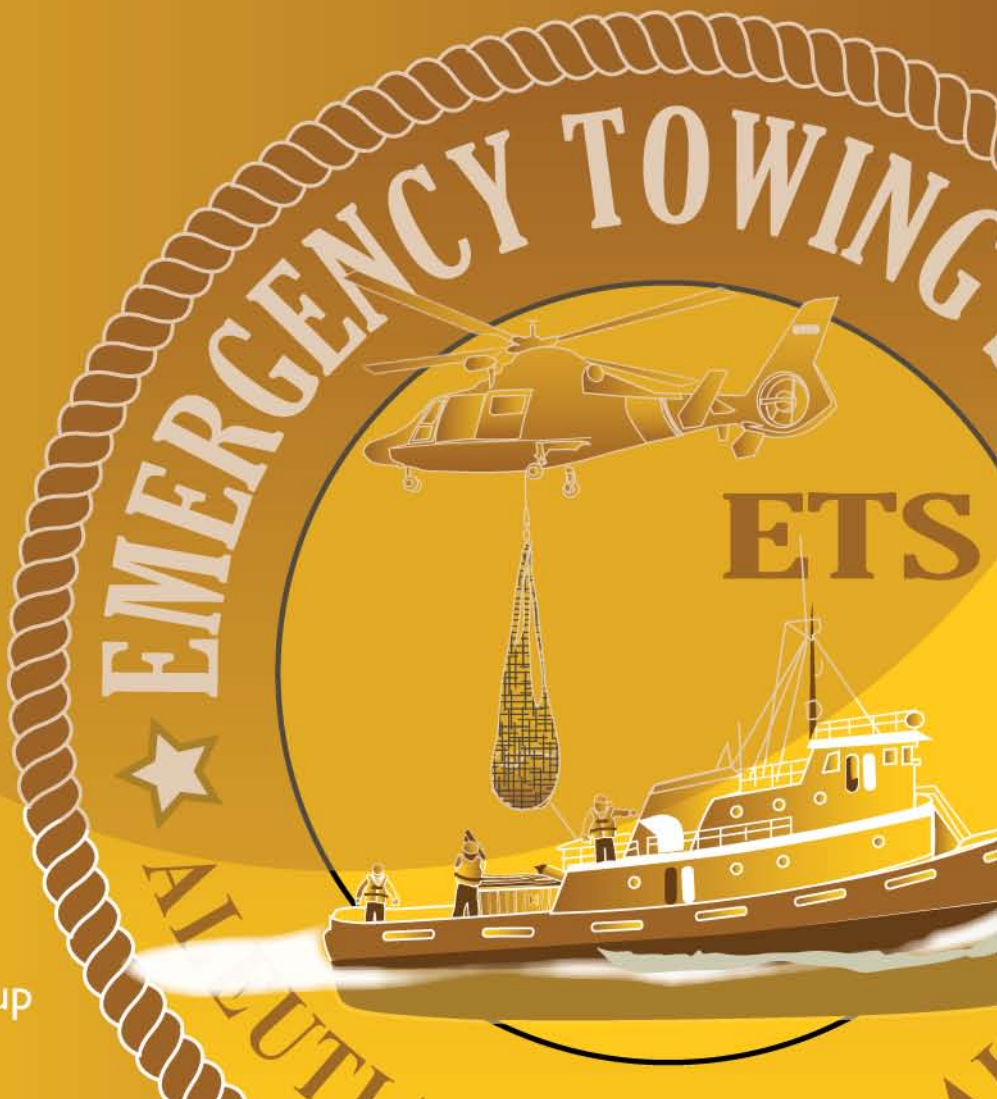
Aleutian Islands, Alaska Emergency Towing System (ETS)

Procedures Manual

November 2007



by:
Aleutian Islands ETS Workgroup

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(ETS)

Procedures Manual

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Project website: http://www.dec.state.ak.us/SPAR/perp/aiets/home.htm

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INTRODUCTION

PURPOSE OF THE AI ETS

Because of the history of distressed and stricken vessel incidents in the Aleutian Islands, the City of Unalaska and the Alaska Department of Environmental Conservation (ADEC) acquired two Emergency Towing Systems (ETS) to be stationed permanently at the Port of Unalaska. The systems are intended to improve safety and environmental protection by facilitating prompt and effective assistance to distressed vessels.

The ETS consist of a Tow Line capable of towing a distressed vessel, a Messenger Line to assist in deploying the Tow Line, Line-gun, buoy, and chafing gear. The ETS may be deployed from the stern of a rescue tug, or lowered to the ship's deck via helicopter.

HOW THIS DOCUMENT WAS DEVELOPED

This manual was developed by the Aleutian Islands ETS Workgroup, which was convened in 2006 with the goal of developing an emergency towing capability for disabled vessels in the Aleutians subarea. The Workgroup consisted of the following participants:

- Alaska Department of Environmental Conservation (ADEC)
- Alaska Marine Exchange (AMX)
- Alaska Marine Pilots Association (AMPA)
- Alaska Maritime Agencies
- City of Unalaska
- Dunlap Towing
- International Port of Dutch Harbor
- Horizon Lines
- Pacific Coast Maritime, Inc.
- Samson Tug and Barge
- US Coast Guard, Air Station Kodiak
- US Coast Guard, Anchorage Sector
- US Coast Guard, Unalaska Marine Safety Detachment (USCG, MSD Unalaska)

The manual's recommendations are based on the outcome of a deployment exercise held July 30 and 31, 2007 and the best professional judgment of the Workgroup members according to their collective and diverse experience.

HOW TO USE THIS DOCUMENT

This manual provides all parties that may be involved in an Aleutians ETS response with a common set of recommendations for mobilization and deployment. It is divided into the following sections:

- Introduction
- System Components and Storage Locations
- Procedures
- Training
- Contacts

This manual describes suggested procedures specific to the following roles:

- First responder (which may or many not be the distressed ship's master)
- USCG, MSD Unalaska, Detachment Commander
- City of Unalaska, Department of Ports and Harbors (Harbormaster)
- AMPA Dispatcher
- Captains of the tugs *James Dunlap* and *Gyrfalcon*
- AMX
- ADEC
- Master of the distressed ship
- Crews of rescue tugs and distressed ship, as per instructions from the masters of these vessels

This manual is intended to serve as guidance only. In the event of an incident requiring use of the ETS, responders should act according to their own training, judgment, and the requirements of their respective companies, organizations, agencies, or other institutions. The USCG has the responsibility to assume command and control of a search and rescue operation.

WHO TO CONTACT WITH INPUT FOR FUTURE REVISIONS OF THIS DOCUMENT

This document is administered by the City of Unalaska. If you have suggestions for future revisions contact:

City Clerk
City of Unalaska
PO Box 610
Unalaska, AK 99685
907 581-1251

or

Detachment Commander
US Coast Guard
Unalaska Marine Safety Detachment
PO Box 920446
Unalaska, AK 99692
907 581- 3466

SYSTEM COMPONENTS AND STORAGE LOCATIONS

SYSTEM COMPONENTS AND NOMENCLATURE

The following illustrations depict the ETS components and nomenclature for the tug-to-ship deployment (Illustration sc-1) and the ship-to-tug deployment (Illustration sc-2). To avoid confusion, the nomenclature for each component should remain consistent.

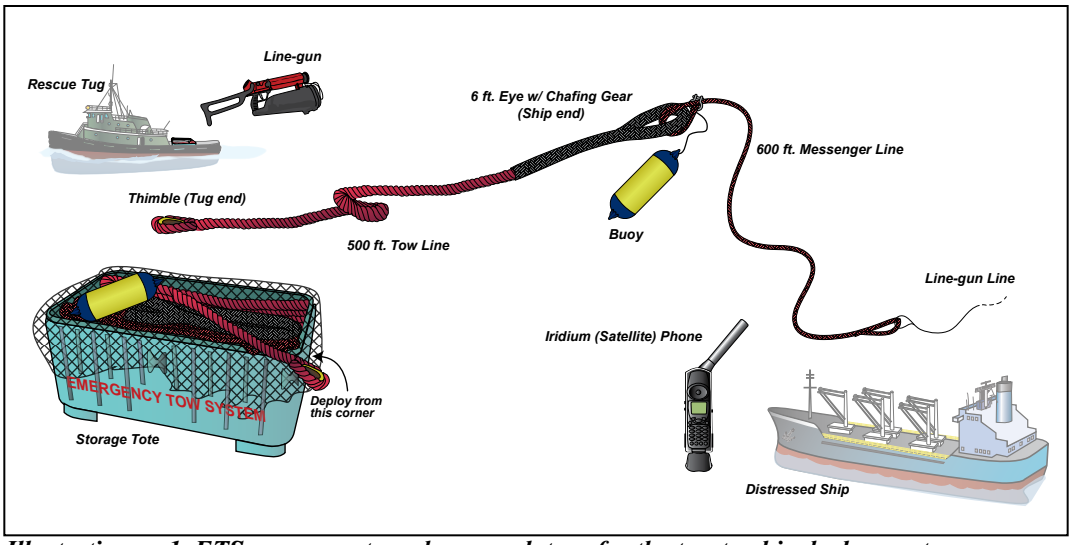


Illustration sc-1. ETS components and nomenclature for the tug-to-ship deployment.

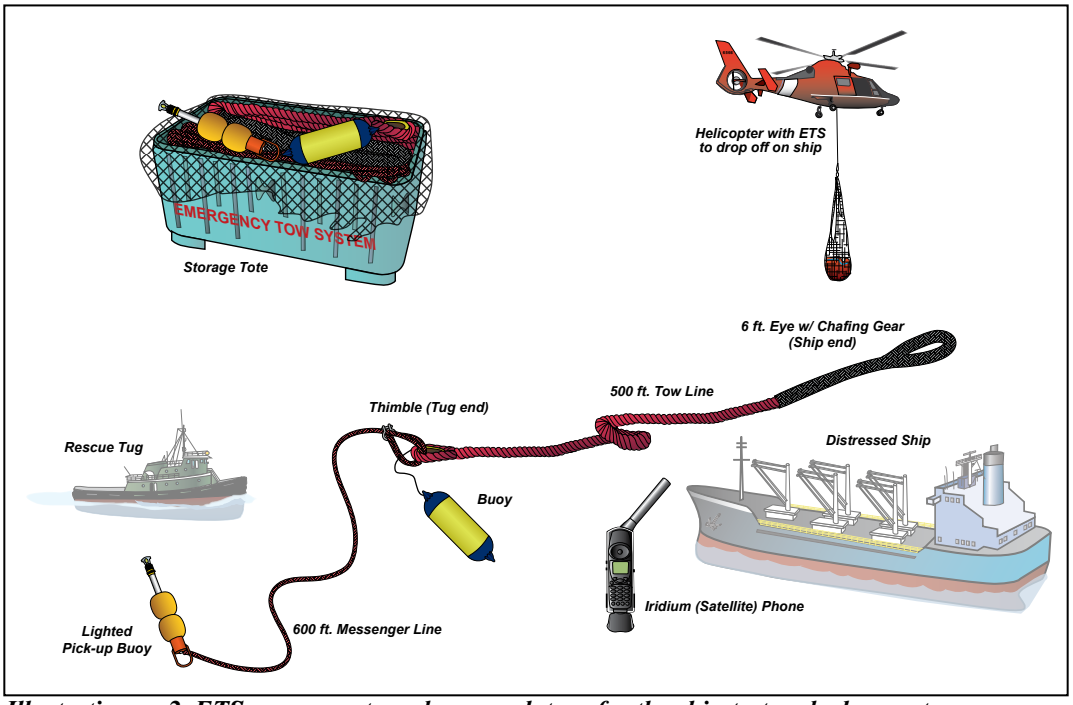


Illustration sc-2. ETS components and nomenclature for the ship-to-tug deployment.

The specifications for each ETS component are listed in the following table.

ETS System	Component	Specifications	Manufacturer
Smaller ETS < 50,000 DWT *Procured by the City of Unalaska through Obert Marine*	Tow Line	ETS-450 7 in. circ x 500 ft. of Plasma® 12 Strand. The ETS-450 has a minimum break strength of 2,000 kN (450,000 pounds) meeting the requirements for ships under 50,000 DWT. The tow lines are floating lines in a soft, torque-free braided construction with a high visibility urethane coating. Unlike Kevlar®, these tow lines do not require special large radius chocks or fairleads and can be handled in the same manner as regular towing hawsers.	Cortland Puget Sound Rope 1012 Second St. Anacortes, WA 98221 360.293.8488
	Tow Line Chafing Gear	Anso-Tex® Chafe Guard is a lightweight, tubular cloth made of a special abrasion-resistant nylon. This type of chafe guard is known under several trade names such as cordura, shark skin, and ballistic nylon. It is the lightest weight chafe protection and has excellent snag resistance due to its tight weave. Due to the light weight, it does not offer as much protection or last as long as braided chafe guard under severe chafe conditions. Features of Anso-Tex® Chafe Guard are: lightest weight, excellent snag resistance, easy to handle, and good protection from UV.	Southern Weaving Company - Sleeving Products 210 Fern Street PO BOX 558 Easley, SC 29641 Phone: 864.859.7531 Ext. 20 Fax: 864.859.7532 Email: sales-easley@southernweaving.com
	Messenger Line	High visibility - 7/8 in. diameter x 600 ft. Spectra 12 Strand rope with a minimum break strength of 200 kN (45,000 lbs.)	Cortland Puget Sound Rope 1012 Second St. Anacortes, WA 98221 360.293.8488
	Lighted Pick-up Buoy and battery	A manually-activated lighted buoy that is small enough to fit through any chock that will accept the tow line thimbles. Replacement Batteries: D-cell	Cortland Puget Sound Rope 1012 Second St. Anacortes, WA 98221 360.293.8488
	Storage Tote	79 in. x 46.5 in. x 41 in. 342 lbs. A heavy duty polypropylene storage container that is ready to attach to the deck. The line is faked into the container for easy attachment and deployment.	Western Region Bonar Plastics 6111 South Sixth Avenue Ridgefield, WA 98642 360.887.2230
	Cargo Net		Arctic Wire Rope and Supply, Inc. 6407 Arctic Spur Road Anchorage, AK 99518-1545 800.478.0707
Larger ETS > 50,000 DWT *Procured by ADEC through Arctic Wire Rope and Supply*	Tow Line	ETS-900 10 in. circ x 350 ft. of Plasma® 12 Strand The ETS-900 has a minimum break strength 4,000 kN (900,000 lbs) meeting the requirements for ships over 50,000 DWT. The tow lines are floating lines in a soft, torque-free braided construction with a high visibility urethane coating. Unlike Kevlar®, these tow lines do not require special large radius chocks or fairleads and can be handled in the same manner as regular towing hawsers.	Cortland Puget Sound Rope 1012 Second St. Anacortes, WA 98221 360.293.8488

