

THE SHANGHAI MASS CONNECTION

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Abstract. There is a growing demand for trained maritime personnel both in the seafaring and shore-side sectors. Historically, we have seen a trend of sea-farers transitioning into shore-based opportunities. However as the jobs become more demanding with regard to proficiency in business and management strategies, information technology and security related issues, a new breed of maritime professionals is emerging in the global arena. Shore-based maritime professionals are required to master the intricacies of marine insurance, maritime finance, inter-modal logistics, chartering and brokerage, be proficient in the latest software tools and engage in safe and environmentally friendly practices in a multicultural and diverse environment. Although the seafaring side of the shipping industry embraces globalization, the shore side maritime professionals are generally recruited from the host nation with little cross pollination. While it is quite common to have a Filipino officer on a Greek owned ship registered in Liberia, chartered by a Chinese company carrying cargo from India to Japan, the shore based professionals running the Greek company will typically be Greek nationals. The paper calls for greater cooperation among maritime academies that bring new opportunities. Specific initiatives undertaken by Massachusetts Maritime Academy in this context are discussed in detail.

1. INTRODUCTION

A shore based maritime professional sounds like an oxymoron but dramatic technological and regulatory developments in the maritime sector have created a growing demand for adequately trained maritime personnel in the shore-side segment of the maritime sector. Historically, there has been a trend of sea-farers who transitioned into shore-based opportunities after spending some years at sea. However, in the past decade, the shore-side jobs have become more demanding and there is an emerging need for a new breed of professionals with specific skill sets. These individuals are required to master the intricacies of finance, logistics, chartering and brokerage, marine insurance, be proficient in the latest IT tools and promote safe and environmentally friendly work practices in a multicultural and diverse environment. In the various maritime academies, the traditional emphasis has been on the training, education and retention of the seagoing students in the marine transportation and marine engineering programs. It is relatively recently that traditional maritime schools are introducing programs like International Maritime Business that pay attention to the shore side human resource needs of the shipping industry.

Although the seafaring side of the shipping industry embraces globalization, the shore side maritime professionals are generally recruited from the host nation with little cross pollination. While it is quite common to have a Filipino officer on a Greek owned ship registered in Liberia, chartered by a Chinese company carrying cargo from India to Japan, the shore based professionals running the Greek company will typically be Greek nationals. Technological innovations have made the world a much smaller place and the maritime sector particularly, has always been at the forefront of multinational initiatives. It is important that students of a maritime academy, who face the world as a workplace upon graduation, have some exposure of globalization during their training and education. IAMU, with its wide array of member scattered around the world can be a key catalyst in initiating a cross-pollination of training among its member institutions both on the sea faring and shore based segments.

Moreover, the current economic downturn, drop in trade volumes and security threats at sea have further changed the environment of the maritime sector. There is an urgent need felt by all stakeholders to comprehend the altered scenario and its implications as we train and educate the maritime professionals of tomorrow. This requires a concerted, joint effort by maritime academies worldwide as the impacts reverberate at different intensities around the world. The paper outlines the current labor market trends and also discusses some specific initiatives undertaken by Massachusetts Maritime Academy to add value to the maritime workforce.

Section 2 discusses the prevailing conditions in the shipping markets ranging from economic volatility to regulatory pressures stemming from safety, security and environmental concerns in a global arena. The impact on the maritime labor market is then outlined.

Section 3 focuses on the role of shore-based programs like International Maritime Business at MMA in meeting the labor demands and identifies some specific initiatives undertaken by Massachusetts Maritime Academy.

Section 4 provides conclusions.

