Health & Safety

Part 2: Life saving equipment and Types of emergencies

http://www.resolvemarinegroup.com/?q=node/122

Objectives

- List 4 pieces of life saving equipment & describe when each should be utilized
- List the 3 elements of effective signals
- Describe the advantages and disadvantages of 3 types of visual distress signals.
- List the most common types of emergencies
- Recognize the emergency alarms
- Describe how to respond if a person falls overboard; if fire or smoke is detected; the abandon ship alarm is sounded

Survival equipment

- Flotation devices (PFDs)
- Fire extinguishers
- Survival craft (hydrostatic release)
- Signals
- First aid kit

Survival equipment – flotation devices

Survival equipment – flotation devices

- PFD – personal flotation devices
  - Variety of types
  - Best = the one you wear & fits properly
  - Attach whistle (& light)

Courtesy: J. LaFargue, WCGOP

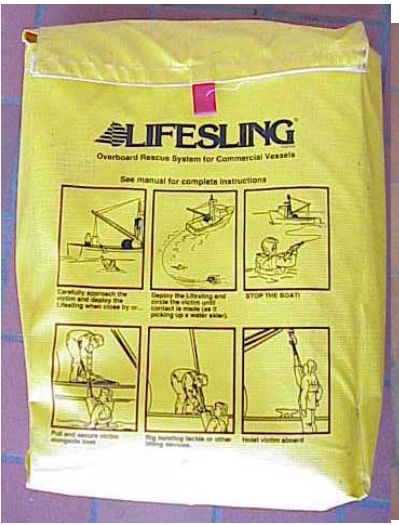
Survival equipment – flotation devices

- PFD – personal flotation devices
  - Variety of types
  - Best = the one you wear & fits properly
  - Attach whistle & light
- **Care / maintenance**
  - Dry thoroughly but not directly on a heat source
  - Don't crush
  - Monitor for rips / loss of reflective tape before every trip

Survival equipment – flotation devices

- Other flotation
  - Cushion
  - Life ring
  - Life sling (for hoisting on board)
  - Immersion suits (cold water)

www.westmarine.com

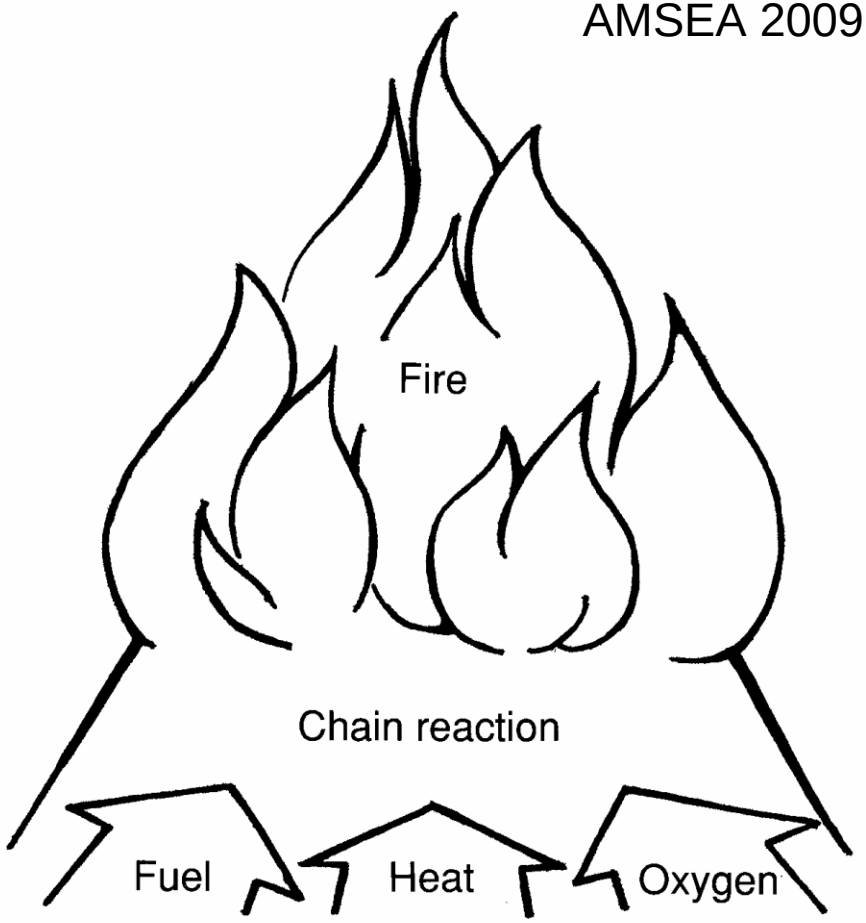


Courtesy: J. LaFargue, WCGOP

Survival equipment - fire extinguishers

- Fire
  - What do you need to make a fire?
  - Video

AMSEA 2009



Diesel
Cooking oil
Packing material
Bedding

Engine
Electrical
Galley

Survival equipment - fire extinguishers

- Extinguishing agents
  - Different extinguishing agents for different "fuels"

Agent	Good for	What it does	Issues
Water	Wood, paper, rubber (anything that leaves ash); flammable liquids	Cools fire	Conducts electricity; corrosive
Foam	As above	Smothers & cools	Conducts electricity
Carbon dioxide	Flammable liquids/gases; fire involving electricity	Smothers	Space must be sealed;
Halon	"Ash" materials; flammable liquids/gases; electrical	Interrupts chain reaction; displaces oxygen	Space must be sealed;
Dry chemicals	as above	Interrupts chain reaction	Causes alkaline burns; corrosive
Dry powders	Combustible metals		

Survival equipment - fire extinguishers

- Built in
  - Halon in engine room
  - Water sprinklers
- Portable
  - Mounted on wall
  - Sometimes have a gauge – make sure in the 'green'

Courtesy: J. LaFargue, WCGOP

Survival equipment - fire extinguishers

- CO_2 Type B/C Size II
- Note no gauge
- Must be weighed to determine if okay.