ETS System	Component	Specifications	Manufacturer
Larger ETS > 50,000 DWT (continued)	Tow Line Chafing Gear	Anso-Tex® Chafe Guard is a lightweight, tubular cloth made of a special abrasion-resistant nylon. This type of chafe guard is known under several trade names such as cordura, shark skin, and ballistic nylon. It is the lightest weight chafe protection and has excellent snag resistance due to its tight weave. Due to the light weight, it does not offer as much protection or last as long as braided chafe guard under severe chafe conditions.	Southern Weaving Company - Sleeving Products 210 Fern Street PO BOX 558 Easley, SC 29641 Phone: 864.859.7531 Ext. 20 Fax: 864.859.7532 Email: sales-easley@southernweaving.com
	Messenger Line	High visibility - 7/8 in. x 600 ft. Spectra 12 Strand rope with a minimum break strength of 200 kN (45,000 lbs.)	Cortland Puget Sound Rope 1012 Second St. Anacortes, WA 98221 360.293.8488
	Lighted Pick-up Buoy	A manually-activated lighted buoy that is small enough to fit through any chock that will accept the tow line thimbles. Replacement Batteries: D-cell	Cortland Puget Sound Rope 1012 Second St. Anacortes, WA 98221 360.293.8488
	Storage Tote	79 in. x 46.5 in. x 41 in. 342 lbs. A heavy duty polypropylene storage container that is ready to attach to the deck. The line is faked into the container for easy attachment and deployment.	Western Region Bonar Plastics 6111 South Sixth Avenue Ridgefield, WA 98642 360.887.2230
	Cargo Net		Arctic Wire Rope and Supply, Inc. 6407 Arctic Spur Road Anchorage, AK 99518-1545 800.478.0707
Misc Equipment	Helicopter pendants and slings	MK 105 Mod 0 Pendants (part number 2643484) Two - 90 ft. x 1.5 in. double braided helicopter slings. Safe working load of 7 tons; maximum load 14 tons.	MilBase Industries, Inc. 197 Old York Road PO BOX 354 New Cumberland, PA 17070-0354 717.774.0968
	Helicopter cargo release hook	2 Helicopter cargo release hooks	MilBase Industries, Inc. 197 Old York Road PO BOX 354 New Cumberland, PA 17070-0354 717.774.0968
	Ratchet straps for securing tote to deck	On order: City of Unalaska	
	Safety shackle	4 @ 7/8 galvanized bolt/nut safety shackle and small tool kit to retrieve or bend the cottor pin to shackle. Safe working load of 9.5 tons.	Arctic Wire Rope and Supply, Inc. 6407 Arctic Spur Road Anchorage, AK 99518-1545 800.478.0707

ETS System	Component	Specifications	Manufacturer
Line-gun System	Launcher	ResQmax: Launcher Assembly housings are injection molded from polycarbonate, for high impact resistance. http://www.resqmax.com/resqmax.html Part #500	ResQmax Inc. 2234 SW Second Ct. Redmond, OR 97756 800.709.5018
	Projectiles	Streamline Luminescent Training and Streamline Projectiles with 2 spare covers 3000 psi / 207 bar service pressure projectiles Part #306-S and 300	ResQmax Inc. 2234 SW Second Ct. Redmond, OR 97756 800.709.5018
	Lines and containers	4.0 mm and 6.0 Spectra Line @ 500 ft. each w/ containers http://www.resqmax.com/resqmax_line.html Part # 803 and 804	ResQmax Inc. 2234 SW Second Ct. Redmond, OR 97756 800.709.5018
Line-gun System (continued)	Projectile refill equipment	Streamline Filler Hose for SCBA (Part # 911-S) and Quick Connect/Disconnect Fittings for SCBA and SCUBA Cordura Carry All Bag	ResQmax Inc. 2234 SW Second Ct. Redmond, OR 97756 800.709.5018
Satellite Telephone	Telephone, batteries, and charger	8816-3146-2593 Motorola 9500 Iridium Phone (State ID # 10066766), holster, desk charger, wall charger adapter/plug in, 12 volt plug in charger, 1 - (new) 2800 mAh lithium battery, 2 - 4000 mAh lithium batteries, one quick start guide: all stored in black Pelican Case. Operating Frequency: 1616 - 1626.5 MHz, L-Band	Motorola, Inc. One Symbol Plaza Holtsville, NY 11742-1300 Phone: +1.800.722.6234 or +1.631.738.2400 Fax: +1.631.738.5990

STORAGE LOCATIONS

Illustration sl-1 shows the approximate locations for each ETS component in Unalaska. The Unalaska Harbormaster has access to and knowledge of the exact location of each of the ETS components, except for the helicopter cargo hook, which is at the USCG MSD office.

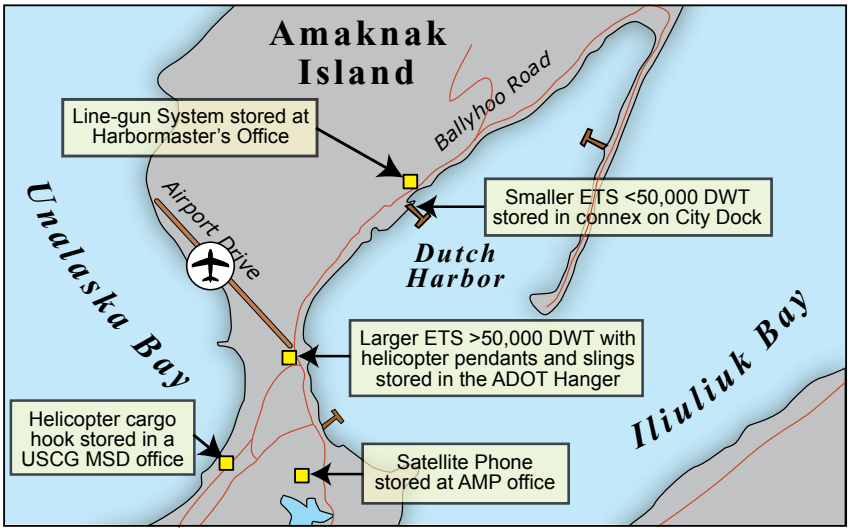


Illustration sl-1. Approximate locations of ETS components in Unalaska.

PROCEDURES

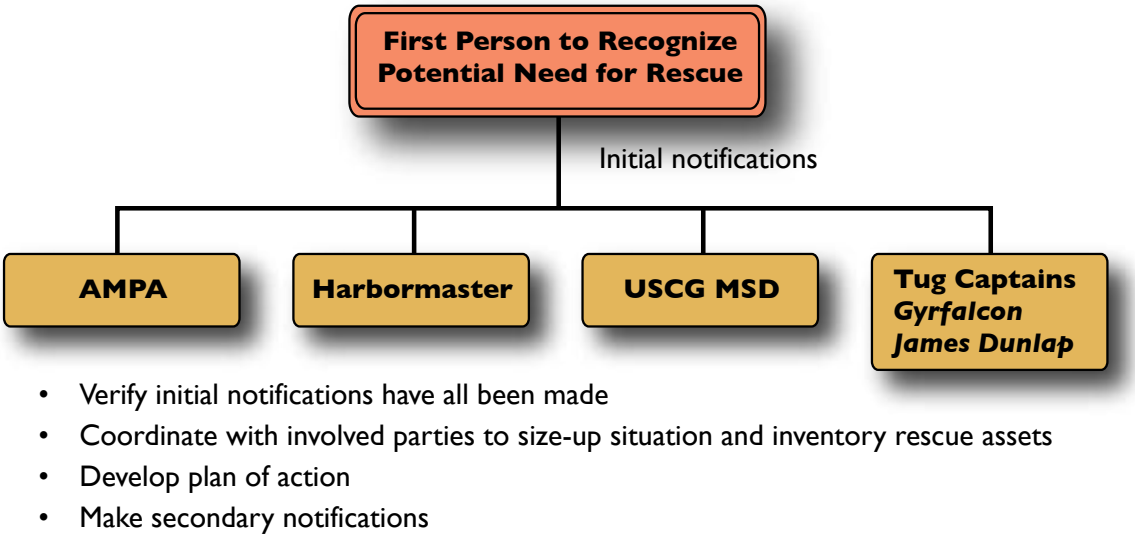
ACTIVATION, CALL-OUT

Overview

There are two ETS maintained for immediate deployment from the Port of Dutch Harbor. The City of Unalaska owns the smaller of the two ETS; ADEC owns the other. The Harbormaster maintains the ETS and will provide services to transfer either of the ETS to the airport (for helicopter mobilization) or a dock (for rescue tug mobilization).

Recognizing the problem is the first step in any rescue. While the distressed ship's master is usually the first person to identify the problem, others may be the first to report the situation, including marine pilots, City Ports personnel, other mariners, the AMX, or the USCG. Once the *potential* need for an ETS is identified, the system must be activated in anticipation of mobilization. Activation involves the immediate notification and coordination of all the parties involved in ETS mobilization and deployment. (See Illustration ac-1)

The command and control of any rescue operation is outside the scope of this manual. The USCG has jurisdiction over the movement of vessels in US waters and the responsibility to assume command and control of any search and rescue operation. However, there is a long tradition that requires any mariner to aid another mariner in distress. Prior to the establishment of a formal incident command, the USCG encourages all parties to take any actions that they deem safe and appropriate to aid a distressed ship.



- Verify initial notifications have all been made
- Coordinate with involved parties to size-up situation and inventory rescue assets
- Develop plan of action
- Make secondary notifications

Illustration ac-1. Initial activation and call-out of the AI ETS.

Detailed Procedures

1. The **first person** to recognize that a ship is in distress and may need towing assistance should make initial notification of the incident to the following parties:
   - USCG, MSD Unalaska, Detachment Commander (USCG Detachment Commander)
   - City of Unalaska, Department of Ports and Harbors (Harbormaster)
   - AMPA Dispatcher
   - Captain of the tug *James Dunlap*
   - Captain of the tug *Gyrfalcon*

   The contact numbers for each of these organizations are listed in Appendix A of this manual.

2. The **USCG, MSD Unalaska, Detachment Commander** may consider taking the following actions:
   a. Verify that the parties listed in #1(above) have been notified. Make additional notifications to:
      - Ship's agent (if any)
      - Sector Anchorage Command Center
      - ADEC
      - AMX

   b. Assess the availability of USCG pendants and cargo release hooks for possible mobilization by helicopter.
   c. Establish an incident command post.
   d. Appoint a Safety Officer and ask him/her to develop an incident-specific safety plan.
   e. Coordinate the request of other resources.
   f. Coordinate search and rescue operations until relieved.
   g. Establish an incident log and ICS 201 briefing form.

3. The on-duty **Harbormaster** may consider taking the following actions:
   a. Verify that the parties listed in #1 (above) have been notified and make additional notifications as necessary.
   b. Callout additional harbor personnel, if needed.
   c. Ensure ready access to the ETS storage van and airport storage location. Remove snow and ice as necessary.
   d. Determine the availability of dock and crane space in the Port and make any necessary arrangements for possible delivery of the ETS to a rescue tug.
   e. Arrange for a forklift and flatbed truck to mobilize the ETS to dock or airport.
   f. Determine that the Line-gun is ready and all projectiles are charged.
   g. Determine that the dedicated satellite telephone is ready and the batteries are charged.
   h. Notify the City Manager of the incident.
   i. Begin logging all activities and actions.

4. The **AMPA Dispatcher** may consider taking the following actions:
   a. Verify that the parties listed in #1 (above) have been notified and make additional notifications as necessary.
   b. Attempt to contact the distressed ship and ascertain the ship's situation, the master's intentions, and means to maintain regular contact with the ship's master (VHF or satellite telephone).
   c. Determine the distressed ship's position, direction and rate of drift, and distance and estimated time to any possible grounding location.
   d. Determine the weather and sea conditions at the scene and between the scene and Unalaska.
   e. Determine the short-term marine forecast for the area of the incident.
   f. Begin logging all activities and actions.
5. The **Captains of the *James Dunlap* and *Gyrfalcon*** may consider taking the following actions:
   a. Report availability of their vessel for rescue operations to the USCG Detachment Commander, AMPA Dispatcher, and the Harbormaster.
   b. Report potential availability of other rescue tugs to the USCG Detachment Commander, AMPA Dispatcher, and the Harbormaster.
   c. Call-out additional crew, if necessary.
   d. Ready decks to receive the ETS.
   e. Determine from Harbormaster which dock/crane would be best for loading the ETS.
   f. Begin logging all activities and actions.
6. The **AMX** may consider taking the following actions:
   a. Acquire and track the distressed ship's location using Automated Information System (AIS) or other means.
   b. Determine the distressed ship's position, direction and rate of drift, and distance and estimated time to any possible grounding location.
   c. Determine the location and identification of other ships in the vicinity of the distressed ship.
   d. Determine the location and identification of potential rescue tugs in the vicinity of the distressed ship.
   e. Communicate information obtained to the USCG Detachment Commander, AMPA Dispatcher, and the City Harbormaster.
   f. Begin logging all activities and actions.
7. The **ADEC** may consider taking the following actions:
   a. Make notifications and develop contingencies for a possible oil spill.
   b. Determine the amount and type of oil onboard the stricken vessel.
   c. Begin logging all activities and actions.

Safety Considerations

- Determine current and forecasted weather and sea state at the scene and between the scene and Unalaska.
- Assess the visibility, wind, and icing situation that may impact helicopter mobilization.
- Determine what personal protection equipment (PPE) is available to the deck crews on the distressed ship and potential rescue tugs.
- Indicate safety hazards (i.e. hypothermia, falling overboard, ice, visibility, slips-trips-falls) to all personnel involved in the response.
- Consider developing an incident safety plan.