2. CURRENT CONDITIONS IN THE MARITIME LABOR MARKET: GLOBALIZATION AND THE MARITIME LABOR MARKET

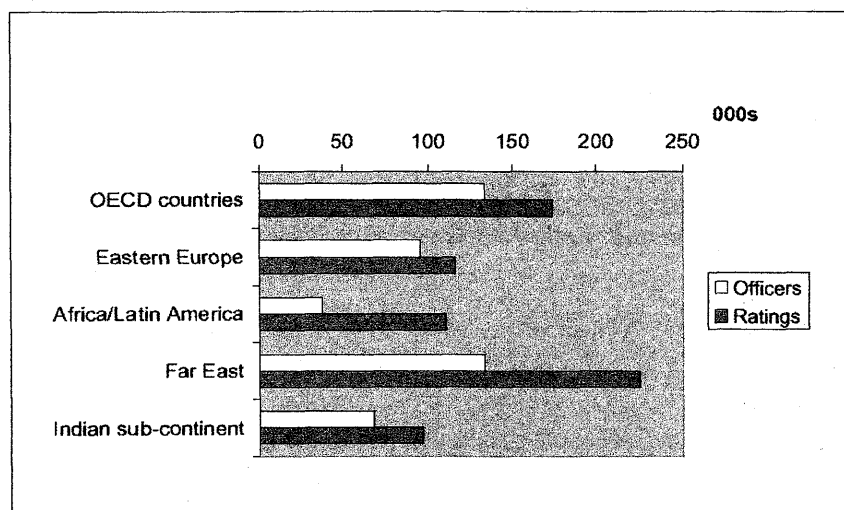
The maritime sector is emblematic of the world economy, moving 90 % of the world's trade. Maritime transportation is one of the most globalized industries and its components such as vessels, personnel, flag registration, class inspections, insurance coverage etc. are purchased globally. Never has a clear understanding of the global economy and markets been more relevant to the shipping industry as it is now. While shipping has benefited more than almost any other sector in recent years from globalization, this has also made it more vulnerable to the global economic crisis. Freight and charter rates have plunged, jobs at shipping companies are being slashed and many ships are being parked for months at a time causing significant concern. Shipyards are facing cancellations and are caught in a financial turmoil. Bankers already badly wounded by excessive lending in real estate and involvement in toxic financial products are likely to suffer more through their shipping portfolios and are being extra cautious about lending. The higher cost of financing and insurance in a credit starved market is being experienced worldwide.

In spite of the global slowdown, it is expected that China will continue to be the main driver while S. Korea and Japan will take longer to restart on their growth paths. It is expected that China will recover faster from the recession than the US because of its sound financial and debt situation. However, even before the current recession, the dominating growth path of Asian economies in the maritime sector was clearly evident. The Asia-Pacific region is home to 11 of the world's top 20 container shipping operators, half of the world's 24 busiest container ports are in Asia, and more than one third of world trade either originates in or is destined for this region.

Asia accounts for 39 % of the global maritime market and is forecast to grow at a CAGR (Compound Annual Growth Rate) of 7 % between 2006 and 2010 according to the Hong Kong Shippers Council. Growth for port operations and services is expected to be widespread in the Asia Pacific region. The region accounts for 42 % of the global value market of port operations and is expected to grow its share to 44 % or US\$54 billion by 2010 (CAGR of 6 %). The main areas of growth in ports and terminals are expected in China, India and Korea. By 2011, Asia is expected to handle 206 million TEUs, including 64 million TEUs in transshipment. As an example of this trend, it might be interesting to look at China's shopping spree of ports around the world in strategic locations that is aimed at gaining control of international shipping routes and at the same time, having direct access to raw materials. Various ports are now controlled by private Chinese enterprise. These include the Buenos Aires Container Terminal in Argentina, the Panama Ports Company, operator of the Cristobal

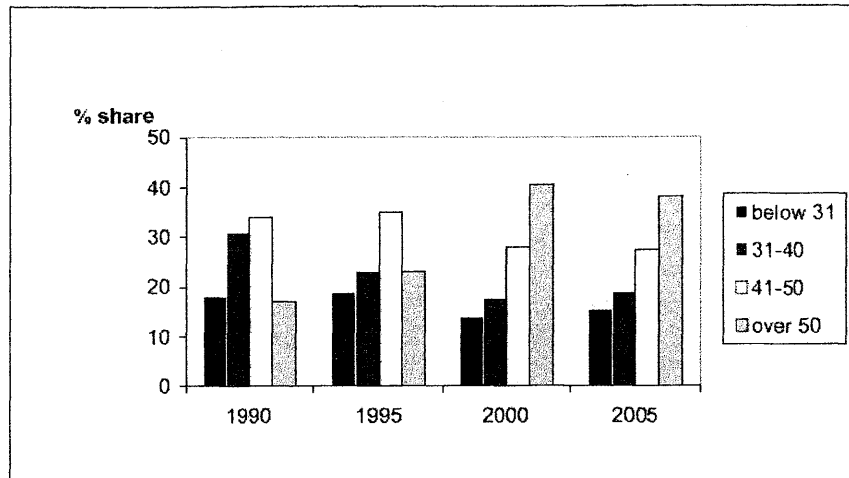
and Balboa ports at each end of the Panama Canal; the Ensenada International Terminal at the international port of Manzanillo on Mexico's Pacific coast; a large operation in Veracruz, on Mexico's Atlantic coast and two ports in the Bahamas. This trend creates a need for maritime professionals to be conversant with topics like international business cycles, maritime finance, port terminal operations and management that requires specialized training.

