

INTEGRATED ESCAPE CHUTE (AND LIFE RAFT) SYSTEM (IECS)

Basic Principles and applications
Example: Variable Height Integrated Escape Chute System

Risk Safety Systems US Inc.

RISK GROUP OF COMPANIES



HSE & Risk Consulting for the upstream & downstream Oil & Gas Industry for major offshore developments:

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- Conoco Phillips Magnolia TLP US GOM
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- Escape Chute and Descent Device Systems
- Complete Safety Signage Systems
- Hazardous Material Vacuum Recovery Systems
- Coiled Pipe Markers
- Photo Luminescent Illumination Systems
- Safety Location Information & General Information Boards
- Permit To Work Systems



- Drilling Risk Instrumentation & Control
- Well Control/Choke Control
- BOP Controls
- Hazardous Area IS/Exd Systems
- Anchor Winch Monitoring
- Marine Monitoring Systems
- Explosion Proof Camera Systems

IECS offers a Practical, Safe Alternative to High Cost, High Maintenance Evacuation Systems

The RSS self contained 'Integrated Escape Chute System' (IECS) offers a low cost, low maintenance, highly reliable alternative to a TEMPSC, stand alone or davit launched life raft or other means of evacuation from an offshore facility. The system is fully integrated enabling the crew to deploy life rafts, descend safely to sea level protected from smoke or flames and embark the life rafts without entering the water. The system offers significant advantages when utilized for the following:

Manned Facilities (Steel Jacket, Fixed Height Floating Systems, GBS Etc.)

Used primarily as a tertiary escape system, alternative to throw over or davit life rafts where otherwise, personnel would be exposed to flame/heat flux or combustion products and required to enter the sea.

Unmanned Facilities

For normally unmanned facilities the IECS offers a proven alternative to high capital cost and maintenance intensive evacuation systems (TEMPSC/Lifeboats) at a fraction of the cost. Where existing facilities use stand alone life rafts the IECS can be installed as a dependable evacuation system significantly enhancing safety per personnel required to evacuate under a hazard event.

Floating Variable Height Facilities (FPSO/FSO ETC.)

The Variable height IECS can be installed on facilities where the height between the deck and sea level varies (ballasting etc.) providing a safe alternative to throw over life rafts where personnel are required to enter the sea (see Variable Height System Document).

Tertiary Escape

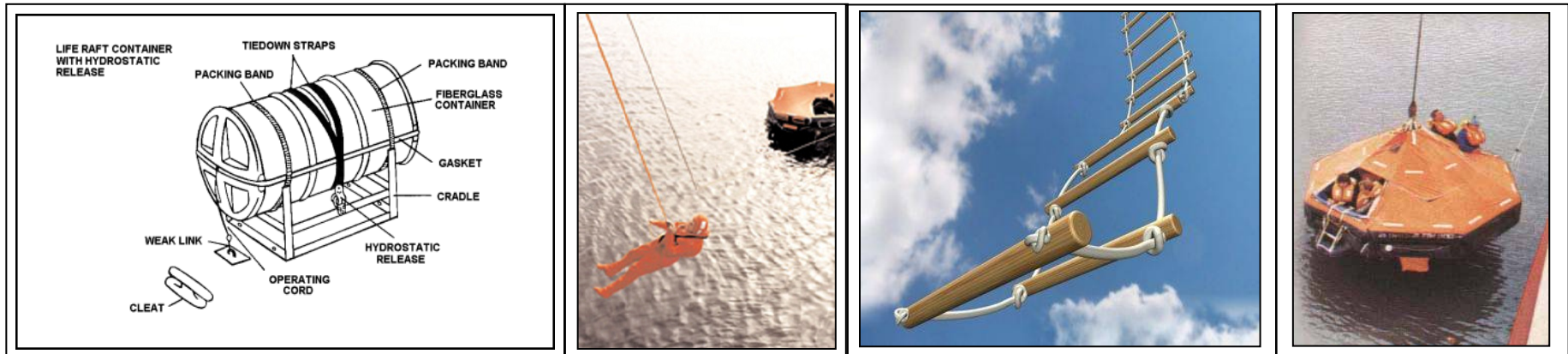
- The preferred means of evacuation from a facility will usually be by Helicopter.
- The primary means of evacuation from a facility during a hazard event will usually be by lifeboat (TEMPSC) accessed from the TR.
- The Tertiary (alternative) means of escape such as Life Rafts are provided at other locations. These are located so as to provide adequate facilities for escape to sea for any personnel unable to reach the TR during a hazard event.

Tertiary Escape Systems are designated ‘**Safety Critical Equipment**’ and usually require a **Performance Standard**:

Safety Critical System ER-0400 Emergency Egress & Rescue Systems	0401-ER	Lifeboats / life Rafts
	0402-ER	PPE (lifejackets, emergency breathing apparatus / smoke hoods, descent-donuts, etc.)
	0403-ER	Egress routes, access to and from TR
	0404-ER	Egress route lighting and signs
	0405-ER	Rescue craft
	0406-ER	Emergency communication (onboard, i.e. PA/GA)

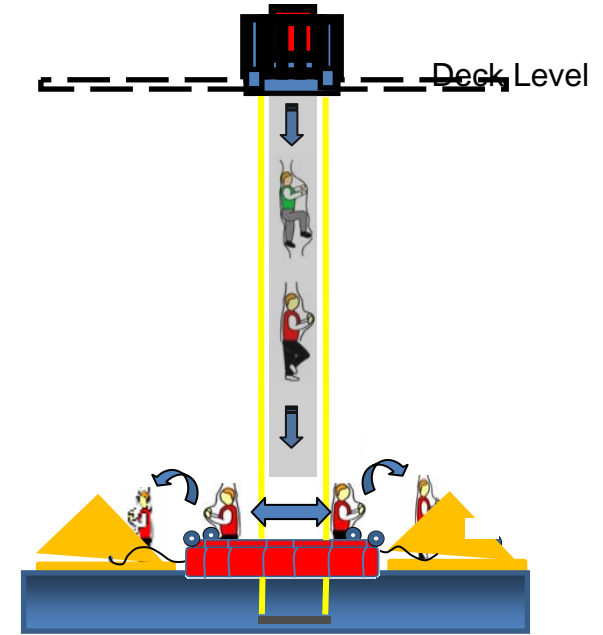
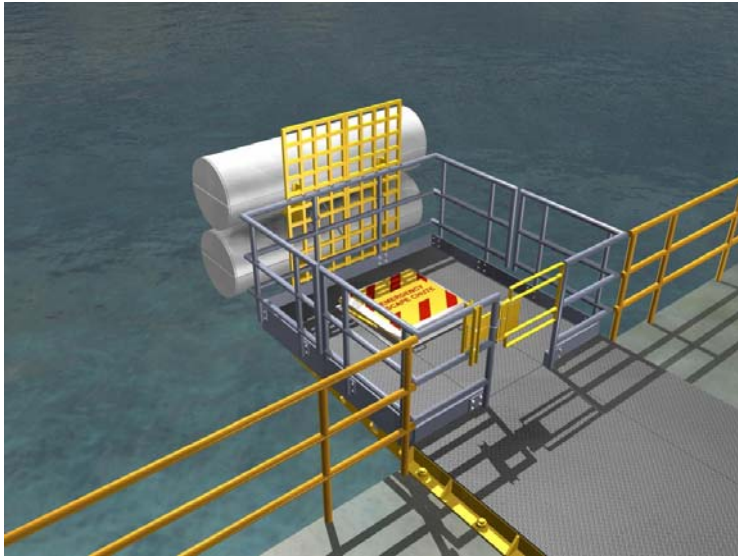
Most Currently Available methods for accessing a life Raft once deployed, pose a number of additional risks:

