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CREW ENDURANCE AND THE TOWING VESSEL ENGINEER – A DIRECT APPEAL TO CONGRESS

[GCMA submitted this report to Coast Guard Docket #USCG-2004-19977 for consideration in their towing vessel inspection rulemaking project.]

[Also, refer to GCMA Report #R-279, Revision 5, Review and Set Safe Manning Standards for Offshore Supply Vessels and Uninspected Towing Vessels.]

TABLE OF CONTENTS

Introduction	1
Towboats Need More Than One Engineer	2
Engineer Stressed to the Breaking Point and Worked to Death in the Engineroom.....	2
Death of Chief Engineer Gary Duncan.....	3
The USCG/AWO Partnership Blissfully Ignores Mariner Safety Issues.....	4
Absolute Exercise of Authority Over "At Will" Employees.....	4
Training and Upgrading Towing Vessel Engineers.....	5
Preventive Maintenance and Repair.....	8
Historic Document #1 "Engineers on Uninspected Towing Vessels (1973)	9
Historic Document #2 "The Need for Licensed Engineers Aboard Uninspected Towing Vessels	23

INTRODUCTION

The purpose of this document is to outline our mariners' position on towing vessel engineer issues for consideration by both Congress and the Coast Guard.

Section 415 of the Coast Guard and Maritime Transportation Act of 2004 grants the Coast Guard authority to bring towing vessels under Coast Guard inspection after more than

30 years of relaxed and virtually unregulated operation. During this period, employers took advantage of many mariners working in the towing industry serving without the protection of laws and regulations similar to those that govern inspected vessels of comparable size and horsepower like small passenger vessels, offshore supply vessels, and to some extent commercial fishing vessels.

In 1973, Congress formally considered whether to require engineers on towing vessels. Congress ordered the Coast Guard to look into the matter. The Coast Guard, in turn, contracted with the Educational Testing Service (ETS) to conduct a study in 1972-73.

The report from the Educational Testing Service supplemented by views of a panel of commissioned Coast Guard officers "shot down" the issue of requiring engineers on uninspected towing vessels in 1973. After endorsing the report, the Coast Guard and Congress went on their way and, in over 30 years, never looked back.

The towing industry company management evidently was pleased with the 1973 report because it allowed them to reduce their payroll to a bare minimum and did not require them even to train their engineroom staff or, for that matter, to even maintain a separate engine department on their towing vessels.

The 1973 recommendations stated: "A review of the findings and conclusions in this study seems to indicate that the addition of designated engineers aboard uninspected towing vessels will not reduce the casualty rates currently experienced and therefore will not improve the safety record of these vessels. Therefore, it is recommended that at this time the Coast Guard not make any legislative recommendations which would require engineers on uninspected towing vessels."

GCMA believes that "this time" referred to in the ETS study has passed. Conditions in 2005 are not the same as conditions thirty-two years ago in 1973. Consequently, GCMA reviewed the 1973 ETS report and a companion document submitted by the Marine Engineers' Beneficial Association (1973) and commented upon them in the "Historic Documents" section of this report. The comments and letters on these two "Historic Documents" point to a position that best represents the views of our "lower-level" merchant mariners who work on tugs and towboats and other commercial vessels of less than 1,600 gross register tons (GRT) in 2005.

GCMA is "The Voice for Mariners." To make our voice heard we have an obligation to accurately represent and report on the thoughts and opinions of concerned "lower-level" mariners. We received significant verbal input from the "Historic Documents" we distributed over eight months ago and incorporate them with our "comments" in this report.

The Educational Testing Service report provided the rationalization for the Coast Guard's policy of neglect of vessel engineers for over thirty years. However, this report failed to recognize the important role that engineers on towing vessels must play in the safe operation of these vessels. Congress and the Coast Guard chose to ignore the second "Historic Document" from the Marine Engineers Beneficial Association (MEBA).

Loss of Engineering Skills and Dwindling Interest Contribute to Today's Personnel Shortage

The number of formally-trained and licensed engineers on

towing vessels and the skill level they once attained dwindled to practically nothing over the past 30 years. Instead of skilled engineers, the towing industry welcomes minimum wage dipstick deckineers so that it can hire and fire at will without bothering to train them.

Having driven maritime labor unions from the rivers and from much of the towing industry, management settled back to dominate its cat willö employees. The following letter published in the March 2005 issue of WorkBoat magazine by well-qualified engineer who recently retired from the towing industry, gauges the effect the Coast Guard's laissez-faire regulatory policies had on the towing industry.

TOWBOATS NEED MORE THAN ONE ENGINEER
By Chief Engineer David A. Sager (Ret'd)

[Source: WorkBoat Magazine, March 2005. Chief Sager was trained by the United States Navy and attained the rank of Chief Petty Officer before "retiring" to a job as Chief Engineer on river towboats. He studied and attained a U.S. Coast Guard Engineer license. Unfortunately, the towing industry attracts very few trained engineers from the armed forces for a variety of reasons – many related to the problems cited in his letter including overwork, disregard of safety, poor equipment maintenance, and a lack of respect accorded industry management. Chief Sager lives in Jacksonville, Arkansas and is now an Engineer Consultant.]

First, I feel that I am qualified to comment because I had 40-plus years of experience in the marine diesel engineer field, until recently, held a high-level first-engineers license, and ran chief engineer on linehaul towboats for 20 years.

Back in the late 1980s, early 1990s, most of the river barge industry began instituting a one-engineer boat policy. My personal experience is if the following is factored in ó management demands every inch of the engine room, shaft alleys, and rudder room be painted and immaculate, plus other maintenance and repairs that the chief must do ó a 6,000-hp towboat is too much for one engineer.

I am not naïve enough to believe that management will go back to two-engineer boats. However, I have several suggestions that would help.

First, a one- or two-man floating paint crew that would go from boat to boat and help the chief engineer needle gun, prime, and paint.

Second, you port engineers when the chief says he needs help he means it. About the only way the chief will get good help is if there is a deckhand who wants a letter of recommendation from the chief to get into the engine room. Otherwise, the mate will give him the worst guy he has. Third, it has to be a company policy that a prerequisite for being a head port engineer is that the individual has been a chief on a towboat. I worked under one person who had not been a chief and had totally unreasonable expectations. It made a difficult situation intolerable.

Fourth, companies are going to have to come down hard on deck crews that take tools (and other things) out of unattended engine rooms without the chief's permission.

Fifth when shore-based ship yard repairs are needed, do not put them off. Do it with quality parts and workmanship, not the quick and cheap jury rig.

I was with one company who had a ðrun it until it blowsö policy. Combining this with an engineroom that is unattended, a large percentage of the time is asking for disaster.

The thing that companies who do not maintain the machinery usually do not maintain the alarm system either. The No. 1 engineer is stretched thin enough as it is without having to deal with things like this.

**ENGINEER STRESSED TO THE
BREAKING POINT AND
WORKED TO DEATH IN THE ENGINEROOM**
[Refer to GCMA Report #412 on the internet for full details.]

Although towing vessel officers (Masters, Mates, and Pilots) are limited to working a 12-hour day, no such restrictions apply to ðunlicensedö crewmembers like engineers, deckhands, or tankermen. In particular, the Coast Guard does not require engineers on inland and (most) coastwise towing vessels to hold Engineer licenses. Engineers receive insufficient recognition for the skills they possess when working as unlicensed crewmembers.

Many, if not most, towing vessels do not carry a ðdesignatedö engineer ó i.e., a person who is designated specifically by either the company or the Coast Guard as being responsible for the proper operation and maintenance of all the machinery on the towing vessel. We urge the current towing vessel inspection rulemaking project manager to add designated engineers and oilers to the towing vessel's Certificate of Inspection (COI).

Our Association has serious concerns about the degrading treatment of engineers and, in this report, brings these matters to the attention of both Congress and the Coast Guard for these reasons:

- The watchstanding Master or Pilot of a towing vessel can only be in one place at any time. Expecting him also to carry out engineer duties, as is often expected on smaller boats, may cause him to disobey the ð12-Hourö statute (i.e., 46 USC 8104(h)) and can detract from his performance of his primary pilothouse duties.
- The master of a towing vessel cannot legally serve as a tankerman or engineer beyond the statutory 12-hour limit even though some companies expect the master to pump fuel barges when ðoff-dutyö in violation of both statute and Coast Guard Policy Letter #G-MOC-04-00. Coast Guard enforcement of documented work-hour violations has been pitiful. We have fully documented this allegation to our current District Commander as well as to the Commandant.
- For a Master or Pilot to attempt to perform engineer duties while the vessel is underway is not realistic because he cannot legally hand over control of the vessel to an unlicensed individual. One outstanding **example** was the fatal allision of the towboat CHRIS that knocked down a portion of the Judge Seeber Bridge crossing the New Orleansö Industrial Canal on May 28, 1993. This accident occurred when the Master left the pilothouse to help his new ðdeckineerö change a fuel filter in the engineroom! His barge came loose from the bank where it was purposely grounded. The barge then struck a bridge bent collapsing the span and killing one motorist who drove off the bridge

with her infant daughter and severely injured several other motorists.⁽¹⁾ [⁽¹⁾Refer to NTSB/HAR-94/03, U.S. Towboat CHRIS, Collision with the Judge William Seeber Bridge, New Orleans, LA May 28, 1993.]

É A ðeckineer, ð like the master, can only be in one place at a one time. If he is on the head of the tow or sleeping in his bunk, he may not be immediately available to re-start a stalled engine, pump the bilges, put out a fire (etc.) in an emergency.

É Neither the industry nor the Coast Guard placed any emphasis on offering formal engineer training to its employees. All that is available in most companies is ðon-the-job training.ð This is often little more than the blind leading the blind. Although engine manufacturers and distributors offer formal hands-on instruction in well-equipped training facilities, this training is under utilized by the towing industry and, in any event deals with only one part of the engineroom ó the main propulsion engine(s).

As a direct consequence of this neglect for the last three decades, the industry now relies upon untrained help to operate and maintain expensive and increasingly complex machinery in a hot, noisy, and potentially unsafe environment.

We cite the case of Chief Engineer Gary Duncan. The case is unusual in that Chief Duncan was a licensed engineer. In spite of that, this is the story of his abuse by his employer that ultimately lead to his death:

THE DEATH OF CHIEF ENGINEER GARY DUNCAN

A jury decided a case in 2002 in a St. Louis courtroom that may give some towing companies pause as to how much work they can squeeze out of their crewmembers. Although the case was widely reported in St. Louis, the marine industry trade journals avoided it like the plague!

Plaintiff Mary Duncan brought suit, in her individual capacity and as representative for the Estate of her deceased husband, Gary Duncan, under the Jones Act for the death her husband suffered while employed by the defendant American Commercial Barge Lines, LLC. (ACBL).

ACBL was, at the time, the largest inland towing company in the United States and an influential member of the American Waterways Operators (AWO), the towing industry trade association. The company recently emerged from bankruptcy that, with this story of Chief Engineer Gary Duncan, speaks volumes about the quality of towing industry management.

Gary Duncan was working as a chief engineer when he died a sudden cardiac death on May 31, 1999, while taking a break in the engine control room on ACBL's linehaul towing vessel, the MISS KAE-D, while pushing barges on the Lower Mississippi River in Louisiana.

Gary had worked for 24 consecutive days, 15 days of which were spent working without the assistance of another engineer. As chief engineer, he was responsible for inspecting, maintaining, repairing, and cleaning the engineroom and its components, including three diesel locomotive type engines that powered the boat. Within an hour before his death, he assisted in removing a 200 lb. power pack from one of the main engines while working in ambient temperatures exceeding 125 degrees. He was required to work 12 or more hours a

day during irregular work and rest cycles, typically alternating periods of 6 hours on and off duty.

This ðirregular ð cycle is known as a ðcall watch⁽¹⁾ where a mariner is called to attend to engine alarms and other matters requiring mechanical expertise any time of day or night. [⁽¹⁾GCMA Report # R-375, Crew Endurance: The Call-Watch Cover-up deals with the deck crew. The situation on a "one-engineer" boat equally abuses the health, welfare and safety of the engineer.]

Gary often was awakened from his sleep on the boat by engine alarms that required immediate attention. If he had a designated assistant (i.e., an oiler) he might have been relieved of much unnecessary stress and strain in his off-duty hours. His typical work cycle was 40 days on the boat and 20 days off the boat that his employer argued were ðconsistent with industry standards.ð The defendant (ACBL) argued at trial that since its work practices were consistent, that it was not negligent.

[GCMA Position: Engineers and oilers, like every other crewmember, must receive 7 to 8 hours of uninterrupted sleep according to a USCG research project. The anxiety of being awakened by an engine alarm sounding in any person's sleeping quarters creates stress and destroys the possibility of attaining restful sleep.]

ACBL denied liability and argued that Duncan's death was a natural event caused by years of smoking, diabetes, family history, and high cholesterol levels that were unrelated to work. A co-worker who resigned after Gary's death and the plaintiff's maritime expert testified that the boat should have been manned by 2 to 4 full time engineers scheduled on regular watches, like the rest of the crew, so as to allow for uninterrupted sleep during off-duty hours. The company that previously operated the vessel utilized a 2 to 4 man engineroom crew. However, after ACBL acquired that company and its vessel and crew, they cut crew size to the bone to cut costs without any regard to the human costs of their actions. The company denied requests by their employees for additional assistance in the engineroom. The expert witness and Gary's co-worker testified that the manning levels used by ACBL were inadequate, unsafe, and violated industry custom and practice.

The autopsy report showed significant coronary artery disease and concluded that it was a major cause of death. However, the Plaintiff's medical expert testified that the significant work stressors and sleep deprivation clearly were contributing causes of both the acute cardiac event and the development of coronary artery disease.

Attorneys submitted damages for lost economic support in the form of wages, benefits, and household services and for damages, Gary suffered before his death for chronic psychological distress.

ACBL argued that the distress damages were not compensable under the Jones Act because they were not due to a physical injury and that the Act did not recognize such claims. Although ACBL's economist suggested that the economic loss suffered was only about \$450,000, Mary Duncan's economist concluded that the losses were about \$850,000. Nevertheless, the final jury award was reported to be \$950,000. ACBL unsuccessfully appealed the jury verdict.

Mary Duncan's attorney noted that the towing industry's "customary" practices were the subject of recent national and local media scrutiny following the Oklahoma bridge tragedy but that regulation of the towing industry is weak and violations are often not enforced.

The Gulf Coast Mariners Association calls upon Congress and the Coast Guard to address work conditions that are patently unsafe and far exceed those seen in any other industry in the civilized world. The industry acknowledges that existence of laws that limit the hours

of service of Masters and Pilots but refuses to acknowledge the need for such limitations for other crewmembers, such as engineers, deckhands, and tankermen who face similar work stresses, fatigue, and safety concerns.

[GCMA Position: We petitioned the Coast Guard to prepare a Legislative Change Proposal (LCP) to limit the work-hours performed by any unlicensed crewmember on any uninspected towing vessel to the same hours for licensed officers on that vessel. In light of the Coast Guard's unwillingness to do so, GCMA directly petitioned Congress on February 14, 2003.]

THE USCG/AWO PARTNERSHIP BLISSFULLY IGNORES MARINER SAFETY ISSUES

For the last 10 years, following the Bayou Canot accident near Mobile, Alabama that took 47 lives, the towing industry continued to operate without adequate regulation by the Coast Guard.

In place of adequate regulations, the towing industry was encouraged by a formal "partnership" with the Coast Guard to regulate itself under the "Responsible Carrier Program" (RCP). Unfortunately, for mariners, the "RCP" is only enforceable only through the "power of persuasion" by the industry's trade association, the American Waterways Operators. This is like inviting the fox over for dinner in the hen house. The hens and roosters are justifiably upset with this one-sided arrangement.

Although the AWO boasts a competent and professional staff, they are only "employees" who must satisfy their employers. Their "employers" are executives from member companies. Staff members would be reluctant to criticize the senior business executives whose dues help pay their salaries. Even the Coast Guard appears to be incapable of dealing with some of the larger, more powerful, and politically connected corporations.

The result over the past decade is that member companies can follow their own versions of the RCP as much or as little as they choose and can do it whenever they want to. Although the RCP (in writing) is, for the most part, a reasonable document it has one fatal flaw in that it recognizes nothing wrong with assigning a fifteen-hour workday to its unlicensed employees. Yet, even that schedule may not be as demanding and psychologically debilitating as the "call watch" that exists with only placing a single engineer on a large towboat.

