



Deck General – Safety

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Which shape shown in illustration D016RR below would be displayed by a mobile offshore drilling unit that is being towed more than 200 meters astern of a towing vessel?

**B**

**Illustrations:** D016RR\_WM\_052416

A mobile offshore drilling unit will show the day-shape shown in illustration D010RR below to indicate which of the following?

**being towed**

**Illustrations:** D010RR\_WM\_052416

See REF1695

The sprocket teeth on a wildcat are known as the \_\_\_\_\_.

**whelps**

**Illustrations:** WILDCAT

See REF819

What is the purpose of a chain stopper?

**Secures the chain after it has been stopped**

**Illustrations:** NAVYCHAINSTOPPER

If help has not arrived in 10-12 hours after you abandon a MODU in a survival craft, which of the following would be the best course of action?

**shut down the engine(s) and set the sea anchor**

**Illustrations:** SEAANCHOR

See REF784

In towing it is desirable for the tug and the MODU to ride wave crests simultaneously because \_\_\_\_\_.

**shock loading on the tow line is reduced**

**Illustrations:** TOW IN STEP

See REF292

The condition where a MODU on the end of a tow line is riding a wave crest at the same time as its tug rides a wave crest is known as riding in \_\_\_\_\_.

**step**

**Illustrations:** TOW IN STEP

See REF292

Yawing can be described as \_\_\_\_\_.

**veering from side to side on the end of the tow line**

**Illustrations:** PITCH\_ROLL\_YAW

See REF291

If you see someone fall overboard from a MODU, you should \_\_\_\_\_.

**call for help and keep the individual in sight**

**Illustrations:** WILLIAMSON\_TURN, ANDERSON\_TURN, SCHARNOW\_TURN

See REF180

If you see someone fall overboard from a MODU, you should \_\_\_\_\_.  
**call for help and keep the individual in sight**

**Illustrations:** WILLIAMSON\_TURN, ANDERSON\_TURN, SCHARNOW\_TURN  
See REF180

If you see someone fall overboard from a MODU, you should \_\_\_\_\_.  
**call for help and keep the individual in sight**

**Illustrations:** WILLIAMSON\_TURN, ANDERSON\_TURN, SCHARNOW\_TURN  
See REF180

The LWT anchor has two angular positions for the flukes. These are \_\_\_\_\_.  
**30° and 50°**  
See REF800

The length of chain between the anchor and the end of the pendant line is called the \_\_\_\_\_.  
**crown chain**

The fluke angle of an anchor system is the angle between the \_\_\_\_\_.  
**flukes and the shank**

The only wire rope termination which may be made in the field is \_\_\_\_\_.  
**spelter poured and resin sockets**

When loading or discharging dry mud or cement, crew members should use facial respirator masks and \_\_\_\_\_.  
**goggles**

For well control, the American Petroleum Institute recommends that hydraulic units have sufficient horsepower to close the annular preventer in \_\_\_\_\_.  
**30 seconds**

In very deep water drilling, it becomes necessary to reduce tension caused by the weight of the riser joints. This is accomplished by using a(n) \_\_\_\_\_.  
**buoyant riser**

A heavy, thick-walled tube, usually steel, used between the drill pipe and the bit in the drill stem to weight the bit in order to improve its performance is called a \_\_\_\_\_.  
**drill collar**

The operation of hoisting the drill stem out of and returning it to the wellbore is called a \_\_\_\_\_.  
**trip**

A drilling bit which is doughnut shaped to permit recovery of the center portion of the hole drilled is called a \_\_\_\_\_.  
**core bit**

The probability of sulfide stress cracking in the presence of hydrogen sulfide is greatest for which of the following materials?  
**high strength steel**  
See REF1807

In evacuation from a MODU, an individual without the option of a survival craft or liferaft should enter the water on the leeward side. This procedure is valid except when which of the following circumstances applies?  
**there is burning oil on the water**

When H<sub>2</sub>S is burned (flared) on a MODU, what can you expect to occur?

**Only 80% of the H<sub>2</sub>S will be converted to SO<sub>2</sub> or free sulfur.**

See REF1807

What kind of conditions would you observe as the eye of a storm passes over your MODU's position?

**Huge waves approaching from all directions, clearing skies, light winds, and an extremely low barometer**

The procedure of strengthening damaged structures on a MODU by using wood or steel is called \_\_\_\_\_.  
**shoring**

The record of tests and inspection of fire fighting equipment on board a MODU must include \_\_\_\_\_.

**the name of the person conducting the test**

See REF1822

What equipment is included in the fireman's outfit?

**Self contained breathing apparatus**

Where would you find the FCC authorization for transmitting on your rig's EPIRB?

**On the Ship Station License**

During the required periodic abandon ship drill aboard a MODU, each person not assigned duties in the muster list is

\_\_\_\_\_.  
**instructed in the use of life jackets**

Why should you soak an anchor?

**It can prevent the anchor from slipping during pretensioning.**

When a MODU is afloat in equilibrium, the horizontal component of mooring line tensions should equal \_\_\_\_\_.

**environmental forces**

What pressure must a spring buoy, moored at a 500 foot depth, withstand?

**225 psig**

When a semisubmersible rig under tow experiences pounding on the forward transverse brace, the surest way to alleviate the condition would be to \_\_\_\_\_.