Courtesy: J. LaFargue, WCGOP

Survival equipment – survival craft

- Life boats & other dinghies – manual deployment

http://www.boatnerd.com

- Life rafts – manual or automatic deployment

http://www.nauticexpo.com

Survival equipment – survival craft

- Life rafts
  - Annual re-pack – decal
  - Mount in float-free location

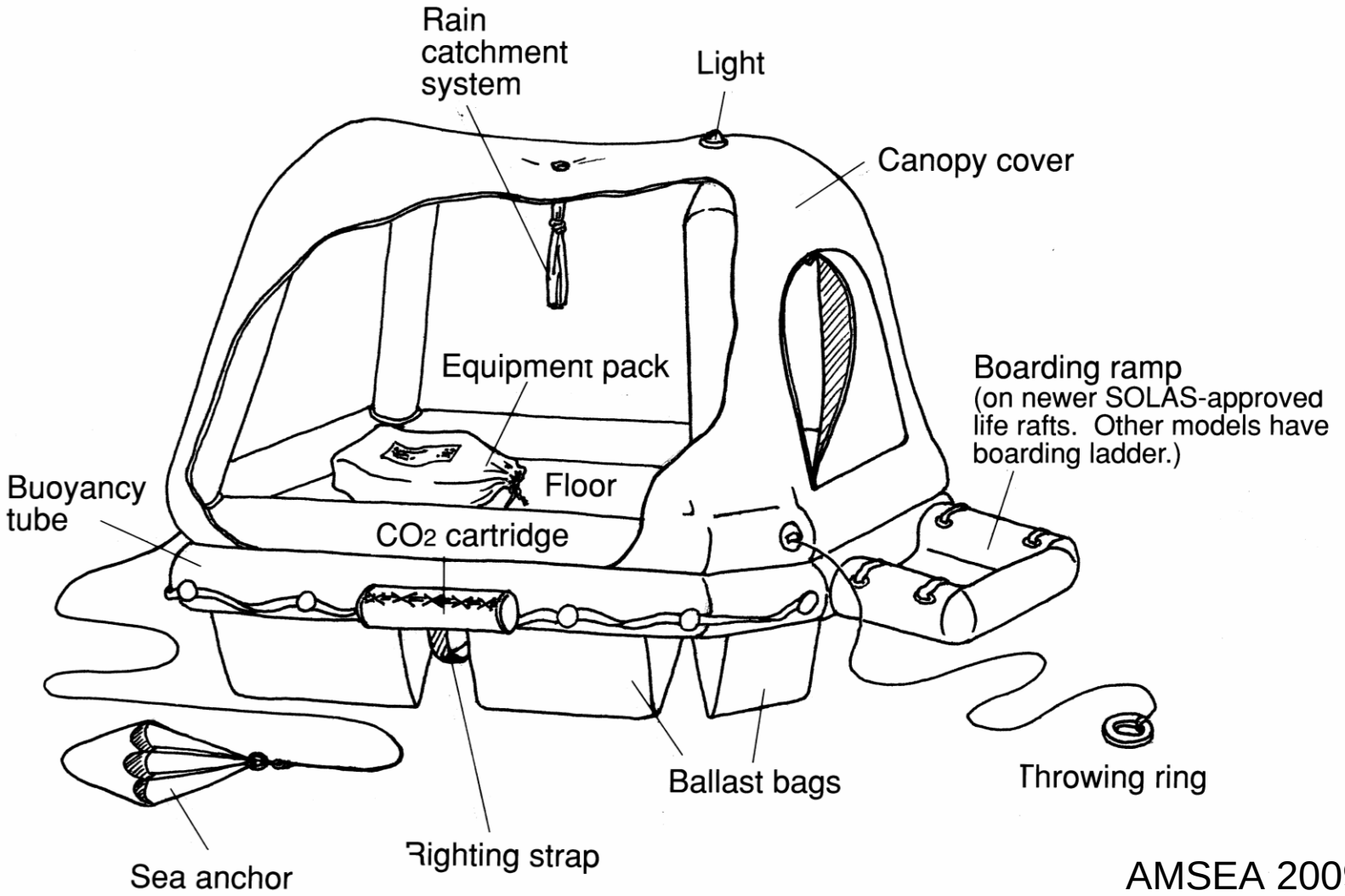
Courtesy: J. LaFargue, WCGOP

Courtesy: J. LaFargue, WCGOP

FIRST
Courtesy: J. LaFargue, WCGOP

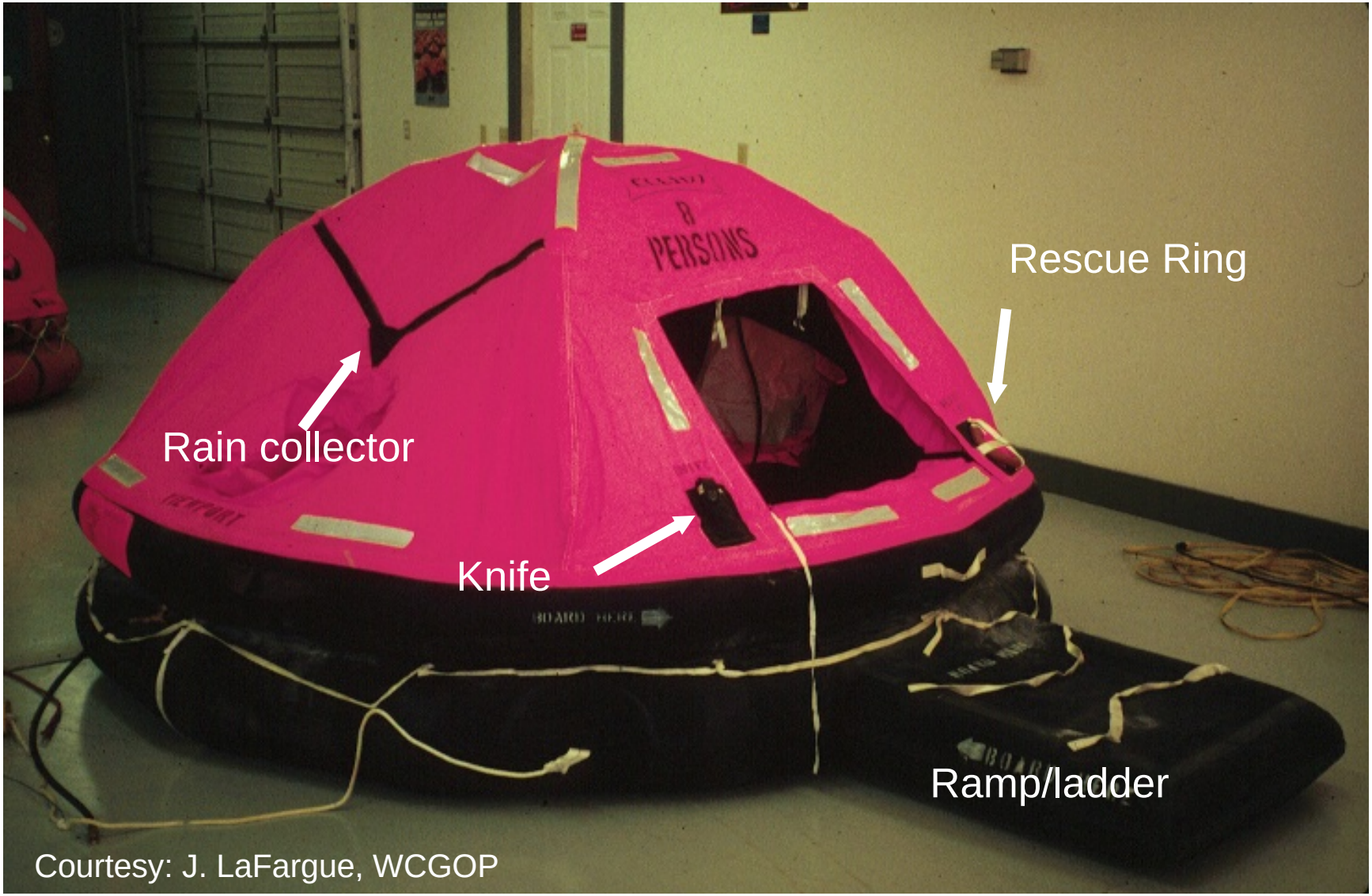
Survival equipment – survival craft

- Life raft components



Survival equipment – survival craft

- Components

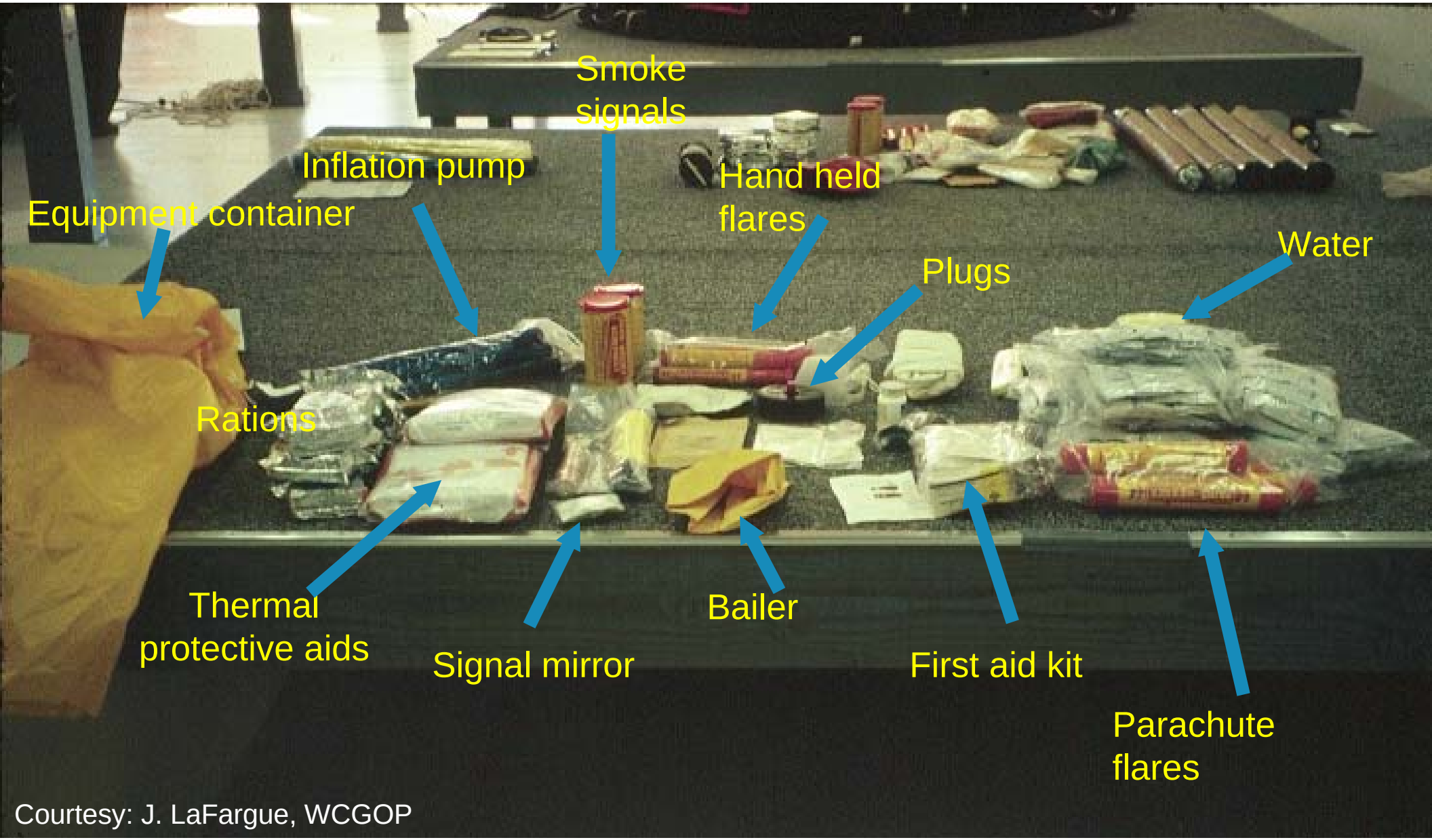


Survival equipment – survival craft

- SOLAS kit
  - **S**urvival **o**f **L**ife **a**t **S**ea
  - Different types have different equipment
  - Only A pack has food water
  - Coastal contains no signal flares

Item	SOLAS A	SOLAS B	Coastal
Bailer (<13=1) (≥13=2)	1 or 2	1 or 2	1
Can Opener	3		
Drinking Cup	1		
First Aid Kit	1	1	
Fishing Kit	1		
Flashlight	1	1	1
Heaving Line	1	1	1
Instruction Card	1	1	1
Knife	1	1	1
Mirror, Signaling	1	1	1
Paddles	2	2	2
Painter	1	1	1
Provisions (Units per person)	1		
Radar Reflector	1	1	
Repair Kit	1	1	1
Plugs kit (pressure relief valves)	1	1	1
Pump	1	1	1
Sea Anchor	2	2	1
Seasick Pills (unit = 6 per person)	1	1	
Signal, smoke	2	1	
Signal, hand flare	6	3	
Signal, parachute flare	4	2	
Sponge	2	2	1
Survival instuctions manual	1	1	1
Table of lifesaving signals	1	1	
Thermal protective aids	10%	10%	
Water (liters per person)	1.5		
Whistle	1	1	1

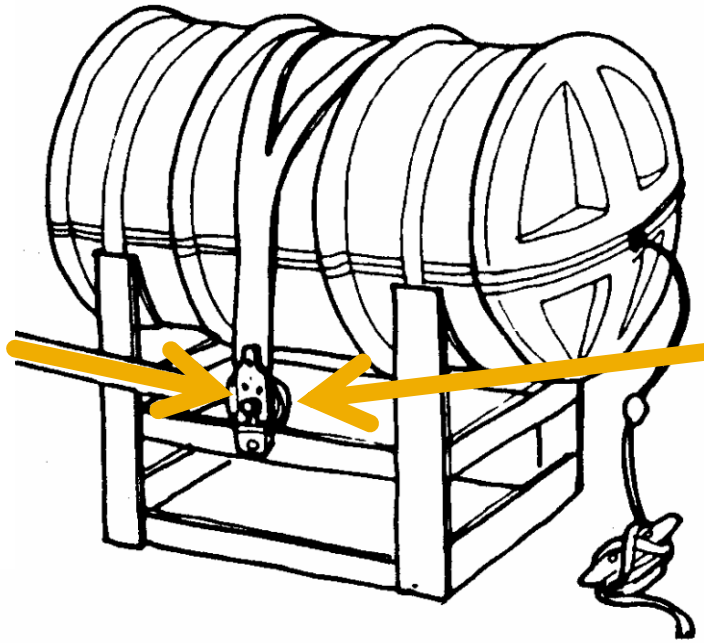
Survival equipment – survival craft



Courtesy: J. LaFargue, WCGOP

Survival equipment – hydrostatic release

- Play Hammar movie



http://www.landfallnavigation.com/hydrostatic.html

Hydrostatic Release Unit

Life Raft hold down strap
- Pelican Hook

Courtesy: J. LaFargue, WCGOP

Hydrostatic Release Unit

Life Raft hold down strap
- Pelican Hook

Shackle to Sea Painter
(Inflation lanyard)

Hydrostatic Release Unit

Shackle to Sea Painter
(Inflation lanyard)

Hydrostatic Release Unit

Life Raft hold down strap
- Pelican Hook

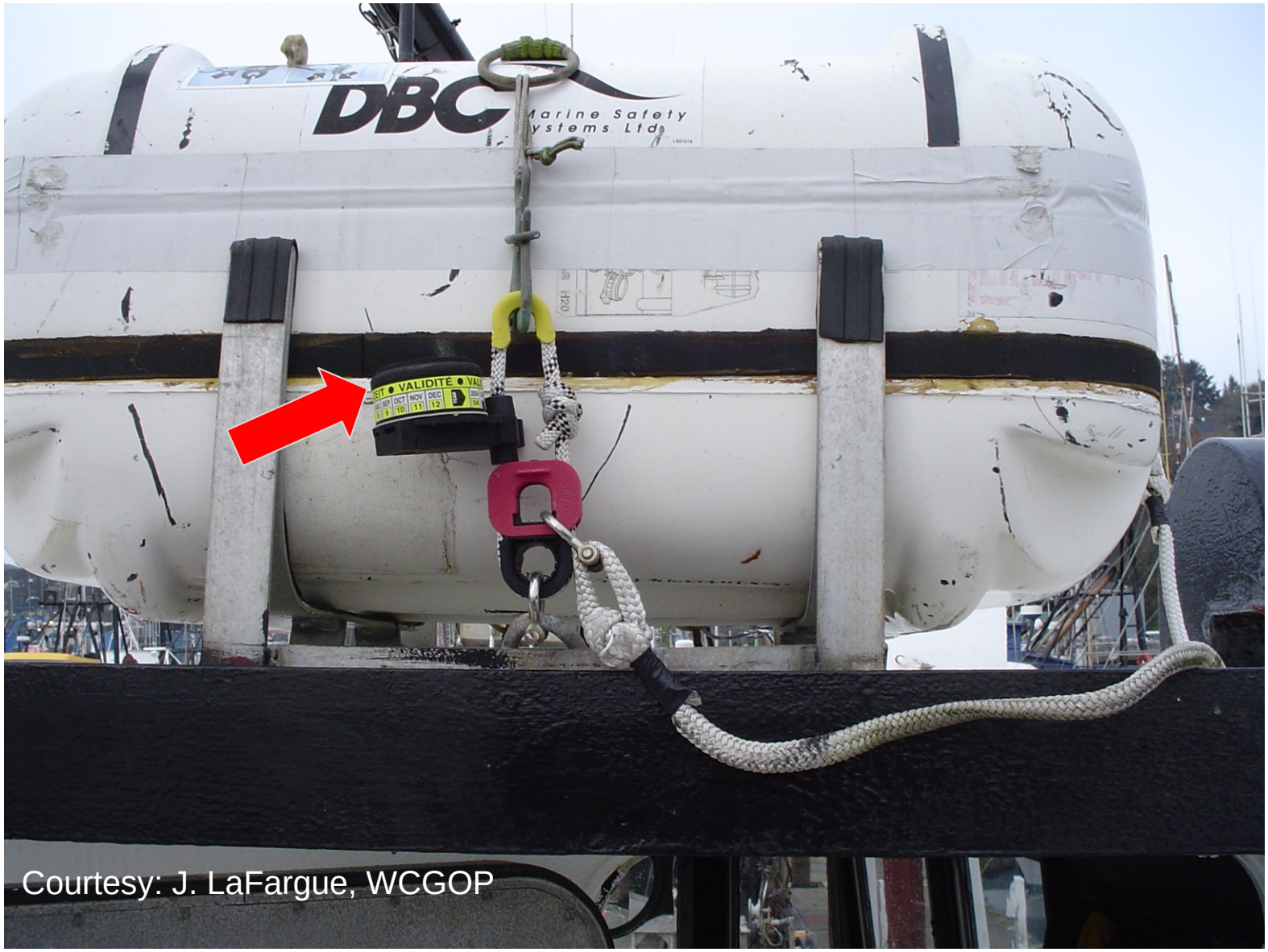
Shackle to Sea Painter
(Inflation lanyard)

Shackle to Cradle
(Deck)