EMPLOYERS EXERCISE ABSOLUTE AUTHORITY OVER "AT-WILL" EMPLOYEES

If you won't do it, we'll find someone that will is a common refrain our mariners hear and understand. Companies large and small exercise virtually unrestrained authority over most "lower level" licensed and unlicensed mariners except in those few corners of the industry where unions maintain a foothold today.

While the AWO maintains excellent relations with the public and the Coast Guard, executives of some towing companies display their disregard for the Coast Guard, their employees, and even the Responsible Carrier Program when they place their employees "between a rock and a hard place." In

some instances as in the **example** below, companies expect their mariners to openly violate inconvenient federal regulations with impunity.

In a personal letter to Vice Admiral [REDACTED], the Coast Guard's Vice-Commandant, one mariner stated in part:

Dear Admiral [REDACTED],

I am writing to you to express my personal concern for individual mariners who are unfairly discriminated against when they properly perform their duties in a responsible manner and report unsafe or hazardous conditions to the United States Coast Guard.

I will recite a recent personal experience as an example: On July 14th at approximately 1650 hours, I reported a condition on my vessel, the M/V AMERICAN PILLAR, that I determined warranted reporting under 33 CFR 160.215. I reported to the Marine Safety Office in New Orleans that my vessel had lost its back up air compressor.

Considering that this air compressor provides air for main engine throttles, main engine clutches, as well as starting both main engines and generators, I believed that this condition could clearly and adversely affect the performance of my vessel if the remaining air compressor were to fail.

At the time of my report, I was about 30 miles north of Baton Rouge with a 10,500 horsepower towboat pushing 40 loaded barges including 3 loaded tank barges. I did not anticipate a problem in continuing my journey as far as Baton Rouge where I would receive parts and repair my vessel. Considering the congestion in the New Orleans area, I was uneasy about proceeding with one compressor down. It was a judgment call. The Marine Safety Office agreed that this was a reportable condition and instructed me to continue as far as Baton Rouge but to stop and make repairs before proceeding.

For contacting the Coast Guard, my company suspended me for two weeks without pay. Consequently, I contacted the Merchant Marine Investigation Office at MSO New Orleans and asked for their assistance. I have also asked my attorney to start civil proceedings for reinstatement and seek to recover several thousands of dollars in back pay based on Title 46 Section 2114 - Protection of Seamen Against Discrimination. This is an expensive undertaking for an individual to bear.

I have written this letter to inform you of this incident which I see as an example of what seamen encounter along the road as "model companies" deal with their employees. There appears to be little in this concept that will protect employees from companies that want to keep Coast Guard regulators happy and at a very comfortable distance from their business.

The New Orleans Marine Safety Office responded to the mariner's request by writing to his employer as follows:

American River Transportation Company
P.O. Box 2889
St. Louis, MO 63111

Gentlemen:

I wish to express my deep concern over the recent mechanical casualty occurring to your vessel M/V AMERICAN PILLAR, and to request your commitment to the immediate reporting of future hazardous conditions to the Coast Guard.

On the afternoon of July 14, 1994, while downbound on

the Lower Mississippi River with a tow of 40 loaded barges, including three tank barges the M/V AMERICAN PILLAR suffered a failure of the electric motor which drives one of two air compressors vital to the safe propulsion of the towboat. These air compressors, connected in parallel, provide the compressed air necessary to start the vessel's propulsion engines and to engage the clutches.

Upon receiving notice of the failure of the failure of the air compressor motor, the operator of the AMERICAN PILLAR, Mr.■■■■, reported the vessel's situation to my office. The vessel was permitted to proceed to Baton Rouge, Louisiana to effect repairs, but was ordered not to enter the harbor area until repairs had been completed. We were subsequently informed by Mr.■■■■ that the AMERICAN PILLAR had held up at mile 251 above Head of Passes to make repairs, and, later; that the repairs had been completed.

I have been informed that your company instructed Mr.■■■■ not to report the vessel's mechanical failure to the Coast Guard, and that Mr.■■■■ has been suspended for reporting this incident. Without discussing the legality of your actions in light of Title 46, United States Code, §2114, I find your actions most disconcerting. Although a backup air compressor was available, this mechanical, failure adversely affected the operating reliability of the AMERICAN PILLAR's propulsion system. As such, the incident clearly constituted a "hazardous condition" as defined in Title 33 Code of Federal Regulations, §160.203 (33 CFR 160.203), for which; immediate notification of the Coast Guard is required by 33 CFR 160.215. In addition, this mechanical failure could arguably be considered a reportable marine casualty per 46 CFR 4.05-1(c), which also requires notice as soon as possible to the Coast Guard. I believe that your vessel operator acted in good faith by notifying my office of a condition, which could impair the propulsion of a 10,500 horsepower towboat pushing a tow 280 feet wide and 1000 feet long, which had yet to clear the Upper Baton Rouge Bridge. To have failed to report this condition to my office would have also subjected Mr.■■■■ to possible civil penalties and suspension and revocation action against his license.

I am concerned that your attempts to dissuade your vessel operators from reporting the vessel's hazardous condition, followed by your disciplinary action against the operator for doing so, may send the message to operators of uninspected towing vessels that they risk their continued employment and livelihood by their compliance with Coast Guard regulations. Your actions in this case are not indicative of a strong commitment to marine safety and protection of the marine environment.

Dissatisfied with the number and severity of marine casualties on the Lower Mississippi River, the Commander, Eighth Coast Guard District instituted Operation Safe River on March 24, 1994. A copy of the Safety Broadcast Notice to Mariners announcing this operation is enclosed. Although this operation has been discontinued, I ask you to take heed of this message, and to evaluate the circumstances within your control which may contribute to accidents involving your towboats, e.g., vessel horsepower for the loads towed, vessel maneuvering characteristics, and operating practices which may encourage your vessel operators to take imprudent actions.

Again, I ask for your support, as a major inland waterways operator, in ensuring the prompt reporting of casualties and hazardous conditions aboard your vessels. Please help us to improve the safety and cleanliness of our nation's

inland waterways.

Sincerely,

s/ ■■■■■■

Commander, U. S. Coast Guard

Alternate Captain of the Port

Copy: Commander, Eighth Coast Guard District (m)

Commander, Second Coast Guard District (m)

[GCMA Comment: The company terminated Mr.■■■■'s employment. He filed suit and eventually recovered his lost wages. The Coast Guard took no further action against the employer.]

TRAINING AND UPGRADING TOWING VESSEL ENGINEERS

The "Cover Up"

While certain engine manufacturers conduct training classes in the proper operation and maintenance of their engines, there are very few training facilities today that train engineers or oilers to serve in the engine rooms of any vessel under 1,600 gross register tons. Both the industry and the Coast Guard neglected engineer training for years as if it were totally unnecessary. However, the Marine Engineers Beneficial Association (MEBA) in 1972 documented the need for this training in **Historic Document #2** (below).

We can only imagine the cost to taxpayers if the Coast Guard allowed similar laxity in training, maintenance and repair on board their floating assets. The taxpayers would expect Congress to demote or fire the officers responsible! There has been gross neglect on the part of the Coast Guard in adequately overseeing the towing industry for many years.

Undermanning

Many towing vessels operate with pitifully small crews. Masters and pilots, while underway, cannot leave their post in the pilothouse and make or supervise engine repairs or adjustments while underway. It is physically impossible to do so. Some employers expect a deck watch officer to work in the engine room after the end of his watch to perform tasks like change engine oil or fuel filters, or repack the stuffing box in violation of 46 USC §8104(h).

46 USC §8104(e), a statute that refers to a merchant vessel of more than 100 gross tons, states that: "a seaman may not be engaged to work alternately in the deck and engine departments; or required to work in the engine department if engaged for deck department duty or required to work in the deck department if engaged for engine department duty."

Unfortunately, this provision **does not apply** to a vessel only operating on rivers, harbors, lakes (except the Great Lakes) bays, sounds, bayous, or canals or to vessels of less than 100 gross register tons or a significant shortcoming. This policy leads to mariner abuse in the person of the "deckkiners" who often must be in two places at the same time. For **example**, this is hard to do if you are handling lines at the head of a 1000-foot tow and the engine dies as the tow enters a lock. Few tugs and towboats can re-start their engines from the pilothouse!

[GCMA Recommendation #1: We request that Congress require every person assigned duties in the engine room on every towing vessel to complete and document basic engine room safety training instruction to an appropriate Coast Guard standard. On most small towing vessels, this might refer to every crewmember.]

[GCMA Recommendation #2: We request that Congress remove the exception cited above and require a separate "oiler" position on every tug and towboat over 1,000 horsepower and 100 gross register tons.]

Of course, a necessary prerequisite is to require each boat owner to honestly and correctly report the brake horsepower of his propulsion engines on each initial application for a Coast Guard Certificate of Inspection (COI).

[GCMA Recommendation #3: We request that Congress require every Engineer on a towing vessel of 4,000 brake horsepower and/or 200 or more gross register tons to complete a comprehensive engineer training course to an appropriate standard and grant him a license on successful completion of that course.]

46 USC §8104(d) Limits coal passers, firemen, oilers and water tenders on vessels over 100 gross register tons to a three-watch system and an eight-hour workday while at sea. This law, written in the days of steam, is fifty years out of date and must be amended to protect engineers like Gary Duncan who serve on today's diesel-powered towing vessels.

[GCMA Recommendation #4: We request that Congress require one "oiler" in addition to the Engineer be carried on every towing vessel of 4,000 or more horsepower and/or 200 gross register tons in 12-hour service. Require a second "oiler" for every towing vessel in 24-hour service.]

Training must be the responsibility of the employer. Safety demands that an employer must assume the responsibility for training at least one unlicensed crewmember (i.e., an oiler) to perform every type of required engine room task required on his vessel on each watch. This training must be adequately documented for the protection of both the employer and the mariner.

Additional training beyond basic safety and watchstanding training is necessary for a vessel of 1,000 or more horsepower and/or 200 gross register tons requiring a trained individual to serve as a designated engineer.

Although the Officers Competency Act of 1938 that enacted the Officers Competency Convention of 1936 into U.S. law required licensed deck officers on vessels in excess of 200 GRT, this statute only applies to vessels on oceans and coastwise routes. The vast majority of existing towing vessels were purpose-built to remain below the 200 GRT threshold. The Act does not apply on inland waters and western rivers where the largest towboats approach 1,600 GRT.

After 1973, the lack of effective oversight by the Coast Guard allowed industry to cut costs so deeply and degrade the status of engine room personnel to the level of ignorance and incompetence found on many towing vessels today.

Regulations must require basic comprehensive training for a towing vessel's Engineer so that he can maintain, adjust,

monitor and undertake immediate repairs to the main engine(s), pumps, hydraulic and pneumatic systems, and generating equipment. The Engineer must be well versed in electrical safety, proper use of all hand and power tools available to him and knowledgeable through training in pollution prevention to properly refuel his vessel and properly maintain necessary records.

Engineers are also responsible for maintaining machinery and machinery records for equipment beyond the main propulsion machinery in the engine room as well as deck machinery. This machinery includes bilge pumps and stuffing box packing on propeller shafts. When untrained deckhands (ödeckineersö) must perform engine room duties on a part-time basis, other duties such as handling lines, making or breaking tow, cleaning (air conditioned) accommodation spaces or cooking for the crew often take precedence so that they neglect tasks in the hot, noisy and dirty engine room.

Ignorance and Avoiding Engine Room Duties

Since a towing vessel's engine room is a hot, noisy, dirty, claustrophobic, and inherently dangerous place for the unwary, many ödeckineersö avoid the area and concentrate on other less demanding duties. Pilots, concerned mainly with piloting the vessel, occasionally forget to remind less motivated crewmembers to make regular checks of the engine room. Herein lay the seeds of potential disasters.

One Pilot on a well-equipped towboat received a main engine low-oil-pressure alarm signal in the pilothouse. He called his ödeckineerö on duty (actually a tankerman/engineer) to the pilothouse and instructed him to shut down that engine,⁽¹⁾ check its oil level, and refill it with oil if necessary. [⁽¹⁾Towing vessels are not required to have engine "kill" switches or engine re-starting capabilities in the pilothouse.]

The Pilot then instructed his ödeckineerö to check the other engine when he finished with the first engine.

Several minutes later, the ödeckineerö stopped the engine that was low on oil and, a moment later, also stopped the other main propulsion engine to check its oil as well. While this might have saved time and been more efficient if the vessel was alongside the dock, it was not a smart move to leave the vessel without power pushing a red-flag tow drifting in the crowded Lower Mississippi River between Baton Rouge and New Orleans with a nearby upbound ship in the area.

Sinking, Capsizing, and Flooding Incidents

A review of accidents in our files show that unexpected sinking and capsizing are often traced to flooding that went unnoticed while the engine room was unmanned. For the years 1992 through 2004 inclusive, a 13-year period, there were 607 reported sinking, 593 reported flooding, and 115 reported capsizing events on uninspected towing vessels for annual averages of 47, 46, and 9 respectively. These often serious, life-threatening, and traumatic incidents for the mariners involved.

As part of the towing vessel inspection docket #USCG-2004-19977, GCMA requested that the Coast Guard analyze this öraw dataö data on towing vessel sinking, flooding, and capsizing occurrences and make their findings available to the regulatory project manager and to the general public for inclusion in the towing vessel inspection rulemaking process.

“Deckineers” Minding the Engineeroom

At approximately 2330 on July 9, 2003, while transiting back through the Bayou Sorrell Locks light-boat, the uninspected towing vessel (UTV) FAITH capsized and sank inside the Bayou Sorrell Locks. As a result of the incident the operator of the FAITH sustained serious injuries (i.e., a crushed forearm that was later amputated) while abandoning ship.

On July 5, 2003, the FAITH was northbound on the Intracoastal Waterway pushing four loaded hopper barges. Before entering the Bayou Sorrell Locks, the FAITH secured two of its barges to the buoys outside of the lock since the lock is only large enough to hold two barges at a time. After pushing two of its barges north through the locks, the FAITH prepared to transit south through the locks, light-boat, to pick up the two remaining barges.

After the FAITH separated from its tow, some of the crew as well as the Lockmaster noticed the boat listing slightly to its port side.

The FAITH entered the Bayou Sorrell Locks behind the THERESA B that was pushing two barges. The Bayou Sorrell Lock is 800 feet long and 56 feet wide. The FAITH then positioned itself off the starboard side of the THERESA B.

The Lockmaster opened the south gates of the Locks and the THERESA B started to push its barges forward out of the locks. As the THERESA B moved forward the FAITH started to roll to port.

The master noticed the FAITH listing to port and sent his deckhands to the engineeroom to investigate. The deckhands noticed water up to the deck plates in the port side of the engine room. One crewmember stated in his witness statement that he saw bubbles coming from under the port generator. The deckhands then attempted to set up a pump for dewatering but the FAITH was rolling to its port side too fast.

When the FAITH listed approximately 45 degrees to port, the master ordered the crew to abandon ship. All of the deckhands climbed onto the lock walls to safety. While abandoning ship the Master jumped onto the deck of the THERESA B and fell. He was lying on the deck when the FAITH rolled onto the THERESA B crushing his left arm. The trip pilot, was inside of the FAITH when it rolled and was trapped in the wheelhouse until one of the windows was blown out from the water pressure. Personnel working at the Bayou Sorrell Locks and crewmembers aboard the THERESA B helped to rescue the crew of the UTV FAITH.

The FAITH rolled to port and sank in the Bayou Sorrell Locks at approximately 2315. As it did so, it discharged approximately 3,000 gallons of diesel oil into the water after sinking.

On July 10, 2003 two Coast Guard Inspectors boarded the FAITH at the locks and checked all of the accessible voids and spaces and the position of all of the valves. Coast Guard Inspectors were not able to test the vessels engines for leaks because the engines were not operable once the boat was re-floated. Coast Guard Inspectors did not find any damage or breaches in the vessels watertight envelope.

On July 11, 2003, two Coast Guard inspectors conducted a thorough inspection of the vessel immediately after it was placed on dry-dock in Morgan City, LA. No hull damage or breaches in the watertight envelope were detected with the exception of a fracture located in the aft starboard rudder post void. A thorough examination of the hull plate under the port

generator where the deckhand reported seeing bubbles did not reveal any damage or source for the reported bubbles.