Operational Considerations

- Assess the availability of potential rescue tugs and helicopters.
- Determine the mobilization times for each option.
- Determine the following information for the distressed vessel: location, rate of drift, and distance and time to grounding.

MOBILIZATION VIA HELICOPTER

Overview

The ETS may be airlifted to the distressed ship via USCG helicopter. USCG aircrews are highly trained to execute this type of aerial lifting operation. It is beyond the scope of this manual to restate USCG procedures. This manual describes procedures relevant to the other parties involved in mobilization. The USCG aircrew will provide specific directions once on scene.

The City of Unalaska, Ports and Harbors Department (Harbormaster) will be responsible for mobilizing the appropriate ETS system from its storage location to the airport. In addition to the ETS and helicopter, aerial mobilization requires:

- External cargo release hook (stored at the Unalaska MSD)
- Cargo pendant (stored with the ETS at the airport)
- Satellite telephone (stored at the Alaska Marine Pilots' office)
- Cargo net (ETS is stored in a tote lined with a cargo net for quick deployment)

The primary goal of load preparation is to create a load that is safely transported and arrives at the destination undamaged. Consider the following:

- External loads are subject to extremely high winds during transportation, and shall be prepared accordingly.
- Delivery of the ETS to the distressed ship requires a 15-ft. obstruction clearance at all times.
- These operations should not normally be conducted above Sea State 4.

Detailed Procedures

1. Review *Activation, Call-out* procedures, if necessary.
2. Review *System Components and Nomenclature*, if necessary.
3. There are two ETS in Unalaska. The smaller < 50,000 DWT system owned by the City of Unalaska is stored at the Port. The larger > 50,000 DWT system owned by the ADEC is stored at the Alaska Department of Transportation (ADOT) hangar at the airport. See the *Storage Locations* section in this manual.
4. Once it is decided to mobilize the ETS via helicopter, the Harbormaster coordinates with the USCG MSD Commander to determine the ETA of the helicopter at the Unalaska Airport. They will then consult with a marine pilot, rescue tug captain, or ship's agent to choose the most appropriate ETS and select a helipad location at the airport.
5. The Harbormaster will arrange to move the ETS Tote, pendants, cargo hook, and satellite telephone to the staging location by truck. A forklift will be needed at the helipad location to unload the truck.
6. The Harbormaster should confirm the ETS weight and that the tamper-proof band is intact. Prior to airlift operations, this band and the ETS tote lid must be removed.
7. Conduct a Foreign Object Debris (FOD) walk-around at the helipad. Consider sweeping loose dust or snow from the staging location to reduce blowing debris from rotor wash.

8. Once the helicopter arrives at the helipad, the Harbormaster should communicate the weight of the ETS (not including the Tote) to the aircraft pilot. The pilot is responsible for calculating the range, time-aloft, and fuel requirements for the flight.
9. USCG aircrew normally attaches the pendant to the helicopter. All other personnel should stay back at least 200 ft. If other personnel are requested to perform this hook-up operation, they will be given specific instructions by the aircrew.
10. Before any ETS delivery operations, the distressed ship's master should be briefed on the following items, at a minimum:
    a. The drop off area (normally the bow) must be agreed to by both the ship's master and the aircraft commander.
    b. The ship's master shall ensure that a FOD walk-around is conducted as thoroughly as possible before commencing operations. This should include examining the drop off area and removing or securing lightweight and small items.
    c. Procedures to follow in the event of an emergency.
    d. Relative wind direction for drop off.
    e. The helicopter's approach will be announced to the ship's deck crew, as feasible.
    f. Only personnel needed to conduct ETS delivery operations should be allowed on deck.
    g. The helicopter shall be clear of the disabled ship before the deck crew moves in to unpack the ETS.
    h. The ship's crew must be warned of the danger associated with static discharge, and instructed not to touch the load until the helicopter has released the cargo hook and the ETS is safely on deck.
    i. Radio communications with the helicopter while it is in a hover over the ETS delivery zone are distracting, and will be limited to urgent communications only.
    j. No flash photography or spotlights during delivery operations.
11. The helicopter will normally complete the approach into the wind, arriving in a hover just off the disabled ship.
12. When the helicopter's approach is announced, all ship's personnel must clear the ETS delivery area.
13. The pilot transmits to the disabled vessel via radio: "Request permission to hover for ETS delivery."
14. The ship's master answers: "Roger, you are cleared to hover for ETS delivery."
15. The pilot, guided by commands from the designated helicopter crewman, maneuvers the helicopter over the ETS delivery area.
16. The designated helicopter crewman gives directions for spotting and lowering the load. As soon as the load is on deck, the crewman informs the pilot.
17. When the pendant slackens, the designated ship's crewman signals the pilot to release the load. The pilot or crewman (as briefed) releases the cargo hook.
18. In extreme winds or sea states, as a last resort, the ETS may be released from above the ship and allowed to fall onto the deck of the disabled ship.

Photographs

Photograph mh-1. ETS in cargo net lined prepared for helicopter deployment.

Photograph mh-2. Aircrew member demonstrates attaching the pendant to the cargo release hook.

Photograph mh-3. USCG H65 helicopter and ETS prepared for deployment.

Photograph mh-4. USCG ground crew hooking ETS pendant to hovering helicopter.

Photograph mh-5. Helicopter pendants and slings stored with large ETS at the DOT Airport Hanger.

Photograph mh-5. USCG helicopter lifting ETS and cargo net from storage tote.

Photograph mh-6. USCG helicopter delivering ETS to the ship's bow; no deck crew on bow of ship.

Photograph mh-7. Extreme winds caused by helicopter prop-wash.

Photograph mh-8. 15-ft. clearance to obstacles and a deck free of debris are required.

Photograph mh-9. ETS in cargo net immediately after helicopter delivery.

Safety Considerations

- Ports personnel will follow established safety procedures.
- Everyone should be alert for slips, trips, and fall hazards.
- Anyone within 50 ft. of lifting operations must have a hard hat and steel toe shoes.
- Beware of backing equipment and aircraft movements.
- Anyone at the airport staging area should be aware of helicopter noise and rotar wash. Hearing and eye protection are required. Observers should stay at least 200 ft. from the helicopter during lifting operations.
- At the ship, once the helicopter has been cleared to hover, personnel shall not enter the ETS delivery area until after the load is on deck. Personnel should *not* attempt to steady the load until it has been released and is safely on board.
- Personal Flotation Device (PFD), hearing protection, safety glasses, and hard hats with chinstraps are required for anyone on deck of the distressed ship.
- Under no circumstance shall flash pictures be taken during night ETS delivery, as the flash will temporarily blind the pilot.
- Lightweight loads can be blown up into the bottom of the helicopter, or fly up into the rotor blades.
- Never attach the pendant to any point other than the Cargo Release Hook. Never connect a load in any way other than directly to the safety hook. Kinking and chafing will damage the lifting equipment.

- The deck crew on the distressed ship should be stationed well clear of the ETS delivery area. Ideally, the helicopter pilot will maintain direct visual contact with the designated crewman at all times; however, the pilot can request the aircrew to relay signals if necessary.
- The pilot shall maneuver the helicopter to see and avoid all obstructions.
- Releasing the load before there is slack in the pendant can cause damage to the aircraft, cutter, load, and/or injury to personnel.
- The sling may not immediately release from the aircraft cargo hook. If the sling hangs up, the pilot shall initiate a slow vertical climb, gradually applying tension until it separates from the hook.
- Never cut nets, beckets, or cargo wrap-around straps.

Operational Considerations

- A 15-ft. obstruction clearance must be maintained throughout delivery of the ETS.
- These operations should not normally be conducted above Sea State 4 (winds of 11 to 16 knots and seas of 3.5 to 5 ft.). The USCG will grant exceptions on a case-by-case basis.
- Verify the weight of the ETS and notify the aircraft pilot.
- The following items should be considered when deciding to mobilize the ETS via helicopter.
    - Availability of helicopter and ETA to Unalaska Airport.
    - Distance from Unalaska to distressed ship.
    - Distance and time the distressed ship has before grounding.
    - Weather, visibility, and sea state at Unalaska, the route of flight, and the distressed ship's location.
    - Availability of other means of mobilization, such as rescue tug or other vessel.

MOBILIZATION VIA TUG

Overview

The ETS may be mobilized to the rescue tug for tug-to-ship deployment. Tug crews are highly trained and experienced in towing operations. It is beyond the scope of this manual to provide procedures for the tug's crew in towing operations. The manual covers getting all of the necessary equipment to the tug and gives guidance based to the 2007 ETS exercise and the experience of the ETS Workgroup.

The City of Unalaska, Ports and Harbors Department (Harbormaster) will coordinate with the rescue tug captain to choose a dock for transferring the ETS. The Harbormaster will be responsible for mobilizing the appropriate ETS system from its storage location to the dock. In addition to the ETS Tote the following items must be mobilized to the tug:

- Satellite telephone (stored at the Alaska Marine Pilots' office)
- Line-gun (stored at the Harbormaster's office)
- Ratchet-straps for lashing the ETS to the deck (stored with the ETS)

The primary goal of load preparation is to create a load that is safely transported and arrives at the destination undamaged. Consider the following:

- The tug may experience heavy seas with decks awash during the transit to the scene.
- Delivery of the ETS to the rescue tug requires a dock with amble depth and a suitable crane for lifting the ETS.
- Lighting may also be required during darkness.

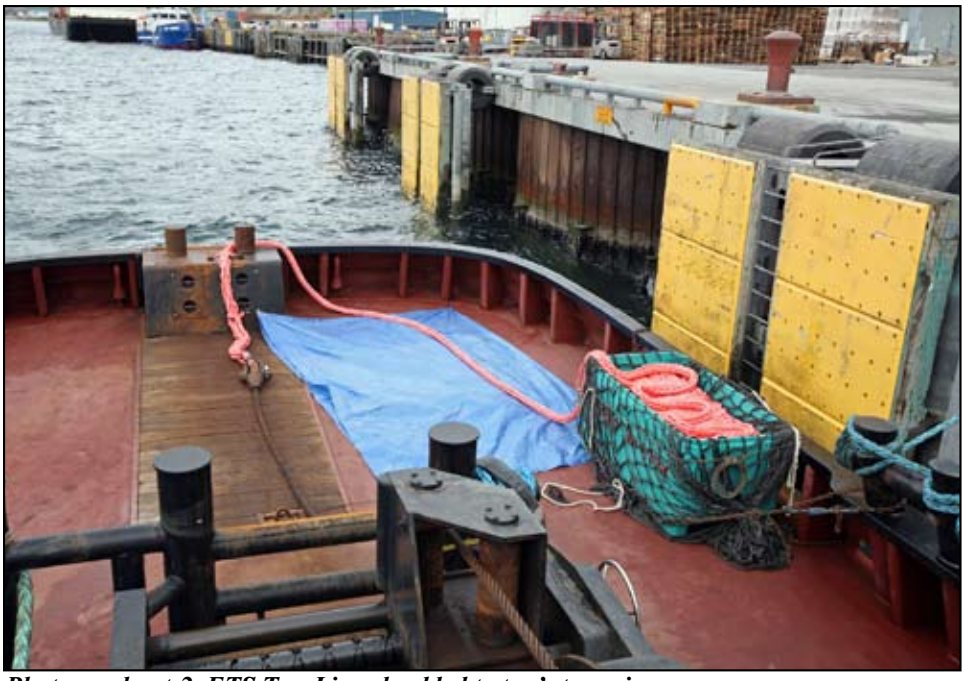
Detailed Procedures

1. Review *Activation, Call-out* procedures, if necessary.
2. Review *System Components and Nomenclature*, if necessary.
3. There are two ETS in Unalaska. The smaller < 50,000 DWT system owned by the City of Unalaska is stored at the Port. The larger > 50,000 DWT system owned by the ADEC is stored at the ADOT hangar at the airport. See the *Storage Locations* section in this manual.
4. Once it is decided to mobilize the ETS via rescue tug, the Harbormaster coordinates with the tug master to choose a dock for transferring the ETS. The dock face must have water depth to accommodate the tug, a crane or boom is required, and adequate lighting should be provided. In some cases, vessels already at the dock may have to be moved. The Harbormaster and tug master may establish an ETA for the tug at the dock.
5. The Harbormaster will consult with a marine pilot, rescue tug captain, or ship's agent to choose the most appropriate ETS.
6. The Harbormaster will ensure that the Line-gun projectiles are charged to capacity and that all spare projectiles and lines are with the gun.
7. The Harbormaster will arrange to move the ETS Tote, Line-gun and ratchet-straps for lashing to the transfer dock by truck.

8. The ETS will be transferred to the rescue tug using the normal City of Unalaska hoisting procedures by experienced personnel properly trained with the correct personnel protective equipment.
9. Once the ETS is on the deck of the rescue tug, the tugs crew will lash the ETS Tote on deck with the "Deploy From Here" labeled corner to the aft and inboard. The tote will be secured for heavy seas.
10. The Harbormaster and tug master will confirm that the following necessary equipment is onboard in a final shoreside briefing before the tug departs:
    - ETS, including Pick-up Buoy
    - Line-gun with spare projectiles and lines
    - Satellite telephone with telephone number list
11. The Rescue Tug Captain with also verify before departure that he has the proper shackle to attach the ETS thimble to his tow-wire.
12. Consider taking a marine pilot to facilitate communications at the scene.

Photographs

Photograph mt-1. ETS delivered to rescue tug at dock and lashed to deck with "Deploy From Here" corner to the aft and inboard.



Photograph mt-2. ETS Tow Line shackled to tug's tow wire.

Safety Considerations

- Ports personnel will follow established safety procedures.
- Everyone should be alert for slips, trips, and fall hazards.
- Anyone within 50 ft. of lifting operations must have a hard hat and steel toe shoes.
- Beware of backing equipment and vehicle movements.
- PFD, hearing protection, safety glasses, and hard hats with chinstraps are required for anyone on deck of the rescue tug.