- **Exposure to Smoke, Heat Flux or Flame** during the descent which may result in death or incapacitation (Open Escape Chutes, Donuts etc. Rope Ladders Etc.)
- **Risk of falling** from rope ladders or nets through inadequate upper body strength (Rope Ladders, Knotted Ropes, Fixed vertical ladders etc.)
- **Complex launch methods** requiring extensive maintenance (Davit Launched Life Rafts)



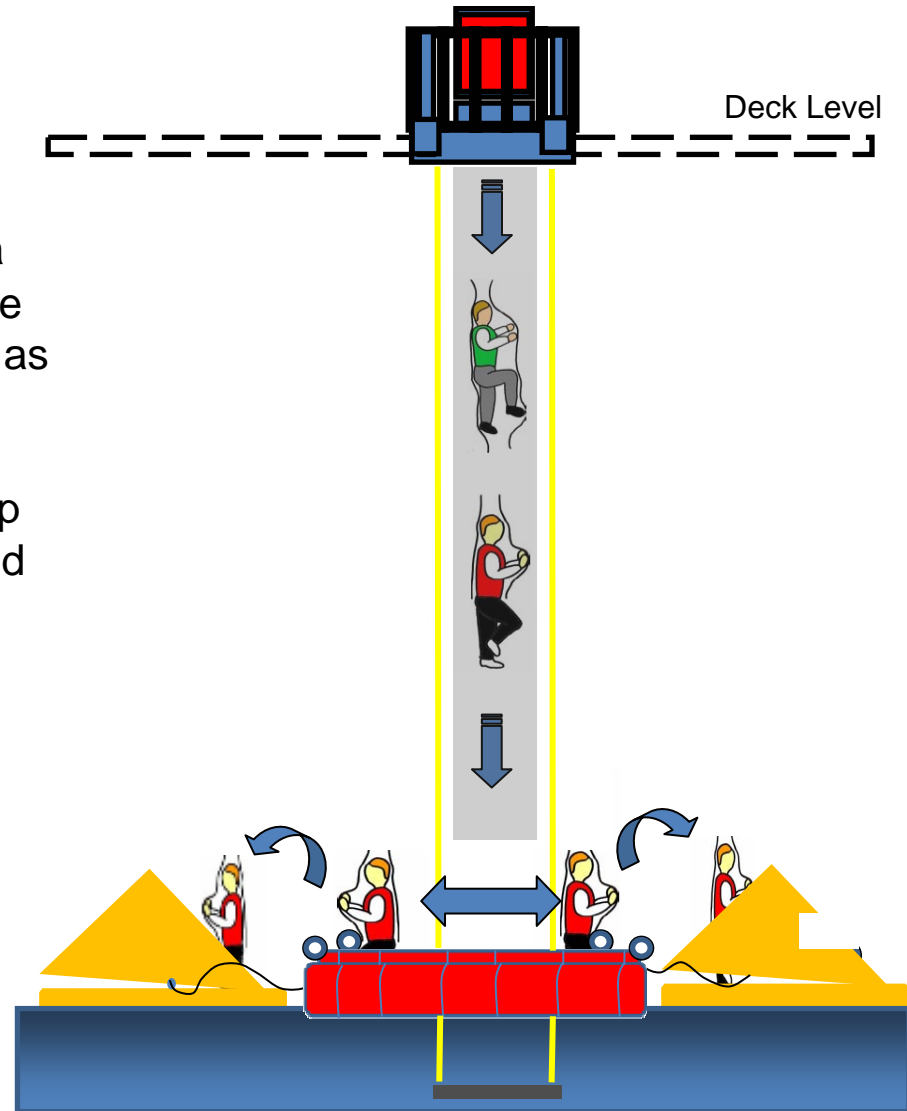
What is the Integrated Escape Chute System?

The IECS is an integrated Escape Chute System that provides a vehicle for personnel who are required to utilise Life Rafts to leave an installation to move from the deck level into Life Rafts via a protected, enclosed modular system.

