convenient to say that maritime safety is given away due to human error. Allegations of personnel incompetence and doubtful certification then follows...it takes two to tango. Let us all admit a lot of operators prefer Filipinos because of one reason, cost. Everything boils down to the bottomline, the profit margin (Aldanese 1995, p.8).

Aldanese believes that the responsibility for poor quality is, in part, the responsibility of the labour users - the shipowners/managers. If the developing nations can not provide the support and infrastructure needed to have quality institutions then the shipping companies may need to provide the support. Thus, as a result of the predicted shortage of seafarers and the increase in shipping casualties, international shipowners are now realising they may need to take greater involvement in the provision of sufficient resources for training. This realisation is quite a paradigm shift for the majority of international shipping companies. The following quotes reflect the growing awareness of the ship operators' responsibilities:

The manpower (sic) of a company on board and ashore is no doubt the most crucial subject that a company has to deal with, and training appears to be the only way of securing that there is adequate manpower (sic) available in the years to come (Meyer 1992, p. 3).

The shipowner gives the control of an investment worth tens of millions of dollars...the actions or inactions of the staff on board can easily decide the entire fate of a company...so for God's sake - let's (sic) give them a chance to learn - let's (sic) give them proper training...all of you who are in shipping have an obligation to contribute directly to the training of those who serve you (Cremers 1994, p. 3).

Competent seafarers can no longer be 'found' they must be trained, developed and retrained in the company (Raeng 1993, p.4).

The Industry needs qualified crews. If it is to ensure its availability the shipping industry is going to have to pay for it...The industry itself through direct sponsorship of training is the only means by which this supply can be assured (Thorstensin & Shield 1994, pp. 118-119).

...owners and managers should...select nautical institutions based on their performance - support them where required - and only accept employment of officers from these institutions (Cremers 1994, p. 3).

The recognition of the need to support training to supply quality personnel appears to be quite strong. Some of the larger international companies are investing heavily in training equipment and facilities in developing nations like India and the Philippines. The Norwegian Shipowner's Association has established the Norwegian Maritime Foundation of the Philippines. Its purpose is to ensure that adequate courses are available for Filipino seafarers working on board Norwegian controlled vessels (Raeng 1994, p. 8). The Norwegian companies have also invested in training in India (Shukry 1994, p. 5). Japan, a major employer of Asian seafarers, has established training institutions in the Philippines, Indonesia and Myanmar, with the Nippon Yusen Kaisha (NYK) line a major financial contributor (Sien 1994, p. 11).

FUTURE REGULATION OF THE INTERNATIONAL SHIPPING INDUSTRY

During an address at the ships of shame conference, Morris (1993) quoted a shipowner as saying, "We need to recognise that there are two classes of shipowners: those who work very hard to meet all the regulations and those who work very hard to avoid the regulations". Shipowners and managers, collectively, have not maintained stewardship of the industry, and standards have slipped amidst the collection of seemingly unenforceable international standards and regulations. In response to the failure for these regulations, new conventions and regulations are being developed and implemented to hopefully encourage the shipping companies, flag States and port States to raise shipping standards.

International Safety Management Code

In recent history the world has witnessed some serious maritime accidents. These accidents have produced legal actions against the vessel, the crew and the company's management. Some examples of this follow:

1. In 1987 the *Herald of Free Enterprise* sank off the port of Zeebrugge killing 188 people because the bow door was not closed on departure. The Sheen Commission's investigation of the accident highlighted that the Board of Directors did not appreciate its responsibility and that management, from the top down to the junior superintendent, was "infected with the disease of sloppiness" (Okamura 1995, OH 2). Members of the shore and shipboard management were charged in the high court with "unlawful killing of passengers" (Thompson 1995, p. 2). Two directors and a senior manager for the company operating the ferry, P&O European Ferries (Dover) Ltd, were tried for manslaughter (McKenzie 1995, p. 6).

2. In April 1990 the *Scandinavian Star* had a fire on board which caused the death of 158 passengers. Senior members of the shore and shipboard management were charged with "causing death and risking lives of people on board, whilst in the course of pursuing commercial gain" (Thompson 1995, p. 3).
3. In March 1989 the *Exxon Valdez* ran aground. The United States National Transport Safety Board found that the Third Mate had failed in his duty because of fatigue and excessive workload. This was caused by the failure of the Exxon Shipping Company to provide a fit Master and a rested and sufficient crew for the *Exxon Valdez* (Okamura 1995, OH 3).

In addition to legal action, major shipping disasters often produce international regulations that govern shipping. The SOLAS convention came into existence after the death of 1 500 passengers with the sinking of the *Titanic* in 1912. The *Titanic* had an inadequate number lifeboats on board, as a result, the SOLAS convention requires vessels to carry enough lifeboats for the whole complement on board. In 1967 the *Torrey Canyon* ran aground spilling thousands of tonnes of oil; hence, the existence of MARPOL 73/78. The MARPOL convention regulates the deliberate and accidental pollution of the seas. The *Estonia* disaster, where 900 people died in 1994, has produced new structure and safety requirements in the construction of Roll-on/Roll-off vessels in the European Community (McKenzie 1995, p. 6). In the United Kingdom the *Herald of Free Enterprise* case has encouraged the British Law Commission to change British law to include corporate manslaughter (McKenzie 1995, p. 7). The *Exxon Valdez* disaster led to the passing of the United States Oil Pollution Act 1990 (OPA 90) which imposes unlimited liability on any shipowner if it causes an oil spill. In the case of the *Exxon Valdez* this is in the region of US\$3 to 4 billion (McKenzie 1995, p. 7).

As a result of substandard ships, substandard management, substandard crews and general disregard in the management of shipping safety, there has been a recent quality movement in international shipping (Vessey 1995, p. 1). Following the lead

of the International Ship Managers Association, many companies have taken up the ISO 9002 Standard of Quality Management System (Sorlie 1995, p. 1). The ISO 9002 proposes to enhance the safe, efficient and economic operation of vessels. (Conolly 1995, p. 2). Quality Assurance is also becoming a strong advertising tool for shippers, and the axiom of 'If you think Quality costs you money, try accidents!' appears to be gaining some credibility (Vessey 1995, p. 2; Lemley 1994, p. 16).

For the same reasons that the international shipping community has moved voluntarily toward quality systems, the IMO was encouraged to take up a Quality Assurance regulation which will form part of the international regulations of shipping (Ships of Shame Report 1992, p. 71). The 'International Code for the Safe Operations of Ships and for Pollution Prevention', or the 'International Safety Management (ISM) Code' for short, was developed as the international shipping quality regulation.

The purpose of the ISM Code is not as extensive as the ISO 9002 quality system. The ISM Code is limited to providing company management systems to ensure the safety of the operation of the ship and reduce accidents which may cause pollution or injury (McKenzie 1995, p. 1; ICS & ISF 1993, p. 3). Implementation of the ISM Code attempts to change the way a company's personnel, from senior management down to the junior crew member of a ship, think about safety (Okamura 1995, p. 4). The Code basically informs the organisation 'what the right thing to do is', 'how to do it right' and 'when to do it' (Thompson 1995, p. 5). The ICS/ISF guidelines to the ISM Code point out that levels of competence for the enterprise tasks should be defined clearly and that senior management should ensure that shore and sea personnel are adequately qualified and experienced to undertake their duties. This puts the responsibility of competence and incompetence squarely at the feet of the management of the company and not just the individual seafarer.

At the time of writing the ISM Code was voluntary. The ISM code will become a mandatory application in a new chapter of the 1974 SOLAS convention. For all passenger ships, oil tankers, chemical tankers, gas carriers, bulk carriers and cargo

high speed craft of 500 gross tonnage and upwards, the Code will come into force not later than 1 July 1998. For other cargo ships and mobile offshore drilling units of 500 gross tonnes and upwards the Code will become mandatory at the beginning of 2002.

STCW Convention

The safety of the vessel is in the hands of the Master and the shipowner/manager. It seems that some shipowners'/managers' economic considerations have taken precedence over the basics of crew competence (Thorstensin & Shield 1994, p. 105). There is a fear that in the future, with the shortage of seafarers, the shipowners/managers will employ anyone they can get, competent or not (O'Neil 1994, p. xii). Meyer (1992, p. 93) points out that shipowners and ship managers regard crewing and training as irrelevant whilst at the same time being worried about the consequences of not having enough properly trained personnel.

As stated, to legally operate a vessel, a ship's officers must have a Certificate of Competency. The IMO's STCW 78 convention sets out the comprehensive knowledge required for certification, but it stipulated the level of attainment is 'to the satisfaction of the Administration'. This means there is no international standard. In recent years the STCW convention has been generally criticised as being out-of-date, not reflecting new work practices, not having adequate or defined standards, and of being unenforceable (Chapman 1994b, p. 14; Morrison 1994, p. 6).

After the recent serious ship casualties, and with a much quoted statistic of 80% of shipping accidents being caused by human error (International Chamber of Shipping 1993, p. 3), a major focus for improving the safety performance of international shipping is the improvement and enforcement of training standards and certification of ship officers (Thompson 1993, p. 4). In 1992 the IMO decided to review the STCW Convention. The completion of the review was expected to be in 1998, but the IMO member nations realised that the environment and the

industry could not wait until 1998; hence, the review completion date was brought forward to July 1995 (Sandvik 1994, p. 2). The International Shipping Federation (ISF) sees the new STCW convention as a means of 'putting right' a number of ship safety issues and calls for shipowners to be aware of what is going on (Dearsley 1993a).

IMPLICATIONS OF THE NEW STCW CONVENTION

The training of officers in traditional maritime nations, and within the STCW convention, has been based on the assumption that mandatory seetime would produce the required skills, and that knowledge and skill could be assessed through a written examination (Matthew 1995, p. 3). The new STCW convention, called STCW95, is based around a standard or benchmark defining the knowledge and skills necessary to carry out the functions on board a vessel. In the deliberations of STCW95, J.L. Thompson, Head of the IMO navigation section, defined a function as:

...a shipboard task, duty or responsibility, or a group of closely related tasks, duties or responsibilities essential to safe operation practices, safety of life and property at sea or protection of the marine environment whatever the shipboard organisation (Thompson 1993, p. 5).

The functions can be subdivided into the levels of work of support (basic operations and maintenance), operations (executing and monitoring) and management (planning and control) (Matthew 1993, sec. 3.3). The functions and their levels will establish a standard to which a person's knowledge and skills can be measured to determine competence. The convention will define how the knowledge and skills are to be assessed and evaluated against the functions. This process is termed the 'functional approach' (Chapman 1994a, p. 14; Dearsley 1993b, p. 1).

An important part of the convention is the definition of competence and documentation of how the evaluation should be carried out.

Competence means ability to perform a particular function in a safe and efficient manner to the international agreed criteria - incorporating prescribed standards or levels of knowledge, experience, instruction and demonstrated skill (Thompson 1993, p. 5).

The functional approach to the assessment of knowledge and skill within the levels of responsibility will allow flexibility in the certification of seafarers and the operation of vessels. Under the functional approach a vessel may be organised by functions rather than by rank (Dearsley 1993a). This method of organising tasks may enhance the safe operation of the modern high-technology ships, and facilitate the reduction of on-board manning. The functional approach appears to be compatible with the shipping industry's need for operators to demonstrate mastery of skills rather than written knowledge (Waters 1994).

The development of function standards and the requirement of seafarers to demonstrate competency in terms of knowledge, skill, attitude and experience in an industry setting, directly reflects the Australian Vocational Training sector's pursuit of Competency Based Training (CBT), the United Kingdom's National Vocational Qualifications (NVQ) (House of Commons Employment Committee 1993, p. 3 para. 17 & 20) and the New Zealand vocational training reforms. These countries systems require the development of skill standards and training systems that measure the knowledge, skill and attitude of individuals to the required industry standard. The focus of the system is primarily on outcomes rather than the training process itself (Merchant Navy Training Board c. 1994, p. ii). The industry sector is required to have close involvement in the development of the standards and the articulation of training into the workplace.

The STCW95 convention has not changed the basic academic knowledge requirement of the deck officer, but it has changed the assessment to include the proof of competence within, as near as possible, the industrial setting. The convention also puts a formal obligation on the owner to employ a properly qualified crew and on the flag State to accept the responsibility for attesting the competence of their seafarers. The convention requires the flag State to submit

written details of their training, examination and certification to the IMO which, if deemed acceptable, will be placed on an international 'white list' of acceptable certificate countries (Horrocks 1995, p. 3).

Enforcement regulations

The freedom the shipowners/managers have enjoyed through the lack of enforced regulations has not been tempered by the responsibility that should go with the freedom. New encouragement for ship operators responsibility is needed. The IMO has 135 member states which agree to international conventions, but the IMO has no means of enforcing its global standards. Implementation and enforcement of the international conventions is the responsibility of the flag and port States.

FLAG STATE CONTROL (CLASSIFICATION SOCIETY RULES)

The flag State is responsible for the administrative control of a vessel through certification and the implementation of international conventions (Oca 1994, p. 103). A country that accepts the registration of a vessel is required to ensure that the vessel at least meets international standards of operation. James, reporting on the 1994 ship shape conference, noted that a common concern at the conference was that flag States, who are vital in ensuring safety at sea, are not doing their job (James 1994, p. 29).

A shipping company may want the benefit of a flag-of-convenience registration but not the bad name the registration gives. To achieve this a flag State may allow Classification Societies to carry out their inspections for issue of Certificates of Compliance, therefore, the quality of the vessel can be determined by the classification rather than the registration. However, Classification Societies have come under criticism for lowering of standards as the world's fleet moved to the flags-of-convenience. Bell, Permanent Secretary of the International Association of Classification Societies (IACS), speaking at the 1994 ship shape conference, saw the

Classification Societies as central to shipping safety (Bell 1994, p. 1). The 11 IACS members classify 90% of the world's tonnage which equates to over 50% of the world fleet by number (Bell 1994, pp. 5-6). IACS has articulated a commitment to achieving increased control and standards of classification in a recent e-mail from the IACS Permanent Secretariat:

Members of the IACS will be required to conform with more strict requirement for renewing Certificates of Conformity with the Association...The new provisions bring greater alignment with ISO 9001. (e-mail 9/8/95 Press release, J.D. Bell iacs@bbcnc.org.uk)

Ugland, the former Chairperson of Intertanko, stated that the Classification Societies should be one of the mainstays for the safe operation of ships. Ugland also made the point that shipping companies themselves are ultimately responsible for their ships and should only accept Classification Societies that are full members of IACS (Ugland 1994).

PORT STATE CONTROL

The international community has accepted the IMO and International Labour Organisations (ILO) principle ship safety Conventions of SOLAS, MARPOL, STCW, COLREGS, ILO 147 and LOAD LINE. The primary responsibility for ensuring compliance to these regulations rests with the flag State (Dayton 1993, p. 2). Obviously with the growing collection of Ships of Shame, this enforcement by the flag State is inadequate. The international shipping industry needs a 'police force'.

In 1978 the *Amoco Cadiz* ran aground and the pollution that it caused on the French coast provided the catalyst for the establishment of the Paris Memorandum on Port State Control (Dayton 1993, p. 4). Port State control allows a country to provide some protection of its coastline and ports. Any port State (country) can inspect a vessel within, or on approach to, its ports to determine if it meets the agreed international standards. If a vessel is below international standards it may

be detained until the vessel deficiencies are rectified. In Australia, the port State control inspections are the jurisdiction of the Australian Maritime Safety Authority (AMSA). McGrath, Head of AMSA, recognised that to improve the state of world shipping the scale must be toppled on the side of enforcement of conventions and away from commercial considerations (McGrath 1994).

The European Union (EU) is introducing its own regulations that will apply to any vessels operating in EU waters. The action plan for safer ships and cleaner seas in the EU is called 'A common policy on safer seas' (McKenzie 1995, p. 5). McKenzie stated that the EU has a target of inspecting 15% of all ships entering EU ports. Vessels that fail to comply to standards will result in refused access to other EU ports and public black listing (McKenzie 1995, p. 5). Also, as a result of the United States OPA 90, the US Coast Guard has developed an extensive matrix of factors, such as vessel owner, vessel operator, flag of registry, vessel classification, and vessel history, which targets port State control boarding for US ports (Lemley 1994, p. 12).

The increased port State inspections, the development of international data bases for the publication of port State transgressors and the introduction of national laws and control measures will make it harder for substandard shipping to find places to trade. Port State control gives the international conventions the teeth that they need. The message that port State control gives is that sub-standard ships should stay away from port State control active nations (McGrath 1994, p. 19). However, substandard vessels do not necessarily disappear, they are often moved into areas of the world with less ability, or will, to enforce port State control measures; the problems are merely moved.

CONCLUSION

The global economic downturn in the 80's and early 90's led to intensive competition for freight and a subsequent pursuit of cost reduction within all aspects of the international shipping industry. In an industrial climate of quasi-

self-regulation, due to ineffective international regulations, maritime shipping standards have diminished. The following are examples of the lowering of the merchant shipping standards:

- reduction of new ship building and the inevitable ageing of the world's merchant navy fleet;
- reduction in the number of crew on vessels;
- increased sophistication of control systems on board where fatigue and work related stress are becoming recognised as significant problems;
- increase in flag-of-convenience vessels and a subsequent use of cheaper, often less competent, developing nation seafarers, leading to questionable work practices;
- predicted huge shortage of qualified officers worldwide;
- lack of training opportunities as traditional shipping nations, and companies, slow down training activity;
- inability of developing nations to provide the quality of certificated officers required.

The shipping industry is a large, if not the largest business in the world. To develop, within an industry, a collective consciousness which will consider ethics and moral behaviour across cultures and against economic arguments is difficult, if not impossible. However, market forces and the international community are forcing the shipping industry to take more responsibility and to focus on improving the quality of its operations through the following:

- Quality Assurance and the ISM Code is attempting to change the attitudes and thinking of the shipping industry;
- revision of the STCW convention is endeavouring to define a means by which real competence can be measured;
- port State control is attempting to police the national and international standards of operation through inspections and shame; and
- IACS is actively focusing on an improvement of the classification of vessels.

The above pressures have made the shipping companies realise that education and training of vessel personnel, under their sponsorship or support, may be necessary to improve vessel safety and efficiency. This may mean that the maritime education and training industry is moving from government supported maritime institutions in developed nations, to company sponsored training in developing nations.

CHAPTER 3

DECK OFFICER TRAINING SYSTEMS AND METHODS

INTRODUCTION

As concluded in the previous chapter, the employment of officers with questionable competence from developing nations is a problem for the international shipping industry. The shipping industry has undergone major operational changes over recent years, but the training and certification system, which is regulated by government bodies, has not altered with these changes. The certification of officers is considered more of a regulatory requirement than an individual's level of ability. The following quote summarises the situation:

Our industry (merchant shipping) is hidebound by traditional ways of training and education, which no longer suit the needs of modern vessels...I suggest that the navigational errors, hull and machinery failures are partly caused because, over the years, we have not adjusted the training of seafarers to meet the conditions of today (Stratton 1993, p. 2).

The purpose of this chapter is to describe traditional, and innovative, deck officer education and training programs which may be acceptable to the Asia Pacific shipowners/managers. This is achieved by the collection of data from the AMC, the Australian Maritime Safety Authority and referenced conference papers.

ORGANISATION OF DUTIES ON BOARD A MERCHANT VESSEL

A figure widely quoted by politicians, industry leaders and academics is that 96% of world trade, by volume, is carried by the world's merchant navy. The seafarers who are engaged in this industry are in one of the oldest occupations in the world. The Master of a vessel has been of major importance to the success of a shipping company from the earliest days (Okamura 1995, p. 2). The Master bought and sold cargo, hired and fired crew, ensured the health and safety of the crew and maintained discipline. The success of a shipping venture was often determined by the man appointed as the Master (Okamura 1995, p. 2).

Due to the loss of ships and seafarers' lives during the nineteenth century, the Certificate of Competency was introduced to prove that a deck officer was responsible and competent to navigate a vessel (McCallister 1992, pers. comm.). The Certificate of Competency, or 'ticket', has become the universal qualification that is recognised as a means of proof that an individual is competent in the duties of a deck officer. On-board organisation of a merchant vessel has been based around a military ranking system of officers and crew. Historically the position of authority of the officer over the complement of the vessel was a response to the internal threat of mutiny and the external threat of piracy (Roggema & Smith 1982, p. 13). Today the workers on board the majority of the world's merchant fleet can be categorised as officers, crew and ancillary staff. The officers are the managers of the vessel and their occupations, which are based on rank, can be separated into deck officers and engineer officers. Deck officers are responsible for the administration, navigation, and the loading and discharge of cargo. Engineer officers are responsible for the mechanical and electrical running of the vessel. The crew (ratings) are the labourers of the vessel, carrying out routine maintenance, routine tasks and assisting the officers as required. The ancillary staff are responsible for the upkeep of the living quarters and the provision of meals.