The impact of globalization and the emergence of Asian economies in the maritime labor field have been significant. The complexity of seafaring labor supply revolves around a variety of factors like age, marital status, family and domestic commitments, safety and security of life at sea, tax laws and alternative employment opportunities. The seafaring laborer is a truly international entity represented by various nationalities, employed on board vessels under different flags, owned and operated by citizens of many different countries. Seafarers are considered to be unique migrants as they are able to participate in a nation's seafaring labor force without actually shifting residence. However, there are significant disparities in salary and tax benefits depending on the nationality of the individual. It is not uncommon to see an Indian seafaring officer in a Norwegian vessel enjoying significant salary and tax benefits which may not be available to someone from a different part of the world. The BIMCO/ISF Manpower Update of 2005 indicates that the worldwide supply of seafarers in 2005 is estimated to be 466,000 officers indicating a shortfall compared to the demand of 476,000 officers. There is excess supply in the market for ratings where there is a supply of 721,000 ratings while demand is for 586,000. The OECD countries (North America, Western Europe, Japan etc.) remain an important source of officers, although Eastern Europe has become increasingly significant. The Far East and South East Asia, particularly the Indian sub-continent continue to be the largest sources of supply of ratings and are rapidly becoming a key source of officers (Fig. S.1). The report indicates that China has seen a significant increase in maritime labor supply, although most of the additional workforce is currently used by the Chinese-owned fleet to meet expanding domestic requirements and some Chinese crew still experience English language difficulties. It indicates that the world fleet continues to rely heavily on officers from Europe, North America, Japan and other OECD countries. However, over 25 % of these are over 50 years old, and well over 50 % are over 40 (Fig. S.2). Most are in senior positions such as Masters or Chief Engineers and the impact of their retirement could be severe. The report emphasizes the need to progress Asian seafarers who represent a much younger demography (Fig. S.3) to senior positions where fewer than 8 % of officers from the Far East are over 50. Hence, we see that there are some areas of concern in the seagoing segment of the labor market.



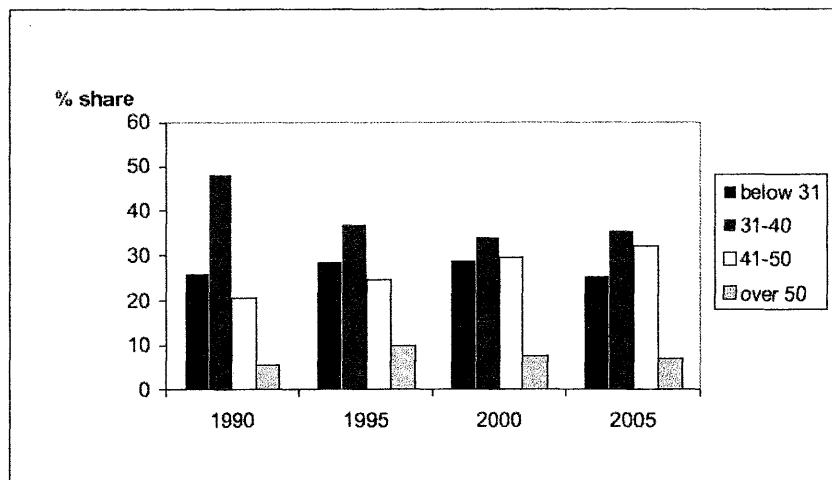
Source: BIMCO/ISF estimates.

Fig. S.1. Supply by Area of Domicile 2005 (catering and hotel staff excluded)



Source: BIMCO/ISF estimates from Company Surveys.

Fig. S.2. Age Structure for OECD Officers



Source: BIMCO/ISF estimates from Company Surveys.

Fig. S.3. Age Structure for Far East Officers

The report also points out that, new regulatory requirements, such as the ISPS Code, together with commercial demands, have increased the workload on board. This has resulted in significant stress and fatigue due to additional time demands for existing officers that need to be addressed.

In order to keep up with the changing times, the shore side maritime professional is now being recruited with a well defined skill set required to tackle the current challenges of the industry. Concerned about the effective implementation of various regulations imposed on the maritime sector, more and more ship owners are turning to professional ship managers for assistance. Putting ships out to third-party managers such as Acomarit, Wallem, V Ships, Denholm, Barber, Columbia and the Schulte Group not only enables owners to acquire compliance, but also gives them the benefits of economies of scale. Acomarit joined forces with World-Wide and Teekay Shipping to form Marine Contracting Association with 250-plus ships, while Wallem has turned to e-commerce for its marine supplies, using the internet to invite and receive bids from suppliers resulting in a 20 % saving.