Hydrostatic Release Unit

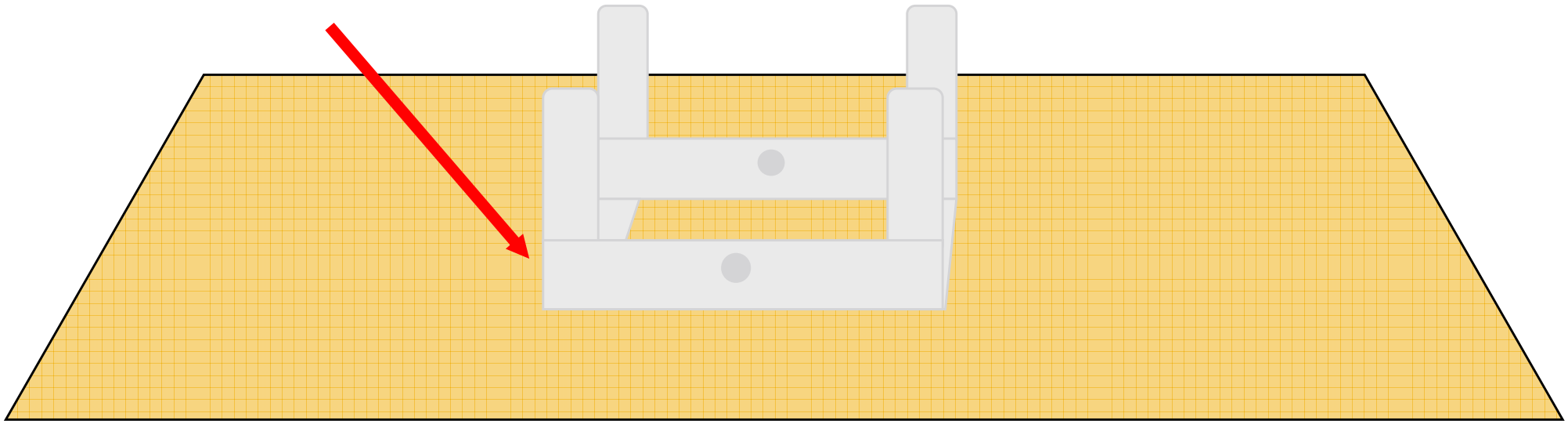
Shackle to Cradle
(Deck)

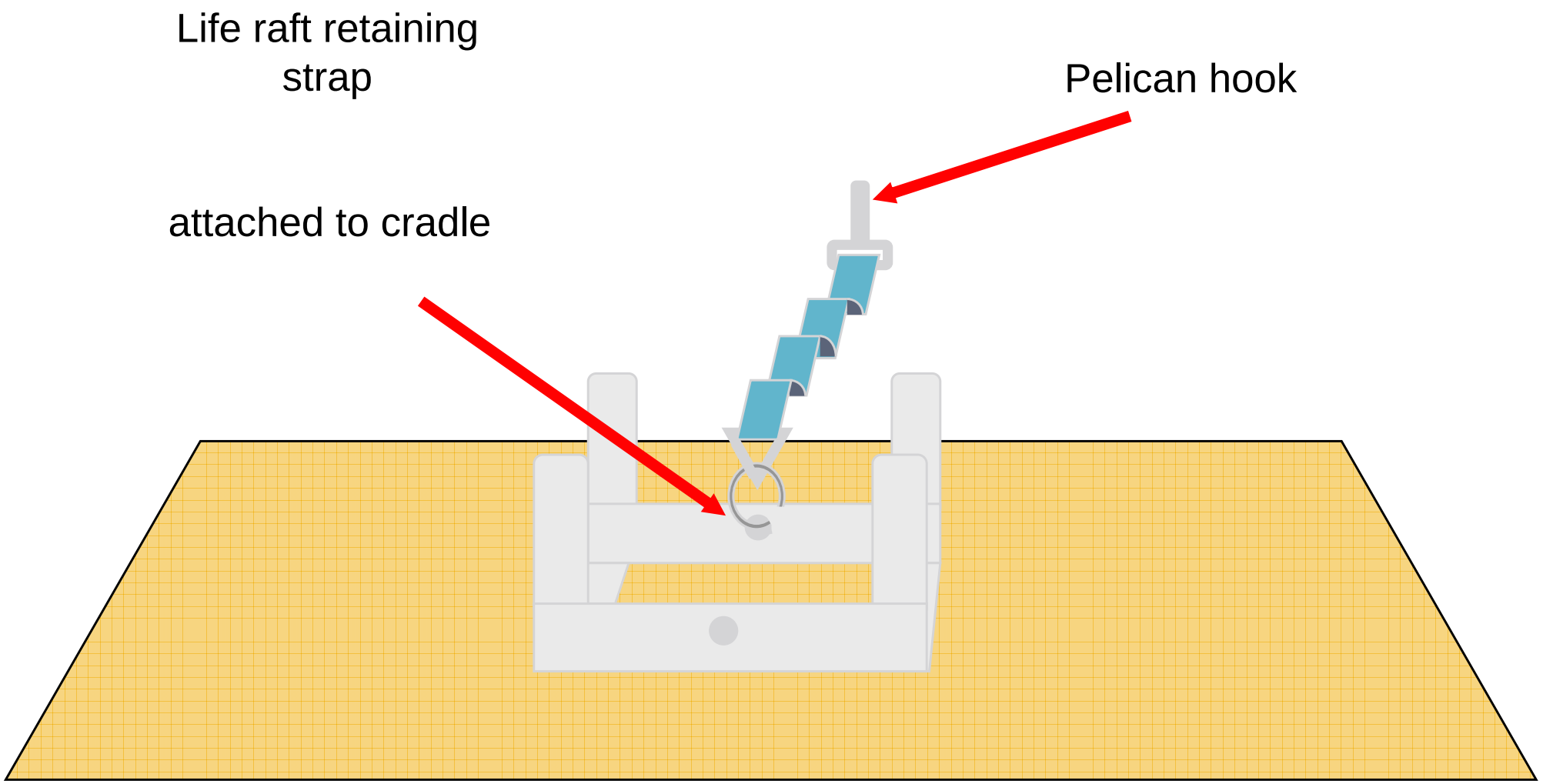
Hydrostatic Release Unit

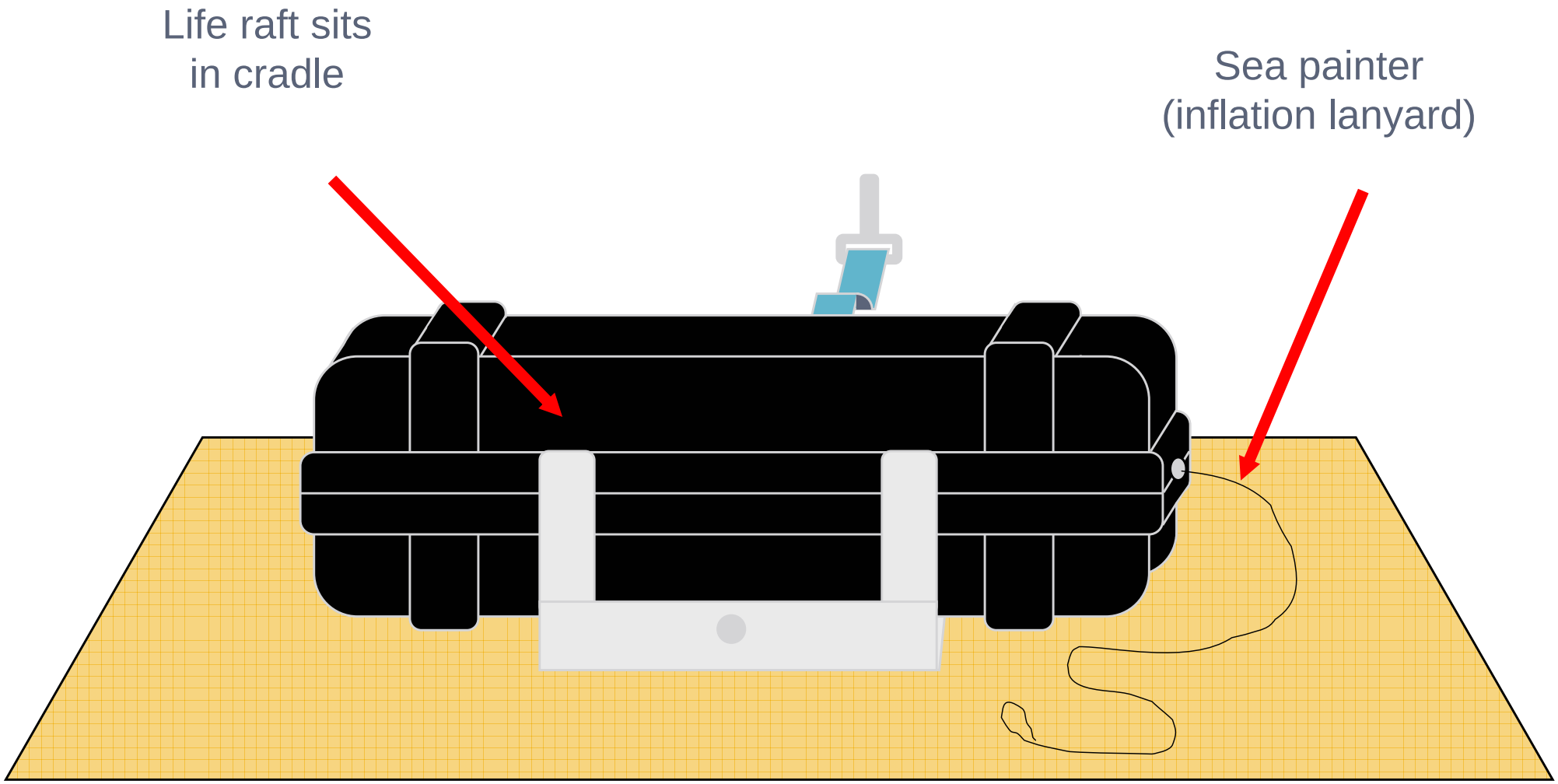


Courtesy: J. LaFargue, WCGOP

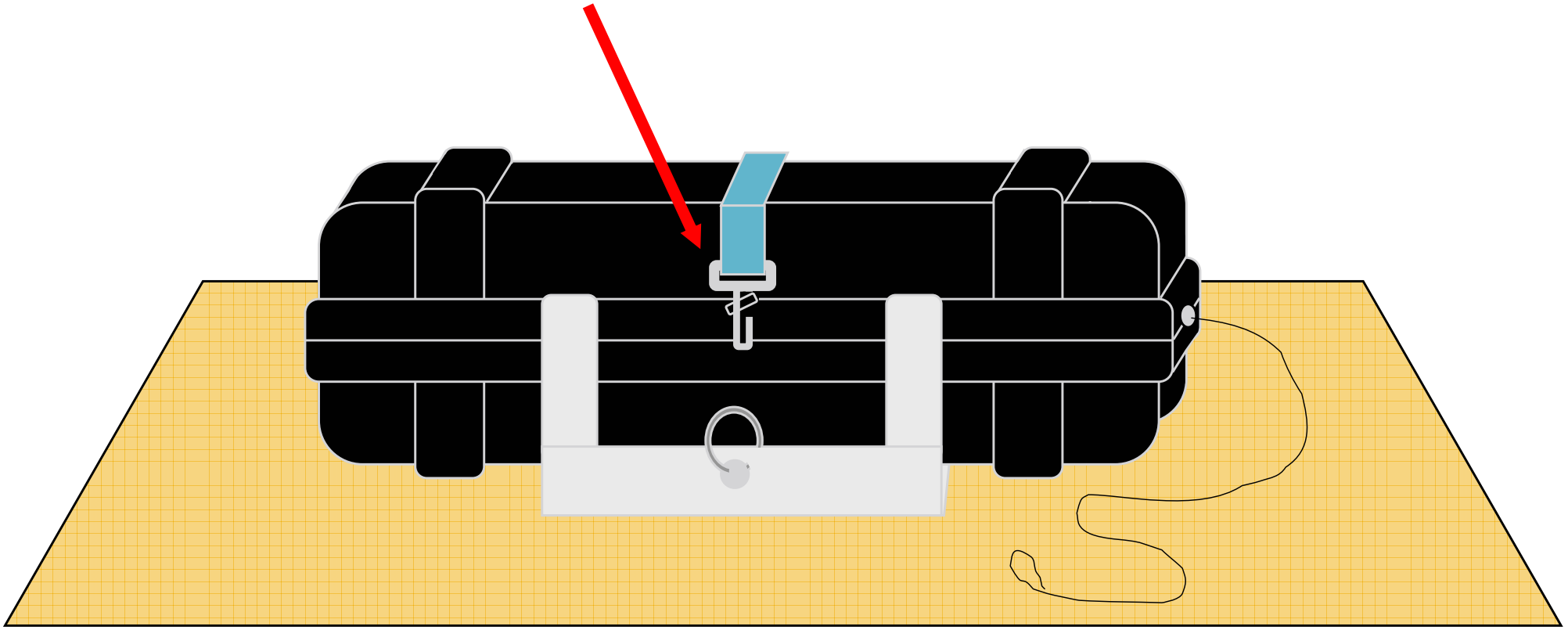
Life Raft Cradle is mounted to the vessel