The Coast Guard identified these factors contributed to the accident:

- Improper rounds of the engine room by the deckhands aboard the UTV FAITH. Proper rounds might have noticed water in the engine room earlier.
- The aft starboard rudder post void of the UTV FAITH was flooded from a crack in the rudder housing and an adjoining void had been flooded to counterbalance the flooded stern void. There are four watertight voids under the vessel's stern aft of the engine room. These voids are very small in comparison to the size/volume of the other voids on the vessel.
- Crewmembers reported a possible inoperable bilge pump and check valve on the port side. However, when the vessel was righted and re-floated the bilge pump was operable.

After inspecting the towboat after it was righted and after it was placed on dry dock Coast Guard investigators were unable to determine a precise cause for the vessel sinking. Coast Guard investigators believe that a chain of events including one or more of the contributing and possible contributing factors lead to the sinking in the Bayou Sorrell Locks.

In their opinion there was probably a considerable amount of water in the vessel's bilge before the incident. Deckhands reported seeing water in the engineeroom after the boat started to list to port. Investigators were unable to locate any breaches in the watertight envelope to account for the water in the engine room (i.e. flooding).

As soon as the vessel started to roll to port all of the loose gear (including washer, dryer and refrigerator) slid to the port side changing the vessel's center of gravity. This combined with the free surface effect of the water in the engineeroom and the fuel in the fuel tanks aided in rolling the vessel.

The Bayou Sorrell lock was closed for approximately 4 days at an estimated cost of \$150,000 per day for marine traffic. The waiting time at the Algiers locks increased from approximately 3 to 4 hours to 18 to 20 hours as traffic was diverted from the Morgan City 6 Port Allen alternate waterway. The property damage estimate for the vessel was estimated at \$150,000.

Formal Engineeroom Training Needed

Formal training for tug and towboat⁽¹⁾ engineers must be supported by regulations. This training must include the areas listed below for the safety of our mariners.⁽²⁾ *[⁽¹⁾Engineer and safety training is also necessary for Offshore Supply Vessels under 200 GRT including crewboats under 100 GRT although not covered in this report ⁽²⁾Refer to GCMA report #R-276, Revision 8, Item #53.]*

Each subject listed below is generally required at the oiler level on many inspected vessels. This provides a good starting point for training towing vessel Oilers and Chief Engineers.

Proof of satisfactorily completing basic engineeroom safety training (based on the same basic list of subjects) must be required before any mariner performs any function in an unmanned engineeroom on a towing vessel. "Licensing," in the traditional sense of the word (e.g., to meet STCW standards) need be discussed only after sufficient personnel

receive basic engineroom safety (e.g., survival) training:

- First Aid and CPR
- Respiratory Protection
- Tank Safety and Testing
- Confined Space Entry.
- Lifesaving Equipment Training & Drills.
- Firefighting School.
- Liquid Cargo Training.
- Pollution Prevention and Control.
- Damage Control.
- Vessel Construction.
- Tools and instruments.
- Piping Systems and Components Including Pumps.
- Lubrication Including Filters and Strainers.
- Diesel Engines.
- Basic Electricity.
- Pneumatics Including Air Compressors and Air Systems.
- Hydraulics.
- Steering Gear & Electrical and Hydraulic.
- Deck Machinery & Winches, Capstans and Cranes.

Review Existing Guidelines for Periodically Unmanned Enginerooms

The guidelines presented in Navigation and Vessel Inspection Circular (NVIC) 1-78, Automation of Offshore Supply Vessels of 100 Gross Tons and Over needs to receive a comprehensive review as part of this process.

Forgotten and Ignored: The Occupational Safety and Health Act

Comprehensive safety training is necessary to promote engineroom safety if for no other reason than the Coast Guard never conscientiously enforced most OSHA land-based safety standards on towing vessels. OSHA never had a serious presence on towing vessels since the enactment of the Occupational Safety and Health Act in 1970 & 35 years ago. This was brought to light following the Supreme Court decision on *Chao v. Mallard Bay Drilling* on January 9, 2002.

In §651 of the Occupational Safety and Health Act of 1970, "The Congress declares it to be its purpose and policy, through the exercise of its powers to regulate commerce among the several states and to provide for the general welfare, to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources."

Working in the enginerooms of many towing vessels hardly can be seen as safe and healthful nor can the work hours of unlicensed personnel be viewed as preserve(ing) human resources.

Human resources are fleeing from these sinking towing vessels because of the atrocious living and working conditions found on many boats and fostered by many companies.

In order to accomplish Congressional purpose and policy as stated in the OSH Act, the following **regulatory areas** must be addressed in training engineroom personnel as they are in land-based workplaces:

- 29 CFR §1910.169 - Air receivers.
- 29 CFR §1910.212 - General requirements for all machines.
- 29 CFR §1910.243 - Guarding of Portable Power Tools.
- 29 CFR §1910.244 - Other Portable Tools and Equipment.

- 29 CFR §1910.253 - Oxygen-Fuel Gas Welding and Cutting.
- 29 CFR §1910.254 - Arc Welding and Cutting.
- 29 CFR §1910.332 - Training (electrical shock)
- 29 CFR §1910.334 - Use of (Electrical) Equipment.
- 29 CFR §1910.335 - Safeguards for Personnel Protection.
- 29 CFR §1910.147 & Control of Hazardous Energy (i.e., Lockout/Tagout procedures.)

Existing conditions on many towing vessels clearly demonstrate that the Coast Guard, OSHA, and Department of Health and Human Services failed to protect our mariners with **enforceable regulations** in these specific areas. Guidelines, such as Navigation and Vessel Inspection Circulars are **NOT** enforceable regulations:

- Hearing Protection (Refer to GCMA Report #R-349)
- Clean Potable Water (GCMA Report #R-395, Revision 1)
- Asbestos Protection
- Working on Uninspected Barges
- Sanitary Inspections
- Sanitary Food Service (GCMA Report #R-395, Revision 1)
- Fall Protection
- Confined Space Entry Protection.

These neglected areas need correction & if necessary by incorporation by reference of existing regulations promulgated by other Federal agencies.

PREVENTIVE MAINTENANCE AND REPAIR

The Coast Guard preached preventive maintenance to its own personnel and kept its own fleet of cutters and small boats in operation beyond the end of their useful live span. Yet, they sat back and ignored the shabby condition of many towing vessels for years without raising a finger and without seeking the necessary authority from Congress to do so.

Consequently, the Coast Guard does not have specific regulations requiring a preventive maintenance program for towing vessels and, as the NTSB recently pointed out⁽¹⁾ for inspected small passenger vessels either. [⁽¹⁾NTSB/MAR-04/01, *Sinking of U.S. Small Passenger Vessel PANTHER Near Everglades City, FL, Dec. 30, 2002, Recommendation M-02-05 – Coast Guard objections not withstanding.*]

The federal regulators of other transportation modes recognize the importance of preventive maintenance to the safety of their operations and require that operators have a systematic program for performing inspections and maintenance. Perhaps this is a role that the Safety Management System for towing vessels could fulfill if mandated to do so by regulation.

The Federal Aviation Administration (FAA) promulgated for all airplane operators comprehensive maintenance requirements, which include provisions for inspections, repairs, and preventive maintenance.

The Federal Motor Carrier Safety Administration (FMCSA) requires that every motor carrier systematically inspect, repair, and maintain all motor vehicles subject to its control.

The Federal Railroad Administration (FRA) has extensive inspection and maintenance requirements for locomotives, train cars, crossing signals, and tracks.

Extrapolating the NTSB views from small passenger vessels to include towing vessels:⁽¹⁾ "Because no authority other than the Coast Guard exercises oversight over (these towing vessels) the Coast Guard should require that companies op-

erating (towing vessels) develop and implement a preventive maintenance program for all systems affecting the safe operation of their vessels, including the hull and the mechanical and electrical systems.

A requirement to develop and implement such (a) program should not be burdensome to the vessel operators who already have them in place. It would only affect substandard operators without effective preventive maintenance programs.

Without an ongoing preventive maintenance program, substandard operators can continue to operate substandard vessels and in so doing, continue place the public and our mariners at risk. [NTSB/MAR-04/01, p.36,37, Recommendation #M-02-5. GCMA File #M-519.]

HISTORIC DOCUMENTS

[GCMA Editorial note: We made non-substantial changes in format and grammar to these 1973 documents and added emphasis by underlining and boldface type. We submitted these documents to approximately 75 mariners for comment in July 2004.]

DEPARTMENT OF TRANSPORTATION COAST GUARD

A REPORT TO CONGRESS CONCERNING THE NEED FOR ENGINEERS ON UNINSPECTED TOWING VESSELS

Executive Summary and Volume 1
May 1973

FOREWORD

Public Law 92-339 requires the Secretary of Transportation to conduct a study concerning the need for engineers on uninspected towing vessels and also to submit to the Congress a report on this study, together with any legislative recommendations, not later than May 7, 1973. The primary objective of the study is to determine whether a requirement for engineers aboard uninspected towing vessels, while underway, would improve the safe navigation of these vessels.

The responsibility for performing this study was delegated to the United States Coast Guard. A study group consisting of five Coast Guard officers having wide experience in merchant marine safety was formed to carry out this responsibility. The study group first attempted to determine whether the safe navigation of uninspected towing vessels, while underway, would be improved by having engineers aboard. If this were found to be true, then the study group would also attempt to determine:

1. Whether these engineers should be licensed?

GCMA Comment: Thirty-two years ago, five Coast Guard officers opined that adding engineers would not improve the navigational safety of towing vessels. As a result, today, most tug and towboat engineers hold no licenses and meet no standards of knowledge or experience.

Looking back, we can only speculate as to how much actual working experience the five Coast Guard officers making this critical decision had aboard commercial towing vessels. If USCG officers made this decision was made today, we would confidently say, "Damn little."

2. Whether a requirement for engineers should be restricted to selected classes of uninspected towing vessels and not required of others?

GCMA Comment: Which tugs and towboats should have designated engineers, i.e., a person whose job is to maintain the engine room and all vessel equipment as opposed to a deck officer who is a jack of all trades and master of none.

3. What legislation would be recommended to implement these determinations?

The study group was assisted in reaching their determinations by the Educational Testing Service of Princeton, New Jersey, under Contract Number DOT CG-31-448A. They were contracted to assist in the conduct of this study and to perform the following tasks:

1. Provide a statistical description of the utilization of engineering personnel on uninspected towing vessels. Develop a matrix from data supplied by the U.S. Coast Guard analyzing the proportion of Licensed, Unlicensed, and No Designated Engineers by types of vessel and nature of operation.

GCMA Comment: We used these same three terms so we can compare apples to apples 32 years later.

2. Investigate differences in engineering related reported casualties to describe the experience of vessels utilizing Licensed, Unlicensed, and No Designated Engineers as they relate to such vessel factors as horsepower, tonnage, waters of operation, and automation.
3. Design a sampling technique to perform a task analysis for Licensed, Unlicensed, and No Designated Engineers and analyze the results by type of vessel and classification of personnel.
4. Develop findings and conclusions based on statistical analysis and make recommendations.
5. Produce a report in two volumes. Volume I - Summary and Volume II - Statistical Data.

The Coast Guard Study Group, in addition to working closely with the Educational Testing Service to insure that adequate and plausible conclusions based on statistical analysis were reached, performed the following tasks:

1. Defined and supplied all data to be used in analysis. Data was gathered by on site interviews, observations,

- correspondence, and review of reported casualty cases.
- Gathered information for task analysis using on board observations and interviews of operating personnel techniques.
 - Investigated in smaller portions those uninspected vessels of 0-1000 horsepower. The results of this analysis are contained in Volume II, Appendix H.
 - Reviewed report and data developed by Educational Testing Service, and based on this report and the experience gained by individual study group members, developed the Executive Summary.

The Executive summary that follows presents in condensed form the determinations of the study group. Where detail beyond that presented in the Executive Summary is desired, the additional material contained in the report should be examined.

EXECUTIVE SUMMARY

The Need for Engineers on Uninspected Towing Vessels, P.L. 92-339, included a requirement for a study to be conducted concerning the need for engineers on uninspected towing vessels. During the hearings on this legislation, Congress indicated its intent that the study include an analysis of casualty data. Based on an analysis of the casualty data and other factors, a determination would be made whether having a requirement for engineers to be aboard uninspected towing vessels, while underway, would increase the safe navigation of these vessels.

Analysis of the casualty data did not lead to a determination that navigation of uninspected towing vessels would be safer as a result of carrying an engineer aboard, while underway. This determination emerged from the basic findings of the study that:

- The average annual reported engineering related casualty rate for uninspected towing vessels is a very low 1.026 percent, i.e., an average of one out of one-hundred towing vessels has one engineering related casualty annually; and engineering related casualties represent only 6% of total reported casualties involving uninspected towing vessels.
- A breakdown of casualties included in this 1 percent rate indicates for FY 71 and FY 72: Loss of life = 1; Injured = 5; Fires = 31; Collisions and Groundings = 76; Other = 11; and there were no reported engineering related casualties that could be considered a major casualty insofar as its effect on other vessels, structures, or involving release of hazardous materials.
- The annual reported casualty rate for uninspected towing vessels is distributed by type of engineer as follows:
0.95% for vessels carrying a licensed engineer
2.34% for vessels carrying a designated but unlicensed engineer
0.68% for vessels carrying no engineer

The combined facts of:

- A very low casualty rate reported for engineering related

casualties;

- Few reported engineering casualties that could be considered major casualties; and underway, had a lower engineering related casualty rate than those that did, leads to the conclusion that a requirement to carry an engineer on board, while underway, would not significantly improve the safe navigation of uninspected towing vessels. This conclusion, which is drawn from analysis of casualty data, may be somewhat qualified by:
- Towing vessels which did not carry an engineer on board, while underway, had a low engineering related casualty rate than those that did, leads to the conclusion that a requirement to carry an engineer on board, while underway, would not significantly improve the safe navigation of uninspected towing vessels. This conclusion, which drawn from analysis of casualty data, may be somewhat qualified by:

- A lack of quantifiable available data indicating the number of casualties that were prevented or minimized by the presence of an on board engineer;
- The competence of on board engineers;
- The competence of other personnel and the amount of attention given to engineering equipment and systems on towing vessels carrying no designated engineer; and
- The amount of shoreside preventive maintenance. The conclusion is further qualified by the fact that the casualty data reflects only two years experience. This is because the Addendum to U. S. Towing Vessel Casualty Investigation, CG-4724, which was developed in 1970 to improve accumulation and processing of casualty data for towing vessels, has been in use only for FY 71 and FY 72.

Although there is presently no Federal law requiring it, approximately one-third of the uninspected towing vessels carry on board a designated engineer, either licensed or unlicensed. The decision to operate with or without an on board engineer is influenced by a number of factors in addition to navigation safety. These factors are believed to include:

GCMA Comments: In the 1950s and 1960s most towboats changed from steam to diesel propulsion. Steam required licensed engineers. Many trained and licensed engineers remained in service at the time this report was written in 1972.. However, very few licensed engineers remain on the nation's towing vessels today where not required by law.

- Design, age and preventive maintenance programs of engineering equipment and systems.
- Level of shoreside maintenance.
- Need for protection of equipment and/or investment.
- Need for dependability of equipment to perform its mission.
- Historical and traditional considerations.
- Labor contractual commitments.

7. Regional competitive market.
8. Duration of voyage and remoteness from available shore-side maintenance support.

To develop insight into these additional factors, the study group attempted to gather information and data through extensive travel and on site observations throughout the United States. Both management and labor (Engineers, Masters and Crews were interviewed, surveys were conducted and actual on board observations were made. However, this effort resulted only in identifying a sharp division of subjective opinions between management and labor which made an objective evaluation difficult.

GCMA Comment: In 1973 management was concerned with the bottom line and labor was concerned with employment issues. In 2005, GCMA's basic concern is with safety issues as reflected by our mariners' experiences on towing vessels.

With due consideration given to the qualifying factors discussed above, it is still considered a valid conclusion that requiring engineering personnel aboard uninspected towing vessels would not improve their safety record. This conclusion is primarily based on the fact that a casualty rate of only 1 percent is considered not only an acceptable rate but one that is commendable plus the fact that there were no reported engineering casualties that could be considered a major casualty insofar as its effect on other vessels, structures or involving release of hazardous materials.