The deck officers' competence is of particular importance as they are responsible for the navigation of the vessel, in all weather and traffic conditions, and the safe handling of cargoes. The deck officers' responsibilities are defined by rank. The chief executive of the vessel is the captain (Master); he or she is responsible for the whole vessel. The first officer (First Mate) is responsible for the cargo and maintenance, and is a navigating officer. The second officer (Second Mate) is responsible for the navigation, navigation equipment, payment of crew and is a navigating officer. The third officer (Third Mate) is responsible for the vessel's safety equipment and is a navigating officer. For each rank an individual must obtain a Certificate of Competency as proof of ability to undertake the tasks of the rank. The senior officers of a vessel are the Master, First Mate, Chief Engineer and Second Engineer, and the junior officers or watchkeepers are the Second Mate, Third Mate, Third Engineer and Fourth Engineer. This method of organisation and certification is often called the Departmental system and is the prevalent system in the world today, especially in the Asia Pacific region (Lambert & Dove 1993, p. 11).

DECK OFFICER QUALIFICATIONS IN AUSTRALIA

The deck officer qualification is the legal requirement enabling a person to be in charge of a vessel. The Australian deck officer qualifications are issued by a government body called the Australian Maritime Safety Authority (AMSA). AMSA regulations have been developed to ensure the vessels, crew, and the environment, are safeguarded against incompetent seafarers. These regulations are based on international conventions, making the qualifications acceptable throughout the world. AMSA allows non-Australian seafarers to obtain the Australian qualification, provided they satisfy the AMSA qualification criteria.

To become a ship's junior officer (Second or Third Mate) the AMSA criteria is as follows:

Over 20 years of age.
Pass an eye sight test.
Pass a medical test.
Complete approved seetime (Industrial Experience).
Complete an approved course of study.
Pass an AMSA oral examination.
(Marine Orders Part 3, s. 7.5, p. 10)

To become a ship's First Mate the AMSA criteria is:

Pass a medical test.
Possess an Australian, or equivalent Second Mate certificate.
Complete approved seetime (Industrial Experience).
Complete an approved course of study.
Pass an AMSA oral examination.
(Marine Orders Part 3, s. 7.2, p. 7)

To become a ship's Master the AMSA criteria is:

Pass a medical test.
Possess an Australian, or equivalent First Mate certificate.
Complete approved seetime (Industrial Experience).
Complete an approved course of study.
Pass an AMSA oral examination.
(Marine Orders Part 3, s. 7.1, p. 7)

An individual must progress through the certificates from junior officer to Master. The 'approved course of study' refers to academic courses which have been given AMSA approval, meeting their requirements for knowledge and practical content. The AMC's AMSA approved courses were developed with reference to the Department of Transport (DoT) 1989 syllabus and Marine Order Part 3. The courses are audited by AMSA annually and have five yearly external accreditation with the ACT Accreditation Authority.

Being a government marine safety organisation, AMSA is not focused on the operational aspects of a vessel's work but on ensuring the work is carried out safely for the protection of personnel, the public and the marine environment. It is with the thrust of safety that the approved course syllabuses and Marine Orders have been written. AMSA and the qualification system specifies that a person must obtain industrial experience, in the form of time spent on board a trading vessel, and education, in the form of a land-based academic course. The seetime provides the practical training opportunities which endeavours to develop skills and attitudes, and the AMC's approved courses aim to develop the knowledge required to safely operate a vessel.

The traditional model of officer certification has been to break the academic program into the Certificates of Competency. As a person completes each course and examinations, he or she obtains the next level of certification. Figure 1 outlines the traditional model's academic and certification sequence:

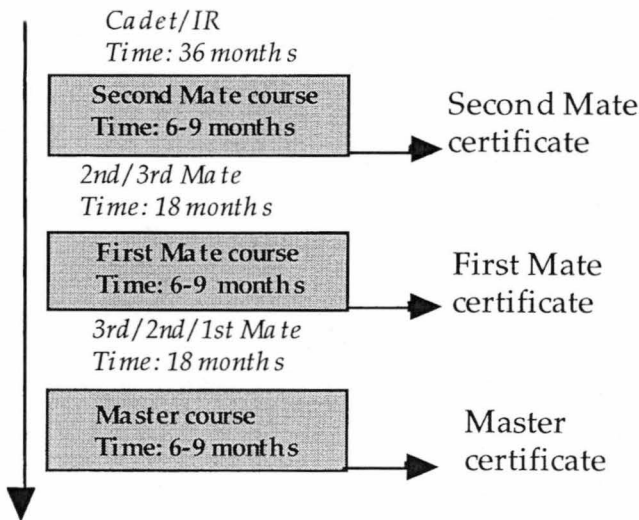


Figure 1: Traditional academic and certification program

DECK OFFICER QUALIFICATION MODELS AT AMC

The Dip. Shipmaster and the Diploma of Applied Science (Nautical Science) (Dip. Nautical Science) are AMC's, AMSA approved, courses for the Second Mate, First Mate and Master Certificates of Competency. Both courses produce the same Certificates of Competency, however, they are very different education and training systems.

Diploma of Applied Science (Shipmaster)

The Dip. Shipmaster is a 'nested' program in which a student moves through levels of academic qualification and Certificates of Competency. The Dip. Shipmaster incorporates the Certificate in Marine Operations (CMO) and the ACMO. The Dip. Shipmaster program is interspersed with industrial experience between the academic qualifications. An individual must progress through the level of certificates from Integrated Rating/Cadet to Second Mate, First Mate and finally Master. The academic program reflects the levels of certification and is often termed the 'Sandwich' model. Figure 2 shows the Dip. Shipmaster academic program and certification program sequence.

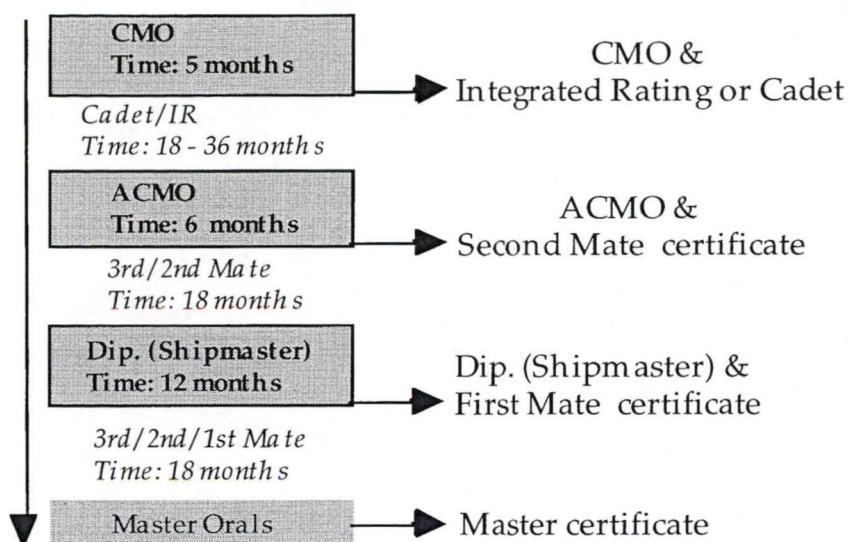


Figure 2: Diploma of Applied Science (Shipmaster) program

CERTIFICATE OF MARINE OPERATIONS (CMO)

The CMO is designed for new entrants into the Australian shipping industry. Students attending the CMO are predominantly Australian first year company-sponsored cadets or industry-sponsored Provisional Integrated Ratings (PIR). The CMO is the single point entry of all Australian seafarers. On completion of the CMO the cadets will enter the Dip. Nautical Science scheme and progress to becoming junior officers. The PIR's will progress to Integrated Rating (IR) and may have access to deck officer training through the ACMO.

The CMO is not a deck officer course, and therefore is not considered in this study.

ADVANCED CERTIFICATE OF MARINE OPERATIONS (ACMO)

The ACMO is the AMC's Second Mate, AMSA approved, course. The ACMO services the Australian IR's, Australian small vessel Masters (Master Class 4 and 5) and the international cadets, IR's and retraining Radio Officers. The majority of students come from Pakistan, India, Singapore and Hong Kong. Students who

have not completed the CMO are able to apply for exemption by way of previous academic qualifications and/or sea experience.

The ACMO is a TAFE level course and does not attract the Higher Education Contribution fee. The International students are required to pay a full fee of \$4 900 (1996) for the six month long course. The ACMO has a healthy reputation with the international students and enrolls approximately 55 to 60 students per year.

DIPLOMA OF APPLIED SCIENCE (SHIPMASTER)

The Dip. Shipmaster is the AMC's, AMSA approved, combined First Mate and Master course. The Dip. Shipmaster services the Australian and international Second Mate Certificate of Competency holder, and, like the ACMO, its major clientele has been the international seafarer rather than the Australian seafarer.

The Dip. Shipmaster combines the educational requirements of the First Mate and Master certificates. After the completion of the Dip. Shipmaster, and the AMSA oral examination, the student obtains the First Mate Certificate of Competency. To obtain the Master Certificate of Competency the seafarer need only obtain seetime and pass another AMSA oral examination. The First Mate certificate holder is not required to undertake more institution-based training.

The Dip. Shipmaster is a 12 month TAFE level course which costs the international student \$8 600 (1996).

EDUCATION AND TRAINING DELIVERY AND ASSESSMENT STRATEGIES

On campus

The main focus of education delivery of the ACMO and Dip. Shipmaster is based around the fulfilment of the AMSA requirements and critical operational knowledge in a lecture, practical and tutorial format. The training component focuses on the available equipment, in particular the ship handling simulator,

engine simulator, radar/electronic navigation simulator, navigation chartroom, communications laboratory, survival centre, *Wyuna* and the fire fighting centre. A full description of the AMC's facilities is given in appendix C: AMC facilities. The assessments are based around the completion of course written, practical and oral examinations and final semester written or practical examinations. The examination and assessment process is audited yearly by AMSA.

At sea

For the international student, the AMC has no at-sea distance education program in place. For the Australian IR who wishes to have a remission of sea service and National Maritime Industry Training Council funding to attend the ACMO, the AMC has the Accelerated Advancement Scheme (AAS). The AAS includes a distance education maths and physics program, a pre-study program and a 'bridge understudy' program. The AAS prepares an IR for a Second Mate Certificate of Competency course and allows the seafarer a remission of up to 18 month seetime, but does not exempt the student from any subjects within the ACMO.

Diploma of Applied Science (Nautical Science)

The Dip. Nautical Science is a Higher Education academic qualification, and allows an Australian cadet to undertake all the education up to the highest Certificate of Competency, the Master certificate, during a four year cadetship and college academic program. During the cadetship the student will also receive the required seetime for the issue of the Second Mate certificate. After the completion of the Dip. Nautical Science, and obtaining the Second Mate Certificate of Competency, the seafarer need only accrue seetime and pass oral examinations to obtain the higher level Certificates of Competency.

The program has been running at the AMC since 1980 almost exclusively for Broken Hill Proprietary Ltd. Transport (BHP), Associated Steamship Proprietary

Ltd. (ASP), Australian National Line (ANL) and Howard Smith Industries. This system, or its variations, is available in other Asian Pacific nations and is often called the 'Front-end' model. Figure 3 outlines the Dip. Nautical Science academic program and the certification sequence.

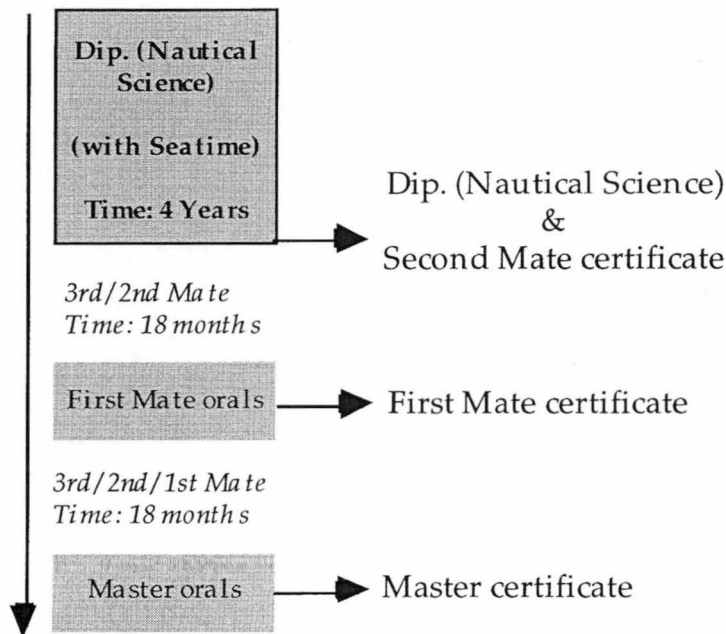


Figure 3: Diploma of Applied Science (Nautical Science) program

EDUCATION AND TRAINING DELIVERY AND ASSESSMENT STRATEGIES

On campus

The curriculum format of the Dip. Nautical Science is very similar to the ACMO and the Dip. Shipmaster. For many of the classes the cadets and ACMO or Dip. Shipmaster students are combined in the same group. The main difference between on campus delivery strategies of the Dip. Nautical Science and the ACMO/Dip. Shipmaster is in the use of the Wyuna. The cadets spend an extensive amount of time on the training vessel under practical instruction and assessment.

At sea

The Dip. Nautical Science differs greatly from the AIMO and Dip. Shipmaster in the area of at-sea education. During the cadets' 18 months sea time they are required to produce assignments and task-books, these are checked by the officers on board and assessed by the college. These at-sea work experience programs do not reduce the time at the AMC but reduce the amount of sea service required, by AMSA, to obtain the Second Mate certificate.

Future deck officer certification programs at AMC

There have been a number of other deck officer education and training models used or proposed for the certification of deck officers, in particular the Cadet Vessel model, the Degree model and the Distance Education model.

CADET VESSEL MODEL

It was relatively common in the 60's and 70's for large shipping companies or government organisations to run a Cadet Vessel as one of the fleet (Parsons 1992, p. 2). The vessel would usually be a commercial vessel operated by cadets under the command of senior officers and instructors. The cadets would be instructed in theoretical subjects and the practical applications of the Second Mate Certificate of Competency. Today Cadet Vessels are few; however, BHP is trialing the introduction of a Cadet Vessel system using AMC lecturers as on-board instructors. The cadet program may form part of the Dip. Nautical Science or the Dip. Shipmaster. Assuming the system is introduced to the Dip. Shipmaster scheme it would most likely fulfil the CMO and AIMO academic course requirements. Figure 4 outlines the possible Cadet Vessel/Dip. Shipmaster program.

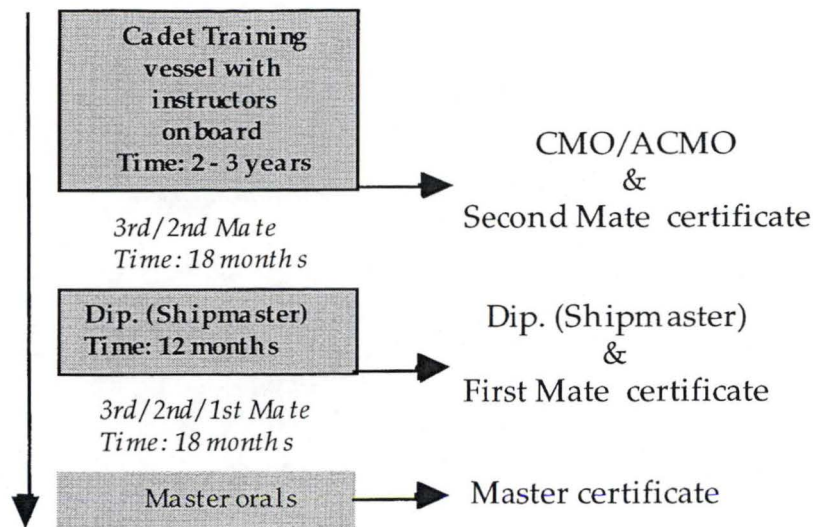


Figure 4: Cadet Vessel model

A variation of the Cadet Vessel model is the use of an on-board Cadet-Training Officer as one of the crew complement on a normal trading vessel. This instructor assists the education and training of the cadets in the practical application of the work of an officer. Sydney Technical College has undertaken such an agreement with a Malaysian shipping company, Pan Pacific Ltd.

DEGREE PROGRAM MODEL

The Degree Program is similar to the Dip. Nautical Science with the education and training being Front-end. The Degree Program does not only focus on the seagoing qualifications, it also focuses on the general field of maritime business. The Degree Program would allow a school leaver to attain the necessary academic qualifications to obtain the first Certificate of Competency and/or to be employed in a maritime business field. This allows the student a flexibility of career paths. A student has the choice to continue with the seagoing profession or move into a shore-based maritime profession. A Degree Program exists in Singapore and Hong Kong. Figure 5 discusses the outline of a possible Degree Program/Dip. Shipmaster system.

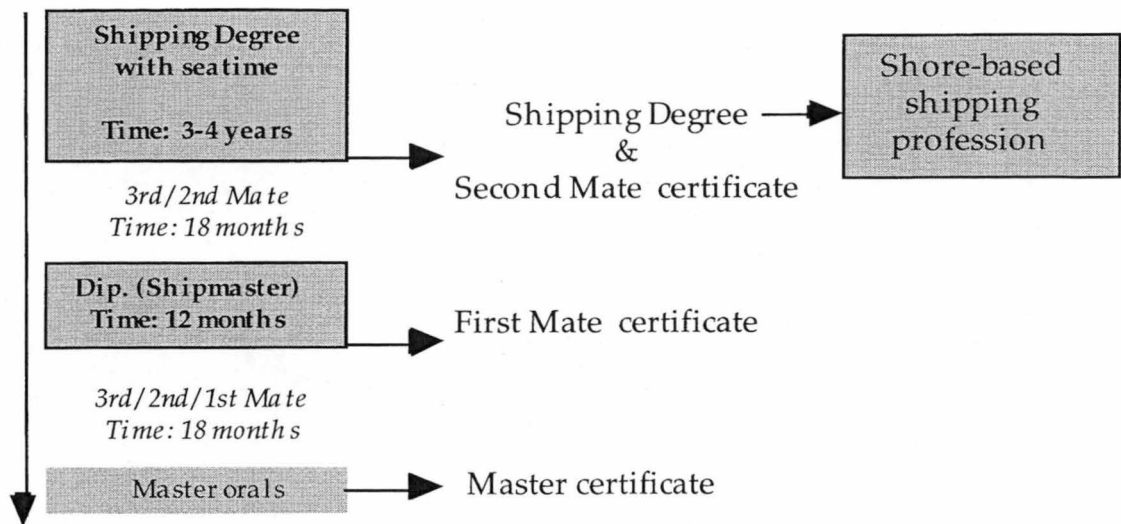


Figure 5: Degree Program model

DISTANCE EDUCATION MODEL

A Distance Education program could utilise the time at sea as distance education time, where a seafarer undertakes programs which enhance or are credited to an institution-based course. The program would most likely be used in the Dip. Shipmaster and would reduce the time spent at an academic institution for the completion of the approved course.

For the Second Mate certificate some maritime institutions in the United Kingdom operate correspondence courses for which they give academic credit. A full Dip. Shipmaster/Distance Education program could be structured as in figure 6:

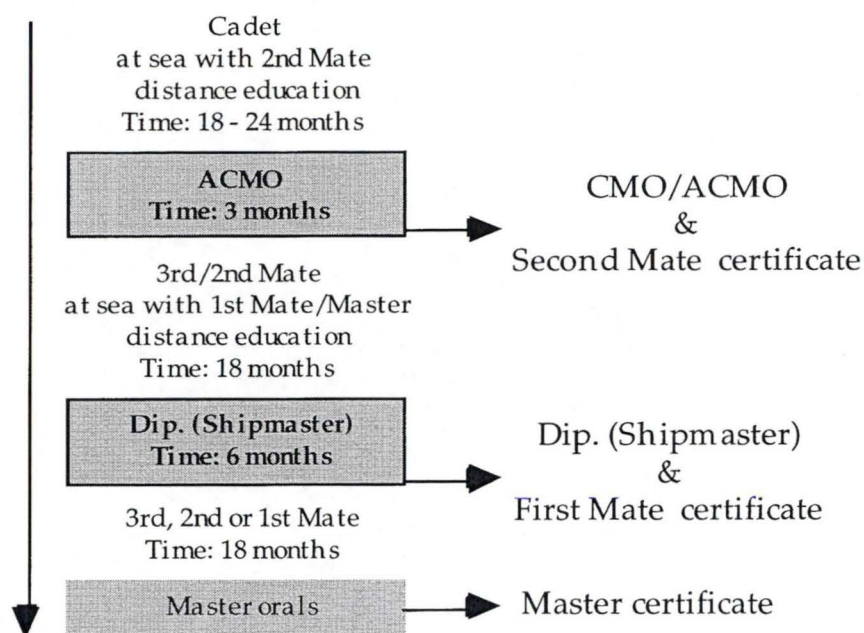


Figure 6: Distance Education model

The Cadet Vessel, Degree Program and Distance Education models are not the only future models available, but they are the models that are most likely within the AMC and the Australian certification system.