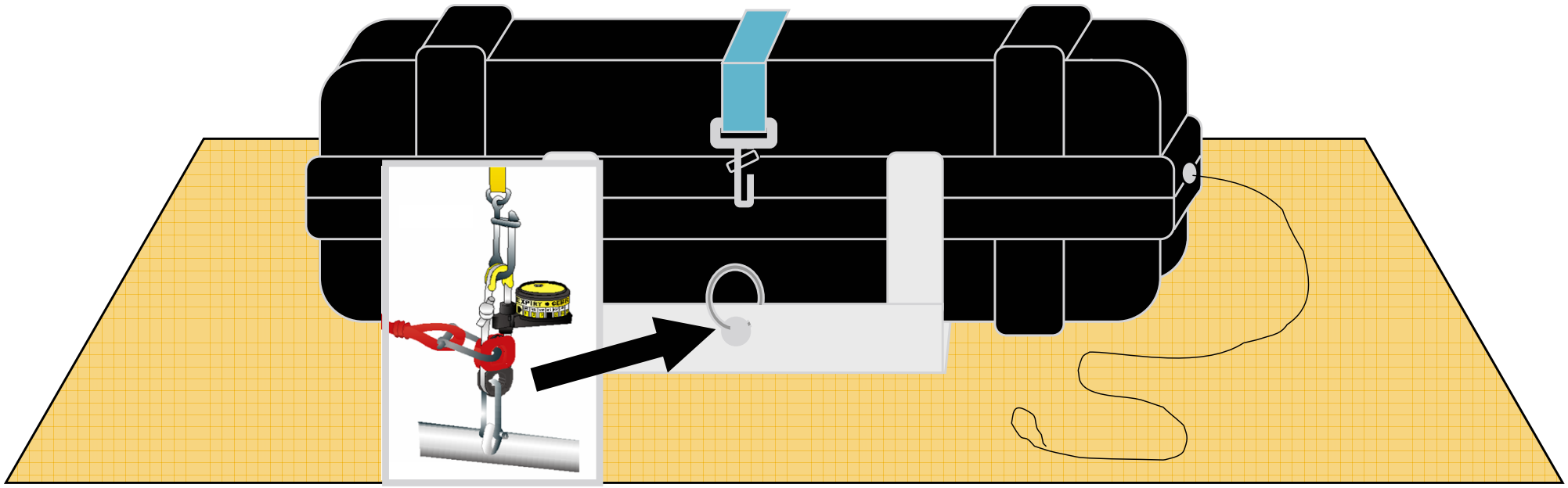

Life raft retaining strap
Pelican hook
attached to cradle


Life raft sits
in cradle
Sea painter
(inflation lanyard)

