

THE SHIPPING TRADE

**PowerPoint Presentation to AIMU
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It is a pleasure to have this opportunity to speak to the American Institute of Marine Underwriters this afternoon on a topic that will be of great importance to Americans in the years to come.

I hope that I won't repeat too much of what you have already heard from my two colleagues who preceded me this afternoon. We did attempt to coordinate our talks to a certain degree.

I think that you will agree that they have made a strong case that natural gas will continue to be a major source of power fueling our economy in the years ahead, and indeed its use will grow over the next twenty years to a point where it will surpass oil as our major source of energy. Bill Sember has made the case that LNG ships are technically different from all other ships, and they will continue to change as new construction occurs.

What I will focus on in my talk is the looming manpower shortage that the LNG industry faces as the result of this unprecedented growth in the use of natural gas and the subsequent increase in the number of LNG ships that will be required to haul the gas. I'll also touch upon the manpower needs of the shoreside operations required to take the liquid gas off the ships, store it and then re-gasify it as demand warrants.

Let me start with just a general overview of technical changes that have occurred in the shipping industry over the past two centuries.

For centuries the only things that mariners needed were a strong back and some knowledge about currents, stars, sun and prevailing winds. They rarely ventured far from the sight of land. Next came the clipper ships, and the navigational equipment found on board these ships was a compass, a rudimentary sextant and a telescope. The life expectancy of the ship was just a few years. Cargo was loaded and unloaded by strong men aided by some basic pulley systems.

Finally in the mid-19th century with the invention of the steam engine, ships began to be constructed with steel and they no longer depended on currents and wind. By the mid-20th century ships were 500 feet and longer, they had some mechanical help with loading and unloading, were powered by steam, and the steam was produced by burning coal and oil. On the bridge you now saw a gyro compass, possibly a gyro steering stand, radar, radio directional equipment, fathometer and radio and telegraph equipment. The shipping industry offered an exciting career option. Ships went around the world and stopped for fairly long periods of time in exotic ports as it took days and

sometimes weeks to un-load and re-load the ship. There was a lot of truth in the saying “a sailor had a girl in every port.”

Let’s look at ships today.

On the bridge you will find:

Compasses - gyro, electronic and magnetic
Digital steering stand
Radar with ARPA
Loran C
GPS
ECDIS, etc. etc. etc.

In the engine room you may encounter a variety of power systems: steam; diesel; diesel electric; and gas turbines, along with sewage treatment facilities, generators, air conditioning systems, hydraulics, evaporators, etc. etc. etc.

And the cargoes that are carried on today’s ships are as diverse as one can imagine and require sophisticated cargo handling equipment. The watch word for cargo handling is speed - how quickly and safely can a crew unload and load a ship - time is money. This one factor has made the shipping industry a less glamorous profession than in the past. No longer are there long port stays, in fact it is common for merchant mariners today to never set foot off the ship from the time they board until the time they finish their tour, which in most cases is 2 to 4 months in duration.

So as you can see shipping in the early part of the 21st century is quite different. Shipping is heavily regulated, crews have to be well educated and understand and conform to regulations and procedures designed to protect cargo, crew, investors, and the environment.

While these changes have been occurring in the industry there has also been a changing dynamic in the supply chain of ship board officers and crew.

- Traditionally the world’s economic powers built the ships and trained their citizens to operate them.
- Today, the citizenry of the developed countries are less likely to seek careers at sea. *While the salaries are still quite good, they are no longer so much better than shore side salaries that they compensate for the time away from home, especially given the fact that very little time is spent in foreign ports.*
- Today’s ships are much more likely to have been built in a foreign yard and have a multi-national crew. *Very few commercial ships are built in U.S. yards today, unless they are being built for Jones Act trade.*
- Significant shortages of qualified ship’s officers and crews are expected over the next decade in all segments of the shipping industry. *The traditional maritime nations, U.S., England, Spain, Norway, Germany, and Japan, unless they have*

a security need, are no longer producing a sufficient number of mariners. The U.S. is an exception because of coastal trade and security issues.