DECK OFFICER QUALIFICATION MODELS IN THE ASIA PACIFIC

In the Asia Pacific region there is a diversity of cultures, economic stability, standards of living and political and sociological forces. It is, therefore, not surprising to find extensive differences in the training systems, curriculum, examination and maritime education facilities in the region. Generally the traditional certification system does not differ much among the Asian countries, but the training models vary widely (Shukry 1994, pp. 3-4). Shukry (1994, pp. 3-4) identified the existence of the Traditional, Sandwich, Front-end and Degree models, noting that the Traditional model is no longer common. The Sandwich model is relatively common, but there has been a shift of emphasis in many national colleges using this model towards the Front-end model, mainly for

reasons of academic convenience. Hong Kong and Singapore offer the Degree model in which the Certificate of Competency courses are offered within a business degree program.

MERCHANT NAVY EDUCATION, TRAINING AND ASSESSMENT METHODS

Two internationally accepted criteria for the issue of the Certificates of Competency are the passing of written examinations and seagoing experience (Berg 1994, p. 91). This is based on the assumption that adequate experience and skills are gained by set periods at sea, and that the knowledge, skill and understanding needed to carry out the functions on board vessels can be tested by written examinations. This expectation may have been valid 20 years ago, but today there is a widening gap between the traditional 'knowledge based' competency assessment and modern shipboard operational requirements. This gap has lead to the recent revision of the STCW convention (Waters & Muirhead 1994, p. 79).

The Certificates of Competency mainly satisfy the safety requirements of the government administrations and not the operational requirements of merchant vessels. A problem today is that with reduced manning, long work hours, stress, fatigue, and an increase in ship technology, the development of competent cadets and junior officers is lessened due to the reduced access to 'learning-by-doing' practical instruction (Waters & Muirhead 1994, p. 79). The inadequacy of the Certificate of Competency system and the increased desire for well trained officers appears to have resulted in two areas of focus:

1. Certificates of Competency are becoming 'competence based', or 'functional', whereby an assessment of knowledge, skill and attitude is based on the actual demonstration of work. The acceptability of the functional approach is based on the assumption that its claimed flexibility will permit evolutionary change,

maintain good standards of competence and protect the prospects of serving seafarers (Nautical Institute 1994, p. 2). and,

2. Shipping companies are 'going it alone' and introducing company specific competency requirements (Berg 1994, p. 88), with some of the larger shipowners/managers investing heavily in training in developing nations. This attitude has been encouraged by the Quality Assurance movement and the reported lack of officers for which direct sponsorship of training is the only means whereby officer supply can be assured (Thorstensin & Shield 1994, p. 119).

Regardless of whether the motivation is to improve the Certificate of Competency or provide specific company training, greater weight is being given to the demonstration of practical skills (Moreby 1994, p. 22; Vardon 1994, p. 28). This view was supported by the Nautical Institute study which suggested greater consideration should be given to the demonstration of practical skills and that the serving seafarers' judgements of the ability of an individual should have greater influence in this assessment (Nautical Institute 1994, pp. 1-2).

The assessment of practical skills on board trading vessels is difficult in today's industry. Captain Vardon, of the Singapore Polytechnic, suggests the use of a training vessel, or a training officer, could overcome the logistics of training seagoing personnel to assess cadets and junior officers (Vardon 1994, p. 28). Brindle, of AIM safety, also suggested the use of designated on-board training officers (Brindle 1992, p. 2).

Moreby (1994, p. 21) citing the writing of Chapman (1994), Signorine (1994) and Mansfield (1991), concluded that the assessment of competence for marine functions is best done on-board ship, but the lack of trust of the on-board assessor and the impossibility of assessing critical operations and situations prevents the development of on-board assessment. If on board assessment can not be validated the next best option is the use of a training vessel and if a training vessel is not available, assessment on a simulator is the next best option. In STCW95 simulator

technology, in the form of PC, radar, communications, engine, cargo and full bridge simulators will play an important part in the training and assessment of officers. It is felt modern simulators can bring practical assessment of competence close to actual on board practice (Waters & Muirhead 1994, p. 79). A Nautical Institute study also supported the use of simulators in the assessment of competence (Nautical Institute 1994, p. 1). A research study by Knirk and Christinaz evaluated the applicability of state-of-the-art instructional technology and teaching strategies to navy classroom training by studying 22 training organisations in the United States. The study suggested there was a trend toward real environment simulators and that the future of education lies in simulating real environments both physically and by computer programming (Knirk & Christinaz 1990, p. 5).

With reference to distance education on board ship, Slotte (1992) suggested there is a significant market for shipboard training and sees the use of interactive compact disc as a way of the future. Knirk and Christinaz noted that many of the corporate and military training centres use satellites as a cost effective way of disseminating quality video-taped or live instruction presentations for the training function (Knirk & Christinaz 1990, p. 7). The use of video at sea may be a very efficient method of delivering on board training (Walton 1994, p. 1), and with the advancement of communications technology the use of satellites to deliver on board training is possible. The AMC is undertaking a research project to investigate the possibility of using satellite communications for the assessment of the written course work of cadets at sea.

The maritime industry has few role models to work from and may suffer from, as the Nautical Institute suggested, 'holding on to nurse for fear of something worse' (Nautical Institute 1994, p. 4). The manager of a shipping company will most likely have been a Master or Chief Engineer and have come through a traditional maritime education and training experience. It may be difficult for such a manager to make an informed judgement on innovative delivery methods. The education, training and certification of deck officers is governed by traditional roles and regulations. Even though people like David Stratton, Fleet Director of Bergerall &

Hudner, suggest that the shipping industry has to break away from many years of tradition in education and training (1993, p. 2) any proposed system needs to be acceptable and recognisable to the managers of the shipping companies. Innovative programs and delivery methods need to be sold to the managers.

Formal relationships and contracts between international shipowners/managers and maritime institutions are few. George Angus, Head of South Hampton Maritime Operations Centre, calls for shipowners and colleges to be partners; no longer can shipowners see colleges as 'isolated units churning out crew' and no longer can colleges dictate to industry what they need in training (Angus n.d., p. 11).

CONCLUSION

The deck officer education and training systems are based around the hierarchical certificate rank system which is predominant on board merchant vessels in the Asia Pacific region. The Australian certificate system is defined by AMSA criteria which requires the attainment of sea time and the completion of an approved course of study. The AMC has two deck officer, AMSA approved courses, the Front-end Dip. Nautical Science and the Sandwich Dip. Shipmaster. The Cadet Vessel, Distance Education and Degree Program deck officer education and training models are systems that may also be implemented with the Asia Pacific shipowners/managers.

The delivery of education and training has been based on individual, often *ad hoc*, sea experiences and institution knowledge-based education and assessments. Developments and pressure within the international maritime industry has highlighted the need to provide more, and better, education and training opportunities. These opportunities may require the use of innovative delivery techniques using simulation, training vessels, training officers, video, computer and satellite communications. The use of these delivery techniques and the general focus to improve the quality of the training of deck officers may be

impossible if shipowners/managers are unwilling to pay the price for the quality deck officers they indicate they need (Raeng 1993, p. 9).

CHAPTER 4

RESEARCH QUESTIONS AND METHODS

INTRODUCTION

The previous background chapters dealing with the international shipping situation and the deck officer education and training systems provide the basis for this chapter. The purpose of this chapter is to state the critical questions that need to be answered to achieve the research aim, and to explain the research methods undertaken to answer the questions.

RESEARCH QUESTIONS

From the background work it appears the international shipping industry is coming to acknowledge, through the focus of the media and new international regulations, a need to provide safer and more accountable shipping operations. It also appears the quality of deck officers needs to be improved through employment selection and increased support for the education, training and certification of deck officers by the shipowners/managers. However, the likelihood of increased training activity initiated by individual shipping companies needs to be assessed in terms of the pressures they are under and their willingness to sponsor training.

The shipowners'/managers' opinions on education, training and delivery methods are very important in determining a deck officer education and training system which may encourage a contractual arrangement between a company and the AMC. The following research questions reflect this need to understand the education and training of deck officers from the shipowners'/managers' point of view, and form the basis of the research focus.

Question 1

Do the Asia Pacific shipowners/managers have difficulty obtaining adequately trained deck officers?

This question will determine whether the companies are experiencing a shortage of deck officers and, therefore, whether a possible training need exists.

Question 2

Do the Asia Pacific shipowners/managers wish to support deck officer training through an agreement with a maritime institution and/or funding to deck officers?

This question will determine whether a company sees its role as providing, albeit through a training agreement and/or financial assistance, the education and training required for the company's personnel to obtain the Certificates of Competency.

Question 3

What are the acceptable deck officer Certificates of Competency education and training systems for the shipowners/managers in the Asia Pacific region?

The structure of an education and training program determines the amount of time away from the company, and the knowledge and skill level of the deck officer at stages through his or her career. This question determines the most acceptable mix of education and occupation.

Question 4

What are the desirable/undesirable delivery methods for the deck officer education and training program for the Asia Pacific shipowners/managers?

An important part of any education and training program is how it will be delivered. The desirable delivery methods give an indication of whether the training should be on-the-job or off-the-job, practical or theoretical, based on modern technologies or traditional methods.

Question 5

What do the shipowners/managers see as the major influences on the education and training of deck officers in the Asia Pacific region?

This question examines the pressures that may influence the implementation of a deck officer training system for the Asia Pacific Shipowners/managers.

RESEARCH METHOD

The study seeks to determine an education and training system that may lead to a contractual agreement between the AMC and Asia Pacific shipowners/managers. This study forms the first step of a feasibility study to determine the type of education and training system which could be sold to the international shipping companies for the training of their deck officers/cadets. In order to answer the questions concerning the current status of Asia Pacific maritime education and training, the research method needs to report the attitudes and opinions of the shipowners/managers. Therefore, the research method used in this study is descriptive research (Gray 1992, p. 13).

The shipowners/managers are, of course, in the Asia Pacific region, with the main locations for international shipping companies being in Hong Kong and Singapore. With due regard to the constraints of time and costs associated with obtaining data from an international sample, and after discussion with a number of my colleagues, the author chose two descriptive research methods to collect data from shipping company personnel.

The first method, made possible with the support of the AMC, is face-to-face interviews with shipping company personnel in the Asia Pacific region. This method will hopefully enable a frank discussion about acceptable deck officer education and training systems and the factors affecting education and training implementation. The second method is a survey questionnaire which asks the respondents for opinions and facts about deck officer education and training systems and industrial pressure influencing the companies. This method will enable the researcher to access a larger international sample than the interview method.

In order not to disrupt the logic flow of the design and results of each method (Evans 1995, pp. 85-86), the interview's design and results are contained in chapter 5 and the questionnaire's design and results in chapter 6. A combined elaboration of the results from both the interviews and the questionnaire is contained in the discussion chapter 7.

CONCLUSION

The research seeks to understand the many concerns and facets of the education and training of deck officers from the Asia Pacific shipowners'/managers' point of view. The study uses descriptive research methods, interviews and a questionnaire, to investigate the research questions.

CHAPTER 5

DESIGN AND RESULTS OF INTERVIEWS

INTRODUCTION

This chapter first explains the development and design of the interview method and then reports the results of the interview research. The chapter ends with the conclusions of the result data.

DESIGN OF INTERVIEWS

The Asia Pacific region contains a large number of shipping companies, with the main concentration of the companies being in Singapore and Hong Kong. Because of this the author and a colleague, J. Milward, would concentrate the interview efforts to these two centres. It was also decided, by the Principal of the AMC, that the author would travel to Manila to visit, and interview, Magsaysay Shipping personnel.

In Hong Kong and Singapore the quality of the companies vary greatly, from high profile 'world best practice' companies to obscure one ship companies with an untraceable management structure and dubious operations. As the project will hopefully lead to a training contract between the AMC and international shipping companies, only the larger, higher profile and internationally recognised quality shipowners/managers were chosen for interviews.

Development procedures

Before leaving Australia, shipowners/managers in Hong Kong and Singapore were contacted by letter to arrange meeting times. The shipowners/managers in

Manila, other than Magsaysay, were not contacted due to the fact the author would be in the city only one full day and an estimate of the amount of free time available for the research was difficult.

We had a disappointing response from the letters with only two companies arranging interview times. However, on arrival at Hong Kong and Singapore J. Milward devoted half a day to contacting companies to arrange meetings. This proved fruitful and adequate interviews were arranged. Our main limitation was time as the interviews had to be carried out during the AMC's non-teaching week, 25 to 29 September 1995.

Interview design

The objective of the interviews was to obtain qualitative data for the research questions. The interviews concentrated on the following:

1. difficulty, or ease, of obtaining adequately qualified personnel (Question 1);
2. present training format of deck officers and acceptance of education and training models for deck officers (Question 3 and 4);
3. major international influences on the company's training of deck officers (Question 5)

For the convenience of the interviewee, the interviews were carried out at the offices of the shipping companies by the author and J. Milward. In the interview the research questions were used as prompts for discussion rather than specific questions to be answered. The reason for this was to encourage a free-flowing discussion which would help the interviewee to open-up and provide experiential insights to the discussion.

Hand-written notes were made during and after the interviews, which lasted between 45 minutes to three hours. No audio recordings of the interviews were

made as a tape recorder would have been inappropriate and limiting on the discussions.

Interview success

Interviews of ship managers in Manila, Hong Kong and Singapore produced excellent quality data. The success of the interviews was greatly enhanced by the organisation, contacts and reputation of J. Milward, an ex-Master with Swires - Hong Kong. The fact that we had travelled to these countries, were available at the companies' convenience, and had the reputation of the AMC as an introduction, meant we were very well received by all managers. The only difficulty was faced in Manila where traffic congestion and distances proved time consuming between offices.

Future interviews

Hong Kong and Singapore are major shipowner/manager centres, and it is right to continue with interviews in these countries. Kuala Lumpur is expanding as a shipping centre, with some of the major ship management companies such as Barber Ship Management relocating from Hong Kong to Kuala Lumpur in response to some uncertainty with the handing back of Hong Kong to the People's Republic of China in 1997. Manila would like to become a major centre, but the limitations of its governmental organisation appears to be hindering this development.

INTERVIEW RESULTS

Sample demographics

The breakdown of the ship management companies interviewed is as follows:

1. Manila
 - Magsaysay Institute of Shipping
2. Hong Kong
 - Swire Pacific Ship Management
 - Jardine Ship Management
 - Orient Oversea Container Line
 - Anglo-Eastern Ship Management
3. Singapore
 - Kapal Ship Management
 - AP Moller (Maersk)
 - Wallem Ship Management
 - Tanker Pacific Management

16 Marine Superintendents, Fleet Personnel Managers, Operations Managers and Technical Managers were interviewed from nine companies. These companies collectively owned and/or managed 450 vessels, which is in excess of six times the size of the Australian fleet.

The data from the shipowner/manager interviews is presented as common themes which emerged in the interviews and relate to the research questions. To maintain confidentiality only aggregate data is represented in this study.

Difficulty obtaining adequately trained deck officers

Hong Kong and Singapore shipowners/managers operate in the international labour market and have difficulty obtaining well trained deck officers. However, the shipowners/managers generally have more difficulty obtaining well trained competent senior deck officers than junior deck officers. An insight into the situation emerged during the interviews. The registration of the vessels in Hong Kong and Singapore allowed the companies to employ developing nations officers. The majority of companies have been using Filipino, and some Indian, junior officers, with European or Commonwealth senior officers. The reason Filipino junior officers have been employed is because they are cheap, have good English skills and are easy to work with. However, most of the companies interviewed in Hong Kong and Singapore realise they have long term disadvantages with the employment of Filipino junior officers. Generally, the Filipino junior officer does not have the educational background or motivation to become a senior officer. For a person to become a senior officer he or she needs to first be a junior officer. As a result of the concentration on the employment of the cheap developing nations crews since late 1980's, at the expense of the better educated and trained and more expensive developed nation seafarers, the industry is suffering from a lack of senior deck officers rather than junior deck officers.

Training systems employed by shipping companies

As mentioned previously, the only way a person can become a senior deck officer is to first be a junior officer, and the industry needs more well trained senior officers. Hence, in Singapore and Hong Kong most companies had increased the employment of cadets from United Kingdom, India and China to increase the flow of junior deck officers. One Hong Kong company had set up a training school in mainland China, another had bought a simulator and set it up in India for the training of company cadets, and a third had employed 20 United Kingdom cadets for which the government is subsidising 50% of the costs. A well respected Danish

company maintained a cadet training program in India which selects the best candidates and supports them through the cadetship with a three year degree and on-board training programs. The company took great pride in the quality of its officers. A problem for the company was the loss of well trained personnel to other companies; hence, company pride and loyalty was strongly emphasised.

Even though the companies did not want extensive education and training agreements for the Certificates of Competency, there was strong evidence that the companies are employing more cadets and are, to a certain extent, going-it-alone with the training of their staff or are looking to up-grading training of certificated officers.

Deck officer certification system

The interviews revealed a definite recent increase in the recruitment of deck cadets. These recruitments are mainly in terms of the cadetship certification system. In this system a company employs a young person, provides initial training and sea experience, after which the cadet obtains a Certificate of Competency, usually from a Commonwealth country such as Australia, India, United Kingdom, Hong Kong, Singapore or New Zealand. Once cadets have obtained the junior officers Certificate of Competency they work on board and accrue sea-time for the senior officers certificate. At the end of this sea-time it is again up to the officer to obtain the senior officer certificate. The certificate model is determined by the country in which the certificate is obtained.

From interviews in Manila, Hong Kong and Singapore the Sandwich and Traditional models were supported. Most of the companies opposed the Front-end training system on the grounds that a Front-end trained officer would have out-of-date and incomplete knowledge when reaching the level of senior officer.

Most companies felt a strong need for additional training in the form of simulator training and GMDSS training and certification. The availability of competent deck officers was a long term training need which was being dealt with by increased cadet intakes. However, the short term need for additional deck officer training was of greater concern to the majority of the companies.

Education and training delivery methods

From interviews in Hong Kong and Singapore, distance education was seen as an acceptable method of supplementing the training of cadets by most companies. With the exception of one company, the idea of distance education for the senior deck officer's certificate was not supported. The companies believe that officers are too busy running the vessel efficiently to have time to carry out distance education.

The majority of interviewees were ex-Masters or ex-Chief Engineers and, with the exception of one company, did not seem to have any innovative education and training delivery methods they wished to implement within the company. One company did have an on-board deck cadet training record logbook to assist in the training and evaluation of the deck cadets.

Major influence on certification of deck officers

In Hong Kong and Singapore interviewees gave the impression that shipping companies have let the industry standards fall. As a result, the companies are now experiencing the consequences through the lack of competent officers and the increase in regulations. The ISM code and port State control measures are seen to be providing significant pressure on the companies to improve the competence of people on board. Most companies had, or were, working towards ISO 9002 Quality Assurance certification.

Most companies were undertaking new ship building projects and looking at expanding their operations. The reasons for this include an increase in the confidence of the world economy and the large number of ageing vessels needing replacement. One general manager made the point that ship operations had reached a stage where it was very difficult to become more efficient. The operations, both at sea and in port, had reached their technical optimum, port turn around time and costs are at a minimum. As a consequence, the percentage cost of employing personnel had increased, with 65% of a vessels cost being crew costs. The general manager pointed out that the company accountants saw the cost of crewing as a cost area to be targeted for increased efficiency. He had to regularly remind the accounting department that crewing levels are at a minimum and that it was not that crew costs had increased, but rather, other cost areas had been reduced by a greater proportion.