Life raft held in place by retaining strap



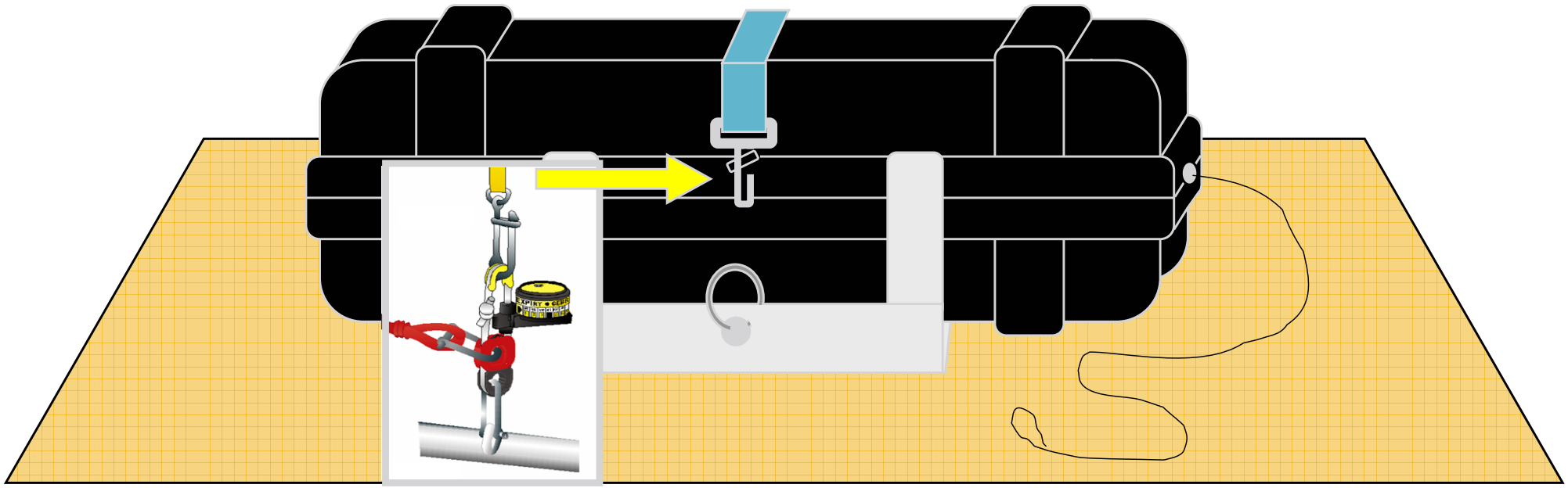
Attaching the Hydrostatic Release



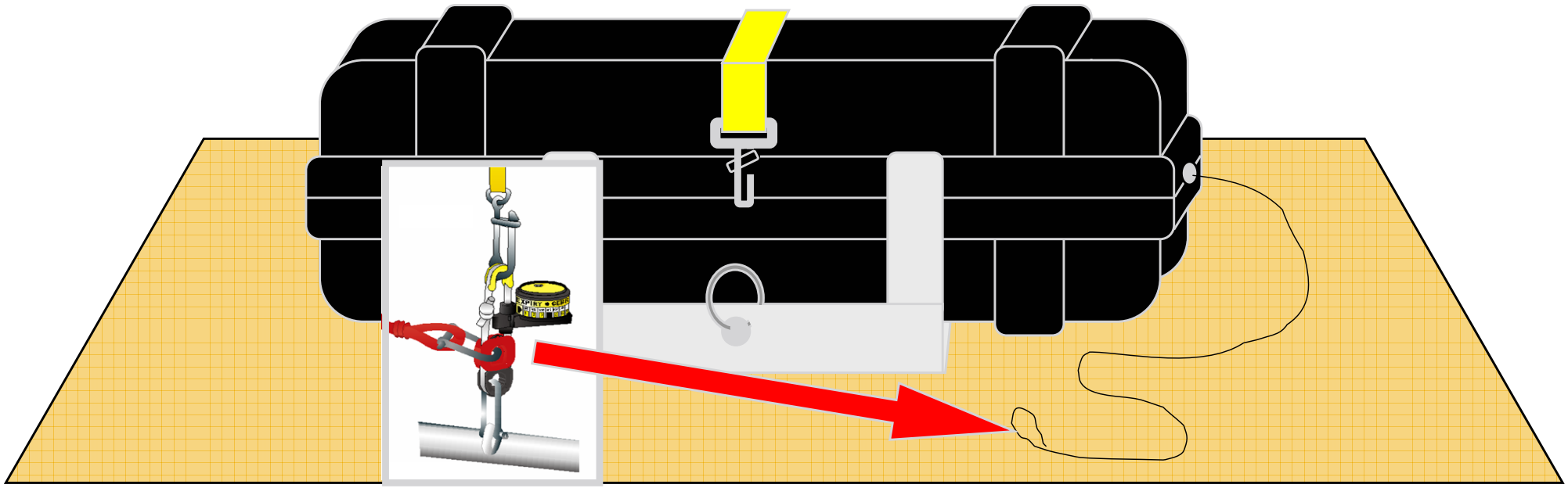
Attaches to cradle

Attaching the Hydrostatic Release

Attaches to pelican hook



Attaching the Hydrostatic Release



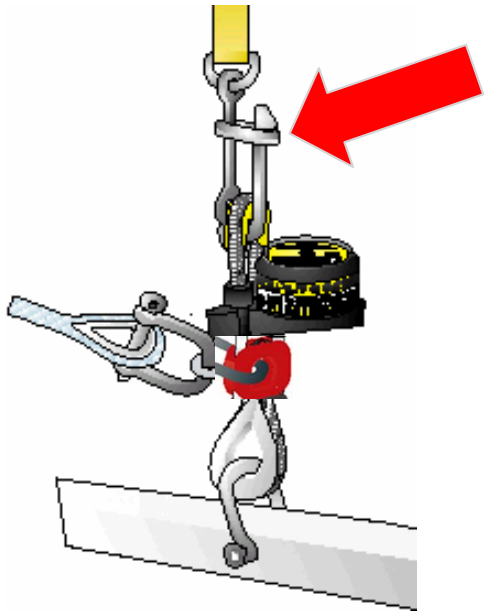
Attaches to sea painter

Manual Release

Step 1: Release pelican hook

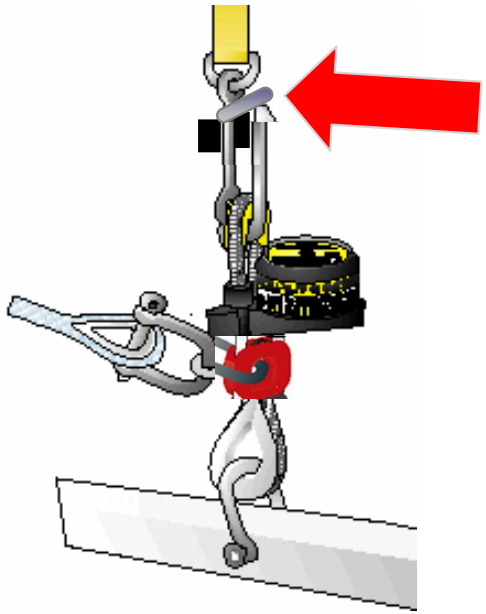
Manual Release

Step 1: Release pelican hook



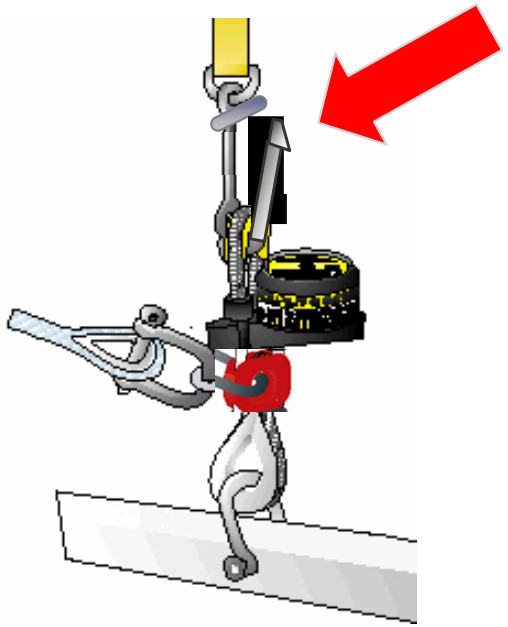
Manual Release

Step 1: Release pelican hook



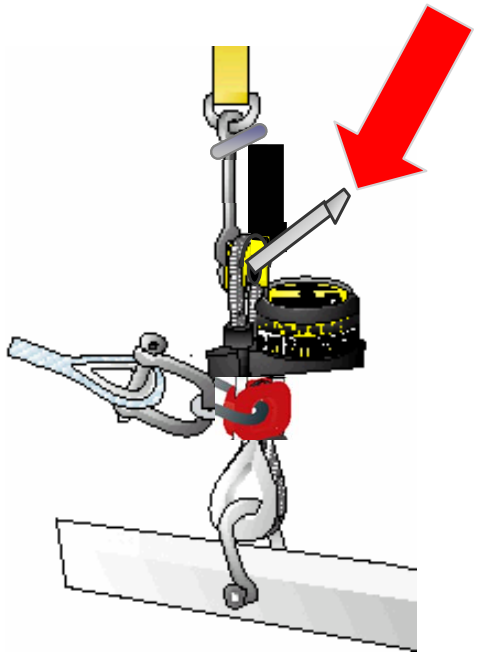
Manual Release

Step 1: Release pelican hook



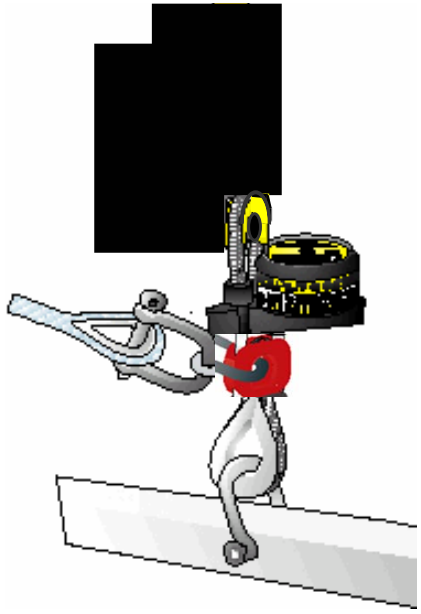
Manual Release

Step 1: Release pelican hook



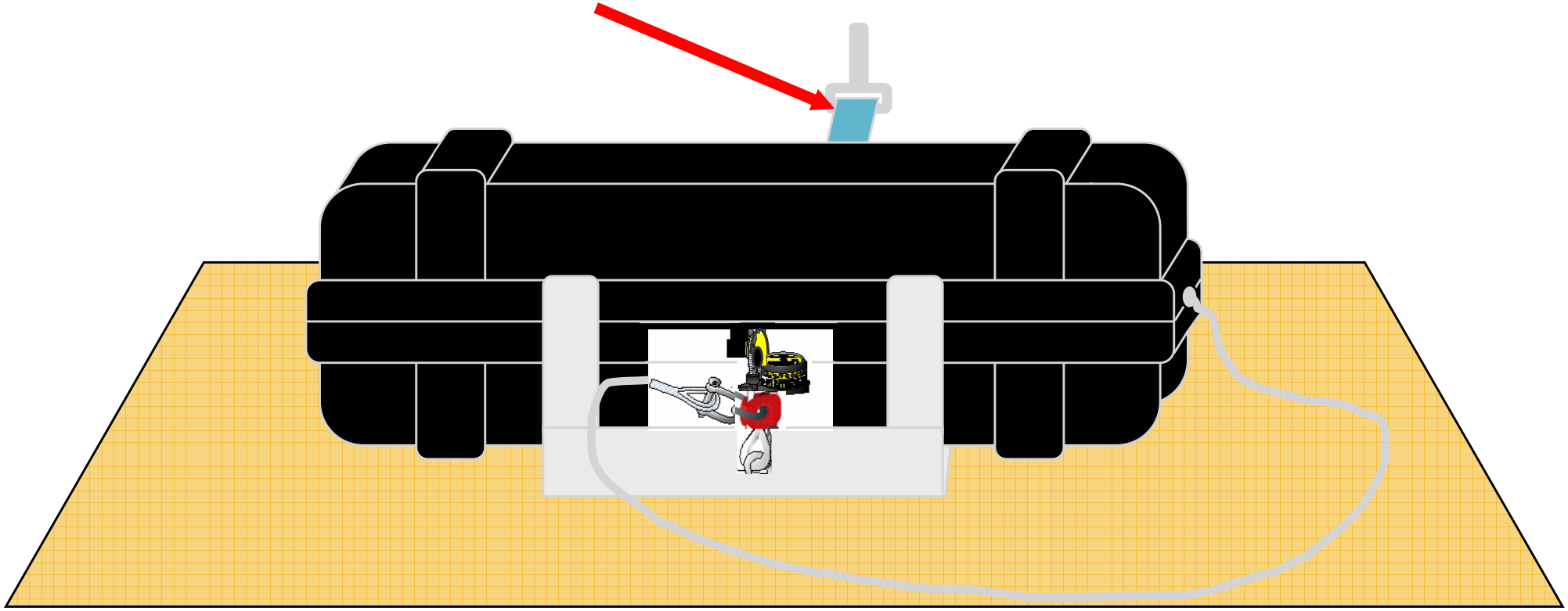
Manual Release

Step 1: Release pelican hook



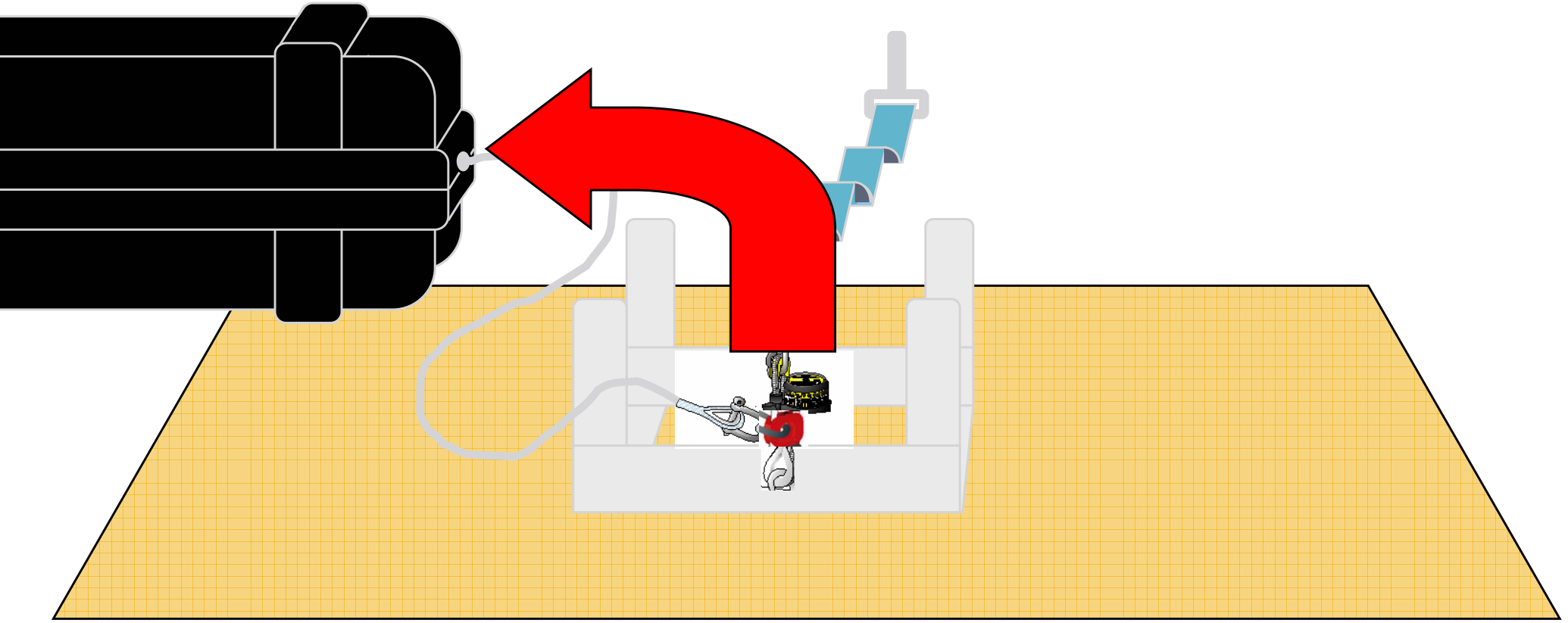
Manual Release

Step 2: Remove strap



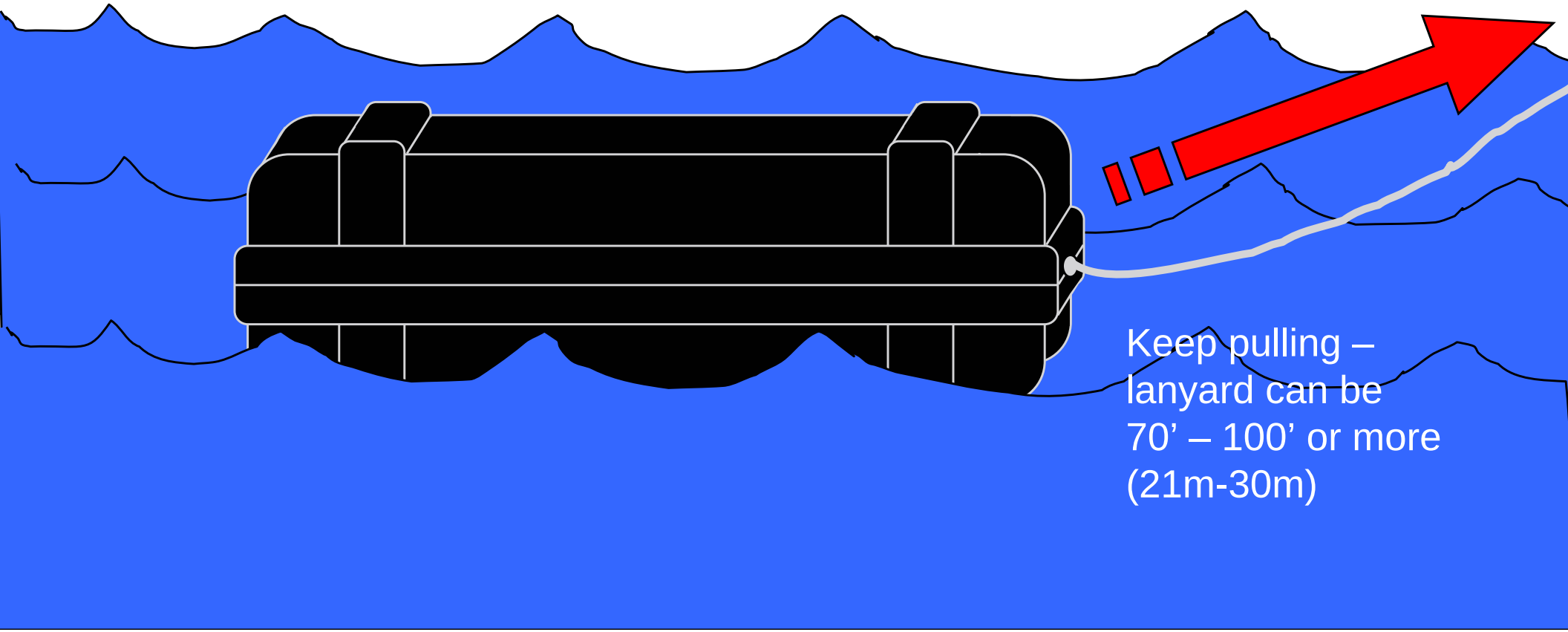
Manual Release

Throw raft overboard



Manual Release

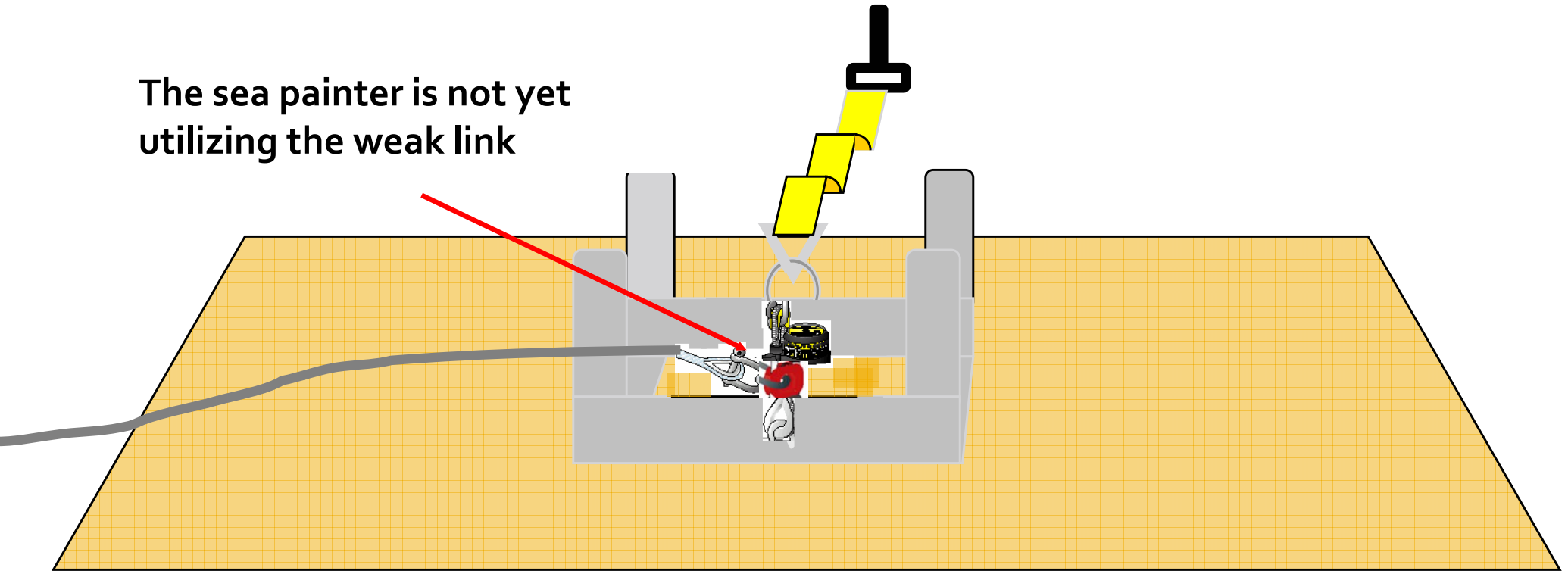
Pull inflation lanyard



Video

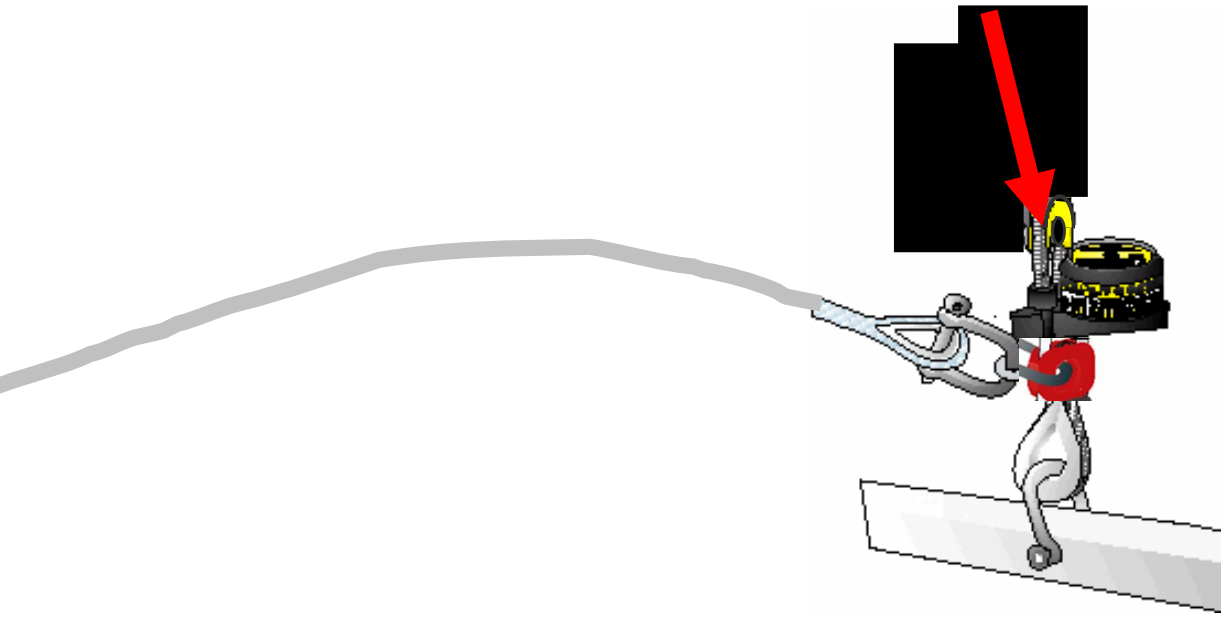
Manual Release

The sea painter is not yet utilizing the weak link



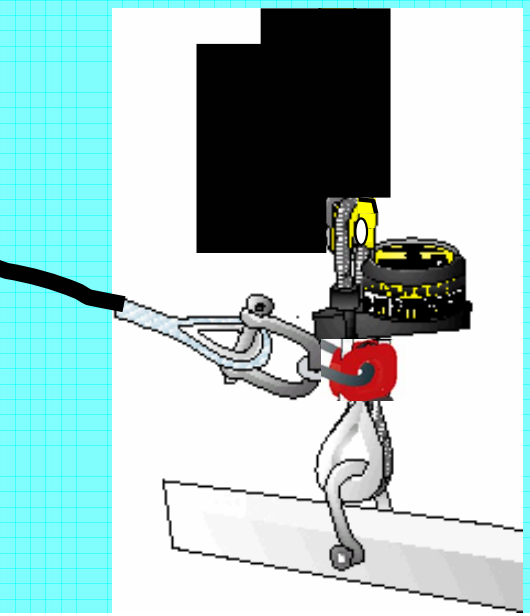
Manual Release

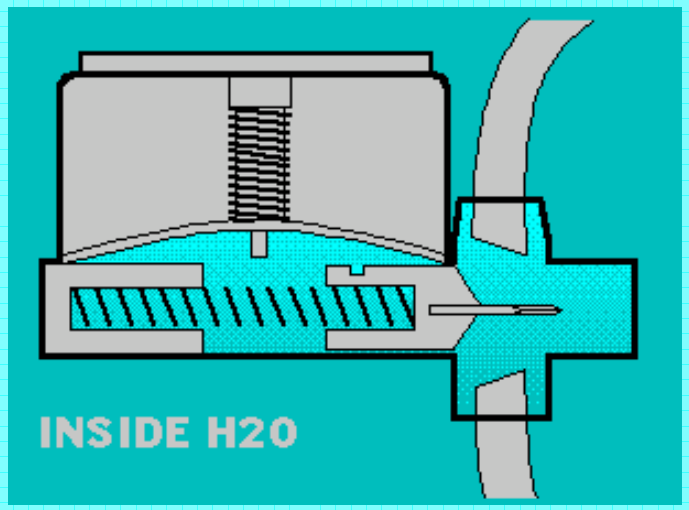
- The knife has not cut the main line
- The sea painter is still being held by the main line (not the weak link).



Manual Release

Once the hydrostatic release is below the water line (5 – 13 ft; 1.5-4m), the main line is cut and the sea painter is now on the weak link





Manual Release

The weak link will break at approximately 500 lbs (227 kg)