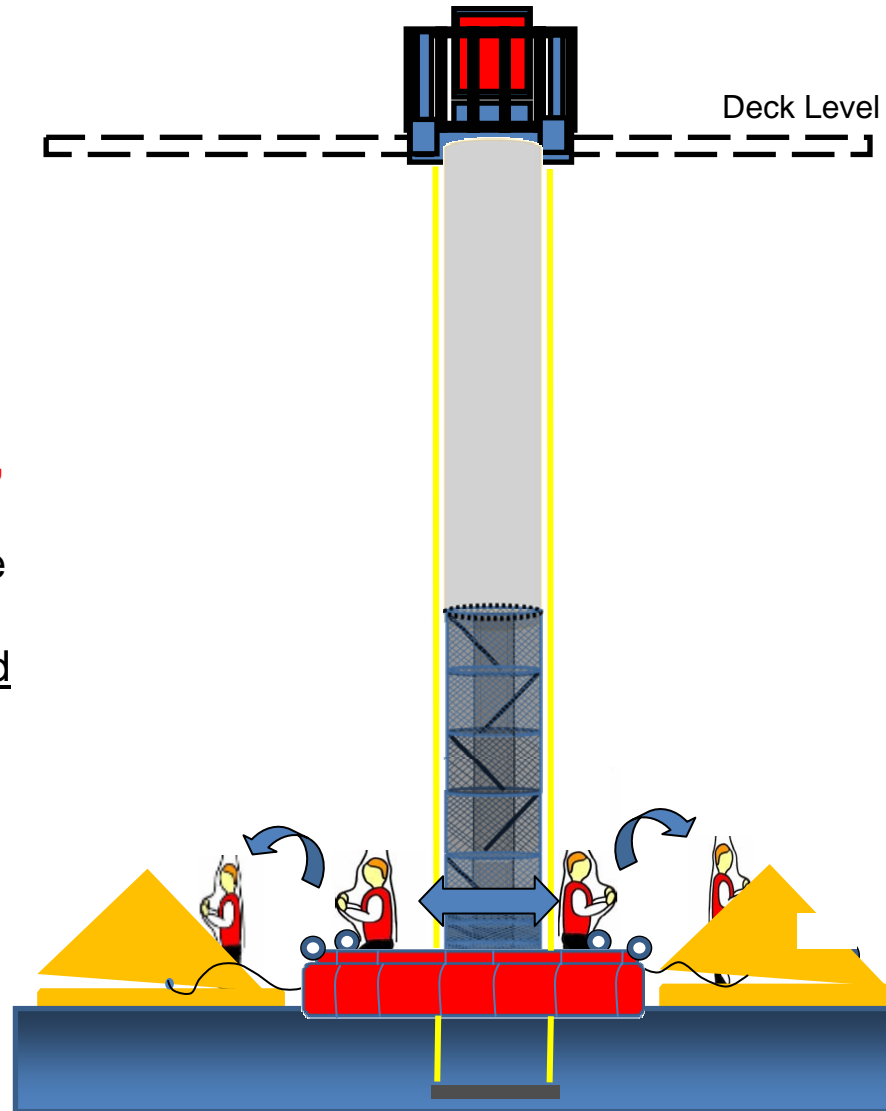


Personnel Descend through the chute to the Debarkation Raft, transfer to The 50 man SOLAS life-rafts which are then detached from the debarkation raft and away from the hazard to await rescue.

Fixed height IECS utilizes a Single chute configuration suitable for fixed height applications such as **TLP, Spar, Fixed single Jacket, Multi Jacket Facilities** and any other facility design where the gap between the skid at deck level and mean sea level does not vary.



The Variable height IECS utilizes a dual chute configuration allowing for variable height applications such as **FPSO, FSO, Drilling rigs, MODU, Shuttle Tankers** or any application where the gap between the deck skid location and mean sea level could be variable.



The Integrated Escape Chute System (IECS) provides a vehicle for personnel who are required to utilise Life Rafts to leave an installation to move from the deck level into Life Rafts via a protected, enclosed system.

The IECS integrates the Life Rafts with a reliable method of descent to sea that offers protection from heat flux, flame impingement and Smoke/gas.

Personnel descent through the chute to a debarkation raft at the bottom of the chute column to which the Life Rafts are connected by their painter lines.

The system enables a large volume of personnel to evacuate from a topsides location into Life Rafts without exposure to flame/heat or smoke without entering the water. Transit time varies but each person will spend approx 15 seconds transiting from topsides to the debarkation raft.

The IECS is a low cost low maintenance, low weight, modular unit skid mounted and easily integrated into any existing or new build facility; needing only an unobstructed drop to sea below and 7' GAP created in the deck edge rails.

Integrated Escape Chute Systems – IECS is a fully integrated, vertical, skid mounted escape chute system. The System main components comprise:

- **Purpose built 7ft x 7ft steel box section skid** with checker plate deck, safety hand rails, access gate and instructions on use, warning and other appropriate signage.
- **Life Raft Mounting Assembly** located at the front of the skid (2 X 10,25 or 50 man Life Rafts)
- **Upper Chute Container** with hydraulically dampened lid containing, system deployment lever, packed 3 layer chute.
- **Lower Chute Container** fixed to underside of skid frame containing Kevlar main structural support cables, 3 layer chute interface with netted Kevlar variable height application chute, debarkation raft, 250lb stabilization plate, lower hinged door to deploy the system.

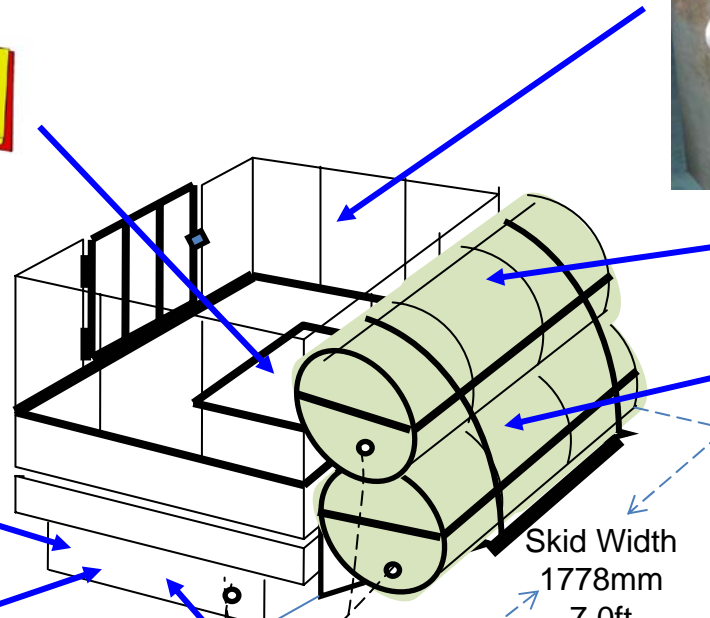
Three layer Escape Chute and Upper Container



50 man SOLAS Life raft

50 man SOLAS Life raft

Lower Chute Container

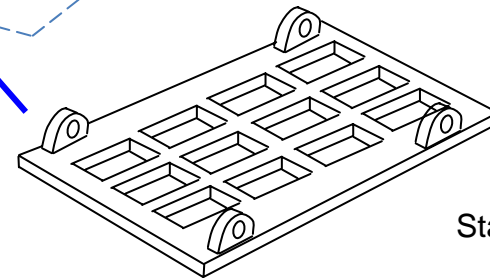
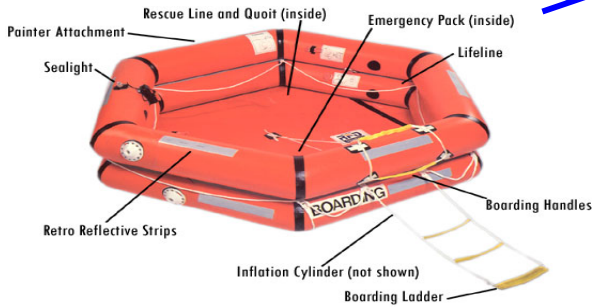