Operational Considerations

- Verify the ETS thimble can be shackled to the rescue tug's tow wire.
- The following items should be considered when deciding to mobilize the ETS via tug.
    - Distance from Unalaska to distressed ship
    - Distance and time the distressed ship has before grounding
    - Weather, visibility, and sea state at Unalaska, the route to, and the distressed ship's location
    - Availability of other means of mobilization, such as a helicopter or other vessel

SHIP-TO-TUG DEPLOYMENT

Overview

The ETS can be mobilized to the distressed ship and deployed from the ship to the rescue tug. This is most likely done by dropping the ETS onto the deck of the distressed vessel via helicopter. (This procedure is covered in *Mobilization via Helicopter*). Once the ETS is dropped onto the deck of the ship, the ship's crew must unpack the ETS and arrange it on the deck of the ship for deployment according to instructions given via radio or satellite telephone and the illustrations included with the ETS. After the ETS is arranged and the rescue tug is in the general vicinity of the distressed ship, the ship's master may order the ETS to be deployed by throwing the Lighted Pick-up Buoy overboard. The ship will drift away from the ETS so the Pick-up Buoy, Messenger Line, and Tow Line will trail up-wind. The rescue tug will catch the Messenger Line and haul it in to retrieve the Tow Line. When the Tow Line is made up to the tug's tow wire, towing can commence.

Detailed Procedures

1. Review *Mobilization via Helicopter* if applicable.
2. Review *System Components and Nomenclature*. (Illustration st-1)
3. Once the ETS is delivered to the distressed ship (Illustrations st-2, st-3, & st-4), instruct the ship's crew to find and review the Instructions delivered with the ETS.
4. Reconfigure the ETS for ship-to-tug deployment. (The ETS will be packed for tug-to-ship deployment.) Remove components from the cargo net and organize as follows.

   First determine if the Tug's Thimble will fit through the ship's bullnose (the Tug's Thimble on the smaller ETS is 10" long x 12" wide x 4" thick and weighs 20 lbs., on the larger ETS it is 18" long x 14" wide x 6" thick and weighs 45 lbs.). If the thimble will fit through the bullnose use procedure 4a, if not use 4b.

   4a. Shipboard ETS configuration if Tug's Thimble will fit through the ship's bullnose.
   - i. 6 ft. Ship's Eye end of the Tow Line secured to the ship's bit or anchor chain,
   - ii. 500 ft. Tow Line faked on the ship's deck to allow it to run freely,
   - iii. 600 ft. Messenger Line shackled to the Tug's Thimble,
   - iv. Thimble Buoy tied to the Tug's Thimble,
   - v. 600 ft. Messenger Line faked on the deck to allow it to run freely,
   - vi. Buoy end of the 600 ft. Messenger Line run out through the ship's bullnose and back over the rail,
   - vii. Lighted Pick-up Buoy secured to the Buoy end of the Messenger Line. (Illustration st-5), and
   - viii. At night or during periods of low visibility, activate the lamp on the Lighted Pick-up Buoy before deployment.

   4b. Shipboard ETS configuration if Tug's Thimble will not fit through the ship's bullnose.
   - i. Run the 6 ft. Ship's Eye end of the Tow Line through the bullnose from the outboard side and secured to the ship's bit or anchor chain,
   - ii. 500 ft. Tow Line faked on the ship's deck to allow it to run freely,

iii. 600 ft. Messenger Line shackled to the Tug's Thimble,
iv. Thimble Buoy tied to the Tug's Thimble,
v. 600 ft. Messenger Line faked on the deck to allow it to run freely,
vi. Lighted Pick-up Buoy secured to the Buoy end of the Messenger Line. (Illustration st-5), and
vii. At night or during periods of low visibility, activate the lamp on the Lighted Pick-up Buoy before deployment.

5. Once the ship's master has determined that the ETS is correctly configured and the rescue tug is close enough, the ETS can be deployed. (Illustration st-6) Deploy the ETS by throwing the Lighted Pick-up Buoy over the ship's windward rail and allowing the Messenger Line to pay out through the ship's bullnose. The ship should drift faster than the line in the water, causing the line to trail to the windward side of the ship. (Illustration st-7)
6. Once the Messenger Line is stretched out, feed the Tug's Thimble and Thimble Buoy through the bullnose and pay out the Tow Line.
7. The ship's crew must avoid letting the lines pay out too quickly. This may cause the lines to tangle so they do not trail away from the ship.
8. Once the lines are deployed, the ship's master must notify the rescue tug's master that the ETS has been deployed and the ship is ready for towing.
9. The tug should approach the distressed ship from the windward and maneuver to retrieve the Messenger Line. In most cases this can be done by pointing into the wind and drifting or backing down alongside the Pick-up Buoy. (Illustration st-8)
10. The tug's crew will catch the Messenger Line with a flying gaff or the Line-gun gaff projectile. (Illustration st-8)
11. The tug's crew will pull in the Messenger Line to retrieve the Tug's Thimble end of the Tow Line. The tug's master must maneuver to keep the Messenger Line from tightening during the retrieval process. The Messenger Line must not be tied off, but handled so it can be slipped if the line does come tight.
12. Once the Tug's Thimble is onboard the tug, the tug's crew shackles the thimble to the tug's tow wire. Use caution to ensure that the Tow Line does not come tight during this procedure. The Messenger Line should remain attached to the Tow Line until the Tow Line is secured to the tug's tow wire. A stopper line may be rigged to the Tow Line to prevent strain on the Tug's Thimble during the shackling procedure. (Illustration st-9)
13. Once the Tow Line is made-up to the tug's tow wire, no crew should be on the tug's aft deck or the ship's bow.
14. The tug's master then coordinates with the distressed ship's master and commences towing operations suitable to the circumstances of the incident. (Illustration st-10)

Illustrations

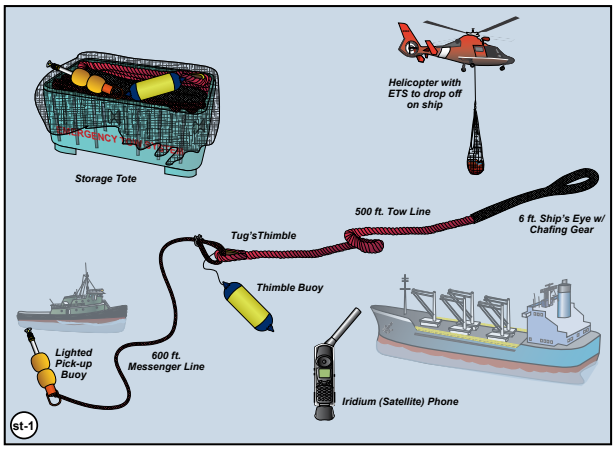


Illustration st-1. System components and configuration for deployment from ship to tug.

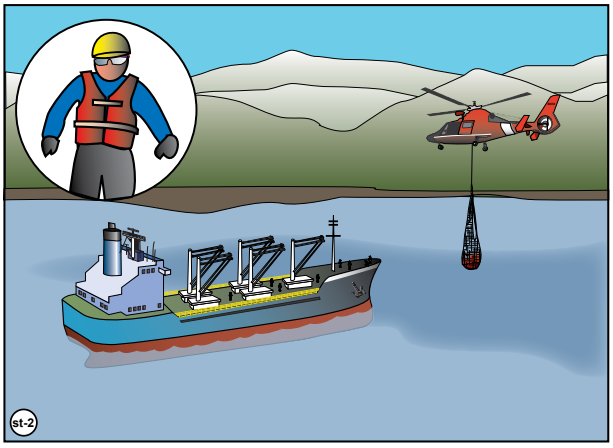


Illustration st-2. ETS being mobilized to distressed ship via helicopter.

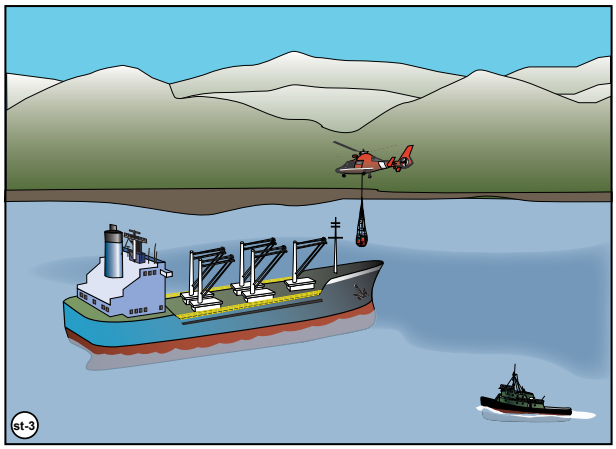


Illustration st-3. ETS landing on distressed ship via helicopter.

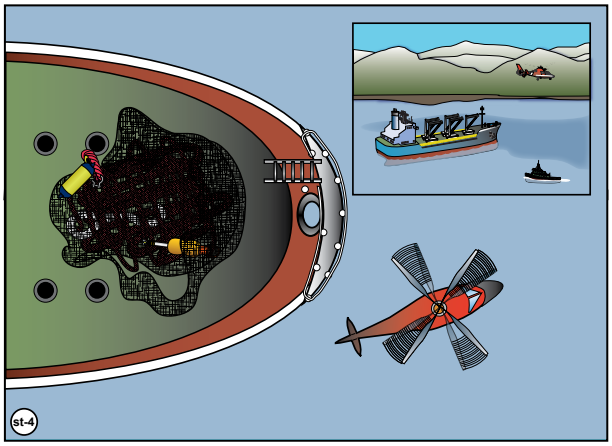


Illustration st-4. ETS in cargo net on the bow of the distressed ship.

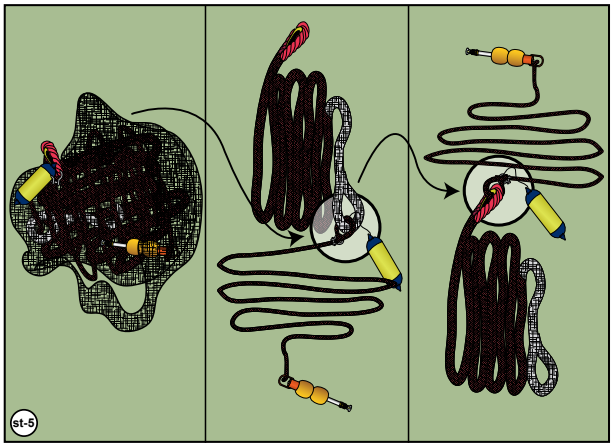


Illustration st-5. Unpacking and reconfiguring ETS for ship to tug deployment. Detach Messenger Line and buoy from the Ship's Eye and reattach the Messenger Line and buoy to the Tug's Thimble end of the Tow Line.

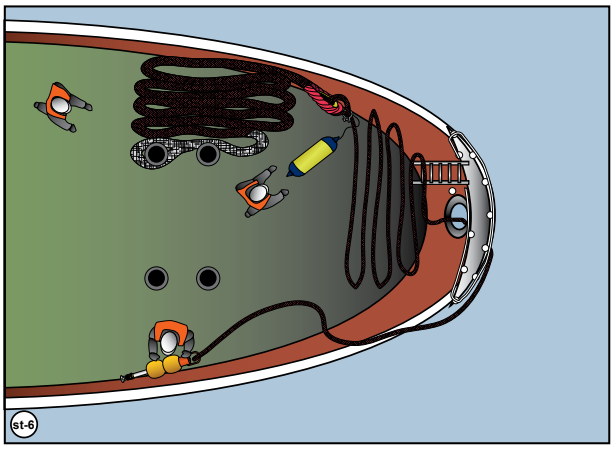


Illustration st-6. ETS arranged on distressed ship ready for deployment.

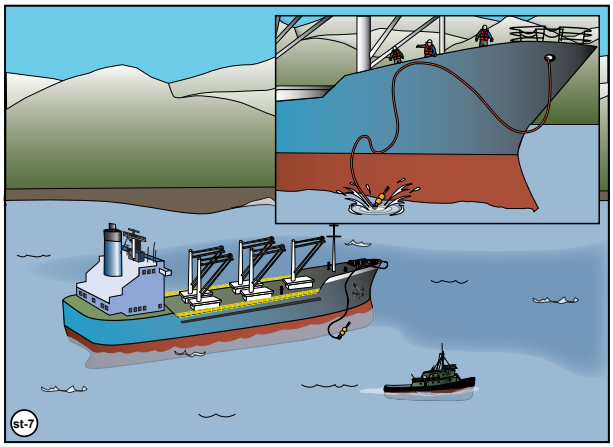


Illustration st-7. Launching Pick-up Buoy and Messenger Line from the distressed ship.

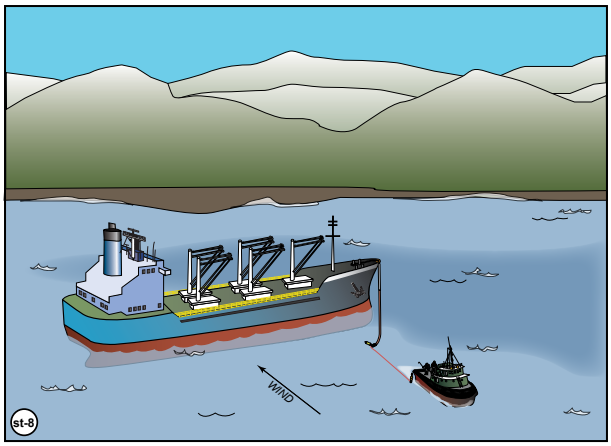


Illustration st-8. Capturing the Pick-up Buoy from the rescue tug.

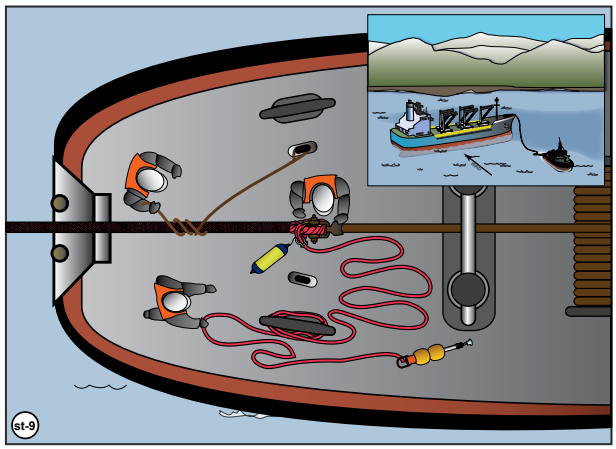


Illustration st-9. Shackling the Thimble end of the Tow Line to the rescue tug's tow wire.