Because approximately 2/3 of the uninspected towing vessels (4,524) were identified to be of 1,000 horsepower or less, a further breakdown from the original subheads of 1,000 horsepower into three lesser horsepower groupings was considered pertinent. This breakdown and analysis by vessel variables resulted in basically the same conclusion.

While not considered within the scope of this study, there are apparent areas other than requiring engineers on uninspected towing vessels which would probably more significantly affect the safety of uninspected towing vessels. A case by case analysis of reported engineering related casualties for FY 71 and FY 72 revealed:

1. The casualties involving fires originated in engineering spaces and there was an apparent lack of effectiveness of existing fire fighting and fire detecting equipment in minimizing the damage.

GCMA Comments: It took 30 years and the SCANDIA-NORTH CAPE disaster for the Coast Guard finally to require more extensive fire prevention and firefighting equipment on towing vessels other than a few portable fire extinguishers. However, present requirements do not even call for mandatory fire training for many towing vessel officers and allow the use of portable fire pumps on some vessels. [Refer to 46 CFR Part 27].

2. The casualties involving fires, collisions, or groundings were due to failures of steering gear, main engines, main engine control, and electrical systems which could be attributed to

lack of adequate preventive maintenance programs.

A task analysis of duties performed by various categories of engineering personnel aboard uninspected towing vessels identified those factors which were common to all engineering personnel, and isolated those duties which were unique to the different manning circumstances. In terms of common factors the tasks of licensed and unlicensed engineers were the same. However, there is a significant difference in the engineering tasks performed by personnel when there is no designated engineer.

It is recommended that the following actions be taken:

1. That at the present time no legislative recommendations be made which would require engineers on board uninspected towing vessels while underway.
2. That the Coast Guard develop and implement the use of a more meaningful definition of what constitutes an engineering related casualty.

GCMA Comment: This report did not define an engineering casualty. The writers apparently worked under the assumption that, in order to be significant, an engineer-related casualty had to directly affect the navigation of the vessel (i.e., cause the vessel to become involved in an accident with another vessel or object). Nevertheless, other considerations like delays to other vessel traffic also are important. Casualties involving sinking, flooding and capsizing based upon neglect were treated as isolated events even though the cumulative number of these events in the past decade is appalling.

3. That the Coast Guard monitor the effects of the provisions of PL 92-339 which requires that uninspected towing vessels be under direction and control of a licensed operator, particularly its effect on the overall safety record and its relationship to the need for engineers on uninspected towing vessels.

GCMA Comment: Since the engineer issue never was never discussed during the USCG licensing rulemaking project that ended in 2001, the Coast Guard incorrectly considers it a dead issue. GCMA does not agree.

4. That the Coast Guard review existing regulations for uninspected towing vessels giving particular attention to those parts related to fire fighting equipment, fire detection systems, and remote control of fire extinguishing agents.

GCMA Comment: The USCG just completed a major and controversial rulemaking project on fire equipment and detection systems in April 2003. The only training it includes for inland waters are requirements for monthly fire drills and instruction by the Master of the vessel who, for most towing vessels under 200 GRT, may not even be required to attend a fire training school. Fire training is only required for licensed engineers. [Refer to 46 CFR 10.205(g)].

5. That the Coast Guard utilize the data contained in the Task Analysis part of this study to improve examination specifications for engineers, so that they will more accurately reflect the actual duties of engineers.

GCMA Comment: The current USCG licensing requirements for designated duty engineers only apply to vessels over 200 GRT in ocean and coastwise service. The entire lower-level licensing process needs to be re-evaluated with input from knowledgeable lower-level mariners to accurately reflect the actual duties of engineers on towing vessels.

6. That the Coast Guard continue to improve its methods of accumulating and processing casualty data relating to uninspected towing vessels particularly through the use of the Addendum to the U.S. Towing Vessel Casualty Investigation.

GCMA Comments: A 1994 report by the Coast Guard Research and Development Center made sweeping recommendations to improve USCG Marine Casualty Investigations and Reporting. The report showed sweeping deficiencies. (GCMA file #A634A). Congress now requires that USCG accident reports be completed within a 2-year period. However, lessons learned from these casualties are no longer widely disseminated to working mariners although blame for these occurrences is placed almost exclusively on their shoulders and rarely implicates management shortcomings.

7. That the Coast Guard through its public information and education capabilities call to the attention of the towing vessel industry the following:

- a. The apparent need on uninspected towing vessels for preventative maintenance programs for propulsion machinery, electrical systems, control of main propulsion machinery and steering systems.
- b. That the casualty statistical analysis of this report indicates that if they have a designated engineer on board their uninspected towing vessel the safety record would probably improve if he were a licensed engineer, i.e., he possesses the experience and has demonstrated his knowledge to perform the duties of an engineer.

GCMA Comments: The rest of this historical document expands upon the Executive Summary. Unfortunately, the statistical data in "Volume II" was not available.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

LIST OF TABLES

CHAPTER

I. Abstract Of Towing Vessel Engineers Study

- Scope of the Problem
- Methodology
- Conclusions and Recommendations

II. Introduction

- Scope of Problem
- Definition of Terms Used in This Study
- Limitations of this Study
- Assumptions
- Hypotheses

III. Methodology

- Tasks
- Sampling Techniques
- Data Analysis
- Related Data

IV. Findings And Conclusions

- Distribution of Vessels by Type of Engineer Aboard
- Casualties of Fiscal Years 1971-1972
- Tasks Analysis
- Correspondence
- Corp of Engineers
- Summary

V. Recommendations

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The authors of this report wish to acknowledge the invaluable assistance rendered by members of the Study Group of the United States Coast Guard, including Captain John Yager, Study Manager; Captain Edwin Schmidt, Lieutenant Commander George Ireland, Lieutenant Commander Randolph Dekrone and Lieutenant Commander Leeland Gregg. Without the unselfish assistance of the aforementioned people the successful completion of this study would not have been possible.

The findings, conclusions and recommendations of this study represent a coequal collaboration of the members of the Coast Guard Study Group and ETS Staff.

LIST OF TABLES

1. Summary of Towing Vessels by Type of Engineer and Expected and Observed Casualties for Fiscal Years 1971 and 1972
2. Distribution of Vessels by Engineering Personnel
3. Distribution of Vessels by Gross Tonnage
4. Distribution of Vessels by Horsepower
5. Distribution of Vessels by Route
6. Distribution of Vessel by Number of Screws
7. Distribution of Vessels by Control of Machinery
8. Distribution of Casualties by Engineering Personnel
9. Distribution of Casualties by Gross Tonnage
10. Distribution of Casualties by Horsepower
11. Distribution of Casualties by Route
12. Distribution of Casualties by Number of Screws
13. Distribution of Casualties by Control of Machinery.
14. Results of One-Way Analysis of Variance and "T-Test"

I. Abstract of Towing Vessel Engineers Study

Scope of Problem: Section 4427 of the Revised Statutes (46 USC 405) provides for the inspection and manning of tugboats, towing boats and freight boats. Although the language of the law is stated in broad terms, since its enactment it has been interpreted to pertain only to steam propelled vessels. However, through the years the number of this type of vessel has diminished to approximately 40 steam towing vessels. In contrast, the number of motor-driven towing vessels operating on this nation's waterways has increased to over 6,000.

Various bills addressed to the subject of manning towing vessels have been presented to the 88th, 89th, 90th, 91st and 92nd Congress.

During the 89th Congress the primary bills under consideration were HR-156, HR-723 and HR-7491. All of these bills spoke to the licensing requirements for personnel on presently uninspected towing vessels. The evidence presented at these hearings was considered insufficient to establish the need for licensed personnel aboard uninspected towing vessels.

During the 91st Congress HR-13987 and HR-14186 were considered for licensing of personnel aboard uninspected towing vessels. The 92nd Congress enacted Public Law 92-339, which required that uninspected towing vessels, while underway, will be under the actual direction and control of a licensed operator. The law also requires the Department of Transportation to study the need for engineering personnel aboard these vessels and make its recommendations to the Congress by May 7, 1973.

The output of this work is a report containing an analysis of the need for engineering personnel on uninspected towing vessels and recommendations and conclusions with regard to requiring licensed and unlicensed engineers on these vessels. The report deals with the following four areas:

- Area 1:** Statistical Description of the Utilization of Engineering Personnel on Towing Vessels
- Area 2:** Statistical Description of the Relationship between Casualty/Disarrangement Rate and Selected Towing Vessel Variables
- Area 3:** Analysis of the Relationship/Differentiation between Tasks Performed by Licensed and Unlicensed Engineering Personnel Aboard Towing Vessels.
- Area 4:** Conclusions and Recommendations: The conclusions and recommendations are based upon information defined and supplied by the Coast Guard, both in the statistical summaries and in the task analysis.

GCMA Comments: Much of the 1973 report is based on statistical analysis. However, any such analysis is only as good as the statistics themselves. The 1994 USCG report on casualty investigation and reporting casts serious doubt on the underlying reliability of recent Coast Guard statistics.

Methodology

A statistical description of the utilization of engineering personnel on uninspected towing vessels was determined by collecting data from 1,510 systematically selected towing vessels. The data collected from each towing vessel included the type of engineer employed, gross tonnage, horsepower, nature of operation,

control of machinery and number of screws.

Engineering casualty data was collected for fiscal years 1971 and 1972 and also analyzed according to the variables previously listed. The rate for the number of engineering casualties was 1.026 per 100 vessels, or approximately 1 per cent per year of the total towing vessel population of approximately 6,040 vessels. The expected number of casualties was computed using this rate and compared to the observed number of casualties to determine if there were any meaningful differences between the two casualty rates.

A task analysis descriptive scale was developed and completed using data collected from 500 systematically selected towing vessels. The scale described those behaviors or tasks which engineers perform in carrying out their responsibilities aboard towing vessels. The task descriptions were analyzed to determine if there was a statistically significant difference between the engineering tasks performed by licensed and unlicensed engineering personnel and the engineering tasks performed on vessels which carried no designated engineer. The relationships between these variables and select towing vessel descriptor variables were also analyzed.

Conclusions and Recommendations

Summary tables below describe the manning of the towing vessels in the United States by type of manning, specifically manned by licensed engineering personnel, manned by unlicensed engineering personnel, or manned in such a fashion that no engineering personnel are considered necessary. The table also presents the observed casualties over a two-year period, fiscal years 1971-1972, and an extrapolation of the expected casualty rate which would be anticipated for the number of vessels in each category described.

TABLE 1:
SUMMARY OF TOWING VESSELS BY TYPE OF ENGINEER AND EXPECTED AND OBSERVED CASUALTIES FOR FISCAL YEARS 1971 AND 1972

	Licensed Engineers	Unlicensed Engineers	No Designated Engineer	Total
Total Vessels	736	1156	4148	6040
Observed Casualties	13	54	56	124
Expected Casualties	15.1	23.7	85.2	

The results above and the analysis of the complete data indicate that we cannot reasonably justify the conclusion that requiring a designated engineer aboard uninspected towing vessels would increase the safe operation of towing vessels.

I. INTRODUCTION

Definition of Terms Used in this Study

For purposes of clarity the following terms used in the study are defined.

A. MANNING

Licensed Engineer - A person who is an officer of the vessel, and is expected to have an expert knowledge of the engineer-

ing plant, both in theory and in practical application. He has been tested by the Coast Guard as to his qualifications to lead a watch in the engineroom and has been issued a license by the Coast Guard.

Unlicensed Engineer - A person who does not hold a Coast Guard license, but who is responsible to the operator of the vessel for the operation and maintenance of the engineering plant, and this is his sole function on the vessel.

No Designated Engineer - A person on board a towing vessel whose primary function is other than engineering related, such as deckhand, operator, or cook, yet who does surveillance of the engineering plant and may or may not perform other minor engineering functions.

B. ROUTE

Ocean - Normally navigating the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore.

Coastwise - Normally navigating the waters of any ocean or the Gulf of Mexico 20 nautical miles or less offshore.

Inland - Normally navigating the waters inside headlands, not offshore, such as lakes (including Great Lakes), bays, and sounds, and the Intracoastal Waterway, but does not include western rivers, rivers, or harbors which are separately defined.

Western Rivers - Normally navigating the Red River of the North, the Mississippi River and its tributaries above the Huey P. Long Bridge and that part of the Atchafalaya River above its junction with the Plaquemine-Morgan City Alternate Waterway.

GCMA Comment: This definition changed in the past 30 years. Western Rivers now includes the Lower Mississippi River (LMR) all the way to the Gulf of Mexico. The Red River of the North was removed from the definition. The alternate waterway now enters the LMR at Port Allen, LA, not at Plaquemine, LA.

Rivers - Normally navigating rivers and canals, but does not include western rivers.

Harbors - Normally navigating in close proximity to home port (usually not more than 5-10 miles distant in any direction). Such vessels might operate on segments of inland, western rivers, or river defined areas.

C. CONTROL OF MACHINERY

Fully Automated is (1) Stop/ Start principal machinery (main engines and generators) from pilothouse, and (2) gauges, indicators, or alarms in pilothouse for all principal systems needed for safe operation, and (3) pilot house control of main engines.

Semi-Automated is (2) and (3) but does not include (1).

Pilothouse Control is obviously included in fully and semi-automated, but does not include (1) or enough of (2) to be considered semi-automated.

None is no pilothouse control of main engines, thus, even with some gauges or indicators in pilot-house would not

qualify as any degree of automation.

D. CASUALTY

A **Reportable Engineering Related Casualty** is a casualty which can be attributed to a machinery failure or disarrangement and requires notice to the Coast Guard because it results in any of the following:

1. Actual physical damage to property in excess of \$1500.00;

GCMA Comment: 1994 regulations raised the dollar amount of reportable casualties from \$1,500 to \$25,000 and requires reports of "A loss of main propulsion, primary steering, or any associated component or control system that reduces the maneuverability of the vessel." Many accidents still are not reported.

2. Material damage affecting the seaworthiness or efficiency of a vessel;

GCMA Comments: 1994 regulatory changes expanded this section to read: "An occurrence materially and adversely affecting the vessel's seaworthiness or fitness for service or route, including but not limited to fire, flooding, or failure of or damage to fixed fire extinguishing systems, lifesaving equipment, auxiliary power generating equipment or bilge pumping systems."

3. Stranding or grounding;
4. Loss of life; or,
5. Injury causing any persons to remain incapacitated for a period in excess of 72 hours.

Limitations of This Study

1. This study was limited to all uninspected towing vessels as previously defined, operating from ports within the continental United States. Justification for this limitation was based upon intent of this study.
2. The study was limited to those individuals with an engineering task on uninspected towing vessels. Justification for this limitation was also based upon intent of this study.
3. The results of this study were limited to the validity and reliability of the techniques utilized including task analysis check-list, vessel variable check list, and casualty reporting data collected by the Coast Guard.
4. We have a high degree of confidence that this study considered all the major casualties that occurred during fiscal years 1971 and 1972. We do not have the same high degree of confidence that uninspected towing vessels complied with the reporting requirements for lesser casualties.

GCMA Comments: We receive a number of reports from our mariners about accidents the Coast Guard can find no record of. The number of personnel injuries never reported to the Coast Guard is even more contro-

versial. The treatment of many lower-level mariners injured on the job by their employers is inexcusable.

Assumptions

The statement of the problem implied that there were certain relationships between engineering personnel, select towing vessel variables, and casualties. In order to generate hypotheses to test and examine these relationships the following assumptions were developed.

1. Sampling vessel variables of 25% of the total uninspected towing vessel population are adequately descriptive of the parameters over the total towing vessel population.
2. It is recognized that the casualties reported in fiscal year 1971 and 1972 are only a small percentage of the total actual casualties during that period of time. It was assumed, however, that distribution of casualties by vessel variables and manning engineering variables would be representative over the total towing vessel population.
3. We assume the task analysis adequately describes behaviors of engineering personnel aboard uninspected towing vessels, and further assume that a systematic sample of 500 towing vessels (8.3% sample) would adequately describe those tasks performed by engineering personnel when projected to the total population.

Hypotheses

A review of the statement of the problem led to the formation of the following research hypotheses(H) which concern specifically the relationship between type of engineering manning, selected towing vessel variables, and casualty rate.