Skid Width
1778mm
7.0ft

Skid Depth
1778mm
7.0ft

Painter lines attached to debarkation raft

Debarkation Raft

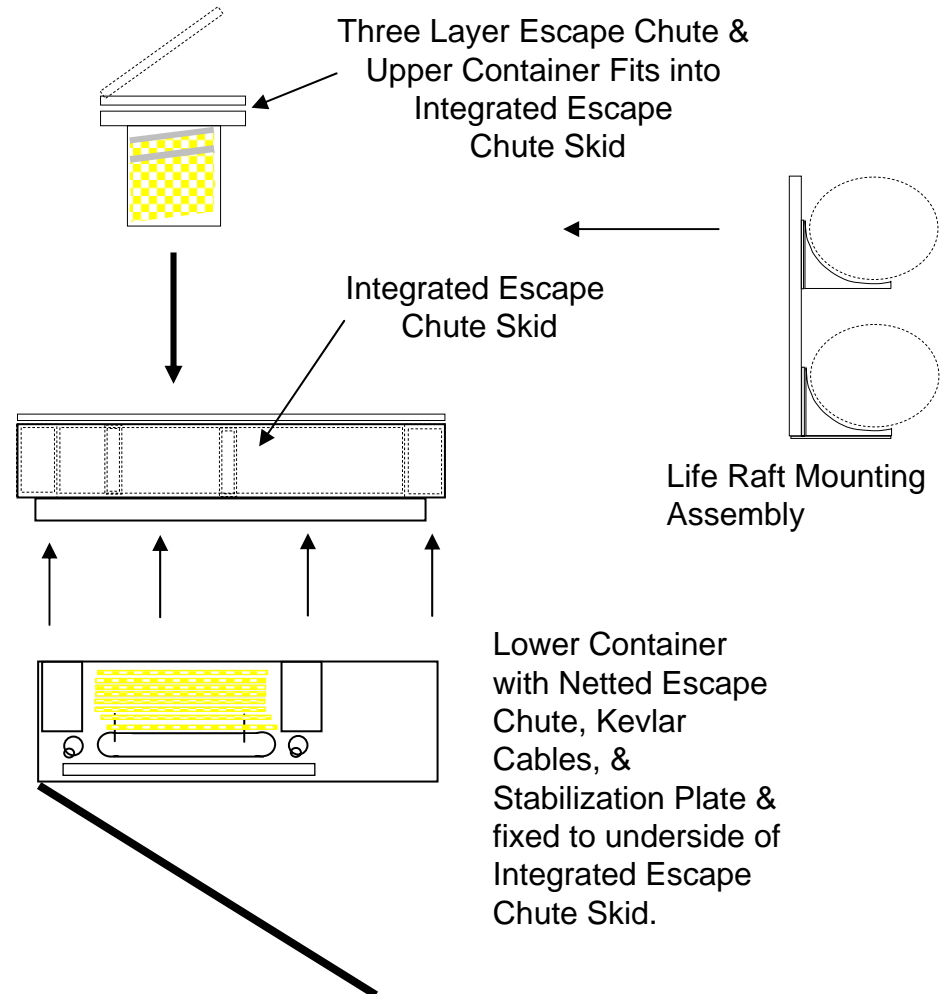
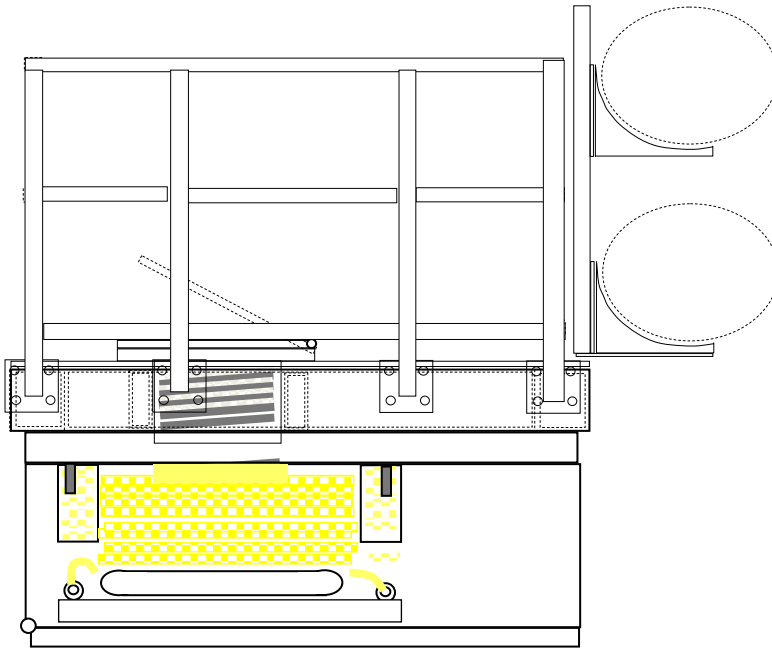


Stabilization Plate

IECS Simplified Exploded Assembly

Note: Hand Rails not Shown for Clarity

IECS Assembled



In an emergency Where personnel are required to evacuate using the IECS the following procedure should be followed:



Assemble at the IECS muster station. Persons designated Topsides Chute Access Supervisor (TCAS), Debarkation Raft Supervisor (DRS), Life Raft 1 & 2 Access Supervisors commence duties:

Topsides Chute Access Supervisor (TCAS) - The individual assigned this task will be responsible for entering the IECS skid, removing life raft safety latches and deploying the system. Once the system is deployed he will remain at the topsides supervising the personnel as they traverse the chute. He will be the last individual into the chute.

Debarkation Raft Supervisor (DRS) - The (DRS) will be the first person into the chute. On exiting at the debarkation raft he will supervise the remaining personnel as they traverse the chute to the debarkation raft. He will communicate directly with the TCAS via hand held radios to supervise personnel descent.

Life Raft Access Supervisor 1 & 2 (LRAS) - The LRAS will be the second and third personnel to descend to the debarkation raft. Once at sea level they will pull in the Life Rafts and take station at the edge of the Debarkation Raft (holding the Life Raft in place). Their function is to supervise the personnel transit into the Life Rafts. They will be last to enter each Life Raft.



Topsides Chute Access Supervisor (TCAS) Responsibilities:

1. Enter the skid, deploy the system
2. Supervise personnel descent through the chute
3. Communicate with DRS via hand held radios at bottom to manage personnel descent
4. TCAS is last to traverse the chute



Debarkation Raft Supervisor (DRS) Responsibilities:

1. The (DRS) will be the first person into the chute.
2. Supervise the remaining personnel as they traverse the chute to the debarkation raft.
3. Communicate directly with the TCAS at the top of chute via hand held radios to supervise personnel descent.
4. After TCAS descends to sea level and enters Life Raft DRS enters Life Raft.