- English is the official language of shipping yet for the vast majority of ship crews, English is a second language-

All of this is a little scary, when you realize that human error is the #1 cause of shipping accidents.

As you heard earlier, we are entering a new era with energy consumption, as LNG will become the fuel of choice over the next 20 years. 96% of the gas reserves are located outside of the U.S., yet the U.S. consumes 25% of the world's natural gas supply, and this percentage will continue to grow. In the past most of our natural gas consumption could be met through domestic sources, which were transported by pipeline. However, when the supply source is 600 miles or more from the consumer, the most efficient, actually the only way to transport it, is by ship. As a result, more ships are being built, they will be larger than ever before, and the technology on board will become more sophisticated. What makes LNG ships so different?

- Cargo is carried at extremely cold temperatures - *260 f below zero*
- LNG can only be carried on specially designed ships. *We've heard from Bill Sember about the special design of these ships*
- Loading and discharge process is different from other tankers.
- Cargo immediately starts to re-gasify (boil off) *no other cargo quite like it.*
- Highly reduced volume 1/600th
- Most ships are steam powered - *most of the world has not trained steam engineers in over 50 years.*
- Some will have re-liquefaction or re-gasification plants on board. *This will require crew to handle a cargo differently than with most cargoes as normally their job is only loading, transporting and discharging. Now they will be asked to process the product.*

As we have heard from my colleagues the safety record of LNG ships is unprecedented. Why?

- Excellence of and continued training of crew
- Experienced officers with long tenure in the LNG industry
- Superior quality of ships and equipment
- Long term contracts with point to point delivery
- Controlled and sustainable growth (supply of officers and crew continually meeting demand)
- Quality control instituted by the owner/operators.

So what is the problem?

The problem is the unprecedented increase in the number of LNG ships being constructed in such a short period of time and being able to find enough senior officers who have LNG qualification to command them. This unprecedented growth comes at a

time when there are projected manpower shortages in the industry at large, and at a time when the existing LNG fleet is experiencing retirements of its senior officers.

The demand for ships is demonstrated in this slide. I won't spend much time on it as this has been well covered by my colleagues. But suffice to say, by 2010 there will be nearly twice as many LNG ships operating as there are today. Many of the operators will be new to the industry, they don't have a track record of training and experience and don't have a cadre of experienced officers to call upon to help with training.

The ultimate result of this phenomenon will be shortages:

SHORTAGES OF ADEQUATELY TRAINED OFFICERS AND CREW TO MEET THE INCREASED MANNING REQUIREMENTS.

Let's take a look at the composition of seafarers on board a typical LNG ship. On the deck officer side each ship will have a master, chief officer (mate), chief cargo officer, 2nd officer, and 3rd officer, or a total of five. On the engine side they will have a chief engineer, 1st assistant, 2nd and two 3rd engineers, also for a total of 5, or a grand total of 10 officers. On the ratings side they will have two boatswains, 5 AB's, an ordinary in the deck department, 5 oilers and 3 QMED's in the engineering department, and at least 3 people in the stewards department for a total of 17 unlicensed people. So the total complement will be 27. The vacation time in the shipping industry is such that you will have two complete crews, or will need 54 people and then adding an amount for turn over, retirements, illness, and other reasons, our estimate is that you will need about 78 people to man each LNG ship.

When you tie that number into the number of expected ship deliveries over the next five years you quickly find that you will need nearly 5000 new LNG crew by 2010, and of that number there will be a need for nearly 3000 senior officers.

ON TOP OF THIS THERE WILL BE A SHORTAGE OF QUALIFIED ENGINEERS WITH STEAM ENDORSEMENTS. As you can see from this slide, there will be a shortage of nearly 1400 engineers with steam endorsement. Since there has been very little steam training around the world for the past 50 years, meeting this shortfall will be an even greater task. Any engineer will tell you that it takes longer to train a steam engineer than a diesel engineer, and in the opinion of many, it is much quicker to train a steam engineer to be a diesel engineer than vice versa.

