



P.T.P.

Prevention Through People

P.T.P.

Small Vessel Damage Control



**U. S. Coast Guard
Marine Safety Office
Portland, Maine**

INDEX

Some Common Small Vessel Flooding Sources

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Small hull breach:

Located here possibly from impact with floating debris such as logs. Also possible from impact of hull by fishing gear, or in structural ailure of wood hulls (broken framing).

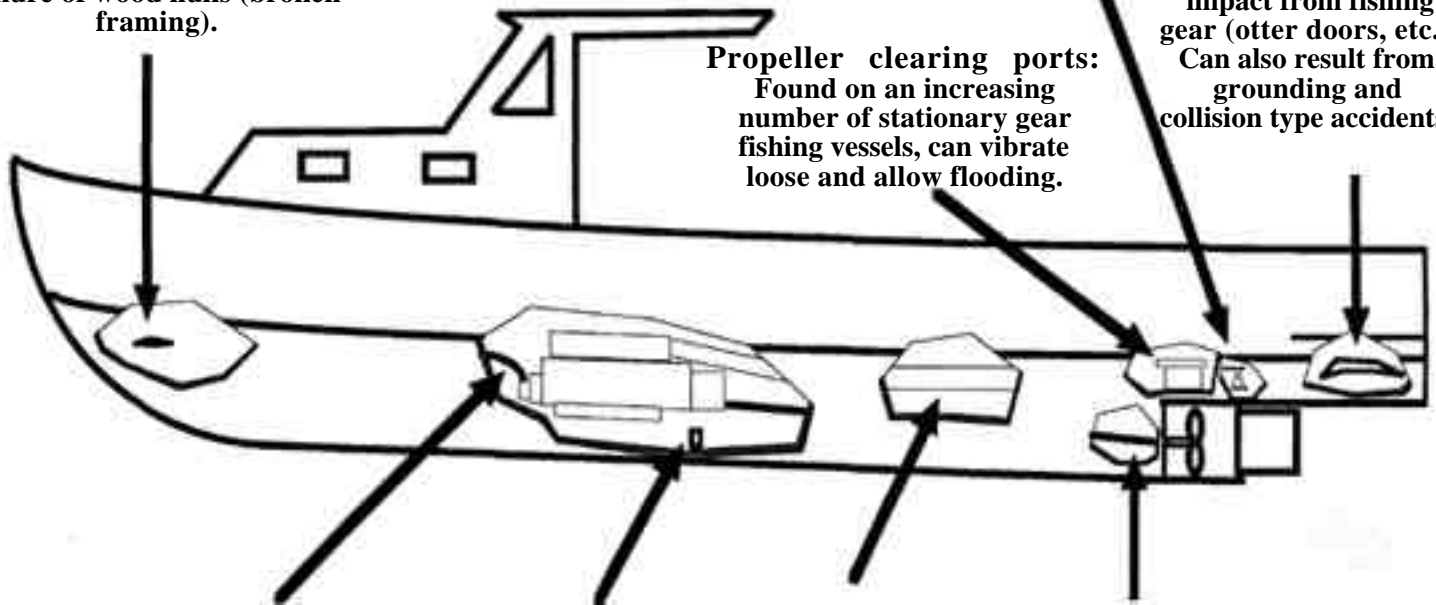
Damaged rudder port fittings:

Packing problems with rudder posts results in many flooding cases. Structural failure (cracking) of the fitting housing has also been observed.

Large hull breach:
Known to result from impact from fishing gear (otter doors, etc.) Can also result from grounding and collision type accidents.

Propeller clearing ports:

Found on an increasing number of stationary gear fishing vessels, can vibrate loose and allow flooding.



Chafed hoses:

Resulting from vibration damage to hoses in washing and engine cooling systems.

Damaged through-hull fitting:

Resulting from corrosion damage or improper hose connections.

Split piping:

Freeze damage to wet exhaust lines, or failures in pump system piping.

Main shaft packing gland:

A perpetual maintenance problem on boats, can also result from emergency maneuvers with fouled propellers.

Damage Control

Small Hull Breach



The Problem....

Hull failure usually associated with impact with logs or other floating debris. May also be caused by structural failure of wood hulls.



The Tools....