- H-1:** Tasks performed by licensed, unlicensed, and no designated engineers are related to select towing vessel variables.
- H-2:** Type of engineering personnel, licensed, unlicensed, and no designated engineer, is related to casualty disarrangement rate.
- H-3:** Select towing vessel variables are related to the selection of the casual-comparative method of research which was based upon the expressed purpose of this research. As indicated in the statement of the problem the basic purpose of this study was to describe and detect association between variables, the type of engineering personnel employed, casualty disarrangement rate, selected towing vessel variables.

The rationale for the casual-comparative approach was also based upon the status of information available on the personnel and vessels concerned. Before researchers can make predictions concerning situations, they must first accumulate relevant facts concerning the situational area. A reservoir of information must be first established concerning the distribution of the vessels and engineering personnel within the total population be

fore rigorous research can be undertaken. Such a collection of data allows experimental researchers to weed out unproductive hypotheses and gain insight into meaningful associations. Since the purpose of this research is to determine relationship or associations, the selection of the casual-comparative method of research seems justifiable.

III. METHODOLOGY TASKS

In order to complete this study the following tasks were accomplished:

Task I: Data was collected from a sample of 1,510 systematically selected towing vessels for the following variables:

- (A) Horsepower,
- (B) Gross Tonnage,
- (C) Type of Engineer,
- (D) Route,
- (E) Degree of Automation, and
- (F) Number of Screws.

A copy of the descriptive questionnaire is exhibited in Appendix G in Volume II of this report.

Task II: Task analysis data in the form of behavioral descriptors were collected on a sample 500 systematically selected uninspected towing vessels. The task analysis form utilized is also presented in Appendix G.

Task III: Casualty-disarrangement data, collected by the Coast Guard were classified according to vessel and personnel variables.

Task IV: Collected data were analyzed to determine the relationship between type of engineer employed and the casualty/disarrangement rate.

SAMPLING TECHNIQUES

Originally, the Coast Guard anticipated collecting data from 100% of the uninspected towing vessel population in order to statistically describe the population. However, due to certain time and personnel constraints this task was found to be impractical. Given these constraints the decision was reached to collect data from 1,510 systematically selected uninspected towing vessels. To accomplish this task the 6,040 towing (1) vessels were alphabetically ordered and every fourth ($i=4^{\text{th}}$) boat was identified for the sample. An alternated sample was to provide alternate towing vessels, in those instances where the originally designated towing vessel was impossible to survey. Such problems could occur in those instances where a towing vessel might possibly be serving in Vietnam, Alaska, or be on a voyage where it would be impossible to survey.

A sample was also identified for those towing vessels to be included in the task analysis. Due to those constraints previously identified and the length of time it takes to complete a task analysis, the decision was reached to conduct task analysis on 500 systematically selected uninspected towing vessels. The same procedure as described NOTE (1): i = the spacing between the names of towing vessels selected from the alphabetical list above used with every ($I=12$) towing vessel selected for the sample. An alternate selection sample was also identified for the task analysis. The sampling table is shown below.

SAMPLING TABLE

Statistical Description Sample Task Analysis Sample

Primary Sample	Alternate Sample	Primary Sample	Alternate Sample
1	3	2	4
5	7	14	16
9	11	26	28
13	15	38	40
17	19	50	52
21	24	62	64
•	•	•	•
•	•	•	•
•	•	•	•
6,040	6,040	6,040	6,040
i=4	i=4	i=12	i=12

DATA ANALYSIS

Descriptive statistics were used to display and describe the uninspected towing vessel population included in the study. Towing vessel description data is presented in Appendix A in Volume II of this report. Additional summaries will be found in the Finding and Conclusion section of this report.

Descriptive statistics were also used to similarly classify the casualty disarrangement data provided by the Coast Guard. Appendix B in Volume II contains this casualty disarrangement data broken down by personnel variables and vessel variables. The casualty disarrangement rate was determined by dividing the total number of casualties (124) encountered in fiscal years 1971 and 1972 into the total of 6,040 vessels for the total populations. This resulted in the casualty rate of 1.026% per year, or approximately 1 casualty for every 100 vessels. This rate was used in order to determine the expected casualty rate in each of the vessel categories and personnel categories included in the study. Array of data is presented in Appendix C in Volume II. Task analysis data was tallied by frequency according to personnel variables and vessel variables. A one-way analysis of variance and a t-test were used to determine whether there was a statistically significant difference between the dependent task analysis variables and the independent engineer classification variables. In addition, two-way analysis of variance was conducted to determine the relationship between dependent task variables and the two independent variables of type of engineer and towing vessel variables. Compilation of both of these analyses are contained in Appendix F in

Volume II of this report.

In order to accelerate the task analysis process and to assure that the data collected were compatible with ETS's data analysis systems, a task analysis instrument was developed. The instrument consists of a cover page which identifies the vessels according to 6 select variables and a listing of terminal and enabling objectives in 6 categories. Under each category a check list was prepared which identifies specific tasks performed by the engineers.

RELATED DATA

In addition to the statistical information gathered in the formal part of the study, information was available on selected casualties from the Corps of Engineers. This information was summarized where possible according to engineering personnel and uninspected towing vessel variables and compared to the total casualty information collected by the Coast Guard.

The Coast Guard solicited correspondence from towing vessel operators, concerned labor organizations, concerned management groups, government agencies, and trade organizations to determine their views on the need for engineering personnel aboard uninspected towing vessels. A summary of this information is presented in Appendix E in Volume II of this report.

IV. FINDINGS AND CONCLUSIONS

The Findings and Conclusions presented in this section of the report are arranged in the same order as the tasks which were presented in Chapter III of this report. Tables of short length are included in close order to the discussion in an effort to enhance the easy reference and clarity of the data. Tables of relative long duration are included for reference in Appendices A through H Volume II of this report.

The data are presented in the following order: Description of Vessel and Engineering Personnel Variables, Description of Casualty Data, Description of Analysis Data, and Description of Related Information.

DISTRIBUTION OF VESSELS BY TYPE OF ENGINEER ABOARD

The distribution of vessels found in the sample of 1,510 vessels included in this survey, extended to the population, describe the engineer manning of uninspected towing vessels as follows:

**Table 2
DISTRIBUTION OF VESSELS BY TYPE OF ENGINEERING PERSONNEL**

Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
Number of Vessels	Percent of Total Vessels	Number Of Vessels	Percent of Total Vessels	Number Of Vessels	Percent of Total Vessels	Number	Percent
736	12.2	1156	19.1	4148	68.7	6,040	100

Table 2 indicates that more than two-thirds (2/3) of the uninspected towing vessels carry no designated engineers. The remainder of the vessels are manned by licensed or unlicensed engineers. The smallest percent of vessels, 12.2 percent are manned by licensed engineers.

The Uninspected towing vessels in this study were further classified by the following vessel variables: Gross Tonnage, Horsepower, Route, Control of Machinery, and Number of Screws. Tables 3 through 7 describe the uninspected towing vessel on these variables.

Table 3
DISTRIBUTION OF VESSELS BY GROSS TONNAGE AND TYPE OF ENGINEERING PERSONNEL

Gross Tonnage	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	Number of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number of Vessels	Percent
< 100	72	1.8	248	6.1	3724	92.1	4044	66.9
1016200	296	25.6	480	41.5	380	32.9	1156	19.1
2016300	196	46.2	184	43.4	44	10.4	424	7.1
>300	172	41.3	244	58.7	0	0	416	6.9

Table 4
DISTRIBUTION OF VESSELS BY HORSE POWER AND TYPE OF ENGINEERING PERSONNEL

Horse-Power	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	Number of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number of Vessels	Percent
< 1000	192	4.2	432	9.6	3900	86.2	4524	74.9
100162000	296	30.0	460	46.5	232	23.5	988	16.4
200163000	68	39.5	92	53.5	12	12	172	2.8
300164000	96	51.1	88	46.8	4	4	188	3.1
>4000	84	50.0	84	50.0	0	0	168	2.8

Table 5
DISTRIBUTION OF VESSELS BY ROUTE AND TYPE OF ENGINEERING PERSONNEL

Route	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	Number of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number of Vessels	Percent
Ocean	84	40.4	96	46.1	28	13.5	208	3.4
Coastwise	136	23.3	188	32.2	260	44.5	584	9.7
Inland	104	4.9	272	12.8	1748	82.3	2124	35.2
River	28	5.4	100	19.2	392	75.4	520	8.6
W. River	160	19.4	336	40.8	328	39.8	824	13.6
Harbor	224	12.6	164	9.2	1392	78.2	1780	29.5

Table 6
DISTRIBUTION OF VESSELS BY CONTROL OF MACHINERY AND TYPE OF ENGINEERING PERSONNEL

Number of Screws	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	Number Of Vessels	Percent of Total	Number Of Vessels	Percent of Total	Number Of Vessels	Percent of Total Vessels	Number	Percent
Single	408	13.7	528	17.8	2036	68.5	2972	49.2
Multiple	328	10.7	628	20.5	2112	68.8	3068	50.8

**Table 7
DISTRIBUTION OF VESSELS BY TYPE OF ENGINEERING PERSONNEL**

Control Of Machinery	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	Number of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number Of Vessels	Percent of Class Totals	Number of Vessels	Percent
Fully- Auto	104	16.7	100	16.0	420	67.3	624	10.3
Semi-Auto	160	5.0	436	13.6	2620	81.4	3216	53.3
Pilot House	440	21.3	536	25.9	1092	52.8	2068	34.2
None	32	24.3	84	63.6	16	12.1	132	2.2

These tables indicate that the majority of the vessels under 100 gross tons and 1,000 horsepower, operating on inland harbor waters, and are semi-automated or have pilot house control. Uninspected towing vessels in this study evenly divided between single and multiple screw vessels. The fewest number of vessels were those over 300 gross tons and 4,000 horsepower, sailing on ocean waters with no automation. The trend in vessel manning indicates that the higher gross tonnage and the horsepower, the greater the likelihood of having a licensed engineer aboard. The highest percentage of unlicensed engineers are found aboard uninspected towing vessels between 100 and 200 gross tons and 1,000 and 2,000 horsepower. On those uninspected towing vessels carrying no designated engineer the highest percentages

are less than 100 gross tons, less than 1,000 horsepower, sailing inland and harbor waters, with either semi-automated or pilot house control of machinery.

Casualties – Fiscal Years 1971 – 1972

The total reported engineering related casualties for fiscal years 1971-1972 were as follows:

As shown in Table 8, casualties are very consistent over the two year period when outlined by type of engineer aboard. The casualty rate was computed at 1.026% per year.

The further breakdown of casualties, combining results of the two fiscal years, by vessel variables as follows:

**TABLE 8
DISTRIBUTION OF CASUALTIES BY ENGINEERING PERSONNEL**

	Licensed	Unlicensed	No Designated	Total
1971	8	27	29	64
1972	6	27	27	60
	14	54	56	124

**Table 9
DISTRIBUTION OF CASUALTIES BY GROSS TONNAGE AND TYPE OF ENGINEERING PERSONNEL**

Gross Tonnage	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total	
	O	E	O	E	O	E	O	E
< 100	1	1.48	16	5.09	46	76.45	63	83.02
101-200	5	6.08	21	9.85	9	7.80	35	23.73
201-300	6	4.02	5	3.78	1	.90	12	8.70
>300	2	3.53	12	5.01	0	0.0	14	8.54
Total	14	15.11	54	23.73	56	85.25	124	123.99

O=Observed

E=Expected

Table 9 indicates that vessels carrying unlicensed engineers had a higher than expected casualty rate when the overall casualty rate of 1.026 percent was applied. Those vessels carrying no designated engineer had a lower than expected

casualty rate. This is due mainly to the comparatively low rate experienced for vessels equal to or less than 100 gross tons, which includes approximately 67 percent of all uninspected towing vessels.

Table 10
DISTRIBUTION OF CASUALTIES BY HORSEPOWER AND TYPE OF ENGINEERING PERSONNEL

Gross Tonnage	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total	
	O	E	O	E	O	E	O	E
< 1000	1	3.94	18	8.87	44	80.06	63	92.87
1001-2000	9	6.08	26	9.44	12	4.76	47	20.28
2001-3000	1	1.40	1	1.89	0	.24	2	3.53
3001-4000	0	1.97	9	1.81	0	.08	9	3.86
>4000	3	1.72	0	1.72	0	0.0	3	3.44
Total	14	15.11	54	23.73	56	85.14	124	123.98

O=Observed E=Expected

Table 10 shows that those vessels carrying an unlicensed engineer had a higher than expected casualty rate in three of five horsepower categories, which resulted in a much higher than expected casualty rate. Those vessels carrying no designated engineer had a much lower than expected

casualty rate. This resulted from the fact that those vessels having less than or equal to 1000 horsepower, which includes 75 percent of all uninspected towing vessels had a very low casualty rate for the no designated engineer category.

TABLE 11
DISTRIBUTION OF CASUALTIES BY ROUTE AND TYPE OF ENGINEERING PERSONNEL

Route	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	O	E	O	E	O	E	O	E
Ocean	2	1.72	3	1.97	0	.57	5	4.27
Coastwise	3	2.79	9	3.86	3	5.33	15	11.99
Inland	2	2.13	10	5.58	35	35.88	47	43.61
River	2	.57	3	2.05	7	8.05	12	10.68
W. River	1	3.28	21	6.90	1	6.73	23	16.92
Harbor	4	4.60	8	3.37	10	28.58	22	36.54
Total	14	15.09	54	23.73	56	85.14	124	124.01

O=Observed E=Expected

Table 11 indicates that when the casualties were distributed by route and type of engineering personnel, the observed expected casualty rates were approximately equal for licensed engineers, much higher than expected for unlicensed engineers and much lower than expected for no designated engineer.

The number of observed casualties were higher than expected for all routes having unlicensed engineers. Observed casualties were lower for all routes when there was no designated engineer, especially on the Western River and Harbor routes.

TABLE 12
DISTRIBUTION OF CASUALTIES BY NUMBER OF SCREWS AND TYPE OF ENGINEERING PERSONNEL

Number of Screws	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	O	E	O	E	O	E	O	E
Single	10	8.38	24	10.84	33	41.80	67	61.01
Multiple	4	6.73	30	12.89	23	43.36	57	62.98
Total	14	15.11	54	23.73	56	85.16	124	123.99

O=Observed E=Expected

Table 12 indicates a higher than expected casualty rate for vessels carrying unlicensed engineers, a lower than expected casualty rate for vessels carrying no designated engineers, and

a rate approximately equal to the expected rate for vessels carrying a licensed engineer.

TABLE 13
DISTRIBUTION OF CASUALTIES BY CONTROL OF MACHINERY AND TYPE OF ENGINEERING PERSONNEL

Control Of Machinery	Licensed Engineers		Unlicensed Engineers		No Designated Engineers		Total Vessels	
	O	E	O	E	O	E	O	E
Fully- Auto	0	2.13	0	2.05	0	8.62	0	12.81
Semi-Auto	5	3.28	29	8.95	4	53.79	38	66.02
Pilot House	7	9.03	22	11.00	43	22.42	72	42.46
None	2	.66	3	1.72	9	.32	14	2.71
Total	14	15.10	54	23.72	56	85.15	124	124.00

O=Observed

E=Expected

Table 13 indicates the lowest observed casualty rate for vessels which are fully-automated and the highest observed casualty rate for vessels which are classified as having no control of machinery. Semi-automated and pilot house control vessels carrying no designated engineers have a lower than expected rate while those carrying unlicensed engineers have a higher than expected rate, and in the licensed engineer category expected and observed rates are approximately equal.

The analysis of the casualty disarrangement rates aboard uninspected towing vessels in the United States should first be qualified by a statement that a casualty disarrangement rate or accident rate averaging approximately 1 per cent per year is extremely low. It is the opinion of the author of this report that were such a rate encountered in industry as a whole, or were it being evaluated by an organization such as the National Safety Council, it would not suggest a need for remedial action. Secondly, it is realized that the number of casualties reported over the two year period, 1971-1972, is in all likelihood only a small percentage of the total actual casualties incurred during that same period.

Many factors contribute to the absence of complete casualty reporting. Coast Guard personnel familiar with the field operation of these vessels have indicated that many casualties go unreported for lack of familiarity with reporting procedures. It is impossible to estimate the total number of actual casualties uninspected towing vessels do encounter during any annual period and several attempts on the part of both the Coast Guard and the authors of this report to obtain actuarial insurance information and other pertinent data proved unsuccessful.