CONCLUSION

The interview research data was collected from nine companies in Manila, Hong Kong and Singapore. The companies indicated a lowering of the shipping standards and the lack of well trained senior deck officers as leading to the increased employment of deck cadets in all companies. Generally, the companies did not want extensive education and training agreements. They are to a certain extent going-it-alone with the training of their staff, or relying on the cadets and officers to source their own Certificate of Competency training.

The Sandwich and Traditional training methods were the preferred models, with the Front-end system being opposed. Distance education was not opposed for cadets but it was opposed for officers, as it would interrupt the work on board a vessel.

More discussion about the interview findings is contained in chapter 7.

CHAPTER 6

DESIGN AND RESULTS OF QUESTIONNAIRES

INTRODUCTION

The second descriptive research method used in this study is a mailed-out questionnaire. The chapter first explains the questionnaire design, design procedure, sequence and problems. The second part of the chapter reports the questionnaire results, which are organised in relation to the research questions. The results are also analysed for each question, however, discussion of the result implications will be dealt with in the next chapter. The chapter ends with the general conclusions of the result data.

DESIGN OF QUESTIONNAIRES

The population for the questionnaire research is composed of large merchant navy shipowners/managers in the Asia Pacific region, excluding Australia.

The questionnaire was designed in English with the population being selected through *Lloyd's Nautical Year Book 1995* by number of vessels managed or owned. The year book provided the addresses, titles and, for many companies, the name of the person in-charge of fleet personnel or the Chief Executive/General Manager of the company.

Design

The object of the questionnaire was to obtain qualitative data which answers the research questions. The questionnaire concentrates on the first Certificate of Competency, the Second Mate level. The proposed certificate models in the

questionnaire differ mainly in the delivery of the first certificate phase with the exception of the Front-end model.

The majority of shipowner/manager representatives are ex-Masters or ex-Chief Engineers. Few will have educational qualifications or backgrounds; thus, the ability of the respondents to make informed judgements on innovative delivery methods may be limited. Therefore, the questionnaire items were designed with the respondents' seafaring experience in mind, in a 'language' and format they would most likely recognise. As shipowners/managers are busy people, the design encouraged quick and easy answering with space for comments where needed. The questionnaire was accompanied by a covering letter from the Principal of the AMC, the author's business card and a return addressed envelope.

Development procedure

Following the initial questionnaire design in June 1995, the trialing of the questionnaire began using the training officers of the three major Australian shipping companies (BHP, ANL/ASP and Howard Smith Ltd), the Australian Shipowners Association (ASA), the AMC's Principal and the Associate Director of Business at the AMC. The trialing pre-tested the questions asked, the terminology used, the length of the questionnaire and the data format. The questionnaire received useful criticism and verification from the ASA, the AMC's Principal and the Associate Director. Follow-up contacts were made with the training officers of two of the three major shipping companies who responded that they would return the trial questionnaire. However, they neglected to return the questionnaire or make any comments.

Based on the trial, the questionnaire underwent modification. The modified questionnaire was verified with John Milward, an ex-Master with Swires and lecturer at the AMC, Larry Piper, a lecturer at the AMC, and Professor Paul Minton, a visiting research fellow from the United Kingdom. The questionnaire was again modified. Professor Paul Minton and John Milward expressed

reservations about the likelihood of busy ship managers taking the time to fill out the questionnaire.

The final questionnaire with a covering letter from the AMC's Principal was sent out at the end of September 1995. The final questionnaire and covering letter is shown in appendix A. The participants were asked to respond within four weeks. By the end of October 1995 the author had received 14 replies. Refer to appendix B: Questionnaire Responses for the aggregate results of the 14 returned questionnaires.

Follow-up

The Principal of the AMC, the author of the covering letter, was the Chairperson of the 1st LSM Philippine Manning and Training Conference in Manila on 12 and 13 of October 1995. The conference was attended by many of the Asia Pacific Shipowners/managers, and the Principal's profile encouraged an increase in response to the questionnaire. Follow-up telephone calls were unsuccessful because it was difficult to identify the individual who obtained the questionnaire within the large companies.

Improvement of research questionnaire

The shipping companies are large and diverse organisations. A problem that arose collating the questionnaire responses was the low number of replies. The problem of obtaining a greater response rate was made difficult because the author could not identify to whom the questionnaire was delivered. The mailing list for the questionnaire was developed from the *Lloyd's Year Book 1995* which gives the address, title and names of personnel within a company. The Year Book was not up-to-date, the names of the personnel that go with the title were incorrect and the title did not necessarily identify who best to send the questionnaire to. On discussion with ship managers in Hong Kong it was felt that identification of

personnel within a company by name was very important in obtaining replies to the questionnaire. For future research these contacts may be available through international, and national, shipowner/manager organisations. The questionnaire length could have been a problem as personnel in shipping companies are very busy and limited in their available time to take on extra tasks such as answering questionnaires.

Item 12.7 (appendix A) asked the respondents if they financially supported the certification of officers but did not ask to what level this support was given.

QUESTIONNAIRE RESULTS

Questionnaire responses were analysed with Statview II® and Excel 3.0®. The results are presented in relation to the research questions.

The respondents are from various countries and appear to be influenced by national regulations and pressures. Where appropriate, and practical, the results are depicted as overall responses and by nationality for countries with two or more responses.

Response rate and sample demographics

The questionnaire produced a low response rate of 8%. Table 1 lists the number of responses against the number of questionnaires sent out:

Table 1: Sample demographics

Country	Sent out	Received
Australia (international)	2	1 (50%)
Hong Kong	68	4 (6%)
India	11	0
Indonesia	3	0
Japan	11	1 (9%)
Malaysia	4	0
New Zealand	3	3 (100%)
Pakistan	3	0
Philippines	18	2 (11%)
Singapore	32	3 (9%)
South Korea	8	0
Taiwan	3	0
Thailand	8	0
Total	172	14 (8%)

All but two of the respondents were operating large international merchant vessels. The Australian respondent operated small offshore supply and salvage vessels, and a Philippines respondent was a crewing/training agent for a Norwegian organisation. The sample demographics by nationality and company type are given in table 2.

Table 2: Demographics by nationality and company type

Country	Company	Respondents
New Zealand	Shipowner/manager	3
Hong Kong	Ship manager	3
Hong Kong	Shipowner	1
Singapore	Ship manager	2
Singapore	Shipowner	1
Philippines	Shipowner/manager	1
Philippines	Crewing Agent	1
Australia (Int)	Shipowner/manager	1
Japan	Shipowner/manager	1

The respondents owned and/or managed in excess of 600 international merchant vessels which totals approximately 1800 deck officers.

Difficulty obtaining adequately trained deck officers

The questionnaire asked respondents to state whether their company had difficulty obtaining junior and senior officers (appendix A: items 5 and 6).

JUNIOR OFFICERS

57% of respondents (n=14) said they did not have difficulty obtaining junior officers and 43% said they did. New Zealand and Japanese respondents do not have difficulty obtaining competent junior officers, Philippine operators have difficulty, as does the Australian-based offshore company. Hong Kong shipowners/managers have some difficulty obtaining junior officers but not as much as the Singapore respondents.

Table 3 displays the results as a percentage of those who answered overall and within each country.

Table 3: Difficulty obtaining competent junior officers

Group	n	YES	NO
<i>All responses</i>	<i>14</i>	<i>43%</i>	<i>57%</i>
Hong Kong	4	25%	75%
New Zealand	3	0	100%
Philippines	2	100%	0
Singapore	3	67%	33%
Other	2	50%	50%

SENIOR OFFICERS

57% of respondents (n=14) said they had difficulty obtaining senior officers and 43% said they did not. As with the junior officers, New Zealand and Japanese respondents do not have difficulty obtaining competent senior officers. The Philippine companies do have difficulty as does the Australian based offshore company. Hong Kong and Singapore respondents had difficulty obtaining senior officers, and the result indicates they are having more difficulty obtaining senior officers than junior officers.

Table 4 displays the result as a percentage of those who answered overall and within each country.

Table 4: Difficulty obtaining competent senior officers

Group	n	YES	NO
<i>All responses</i>	<i>14</i>	<i>57%</i>	<i>43%</i>
Hong Kong	4	75%	25%
New Zealand	3	0%	100%
Philippines	2	100%	0%
Singapore	3	67%	33%
Other	2	50%	50%

Support for deck officer training

TRAINING AGREEMENT

The questionnaire asked respondents to state whether their company had, or wanted to establish, an education and training agreement with a maritime institution, and the type of existing or desired agreement (appendix A: items 7 and 8). The majority of respondents (79%, n=14) had no agreements with a training

institution. A Philippine respondent had in-house training and a Hong Kong respondent funded a cadet sponsorship scheme.

An important question for this study is to determine if the shipowners/managers desire to establish a training agreement with an institution. Table 5 shows the results of this question overall and regionally as a percentage:

Table 5: Training agreement desired

Group	n	YES	NO
<i>All responses</i>	9	56%	44%
Hong Kong	3	33%	67%
New Zealand	0	0%	0%
Philippines	2	100%	0%
Singapore	3	33%	67%
Other	1	100%	0%

The Philippine respondents had training agreements and also wanted additional training agreements. A Singapore and a Hong Kong company wanted to have an agreement for the skills up-grading of employed officers rather than Certificate of Competency agreements.

CONTRIBUTION TO COST OF SECOND MATE CERTIFICATE OF COMPETENCY

The questionnaire asked the respondents if the company financially supported the education and training of officers (appendix A: item 12.7). 93% (n=14) of the respondents supported the education and training of the officers in some way. This question did not define the level to which the costs are supported and what type of education and training the company supported, therefore, only broad emphases can be identified. Table 6 shows the percentage of respondents who supported the listed items:

Table 6: Financial support

Course fees	86%
Paid leave	76%
Study allowance	43%
Travel	26%
Books and study materials	21%

The respondents were also asked to suggest the percentage of contributions the main stakeholders should make to the cost of the Second Mate Certificate of Competency (appendix A: item 9.6).

Table 7 displays the responses to item 9.6 overall and by country. The stakeholders have been grouped by relationships: Employers = Shipowners and Ship managers, government = government and Maritime Safety Authority. For each identified stakeholder the Mean and the Standard Deviations are displayed as a percentage of cost allocation to the stakeholders, i.e. M = 38 is a mean cost of 38% of the total.

Table 7: Percentage cost allocation for first Certificate of Competency

Group	Seafarer			Employer			Government			Union		
	n	M	SD	n	M	SD	n	M	SD	n	M	SD
<i>All responses</i>	13	38	39	13	34	34	13	12	16	13	8	15
Hong Kong	4	88	15	4	13	15	4	0	0	4	0	0
Japan	1	0	0	1	50	0	1	50	0	1	0	0
N. Zealand	3	7	12	3	50	50	3	10	17	3	0	0
Philippines	2	5	7	2	65	50	2	15	21	2	10	14
Singapore	3	37	23	3	20	10	3	17	6	3	27	27

Singapore and Hong Kong have similar percentages of support by the employers. However, the Hong Kong respondents see the government and unions

contributing 0% to the cost, and put the cost burden on the seafarer. Singapore estimates the government and unions should pay 17% and 27% respectively, thus placing less burden on the seafarer. The difference between these similar types of shipping operations may be due to the uncertainty of the People's Republic of China's (PRC) government support for education and training costs, and the existence of unions, when Hong Kong is handed back to the PRC in 1997.

CONTRIBUTION TO SENIOR OFFICER CERTIFICATES OF COMPETENCY

The respondents were asked whether the percentage cost allocated to stakeholders in the Second Mate Certificate of Competency would be the same for the senior officers certificate. Two respondents from Singapore and one from the Philippines stated the allocation would be the same. The respondents from New Zealand were of the opinion that the senior officer can afford to pay more. One Hong Kong manager saw certification costs as the responsibility of the seafarer and the competency up-grading costs as the responsibility of the employer.

Acceptable deck officer Certificates of Competency education and training systems

The questionnaire asked the respondents to, with reference to certification models, describe their present model, predict the model the company will be following in five and 10 years and indicate the model the company would like to follow in five and 10 years time (appendix A: items 9.1 to 9.4). The certification models were described as Model A, B, C, D and E as in figure 7:

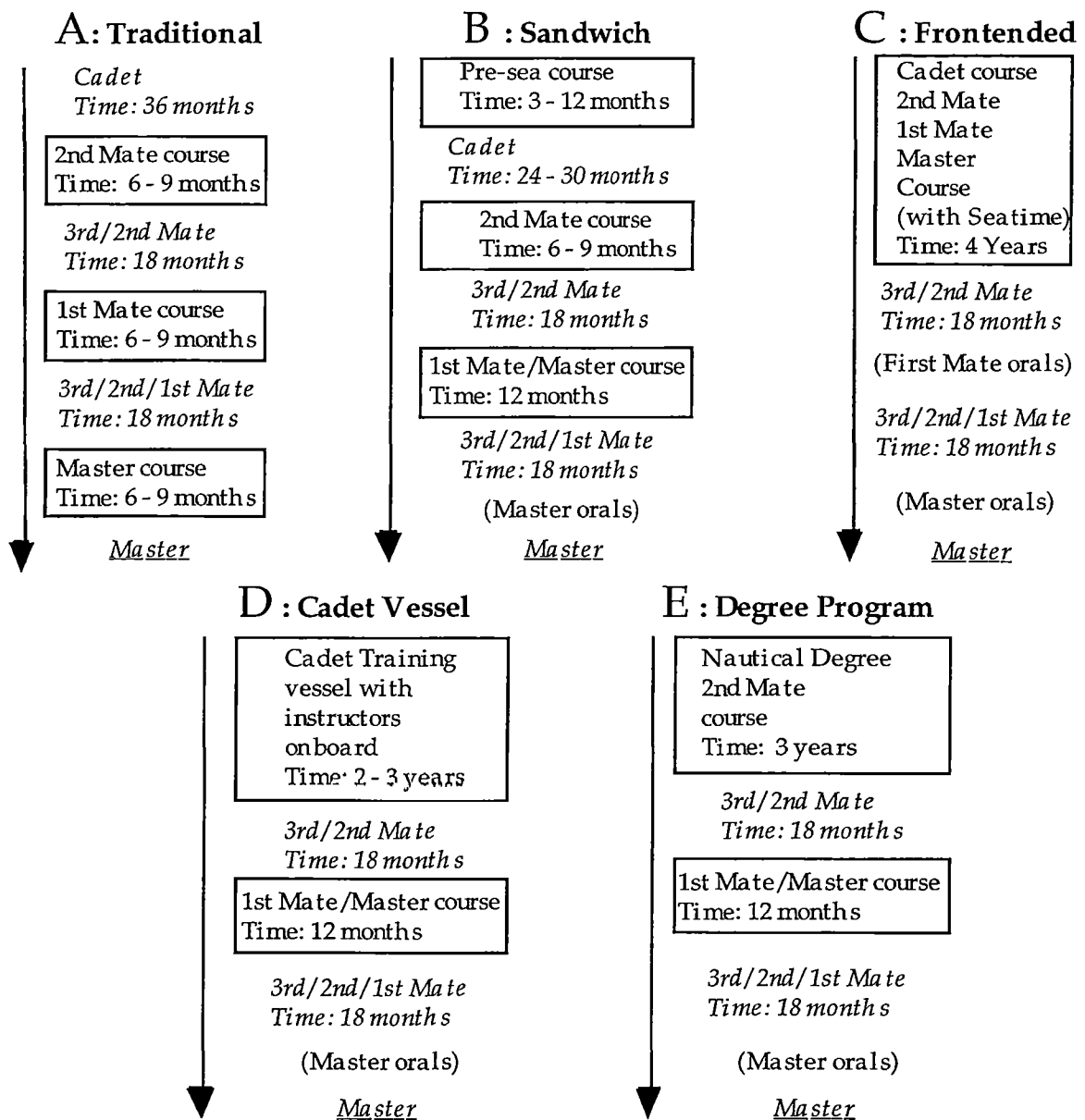


Figure 7: Certification models

PRESENT MODEL

The most common model was the Traditional model at 62% (n=13), the Sandwich model was second at 31%, one company used the Degree model and none of the companies used the Front-end or the Cadet Vessel models.

EXPECTED MODEL

The respondents chose the Sandwich model at 64% (n=11) to be the most expected model in five years, followed by the Traditional model at 27% and the Front-end model at 9%. The selected expectations for 10 years in the future were similar, the Sandwich model at 70% (n=10) followed by the Traditional model at 20% and the Degree model at 10%.

DESIRED MODEL

The most popular desired certification models after five years was firstly the Sandwich model at 67% (n=12) followed by the Traditional model at 17% and Cadet Vessel and Front-end models with 8% each. The most popular desired certification model after 10 years was firstly the Sandwich model at 55% (n=11) followed by the Traditional and the Degree models with 18% each and finally the Front-end model at 9%.

ACCEPTABILITY OF MODELS

The questionnaire asked the respondents to rank the certification models from best to worst. The aggregate response to the ranking of the certification models from best to worst is displayed in figure 8 as a percentage of overall responses.

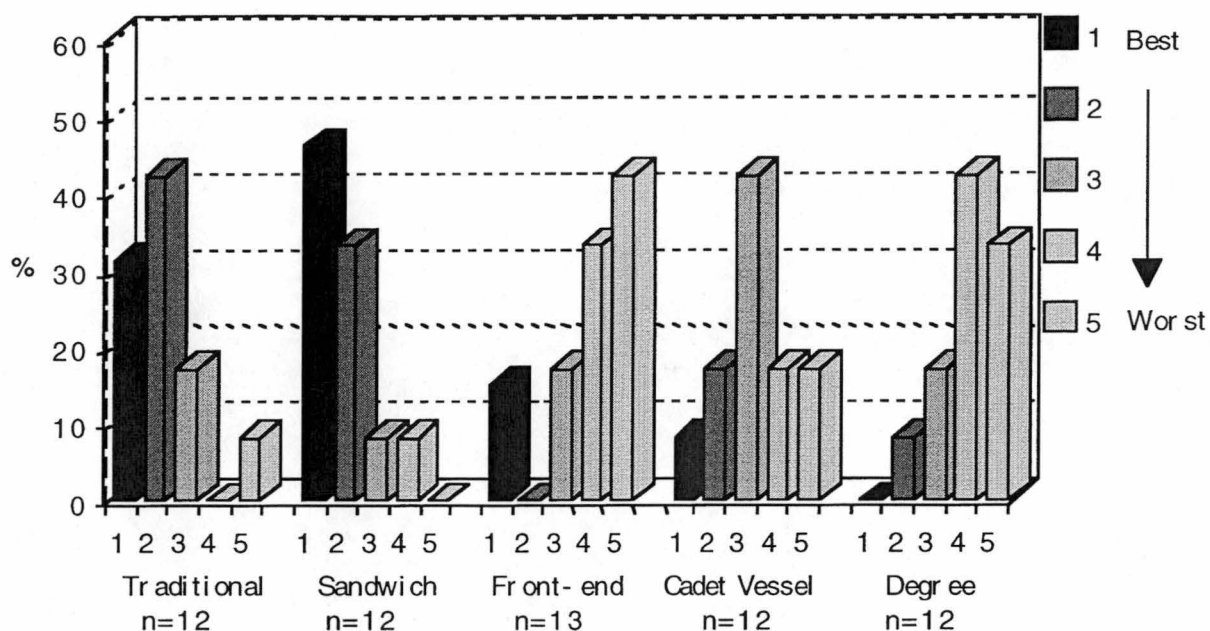


Figure 8: Certification model percentage ranking

Table 8 ranks the models about the mean using a one to five evaluation scale, 1 = Best and 5 = Worst, and gives a spread of opinion as a standard deviation.

Table 8 : Certification model ranking

Model	n	Mean	SD
B	12	1.75	0.97
A	12	2.08	1.16
D	12	3.17	1.19
C	13	3.77	1.42
E	12	4	0.95

The Sandwich model stands out in the percentage of responses, and the mean ranking, as the most preferred model, with the Traditional model a clear second place. The Cadet Vessel model is third with the Front-end and Degree models fourth and fifth.