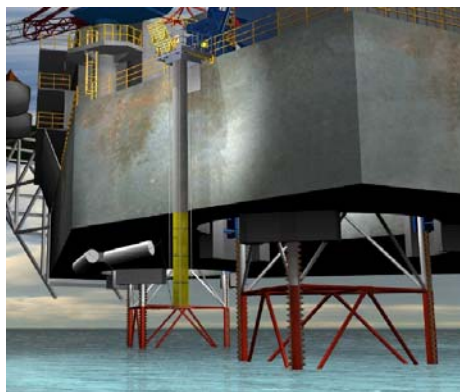
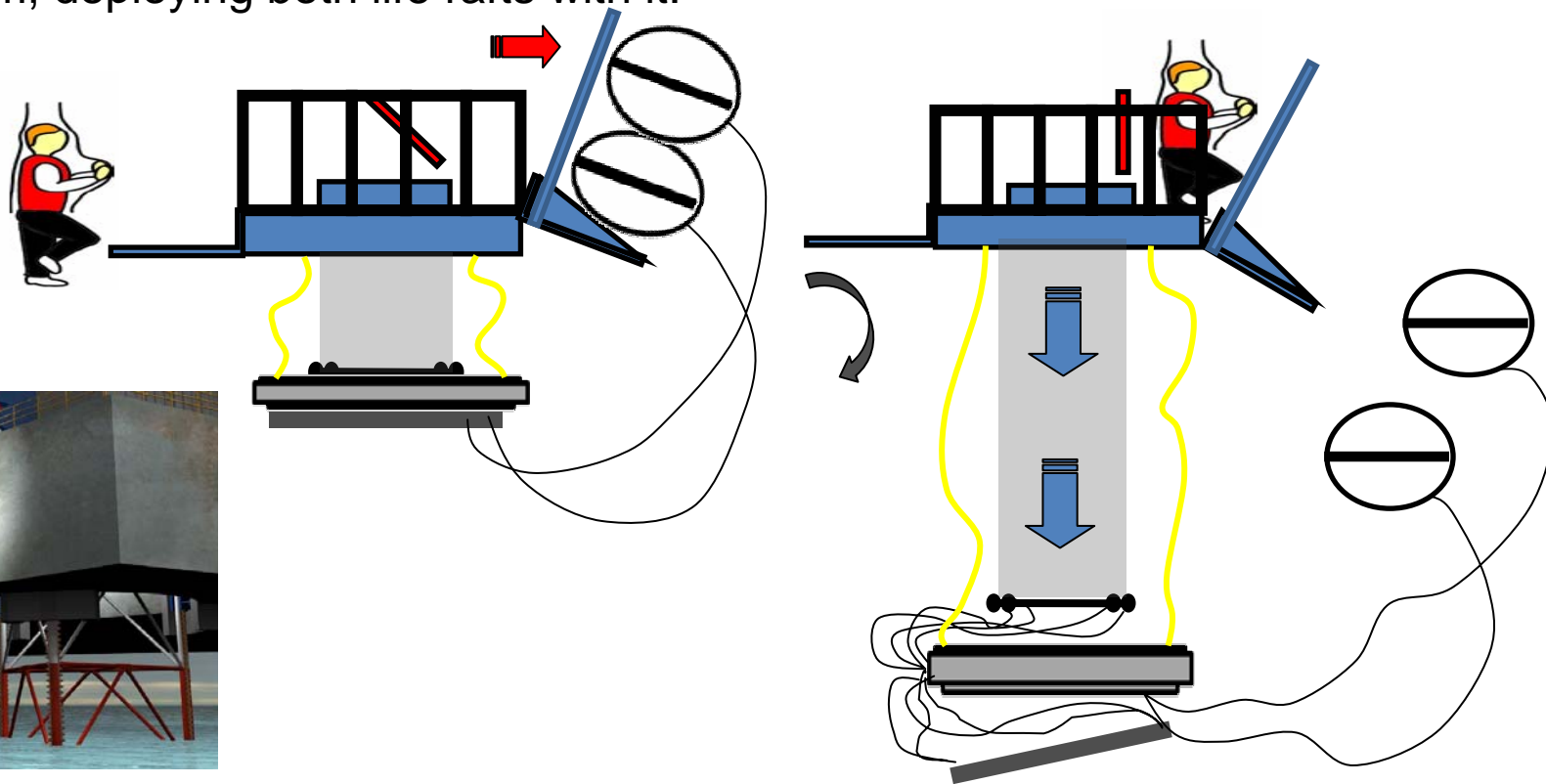


Life Raft Access Supervisor 1 & 2 (LRAS) Responsibilities:

1. The LRAS will be the second and third personnel to descend to the debarkation raft.
2. Once at sea level they will pull in the Life Raft and take station at the edge of the Debarkation Raft holding the Life Raft in place.
3. Their function is to supervise the personnel transit into the life rafts.
4. They will be last to two personnel to enter each life raft after TCAS and DRS have entered life Rafts.
5. They are responsible for disconnecting the Rafts from the debarkation rafts.

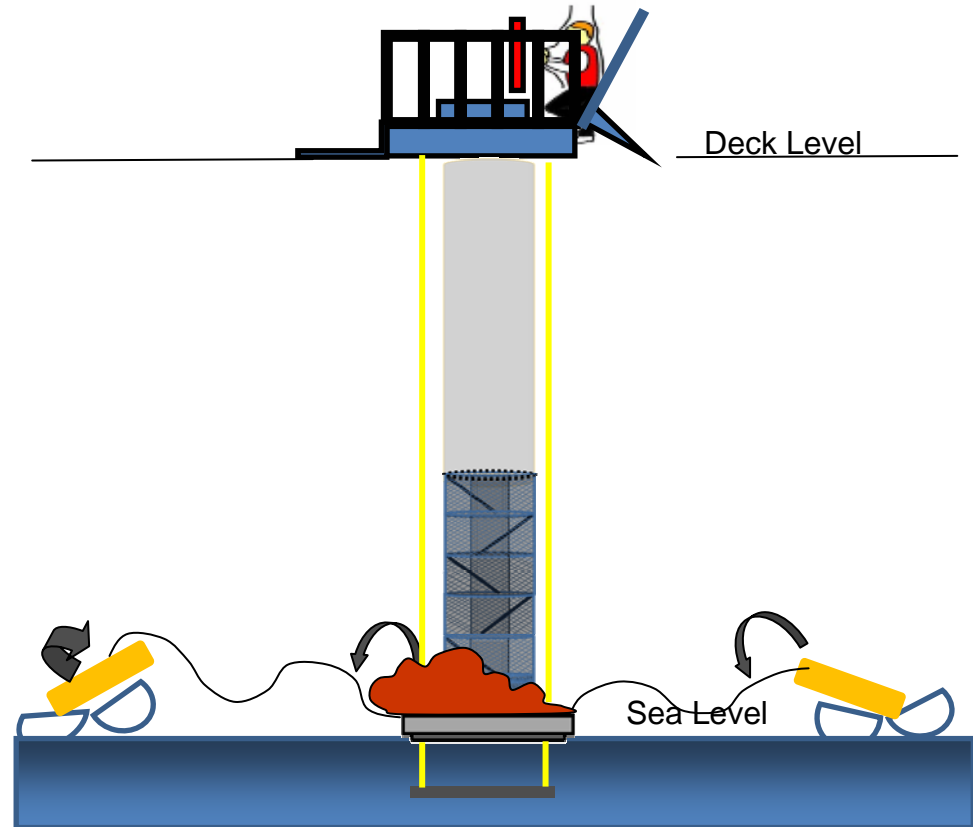
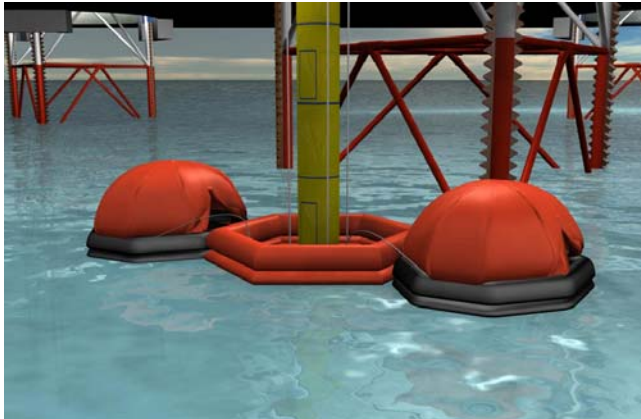
STEP 1 - TCAS enters the skid, releases Life Raft retaining straps, Lifts Upper Chute Container lid and deploys system using deployment handle.