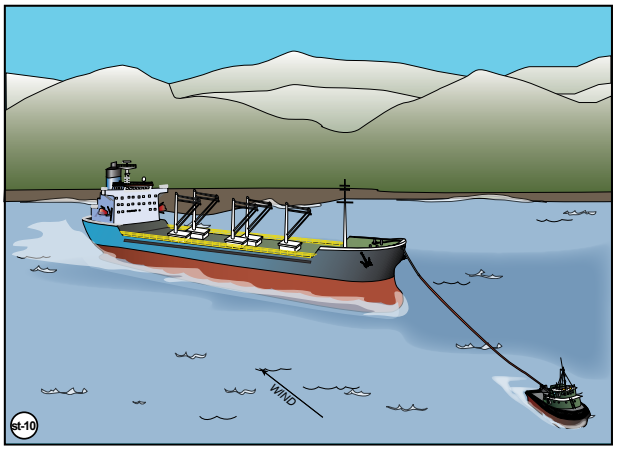


Illustration st-10. Rescue tug towing distressed ship.

Safety Considerations

- Both the vessel and tug crews should wear proper PPE while on deck, including:
  - PFD
  - Hard hat
  - Eye protection
  - Hypothermia protection (as appropriate)
- Good communication is essential between the masters of the vessels and between the master of each vessel and the vessels' deck crews. If possible, one crew member on each bridge should be assigned just to handle radio and/or satellite telephone communications.
- Take extreme care to ensure that the Tow Line and Messenger Line do not come tight until the Tow Line is made-up to the tug's tow wire. The Messenger Line should not be made fast. Consider using a "stopper line" on the Tow Line and tailing the Messenger Line during the haul-in and shackling process.

- No one should be allowed on the aft deck of the rescue tug or on the bow of the ship during towing operations.

Operational Considerations

- Positive aspects of the ship-to-tug deployment are:
  - The ETS can be mobilized long distances quickly via helicopter and the rescue tug does not have to come to a dock to receive the ETS.
  - Working with the ETS on-deck in adverse weather and sea state is generally safer on a ship than on a tug.
  - Once the ETS is deployed by the distressed ship's crew, they can move to the safety of the house.
  - The rescue tug can maintain a head into the weather orientation throughout the hook-up process, thus affording maximum protection for the tug's aft deck.
- Negative aspects of the ship-to-tug deployment are:
  - A helicopter may not be available to mobilize the ETS to the ship.
  - Dropping the ETS to the ship via helicopter is a dangerous operation for the helicopter crew and may be limited by weather/visibility.
- Multiple crew members should handle lines in a manner that allows for control during surges caused by seas.
- Consider mobilizing a satellite telephone to the ship with the ETS and dedicating this device to communications between the ship's master, tug's master, and USCG.
- If possible, consider placing a marine pilot onboard the distressed vessel to assist the master and crew.

TUG-TO-SHIP DEPLOYMENT

Overview

The ETS can be mobilized first to the rescue tug then deployed from the tug to the distressed ship. This is most likely done by placing the ETS on the deck of the rescue tug at one of the docks in Unalaska. (This procedure is covered in *Mobilization via Tug.*) The tug's crew must lash the ETS Tote onto the deck of their vessel in preparation for at-sea operations. Once the rescue tug is in the vicinity of the stricken vessel, the tug's master will coordinate operations with the ship's master. The rescue tug's crew will shoot a Line-gun projectile across the deck of the distressed ship. The ship's crew will haul in the Line-gun Line, once it is attached to the 600 ft. Messenger Line. The Messenger Line is then fed through the bullnose of the ship and hauled in to bring the Ship's Eye of the Tow Line aboard. The distressed ship's crew secures the Ship's Eye to a towing point on the bow. Once the ETS is secured to both tug and ship, the vessel masters will coordinate to commence towing operations.

Detailed Procedures

1. Review *Mobilization via Tug* if applicable.
2. Review *System Components and Nomenclature*. (Illustration ts-1)
3. Ensure that the ETS Tote is securely lashed to the deck of the rescue tug in the proper orientation, with the "Deploy From Here" labels pointed to the aft and inboard. Remove the lid from the ETS Tote, pull out the top of the cargo netting and secure it to the sides of the Tote. (Illustration ts-2)
4. Ensure that the Line-gun, associated projectiles and lines, and satellite phone are onboard.
5. The ETS is always packed for tug-to-ship deployment, so the system should be configured as follows:
   a. A 50 ft. tail of the Tow Line, terminating in the Tug's Thimble, is fed up from the bottom of the ETS Tote and lies on top. This tail is shackled to the tug's tow wire.
   b. The remainder of the 500 ft. Tow Line is stacked on the bottom of the ETS Tote and is shackled at the Ship's Eye to a 600 ft. Messenger Line stacked on top. An Eye Buoy is also attached at this juncture.
   c. The Messenger Line ends in an eye that is attached to the Line-gun Line once it has been fired and recovered by the ship's crew. (Illustration ts-2)

   [NOTE: The Lighted Pick-up Buoy will also be in the ETS Tote, but is generally used only in ship-to-tug deployment.]
6. Once the tug's master has determined that the ETS is correctly configured and secured for heavy seas, the tug departs to intercept the ship.
7. Once the tug is in the vicinity of the ship, the tug's master must coordinate with the ship's master in preparation for ETS operations.
8. If the distressed ship is adrift, she will probably be laying in the trough, abeam the wind. The rescue tug should approach the distressed ship from the windward and maneuver to within 300 ft. in preparation for a Line-gun shot. In most cases this can be done by pointing into the wind and drifting or backing down on the ship. (Illustration ts-3)

9. The ETS is deployed by shooting a Line-gun projectile across the deck of the ship. The tug's master should give adequate warning and receive confirmation prior to firing the launcher by relaying the following to the distressed ship's master via VHF radio or satellite telephone:
    a. *Make Ready for Line-gun Shot*
    We intend to shoot a Line-gun projectile to the deck of your ship amidships, once you are prepared to receive it. Have your deck crew wear hard hats and be stationed amidships to receive the line. Instruct your crew not to tie off the Line-gun line or pull on it until we signal that it is secured to the Messenger Line. Acknowledge.
    b. *Standby for Line-gun Shot*
    We are prepared to shoot and assume that you are prepared to receive. Your deck crew should take cover until the projectile is fired. Acknowledge by radio or with two whistles that your crew is prepared.
    c. *Line-gun Shot to Follow Immediately*
    The Line-gun will fire immediately after this signal. Three whistles.
10. The ship's master should have a crew on deck, along the windward rail near the center of the ship. The deck crew must be alert for the Line-gun shot and should duck behind suitable cover until the projectile passes overhead.
11. The Line-gun should not be shot to the bow of the ship, but rather above the center deck of the ship. This ensures the best chance of successfully getting the line across the deck in high winds and seas. The Line-gun operator must aim high over the deck, away from the crew, with the objective of putting the line across the deck. (Illustration ts-4)
12. Once the Line-gun Line is fired across the deck, the ship's deck crew must grab and handle the line to control any surge caused by heavy seas. They should not tie the Line-gun Line off or make it fast, as this creates the possibility of injuring the tug crew or parting the line. The ship's crew should not pull on the line until instructed by the tug's master, as the tug's crew must first tie it to the Messenger Line. (Illustration ts-5)
13. Once the Line-gun Line is captured by the ship's deck crew, the tug's deck crew must attach it to the Messenger Line. One crew member should be assigned to control the line running to the distressed ship, while others tie or shackle the line into the eye in the Messenger Line. (Illustration ts-6)
14. Once the Line-gun Line is secured to the Messenger Line, the ship's crew will pull the Messenger Line onboard and run the eye-end through the ship's bullnose. One or more crew members should control the line running to the tug, while others feed the line through the bullnose. The Line-gun Line should remain attached to the Messenger Line during this operation. (Illustration ts-7 and ts-8)
15. The 600 ft. Messenger Line is hauled aboard the distressed ship through the bullnose, by hand or with power assist. Care must be taken by the deck crew to allow for line surge. The master of the rescue tug must maneuver to prevent line surge as much as possible.
16. The Ship's End of the Tow Line is hauled through the bullnose and made fast to a towing point, usually a bit. A stopper line can be used to control the Tow Line once it is onboard. (Illustration ts-9) Given time, the ship's master may also consider securing the Tow Line to the anchor chain.

17. Once the Tow Line is secured to the ship, the ship and tug deck crews should move inside to safety.
18. The rescue tug's master will coordinate with the ship's master and commence towing operations suitable to the circumstances of the incident. (Illustration ts-10)

Illustrations

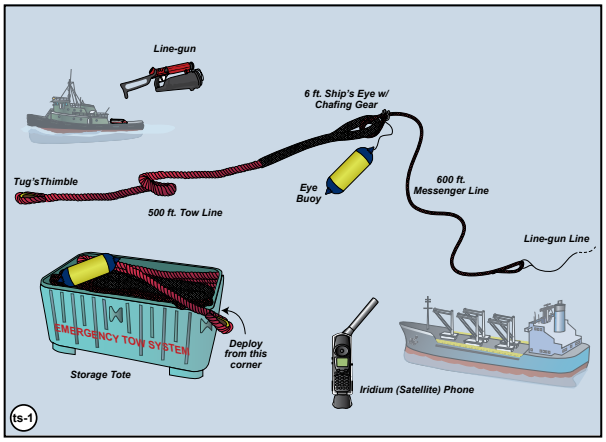


Illustration ts-1. System components and configuration for deployment from tug to ship.

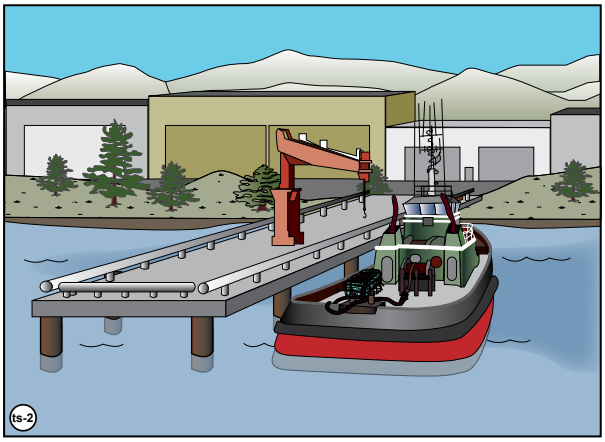


Illustration ts-2. ETS mobilized to rescue tug, lashed to the deck, and shackled to the tow wire.

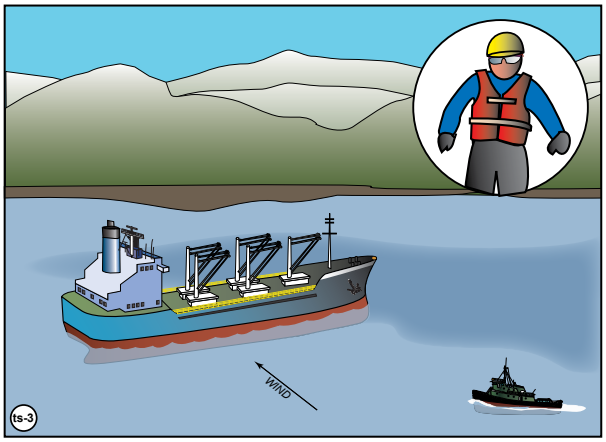


Illustration ts-3. Rescue tug with ETS approaching distressed ship. Deck crews on the ship and tug don proper hard hats, safety glasses, and PFDs.

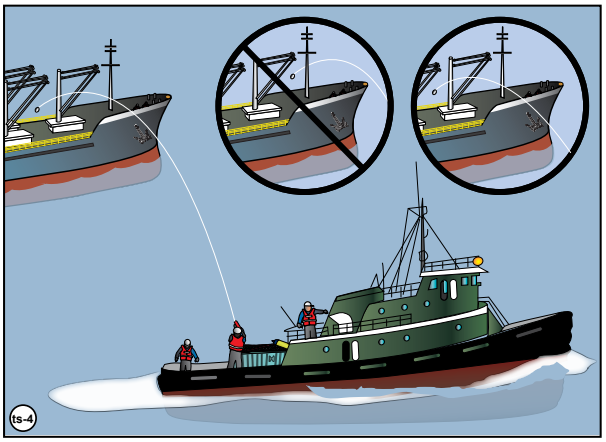


Illustration ts-4. Rescue tug firing Line-gun to distressed ship. Line-gun projectile is fired amidships, not across the bow.

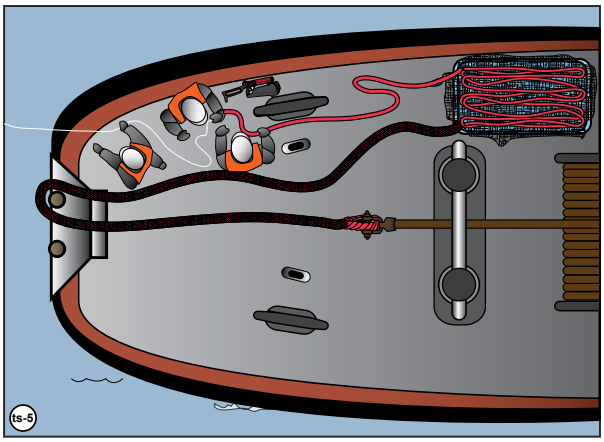


Illustration ts-5. Deck crew on rescue tug attaching Line-gun Line to Messenger Line.