Can you spot the person in the water?

Can you spot the person in the water?

Effective signals increase your chance of survival

Survival equipment - signals

- 3 elements of effective signals

1. Must attract attention & convey a message
2. **Bigger**, **Brighter** & **Different** than surroundings
3. Rule of three (3)

Survival equipment - signals

- 2 types

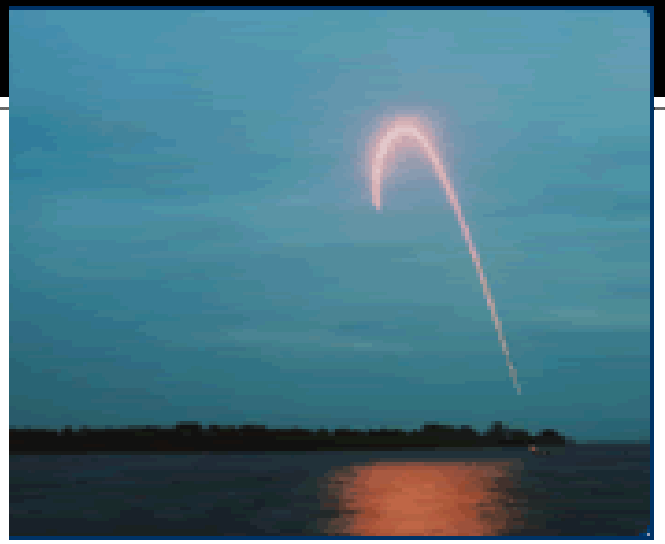
1. **Active** – only work with you, use when rescuers are in sight (e.g. flares, whistles, mirrors, fires, radio)
2. **Passive** – work without you, work continuously (e.g. EPIRB, lights, wreckage, reflective tape)

Survival equipment - signals

- Flares – many types – store in dry, cool area

Types of Flares

- **Parachute flares**
  - Best at night
  - Up to 1000 feet height
  - 60 second burn time



Photos courtesy of L. Hale,
SE Shark Observer Program

Types of Flares

- **Hand-held flares**
  - Longer burn time
  - Best at night
  - Strike point on end
  - Video

Photos courtesy of L. Hale,
SE Shark Observer Program

Types of Flares

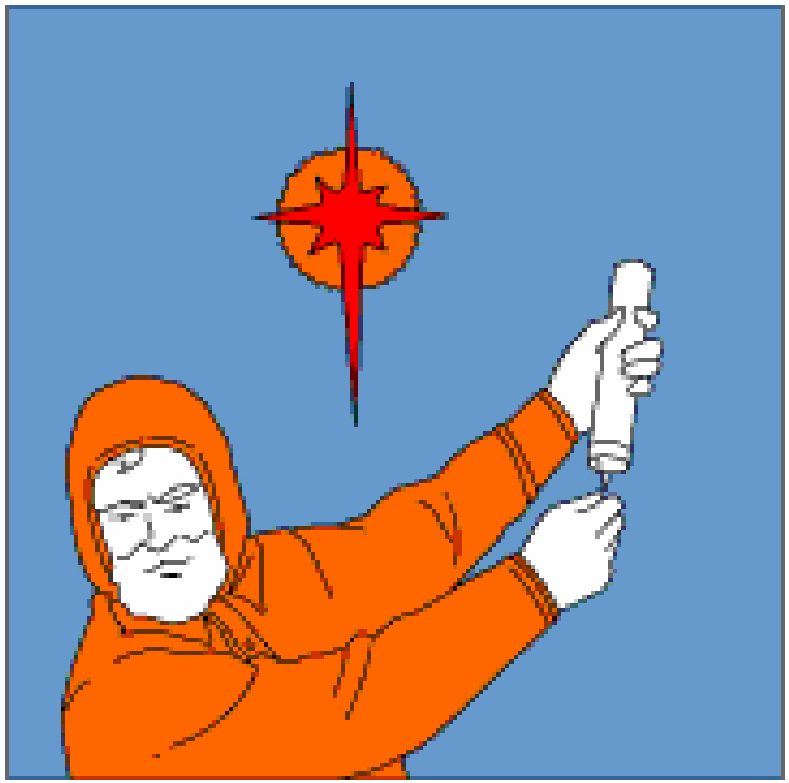
- **Smoke**
  - Longest burn time
  - Best in day & light wind
  - Used to indicate wind direction for helicopters
  - Video

Flare Safety Tips

- Know how to use flares ahead of time

Flare Safety Tips

- Know how to use flares ahead of time
- Turn face away when firing
- Do not fire at aircraft, vessels or people
- Treat like a firearm



Flare Safety Tips

- Fire one flare first, conserve others until search & rescue in sight
- Most pyrotechnics cannot be put out once lit
- Protect yourself from dripping slag – wear gloves if possible

DON'T BURN YOUR RAFT!