As the regulatory framework of the shipping industry gets more complicated, this reliance on the professionally trained ship manager with a sophisticated quantitative and IT focus will continue to grow. The fragmented regulatory structure is discussed in greater detail in the next segment. Today, more than ever, we need a well rounded maritime professional who is conversant with all aspects of the shipping industry. This includes safety and environmental regulations, a clear understanding of finance, budgeting, shipping business and current software used in the industry for better management of vessels and compliance with regulatory bodies.

Fragmented regulatory environment

Significant complexity, created in part by differing interpretations and applications of new rules by flag and port states, invariably means extra costs to the maritime industry. Those who can minimize such costs through greater efficiency in operations stand to gain, and ship managers with such an advantage might find themselves benefit in the form of extra business from those who cannot effectively manage this trend.

When the ILO adopted the Maritime Labor Convention (MLC) on 23 February 2006, Director-General Juan Somavia called it a historic moment for the world's more than 1.2 million seafarers. Three years on, in line with the ILO's five-year Action Plan, this key global agreement has now been ratified by five major flag States and key ILO Members, representing nearly 45 per cent of the world's gross tonnage. Although the new ILO Convention emphasizes that "No longer will seafarers or ship owners face a bewildering array of national laws subject to differing international labor standards. Under its provisions, for the first time in history, there will be a truly global foundation available for the various national laws in the maritime labor sector," there continues to be room for confusion and bewilderment. MLC is designed to cover the minimum requirements for seafarers to work on a ship, conditions of employment, hours of work and rest, wages, leave, repatriation, accommodation, recreational facilities, food and catering, occupational safety and health protection, medical care, welfare and social security protection. In the action plan for 2006 – 2011, the specific strategic goals for 2009 and 2010 are as follows: 2009: development of the training materials for the flag State and port State control guidelines; at least 24 ratifications or coverage of at least 24 per cent of world gross tonnage.

2010: complete development of the ILO database to record country reports on flexibility determinations and to record problems and complaints arising in the context of port State inspections.

These objectives seem ambitious at best as we finish the first half of 2009 for the 1.2 million seafarers around the globe. According to ILO reports, the growing number of ship detentions in many ports worldwide had alarming consequences for the shipping industry. In the European Union alone, the number of detentions of ships for a wide range of issues including environmental, ship safety, security and labor standards, has risen for the second year in a row, from 944 in 2005 to 1,174 in 2006 and 1,250 in 2007. The criminalization of crew in many of these incidents has put an additional strain on the supply of maritime labor. The lack of harmony in port state control regulations is a cause of utmost concern. Additional security initiatives undertaken at national and regional levels are also adding to the complexity.

The US Department of Homeland Security (DHS) Strategic Plan for 2008 – 2013 outlines the following national maritime security goals. By FY 2013, 86 % of worldwide US destined containers will be processed through Container Security Initiative (CSI) ports. By FY 2013, 25 % reduction in the maritime terrorism risk over which US Coast Guard has influence. DHS calls for redoubling of efforts to develop technology that can detect radiation and work with the maritime transportation industry to deploy this technology to maximize security without causing economic disruption in its initiative to monitor our ports. However, the topic of maritime security goes beyond ensuring the the internal security of US ports and harbors and moves to the high seas where cargo and crew have become extremely vulnerable to piracy with no clear resolution in sight. The United Nations Convention on the Law of the Sea (UNCLOS) defines piracy as any illegal act of violence committed against a ship on the high seas. There

has been an alarming increase in pirate attacks in recent times and in April 2009, the world media was focussed on the attack on the Maersk Alabama that has really hit very close to home.

According to the annual report of the International Maritime Bureau Piracy Reporting Center, there were a worldwide total of 293 incidents of piracy against ships in 2008, which is up more than 11 % from 2007 when 263 incidents were reported. In 2008 – 2009 (until March), there have been 154 attacks in the Gulf of Aden and East coast of Somalia and 46 ships have been hijacked. The largest vessel seized by pirates was the VLCC Sirius Star that was taken 450 miles off the coast of Somalia. Now, more than ever, shipping companies are finding the critical need to have a vessel security plan and risk assessment strategy, hire a ship security team, perform security drills and ensure counter piracy measures to keep their crew and cargo safe.