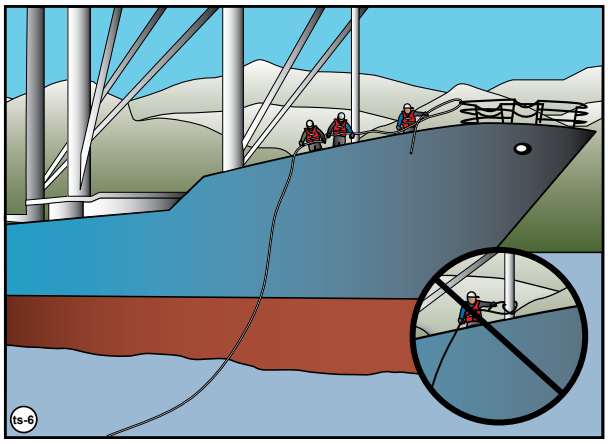


Illustration ts-6. Deck crew on disabled ship captures the Line-gun Line and waits until the tug crew secures it to the Messenger Line before hauling it in. Do not tie-off Line-gun line or Messenger Line.

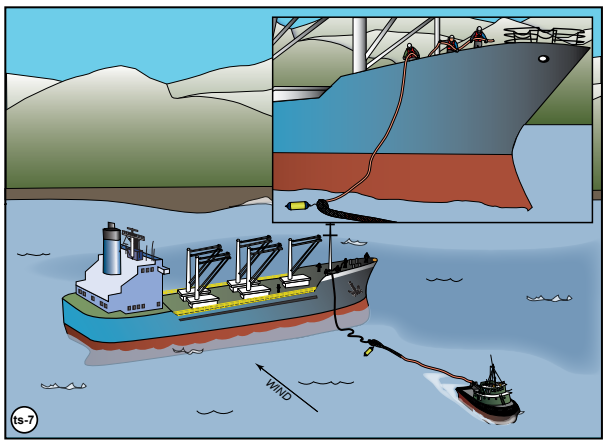


Illustration ts-7. Distressed ship's deck crew moving Messenger Line to bullnose.

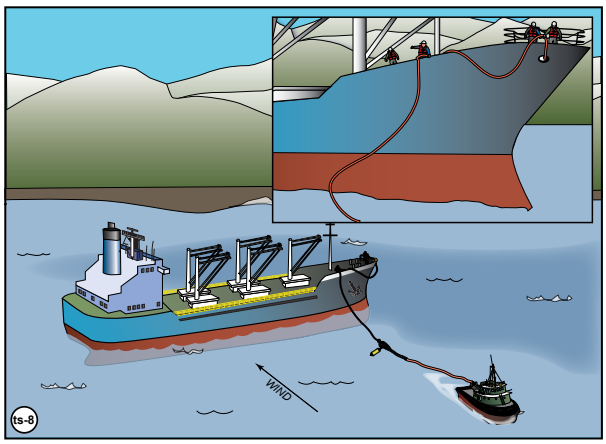


Illustration ts-8. Distressed ship's deck crew feeding Messenger Line through bullnose before hauling in.

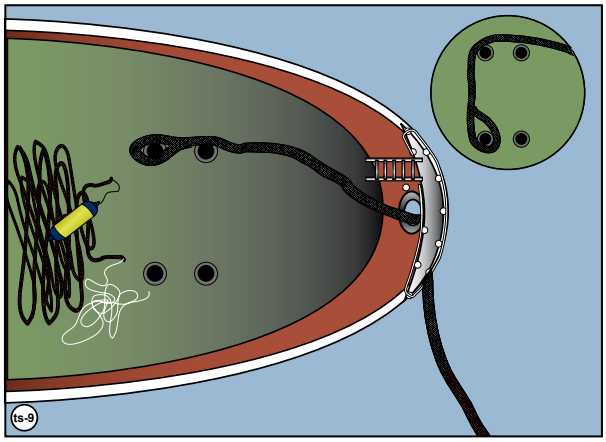


Illustration ts-9. Tow Line secured to towing point on disabled ship.

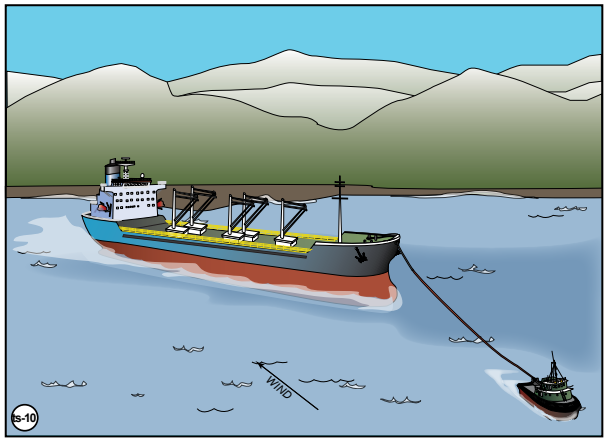


Illustration ts-10. Rescue tug towing distressed ship.

Safety Considerations

- Both the vessel and tug crews should wear proper PPE while on deck, including:
  - PFD
  - Hard hat
  - Eye protection
  - Hypothermia protection (as appropriate)
- Good communication is essential between the masters of the vessels and between the master of each vessel and the vessel deck crew. If possible, one crew member on each bridge should be assigned just to handle radio and/or satellite telephone communications.
- Take extreme care to ensure that the Tow Line and Messenger Line do not come tight until the Tow Line is made-up to the tug's tow wire. Neither the Messenger Line nor the Line-gun Line should be made fast. Consider using a "stopper line" on the Tow Line and tailing the Messenger Line during the haul-in process.
- No one should be allowed on the aft deck of the rescue tug or on the bow of the ship during towing operations.

Operational Considerations

- Positive aspects of the tug-to-ship deployment are:
  - The ETS can be mobilized quickly to a dock and there are usually tugs available in Unalaska.
- Negative aspects of the tug-to-ship deployment are:
  - Working with the ETS on-deck in adverse weather and sea state is generally more dangerous on a tug than on a ship.
  - Line-gun operations during heavy weather and seas are risky and unreliable.
- Consider mobilizing a satellite telephone to the ship with the ETS and dedicating this device to communications between the ship's master, tug's master, and USCG.
- If possible, consider placing a marine pilot onboard the tug or distressed vessel to assist in communications with the master and crew.
- Multiple crew members should handle lines in a manner that allows for control during surges caused by seas.
- Rescue tug crew should consider lashing across the open ETS Tote to secure the ETS during transit in heavy seas.

LINE-GUN PROCEDURES

Overview

A critical component of the tug-to-ship rescue is the Line-gun.[1] The Line-gun casts a strong 4.0 or 6.0 mm x 500 ft. ribbon-line across the distressed vessel giving her crew the means to haul in the Messenger Line and in turn the Tow Line. A ResQmax line-throwing appliance (Line-gun) is stored at the Unalaska Harbormaster's office. This system uses a projectile that is fueled by compressed air. Under ideal conditions the rescue line can be thrown 600 ft. The Line-gun system consists of:

- A ResQmax Model Launcher
- 2 Line Containers - one with 4.0 mm Line and one with 6.0 mm Line (both have 500 ft. of Line)
- 2 Luminescent Training Projectiles
- 2 Streamline Rescue Projectiles with 2 spare covers
- 1 Streamline Filler Hose for SCBA
- Cordura Storage/Transport Bag
- Quick Connect/Disconnect Fittings for SCBA & SCUBA
- Grapple Attachment (future Line-gun component)

The procedures for filling projectiles, packing the connecting line, safety, maintenance, and operation are contained in the Operation Manual contained in Appendix B. The Harbormaster also has copies of an instructional video for Line-gun procedures. This section of the ETS Procedures Manual is not intended to replace the manufacturer's manual and video. This section describes considerations for using the Line-gun in conjunction with the ETS in the tug-to-ship rescue process. Anyone using the Line-gun in rescue operations should have prior training, including having read the manufacturer's Operation Manual and viewed the instructional video.

Detailed Procedures

1. Review *Tug to Ship Deployment* procedures.
2. Review *Appendix B. ResQmax Operation Manual*
3. The Line-gun is stored at the Harbormaster's office. The Harbormaster should inspect the Line-gun and associated components monthly to ensure that the projectiles remain changed, the lines are correctly packed, and the gun is in operating order. Maintenance of the Line-gun is covered on pages 31 to 34 of the Operation Manual. Projectiles are pressure vessels and must be serviced by a manufacturer-certified technician at least once every five years.
4. The Harbormaster should also maintain a log for the Line-gun including dates inspected, service dates, training, and number of shots fire for each projectiles.

1 This system could also be used in the ship-to-tug deployment with the grappling hook projectile to capture the Messenger Line, if the Line-gun can be mobilized to the rescue tug.

5. Potential rescue tug captains should consider having one or more of their crew trained annually in Line-gun operations. Practice will build the proficiency necessary for reliable shots in rescue situations.
6. The Harbormaster will mobilize the Line-gun system to the rescue tug once the ETS has been activated.
7. Once on scene at the distressed vessel, the rescue tug's captain will maneuver the tug to the windward within 300 ft. of the distressed ship. The tug should be pointed into the wind or otherwise positioned to afford maximum protection to the Line-gun operator.
8. The rescue tug's captain must communicate with the distressed ship's master to coordinate the Line-gun shot. No shot should be attempted until the distressed ship's deck crew is prepared to capture the line. The following messages should be communicated to the distressed ship's master via VHF radio or satellite telephone:
    a. *Make Ready for Line-gun Shot*
    We intend to shoot a Line-gun projectile to the deck of your ship amidships, once you are prepared to receive it. Have your deck crew wear hard hats and be stationed amidships to receive the line. Instruct your crew not to tie off the Line-gun line or pull on it until we signal that it is secured to the Messenger Line. Acknowledge.
    b. *Standby for Line-gun Shot*
    We are prepared to shoot and assume that you are prepared to receive. Your deck crew should take cover until the projectile is fired. Acknowledge by radio or with two whistles that your crew is prepared.
    c. *Line-gun Shot to Follow Immediately*
    The Line-gun will fire immediately after this signal. Three whistles.
9. While the Line-gun operator is preparing to shoot, other deck crew on the tug should watch for waves sweeping across the deck or any other unsafe conditions that the operator may not notice while preparing for the line shot.
10. The Line-gun operator should aim amidships of the distressed ship, rather than across the bow. This will minimize the likelihood of missing the ship with the line and give the ship's crew the best chance of successfully catching the line.
11. The Line-gun operator should also aim above the ship with the objective of shooting the projectile above the deck allowing the training line to fall across the deck. Never aim directly at the ship or the ship's crew.
12. If the first shot fails, load another projectile and line and repeat the shot.
13. Once the distressed ship's crew has captured the Line-gun line, they must not tie it off, but hold on to it by hand to control surges caused by seas. They should not pull on it until the rescue tug's crew has secured the Line-gun line to the Messenger Line.
14. The deck crew of the rescue tug must work together control line surges while tying the Line-gun line to the eye of the Messenger Line.
15. After the Line-gun is used and returned to the Harbormaster, he will clean it, refill all projectiles, repack line containers, inspect it according to the Operation Manual (Appendix B), and if there is any indication that there is any problem with the Line-gun equipment, he will contact the manufacturer for service.

Photographs

Photograph lg-1. Line-gun Launcher.

Photograph lg-2. Line-gun projectile pressurized to 3,200 psi.

Photograph lg-3. Loading the projectile into the launcher.

Photograph lg-4. Line-gun launched from the deck of the rescue tug.

Photograph lg-5. Line-gun launch as seen from ship.

Photograph lg-6. Crews on tug and ship control line surges while tug's crew secures Line-gun Line to Messenger Line.

Photograph lg-7. Distressed ship's deck crew retrieves Line-gun Line.

Safety Considerations

- The Line-gun is intended to be used by professionals trained in its use. Misuse may cause bodily injury or death. Read and follow the manufacturer's Operation Manual (Appendix B).
- The Line-gun is extremely powerful and should be treated with the same precautions as a firearm. Never aim or fire the projectile at a person. When training, make sure that no person or property is in the vicinity of the target.
- The Line-gun requires proper training and servicing. Operators must be familiar with the equipment and willing to follow the manufacturer's Operation Manual. The manufacturer's recommended service and maintenance guidelines must also be followed.
- If you are uncertain about the proper usage, care, maintenance or any other aspect of the Line-gun contact the manufacturer. (See Appendix A. Contacts)
- Both the vessel and tug crews should wear proper PPE while on deck, including:
    - PFD
    - Hard hat
    - Eye protection
    - Hypothermia protection (as appropriate)
- Good communication is essential between the masters of the vessels and between the master of each vessel and the vessel's deck crew. If possible, one crewmember on each bridge should be assigned just to handle radio and/or satellite telephone communications.
- The Line-gun line should not be tied off or made fast, but controlled by hand to allow for surges in the line.
- On the tug, other crewmembers should watch for boarding seas and other unsafe conditions while the Line-gun operator is making the Line-gun shot.
- On the ship, the deck crew should take cover and be vigilant at the time of the line shot.

Operational Considerations

- Multiple crew members should handle lines in a manner that allows for control during surges caused by seas.
- The Line-gun operator should have training and practice to maximize the chances of a success.

DECONTAMINATION AND PACKING

Overview

The ETS is always packed for deployment from the rescue tug, so it is immediately deployable for incidents within Unalaska Bay. However, the ETS is placed inside of a cargo net within the Tote, so it also may be quickly mobilized via helicopter. The purpose of this procedure is to ensure the ETS is packed in a standardized way so either deployment can be accomplished easily and quickly. After any use, the ETS will have to be decontaminated, dried, and inspected according with the manufacturer's recommendations.