STEP 2 - Chute falls to sea with Debarkation Raft and Stabilizer attached to bottom, deploying both life rafts with it.

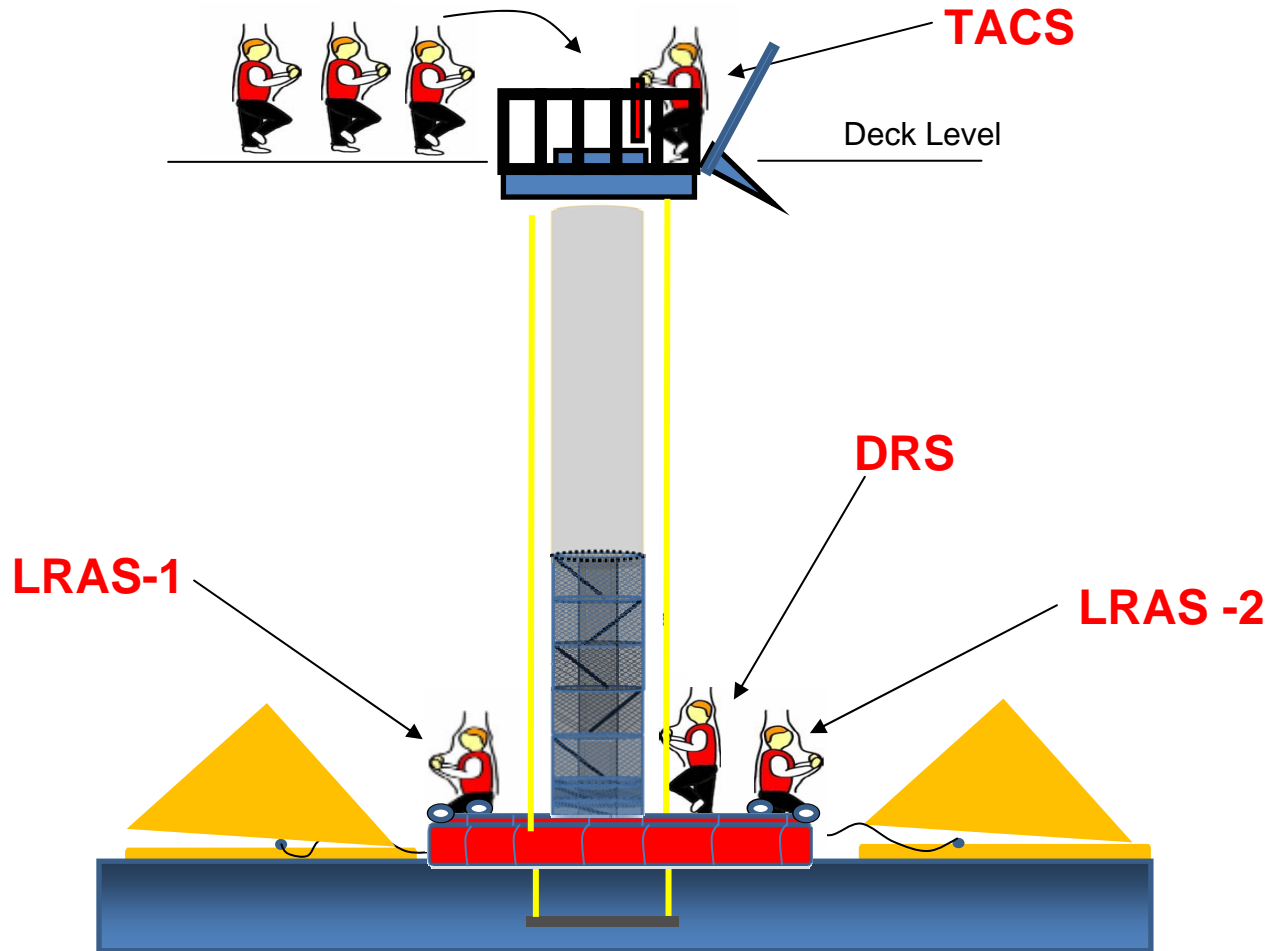


STEP 3 - As the debarkation raft hits the water it starts to inflate, attached to the chute bottom by the anchor cables running through the raft to the stabilizer.