Apart from maritime security issues, several instruments to reduce CO₂ emissions from ships are under consideration at IMO. These include Energy Efficiency Design Index, Ship Efficiency Management Plan, and the Energy Efficiency Operational Index. While these are very noble initiatives, the maritime business community wants assurance that the strategy to reduce carbon emissions to air must deliver the environmental goals while maintaining the sustainability of shipping interests. There has been noticeable improvement in the number of oil spills falling from an average of 25.2 spills in 1970 – 79 to 3.4 spills in 2000 – 2008, but a lot of work still needs to be done. The current recession in the market is a concern as people are more prone to cutting corners during such difficult economic times and are more likely to cause accidents. Fragmented and incompatible regulations at national and regional levels continue to prevail. The need for a unified, comprehensible set of standards understood and implemented worldwide and the ability to abide by them via training and education is proving to be a serious challenge for the maritime community.

The previous paragraphs provide some indication of the various layers of new regulations dealing with maritime safety, security and environmental concerns have led to increasing responsibilities and burdensome paperwork and administrative functions of senior officers on board vessels. These have caused stress and fatigue, pushing these officers to transition into shore based opportunities at earlier phases of their careers. This is becoming a worldwide phenomenon. Recent data (2007) from AMOSUP (Associated Marine Officers' and Seamen's Union of the Philippines) indicate that 20 – 25 percent of maritime seagoing professionals filing for retirement claims are less than 50 years old. This early transition and retirement among seafarers from the Far East will certainly accentuate the shortfall in the supply of seafaring officers. This critical issue therefore requires careful consideration.

Role of the shore-side maritime professional

We now turn our attention to the shore side segment of maritime labor. In order to explain the role of the shore side segment, the example of maritime clusters can be used. Internationally, the maritime sector has a history of evolution in geographical clusters on the shore side. These clusters have an emphasis on cross-industry linkages and complementarities and have been known to foster synergies that have boosted the development of the maritime community and created significant number of jobs on the shore side of the maritime industry. The following countries/regions in the world are some examples of competitive maritime clusters:

- Houston, USA: global oil and gas center with substantial maritime interests;
- UK: large maritime cluster with specialization in advanced maritime services;
- Norway: complete globally oriented cluster with focus on knowledge development;
- Singapore: open easy-to-access port sector cluster serving as a gateway to Asia;
- South Korea: world leader in ship-building, stimulated by an active industrial policy.

As the abovementioned list shows, clusters can become engines of value creation and innovation. For example, the Norwegian cluster is responsible for providing 40 % of marine insurance coverage to the

world's tonnage. The Norwegian government is heavily invested in providing adequate resources for innovation, education and research in order to become a leading maritime power in Europe. This has certainly had an impact on the Norwegian maritime industry and educational institutions where these shore based support services have gained prominence.

Learning from the success of maritime clusters, it makes complete sense to nurture such inter-connected synergy in the maritime education sphere. It is important that we recognize the various facets of shore based maritime labor that needs to cooperate with the seafaring side for the smooth functioning of the industry. Some of the key personnel on the shore side are maritime educators, business management professionals, brokers, freight forwarders, emergency management personnel, environmental protection personnel, surveyors, loss adjustors, ship builders and naval architects, parts and repairs providers, logistics providers in ports and inland transportation etc. This is by no means an exhaustive list but provides some understanding of the significant support system that needs to exist on the shore side for the safe and efficient operations of ships. The same notion was observed in a manpower study in Singapore that was jointly commissioned by the Maritime and Port Authority of Singapore (MPA) and the Ministry of Manpower (MOM)/Workforce Development Agency (WDA) in June 2003. The study showed that there were about 116,800 persons employed in the Singapore maritime industry. Of these, about 70 % were engaged in shore-based employment, while 30 % were sea-going personnel. The shipping management sector, ship chartering, ship agencies and ship-broking activities, was the largest employment sector, absorbing about 40 % of the maritime workforce (both shore-based and sea-going). The study projected that the maritime workforce will increase at an annual compound rate of up to 5,2 % for shore-based personnel and 1,9 % for sea-going personnel (onboard Singapore-registered vessels), reaching over 200,000 for the entire maritime industry in 2018. The sectors with the highest employment growth are shipbuilding and repair, freight forwarding, shipping management and cargo terminals.

Although these trends are quite significant, very often, when we have a discussion on maritime training and education, we focus only on the seafaring side. Our attention is also typically restricted to national boundaries and cross border training is neglected. Although shipping is a truly global business, much of the training takes place within national boundaries in a mono-cultural environment. The following initiatives undertaken by Massachusetts Maritime Academy focus on meeting the education needs of the shore based maritime professional in a truly international context.