Soft wooden wedges are used to plug cracks and other small hull breaches. Pine and fir are ideal for wedges because the wood is more likely to conform to the shape of the hull breach, is easy to handle, and will absorb water and swell, increasing the effectiveness of the plug.



The Solution....

Pound wedges into the breach with a hammer. Soft wood wedges are easy to split with a hatchet for filling small spaces. The wedges may be sawed off at the base to prevent inadvertent removal.

Damage Control

Chaffed Hose



The Problem....

Vibrations can cause engine cooling hoses or water wash down hoses to wear and crack.



The Tools...

“Grease Tape” may be fashioned from 3 inch wide strips of burlap or landscaping fabric covered with industrial grade grease.



The Solution....

Wrap the “Grease Tape” tightly around a chafed hose.

Damage Control

Damaged Through Hull Fitting



The Problem....

Through hull fittings may flood a vessel because they are damaged by corrosion or because of improper hose connections.



The Tools....

Conical soft wood plugs are available from most marine suppliers. They should be sized according to the vessel's seacocks.



The Solution....

Pound the cone tightly into the open through hull fitting to stop the flooding.

Damage Control

Split Piping



The Problem....

Wet exhaust lines may split and cause flooding. This is usually associated with collision damage or freezing in extreme climate conditions.



The Tools....

A variety of fabrics may be used to cover large pipe cracks. Some of the best are wet suit and foul weather gear fabric.



The Solution....

Place or wrap the material around the pipe. Tie tightly with cord.



Damage Control materials and tools suggested for small vessels

Soft wood wedges

Conical soft plugs, sized as per a boats seacocks.

Sheet rubber

"Grease tape", fashioned from burlap or landscaping membrane and covered in industrial grade grease.

Water impervious patching material, such as sections of a discarded survival suit.

Manila twine.

Spare hose clamps.

Simple hand tools, including:

- **Hatchet (for splitting wedges).**
- **Hammer.**
- **Screw drivers.**
- **C clamps.**
- **Small hand saw.**
- **Disposable flashlights.**

Damage control kits can and should be modified to reflect risks unique to a vessel or to a vessel's operating area. For example, wood hulled vessels might include pre cut plywood sections and drywall screws to affect a rapid hull patch. Vessels operating in cold waters should include neoprene gloves to limit cold water exposure concerns.



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The pictures and lessons on this program show only a portion of the educational capabilities of the small vessel damage control trainer designed and built by the Marine Safety Office, Portland, Maine. The small vessel damage control trainer project was developed following a study of marine casualties involving commercial fishing vessels in northern New England waters in 1993 and 1994. In that period of time, 1/3 of all marine casualties involved watertight integrity issues (sinking or flooding incidents). These casualties, which ranged from simple "flooding on mooring" incidents to open ocean sinkings, appeared to involve the common thread of a crew's limited ability to control flooding rates. The damage control trainer project is intended to help improve the performance of mariners faced with flooding situations, by providing training in basic damage control procedures and by increasing industry awareness of the source and effect of typical flooding risks.

The small vessel damage control trainer can recreate 8 of the most common flooding risks typical of northern New England commercial fishing vessels. Flooding rates are controlled from near zero to four foot head pressures to accurately simulate flooding rates likely to be experienced on vessels in the 35 to 45 foot length range. Flooding risks included in the small vessel damage control trainer include:

- **Chaffed 1 1/2' hose, typical of main engine cooling systems or water wash down systems.**
- **Small hull breach, typical of hull failures/breaches associated with the use of certain types of heavy mobile fishing equipment.**
- **Damaged stern tube packing, typical of vessels experiencing fouled propellers while maneuvering to recover fishing gear.**
- **Large hull breach, typical of vessels experiencing heavy damage while recovering fishing equipment, or grounding or collision damage.**
- **Open through hull fitting, simulating a lost hose or damage piping/through hull fitting.**
- **Loose propeller clearing port, simulating a flooding risk found on vessels designed for stationary gear fisheries.**
- **Damaged rudder port fitting, simulating accidents that may occur in high powered vessels with improperly selected rudder port fittings.**
- **Split wet exhaust line, simulating a flooding condition associated with collision damage or in extreme climate conditions (freezing).**

Damage Control Trainer



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