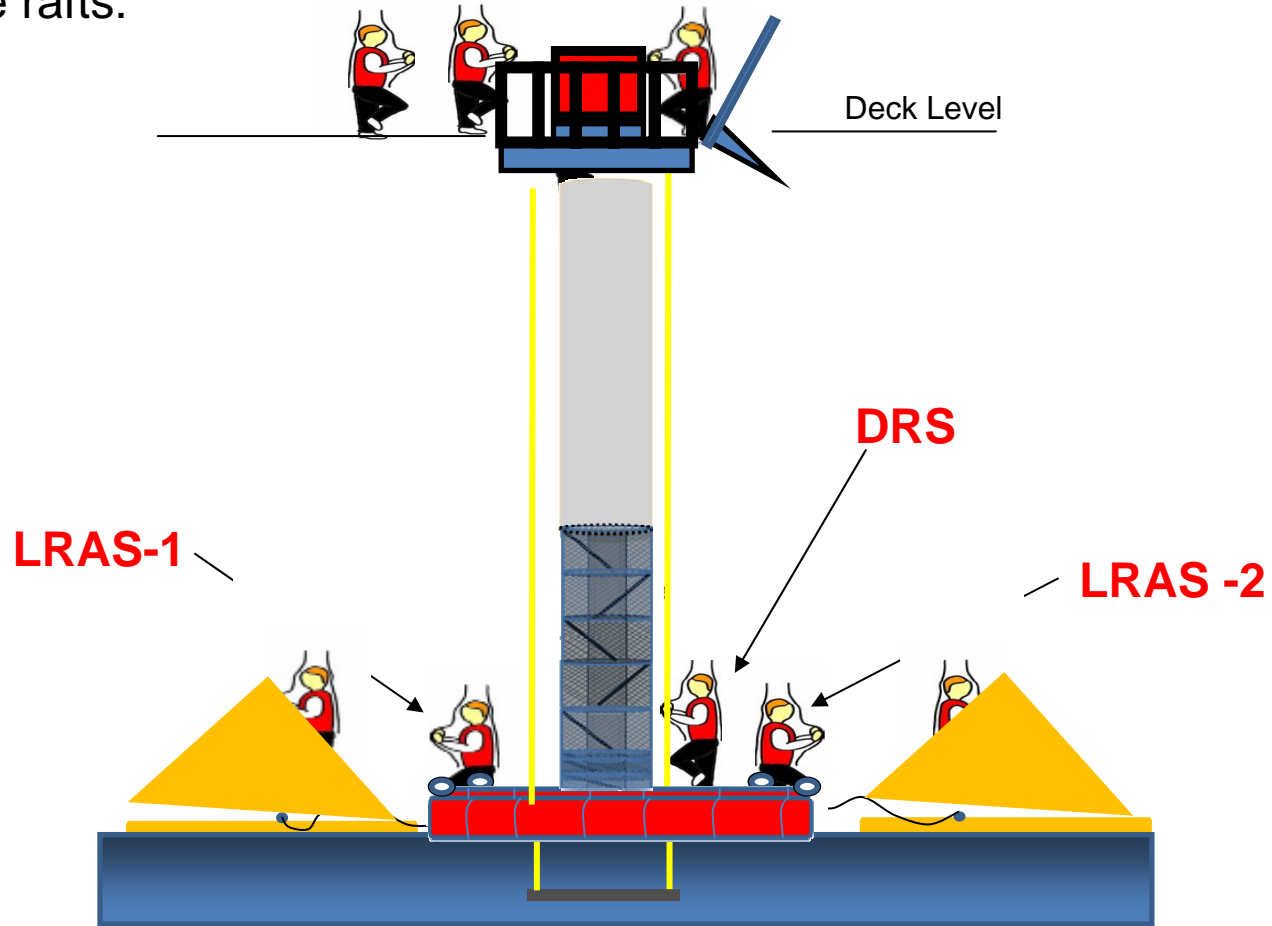
On impacting the water the two SOLAS life rafts float awaiting inflation by the LRAS they are connected to the debarkation raft via the painter lines.



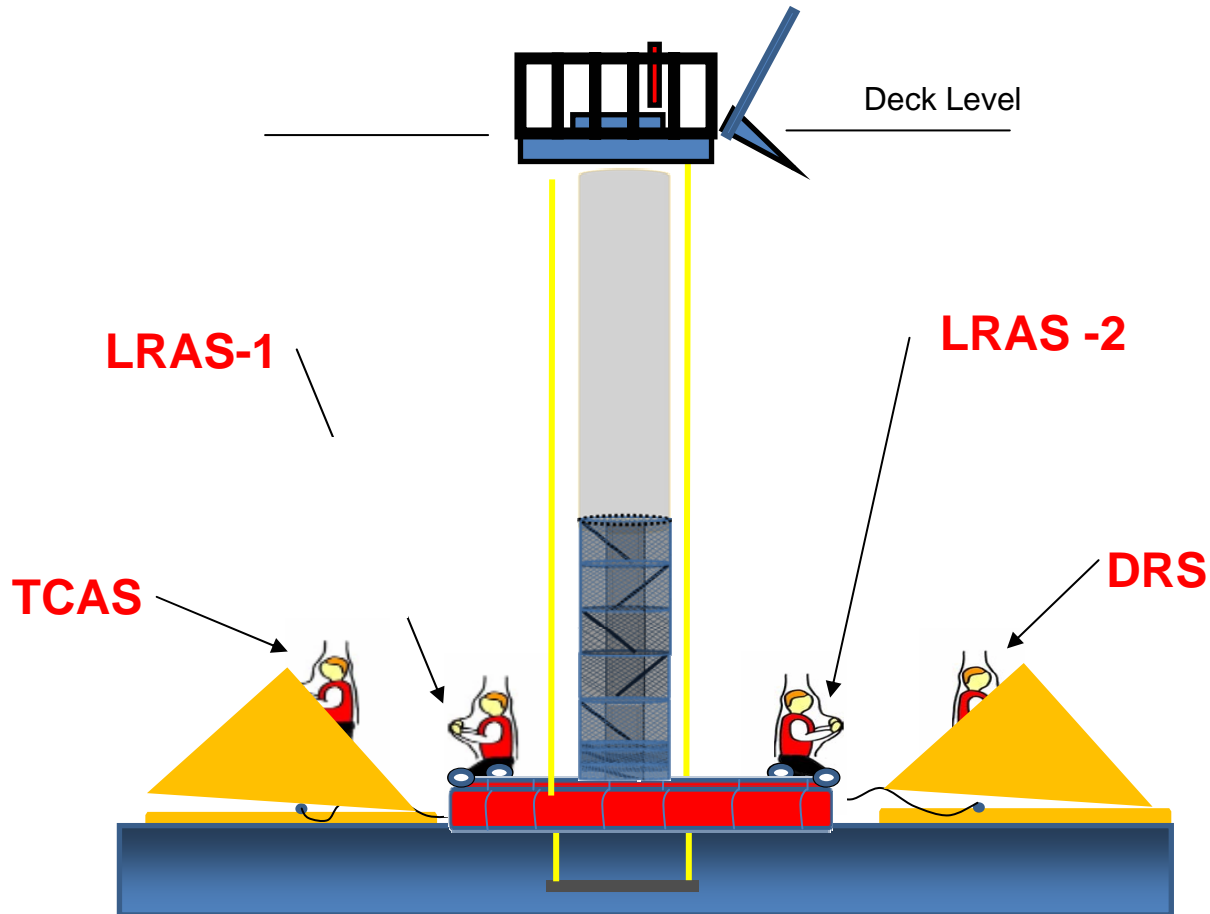
STEP 4 – TACS, DRS & LRAS take stations. Personnel begin the decent into the debarkation raft ready to transfer to the two SOLAS life rafts.