Signals - Other

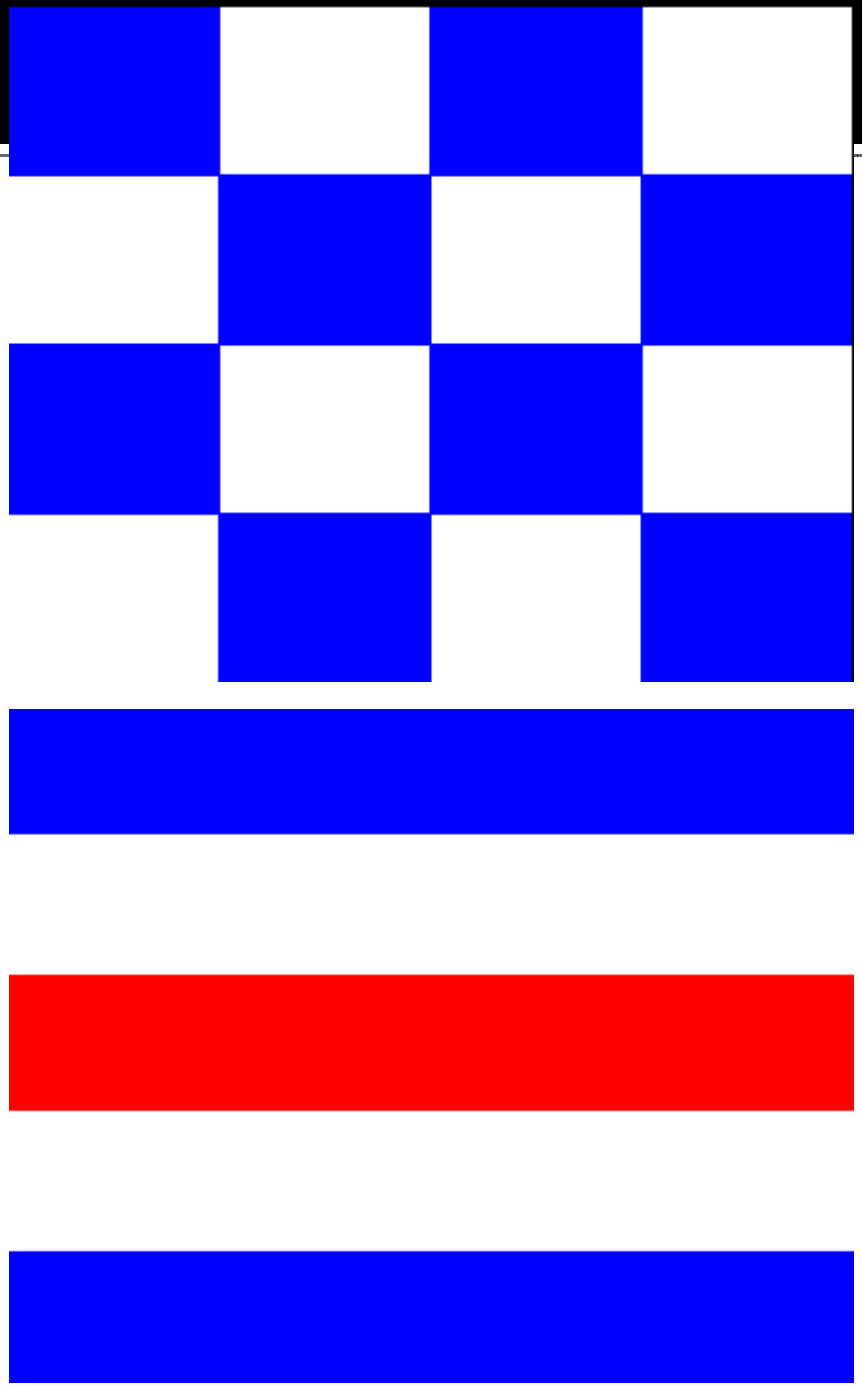
- Lights visible at night

Signals - Other

- Whistle **3 to 5 X** louder than human voice
- PLAY

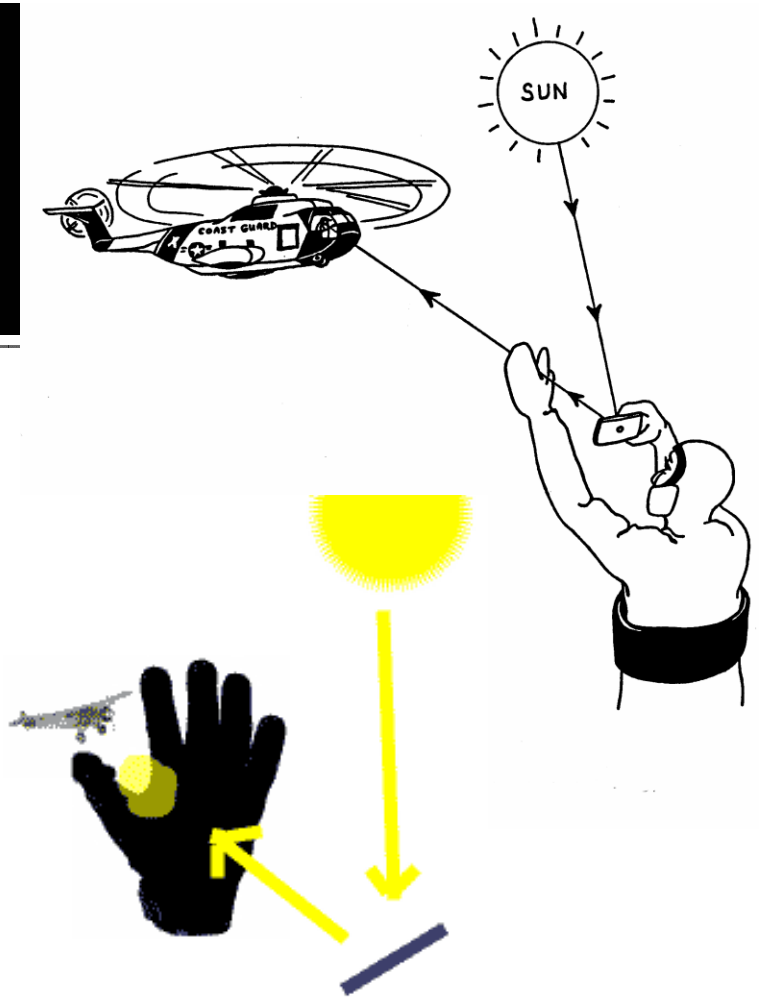
Signals - Other

- Distress flags



Signals - Other

- Mirror visible up to 50 miles away
  - Form a "V" with your two fingers.
  - Move your hand until the object you want to flash is sighted between the "V"
  - Position the mirror so that the sunlight reflected off your mirror through the "V"



Activity – Signal mirror

- Take a signal mirror (or CD)
- Go outside & signal the target

Survival equipment - EPIRBs

- Emergency Position Indicating Radio Beacon
- Not affected by weather or darkness
- Must be registered & installed properly
- Mandatory (?)
- Transmits on 406 MHz to satellite system
- Received signal assumes distress

http://www.pridemarine.com/

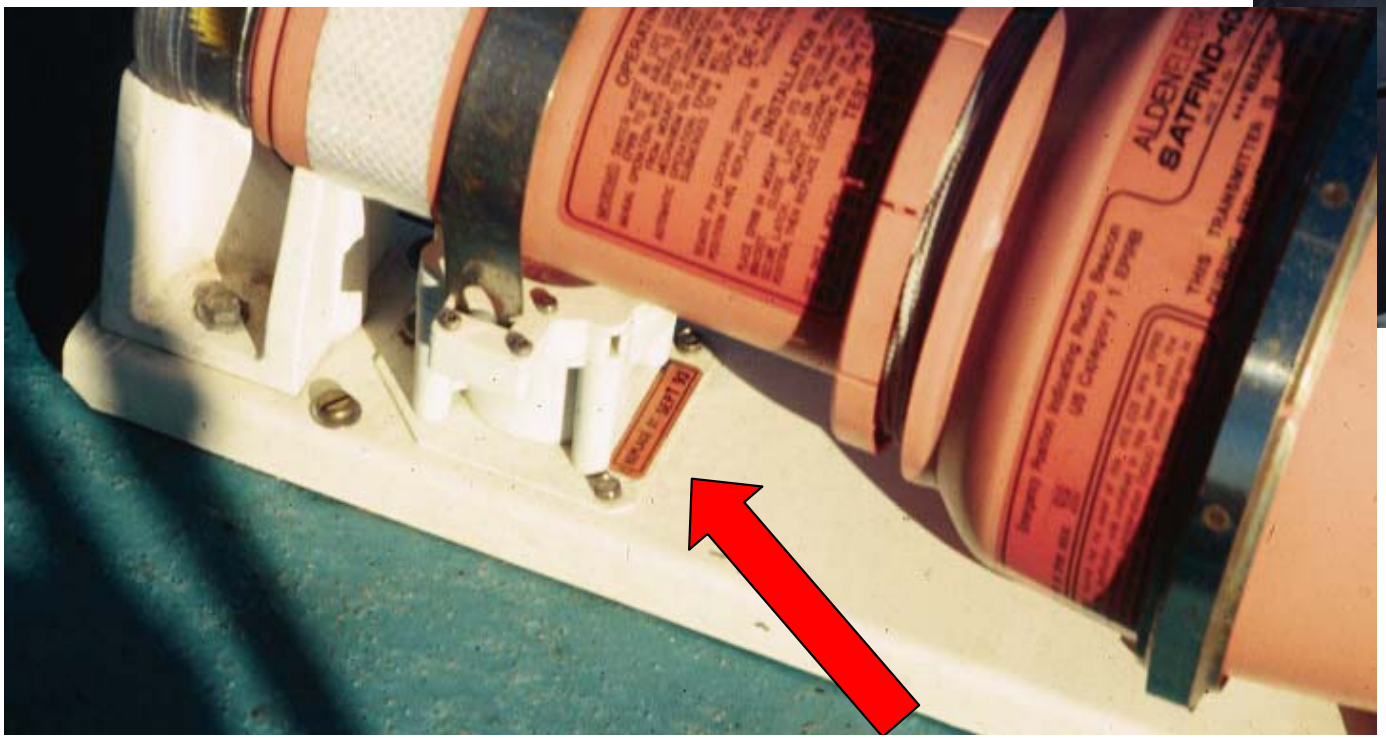
Survival equipment - EPIRBs

- Variety of types
- EPIRB should be mounted in a float free location

Courtesy: J. LaFargue, WCGOP

Survival equipment – EPIRBs

- Check EPIRB battery expiration date and hydrostatic release expiration date



Photos: J. LaFargue, WCGOP

Survival equipment - EPIRBs

- Variety of types
- EPIRB should be mounted in a float free location
- Check EPIRB battery expiration date and hydrostatic release expiration date
- Other potential issues
  - Bracket magnet away from internal deactivation switch
  - EPIRB may activate when gets wet from rain, sea spray
  - Be sure that EPIRB's lanyard spool not showing when mounted

Survival equipment - EPIRBs

Photo courtesy of L. Hale, SE Shark Observer Program

Types of Emergency Broadcasts - Radio

- SECURITE – Lowest urgency
  - Brings attention to weather and navigation hazards.
- PAN PAN
  - Calling station has urgent message.

http://www.marineradios review.com

- MAYDAY – Highest urgency
  - Immediate and life-threatening danger.

Emergency broadcast - Mayday

- Captain typically makes call
- Instructions posted

- Inmarsat terminal has a "single press" distress button (Need to hold it down for 7 seconds)

Photo courtesy of J. LaFargue, WCGOP

Mayday procedure

http://www.marineradiosreview.com

- Procedure:
  1. Make sure radio is on and select channel 16 if using a VHF radio or frequency 2182 kHz if using a SSB radio.
  2. Press the transmit button and speak slowly, clearly, and calmly and say, "MAYDAY - MAYDAY - MAYDAY."
  3. Say, "This is (your vessel name and call sign)" and repeat 3 times.

Mayday procedure

- Procedure (continued)
  4. Give your present position (latitude and longitude or landmarks).
  5. State the nature of your distress (e.g., fire, grounding, medical emergency, etc.).
  6. Give the number of persons aboard and condition of any injured.
  7. Describe the amount and type of survival gear on board (PFDs, liferaft, etc)

Mayday procedure

- Procedure (continued)
  8. Briefly describe your vessel providing length, type, hull, and colors.
  9. End your message by saying, "This is (vessel name and call sign) over."
  10. Release the microphone and listen. If you do not receive an answer, repeat the above procedure. If there is still no answer, try another channel and begin again

Activity - Mayday

- Listen to mayday calls: 1 2 3
- For each call, note the following:
  - Vessel name
  - Position
  - Nature of distress
  - #persons / condition
  - Survival gear
  - Vessel description

Activity - Mayday

- Could you get all the information?
- Vessel 1
  - Vessel name: **?**
  - Position: **800 ft water, 45 mi offshore**
  - Nature of distress: **flooding, no power**
  - #persons / condition: **3**
  - Survival gear
  - Vessel description
- Outcome: vessel sank but crew all survived

Activity - Mayday

- Vessel 2
  - Vessel name: **Captain John & Son**
  - Position: **N22°04 W7 °31; 6 mi off Gurnet Lt-house**
  - Nature of distress: F**ire?, smoke in engine room**
  - #persons / condition: **36**
  - Survival gear: **?**
  - Vessel description: **85 LOA; blue hull w/ white house**
- Outcome: **all rescued; vessel towed to shore**

Activity - Mayday

- Vessel 3
  - Vessel name: **Mar-Gun**
  - Position: **N56°36 W169°36 St. George**
  - Nature of distress: **Aground**
  - #persons / condition: **5 / OK**
  - Survival gear: **?**
  - Vessel description: **?**
- Outcome: **Crew rescued – successfully refloated**

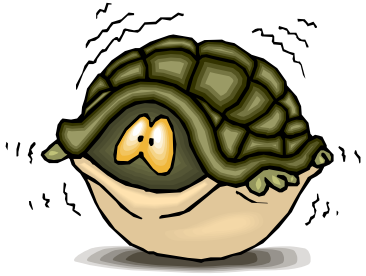
U.S. Coast Guard /MST2 Gerald Holle

Types of emgergencies

- Types
  - Immediate onset
  - Delayed onset

Types of emgergencies

- Emergency reactions: fear, panic, depression



- How to minimize these emotions?
  - Accept that these situations can happen to YOU
  - Make plans
  - Practice drills / execute your plan
  - Develop a positive mental attitude

Types of emgergencies

- Primary emergency situations
  - Person overboard
  - Fire
  - Flooding
  - Abandon ship

Marine Emergency Duties (MED) training provides the necessary knowledge and skills for surviving accidents of this nature.

http://www.ccg-gcc.gc.ca/eng/ccg/sar_adr

http://coastguardnews.com/

Emergency situations – person overboard

- Avoid unsafe deck behavior
- Someone else falls overboard
  - Mark position
  - Sound alarm (3 long blasts)
  - Post lookout
  - Maneuver vessel back to victim
  - Recover victim
  - Treat victim
  - Contact authorities as appropriate

Emergency situations – person overboard

- YOU go overboard
  - Attract attention

Emergency situations – person overboard

- YOU go overboard
  - Attract attention
  - Assume HELP or HUDDLE position (if more than 1 person)

Heat
Escape
Lessoning
Position

Emergency situations – person overboard

- YOU go overboard
  - Attract attention
  - Assume HELP or HUDDLE position
  - Keep your clothes on
  - Grab any floating objects

http://www.fullthrottlewatersports.com

http://www.marinesafetytt.com/

Emergency situations – person overboard

- YOU go overboard
  - Attract attention
  - Assume HELP position
  - Keep your clothes on
  - Grab any floating objects
  - Stay calm & still; take deep breaths