3. MASSACHUSETTS MARITIME ACADEMY INITIATIVES

The newer majors

The existence of Massachusetts Maritime Academy as an educational institution began with an act of the State legislature, June 11, 1891, which created the Massachusetts Nautical Training School. The school has grown significantly from an entering class of forty cadets in April, 1893, to the largest State maritime academy in the US. In addition to the traditional sea going programs like Marine Transportation and Marine Engineering, since 1990, the Academy's programs have been expanded to include Facilities Engineering, Marine Safety and Environmental Protection, International Maritime Business and Emergency Management.

The International maritime Business major prepares graduates to enter the maritime shipping and transportation industry as a business professional. As shown in Fig S.4, the curriculum includes introductory courses in vessel familiarization, cognate courses in admiralty law and port terminal operations; and major specific courses in economics, finance, accounting, business of shipping, global logistics, chartering and brokerage, marine insurance, e-commerce, international business, negotiations and organization management. It also includes a capstone seminar in international maritime business during the senior year. There is significant emphasis on the use of quantitative tools and information technology, particularly proficiency in spreadsheet skills and understanding of latest software used in the

maritime sector in our courses. The practical component of the curriculum includes one freshman sea term and two internships. We have aggressively pursued international internships and were successful in placing interns in places like Tokyo, London, Antwerp and Guayaquil.

B.S. International Maritime Business

Semester 1				Semester 2			
HU-1111	English Composition	3	0 3	HU-1222	Analysis of Literature	3	0 3
SM-1111	Algebra and Trigonometry	3	0 3	SM-1212	Calculus I or		
SM-1131	Chemistry I	2.5	1 3	SM-1214	Applied Calculus	3	0 3
SM-1141	Computer Applications	0	2 1	GESM-5	Science/Math Group II	3	1 3.5
MT-1111	Vessel Fam and BST	3	2 4	SS-1211	Western Civilization	3	0 3
EN-1111	Intro Steam Engineering	2	1 2.5	BM-1212	Macroeconomics for Bus.	3	0 3
Total Credits			16.5	Total Credits			15.5
SI-0999	Sea term I		6				
Semester 3				Semester 4			
SM-2117	Quantitative Methods	3	0 3	IM-2221	Accounting II	3	0 3
IM-2121	Accounting I	3	0 3	IM-3133	Finance I	3	0 3
GESM-6	Science/Math Group III		3/3.5	HU-2242	Spanish II	3	0 3
SS-2131	Economics II Micro.	3	0 3	SM-2218	Statistics	3	0 3
HU-2141	Spanish I	3	0 3	SS-2232	World Econ Geography	3	0 3
Total Credits			15/15.5	IM-2211	Business of Shipping	3	0 3
Total Credits			18				
Semester 5				Semester 6			
SS-2121	American Government	3	0 3	MT-3252	Port Terminal Op Mgt	3	0 3
GEHU-3	Humanities Group I	3	0 3	IM-3231	Vessel Chartering	3	0 3
IM-3233	Finance II	3	0 3	HU-6072	Business Communications	3	0 3
IM-3111	Transportation Op Mgmt	3	0 3	SS-3221	Business Law	3	0 3
SS-3121	Admiralty Law	2	0 2	IM-1211	Organizational Mgmt	3	0 3
GESS-5	Social Science Group III	3	0 3	Total Credits			15
Total Credits			17				
IM-3011	IMBU Cooperative I		6				
Semester 7				Semester 8			
IM-3241	Principles of Marketing	3	0 3	IM-4211	Seminar: Negotiation	3	0 3
IM-4111	Marine Insurance	3	0 3	IM-4251	Comp App in E-Com	3	0 3
IM-4112	International Business	3	0 3	IM-4212	Seminar: Int Mar Bus	3	0 3
IM-4151	Global Bus Logistics	3	0 3	GEHU-4	Humanities Group I or II	3	0 3
	Free Elective 1	3	0 3		Free Elective 2	3	0 3
Total Credits			15	Total Credits			15
ST-2321	Sea Term Ind. Study or		6				
IM-4011	IMBU Cooperative II		6				

Fig. S.4. Curriculum of International Maritime Business

Our common freshman sea term gives students the opportunity to cycle through the offerings of various departments so that they get the whole picture of the maritime industry. During sea term, each student

takes classes in Marine Transportation, Marine Engineering, International Maritime Business, Marine Safety and Environmental Protection and Emergency Management. They also stand deck and engine watch and engage in shipboard maintenance. This training is critical for building the foundation for a well rounded maritime professional conversant with the various facets of the maritime industry and the end product is appreciated by the organizations that hire our graduates. The school also offers a minor (a six course selection) in International Maritime Business that is very popular among students pursuing sea going career paths.