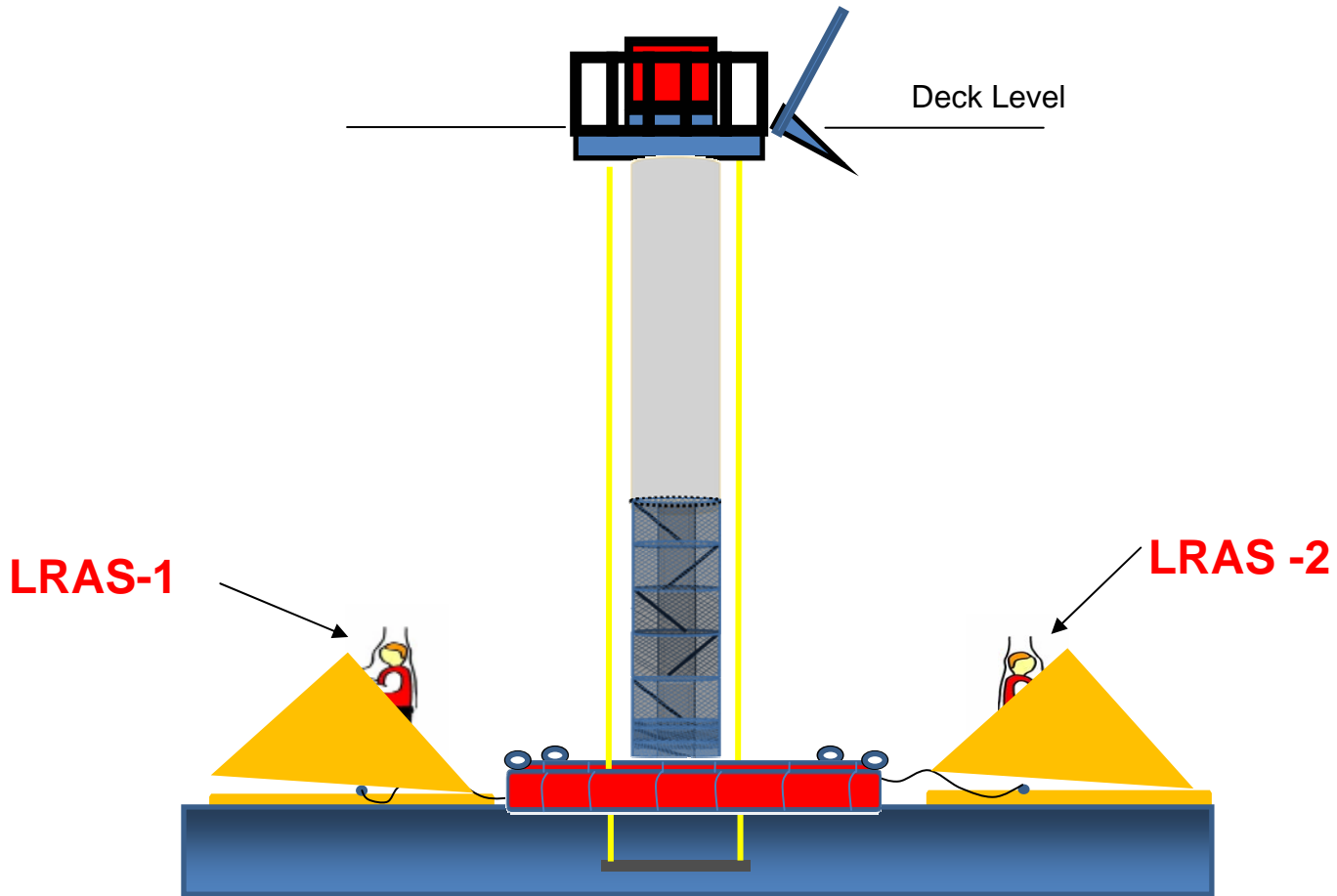
STEP 5 – Personnel traverse into the debarkation raft and transfer to the two SOLAS life rafts.



STEP 6 – TCAS & DRS enter Life Raft.



STEP 7 – LRAS-1 & LRAS - 2 enter Life Raft & Separate Life Raft from Debarkation Raft.



Operating the IECS – Prerequisites for Use:



NOTE: Safety awareness is vital when using any type of evacuation system, the same applies with the IECS. At all times follow instructions and ensure you are fully trained prior to access to the facility where the system is installed. If in doubt **ASK!** If you need more training **ASK!**

- **All personnel** must undergo a minimum of **Two** hours training combination classroom and practical using the training chute prior to access to the facility where the IECS is installed.
- **All personnel** will be assessed on their capability by the trainer identifying any persons who have a fear of heights, vertigo or any other height related phobias. Fully document each person's condition or phobia and earmark for extended training.
- **The IECS is a vertical descent device** and as such all users must be fully familiarized with this type of evacuation procedure before accessing the facility on which it is utilized.
- **During evacuation be aware of your surroundings** and any hazards that may be present, stay calm at all times and try not to panic. Ensure you have read the operational manual and fully understand the Facility muster and evacuation procedures. Follow directions of designated personnel (see next slide).
- **Familiarize yourself with all pictorial warning and written instructions** that are provided with IECS system and located in front of the skid and attached to the hand rails.



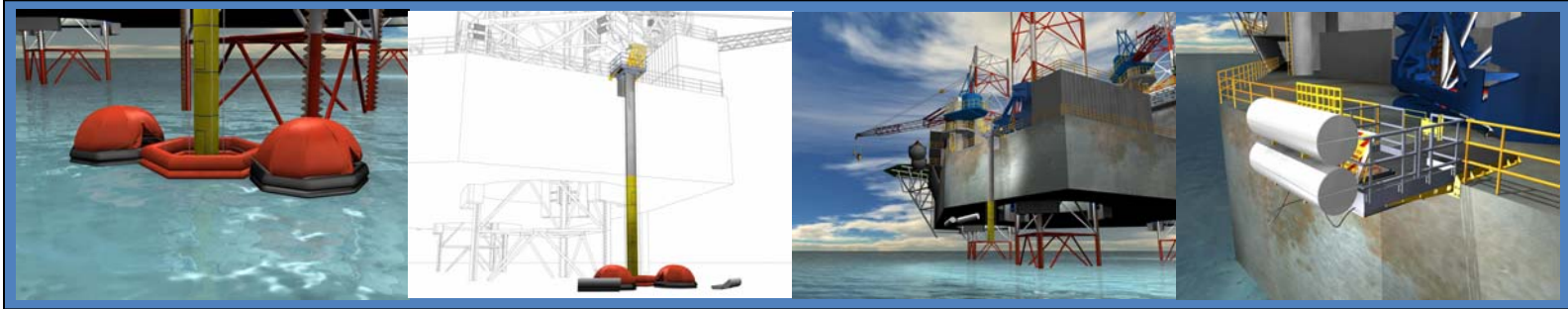
- **Exxon Mobil Kizomba A – FPSO Refit** on station with 100 plus personnel. Four IECS have been installed to provide additional evacuation facilities.



- **Exxon Mobil Kizomba B – FPSO Refit** on station with 100 plus personnel. Four IECS have been installed to provide additional evacuation facilities.



- **Dolphin Energy Qatar – 2 x Wellhead /flare multi-jacket facilities** in Persian Gulf. 2 X IECS per facility, one located at mid bridge link support jacket, the other at flare platform.



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(IECS)**

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