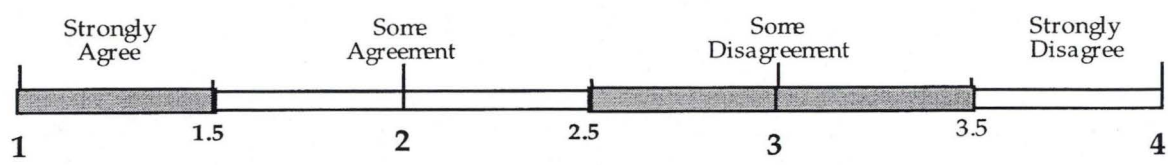
The respondents were asked to give reasons for the selection of the best model (appendix A: item 9.5). A collection of the responses is as follows:

1. Model A: Traditional
 - The traditional model allows practical hands-on training and allows Ratings to progress into the officer ranks.
2. Model B: Sandwich
 - The Sandwich model allows the seafarer to study how life at sea is and the company will obtain 'real' seafarers.
 - The model allows the single point entry system and the Pre-sea course would be beneficial.
 - The model allows an extended opportunity to become ingrained with a company's policies and Quality Assurance systems and gives an individual a feeling of belonging in the company.
 - Hands-on experience on board, preceded by basic training, is the best way to build up officers
3. Model C: Front-end
 - The Front-end model means the deck officers have less disruptive sailing time.
 - Provides proof that the seafarer has the necessary academic ability to proceed through to Master.
4. Model D: Cadet Vessel
 - The Cadet Vessel model provides a long period of time in which to learn the skills to be an officer. This produces a strong foundation for the deck officers career.
5. Model E: Degree Program
 - No comments.

Desirable and undesirable delivery methods

The questionnaire asked the respondents to indicate their agreement or disagreement with education and training delivery strategies for the Second Mate Certificate of Competency, and to comment upon any differences for the senior officers. The questionnaire item was divided into three areas of consideration; at

sea, at maritime college and in general (appendix A: items 10 and 10.1). The responses have been described using a four point scale about a mean figure with the standard deviation showing the spread of opinion.



AT-SEA DELIVERY METHODS

The ranking of the at-sea delivery methods are given in table 9 and the percentage of responses for each category given in figure 9.

Table 9: At-sea delivery method ranking

Strongly Agree	n	M	SD
Senior officers should officially assess the cadet / trainee	13	1.31	0.63
Practical training delivered by officers on board trading vessel	14	1.36	0.50
Training as a cadet	14	1.43	0.85

Some Agreement	n	M	SD
Education and training videos	12	1.75	0.45
Lectures delivered by senior officers on board vessel	14	2.07	0.73
Distance education by computer based tuition	14	2.36	0.50
Distance education by correspondence course	14	2.36	1.01
Company cadet training vessel	14	2.43	0.85
Training as an able seaman / rating	14	2.43	1.02

Some Disagreement	n	M	SD
Training officer on board trading vessel delivering lectures and training	14	2.57	0.76
Distance education by satellite communication	14	3.00	0.8

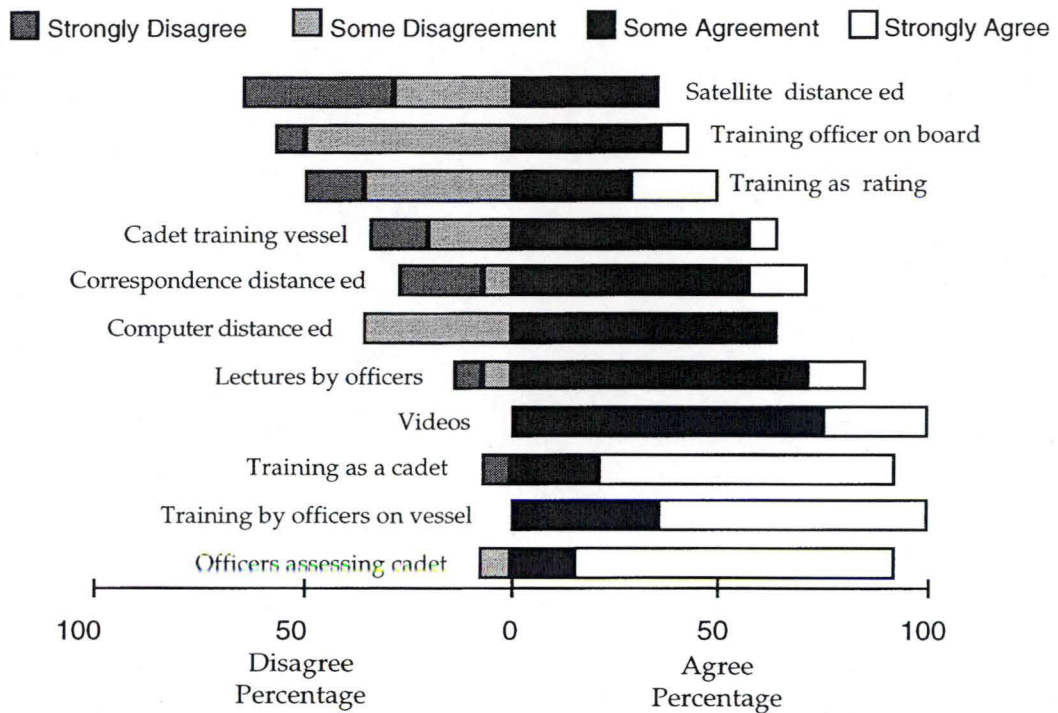


Figure 9: Percentage of responses to at-sea delivery methods

The percentages and rankings show a strong agreement with the senior officers officially assessing and training cadets on board. Training as a cadet was given a strong preference over training as a rating. Education and training videos and lectures delivered by senior officers on board trading vessels were agreed with. Distance education in the form of computer based tuition and correspondence courses were marginally supported, as was the concept of a cadet training vessel. The ranking gave marginal disagreement to the concept of having training officers on board vessels delivering lectures and training. Distance education by satellite communications was generally disagreed with.

The ranking of the maritime college delivery methods are given in table 10, and the percentage of responses for each category given in figure 10.

Table 10: Maritime college delivery methods ranking

Strongly Agree	n	M	SD
Training on Radar / bridge simulator	14	1.14	0.36
Training on Communications simulator	14	1.21	0.43
Training on Cargo simulators	14	1.29	0.47
Practical tutorials	14	1.29	0.47
Training on Ship handling simulator	14	1.36	0.63

Some Agreement	n	M	SD
Lectures	14	1.57	0.51
Computer based tuition - multi media	13	1.69	0.75
Training on maritime college training vessel	14	1.71	0.61
Role play	14	1.86	0.86
Self Study	14	2.00	1.04

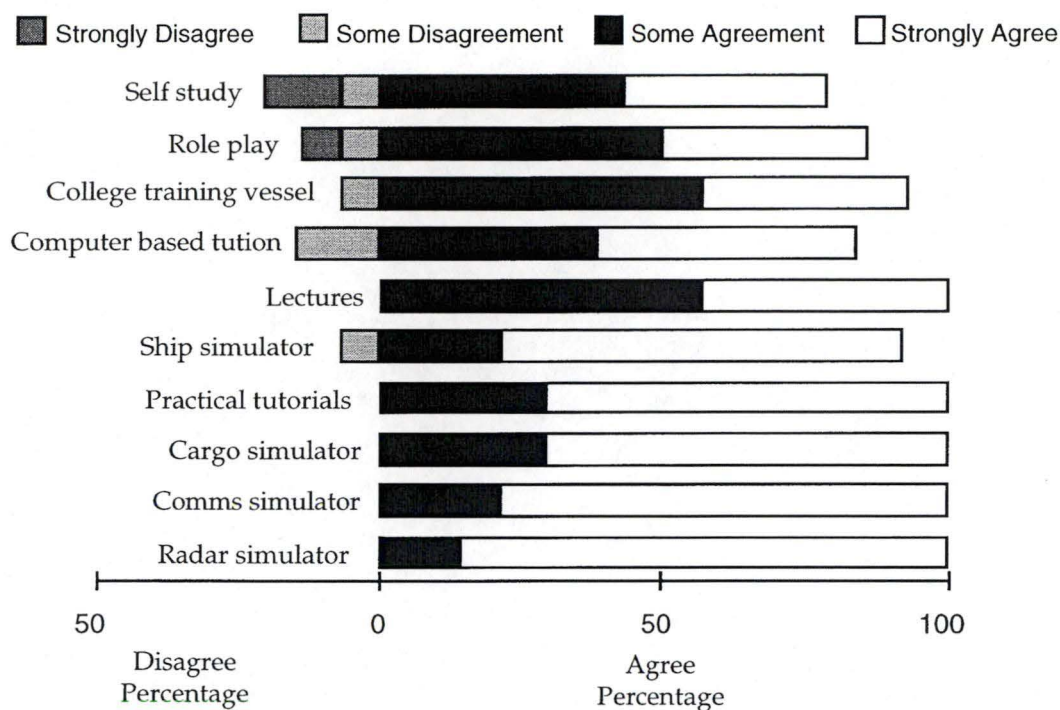


Figure 10: Maritime college delivery methods percentage ranking

The ranking shows agreement with all of the delivery methods but tends toward the use of simulators and practical tutorials over lectures, computer based tuition, college training vessel, role play and self study. However, individual respondents had some disagreement with the use of the ship handling simulator for the junior officers, computer based tuition and the use of the college training vessel. There was some strong disagreement with self study and role play.

GENERAL DELIVERY METHOD CONSIDERATION

This section compares general concepts within the education and training programs for the junior officer's Certificate of Competency. In relation to the senior officer delivery methods there was no perceived or stated differences between the junior and senior officer delivery methods. The respondents produced a wide spread of opinion. The ranking of general delivery considerations is given in table 11 and the percentage of responses for each category given in figure 11.

Table 11: General delivery methods ranking

Some Agreement	n	M	SD
Training by senior officers on board and college based education and assessment	14	1.64	0.50
A 2nd Mate should have on-the-job training after obtaining the certificate	14	1.86	1.29
Certification should be based on the assessment of practical skills	14	1.93	1.07
Distance education at sea and college-based assessment	14	2.07	0.73
Certification should be based on passing a college course	14	2.36	1.01
Distance education at sea and at-sea based assessment	13	2.38	0.96
All education, training and exams should be done at a maritime college.	14	2.43	1.09

Some Disagreement	n	M	SD
All education, training and exams for 2nd Mate should be done on board trading vessel	14	2.57	1.02
A 2nd Mate will be required to do the 2nd Mates work with no training after obtaining a certificate	14	3.00	1.04
All education, training and exams should be done on board a company training vessel.	14	3.07	0.92

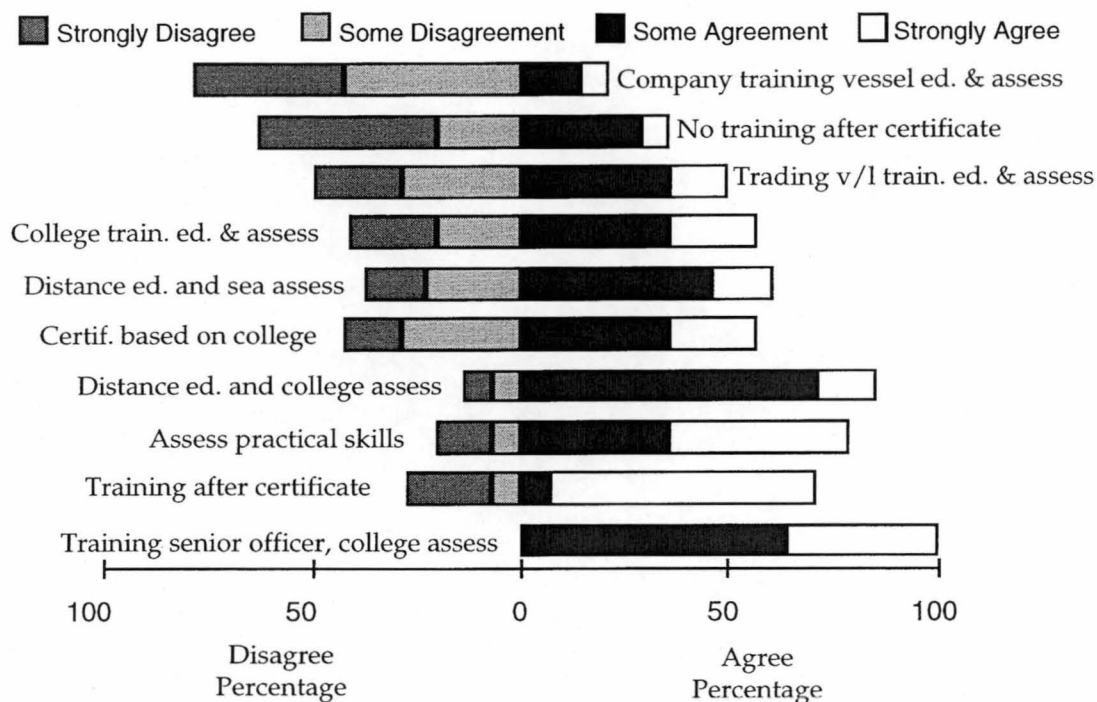


Figure 11: General delivery method percentage ranking

DELIVERY METHODS

The existing concept of training by senior officers on board with college-based assessment, was the only item to have 100% agreement, the other concepts all varied from strongly agree to strongly disagree. Distance education at sea, with college based assessment or at-sea based assessment, was ranked in the area of agreement above the concept of having all education and training carried out at a college. The concept of having all education, training and examination done on a company training vessel obtained the most disagreement ranking.

POST CERTIFICATE TRAINING

The results showed agreement with the concept of training junior officers after obtaining their certificate, and disagreement with the concept of junior officers receiving no training after obtaining the certificate.

PRACTICAL SKILLS

The results supported the concept of the certificate being based on practical skills assessment and marginal support for certification being based on passing a college course.

DISTANCE EDUCATION

The questionnaire specifically asked the respondents whether distance education was acceptable for seafarers to obtain a Certificate of Competency (appendix A: item 11 and 11.1). 58% (n=12) of respondents supported distance education and 42% did not support distance education. Item 10 asked the respondents to evaluate distance education for the first Certificate of Competency. In table 11 some respondents agreed with the concept of distance education at sea and college based assessment, but when asked to indicate agreement or disagreement with delivery methods (table 9) at-sea distance education by computer based tuition and correspondence course, was given marginal agreement second to the concept of having on-board senior officers delivering lectures. Distance education by satellite communications was disagreed with but the use of education and training videos was given total agreement in the responses.

The questionnaire asked the respondents, who favoured distance education, to describe the type of distance education that would be appropriate. Those who replied in the negative were asked to give reasons as to why distance education was unacceptable to the company. The list of comments is given below.

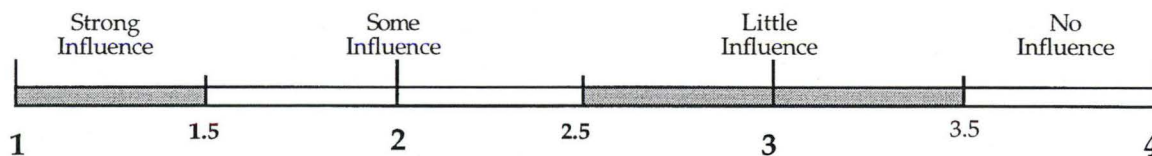
1. Appropriate types of distance education:

- Correspondence courses, training record books and training videos (New Zealand)
- Sandwich distance education where a student spends a certain period on a vessel with distance education material and not more than three weeks at a college. (Singapore)
- Distance education at sea, and college based assessment. (Philippines)

- Distance education at sea in conjunction with college based training. (Philippines)
2. Reasons why distance education is unacceptable:
- Working hours and stress on board give seafarers no time to study on board. (Hong Kong)
 - Vessel with many ports of call on short runs and a limited six week time on board means a seafarer's routine is not conducive to distance education. (New Zealand)
 - Education and training based around distance education is not enough (Hong Kong)

Major influences on the education and training of deck officers in the Asia Pacific region

The Questionnaire asked respondents to evaluate the level of influence 35 items had on the certification, education and training of their deck officers (appendix A: 12 to 12.6). The responses have been evaluated using a four point scale about a mean figure with the standard deviation showing the spread of opinion.



The ranking of the influences is given in table 12.

Table 12: Shipping influences ranking

Strong Influence	n	M	SD
Licensing authority requirements	14	1.2	0.43
International Maritime Organisation Regulations	14	1.21	0.43
STCW Convention	13	1.23	0.44
Owner's quality assurance	12	1.5	0.67

Some Influence	n	M	SD
Manager's quality assurance	13	1.54	0.66
Nationality of Certificate of Competence	14	1.57	0.76
International Safety Management Code	13	1.62	0.65
Cost of education and training	14	1.64	0.63
Cost effectiveness of the operation of vessels	14	1.64	0.63
Type of vessel the officers will sail	14	1.64	0.63
High technology of vessels	14	1.64	0.63
Ship manager requirements	14	1.64	0.74
Environmental concerns	14	1.64	0.74
Shipowner requirements	14	1.71	0.83
Number of officers on board	14	1.79	0.43
Business reputation of company	14	1.79	0.58
Type of cargo vessels carry	14	1.86	0.66
Charterer's quality assurance	14	1.86	0.77
Ship charterer requirements	14	1.93	0.73
Insurance company demands	14	2	0.55
Classification society requirements	14	2	0.68
Shipowner organisation (ie ISF) policies	14	2	0.82
The time taken at a college to obtain a certificate	14	2	0.88
Low technology of vessels	14	2.07	0.73
Lack of control of officers remaining with company	14	2.07	0.73
Countries to which a vessel trades	14	2.14	0.66
Academic qualification of officers (not ticket)	14	2.14	0.77
Lack of available officers	14	2.14	0.86
Trading pattern of vessel	14	2.14	0.95
Age of vessel which officer will serve	14	2.21	0.58
Tonnage of vessel	14	2.21	0.7
Seafarer demands	14	2.21	0.7
Nationality of officer	14	2.29	0.61
Seafarer union requirements	14	2.36	1.01
Flag of registration	14	2.43	0.85

The data shows that every factor in the questionnaire has some influence on the certification, education and training of the respondents' deck officers. As expected, the factors that have the strongest influence are primarily the authorities and regulations that issue or govern the Certificates of Competency, such as, the licensing authority requirements (AMSA), the IMO and the STCW convention. The next strong influence was the owner's Quality Assurance followed by the manager's Quality Assurance, the nationality of the certificate, and the International Safety Management Code.

CONCLUSIONS

The shipowners/managers are having more difficulty obtaining senior officers than junior officers. Just under half the respondents are having difficulty obtaining junior officers, and just over half are having difficulty obtaining senior officers. This suggests the training market in the Asia Pacific region is quite secure as there is significant demand for well trained deck officers.

The majority of shipowners/managers do not have, or want, a training agreement with a maritime training institution. Also, the shipowners/managers from the major shipping centres of Hong Kong and Singapore believe that an employer should contribute between 0% and 20% towards the cost of a Second Mate student's training. This suggests, in order to obtain education and training contracts, the AMC has a significant need to produce a training system which has obvious financial benefits to the shipowners/managers.

In relation to the training system, the most expected, desired and best system is the Sandwich system. The Front-end training system is regarded as one of the least expected, undesired and worst systems. This suggests that the Australian cadet Dip. Nautical Science is not a program the AMC should market in the Asia Pacific region, whereas, the Dip. Shipmaster is the most acceptable system to develop and market.

For the delivery of the Second Mate course the most agreeable methods involve senior officers officially assessing and training cadets at sea. This suggests the AMC's deck officer course needs to make greater use of the students' seatime as course time. Within the institutional delivery, greater emphasis must be given to the assessment of practical skills, particularly involving the use of simulators. Distance education for Second Mate students was given marginal support, but was not supported for senior officers due to their workload. This result suggests that the development of distance education material is not a priority.

The factors that strongly influenced the education and training of Second Mate students was the licensing government, the IMO convention requirements and the Quality Assurance of the shipowner/manager. This suggests that the AMC must become Quality Assured so it can deliver, and market, Quality Assured Certificate of Competency qualifications.

CHAPTER 7

DISCUSSION

INTRODUCTION

The aim of the dissertation is to determine a deck officer education and training system which will encourage the establishment of training contracts between the AMC and Asia Pacific shipowners/managers. A contract implies funding, and it must be remembered that the ultimate objective of any company is to make a profit and survive. It is unlikely that a shipping company would invest in the development of its personnel without a firm conviction of producing a more profitable business (Raeng 1993, p. 4). Therefore, the AMC needs to convince the shipping companies of the necessity to fund training by explaining the economic benefits of entering into a contract with the AMC to deliver the Certificate of Competency training. Raeng, of the Norwegian Shipowner's Association, stated the basis for this encouragement in the following:

Statistics show that the human and organisational factors or substandard practices contribute to about 80% of all accidents. Competent seafarers can no longer be 'found', they must be trained, developed and retained in the company. This obvious fact must be made crystal clear to the decision makers in the companies. The challenge is to 'prove' that investments in the company's greatest asset is worthwhile (Raeng 1993, p. 4).