Detailed Procedures

1. Review *System Components and Nomenclature*
2. If the ETS has been used and contaminated with significant amounts of oil or other petroleum product, it must be decontaminated according to a plan approved by ADEC. If is only lightly contaminated it can be washed with a mild detergent and water, rinsed with low pressure water, and dried. Do not use a citrus-based detergent (anything containing d'Limonene) as this can rapidly deteriorate Plasma line. See Appendix D. Inspection Guidelines for Plasma® Synthetic Ropes.
3. In preparation for packing, select an area with enough room to spread out the ETS and place a tarp or sheet of plastic to protect the system components during packing.
4. Inspect all the components of the ETS for signs of damage or wear. See Appendix D for inspection guidelines. If either is noted, contact the component's manufacturer to determine if the component should be taken out of service for repair or retired. Check operability of shackles and connectors. Check battery for the Lighted Pick-up Buoy, replace as necessary.
5. Arrange components on the tarp in the follow order: (see Illustration p-1)
    a. Helicopter Pendant
    b. Pick-up and Eye buoys
    c. 600 ft. x 7/8 in. Messenger Line
    d. Thimble end of the Tow Line
    e. 500 ft. Tow Line
    f. 6 ft. Ship's Eye end of the Tow Line
    g. ETS Tote lined with the cargo net.
6. Attach the eye at the end of the Messenger Line to the Ship's Eye on the end of the Tow Line. Also secure the Eye Buoy to the Ship's Eye. During deployment, the Eye Buoy will provide a visual marker for the Messenger/Tow Line junction when the lines are in the water.
7. There is a black line-marker 50 ft. from the Thimble end of the Tow Line. This 50 ft. tail will be left outside of the Tote until the end of the packing process. This tail is removed from the top and secured to the rescue tug's tow wire prior to deployment at sea. (Illustration p-2)

8. Start packing from the corner of the ETS Tote labeled "Deploy From Here." Begin faking the Tow Line into the bottom of the tote. First length-wise, then cross-wise. Stack the line tightly but in a fashion that will allow it to deploy smoothly. (Illustration p-3 & p-4)
9. Stack the Tow Line into the ETS Tote until the gray chafing gear-covered Ship's End is packed into the ETS Tote. Consider having someone hop inside the Tote to compact the Tow Line. (Illustration p-5)
10. Stack the Eye Buoy, which is attached to the Ship's Eye, at the end of the last layer of Tow Line. It should be placed on the end of the Tote opposite the deployment corner.
11. Place a sheet of Separation Layer (plastic, cardboard, or burlap cut to fit the dimensions of the Tote) over the Tow Line layer. This separates the smaller Messenger Line from the Tow Line ensuring that the smaller line does not fall between the coils of the larger line and become tangled. (Illustration p-5)
12. Fake the Messenger Line into the ETS Tote on top of the Separation Layer in layers with each successive layer cross-wise to the previous. (Illustration p-6 and p-7)
13. Place another Separation Layer on top of the Messenger Line and fake the Tow Line tail (ending in the Thimble) on top. (Illustration p-8 and p-9)
14. Place the Lighted Pick-up Buoy into ETS Tote unattached to the rest of the ETS.
15. Fold into the Tote the portion of the cargo net left hanging out. (Illustration p-10)
16. Place the lid on the Tote and secure it with the attached elastic loops.
17. Place a nylon band around the Tote to secure the lid and prevent tampering.
18. If the weight of the ETS is not known, have it weighed and attach a tag on the outside of the ETS Tote with the following information:
    a. Date Packed
    b. Names of Packers
    c. Weight of the ETS including the Tote
    d. Weight of the ETS and cargo net, without the Tote
19. Place the ETS Tote into the secure storage indicated in the *Storage Locations* section of this manual. Store the Helicopter Pendant in the airport location, but outside the Tote. Store the ratchet straps at the Port storage location, but outside the Tote.

Illustrations

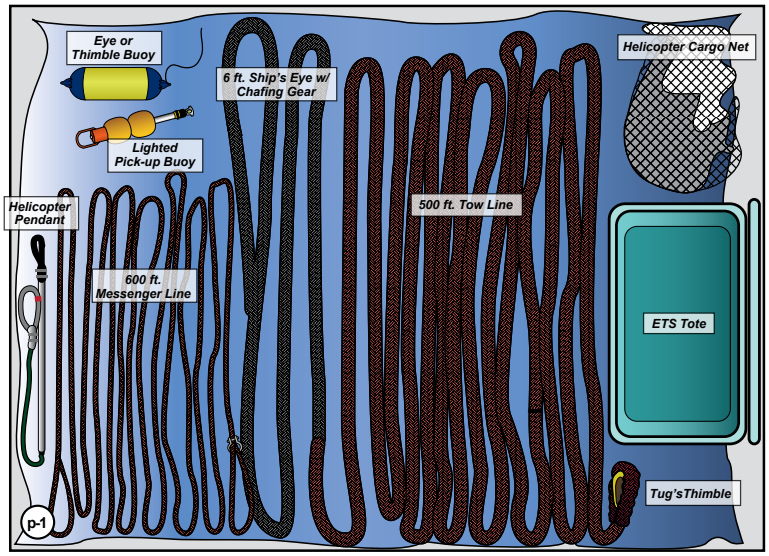


Illustration p-1. ETS components ready to pack.

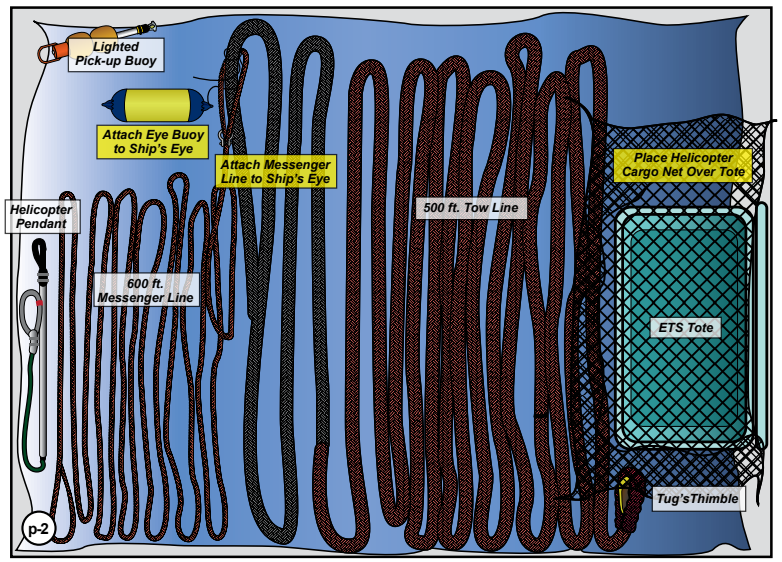


Illustration p-2. Line ETS Tote with the Cargo Net; attach the Eye Buoy and Messenger Line to the Ship's Eye on the Tow Line.

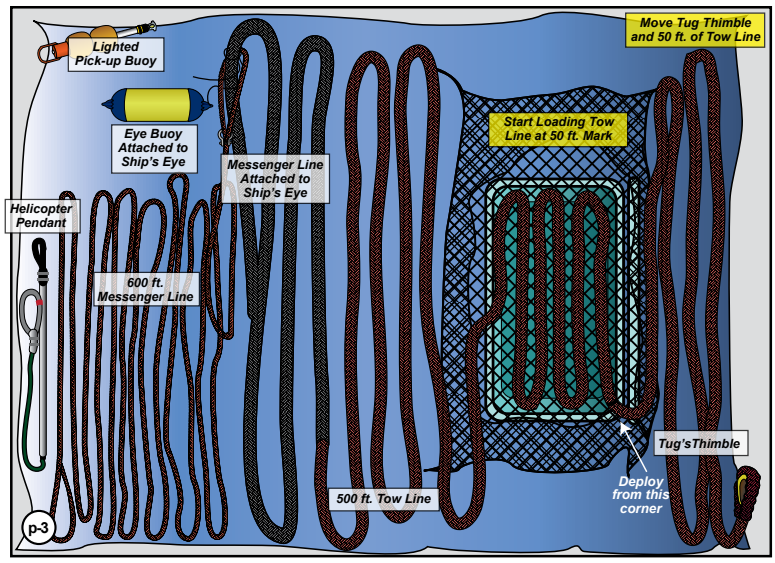


Illustration p-3. Leaving the 50 ft. tail on the tug end of the Tow Line outside the Tote, start faking the Tow Line into the bottom of the ETS Tote.

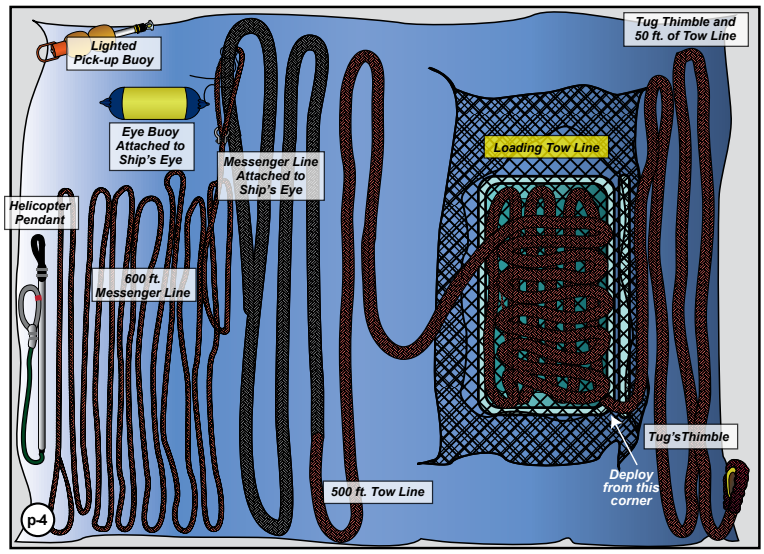


Illustration p-4. Fake the Tow Line into the ETS Tote, first length-wise then cross-wise.

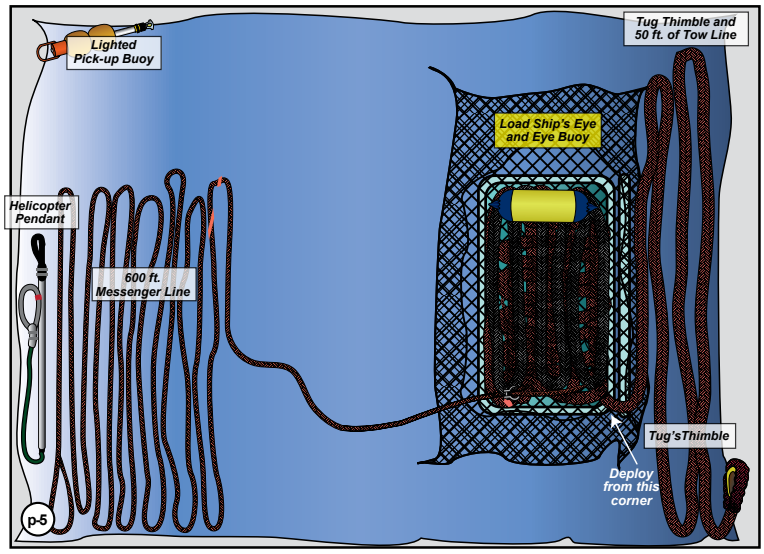


Illustration p-5. Continue to fake the Tow Line into the ETS Tote until the Ship's Eye is inside the tote; also place the Eye Buoy into the Tote.

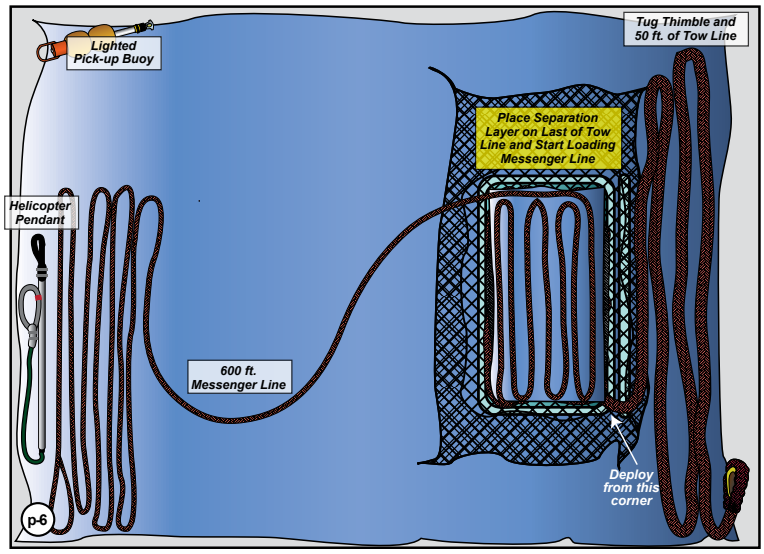


Illustration p-6. Place a Separation Layer on top of the Tow Line and begin faking the Messenger Line into the Tote.

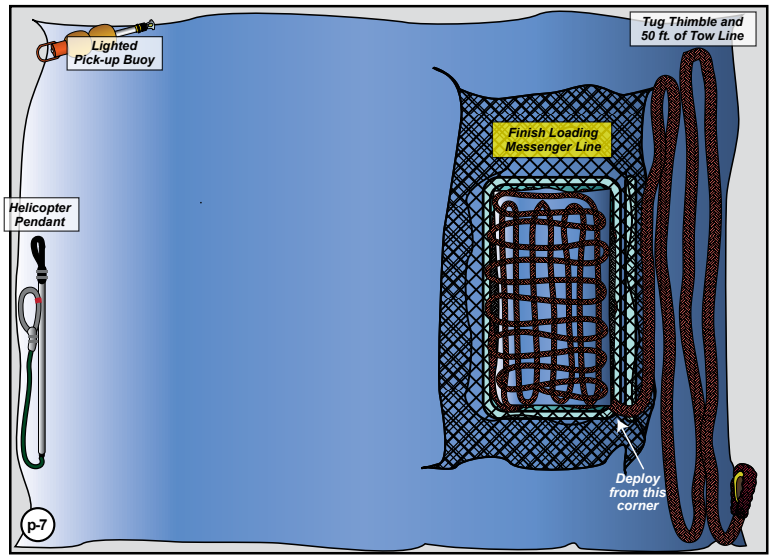


Illustration p-7. Continue faking the Messenger Line into the ETS Tote, first length-wise then cross-wise.