In order to analyze the casualty data available it was necessary, therefore, to make some assumptions. The basic assumption required was that while the data is incomplete, the trends exhibited by the partial data available were representative of trends which would be found within the total data. From this assumption a corollary could be made that relationships observed in the sample would represent relationships existing in the total data. Using these two assumptions, the following analysis of casualty disarrangement rates were made.

The primary question posed by the Coast Guard in commissioning this project was that the conclusions and recommendations of the study must answer the question, "would a requirement for engineering personnel aboard towing vessels,

improve the safety record of these vessels?" The clear answer that emerges from the casualty disarrangement data is that such a conclusion, requiring engineering personnel aboard uninspected towing vessels, would not be expected to improve the safety record. The casualty disarrangement rate for vessels carrying licensed engineers, on an annual basis, is roughly .95 per cent per year (1 casualty per 100 vessels). The casualty disarrangement for those vessels carrying unlicensed but designated engineers is 2.34 per cent per year (2.34 casualties per 100 vessels) or a rate twice that of vessels carrying licensed engineers. Over two-thirds (2/3) of the total vessels, (4,148) carrying no designated engineer have a casualty rate lower than that of those vessels carrying licensed or unlicensed engineers. From this finding it is reasonable to conclude that the safety record in no way indicates that the addition of an engineer on uninspected towing vessels presently carrying no designated engineer would increase or improve safe performance.

Having responded in the negative to the initial question posed by this study, further questions framed by the Coast Guard which seek definition of where the addition of engineers would improve safety are inappropriate. Further analysis was made, however, by vessel variables to determine if any of these were consistently contributing to the differential casualty rates observed. No significant results were obtained by this analysis which is presented in Tables 8 through 13 and in Volume II of this report.

While it is not within the scope of this report and study, the results indicate that should an engineer be carried aboard a vessel, this engineer should be licensed. This is demonstrated by the 2.34 per cent casualty rate experienced by vessels carrying an unlicensed engineer as compared to the .95 per cent used for vessels carrying licensed engineers and .68 per cent rate for vessels carrying no designated engineers.

TASK ANALYSIS

A one-way analysis of variance and a t-test were used to determine if there was a statistically significant difference between dependent task analysis variables and independent engineer variables. The results of this analysis indicated that in 5 out of 6 cases there was a statistically significant difference (<.001) between the dependent and independent variables. The overall results point out that licensed and unlicensed engineers perform the same tasks, but that the tasks

performed by no designated engineers are **unrelated** to those tasks performed by licensed and unlicensed engineers.

A summary of the data is presented on the following page.

A two-way analysis of variance was also conducted to determine the relationship between dependent task analysis variables and independent engineer and towing vessel variables. The results of the analysis indicate that in 25 out of 30 cases there was a statistically significant difference (<.001) between the dependent and independent variables. In 7 cases there was a statistically significant difference (<.001) in the interaction between the independent variables compared in units of the dependent variable. The overall results demonstrate conclusively that the major variables distinguishing job performance were the type of engineering and towing variables.

**TABLE 14:
RESULTS OF ONE-WAY ANALYSIS OF VARIANCE
AND "T-TEST" BETWEEN MEANS**

Group 1 Licensed Group
2 Unlicensed Group
3 No Designated

Variable: Number of Records

	1	2	3
1	6	NS	<.001
2		6	<.001
3			6

Variable: Operations

	1	2	3
1	6	NS	<.001
2		6	<.001
3			6

Variable: Number of Repairs

	1	2	3
1	6	NS	<.001
2		6	<.001
3			6

Variable: Number of Orders

	1	2	3
1	6	NS	<.001
2		6	<.001
3			6

Variable: Number of Stows

	1	2	3
1	6	NS	<.001
2		6	<.001
3			6

Variable: Number of Barge Activities

	1	2	3
1	6	NS	NS
2		6	NS
3			6

NS = Not Significant

In summary, the task analysis of the duties performed by the various categories of engineering personnel aboard unlicensed towing vessels identified those factors which were common to all engineering personnel, and isolated those duties which were unique to the different manning and vessel variables. In terms of common factors, the duties and responsibilities of licensed engineers and unlicensed engineers were so similar that no statistical technique could identify meaningful unique work units. In short, both types of engineers did the same thing over all vessel variables.

As might be expected, there were significant and meaningful unique duties and responsibilities performed by personnel who had tasks other than engineering ones. Such personnel on occasion are called "deckaneers" in that they might be employed as mechanics and deck hands, cooks, or some other form-30of duty. While no statistical data was gathered on the engine maintenance of vessels employing such personnel it is the impression of the Coast Guard that shore side maintenance facilities ranging from the primitive to the highly sophisticated are available to maintain and repair the engineering equipment aboard these vessels.

It should be noted that the task analysis data provided in Volume II of this report not only provides information pertinent to the questions posed in this report, but can be used by the Coast Guard should licensing of towing vessel engineering personnel be an administrative recommendation. Content areas have been identified and specified which would be directly related to the operations in which engineers engage aboard these vessels and on the basis of which legitimate licensing programs could be developed.

CORRESPONDENCE

Public law 92-339 and the subsequent efforts on the part of the Coast Guard to gather the data necessary to reply to Congress generated a great deal of correspondence from a variety of different sources including labor organizations and unions, industry, management organizations, concerned individuals, and federal agencies. The variety of this correspondence makes it difficult to provide a simple summary. We shall however, attempt to present an overview to indicate trends and what seems to be preponderant opinion.

The correspondence was divided up into four general categories, opinions supporting the employment of licensed engineers, opinions supporting the utilization of designated engineers, opinions supporting the position that no designated engineer be required, and informative correspondence essentially expressing no opinion with regard to the situation. Appendix E of Volume II of this report contains a summary of the opinions presented in correspondence in tabular form. The content of this correspondence can be summarized as follows:

Labor/Unions:

Labor organizations and concerned unions submitted correspondence including a petition from the Inland Boatmen's Union of the Seafarers International Union signed by 120 names protesting the study conducted by the Coast Guard and generally expressing the opinion that experienced or competent engineers should be required aboard unin-

spected towing vessels. Also presented was a detailed study of five selected casualties occurring during fiscal year 1971 which were analyzed and published by the Marine Engineers Beneficial Association, AFL-CIO. Preponderant labor union opinions expressed in the correspondence were in favor of the requirement of a designated engineer aboard vessels, be they licensed or unlicensed.

Industry:

During August and early September, 1972, approximately 1,250 individual letters were mailed to all known owners and operators of uninspected towing vessels. Replies to this initial mailing were received totaling 185. This request was an attempt to promote participation in the study. However, in replying, many respondents expressed opinions which preponderantly recommended that no requirement be established that uninspected towing vessels carry either a designated or a licensed engineer.

Management Organizations

Four management organizations submitted written comments stating their positions with regard to the carrying of engineers aboard uninspected towing vessels. These organizations were the Offshore Marine Service Association, the National Association of River and Harbor Contractors, the National Sand and Gravel Association and the Columbia River Towboat Association. Three of these organizations strongly recommended no designated engineer be required. One organization expressed no opinion pro or con.

Individuals

Approximately twenty-one individuals voluntarily submitted letters expressing their opinions on the subject of the study. These individuals were members of but did not purport to represent labor organizations and/or towing vessel operators. Based on their experiences where their actions prevented onboard engineering casualties, they unanimously recommended that at least a designated engineer be required aboard uninspected towing vessels.

Federal Agencies

In August, 1972, letters were sent to the following federal agencies: the National Transportation Safety Board, the Department of Interior, and the Department of Commerce. The respondents essentially offered cooperation and assistance to the study group. The one organization responding with an opinion was the National Transportation Safety Board. Their letter, in part quoted below, is as follows:

"Our review of numerous casualties involving towing vessels the purposes of the current study since it essentially consisted of a listing of actual casualties over varying periods of time. The dates within which casualties covered by the Corps of Engineers is reported in each of the division range from a

brief period, March, 1971 through June, 1972, to as long a period as April, 1960 through October, 1972. The only trend which can be established verifies the trend observed in casualty data supplied by the Coast Guard for fiscal years 1971-1972. Specifically in the Corps of Engineers information, a total of 907 casualties were reported, 818 of which were deck related, 56 of which were due to causes unknown, and only 33 could be identified as having engineering causality. Thus, less than 4 per cent of the total casualties reported for varying periods between April, 1960, and October, 1972, were engineering related.ö

SUMMARY

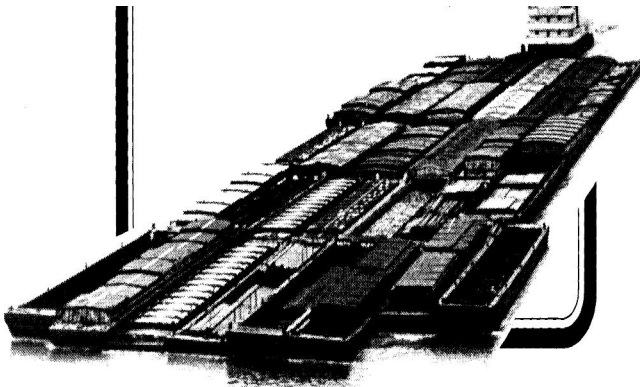
Findings and conclusions described in this chapter can be summarized as follows:

1. Designated or licensed engineers are currently carried on fewer than 1/3 of uninspected towing vessels in the United States.
2. Casualty disarrangement rates can in no way demonstrate that the addition of a designated engineer aboard the over 4,000 vessels which currently carry no designated engineer would improve the safety record of these vessels. Casualty data does in fact, indicate a quite contrary recommendation.
3. Task analysis of the duties and responsibilities of the various categories of personnel carried aboard uninspected towing vessels indicates that licensed and unlicensed engineers aboard these towing vessels essentially perform the same tasks and that the engineering duties performed by personnel other than full time engineers are essentially different from those performed by licensed and unlicensed engineers.
4. The extensive correspondence submitted to the Coast Guard as a result of the legislation is generally centered around common opinions held by the various groups represented. Labor organizations generally favor the employment of designated or licensed engineers. Operators and management organizations generally favor no legislation requiring the employment of designated or licensed engineers. Individuals generally have opinions which coincide with the organization of which they are members.

V. RECOMMENDATIONS

A review of the findings and conclusions in this study seems to indicate that the addition of designated engineers aboard uninspected towing vessels will not reduce the casualty/ disarrangement rates currently experienced and therefore will not improve the safety record of these vessels. Therefore, it is recommended that at this time the Coast Guard not make any legislative recommendations which would require engineers on uninspected towing vessels.

HISTORIC DOCUMENT #2



THE NEED FOR LICENSED ENGINEERS ABOARD UNINSPECTED TOWING VESSELS

The views and recommendations of the Marine Engineers Beneficial Association, AFL-CIO, with respect to the need for engineers aboard uninspected towing vessels, submitted to the U. S. Coast Guard for inclusion in the study Congress has directed that Agency to perform January 2 1973.

The Marine Engineers Beneficial Association, AFL-CIO, (MEBA) is firmly convinced that towboat safety requires the service of licensed engineers aboard all towing vessels, and especially uninspected towboats.

The United States Coast Guard now requires that all oceangoing towing vessels of more than 200 gross tons have licensed engineers on board. MEBA believes that it is imperative that the nearly 6,000 uninspected towing vessels plying the coastal and inland water routes be similarly regulated for engineers on uninspected towing vessels.

We realize that the Coast Guard is fulfilling the mandate of Congress in conducting a study concerning the need for engineers on uninspected towing vessels. As a part of this study, the Coast Guard is analyzing casualties to determine whether a requirement for engineering personnel will improve the unsatisfactory safety record of towing vessels.

In this report we have drawn from a representative sampling of the Coast Guard's accident reports. Although only a sampling, it includes a part of the massively trafficked Inland Waterways. We are confident that the results are representative of the circumstances that show the pressing need for licensed engineers aboard all towing vessels.

RECOMMENDATIONS

As a result of its study of The Need for Licensed Engineers Aboard Uninspected Towing Vessels, the Marine Engineers Beneficial Association, AFL-CIO, **recommends** that:

1. U.S. Coast-Guard-licensed engineers be required aboard all uninspected towing vessels.

2. The engine room be manned by a licensed engineer at all times while the vessel is being navigated.
3. Uninspected towing vessels designed for unattended engine room operation and certified as such by the Coast Guard be required to carry at least one licensed engineer at all times.
4. The Coast Guard be authorized to promulgate regulations making the licensed engineer responsible for the operation and maintenance of all mechanical, firefighting, pollution-control and other safety equipment carried aboard the vessel.

GCMA Comments: Our principal safety concerns must focus on properly training an engineer rather than licensing. This is important because USCG Engineer licenses are simply out of reach for most existing tug and towboat engineers who have never received comprehensive formal training. Since the Coast Guard never required licensing of tug, towboat, small passenger vessel, and OSV (under 200 GRT) engineers, there are few if any schools that offer this training. Consequently, deck officers must carry on without the backing of adequately trained engineers.

The Coast Guard should conduct a comprehensive study of the need for licensed engineers onboard uninspected towing vessels. We believe that such a report will prove that a licensed engineer, is required aboard towing vessels. We feel that the Coast Guard's study should be expanded to include the following areas:

1. River accidents that were prevented by the presence and knowledge of a licensed engineer. We suggest that personal interviews be conducted with engineers.
2. An analysis of towboat fires, their causes, effects, and resultant damage, together with recommendations for their prevention.
3. An analysis of towing-vessel accidents resulting in actual losses exceeding \$20,000.
4. An analysis of all factors surrounding the casualties delineated in the Coast Guard accident reports on file.
5. An evaluation of the need for licensed engineers to provide adequate environmental protection.

We also recommend that the Coast Guard develop a more comprehensive accident reporting procedure, and design forms that detail (1) causes of and (2) effects of towing vessel accidents.

Coast Guard field personnel should be required to make an on-the-scene inspection of each significant towboat accident. Their reports should be subject to review to ensure that they are complete in all details. The economic loss attributed to accidents should include sufficient data to reflect the actual total cost, including vessel damage, business interruption, and wage losses, etc.

Since the majority of towing vessels are uninspected, the only way to improve the poor safety record that plagues the industry is to require licensed engineers aboard these vessels.

We are confident that if the Coast Guard encompasses our views and recommendations with the study it has underway, the results will reflect the urgent need for corrective action and will aid in persuading Congress that legislation making licensed engineers mandatory on all towing vessels is required to stem the rising tide of accidents.

ACCIDENTS IN THE MID-ATLANTIC AREA

During Fiscal Year 1971, eight accidents in the Coast Guard's Fifth District, which encompasses the Mid-Atlantic states, were attributable to engine-room casualties.⁽¹⁾ These eight engine-room casualties, out of 62 casualties in that year, resulted in seven groundings or collisions and one fire.

Only one of the vessels with an engine-room-related accident had an engineer aboard, and he was not manning the engine room at the time of the accident. The Coast Guard report did not indicate the extent of the engineer's qualifications or whether he was the only engineer on board.

[⁽¹⁾The casualty statistics employed in this study were gathered from the files of the Coast Guard's Office of Merchant Marine Safety. In researching the files of Coast Guard Districts II, V and VIII, MEBA sought two things: a) The number of towboat accidents in these Districts during the past several years, and b) the number of engine-room related accidents during the same period.]

The result is a study that looks primarily at the causes of engine-room casualties and the effects they have on safe navigation.

Another vessel had a manned engine room when the accident occurred. However, it was manned by an unendorsed deckhand -- not a licensed engineer.

Coast Guard records indicate that 83 percent of the accidents attributable to engine-room casualties in District V in fiscal 1971 could "possibly have been prevented by a licensed engineer."⁽²⁾ (Emphasis added). *[⁽²⁾Based on Form 4724, which is used by Coast Guard Inspectors to evaluate the causes and effects of towboat accidents. The Coast Guard does not analyze all accidents with Form 4724. However, the majority of accidents were analyzed by use of this form.]*

The need for a licensed engineer is further demonstrated by an evaluation of the one fire in District V in fiscal 1971. S. A. Walker, the Coast Guard inspecting officer, concluded that the fire was due "to the negligence of the chief engineer," and could have been prevented had the engineer been "licensed."⁽³⁾ (Emphasis added) *[⁽³⁾Coast Guard accident report on the M/V LUTHER HERDMAN, a towboat that exploded and burned January 6, 1971 at mile 6.0 of the Kanawha River.]*

The Marine Engineers Beneficial Association strongly believes that first-hand inspection and complete evaluation of each towboat accident is the best method of determining how the accident was caused, who was responsible, and how similar accidents can be prevented. This conclusion has been strengthened by our evaluation of the Form 4724 reports prepared by Coast Guard personnel.