In order to prove the value of a training system, and hopefully guarantee its success, the design of the system needs to consider three areas:

1. the international shipping situation;
2. the needs of the shipowners/managers;
3. the training systems and delivery methods that satisfy the desires and needs of the shipowners/managers.

This chapter uses the questionnaire results, the interview results, background chapters and literature to present the author's arguments within the listed areas of consideration. The conclusions resulting from this chapter are presented in the final chapter of the dissertation.

PRESSURES AND INFLUENCES ON INTERNATIONAL SHIPPING

International regulations

The international community has become increasingly conscious of, and concerned with, the destruction of the environment. Under the weight of public opinion, the media and political leaders see the loss of lives and damage caused by pollution and initially look squarely at the shipowners/managers. The shipowners/managers satisfy existing conventions so the finger is then pointed at the flag-of-convenience governments, who are mute and quite happy to accept the foreign exchange with little regard to world opinion. The Classification Societies are next to come under criticism, some of whom hold up their hands and admit a lowering of standards, but also point to the unenforceable IMO conventions, the lack of port State control and the unscrupulous shipowners/managers. The owners/managers are quick to point out the high cost and low returns in the competitive international market place. This in effect blames the customer for accepting the cheapest freight rate to satisfy the share holders expectation of a profit. Finally the shareholders, many of whom made the initial outcry, have little or no awareness of the effect their indiscriminate demand for profit is having on world shipping. Many of the problems that face international shipping stem from the need to reduce costs to remain competitive in the international shipping market place.

In response to the evident lowering of shipping standards, and concern for the environment, the international media gives pollution of the sea by shipping accidents the same, if not more, attention than passenger aircraft accidents and air

safety. This attention has helped to focused the international bodies, like IMO, and governments to address the problems at the shipowner/manager level. The reliance on self regulation in the shipping industry through the existence of ineffective and inadequate laws and conventions is giving way to the improvement of ship safety by the introduction of the following new or revised merchant shipping control instruments:

1. Quality Assurance, and the ISM Code, is attempting to change the attitude and thinking of all people within the shipping industry and leading to a greater safety consciousness;
2. the STCW95 is attempting to define how competence is to be measured;
3. port State control is attempting to police the international standards of operation through inspections and shame.

Supply of seafarers

The global economic downturn in the 1980's and 90's, the utilisation of the flags-of-convenience registry and the lack of forward planning by the international shipping industry has lead to a labour crisis in the maritime industry; a lack of officers and a lowering of the officer quality. There has been a shift in the recruitment of personnel from traditional developed nations to the developing nations, and at the same time a reduction of investment in training (Raeng 1993, p. 1; Sien 1994, pp. 14-15). As a result the traditional high quality maritime nations have slowed down their training, whilst the developing nations are finding it almost impossible to guarantee the quality of officer training required. In 1995 the Baltic and International Maritime Council (BIMCO) and the International Shipping Federation (ISF) updated the 1990 labour demand/supply survey, undertaken by the University of Warwick, with further research and a report. The report concludes that in 1995 the demand for officers outweighed the supply by 18 000 worldwide, equating to 4.4% of the total workforce - which is a better forecast than the 1990 survey. However, based on somewhat conservative assumptions, the shortage of officers will escalate to 30 000 (7%) in 2000 and 42 000

(10%) in 2005 ('Officer shortage set to get worse: A report from BIMCO and the ISF' 1996, p. 13). The message remains clear that the officer shortage will increase unless corrective action, such as increases in recruitment and quality of training, is taken by the employers ('Officer shortage set to get worse: A report from BIMCO and the ISF' 1996, pp. 13-14).

Shipowner/Manager Support for Education, Training and Certification of Deck Officers

Within the deck officer's working life there are two types of education and training that require funding. The first is the Certificate of Competency; education and training that ensures a person can safely be in charge of any vessel. The other is up-grading training; training that helps a seafarer carry out the work on a vessel more effectively. The questionnaire asked what percentage the industry stakeholders should contribute to the cost of the first Certificate of Competency, the Second Mate certificate. It was assumed that the shipowners/managers are most likely to fund this certificate as the cadets/trainees do not receive high pay and are less able to pay for a course than the senior officers. The results show that the employers (shipowners and managers) in the Philippines should financially contribute 65% (mean) of the education and training cost, in Japan and New Zealand 50% (mean), in Singapore 20% (mean) and for Hong Kong 13% (mean). The two major Asia Pacific shipping nations of Hong Kong and Singapore gave a clear indication that the shipowners/managers should be contributing a relatively small proportion of the Second Mate Certificate of Competency education and training costs. It seems the encouragement of shipping companies (through international conferences and journal articles) to take more responsibility for training has not extended to funding cadet Certificates of Competency courses - particularly in Hong Kong and Singapore. A reason for this may be that a company can not force a deck officer to remain in employment after they have paid for the training. Also, the incentive of individual seafarers from the developing nations of Asia to fund their own training is quite high, because of the promise of a level

of income which makes them wealthy people within their own country (Grey 1995, p. 60).

The questionnaire determined the shipping companies opinion toward establishing a training agreement with a training institute, which implies financial support. The results showed that 67% (n=6) of the respondents from Hong Kong and Singapore did not want a training agreement. The two companies that responded positively wanted skills up-grading of employed officers rather than Certificate of Competency agreements. A questionnaire respondent from Hong Kong summarised the situation well; 'Certification costs should be the responsibility of the seafarer, the employer is responsible for further skill upgrading'. This view was also supported in the interviews where many of the companies were more interested in the available Global Maritime Distress and Safety System (GMDSS) and simulator training at the AMC rather than deck officer education, training and certification programs.

Some companies interviewed were funding the education and training of deck officers. One company in Hong Kong, with its origins in China, had established a training school on the mainland to train cadets. Another company had established a cadet training program in India to guarantee the supply and quality of its officers. This company also countered the problem of losing company trained personnel to other companies by a strong emphasis on company pride and loyalty, and only promoted company trained officers to Master. The isolated cases of funding of cadet training gives some encouragement to the premise that if a company can be convinced of the benefits of funding training, they may invest in a program.

NEEDS OF THE SHIPPING COMPANIES

Quality Assurance

As mentioned, the lack of good quality certificated deck officers is a fact in the international shipping industry. The certification of deck officers is mainly influenced by the national and international licensing authority requirements and regulations. The questionnaire identified that these regulations have the strongest influence on the certification of deck officers. However, the questionnaire also identified that the nationality of the certificate had a significant influence on the education and training for the Certificate of Competency. This suggests that the quality of the national certificates varies.

If a vessel, its operation, equipment or personnel, is below the international convention standards it may be targeted with port State inspections and delays. To avoid the problems of port State control the shipowners/managers can demonstrate their interest in the quality of ship operations (Raeng 1993, p. 4) through the implementation of a recognised quality system. Quality Assurance (QA) is a self imposed visible sign to port State control and insurers that a company, its vessels and its personnel, are of a high quality and meet the international regulations. The questionnaire identified that the QA of the owners and managers, was a major influence, second to the regulatory requirements, on the certification of the companies' deck officers. This suggests that the QA requirements of the shipping company is determining the education, training and employment of the deck officers.

Chapter 2 outlined the problems caused by the lack of enforced standards which the flag-of-convenience administrations allow on international vessels. Indeed, the *Review of Inquiry into Ship Safety - Ships of Shame Progress Report* sighted the lack of compliance by flag States to international conventions as the most

serious problem currently facing ship safety (House of Representatives 1994, p. 24). It is interesting to note that the respondents of the questionnaire ranked the flag of registration (flag State requirements) as having the least influence on the certification, education and training of deck officers. This would suggest that the respondents believe that a company's QA systems are of far greater influence than the requirements, or lack thereof, of the flag State. This means the training system must meet the QA needs of the shipowners/managers rather than the flag State governmental requirements. If a certificate is to meet the QA requirements of the shipping companies then the training must be carried out under a QA system. Stratton (1993, p. 4) suggested that to ensure the competency of seafarers there should be an international requirement for all maritime training and examination institutions to possess QA certification.

Demand for deck officers

The literature on labour supply in international shipping makes significant reference to the existing and future shortage of good quality seafarers, particularly officers. Interviews with shipowners/managers in Hong Kong and Singapore indicated that companies are having some difficulty obtaining well trained deck officers. This finding is reflected in a maritime labour demand/supply survey undertaken in 1995 by BIMCO and the ISF which concludes that some (although not all) companies are experiencing recruitment difficulties with regard to officers, although these difficulties are not great ('Officer shortage set to get worse: A report from BIMCO & ISF' 1996, p.13). The interview and questionnaire results indicated the demand appears to be more at the senior officer level, Master and First Mate, rather than the junior officer, Second and Third Mate, level. This observation was evident in the questionnaire results from Hong Kong with 75% of the respondents stating they did not have difficulty obtaining junior officers, but 75% stating they had difficulty obtaining senior officers. Singapore had the same general response in the interviews and the questionnaire shows 67% of the respondents having difficulty obtaining high quality junior and senior officers. This finding is reflected

in the 1995 BIMCO & ISF report and offers some explanation to the problem in the following:

...more than half the senior officers currently employed to man (sic) the world fleet are nationals of the OECD countries. However, the age profile of OECD seafarers as a whole is higher than that of seafarers from any other region. Recruitment levels are also the lowest of any other region and wastage rates...are very high. The industry needs to consider these findings carefully and to consider their implications. In particular, a key question relates to where the next generation of senior officers will come from and how their recruitment, training and career development are effectively planned ('Officer shortage set to get worse: A report from BIMCO and the ISF' 1996, p. 14)

A deck officer must pass through the certificate system from junior officer to senior officer, and from the interviews it appears that the majority of junior officers, particularly from the Philippines, do not have the ability or inclination to undertake training to become senior officers. To produce a good quality senior officer you must first have a good quality junior officer. If a company wants more well trained senior officers, in the long term, it needs to ensure it has an adequate supply of well trained junior officers.

PREFERRED EDUCATION AND TRAINING SYSTEMS AND METHODS

Certification Models

The AMC needs to have a product which will encourage a shipping company to pay for the deck officer training of its personnel. The program must satisfy the shipowner's/manager's immediate and future needs. The questionnaire attempted to determine the Certificate of Competency deck officer training systems that would be most acceptable to the shipowners/managers.

The questionnaire respondents determined that the most common training model in the region is the Traditional model (62%, n=13). However, Shukry (1994, p. 10) stated that the Traditional model is becoming uncommon in the Asian region. An explanation for this discrepancy could be because shipping companies do not have involvement in the Certificate of Competency training of their personnel and, hence, do not know what system is used. It is also quite likely the questionnaire respondents are ex-seafarers who undertook their training through the traditional system. Therefore, the validity of this questionnaire result is in question.

The Sandwich training model was seen as the most likely to be used in five years time (64%, n=11), most likely in 10 years time (70%, n=10), most desired in five years (67%, n=12) and most desired in 10 years (55%, n=11). It was regarded as the best model for Certificate of Competency training. The Sandwich system provides pre-sea instruction, before hands-on experience, with extended periods of seetime, therefore, producing 'real' seafarers with a good understanding of a company's systems.

The Traditional model, which does not vary greatly to the Sandwich model, was considered to be second on the expected and desired scale as well as ranked second in the best training model scale. From the interviews the Sandwich and Traditional models were well supported as the best systems to train seafarers to be competent officers.

The Cadet Vessel, Degree Program and the Front-end models are the least expected and least desired, and are regarded as the worst training models. The use of a dedicated Cadet Vessel is quite rare, as is the Degree Program, which may explain the low scoring. However, the Front-end training model appears to have become common in the Asia Pacific region. Shukry (1994, p. 11) made the following observation:

The most significant change in the training of seafarers in Asia has been the shift in emphasis in many national colleges, which traditionally practiced the SS (Sandwich) scheme towards the FES (Front-end) scheme.

The interviews also reflected the results of the questionnaire, that the Front-end training system is not seen as an acceptable training method because the officers have out-of-date and incomplete knowledge at the senior officer level.

The AMC at present offers the Front-end training system, Diploma Nautical Science, and the Sandwich training system, Dip. Shipmaster, incorporating the ACMO (Second Mate). The AMC’s Front-end training system has been developed to service the needs of the Australian shipping companies of BHP, ANL/ASP and Howard Smith, and has been offered since 1980. The question that must be asked is why the Australian shipping industry supports a training system that appears to be unpopular with the shipowners/managers? The answer appears to be based on economic considerations. Australian shipping companies are obliged under a labour award to pay an officer a 75% study leave wage, with leave frozen, to attend Certificate of Competency training courses. The cost to the company, in wages, of a Second Mate attending the 12 month Dip. Shipmaster course would be approximately as follows:

12 months College 75% wage	\$52 500
Replacement at-sea wage	\$70 000
Total wage cost	\$122 500

Under the Front-end training system, the training is at time when the seafarer (cadet) is paid lower wages with no leave entitlements. The corresponding section of the Dip. Shipmaster within the Diploma Nautical Science would take about 18 months to complete. Therefore, the cost to the company for a cadet to attend a similar course would be as follows:

18 months at AMC as cadet	\$45 000
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Based on these estimates a company makes a saving of \$775 000 if it pays for the senior officer Certificates of Competency training for 10 cadets per year, as opposed to 10 Second Mates under award conditions. This economic reasoning seems to be the main reason why the Australian Front-end Diploma Nautical Science exists

(telephone conversation between the author and Fred Ross of the Australian Maritime Officers Union and AMC College Council, 3 April 1997). In effect the Merchant Officer's Award has encouraged the development of a training system that helps shipping companies avoid the high cost of funding Certificate of Competency training.

The international shipowners/managers rely on the financial incentives that some nationalities see in becoming a deck officer, even if they pay for their own education and training. The problem is that with the reduction of training in the traditional maritime nations the developing nations' officers are finding it difficult to access good quality training within their own countries. As a result the 'cheaper' officers are usually of a lower quality, and the stricter use of port State control measures may result in vessels being held back in ports due to poorly trained personnel. Therefore, the financial benefit of having well trained personnel is to avoid vessels being held up in port. However, it takes up to 10 years to develop a competent Master, and if the industry has a shortage of qualified officers, where are the replacement officers going to come from now? This observation should become evident to the shipowners/managers and may result in the desire of companies to financially support Certificate of Competency training.

At present the Asia Pacific shipowners/managers, particularly in Hong Kong and Singapore, prefer the Sandwich training system. However, as is evident from the persistence of the Australian Front-end system, any model of certification can be accommodated provided the shipowners/managers are willing to support a program with sufficient funding.

Delivery methods

The mode in which a course is delivered is important when determining the acceptability of a deck officer education and training program to shipowners/managers. In the Dip. Shipmaster all the delivery and the assessments are completed at the AMC while the students are enrolled in the course. The officers on the vessels which these student sail do not formally assist in the training delivery or the assessment of students. However, tradition holds that cadets are to understudy the deck officer's duties to ensure they have the necessary practical experience to hold the deck officer position.

The questionnaire asked the respondents to indicate their agreement, or disagreement, with education and training delivery strategies for the Second Mate Certificate of Competency.

VOCATIONAL EDUCATION TRAINING AND ASSESSMENT AT SEA

The strategy which has 100% agreement from the respondents is the traditional system, whereby the senior officers train the cadets and an institution delivers the education and assessment programmes. However, the at-sea delivery method of senior officers delivering training and officially assessing the cadets abilities finds the most favour and is given the highest agreement factor. This observation is also backed up by the Nautical Institute's STCW: Priorities for Change survey, in the conclusion section it stated as follows:

Members support the use of a wide range of techniques, including the use of simulators, in the assessment of competence. Greater weight should be given to the demonstration of practical skills. Most respondents would like serving seafarers' judgements to have a greater influence on the process. (1994, pp. 1-2)

The emphasis on the need to have on-the-job training and proof of practical skills, or competency, is also one of the main aims of the revision of the STCW95 (Chapman 1995, p. 10) and directly reflects the United Kingdom's National Vocational Qualifications (NVQ) (House of Commons Employment Committee 1993, p. 3 para. 17 & 20) and Australia's Vocational Training sector's pursuit of Competency Based Training (CBT).

Three issues prevent the industry from adopting industry practitioners facilitating the assessment of deck officer students at sea; namely, untrustworthy assessors, the impossibility of assessing people in critical situations at sea (Moreby 1994, p. 21) and the inability of the senior officers to facilitate the training and assessment to a institution's standards. In 1995 United Kingdom shipping companies, including the Maersk line, introduced a pilot trial of the Development of Certificated Officer Scheme. The pilot scheme's role was to investigate the assessment of junior officer candidates using the NVQ/STCW95 competence assessment system and senior officers on board. Cowley, the Chairperson of the Maersk Company, said, in relation to the pilot scheme, there is a great deal of uncertainty regarding the future transitional arrangements of STCW95 and the NVQ system. Nevertheless, despite the anticipated problems, he considers it prudent to begin training Masters and Chief Engineers to national assessor standards, preparing the company for future developments in officer training and certification (Cowley 1996, p. 8).

If the deck officer training program is to include the use of at-sea staff to take responsibility for the training and assessment of students, then the senior officers must first be trained as trainers and assessors. Neither of the AMC's existing deck officer programs caters for the training of senior officers to be on-board trainers and assessors. A train - the - trainer/ assessor course could be easily introduced into the senior officer Certificate of Competency course. However, the difficulty an institution will have is determining an assessment system whereby assessment decisions made in relation to many individuals, by many assessors, in many situations can be made consistently, fairly and validly (Toop, Gibb & Worsnop 1994, p. 13).

The training in, and assessment of, practical skills was also the most highly agreed with method of institution-based delivery of the Second Mate Certificate of Competency course. The most favoured delivery methods are practical tutorials and training on simulators, before the use of the more academic based lectures, multi-media tuition, role play and self study.

Simulators can assess those critical areas of a person's ability which are hazardous to assess, or practice, at sea. For example, navigating in zero visibility in a high traffic density area - the radar simulator, manoeuvring a vessel in a narrow channel or reef - the ship simulator, sending distress signals - the communications simulator and loading a vessel with unusual cargoes - the cargo simulators. The use of simulators means that a maritime training institution needs to have extensive access to expensive capital equipment and staff expertise.

The AMC is in an almost unique position, through the support of the government (funding), the support of the industry (students) and protection of the Australian shipping industry (cabotage), making it impossible for Australian shipping companies to 'flag-out' and employ developing nation crews, it has been able to survive and grow, unlike most developed nations maritime training institutions. The AMC is a small academic institution within the Australian university system, but in terms of national and international maritime institutions it is one of the largest and most respected in the world. This was publicly recognised by Moreby in the following statement:

Training is important and is well delivered by certain companies and in certain colleges. In this respect, the present author would commend to listeners and readers the excellent facilities at the Australian Maritime College which must surely rank as one of the premier, if not the premier maritime college in the world (Moreby 1993, p. 10).

As a result of the extensive facilities at the AMC, the deck officer courses are focused on the delivery of practical skills and assessment of students in the critical vessel operational areas through its use of simulators and training facilities.

The delivery of lectures at a college was given 100% support by the questionnaire respondents, as was the traditional method of using senior officers to carry out the training and a college to deliver the education and assessment. This suggests that the uniformity of a deck officer's underpinning knowledge is important. Cowley (1995, p. 7) also suggests that the knowledge of specific functions of the vessel's operation is best undertaken at a maritime training institution.

DECK OFFICER CURRICULUM

The STCW95 and Australia's Vocational Education and Training (VET) sector's need to have competence based education, training and assessment are almost identical. Both systems require a set of industry competence standards, a list of methods for demonstrating competence and criteria for evaluating competence (IMO 1996, p. 27). From these standards specific learning outcomes are written which describe what a person should be able to do, or know, in terms of Assessment Criteria. The assessment of practical skills is best undertaken in the workplace, i.e. on board a trading vessel, on board a training vessel and in a simulator, with the most preferred method being on board a trading vessel (Moreby 1994, p. 21). The education and training administration, internationally and in Australia, and the desires of the shipowners/managers are in unison. They are encouraging practical training and assessment of deck officer students at sea and on simulators, whilst retaining the necessary underpinning knowledge delivered at a maritime training institution.

The AMC can meet the physical and administrative resource needs of the new courses. However, the present courses are not Competency Based (in terms of the National Training Reform Agenda), the curriculum is of a Higher Education format and accredited under the RATE system. This means that the courses will

need to be rewritten to reflect the requirements of STCW95 and CBT with an increased orientation to the proof of competence rather than focusing primarily on knowledge. The transition from the existing academic based system to the new CBT system will not, however, be too complicated as the existing training and assessment, in critical areas, is outcome-based. The CBT development will require the lecturers at the AMC to become more familiar with the techniques of developing, implementing and administering a CBT course. This suggests that the AMC lecturers and administration staff may need some up-grading training in CBT/STCW95 techniques and requirements.