THERE IS A SHORTAGE OF TIME TO ADEQUATELY TRAIN SENIOR OFFICERS FROM ONE SEGMENT OF THE SHIPPING INDUSTRY TO ENABLE THEM TO MEET THE QUALIFICATIONS TO COMMAND AN LNG TANKER.

It is generally understood that it takes 10 to 12 years for an officer with an entry level license to raise that license to a master's or chief engineer's license. Assuming that an individual already has a master's license and experience sailing on that license but does not have tanker experience, the training scheme in this diagram indicates the minimum

of what they would have to do in order to command an LNG tanker. We're probably talking about a year or more of continuous training and sea going experience in order to meet these requirements. That is if courses are offered on a regular basis, and billets are available. Which brings up the next shortage:

SHORTAGE OF TRAINING BILLETS ABOARD EXISTING LNG SHIPS. In order to meet minimum requirements officers must have several cruises as an observer during which time LNG is loaded and discharged. There is limited space aboard existing LNG's for this purpose, and those that do exist will be utilized by personnel of that company and rarely will be made available to officers from competing companies.

ANOTHER SHORTAGE AREA IS LNG SIMULATION AND HAVING ENOUGH QUALIFIED AND EXPERIENCED LNG INSTRUCTORS.

So what are the consequences of not having a sufficient number of qualified senior officers to command all of the LNG ships, both new ones and old ones?

LNG ships sit idle - cargo doesn't move - highly unlikely.

Poaching of qualified senior officers with LNG experience from one company to another occurs *this is already happening.* *But it will only solve the problem for the company willing to pay the most, and will drive the cost of labor much higher than it needs to be.*

LNG ships sail with minimally trained senior officers and crew - *this is much more likely to occur and if it does then the long record of safe and accident free operations may very likely come to an end.*

A serious accident or accidents occur - *this industry cannot afford a major accident.* *As we already know, the U.S. public in particular is already wary of LNG and its perceived potential for a catastrophic disaster.*

SO IS THERE A SOLUTION TO THIS DILEMMA?

Yes, there is-

First, the industry must recognize that there is a looming problem. *I think that finally the industry has begun to realize that there will be shortages if it doesn't act quickly. We started talking to the big players (Exxon/Mobil, Chevron, BP, and British Gas) about two years ago. We found that most of them believed that they would be able to meet their LNG manning requirements through moving people around within their own fleets. I'm quite certain that if they were the only ones in the business, as has been the case in the past, this would be a viable option. However, that is not the case any longer, and I believe that they now realize what the impact will be on this segment of their industry if there were to be a serious accident. It won't matter who caused the accident, the entire industry will suffer. A similar scenario to what occurred after the Valdez accident.*

International training standards for the LNG industry must be established. *This is being worked on as we speak by the International Association of Maritime Universities and the Society of Gas Tanker and Terminal Operators. Some recommendations should be forthcoming in October.*

Training programs for converting senior officers from one segment of the industry to be qualified to operate LNG tankers must be developed. *Again, these are being developed by IAMU, SIGTTO, and others. In this country this is being done by the companies, by the unions and by the maritime academies. However, since all LNG ships are foreign flagged there is no assurance that American officers will be hired. We sincerely believe that companies trading LNG in the U.S. would be well advised to insist on having some presence on board their ships of American officers and crew. It doesn't have to be 100%, but I think that a wary public might be more willing to accept LNG if it knew that there were Americans aboard these ships in senior level management positions.*

LNG companies must work together to provide observer and training billets aboard their LNG ships; not just for their employees but for others as well. *Well trained and experienced officers will benefit the entire LNG industry.*

Underwriters and financiers should insist on a high level of competency for LNG personnel. *Remember, human error, not mechanical failure is the number one cause of shipping accidents.*

The world's maritime academies must start the process of providing basic LNG training for their undergraduates. *The ultimate solution to ensure the safe operation of LNG ships is to adhere to the model that has been so effective for so many years, and that is to have officers who work in this industry for their entire career. The best*

scenario is to have captains and chief engineers who first started as junior officers, and through training, screening, and many years of experience only the brightest and the best rose to the top.

Thank you for you attention. I would be pleased to try to answer any questions that you might have.