As an example, in a report on an explosion and fire

aboard the M/V LUTHER HERDMAN in 1971, a Coast Guard examiner in West Virginia, after meeting with the crew of the HERDMAN, described the engineer as "incompetent."⁽⁴⁾ The inspector recommended that the Coast Guard seek legislation providing for:

1. "Coast Guard inspection of commercial towing vessels," and
2. "The licensing of the pilothouse and engineering supervisory personnel." (Emphasis added). *[⁽⁴⁾Ibid.]*

INLAND WATERWAY ACCIDENTS

There were 498 accidents reported in Coast Guard Districts II and VIII of the Inland Waterways during fiscal 1971. Six percent, or 33 accidents resulted from engine room casualties.⁽⁵⁾ The 33 machinery-space casualties caused 17 fires and 16 collisions. In 85 percent of these casualties (where information was available), the engine room was not manned. Among the few cases where the engine room was manned, there was insufficient data to determine if the personnel were properly licensed or if they were present at the time of the casualty. *[⁽⁵⁾ See footnote 1.]*

Of the Coast Guard examiners' reports (Form 4724) studied, 79 percent indicate that the accidents caused by engine room factors could "possibly have been prevented by a licensed engineer." (Emphasis added)

It has been estimated in reports by the Coast Guard that about 62 percent of all towing vessel accidents⁽⁶⁾ and 80 percent of the collisions and groundings⁽⁷⁾ can be attributed to pilothouse personnel error. MEBA believes that the licensing of the navigating personnel required in the "Towboat Licensing Act" will greatly reduce, if not eliminate, the pilothouse-attributed casualties. When this goal is achieved, the number of machinery-space casualties will be more significant when compared to the total number of remaining accidents. This will emphasize the already evident need for licensed engineers aboard towing vessels. *[⁽⁶⁾July 29, 1965 letter from Vice Admiral W. D. Shields, Acting Commandant, U.S. Coast Guard, to U.S., Congress, House, Committee on Merchant Marine and Fisheries, Towboat Regulations, Hearings before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee On Merchant Marine and Fisheries, House of Representatives, on H.R. 156, H.R. 723 and H.R. 7491, 89th Cong., 1st sess., 1965, p. 43, Serial No. 89-16. ⁽⁷⁾Testimony of Rear Admiral Charles P. Murphy, Chief, Merchant Marine Safety, U.S. Coast Guard, to U.S., Congress, House, Committee on Merchant Marine and Fisheries, Towboat Crew Licensing, Hearings, before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, on H.R. 13987 and H.R. 14186, 91st Cong., 1st sess., 1969, p. 5, Serial No. 9.1-16.]*

IMPROVED ACCIDENT REPORTING & ANALYSIS

The Coast Guard requires that the Master or owner of the vessel submit an accident report for any accident which causes damage in excess of \$1,500, which results in the incapacitation of a crew member for more than 72 hours, or which af-

fects the seaworthiness of the vessel. Many of the accidents reported (498 on the Inland Waterways in fiscal 1971) cover minor casualties.

Engine-room-related casualties cause substantial damage. In 1970, engine-room casualty losses averaged \$43,000 each, based on estimates made at the time of the accident.⁸ The figure does not reflect the actual financial loss created by the accident. Nor are other costs, such as cargo damage, smoke damage, pollution cleanup, personal accident claims, and business interruption for both the operator and the shipper included.⁹ *[⁸This figure was determined after MEBA analyzed engine-room casualties for Coast Guard Districts II and VIII. ⁹The Coast Guard evaluation of accident damage is incomplete in many respects. The National Transportation Safety Board pointed out in 1969 that the damage estimate reported by the Coast Guard is a rough estimate made at the time of the accident and not after the actual cost of repairs. Thus, damage estimates are usually far below the actual costs of repair.]*

In addition, the accident reports also carry only the damage estimate. They do not indicate the amount of wages lost by crew members who are jobless due to the accident, they do not indicate the loss to the owners in downtime or lost business opportunities; and the accident reports often omit damage caused to other vessels, to locks and docks, and inconvenience to shoreside personnel making rescues, putting out fires, or raising sunken barges or boats.]

If the Coast Guard conducts an analysis of towboat accidents resulting in actual losses in excess of \$20,000, we believe the number of engine-room-related casualties would be highly significant when compared to casualties resulting from other causes. High-loss accidents take on added importance because they pose the greatest danger to the crew, shoreside facilities, communities, bridges, dams and other vessels.

The Coast Guard should also analyze the mitigating causes and factors that contribute to collisions and groundings. MEBA, through the experience of its members, knows that some accidents can be attributed to loss of main-engine power, loss of steering, loss of electrical generators, loss of remote-control systems, and a variety of other mechanics and electrical malfunctions. Experience has also shown us that many of these malfunctions can be prevented by a licensed engineer. Because the present reporting system does not identify these contributing factors, the licensed engineers' contribution, as well as their potential for preventing casualties, are left to speculation.

FIRES ABOARD TOWBOATS

MEBA strongly urges the Coast Guard to evaluate the circumstances surrounding fires aboard towboats. There is a strong link between the majority of towboat fires and the engine room.

There were 46 fires on the Inland Waterways in Coast Guard Districts II and VIII between Fiscal Years 1969 and 1971 that were directly attributable to engine-room casualties, an average of 15 each year, or more than one a month.⁽¹⁰⁾ A 1969 analysis of 13 fires showed that the average damage per vessel was \$54,000, indicating the destructive nature of engine-room fires. The actual costs are far higher than the ves-

sel damage costs.

The Coast Guard has examined a number of these fires through the use of Form 4724. MEBA found that in 94 percent of the cases where this evaluation was made, the Coast Guard reported that the engine-room fires could "possibly have been prevented a licensed engineer." (Emphasis added)

In an analysis of 1971, fires only, where data was available, it was determined that all of the fires were discovered by visual, auditory, or other human sensory perception and not by pilothouse fire-detecting instruments. In most cases the fire was found when it became big enough for the pilot to see the flames or smell the smoke. Once the fire was detected, the pilot had to summon the crew to extinguish the blaze. Unfortunately, there is no requirement for the crew members to be trained in fire-fighting techniques. Many of them are not familiar with fire-fighting procedures.⁽¹⁰⁾ *[See foot note 1.]*

GCMA Comments: Although fire drills are now required by regulation, formal fire school training is only required on vessels over 200 GRT except for tugs of less than 200 GRT in ocean service. *[Refer to 46 CFR 10.205(g).]*

While data was not available in most cases to make a complete determination, in at least six cases it was stated that intense flames and smoke in the engine room prevented the crew from fighting the fire. This was caused in part by the crew's discovery of the fires from outside the engine room. The time lost between the start of the fires and their discovery made effective fire fighting impossible. Early detection is of the utmost importance in fire fighting if the blaze is to be extinguished before it roars out of control.

The 1969 and 1971 statistics show that in 95 percent of the cases, the engine room was unmanned at the time the fire started. Had a licensed engineer been on watch in the engine room, either the cause would have been eliminated or early detection would have been possible, enhancing the chances of extinguishing the fire with minimal damage.

An example in point is the report of a Coast Guard examiner concerning a fire aboard the M/V E'deana Bosworth in 1969, in which he states:

"The absence of assigned personnel, with engine-room duties only, attributed directly or indirectly to a damaging fire. If an engineer had been on watch in the space, early warning of the fire could have been had and possibly early extinguishing, also."⁽¹¹⁾ *[⁽¹¹⁾Coast Guard accident report on the M/V E'DE-ANA BOSWORTH, in which a fire destroyed the vessel, December 15, 1968, at mile 68, Kanawha River.]*

Unmanned engine rooms create other serious hazards. Often the fire extinguishers and the controls for the fire pump are located in the engine room and cannot be reached once the fire has become intense.

Too often when a towboat fire is discovered, crew members, unfamiliar with fire-fighting procedures, techniques and equipment, have to run to the engine room either to start the fire pump or reach the fire extinguishers. The serious results of this policy are pointed out in the following Coast Guard accident report excerpts:

"Despite fire extinguishers in the engine room, neither the mate nor the captain was able to reach them."⁽¹²⁾

[⁽¹²⁾Coast Guard accident report on the M/V Doc. III, in which an engine-room fire gutted the vessel, August 15, 1970, Intracoastal Waterway near Larose, Louisiana.]

"The boat had fire extinguishers in the engine room, but the fire was so intense as to preclude their use."⁽¹³⁾ [⁽¹³⁾Coast Guard accident report on the M/V CAPT. DANE, in which an engine-room fire gutted the vessel, February 19, 1971, at mile 33, Barataria Waterway.]

The Coast Guard examiners on the scene recognized the fire-fighting problems present on towboats built to have manned engine rooms, but operated with the engine rooms unmanned.

The examiner who investigated the fire aboard the M/V E'DEANA BOSWORTH recommended that "external controls for fire-fighting equipment" be installed on towboats with unmanned engine rooms.⁽¹⁴⁾ This recommendation is an obvious response to the problem and one that any responsible operator would make. [⁽¹⁴⁾Coast Guard accident report on the M/V E'DEANA BOSWORTH.]

As shown in the voluminous hearing records dating back to the early 1960's that deal with inspection, manning and licensing, the towboat companies contend that they are responsible and capable of self-policing their equipment. Yet towboat operators, many of whom oppose licensing of engineers and inspection of towing vessels, often have allowed their equipment to be operated in an unsafe manner. This is documented in the cases cited and in many other official Coast Guard accident reports.

NEED TO CONTROL TOWBOAT FIRES

In the past, towboat companies have used numerous techniques to disguise the seriousness of the fires that occur on their vessels. Some river operators suggest that when fire breaks out, the boat be grounded on the bank and the crew jump off. Other towing vessel operators suggest the boat should drop its barge(s) and be run aground. They suggest that if one barge is burning, it be cast off to keep the fire from spreading. If the towboat is burning out of control, personnel are instructed to climb aboard the tow, disconnect the boat, and allow the burning hull and the barges to drift downstream.

Although these methods may save the lives of the people aboard the vessel, the danger to the other boats and tows, citizens along the bank, as well as to the owners of factories, marinas, bridges, and any other buildings and facilities along the river bank is evident. All of these alternatives show a haphazard operating method that can no longer be condoned on America's waterways.

The citizens of Norfolk, Virginia and those along the eastern shore of Maryland have a grim reminder of the economic consequences of an uncontrolled barge. On September 21, 1972, the tug M/V CAROLINE lost its 230-foot barge. The barge knocked down a pillar supporting the Chesapeake Bay Bridge-Tunnel, causing the southbound lane of the causeway to collapse.

Fortunately, no one was on the Chesapeake Bay Bridge Tunnel at the time of this mishap. No lives were lost, but the property damage totaled several millions of dollars, and thousands of citizens were required to find alternative transportation routes causing time loss, added mileage and other costly

inconveniences.

Many residents along the Inland Waterways will tell you the horror experienced in witnessing a burning barge or towboat cast adrift on the river to be at the mercy of the current. The possibility of a major disaster is evident when one realizes that a fire aboard a towboat could cause 40,000 tons of highly flammable petroleum products to ignite spreading along the waters to shoreline facilities or themselves frequently stocked with highly combustible materials causing a massive holocaust in a waterfront city. The chance for devastation is equally apparent in the potential escape of enormous cargoes of death-dealing toxic materials carried by barge, including chlorine. In the event of major fire involving a vessel, its tow, and shoreside facilities, many river communities would not have the amount or type of fire-fighting equipment available to them to fight the fire properly.

NEED FOR FIRE-PREVENTION MEASURES

Unless uninspected towboats are equipped with suitable fire-fighting equipment and adequate personnel trained in its use, fires aboard towing vessels will continue to threaten waterfront residents and their property. It is not enough merely to place fire-fighting equipment on the towboat. It must also be continually inspected, tested and maintained.

Unfortunately, the Coast Guard has not been given the authority to inspect these vessels and make sure that the fire-fighting equipment is properly maintained.

MEBA urges that the Coast Guard be given the power and the responsibility to regulate the towing industry and require competent engineers to man all towing vessels.

In order to prevent engine-room fires, the Coast Guard should require that the engine room be manned continuously unless the vessel is suitably equipped with fire-detecting and fire-fighting equipment that is properly designed for remote sensing, operation and control. Even when the vessel is equipped for unattended operation, a licensed engineer should be aboard the craft at all times in order to assure that all engine-room equipment is in safe operating condition.

The employment of engineers would also reduce the number of other fires aboard uninspected towing vessels. In addition to his other duties, the engineer should be given the responsibility of ensuring that all fire-fighting equipment is properly maintained in accordance with Coast Guard regulations. It is disconcerting to hear about a boat on which the only fire pump is defective, or on which the single fire pump has been removed for repairs. Crew members cite these and other examples of flagrant violations of prudent safety measures.

If a licensed engineer were employed on the vessel and required by the Coast Guard to maintain the fire-fighting equipment, he would not permit unsafe practices.

EVALUATING THE NEED FOR ENGINEERS

Some towboat companies want the best of both worlds; not only do they seek the lowest possible manning scale, but they want the most minimal automation and remote sensing equipment.

Rear Admiral Charles P. Murphy, (then-Chief,

Merchant Marine Safety), U.S. Coast Guard, said during a 1969 Congressional hearing:

"Further, it is felt that engineer manning requirements should not be restricted or frozen by statute. The specifics of engineer manning requirements are influenced by a number of factors such as a vessel's geographical operating area, the mode of operation as well as the sophistication and automation of her engineering plant. All of these factors must be thoroughly evaluated on each vessel in order to properly determine the need for engineers."⁽¹⁵⁾ (Emphasis added). [⁽¹⁵⁾Testimony of Rear Admiral Charles P. Murphy, Chief, Merchant Marine Safety, U.S. Coast Guard, to U.S., Congress, House, Committee on Merchant Marine and Fisheries, *Towboat Crew Licensing, Hearings, before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, on H.R. 13987 and H.R. 14186, 91st Cong., 1st sess., 1969, p. 6, Serial No. 91-16.*]

We agree that the number of licensed engineers is influenced by the degree of automation, and we urge that the study being conducted by the Coast Guard evaluate these factors.

MEBA feels it is essential to the safe operation of towing vessels to require that the engineer be on duty at all times if the vessel's engine room is not designed for safe, unattended operation as determined by the Coast Guard.

Unattended engine rooms should, at a minimum, be equipped with extensive monitoring, control and alarm systems, together with automatic transfer capability of vital auxiliaries, as well as machinery-space fire-detection and bilge-flooding-detection systems.

The manning of engine rooms on uninspected vessels should be subject to the same requirements as those for inspected vessels as detailed in Coast Guard Circular 1-69.⁽¹⁶⁾ MEBA firmly believes that even if a vessel meets the Coast Guard requirements for unattended engine operation, at least one licensed engineer should be assigned to the vessel for its safe, efficient operation under all conditions. This is the only way to prevent the growing rash of engine-room accidents. [⁽¹⁶⁾ U.S. Coast Guard, *Navigation and Vessel Inspection Circular No. 1-69, Automated Main and Auxiliary Machinery, January 8, 1969.*]

NEED TO CONTROL POLLUTION

The National Environmental Policy Act of 1969, the Federal Water Pollution Control Act of 1970, and the Ports and Waterways Safety Act of 1972 have assigned to the Coast Guard new and vastly expanded responsibilities ó the promulgation, administration and enforcement of these laws.

The U.S. Coast Guard, acting under the authority of the Federal Water Pollution Control Act of 1970, has published final regulations governing the design, construction and operation of vessels operating in the navigable waters and contiguous zone of the United States. These regulations will require that all licensed and endorsed personnel employed on inspected vessels pass an examination to show that they are familiar with pollution-prevention regulations and procedures.

These regulations will affect fewer than 1,000 oceangoing and Great Lakes vessels which do not operate continuously in American waters.