DISTANCE EDUCATION AND INNOVATIVE DELIVERY STRATEGIES

In an attempt to encourage the utilisation of the seafarer's time at sea to develop the underpinning knowledge required in the Certificate of Competency course, the acceptability of distance education was investigated both in the questionnaire and the interviews. The questionnaire specifically asked the respondents whether distance education was acceptable for seafarers to obtain a Certificate of Competency. Distance education was supported by 58% (n=12) of respondents. The result of the interviews suggested that distance education may be acceptable for the cadets. However, the majority of interviewees suggested that the officers were too busy with work on board to have time to devote to distance education studies. These opinions were also expressed in the written questionnaire responses.

In relation to specific distance education strategies for the Second Mate course, the use of education/training videos was strongly supported. The use of senior officers to deliver lectures was given some support, followed by computer based tuition and correspondence courses with less favour. Distance education using satellite communications was disagreed with. This suggests that traditional correspondence and computer distance education strategies are not as popular as the use of videos and senior officers to deliver lectures.

The utilisation of a company training vessel and a dedicated on-board training officer was investigated in the questionnaire. Both these strategies were placed low on the list of all the delivery strategies and, therefore, are not strategies the AMC should pursue at this time.

CHAPTER 8

CONCLUSIONS

The research study uses two descriptive research methods, interviews and questionnaires, to investigate the research questions. From its inception this research study was ambitious in that it collected data from diverse and disperse international sources. The mail-out questionnaire was specifically designed for the international maritime shipowners/managers and attracted a very low response rate, 14 replies from 172 issued (8%). It appears that the response rate was low for two main reasons. The first is that the international shipowners/managers, as a result of a down turn in the world economy, have made rationalisations and increased the work-load of the shipping personnel. Hence, personnel do not have time for additional tasks such as answering questionnaires. In the future the identification of the individual respondents needs to be more rigorously undertaken so response preparation and follow-up is more effective. Secondly, the questionnaire was basically too long. The questions were valid but the questionnaire could not be answered quickly. Therefore, due to the low response rate, the results of the questionnaire are not representative of the Asia Pacific shipowners/managers and may not reflect the wider belief of the shipping industry.

ANSWERS TO RESEARCH QUESTIONS

Question 1

Do the Asia Pacific shipowners/managers have difficulty obtaining adequately trained deck officers?

The shipowners/managers are having some difficulty obtaining adequately trained deck officers. Of the questionnaire respondents, 43% were having difficulty

obtaining junior officers and 57% were having difficulty obtaining senior officers. The reason for this appears to be that since the 1980's, as a result of the economic recession in international shipping, international shipowners/managers have increased the employment of the cheaper developing nations' officers, reduced the employment of traditional nations officers and reducing investments in training. As a result the traditional high quality, more expensive, seafarer has been replaced by the lower quality developing nations' seafarer. The lack of adequately trained deck officers is at present more at the senior officer than the junior officer level. It appears that the cheaper developing nations' junior officers are less willing and able to access senior officer training. The junior officers may not have the educational background or motivation to handle the senior officer training, and the developing nations are finding it difficult to guarantee the quality of officer training required. The difficulty of obtaining adequately trained deck officers goes to the core of the international shipping problem; the reduction in shipping standards due to the need to remain competitive by reducing costs and the existence of unenforceable international regulations.

Question 2

Do the Asia Pacific shipowners/managers wish to support deck officer training through an agreement with a maritime institution and/or funding to deck officers?

The amount of deck officer training support, and where that support should come from, depends on the nationality of the company. The interviews and questionnaire responses indicate that Hong Kong and Singapore shipping companies did not see the shipping company as contributing significantly to the funding of Certificate of Competency training. As a result the support of training agreements with a maritime training institution did not extend to the Certificate courses. However, there was a general feeling that the funding of skill up-grading of the officers was the responsibility of the shipping company. Two companies showed interest in a training agreement for skill up-grading training. The

Philippines companies were more inclined to see the Certificate of Competency training as their responsibility and showed interest in a training agreement with a maritime training institution. There is also an indication that some of the larger companies are going-it-alone with deck officer training and are funding the establishment of their own training institutions in developing nations.

Question 3

What are the acceptable deck officer Certificates of Competency education and training systems for the shipowners/managers in the Asia Pacific region?

The Sandwich model is the shipowner's/manager's most acceptable, desired and expected Certificate of Competency education and training model. This system gives the best mix of academic studies at college and practical training at sea. See figure 12 below for the structure of the Sandwich model.

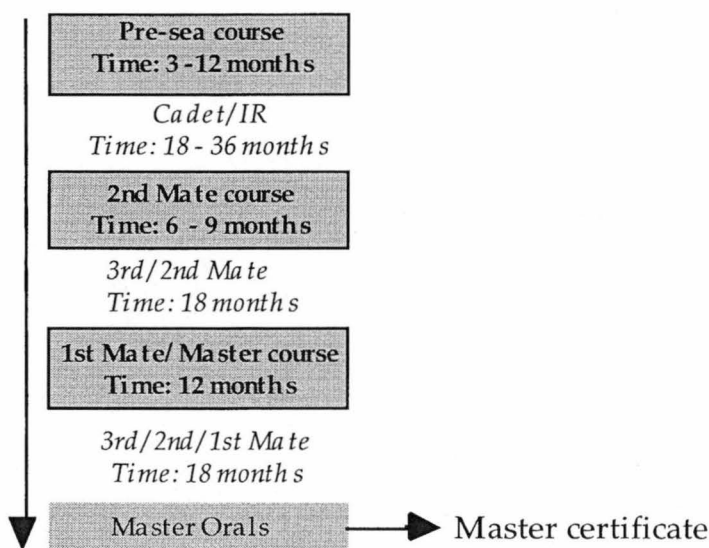


Figure 12: Sandwich model

The Traditional model, which does not vary greatly to the Sandwich model, was considered to be second on the expected, desired and best training model scale. The

Cadet Vessel, Degree Program and the Front-end models are the least expected and least desired, and are regarded as the worst training models for shipowners/managers.

Question 4

What are the desirable/undesirable delivery methods for the deck officer education and training program for the Asia Pacific shipowners/managers?

The training in, and assessment of, practical skills was the most highly agreed with method of institution-based delivery of the Second Mate Certificate of Competency course for the shipowners/managers. The preferred delivery methods are practical tutorials and training on simulators, before the use of the more academic based lectures, multi-media tuition, role play and self study. However, the delivery of lectures at a college was given 100% support by the questionnaire respondents.

The delivery strategy which has strong favour is the traditional system, whereby the senior officers train the cadets and an institution delivers the education and assessments. However, senior officers delivering training **and** officially assessing the cadets abilities was given the highest agreement factor for the at-sea delivery methods. This indicates that there needs to be an emphasis on on-the-job training and on-the-job proof of practical skills, or competency, in a Certificate of Competency course.

Distance education was considered acceptable for the education and training of cadets. However, it appears that the officers are too busy with work on board to have time to devote to distance education studies. In relation to specific distance education strategies for the cadets, the use of education/training videos was strongly supported. The use of senior officers to deliver lectures was given some support, followed by computer based tuition and correspondence courses. Distance education using satellite communications was disagreed with. The utilisation of a

company training vessel and a dedicated on-board training officer are considered low on the list of acceptable delivery methods.

Question 5

What do the shipowners/managers see as the major influences on the education and training of deck officers in the Asia Pacific region?

In response to the evident lowering of shipping standards and concern for the environment, governments and international bodies, such as the International Maritime Organisation (IMO), have identified the need to encourage shipowners/managers to take more responsibility for the safe operation of their vessels. The reliance on self-regulation in the shipping industry through the existence of ineffective and inadequate laws and conventions is giving way to the improvement of ship safety by the introduction of new or revised merchant **shipping control instruments**:

1. Quality Assurance (QA);
2. the International Safety Management (ISM) Code;
3. the Standard of Training Certification and Watchkeeping 1995 (STCW95) convention.

As a result, the strongest influences on the deck officer Certificates of Competency training are primarily the authorities and regulations that issue or govern the Certificates of Competency, such as, the licensing authority requirements (i.e. AMSA), IMO and the STCW95 convention. The next major influence was the owner's QA followed by the manager's QA, the nationality of the certificate, and the ISM Code. This suggests that the QA requirements of the shipping company is determining the education, training and employment of the deck officers.

It is interesting to note that the respondents of the questionnaire ranked the flag of registration (flag State requirements) as having the least influence on the

certification, education and training of deck officers. This would suggest that the respondents believe that a company's QA systems are of far greater influence than the practical requirements, or lack thereof, of the flag State. This means the training system may need to meet the QA needs of the shipowners/managers rather than the flag State governmental requirements.

IMPLICATIONS FOR THE AUSTRALIAN MARITIME COLLEGE

Factors influencing the demand for deck officer training

International shipping is facing more stringent operation of ships in view of the increases and changes in international conventions and regulations. The companies see QA certification as a safeguard against port State control delaying vessels. Shipping companies need Quality Assured certificated deck officers to fulfil the requirements of their own QA systems and port State control inspections.

The international shipping industry has an insufficient number of good quality deck officers to sail the world's fleet, and the situation is set to get worse. The problem is exacerbated by the reduction of crew sizes and the increased sophistication of modern vessels which require a greater level of knowledge and skill from the deck officers. The shipowners/managers are concerned as to who will crew their vessels in the future, and as it takes seven to 10 years to produce a qualified Master the concern is very real and long lived.

These two factors are encouraging shipping companies to become interested in, and concerned about, the training of more personnel. Hong Kong and Singapore are the major shipping centres in the Asia Pacific and shipowners/managers from these centres, although seeing the need for increased Certificate of Competency training, are unlikely to want training contracts with the AMC and may only wish to pay a small proportion of the Certificate of Competency training costs. This leads me to conclude that for the AMC to be able to encourage contracts with these

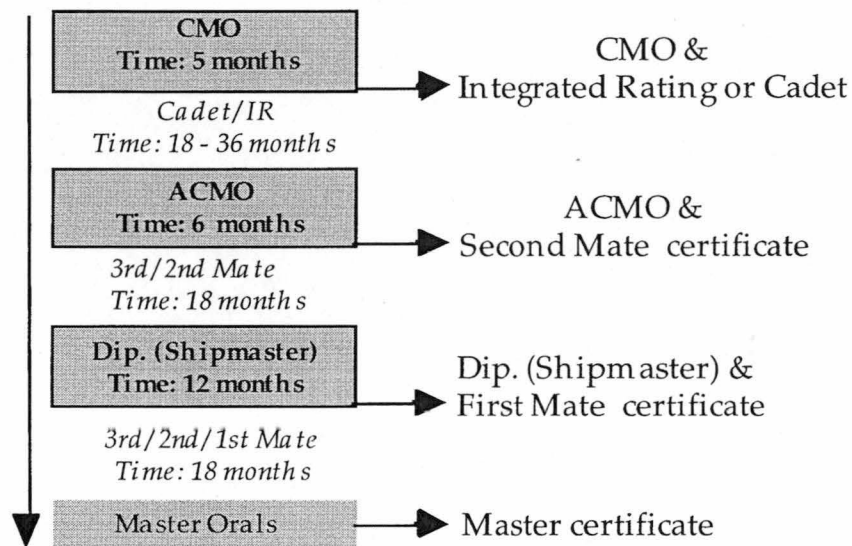
companies, it may need to convince them of the economic benefit of investing in the AMC's education and training systems. To help determine the training needs of companies, and sell the education and training system, the AMC could develop closer relationships with international shipping companies and shipowner organisations in the Asia Pacific region, particularly in Hong Kong and Singapore. It is important that the AMC produce innovative training systems which will solve the problems, and meet the concerns, of the shipowners/managers. Such a system needs to be marketed in a way that it convinces the shipping companies of the benefit of investing in the AMC's education and training system.

Deck Officer education and training system design

Convincing the shipping companies of the economic benefit of investing in the Certificate of Competency training of personnel is important. However, the AMC may need to approach the companies with a system which satisfies their needs and wants. The following training system could be the basis on which the AMC approaches a shipping company in order to develop a relationship with the hope of proving the value of a training contract for the delivery of deck officer education and training.

QUALITY ASSURANCE OF THE AMC

QA is a recognised sign that a company is of high quality and that it meets all the international regulations, ensuring a company does not come under excessive port State control inspection or delays. With the much quoted statistic of 80% of all accidents caused by human error, the quality of the officers certification is coming under increased scrutiny. At the present, the AMC is not a Quality Assured organisation. Therefore, in order for the AMC to sell a Quality Assured deck officer training system it must first become a Quality Assured maritime training institution.



The AMC may not need to change the above training system structure, but may need to focus the educational method from an 'academic' based course to a Competency Based Training (CBT) course. To satisfy the requirements of STCW95, the Australian VET sector and the shipowners/managers the deck officer system needs to have a clear philosophy of practical training delivery and assessment. The AMC may wish to consider rewriting the Dip. Shipmaster in CBT terms, with the emphasis on an increase of on-the-job training and assessments, and practical simulator training and assessment, whilst retaining the important underpinning knowledge requirements within the course.

AT-SEA DELIVERY METHODS

The course may need to provide the opportunity for the senior officers to be involved in the official training and assessment of the deck officer students. This would require the AMC to accept and recognise the assessment of a student from a person in industry. In order for the assessment to be consistent, valid and fair, the senior officers will need to be trained as assessors. The training of the senior officers could be undertaken at the AMC during the 12 month Dip. Shipmaster institution-based education and training. This would be a major change in direction for the traditional issue of Certificates of Competency and would require the full cooperation, and agreement, of the AMSA.

The use of distance education could be used to deliver some underpinning knowledge requirements at sea. However, the distance education package would most likely be for the Second Mate students only, as the deck officers may be too busy with duties to undertake distance education. The use of videos could also be investigated as an effective educational medium.

AT AMC DELIVERY METHODS

The use of a more vocationally orientated deck officer system has some implications of change for the college. The physical resources of the AMC are excellent, and can satisfy the requirements of the CBT system and the shipping companies. In the critical areas of a vessel's operation, students are assessed through proof of competence using the AMC's simulators. However, the demands of a fully CBT deck officer system may require AMC's staff to be trained in the development, delivery, assessment and administration of a CBT system.

SUMMARY

In order to encourage contracts with Asia Pacific shipowners/managers the AMC may need to be able to prove the financial benefit of a training contract. The basis of this proof could be the alleviation of a shipping company's concern of port State control detaining a vessel due to incompetent officers, which costs money, and the non-compliance to QA due to poorly trained officers, which may affect insurance. The AMC could alleviate this concern by the provision of a company approved education and training system that ensures deck officers meet the requirements of port State control and comply to the company's QA. Such a system may need to have the following elements:

- QA to recognised international standards;
- the Diploma of Applied Science (Shipmaster) course structure;
- competency based curriculum which concentrates on the training and assessment of practical skills as well as underpinning knowledge;
- official assessment of deck officer students by on-board senior officers;
- extensive use of simulators in the training and assessment of students;
- distance education option for the Second Mate students.

This package implies that the AMC may wish to consider undertaking the following developments:

- obtain Quality Assurance to an international standard as a matter of urgency;
- develop a CBT curriculum that takes into account the requirements of STCW95 and the Australian VET sector;
- implement CBT training for the AMC staff;
- develop a senior officer train-the-trainer and assessor course;
- develop an on-board deck officer assessment system which ensures all assessments are carried out validly, fairly and consistently to the satisfaction of the AMC and the AMSA;

- investigate the development of distance education learning packages for Second Mate students;
- develop constructive relationships with shipping companies and shipowner organisations in the Asia Pacific region.

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APPENDIX A
COVERING LETTER AND QUESTIONNAIRE



Australian Maritime College

Australia's National Maritime Education, Training & Research Centre

CEO/Principal R F Short, Extra Master, MPP, DPA, FCIT

Reference:

Dear Sir

As Australia's national centre for maritime education, training and research, the college is a significant provider of these services to the Australian and international shipping community.

Many shipowners\managers have expressed increased concern about the competence and training of some of the **deck officers** operating their ships. Such concerns are underscored by recent developments in the regulation of shipping; for example; quality assurance, the International Safety Management Code, Classification Society demands, Port and Flag State control and the amended International Convention on Standards of Training, Certification and Watchkeeping for Seafarers.

The Australian Maritime College can improve the safety, efficiency and economy of ship operations by providing **deck officer** education and training which better meets the needs of shipowners\managers. To help the college determine the most appropriate methods of **deck officer** education and training, we would be very grateful if you would kindly complete and return the attached questionnaire by the end of October 1995.

We appreciate the time and effort we are asking of you in completing this questionnaire and we thank you in advance for responding to our request.

Yours Sincerely

R F Short
CEO/Principal

Australian Maritime College

Australia's National Maritime Education, Training & Research Centre

Merchant Navy Deck Officer Certification, Education & Training Shipowners \ Managers Survey Asia Pacific Region



SECTION A: YOUR COMPANY

1. Company trading name: (optional) _____

2. Please indicate your type of company: *Please circle a box*

Shipowner

Ship manager

Shipowner \ manager

Other

3. Registration of office: _____

4. For ship managers, the number of shipowners that use your services: _____

5. Does your company have difficulty obtaining well trained competent junior deck officers to operate your vessels?

Please circle

Yes

No

6. Does your company have difficulty obtaining well trained competent senior deck officers to operate your vessels?

Please circle

Yes

No

7. Does your company have an education and training agreement with a maritime education and training institution?

Please circle

Yes

No

If yes, what type? _____

8. Does your company wish to have an education and training agreement with a maritime education and training institution?

Please circle

Yes

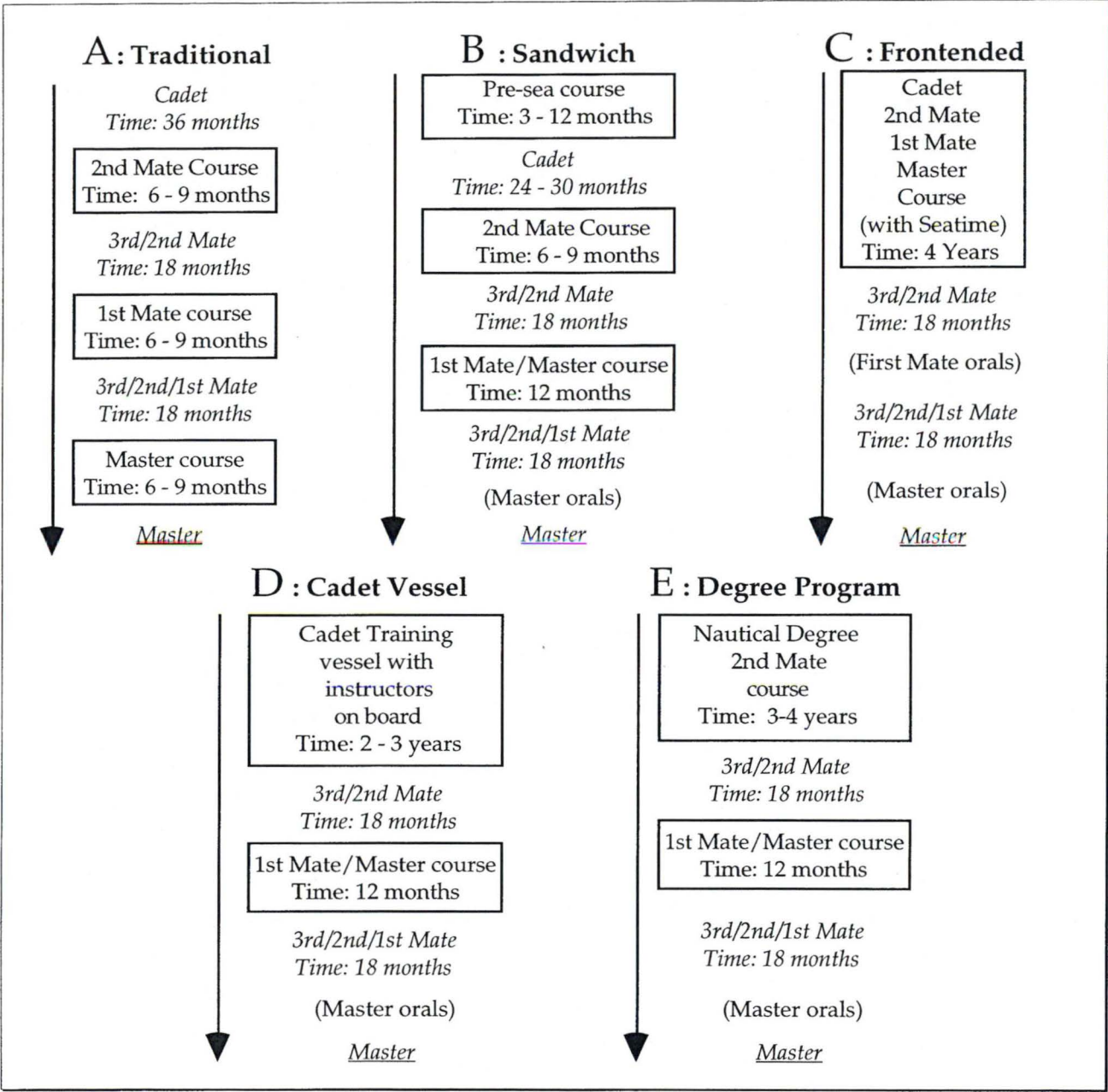
No

If yes, what type? _____



SECTION B: DECK OFFICER EDUCATION, TRAINING & CERTIFICATION DATA

9. A deck officer must obtain the Certificates of Competence to operate your vessels. Below is a list of the most commonly used models of certification from cadet to Master:



9.1 Which model best describes your company's present training method? Please circle

A

B

C

D

E

9.2 In your opinion, looking at your company's present situation, which model do you expect your company to follow? Please circle

in 5 years?