It was not easy to break from tradition and popularize these newer shore based programs at a traditional maritime academy like ours. Even today, when a typical student applies for admission to a maritime academy, the typical choices are marine transportation or marine engineering. This mind set was quite evident when we conducted a survey on students in the International Maritime Business program in April 2009. When asked the question, when a typical student decides to pursue the International Maritime Business program, most students responded that they chose the program either at the end of the first semester, or the end of first sea term or even at the end of the first year of college. It was quite startling to find out that only one student in the senior class selected this program at the beginning of freshman year. This trend is slowly changing over the years as the program is gaining popularity. This is evidenced in the following line graphs in Fig S.5.

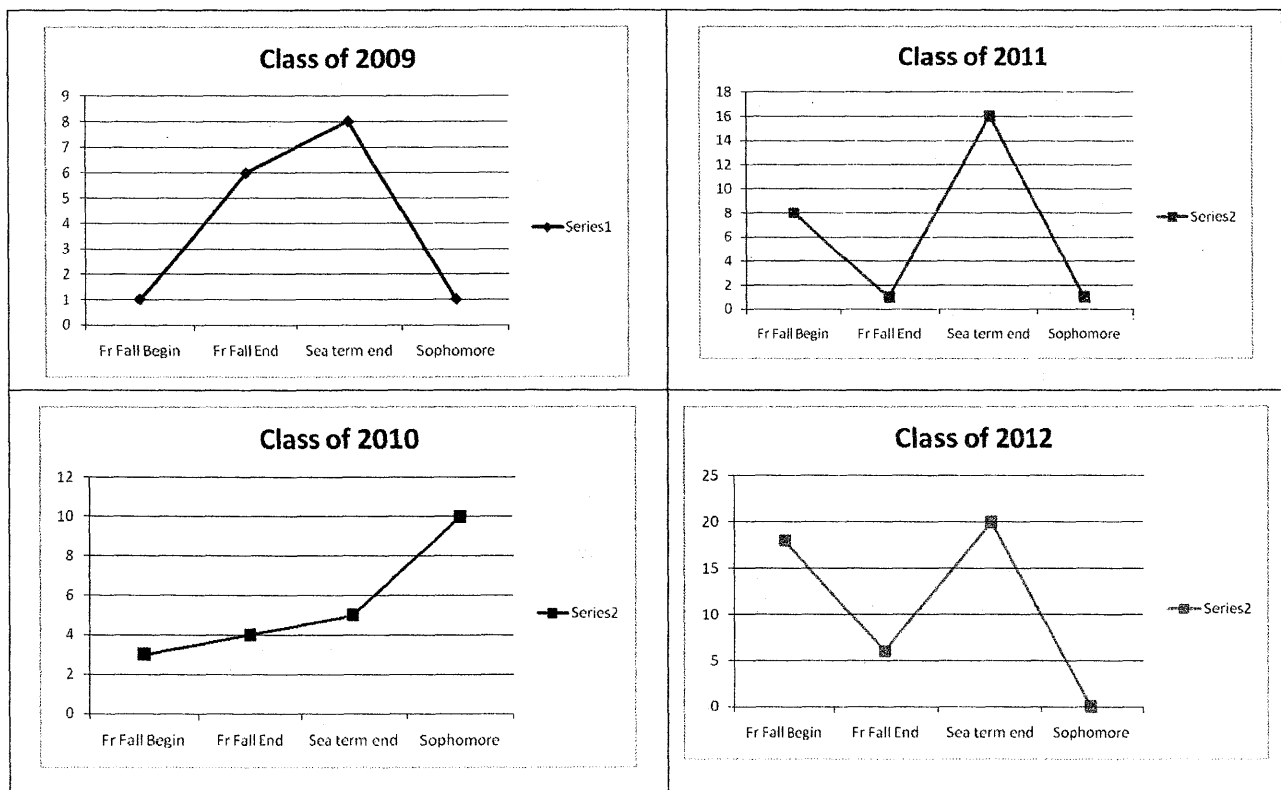


Fig. S.5. Student Decision to choose International Maritime Business at MMA

As discussed in previous sections, today, more than ever, we need a well rounded maritime professional who is conversant with all aspects of the shipping industry. This includes safety and environmental regulations, an understanding of finance, budgeting, shipping business and current software used in the industry for better management of vessels and compliance with regulatory bodies. The fragmented regulations and compliance related issues, pressures of heightened cost competitiveness in a recessive market and the information technology demands of the current maritime industry is proving to be too

overwhelming for deck officers and engineers who need time to concentrate on the operational aspects of their departments. We have received feedback from shipping companies who are considering the idea of creating a new seafaring regulatory compliance officer position. The education and training received in our shore based programs like International Maritime Business is proving to be a good fit for such positions, thereby adding to their popularity.