On the other hand, the almost 6,000 uninspected towing vessels, which operate almost exclusively in the U. S. waters, are all but completely ignored by these regulations. While masters, mates and operators ó all of whom spend 12 hours daily navigating their vessels ó are required to have pollution-control knowledge, they cannot normally perform engine-room work. Vessels towing barges carrying oil are required to have a tankerman who will be familiar with water pollution prevention, but they are primarily interested in the cargo in the barges.

MEBA believes that this is a serious oversight. If pollution controls are to be met by these 6,000 uninspected vessels, many of which are in continuous operation, the personnel responsible for the operation and maintenance of the machinery space aboard towing vessels must be familiar with pollution-prevention procedures and equipment.

The engineers responsible for sewage and bilge water disposal, the disposal of oily waste and other pollutants, including those resulting from emergencies and equipment failures, should be tested and licensed by the Coast Guard.

The urgency of having qualified personnel ó licensed engineers ó who are equipped to cope with the changing demands of pollution-control requirements cannot be over-emphasized.

Recently promulgated Coast Guard regulations would require that engine sumps not be drained to the bilges, and that all vessels be required to carry bilge waste, etc. on board until it can be properly discharged into an appropriate shoreside receiving facility. On many inland craft the bilges will, in all probability, be pumped directly into the shoreside facility because they lack the space needed for holding tanks. The carrying of these waste materials aboard produces yet another fire hazard.

In the interest of public protection and to prevent further adverse publicity by ecological groups, a detailed study should be conducted of the amplified need for properly licensed engineers on all uninspected towboats to operate the auxiliary equipment designed to reduce water pollution in a safe and legal manner.

The impact of the Ports and Waterways Act of 1972 has yet to be developed. New regulations are certain to affect the entire uninspected towboat industry.

In addition, intricate air-pollution laws at the Federal, state and local levels would seem to require that a study be made to determine the extent of the need for properly licensed towboat engineers to effectively operate and maintain sophisticated propulsion and air-pollution abatement equipment so that engine emissions meet legal standards.

ENGINE ROOM ACCIDENT PREVENTION

The Marine Engineers Beneficial Association, based on the extensive experience of its membership, is convinced that the employment of licensed engineers aboard towboats contributes greatly to the prevention of vessel accidents. On countless occasions, engineers have prevented power and steering failures and have been able to effect temporary repairs that have saved vessels from serious accidents. If documented case studies of these actions had been gathered by the Coast Guard, they would have provided undeniable

proof that employment of licensed engineers results in safer towing vessel operations.

For this reason, MEBA strongly recommends that the Coast Guard conduct interviews with towboat engineers to document cases where the presence of a licensed engineer has been the difference between safety and a casualty.

It is not sufficient that the towboat companies be questioned on this subject. All too often they are unfamiliar with the events that prevented an accident on their own vessels.

Congresswoman Leonor K. Sullivan has received and placed in hearing records numerous letters attesting to the contributions that licensed towboat engineers have made in preventing accidents.

Far more thorough documentation of these cases by the Coast Guard -- a respected and impartial organization -- would contribute greatly to the safer operation of towboats.

AUTOMATION AND THE TOWBOAT ENGINEER

Today's sophisticated automated equipment does the job only when it is properly maintained. While it seems to make little economic sense, companies can and do invest the money to install thoroughly automated systems and then let them deteriorate to unsafe, inefficient levels. Once the vessel is launched, the company frequently neglects the control equipment. MEBA's investigations show that where automated gear has been provided, it has often been by-passed, overridden, or removed, defeating its intended purpose.

Because the Coast Guard does not inspect the vessels, the boats continue to operate in this unsafe condition. Our experience has shown that even when the boat goes into the yard for repairs, all emphasis is placed on working on the main engine -- while the automatic transfer gear and other detection, protection, and control systems are ignored.

If licensed engineers were required aboard towing vessels, they would ensure that all the equipment would be maintained in safe, operative condition at all times. Maintenance is more critical on a towboat than on oceangoing ships because of the enormous vibrations on a towing vessel. These vibrations severely affect the operation of control systems. If these systems fail, the possibility of collision is multiplied because towing vessels operate in congested waters. The presence of licensed engineers is mandatory to effect the immediate transfer from defective remote control to manual operation, and to be on stand-by for maneuvering when automated equipment fails.

INCREASING THE ENGINEERS RESPONSIBILITY

By requiring licensed engineers aboard towboats, the Coast Guard would be able to establish a system of regulations making the engineer responsible for the safe operation and maintenance of equipment. Beyond the normal responsibility for propulsion and steering systems and auxiliaries, engineers could be made responsible for fire-fighting and other lifesaving apparatus. Establishing such responsibility takes on added importance in cases where vessels are not inspected.

Most uninspected vessels have no licensed personnel aboard other than the two proposed "Towboat Operators."

Public Law 92-339 states that the licensed pilothouse personnel may not work in excess of 12 hours in any consecutive 24-hour period. Since the two licensed vessel operators must consume 12 hours a day each navigating the vessel, there is no time left to inspect and/or maintain equipment or safety devices.

Nor are the proposed "Towboat Operators" required to be familiar with any of the propulsion gear or with its associated auxiliaries. Under most circumstances, the "operator" would not be able to manually control propulsion machinery or to make mechanical repairs in the event of an emergency.

LICENSED ENGINEERS MINIMIZE DAMAGE

Licensed towboat engineers, because of their engineering knowledge and familiarity with fire-fighting, lifesaving, and damage-control procedures, have frequently minimized damage after accidents and major equipment failures.

Unfortunately, many vessels operate without engineers or with crew members who fill "engineering" slots but who have neither a license nor any aptitude for the job.

Existing Coast Guard reports do not specify how damage might have been minimized had licensed engineers been on board.

The licensed engineers employed on existing towing vessels can describe many of these incidents, and we urge the Coast Guard to include these incidents in the study it is conducting.

This recommendation is reinforced by the Coast Guard examiner reporting on the fire aboard the M/V ERIN O'HARA in 1970 who found:

"Had there been a person assigned to duty in the engine room of the M/V ERIN O'HARA, the severity of this casualty may have been minimized."⁽¹⁷⁾ [⁽¹⁷⁾Coast Guard accident report on the M/V ERIN O'HARA, in which a fire gutted the vessel, August 17, 1969, at mile 270 of the Mississippi River.]

WHY ENGINEERS MUST BE LICENSED

Public Law 92-339 orders the Secretary of Transportation to conduct a study concerning the need for engineers on uninspected towing vessels. The question has been raised as to whether this legislation applies to a licensed engineer or refers to an unlicensed engineer. There is only one kind of engineer; and that is a licensed engineer.

MEBA fully endorses the present concept in which the Coast Guard requires all applicants to have experience and/or training in order to be eligible for a license as an engineer.

The only just and proper method of evaluating a towboat engineer is for the Coast Guard to test and license him. This establishes a standard of measurement upon which all towboat engineers can be rated.

Now that the law requires that pilothouse personnel be licensed, it is logical that engineers be licensed, too. The "licensing bill" was enacted to prevent incapable and incompetent hands from steering towboats. It was adopted to make certain that only those who are familiar with safe navigating procedures will be permitted at the wheel of a towboat.

A license indicates that its bearer has had experience aboard towing vessels, and that he has demonstrated basic

knowledge and fundamental ability to perform competently, as evidenced by his passing the U.S. Coast Guard-administered examination.

In the case of the licensed engineer, this examination is given only to candidates qualified by experience and/or academic training. It establishes that the candidate has qualifications to perform the duties of his license in a safe and legal manner, and that he has taken an oath to do so. The Coast Guard has the authority to discipline him by fine, imprisonment or license suspension should he fail to abide by his sworn professional duties. These factors ensure greater vessel operational safety.

INDUSTRY RECOGNITION OF THE VALUE OF A LICENSED ENGINEER

Some segments of the towing industry have perceived the benefits gained by employing licensed engineers on their vessels, even though the Coast Guard has not made it mandatory. During the 1965 Congressional hearings on towboat regulations, Neville Stone, representing American Waterways Operators, Inc., stated:

"There is no feeling within the industry in opposition to licensed personnel. In fact almost all vessel operators encourage their pilothouse and engine room personnel to obtain licenses and many of them offer extra pay as an incentive for employees to do so."⁽¹⁸⁾ (Emphasis added). [⁽¹⁸⁾Testimony of Neville Stone, representing American Waterways Operators, Inc., to U.S., Congress, House, Committee on Merchant Marine and Fisheries, *Towboat Regulations, Hearings before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, on H.R. 156, H.R. 723 and H.R. 7491, 89th Cong. 1st sess., 1965, p. 205, Serial No. 89-16.*]

While some companies may recognize the need for licensed engine-room personnel, there are other companies, many of which are significant in size, that do not require engineers on their equipment. In addition, there are marginal companies that hold their boats together "with bailing wire" and refuse to invest in the higher wages that qualified personnel earn.

Both types of operations threaten the general public's safety and the economic well-being of enlightened operators who employ licensed engineers. The towing industry is keenly competitive. The companies continually undercut one another in vying for business. Companies operating an undermanned, unsafe vessel can underbid the responsible, safe company. If this system is permitted to continue, the "safe" company must cut down on personnel, at the expense of vessel and public safety ó not because it wants to, but because of the economic pressure of its competition. If the Coast Guard required licensed engineers aboard all vessels, this vicious undercutting would stop; and all vessels would be operated at far less risk with a sufficient number of competent, qualified personnel.

TRAINING FOR A LICENSE

Concern has been expressed⁽¹⁹⁾ as to whether engineering personnel now employed aboard towing vessels are capable of

passing the Coast Guard-administered examination.

Several jointly sponsored union-management schools currently train towing-vessel personnel. They have been highly successful in assisting members in obtaining their licenses. The Marine Engineers Beneficial Association operates schools in Baltimore and Brooklyn for deep-sea engineers, as well as in Toledo and Duluth for Great Lakes' personnel. In the past several years, these schools have trained unlicensed personnel who then passed the Coast Guard examination for Assistant or Chief Engineer of Uninspected Vessels.

To gain more intimate knowledge in training Inland Waterway personnel, District 2 MEBA operated a five-week engineering course in Pittsburgh in 1970. The results: 11 men obtained their license.

We know that unlicensed personnel can be trained to qualify for an engineer's license, and we are prepared and willing to provide that training.

UNINSPECTED VESSEL LEGISLATION - A HISTORY OF FUTILITY

Towboat operators have stymied effective waterways safety legislation since the first hearing on the subject in 1935. Hearings in 1951, 1965 and 1969 have been equally fruitless.

It was not until the 92nd Congress that legislation was enacted to provide even a small measure of safety for towing vessel operations.

Congresswoman Leonor K. Sullivan said when she introduced H.R. 9130 (licensing bill) in 1963:

"It is, I understand, an even broader bill in some respects than my original proposal, and is based on a Coast Guard study which revealed in general that operation of diesel-powered towing vessels involves as great a hazard as operation of those propelled by steam and should therefore be subject to similar Coast Guard safety standards."⁽¹⁹⁾ (Emphasis added). [⁽¹⁹⁾U.S., Congress, House, Congresswoman Leonor K. Sullivan speaking for Legislation To Promote Greater Safety in River Transportation, H.R. 9130, November 14, 1963, From the Congressional Record dated November 14, 1963; inserted into the testimony of Congresswoman Sullivan, to U.S., Congress, House, 'Committee on Merchant Marine and Fisheries, *Towboat Regulations, Hearings before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, on H.R. 156, H.R. 723 and H.R. 7491, 89th Cong. 1st sess., 1965, p. 22, Serial No. 89-16.*]

Steam-propelled towing vessels, unlike diesel-powered craft, are inspected by the Coast Guard. All personnel employed on steam vessels are either certificated or licensed by the Coast Guard.

It is ironic that a diesel-propelled "Lash" vessel carrying 73 barges to an overseas destination must be subject to inspection, certification and licensing of its personnel, while the towboat that pushed these same barges down the congested twisting waterway is subject to no such regulation.

Nor does the irony of regulations stop here. An oceangoing ship like the M/V FLORIDIAN, with a 4,200-horsepower diesel-propulsion system, must by law have licensed personnel in the engine room. At the same time,

towboats having equal or even far greater horsepower can and do operate without licensed engineers.

Many river tows are made up of a towboat and a 1,000-foot-long string of barges 6 abreast. This Goliath, stretching out for a distance exceeding three football fields, will carry upwards of 50,000 tons of mixed cargo. The variety of cargoes includes some that must be heated and others that if subjected to heat, become highly explosive or unstable.

Few American oceangoing ships carry so large a tonnage, and no ships are known to transport the wide variety of incompatible commodities that are found in a typical tow.

Nor are oceangoing ships normally subject to the detailed and continuous maneuvering required of the typical river tow. For the towboat, almost its entire sailing time involves a series of complicated and exacting maneuvers and crossings.

Public Law 92-339 is far from the final answer to towboat safety. But, it could provide the Coast Guard with the opportunity to help vessel personnel and citizens living along the shores to live in an atmosphere of greater safety.

Coast Guard officials have testified in support of this goal. During the hearing conducted by the House Merchant Marine and Fisheries Committee on August 17, 1965, Vice Admiral W. D. Shields, (then-Assistant Commandant), U.S. Coast Guard, testified:

"If it is decided that H.R. 156 (inspection) is not to be enacted and H.R. 7491 (license pilothouse personnel) is further considered, the Coast Guard recommends that serious thought be given to the inclusion of manning requirements and the licensing and certificating of other persons aboard. Among the other persons would be engineer officers aboard certain vessels and able seamen and ordinary seamen for towboats operating in coastal waters."⁽²⁰⁾ (Emphasis and parenthetical added).

This is precisely what has happened. A bill was passed that did not require inspection. Today -- 7 years later only the pilothouse personnel are required to be licensed. [⁽²⁰⁾ August 17, 1965 supplementary statement of Vice Admiral W. D. Shields, Assistant Commandant, U.S. Coast Guard, to his testimony of July 20, 1965, to U.S., Congress, House, Committee On Merchant Marine and Fisheries, Towboat Regulations, Hearings before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, on H.R. 156, H.R. 723 and H.R. 7491, 89th Cong., 1st sess., 1965, pp. 451-452, Serial No. 89-16.]

Admiral Shields' recommendations have not been adopted and river operations remain hazardous. The Coast Guard's study of the waterways must be thorough ó involving all aspects of towboat operations and safety ó if it is to establish beyond doubt the worth of Admiral Shields' comments, which have been substantiated in reports and public statements by other Coast Guard and industry representatives.

ACTION NOW

A recent speech by Coast Guard Captain C. T. Newman to the National Safety Congress and Exposition in Chicago illustrates the nation's need for immediate action to reduce the loss of lives and property caused by towboat accidents.

Warning that many years can be wasted between the con-

sideration and the implementation of new laws, Captain Newman said:

"It is essential that we continue to change, grow and advance if we are to meet the new maritime safety needs. There have been arguments that the Coast Guard's regulations react to, rather than anticipate problems in the now-complex, multifaceted maritime industry and occasionally these arguments are persuasive."⁽²¹⁾ [⁽²¹⁾ Speech by Captain C. T. Newman, U.S. Coast Guard, before the National Safety Congressional Exposition, Chicago, Illinois; in the Proceedings of the Marine Safety Council, Vol. 29, December, 1972, p. 255.]

The Marine Engineers Beneficial Association believes that a study encompassing the added areas we have mentioned would clearly demonstrate the need for licensed engineers aboard towboats. This need becomes more acute as waterway traffic rises. Since the need for inspection and licensing was first discussed, the tonnage on the Inland Waterways, bays and sounds has more than quadrupled. The horsepower of the vessels and the size of the tows have increased to a magnitude not even imagined a few years ago. All of these conditions have made the waterways more congested and hazardous.

MEBA is convinced that licensed engineers are required for safe operations aboard towing vessels. For the first time in many years, Congress has given the Coast Guard the authority to study the need for engineers on uninspected towing vessels and to submit legislative recommendations to the Congress.

As Captain Newman asserted:

"The casualties make the headlines and prompt the action; the near misses go unreported and unnoticed. We must no longer wait for accidents to happen to show us where the need for action is. Let us begin now to anticipate rather than react to maritime tragedy."⁽²²⁾ [⁽²²⁾ *Ibid.*]

We urge the Coast Guard to take the initiative and conduct a study so complete that it will break the chain of accidents first ó action later. We must act now to achieve our goal of safety on America's Inland and Coastal Waterways.