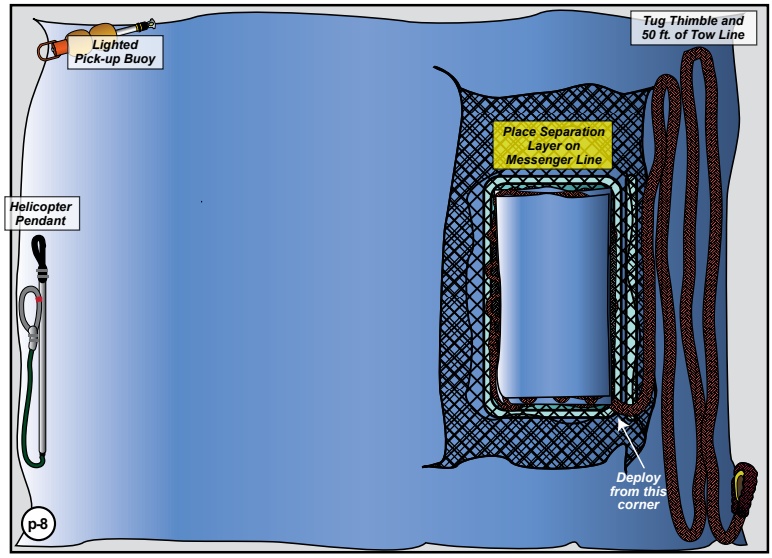


Illustration p-8. Once the Messenger Line is completely loaded in the Tote, place another Separation Layer on top.

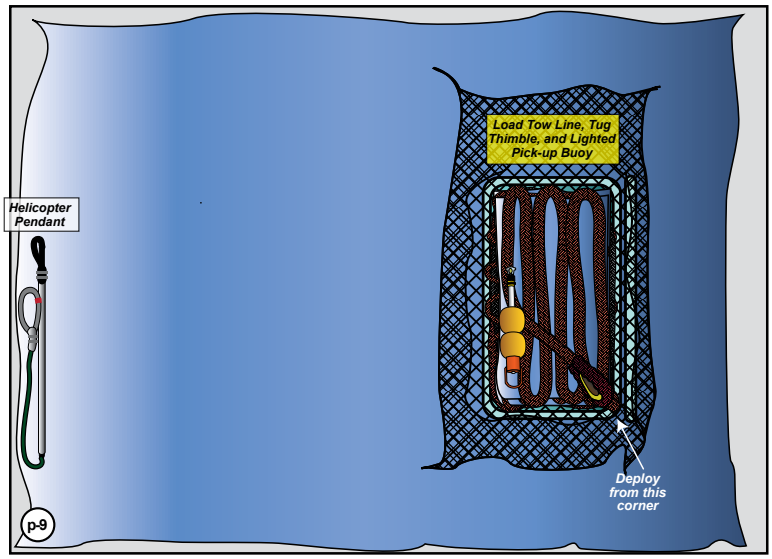


Illustration p-9. Fake the tail of the Tow Line on top of the Separation Layer; place the Lighted Pick-up Buoy inside the Tote without attaching it to the Tow Line. The Helicopter Pendant does not go inside the Tote.

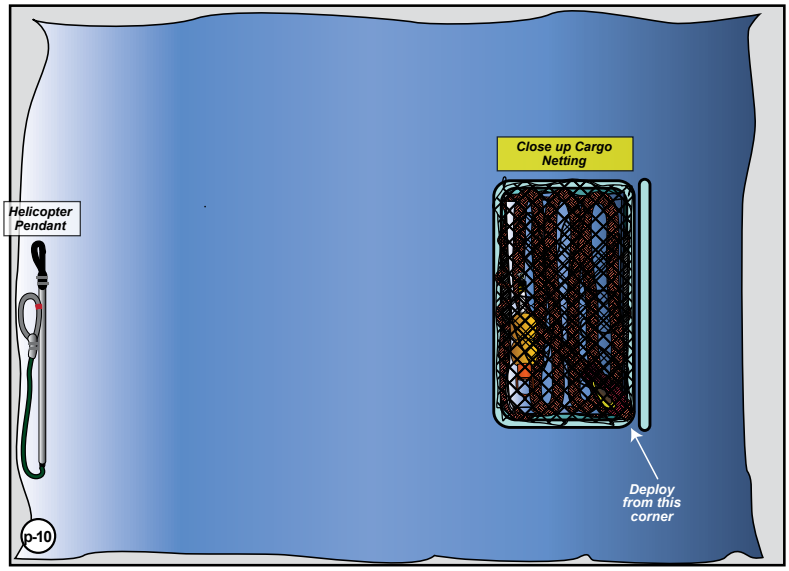


Illustration p-10. Fold the remainder of the Cargo Net inside the Tote; place the Tote lid on the Tote, and secure the lid with the elastic straps.

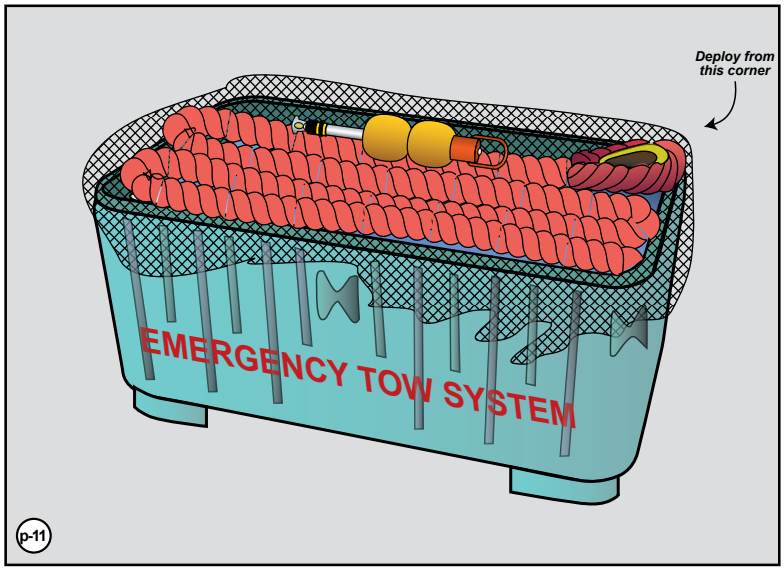


Illustration p-11. ETS packed into Tote, ready for deployment.

Safety Considerations

- Beware of slip, trip, and fall hazards while packing the ETS.
- Beware of machinery used to move the system and Tote.

Operational Considerations

- The Line-gun is stored at the Harbormaster's office and the satellite phone is stored at the Alaska Marine Pilots' office. These components should be checked for operability and maintenance at the same time the ETS is repacked.
- Consider that the repacking process is a training opportunity. Invite tug crews, marine pilots, ship's masters and agents, and USCG personnel to participate and discuss the use and care of the ETS.

MAINTENANCE

Overview

Proper maintenance is vital to ensure the reliability of every component of the ETS. This manual is not intended to replace the equipment manufacturer's maintenance procedures and schedule. Always follow the equipment manufacturer's maintenance procedures and schedules if they conflict in any way with the information summarized here. Contact the manufacturer directly with questions on proper maintenance or repair procedures. (See Appendix A. Contacts)

Ultimately, maintenance responsibility rests with the owner of the equipment. The City of Unalaska is responsible for the maintenance of the smaller < 50,000 DWT system, the Line-gun, and the satellite telephone; and the ADEC is responsible for the larger > 50,000 DWT system and helicopter pendant. The USCG is responsible for the maintenance of the helicopter Cargo Release Hook. However, the City of Unalaska Harbormaster has agreed to perform the periodic inspections of the components stored in his control.

This manual and associated instructional video are also important system components and should be reviewed by each of the workgroup organizations annually. Corrections should be reported to the ETS Procedures Manual Administrator.

Maintenance Procedures

The Table MS-1 summarizes the routine maintenance procedures for the ETS system.

Maintenance Log

The Table MS-2 can be photocopied and used as a maintenance log for the ETS system. The Maintenance log should be kept at the Harbormaster's office with the master copy of the procedures manual and the Line-gun Shot log.

Table MS-1. Routine maintenance procedures for ETS components.

ETS Component	Maintenance Procedure	Responsibility	Frequency
Procedures Manual & Instructional Video	1. This procedures manual and associated instructional video should be reviewed periodically to ensure that the information presented is current and accurate. Particular attention should be given to the contacts information in Appendix A.	Harbormaster, AMPA, USCG Unalaska MSD, potential rescue tug captains, potential distressed ship captains, marine agents. Send edits to the manual administrator.	Annually or whenever any system component is added, replaced, or retired
Smaller ETS (<50,000 DWT) Stored in a 20 ft. connex at the Port.	2. Inspect storage location and ETS Tote to verify: • There are no obstructions to entry. The area is free of snow and debris. • The tamper-proof band on the ETS is intact. • The ETS Tote appears to be in good condition and nothing has changed that would alter the contents in anyway. • There are lifting straps and ratchet straps with the Tote. Notify the Unalaska City Manager and correct any problems.	Harbormaster	Quarterly
	3. Completely unpack the ETS; inspect all components; replace batteries in the Lighted Pick-up Buoy; check all lights, buoys, and shackles for functionality; repack according to the *Decontamination and Packing* procedure; replace tamper-band; and verify the weight of the system both with and without the Tote. This is also an opportunity for training, so other organizations should be invited and encouraged to participate. Notify the Unalaska City Manager and consult with the manufacturer if any problems are noted.	Harbormaster	Annual basis so any repairs/replacements are in place prior to the winter storm season
	4. Open the ETS Tote and replace the batteries in the Lighted Pick-up Buoy, replace the Tote lid and tamper-proof band.	Harbormaster	Annual basis so any repairs/replacements are in place prior to the winter storm season
Larger ETS (>50,000 DWT) Stored at the DOT hanger at the airport.	5. Inspect storage location and ETS Tote to verify: • There are no obstructions to entry. The area is free of snow and debris. • The tamper-proof band on the ETS is intact. • The ETS Tote appears to be in good condition and nothing has changed that would alter the contents in anyway. • The helicopter cargo pendant is with the Tote. Notify the ADEC Prevention and Emergency Response Program (PERP) Manager and correct any problems.	Harbormaster	Quarterly

ETS Component	Maintenance Procedure	Responsibility	Frequency
Larger ETS (>50,000 DWT) (continued)	6. Completely unpack the ETS; inspect all components; replace batteries in the Lighted Pick-up Buoy; check all lights, buoys, and shackles for functionality; repack according to the *Decontamination and Packing* procedure; replace tamper-band, and verify the weight of the system both with and without the Tote. This is also an opportunity for training, so other organizations should be invited and encouraged to participate. Notify the ADEC PERP Manager and consult with the manufacturer if any problems are noted.	Harbormaster	Annual basis so any repairs/replacements are in place prior to the winter storm season
	7. Open the ETS Tote and replace the batteries in the Lighted Pick-up Buoy, and replace the Tote lid and tamper-proof band.	Harbormaster	Annual basis so any repairs/replacements are in place prior to the winter storm season
Line-gun System Stored at the Harbormaster's Office.	8. Inspect to insure that the all parts of the system are present, projectiles are charged to full capacity, the line containers are correctly filled, and the gun is functioning as intended. See *Appendix B. ResQmax Line Gun Operation Manual*. Service Line-gun components and consult with manufacturer as necessary.	Harbormaster	Monthly
Line-gun Launcher	9. Have launcher inspected and serviced by a technician trained and certified by the manufacturer.	Harbormaster	Every 3rd year after date of purchase, after 300 shots have been logged, or whenever there is any problem with the launcher
Line-gun Projectile	10. Have projectile inspected and serviced by a technician trained and certified by the manufacturer.	Harbormaster	The first indication that there is any physical external damage to the cylinder or every 5th year after purchase
Line-gun Nozzle Valve Assembly	11. Replace O-rings according to the procedures on page 32 of the Line-gun operations manual in Appendix B.	Harbormaster	Whenever a projectile fails to hold air
	12. Have valve assembly inspected and serviced by a technician trained and certified by the manufacturer.	Harbormaster	Whenever replacing the O-ring fails to correct the problem, excessive wear is noted on the beveled surface of the nozzle body, of when 150 shots have been logged on the assembly.
Satellite Telephone Stored at the Harbormaster's office.	13. Ensure that the batteries are fully charged, the phone functions as intended, and the current telephone list is with the phone.	Harbormaster	Monthly

Table MS-2. Maintenance log for ETS.

Date	Person Completing Procedure	Procedure (reference procedure number from Table MS-1)	Notes: Comments, problems noted, or notifications made

TRAINING

Regular training is critical to maintaining proficiency in any rescue procedure. Successful use of the ETS depends on the correct implementation of procedures by several different organizations (i.e. the crews of the rescue tug, ship, the USCG helicopter, etc.). The ship's crew may have no training or experience in deploying an ETS and may not even speak English. Other organizations regularly perform some of the required tasks; for example, the USCG helicopter crews regularly practice aerial sling deliveries and the tug crews regularly tow ships. Still, mobilizing and deploying the ETS is not a common event, so routine training and practice are important. While training is voluntary, it is highly recommended to maintain proficiency.

Three methods of training are available:

- Watching the instructional videos (ETS deployment and Line-gun Operations).
- Reviewing this Procedures Manual.
- Conducting an actual deployment exercise.

It is hoped that the entire system can be exercised through a drill at least every other year. However, at the time of this writing, funding for deployment exercises has not been identified. The ETS Workgroup recommends the following training schedule for each organization.

POTENTIAL RESCUE TUG CREWS

The tug captain should walk the crew through the procedures unique to their vessel such as lashing points and shackling the ETS to the tow wire every six months. Each crewmember should review the instructional video and the procedures manual annually. Designated Line-gun operators should also review the Operation Manual (Appendix B) and associated video every six months and should fire practice shots annually. Contact the Harbormaster to assist in Line-gun practice.

POTENTIAL DISTRESSED SHIP'S CREWS

Ship's agents should make every vessel calling in Unalaska aware of the ETS. Ship's masters should be encouraged to read the procedures manual, view the instructional video, and discuss the ETS procedures with the marine pilots and tug captains. Whenever the Unalaska Ports and Harbors repacks an ETS Tote, ship's masters in port should be invited to observe and discuss.

UNALASKA PORTS AND HARBORS

The Harbormaster and Ports personnel should review the instructional video and procedure manual annually. One of the ETS totes should be open unpacked, inspected, and re-packed each year. Potential users of the ETS should be invited to participate in this event. At that time the Harbormaster, a marine pilot, and a tug captain should lead a discussion on mobilizing and deploying the system.

USCG, AMPA, AMX, AND ADEC

The USCG MSD Unalaska, AMPA, AMX, and ADEC should also review the instructional video and procedures manual annually. These organizations are encouraged to hold a tabletop exercise annually to work through the activation, callout, and coordination issues associated with implementing the ETS.