Photo courtesy of J. LaFargue, WCGOP

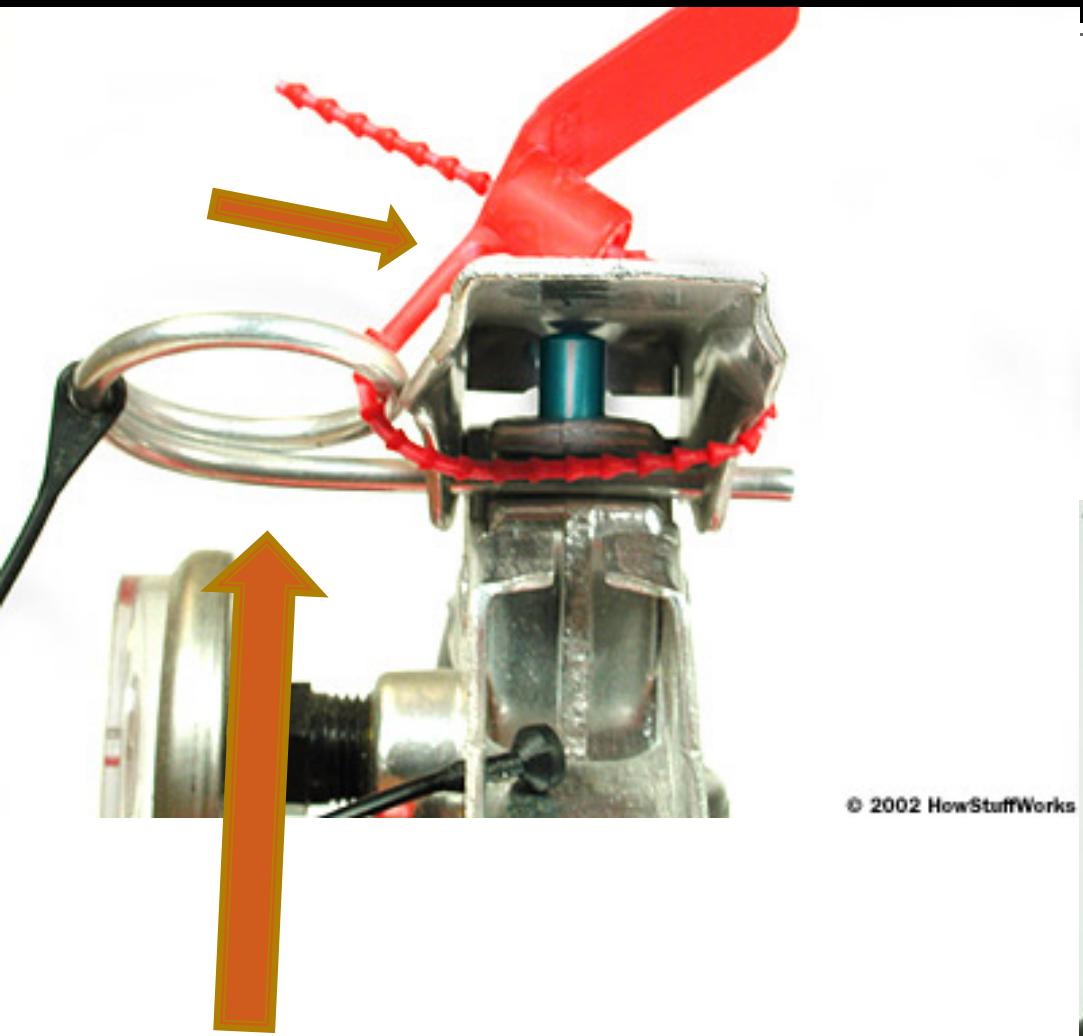
Emergency situations – fire

- Can anyone tell us where the closest fire extinguisher is located? Exits?

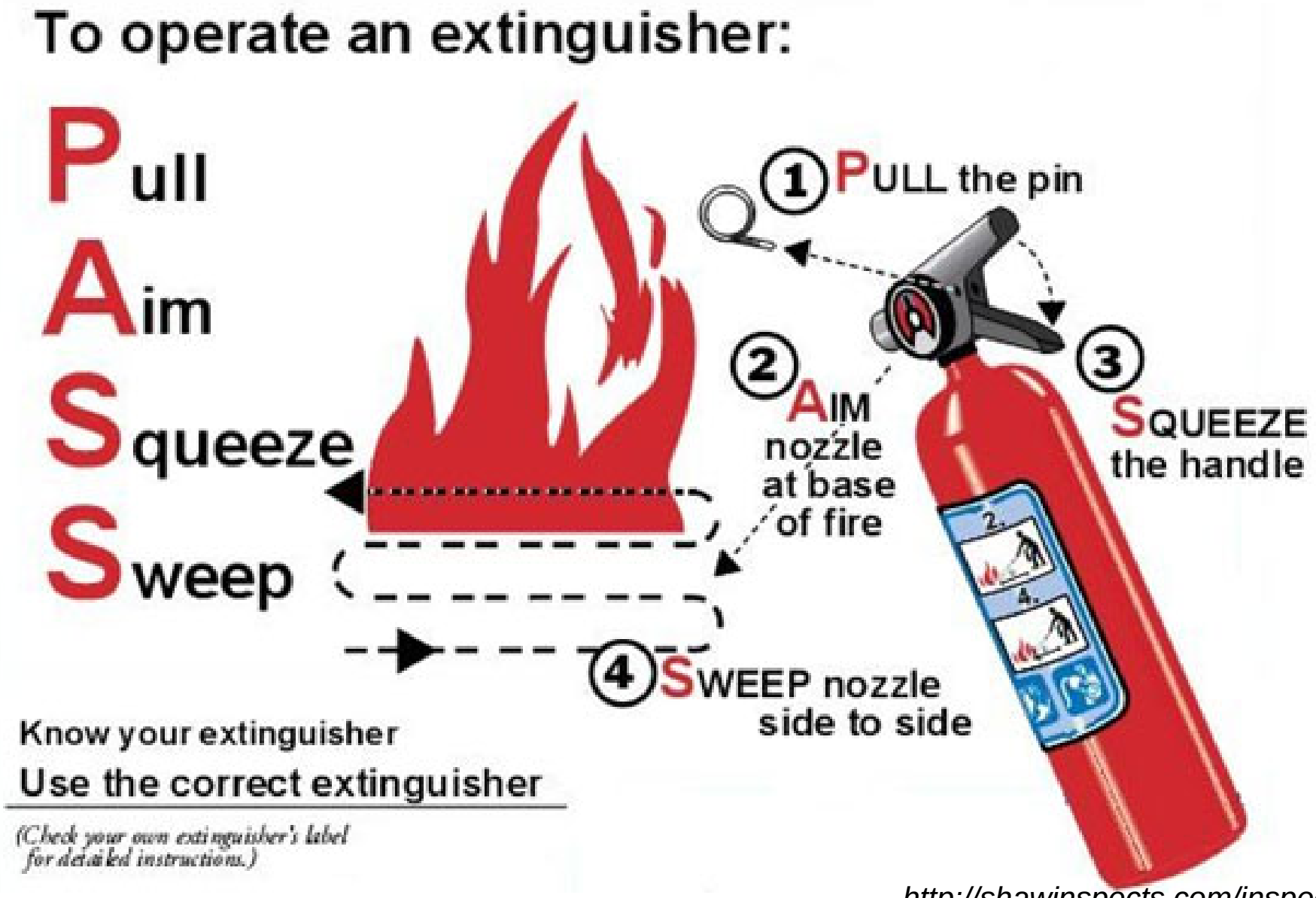
Emergency situations – fire

- Can anyone tell us where the closest fire extinguisher is located? Exits?
- Safety checklist –
  - Determine where fire extinguishers are located
  - Assess how to exit each area where you work and sleep
- Hand held extinguisher – short duration

Emergency situations – fire



Emergency situations – fire



http://shawinspects.com/inspection.html

Emergency situations – fire

- Procedures
  - Sound alarm (1 long blast)
  - De-energize electrical system
  - Close doors
  - Fight fire
  - Account for personnel
  - Establish boundary perimeter
  - Prepare in case of abandon ship

Emergency situations – flooding

- Delayed onset – typical
- Observer has limited role
- Procedure
  - Sound alarm (typically 1 long continuous blast 10 seconds or more)
  - Close all watertight hatches, doors and air vents
  - Plug holes
  - Use pumps and buckets of water.
  - Check lines, through-hull fittings and hull for leakage.
  - Maintain stability of vessel
  - Prepare in case of abandon ship.

Emergency situations – flooding

- PCP
  - **P**lug – hole where water is entering
  - **C**lose – hatches, water tight doors
  - **P**ump – bilge & other dewatering pumps

Images: AMSEA

Emergency situations – abandon ship

- Only if its more dangerous on board than in the water
- Know your exit, mustering station, emergency equipment locations
- Observer may be tasked with minor duties but you should know the whole procedure

Emergency situations – abandon ship

- General Abandon Ship procedures are as follows:
  - Sound alarm (7 short blasts + 1 long blast)
  - Send Mayday
  - Don PFDs - warm clothing.
  - Prepare to launch life raft. Attach painter line to vessel.
  - Assemble signal devices to take into life raft. These include EPIRBs, flares, smoke signals, flashlights, handheld radios, etc.
  - Get first aid kit, water, food, and abandon ship (survival) kit.
  - Muster at embarkation station.
  - When sinking is imminent or remaining on board is inappropriate, launch and board life raft.
  - Keep painter attached to vessel. Be prepared to cut painter immediately if there is risk to life raft or vessel sinks
  - Activate EPIRB and commence 7 Steps to Survival.

Emergency situations – abandon ship – boarding life raft

- Board from vessel if possible

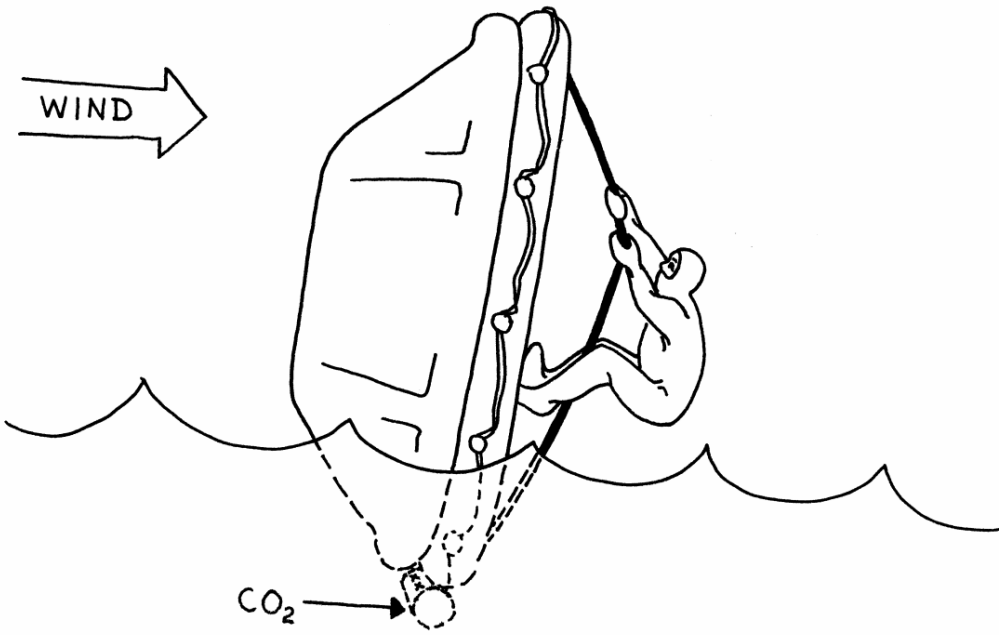
ELLIOT
Carefully!
BOARD HERE
Photo courtesy of J. LaFargue, WCGOP

Assist others

Photo courtesy of J. LaFargue, WCGOP

Emergency situations – abandon ship – boarding life raft

- Board from vessel if possible
- Enter 1 at a time
- Raft inflates upside down?
  - Go to side with CO_2 cartridge
  - Turn to face wind
  - Climb the righting strap
  - You want to land on your back



- Video

Photos courtesy of J. LaFargue, WCGOP

Emergency situations – abandon ship – boarding life raft

- Board from vessel if possible
- Enter 1 at a time
- If raft inflates upside down,
  - Go to side with CO_2 cartridge
  - Climb the righting strap
  - You want to land on your back
- Start 7 steps again

Summary

- List 4 pieces of life saving equipment and describe when each should be utilized
- What are the 3 elements of effective signals
- Describe the advantages and disadvantages of 3 types of visual distress signals.
- What are the most common emergencies?
- What do you do if you hear the following alarms [A , B, C]

Acknowledgements

- **John LaFargue**, West Coast Groundfish Observer Program
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