CHAPTER 7 – UNINTENTIONAL FLOODING AND DAMAGE CONTROL

Time: One hour

GOAL: Students will learn principles of damage control and dewatering to avoid/survive possible casualty situations involving flooding, foundering, and capsizing.

NEED STATEMENT:

1. Flooding, foundering and capsizing are the leading causes of fishing vessel losses in the U.S.

2. Flooding, foundering or capsizing of commercial fishing vessels results in more deaths than any other vessel related casualty.

OBJECTIVES:

1. Describe high-water alarm system.

2. Diagram a dewatering system.

3. Operate emergency (USCG) dewatering pumps.

4. Identify at least seven basic materials needed for a damage control (DC) kit.

5. Demonstrate at least three general steps to minimize the effects of unintentional flooding.

6. List three ways to reduce risk of flooding, foundering and capsizing in day to day operations.

SKILLS CHECKLIST:

1. Demonstrate/explain appropriate three general steps to minimize effects of flooding.

2. Demonstrate/explain twelve steps in the operation of a USCG dewatering pump.

EQUIPMENT NEEDED:

At least six types of flooding control supplies such as wedges, plugs, soft patch.

TEACHING TIPS:

*Ask students about their experiences with problems and solutions to flooding/dewatering, capsizing situations.

*Illustrate as much as possible throughout the lesson; use video of flooding technique and demonstrations.

*Use guest instructors with expertise in damage control if possible; be clear about your objectives and the experience base of the class so that the presentation is appropriate. Remember, you may be asking a specialist to spend an hour explaining what they have learned through years of training and experience.

*If you cannot make a dewatering pump available, use videos and the instructional placards that accompany pumps. Ask the Coast Guard ahead of time for help in obtaining a dewatering pump and regionally located USCG damage control trailers and demonstrations.

INSTRUCTIONAL OUTLINE:

I. HIGH-WATER ALARMS

A. Functional high water or slack tank alarms in all compartments and enclosed spaces with a through hull fitting below the deepest load waterline, such as the lazarette; bilge space subject to flooding from sea water piping within the space; and a space with a non-watertight closure.

B. Alarm should be both visual and audible at the operating station.

C. Tested regularly.

II. DEWATERING SYSTEMS

A. For each compartment

1. Each suction line equipped with a stop valve at the manifold.

2. Each suction line equipped with a strainer.

3. Each suction line equipped with an accessible check valve.

B. Pumping/dewatering station

1. Simple in design.

2. Known to all on board.

3. Tested regularly.

4. Back up pumps.

C. Know how to operate emergency dewatering pumps.

1. USCG vessels and aircraft carry dewatering pumps.

a. Similar in function.

b. Vessel pumps have greater capacity

2. Follow the checklist of instruction on placard with pump.

3. If a demonstration is not possible:

a. Use videotape on the subject to demonstrate.

b. Distribute instruction placards to class to use during discussion or video demonstration. Items to note during viewing: o-ring suction; rubber sleeve discharge; don't over choke; prime pump; caution using inside spaces (carbon monoxide fumes)

III. DAMAGE CONTROL

A. Develop and maintain a damage control kit suitable for vessel

1. Should contain: hose clamps, canvas, rubber sheeting, oakum, soft wood plugs, wedges, and a mallet. (See Chapter Resource Material for suggested damage control kit.)

2. Other material routinely carried on board may also be useful for controlling flooding.

B. Know location to all through-hull penetrations.

C. A piping diagram (particularly of all water systems) will be very useful in an emergency.

D. With adequate warning of high-water alarm it is possible to locate source of leak and repair damage with items in DC kit or other material.

1. Soft wood plugs can be used to secure a failed through-hull fitting.

2. Wedges can be used in conjunction with other material (canvas) to make a temporary repair in hull.

3. Hose clamps and rubber gasket material can be used to make temporary repair to ruptured pipe or hose line.

4. Pieces of plywood or similar material can be used to cover blown-out windows or port-lights.

E. Have a plan. Be creative. Use your imagination! You can save your vessel.

1. Bicycle inner tube wrapped around pipe cracks.

2. Nerf balls, carrots for through-hull fittings

3. Coffee can with rubber gasket over an irregularly shaped hole.

4. Shoring materials like 2 x 4s to hold patches in place.

5. Underwater epoxy.

IV. REDUCE RISKS IN DAY TO DAY OPERATIONS

A. Maintain watertight subdivision

1. Be careful of bulkhead penetrations (i.e., wiring and piping); result in non-watertight bulkheads.

2. Do not drain one compartment into another.

B. Maintain watertight integrity

1. Secure:

a. Weather tight and watertight doors and hatches.

b. Openings to hull, including below-deck ventilation, except ventilation for machinery spaces.

C. Be alert for changes in vessel trim

VI. SUMMARY

A. Make sure you have an operational high-water, slack tank alarm system.

B. Know how to use vessel installed dewatering system and Coast Guard emergency pumps.

C. Understand importance of damage control.

D. Know how to reduce risks in day to day operations.

REVIEW QUESTIONS:

1. Name two important elements of a high-water alarm system.

   ANS: Visual, audible.

2. Describe principle features of dewatering system.

   ANS: Pumps, manifolds, stop valves, check valves, strainers.

3. Name the major components of a Coast Guard emergency dewatering pump.

   ANS: Engine and pump, gasoline tank, suction hose, discharged hose.

4. List four items useful in a DC kit.

   ANS: Hose clamps, canvas, soft wood plugs, wedges.

5. List four steps that can minimize the effects of unintentional flooding.

   ANS: Close watertight doors, hatches and airports; keep bilges dry and free of trash; align fire pumps if possible or use dewatering pump; check all intake and discharge lines through hull; plugging: use wooden plugs, buoys, pillows, mattresses, rags and tarps. Know how to receive and start a CG dewatering pump.

SKILLS CHECKLIST:

1. Given a vessel scenario, describe or demonstrate appropriate steps to minimize effects of flooding.

2. Demonstrate/explain operation of a dewatering pump.