A

B

C

D

E

in 10 years?

A

B

C

D

E



in 5 years?	A	B	C	D	E
in 10 years?	A	B	C	D	E

Best $\xrightarrow{\hspace{1.5cm}}$ Worst

Please tick a box

[illegible]



10. For the delivery of deck officer education and training certification programs a number of strategies can be employed. Please indicate your agreement or disagreement with the following strategies for the first deck watchkeeping (2nd Mate) certificate of competence :

Please tick a box

Strongly Agree Agreement Some Disagreement Strongly Disagree

At Sea				
• Training undertaken as a cadet				
• Training undertaken as a able seaman / rating				
• Practical training delivered by officers on board trading vessel				
• Company cadet training vessel				
• Training officer on board trading vessel delivering lectures and training				
• Distance education by computer based tuition				
• Distance education by correspondence course				
• Distance education by satellite communication				
• Education and training videos				
• Lectures delivered by senior officers on board trading vessel				
• Senior officers should officially assess the cadet / trainee				
At Maritime College				
• Training on maritime college training vessel				
• Training on Radar / bridge simulator				
• Training on Communications simulator				
• Training on Ship handling simulator				
• Training on Cargo simulators				
• Computer based tuition - multi media				
• Practical tutorials				
• Role play				
• Lectures				
• Self study				
General				
• All education, training and exams for 2 nd Mate should be done on board trading vessel				
• All education, training and exams should be done on board company training vessel.				
• All education, training and exams should be done at a maritime college.				
• Training by senior officers on board and college based education and assessment				
• Distance education at sea and college based assessment				
• Distance education at sea and at sea based assessment				



Strongly Agree Agreement Some Disagreement Strongly Disagree

General Continued				
• A 2 nd Mate should have on-the-job training after obtaining the certificate				
• A 2 nd Mate will be required to do the 2 nd Mates work with no training after obtaining a certificate				
• Certification should be based on the assessment of practical skills				
• Certification should be based on passing a college course				

10.1 For the delivery of senior officer education and training do you believe the above strategies are acceptable. If not how would they be different? _____

11. Distance education is a structured and college monitored method of delivering education and training which can be use for cadets and officers on board merchant vessels.

11.1 In your opinion is distance education on board your vessels acceptable for seafarers to obtain the Certificates of Competency.

Please circle

Yes

No

If YES please comment on the type of distance education which you believe would be acceptable to your company. If NO please comment on the reasons why you believe distance education is unacceptable for your company. _____



12. The education and training of deck officers is influenced by many factors. Please indicate how much influence you think the following factors have on the certification, education and training of your deck officers:

Please tick a box

12.1 Operational Influences	Strong Influence	Some Influence	Little Influence	No Influence
1 Shipowner requirements				
2 Ship manager requirements				
3 Ship charterer requirements				
4 Cost of education and training				
5 Business reputation of company				
6 Insurance company demands				
7 Environmental concerns				
8 Cost effectiveness of the operation of vessels				

12.2 Vessel	Strong Influence	Some Influence	Little Influence	No Influence
9 Type of vessel the officers will sail				
10 Tonnage of vessel				
11 Type of cargo vessels carry				
12 Flag of registration				
13 High technology of vessels				
14 Low technology of vessels				
15 Number of officers on board				
16 Age of vessel which officer will serve				
17 Countries to which a vessel trades				
18 Trading pattern of vessel				

12.3 Seafarer	Strong Influence	Some Influence	Little Influence	No Influence
19 Seafarer union requirements				
20 Seafarer demands				
21 Academic qualification of officers (not ticket)				
22 The time taken at a college to obtain a certificate of competence				
23 Lack of guarantee that officers will remain with company after training				
24 Lack of available officers				
25 Nationality of officer				



12.4 Regulations	Strong Influence	Some Influence	Little Influence	No Influence
26 Shipowner organisation (ie ISF) policies				
27 Classification society requirements				
28 International Maritime Organisation regulations				
29 Licensing authority requirements				
30 Nationality of Certificate of Competence				
31 International Safety Management Code				
32 STCW Convention				
33 Owner's quality assurance				
34 Manager's quality assurance				
35 Charterer's quality assurance				

12.5 Other	Strong Influence	Some Influence	Little Influence	No Influence
36				
37				
38				
39				

12.6 Of the factors you felt give a strong influence, please rank them in order of most influence: *Please indicate number in boxes*

Greatest influence Smaller influence

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

127 Does your company financially support the education and training of your officers.

Please circle Yes No

If yes, what kind of support? Please tick

Course fees	<input type="checkbox"/>
Paid leave	<input type="checkbox"/>
Study allowance	<input type="checkbox"/>
Travel	<input type="checkbox"/>
Books & study materials	<input type="checkbox"/>
All of the above	<input type="checkbox"/>
Other _____	<input type="checkbox"/>
Other _____	<input type="checkbox"/>



On behalf of the Australian Maritime College:
Thank you for your time and assistance
it has been greatly appreciated.

*Please put the completed questionnaire in the enclosed envelope and return it
to:*

Neil Stanesby
Course Coordinator (2nd Mates)
Australian Maritime College
PO Box 986
Launceston, 7250
Tasmania, Australia

*Telephone 61 03 354823
Facsimile 61 03 354720*



APPENDIX B

QUESTIONNAIRE RESPONSES

Item 5: Difficulty obtaining junior officers.

Country	Yes	No
Australia	1	
Hong Kong	1	3
Japan		1
N. Zealand		3
Philippines	2	
Singapore	2	1

Item 6: Difficulty obtaining senior officers.

Country	Yes	No
Australia	1	
Hong Kong	3	1
Japan		1
N. Zealand		3
Philippines	2	
Singapore	2	1

Item 7: Agreement with a maritime institution.

Country	Yes	No
Australia		1
Hong Kong	1	3
Japan		1
N. Zealand		3
Philippines	2	
Singapore		3

Comments: Type.

- Norwegian training centre and other government accredited training schools (Philippines).
- In house training school (Philippines)
- Sponsorship scheme (Hong Kong)

Item 8: Desire a training agreement with institution.

Country	Yes	No
Australia	1	
Hong Kong	1	3
Japan		1
N. Zealand		3
Philippines	2	
Singapore	1	2

Comments: Type of agreement

- We already have, but our options are still open in anticipation to learning variations and fast moving technology trend (Philippines)
- Safety Management and basic principles (Philippines)
- General management training fro seagoing staff and effective delivery of offshore training (Australia)
- Up grade of competent officers (Singapore)
- Skill up grade courses for senior officers (Hong Kong)

Item 9.1: Present training model.

Country	A	B	C	D	E
Australia					
Hong Kong	3	1			
Japan	1				
N. Zealand	3				
Philippines	1	1			
Singapore		2			1

Item 9.2: excepted model.

Five years						Ten years				
Country	A	B	C	D	E	A	B	C	D	E
Australia										
Hong Kong		4					3			1
Japan	1					1				
N. Zealand	1	1				1	1			
Philippines	1		1				1			
Singapore		2					2			

Item 9.3: Desired model.

Country	Five years					Ten years				
	A	B	C	D	E	A	B	C	D	E
Australia										
Hong Kong		4					3			1
Japan	1					1				
N. Zealand	1	1				1	1			
Philippines		2					1			
Singapore		1	1	1			1	1		1

Item 9.4: Comment on why expected and desired model differ.

No comments

Item 9.5 Ranking of certification models.

Group	n	Model				
		A	B	C	D	E
Best 1	13	4	6	2	1	0
2	12	5	4	0	2	1
3	12	2	1	2	5	2
4	12	0	1	4	2	5
Worst 5	12	1	0	5	2	4

Comments on the reason for the best selection:

- A: The model allows for ratings to progress to deck officer/master (New Zealand).
- A: Lack of practical hands on training and experience.
- B: Hands on experience on board preceded by basic training is the best way to build up officers (Hong Kong).
- B: As we expect to be recruiting under the single point entry system the use of the presea training course would be beneficial (New Zealand).
- B: They can study how sea life is, that's mean we can get real seafarers (Singapore).
- B: By experience Model B is found to be most suited to our operations as during cadetship the cadet has an extended opportunity to get ingrained with company's operating policies and quality assurance system. It also adds to a feeling of belonging when a cadet starts his career with the company and gradually progresses in the ranks (Hong Kong).
- C: Potential candidate for employment would have proved they have necessary academic ability to proceed through to master (New Zealand).
- C: Less disruptive sailing time (Singapore).
- D: In learning, time element is a very important factor. Learning foundation is also vital, and time has something to do with this. A ladder with a wider foundation base is more stable to stand and hold load atop (Philippines).

Item 9.6 Percentage of cost contribute to cost of Second Mate course.

Hong Kong

Group n=4	100	90	80	70	60	50	40	30	20	10	0
Seafarer	2		1	1							
Shipowner									1		3
Ship manager									1	1	2
Government											4
Maritime safety authority											4
Seafarers union											4

New Zealand

Group n=3	100	90	80	70	60	50	40	30	20	10	0
Seafarer	1								1		1
Shipowner									1		2
Ship manager	1							1			1
Government									1		2
Maritime safety authority										1	2
Seafarers union											3

Japan

Group n=1	100	90	80	70	60	50	40	30	20	10	0
Seafarer											1
Shipowner						1					
Ship manager											1
Government						1					
Maritime safety authority											1
Seafarers union											1

Philippines

Group n=2	100	90	80	70	60	50	40	30	20	10	0
Seafarer										1	1
Shipowner					1			1			
Ship manager							1			1	
Government									1		1
Maritime safety authority										1	1
Seafarers union									1		1

Singapore

Group n=3	100	90	80	70	60	50	40	30	20	10	0
Seafarer						2				1	
Shipowner									2	1	
Ship manager										1	2
Government									1	2	
Maritime safety authority										1	2
Seafarers union						1			1	1	

Comment: If percentage cost for senior officers would be the same.

- Not necessarily depending on employee Company could consider meeting greater or lesser % of costs (New Zealand).
- No Senior officers could afford more and government less shipowner/manager remain the same or slightly higher (New Zealand).
- Yes (Philippines).
- No Shipowner should account for 40%, government 10% (Philippines).
- Yes (Singapore)
- Same as above (Singapore)
- Certification costs should be responsibility of seafarer employer is responsible for further skill up grading (Hong Kong).

Item 10: Delivery of deck officer education and training programs.

At Sea	Strongly Agree	Some Agree	Some Disagree	Strongly Disagree
Training as a cadet	10	3	0	1
Training as a able seaman / rating	3	4	5	2
Practical training delivered by officers on board trading vessel	9	5	0	0
Company cadet training vessel	1	8	3	2
Training officer on board trading vessel delivering lectures and training	1	5	7	1
Distance education by computer based tuition	0	9	5	0
Distance education by correspondence course	2	8	1	3
Distance education by satellite communication	0	5	4	5
Education and training videos	3	9	0	0
Lectures delivered by senior officers on board vessel	2	10	1	1
Senior officers should officially assess the cadet / trainee	10	2	1	0

At Maritime College	Strongly Agree	Some Agree	Some Disagree	Strongly Disagree
Training on maritime college training vessel	5	8	1	0
Training on Radar / bridge simulator	12	2	0	0
Training on Communications simulator	11	3	0	0
Training on Ship handling simulator	10	3	1	0
Training on Cargo simulators	10	4	0	0
Computer based tuition - multi media	6	5	2	0
Practical tutorials	10	4	0	0
Role play	5	7	1	1
Lectures	6	8	0	0
Self Study	5	6	1	2

General	Strongly Agree	Some Agree	Some Disagree	Strongly Disagree
All education, training and exams for 2nd Mate should be done on board trading vessel	2	5	4	3
All education, training and exams should be done on board company training vessel.	1	2	6	5
All education, training and exams should be done at a maritime college.	3	5	3	3
Training by senior officers on board and college based education and assessment	5	9	0	0
Distance education at sea and college based assessment	2	10	1	1
Distance education at sea and at sea based assessment	2	6	3	2
A 2nd Mate should have on-the-job training after obtaining the certificate	9	1	1	3
A 2nd Mate will be required to do the 2nd Mates work with no training after obtaining a certificate	1	4	3	6
Certification should be based on the assessment of practical skills	6	5	1	2
Certification should be based on passing a college course	3	5	4	2

Item 10.1: Are above strategies acceptable senior officers.

three responded with yes, the others no comment

Item 11.1: Is distance education acceptable on board ship for certificates of competency.

Yes	No
7	5

Comments:

Yes: Sandwich distance learning where a student spends a certain period on the ship with a few weeks in college (not more than 3 weeks).

Yes: Distance education at sea and college based assessment.

Yes: Correspondence courses, training task books, training videos.

Yes: Distance education is acceptable but it must be in conjunction with college training.

No: Only distance education is not enough

No: Vessels in the Offshore industry are vastly different in design, operation than more conventional vessels. On board theory training is acceptable however for the more practical aspects of more conventional shipping actual hands on training cannot be replaced. This should also be kept in mind when conventional training has been undertaken and the officers transfer to an Offshore Industry vessel.

No: The working hours and stress on board give no time for seafarers to study on board.

No: Tasman Express vessels are trading only trans Tasman with a large number of port of call therefore an uninterrupted routine is not possible. Time on board for employees is 6 weeks with 6 weeks leave, which allows for adequate study time whilst on leave.

Item 12.1 -5: Influence on Second Mates certificate of competence.

OPERATIONAL INFLUENCES	Strong Influence	Some Influence	Little Influence	No Influence
Shipowner requirements	6	7	0	1
Ship manager requirements	7	5	2	0
Ship charterer requirements	4	7	3	0
Cost of education and training	6	7	1	0
Business reputation of company	4	9	1	0
Insurance company demands	2	10	2	0
Environmental concerns	7	5	2	0
Cost effectiveness of the operation of vessels	6	7	1	0
VESSEL	Strong Influence	Some Influence	Little Influence	No Influence
Type of vessel the officers will sail	6	7	1	0
Tonnage of vessel	1	10	2	1
Type of cargo vessels carry	4	8	2	0
Flag of registration	2	5	6	1
High technology of vessels	6	7	1	0
Low technology of vessels	3	7	4	0
Number of officers on board	3	11	0	0
Age of vessel which officer will serve	1	9	4	0
Countries to which a vessel trades	1	11	1	1
Trading pattern of vessel	3	8	1	2

SEAFARER	Strong Influence	Some Influence	Little Influence	No Influence
Seafarer union requirements	4	2	7	1
Seafarer demands	2	7	5	0
Academic qualification of officers (not ticket)	2	9	2	1
The time taken at a college to obtain a certificate	4	7	2	1
Lack of control of officers remaining with company	3	7	4	0
Lack of available officers	4	4	6	0
Nationality of officer	1	8	5	0
REGULATIONS	Strong Influence	Some Influence	Little Influence	No Influence
Shipowner organisation (ie ISF) policies	4	5	4	0
Classification society requirements	3	8	3	0
International Maritime Organisation regulations	11	3	0	0
Licensing authority requirements	11	3	0	0
Nationality of Certificate of Competence	8	4	2	0
International Safety Management Code	6	6	1	0
STCW Convention	10	3	0	0
Owner's quality assurance	7	4	1	0
Manager's quality assurance	7	5	1	0
Charterer's quality assurance	5	6	3	0

Item 12.7: Financial support for education and training.

Course Fees	12
Paid leave	11
Study allowance	6
Travel	4
Books & study materials	3

APENDIX C

AMC FACILITIES

MARINE SIMULATION CENTRE

Ship-Handling Simulator

This is one of the most advanced commercial simulators in the world. In addition to its use for training, it is extensively used for project work associated with port development and pilotage. Manufactured by Krupp Atlas Elektronik GMBH of Bremen, West Germany, its main components include a 7.5m/5.2m steel wheelhouse with the full-scale instrumentation and related hardware required to navigate and manoeuvre a simulated ship plus computer systems and software to drive the simulator and collect data

Ship Operations (Radar) Simulator

This is a new simulator which is scheduled to commence operations at the start of Semester 1, 1997. It is a unique facility in terms of its design and the scope of training which it provides, placing AMC well to the forefront on marine simulation training. The simulator consists of six 'own ship' cubicles, all with 120° 'out of the window' visual systems. Each ship will be fully equipped with all modern navigation and communication aids including ARPA, ECDIS, GPS/DGPS and GMDSS. Each ship is reconfigurable in layout in order to match equipment layouts on real ship's bridges in either stand-up or seated, 'cockpit', mode. One cubicle has an extra radar and can be configured to operate as a VTS centre receiving radar coverage from up to four remote locations.

Diesel Engine Simulator

The simulated plant has been modelled on a Bulk Carrier of some 120,000 tonne dwt having a length of 230m, a breadth of 45.8m and a loaded draught of 13.7m. The normal service speed is about 16.8 knots and the vessel is considered to be classified as UMS with Lloyds. The simulated Control Room is fitted with a full size console and electrical control panel which allows trainees to operate the plant and to respond to fault conditions in a realistic environment. The simulated Engine Room is fitted with a large

'Mimic Panel' which shows an outline of the plant and displays the status of valves, pumps, controllers etc, and indicates the measured values of the important process variable.

EMERGENCY RESPONSE CENTRE

Survival Training

Situated on the Newnham Campus the survival centre incorporates a covered heated pool, used for the conduct of training exercise. A 'mock-up' ship's superstructure complete with liferaft launching facilities and other life saving appliances is located within the Centre. A classroom equipped with liferafts and lifesaving appliance typical of those currently in use at sea, is situated within the Centre.

Marine Firefighting Training

This facility is located on a 2.4 hectare site at Bell Bay, 45 kms from the College and is operated in co-operation with the port and local industry. The centre is equipped with a full range of modern marine firefighting equipment and specialises in practical, hands-on training. Such training includes the fighting of liquid and gas fires and the fighting of fires in a 'mock-up' ship structure using self-contained breathing apparatus.

Damage Control (Flood) Training

A Damage Control Training Unit comprising three floodable compartments was opened in December 1995. This unit is located on the training vessel Stephen Brown and is used to provide damage control training for Civil and Department of Defence Pacific Patrol Boat personnel.

TRAINING VESSELS

Wyuna

The *Wyuna* is a 64m navigation and seamanship training vessel, based at the Beauty Point campus, that can accommodate 40 students. The vessel has a large training bridge and chartroom for the practice of navigation skills. The *Wyuna* is an excellent training aid on which students work hard and learn fast, and learn excellent professional skills.

Stephen Brown

The *Stephen Brown* is a permanently moored former cargo vessel which has been converted into a training platform for deck and engine room repairs.

Bluefin

The *Bluefin* is a 34.5m fisheries training vessel. She normally accommodates up to 20 students on training voyages varying in length from two days to two weeks. The vessel engages on stern trawling, both bottom and mid water, purse seining and prawn trawling.

Reviresco

The *Reviresco* is a 14m steel hull, ex-Queensland prawn trawler. She is used for training students in prawn trawling techniques and for research and development, particularly in the field of gear technology.

(AMC HandBook1997, pp. 120-125)