Participation in International Conferences and internships:

Top students in the International Maritime Business program have had the opportunity to travel to Australia, China, Ukraine and California to make presentations at the Annual General Assembly of the International Association of Maritime Universities (IAMU). This provides an international arena for students to exchange ideas, discuss current issues affecting the maritime industry and make presentations on chosen research topics. The lessons learned in the process are invaluable.

Each student in the major must complete two internships, each worth 6 credits. Performance is monitored by the host organization whose representative sends a written evaluation of the student. As mentioned before, in keeping with the global trends we have been successful in securing international internships for our students in Tokyo, Belgium, UK and Ecuador for a complete cultural immersion for six weeks. The mandatory sea term allows the entire student body to travel to various new destinations and get hands on training on board a working ship and happens to be a critical component of our curriculum.

Student Exchange Program with Shanghai Maritime University:

Ten students from Shanghai Maritime University, a school of approximately 18,000 undergraduates, arrived at Massachusetts Maritime Academy on February 25, 2009 as the first contingent in a pilot program between the two schools. These students were either pursuing a sea going career in Marine Transportation or a shore based career in International Maritime Business. The Chinese students are currently living in the dorms with ten MMA sophomores in the International maritime Business and Marine Transportation programs. They are thriving in their new environment, soaking in everything that their hosts have to offer (Fig S.6). Besides being engaged in Academics, they were taken on a tour to



Fig. S.6. The Shanghai Mass Connection

Washington DC and various tourist spots in Massachusetts. Their extra curricular activities included attending popular baseball games, ferry rides to Martha's Vineyard, trekking in Maine, a visit to the State House in Massachusetts, a day at the Oceanographic Institute in Woods Hole and many such fun

activities. Their American counterparts will visit Shanghai Maritime Academy during the spring semester of 2010 in a reciprocal arrangement. They are very eager to visit China and spend a semester in Shanghai, tour the Great Wall of China that they have only seen in pictures. Besides their core curriculum, they will also take a course in Chinese history and culture. This is an extremely crucial immersion program initiated by MMA accentuated by the increasing significance of China in the maritime sector. The lessons learned in the process will foster greater cooperation and opportunities for students in the two institutions and the two nations for years to come. Such cross-cultural and cross-border education and training among Maritime Academies around the world is expected to go a long way in building a truly global maritime workforce. This is one area where an apex body like IAMU can be an excellent catalyst for development.

Seeking corporate partners to invest in education and technology

Massachusetts Maritime Academy has reached out to the corporate world in strengthening the quality of training and education and has been quite successful in these initiatives. One such example will be the MMA-SpecTec partnership. The SpecTec Group is a company specializing in the offering of software and services in the field of asset management with a significant market share in the maritime field. In December 2008, Massachusetts Maritime Academy, and SpecTec entered a cooperation agreement in which SpecTec agreed to donate AMOS (Asset Management Operating System) licenses to MMA for education and training purposes. This was the first license donation partnership that SpecTec had entered with a Maritime Academy in the US. Previous partners included Dalian Maritime University, National Taiwan Ocean University and Italian Maritime Academy. The use of AMOS will help the students to understand better all the business and management aspects of shipping, machinery, nautical equipment, vessel and fleet maintenance strategy, update surveys and certificates as well as be compliant with the various rules and regulations in shipping. The software is currently used by various shipping companies across the globe and this partnership will help MMA in producing maritime professionals who are better equipped to meet the required skill sets in the current job market.



Fig. S.7. The SpecTec MMA Partnership

4. CONCLUSION

There is a significant growth in opportunities for the shore side segment of the maritime sector which needs to be efficiently managed in a very competitive global market. The need for high quality professionals to handle the business management, regulatory, security and environmental aspects of maritime transportation requires interdisciplinary training and education. Technological advancement has made its presence felt in every aspect of the shipping industry. However, technology needs to be managed effectively and efficiently in full compliance with relevant regulations in a multi cultural environment. The skill sets of maritime professionals need to be much more diverse and internationally sensitive to succeed in the present environment. Each era of change brings new opportunities and new challenges. The discerning and successful maritime professional must stay ahead of the learning curve and be prepared to adapt quickly. The initiatives undertaken by Massachusetts Maritime Academy are indeed steps in the right direction but the Shanghai Mass connection is just the beginning.

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