**ballast down**

While anchored in 600 feet water depth, 3,150 feet of chain is deployed for line #8. Tension on that line is 220 kips. According to the DEEP DRILLER Operating manual, how much of that chain lies along the bottom?

**1,422 feet**

The International Oil Pollution Prevention (IOPP) Certificate required by MARPOL is issued to U.S. flag MODUs by the

\_\_\_\_\_.  
**U.S. Coast Guard**

See REF1828

A person who holds a foreign credential can serve as the ballast control operator to meet manning requirements on a MODU, on waters outside U.S. jurisdiction, until what point in time?

**MODU returns to a U.S. port**

After conducting an abandonment drill, the Master or person in charge of a MODU shall log \_\_\_\_\_.

**the names of crew members who participated in the drill**

See REF1595

In the event of a casualty to a MODU, who is responsible to make records available to the Coast Guard official authorized to investigate the casualty?

**The owner**

See REF1841

The person in charge shall insure that each lifeboat on a MODU is lowered to the water, launched, and operated at least once every \_\_\_\_\_.

**3 months**

What must the Master or person in charge of a MODU enter in the logbook after conducting a boat drill?

**Which survival craft was used in the drill**

With regard to accommodation spaces on board mobile offshore drilling units, what must the Master or person in charge log?

**The date of each inspection of each space**

On offshore drilling units, any reports of a casualty that are made are required to be retained on board for a period of at least \_\_\_\_\_.

**3 months**

On offshore drilling units, the minimum number of persons required to be trained in the use of fireman's outfits is \_\_\_\_\_.

**2**

It is the responsibility of the Master to ensure that \_\_\_\_\_.

**temporary personnel and visitors are advised of emergency stations**

Operation of the valve control release on a fixed CO2 system must immediately \_\_\_\_\_.

**secure all mechanical ventilation in the protected space**

See REF215

On a MODU, size I and II extinguishers are considered \_\_\_\_\_.

**hand portable**

See REF1867

On a self-elevating drilling unit, draft marks must be located \_\_\_\_\_.

**near each corner of the hull**

On a MODU with lifeboats stowed in two different locations, if all the lifeboats are lost in one location then the remaining lifeboats must accommodate what percentage of the persons permitted on board?

**100 (%)**

On offshore drilling units fitted with fixed CO2 systems, the system must withstand a bursting pressure of at least \_\_\_\_\_.

**6,000 pounds per square inch**

On offshore drilling units, all lifeboats are required to be marked with the \_\_\_\_\_.

**name and port of the unit**

Load line regulations are designed to insure that a MODU has adequate structural strength and sufficient \_\_\_\_\_.

**stability**

See REF491

Certificates of Inspection for offshore drilling units are issued for a period of \_\_\_\_\_.

**24 months**

See REF1873

When weight-testing a davit launched liferaft on a mobile offshore drilling unit, the deadweight equivalent for each person in the allowed capacity of the raft is \_\_\_\_\_.

**165 pounds**

The COASTAL DRILLER has sufficient reserve stability to overcome damage due to flooding of any one watertight compartment in winds to \_\_\_\_\_.

**50 knots**

When a floating MODU inclines to an angle slightly less than the angle of loll, she will \_\_\_\_\_.

**return to the angle of loll**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #4 (Drilling), suffers severe damage to the starboard forward column below the waterline. You should pump from tank \_\_\_\_\_.

**1S**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #4 (Drilling), suffers damage to the starboard aft column below the waterline. Pumping from tanks 8S and 9S is not sufficient to prevent increasing starboard list and stern down trim. You should consider counterflooding in tank \_\_\_\_\_.

**1P**

Scouring is the result of \_\_\_\_\_.

**interruption of the normal current flow by the footing**

The maximum load line draft for the COASTAL DRILLER is \_\_\_\_\_.

**10 feet 10.5 inches**

The rotary of the COASTAL DRILLER is located 38 feet aft of transom and 6 feet to starboard of the centerline. With the changes to lightweight shown in the Operating Manual, the maximum allowable hook load is \_\_\_\_\_.

**424 kips**

The COASTAL DRILLER, in field transit at a draft of 10 feet 0 inches with winds less than 70 knots, has a KGT of 39.0 feet and a KGL of 38.6 feet. The margin on the maximum allowable KG is \_\_\_\_\_.

**26.4 feet**

The COASTAL DRILLER is in transit loaded as shown in the Sample Load Form Number 1 (Rig Move). What would be the new KGT if, during the move, 170.9 kips of fuel oil is consumed from Diesel Oil Tanks 13 and 14?

**50.70 feet**

The maximum draft to which a drilling unit may be safely loaded is called \_\_\_\_\_.

**load line draft**

The emergency power system for the DEEP DRILLER should be placed in operation when the weather forecast predicts winds greater than 90 knots and when \_\_\_\_\_.

**evacuating the unit**

The DEEP DRILLER is loaded as shown in the Sample Load Form #5 (Survival), when an unexpected, slowly increasing port list and bow down trim occurs. A leak in C1P is found. By deballasting from ballast tanks 2P and 3P, the inclination slowly decreases. The increase in the longitudinal free surface correction is \_\_\_\_\_.

**0.49 foot**

The DEEP DRILLER, at a draft of 60 feet and a total vertical moment of 1,012,598 foot-tons, pumps 2,068.7 long tons of ballast overboard. The VCG of the discharged ballast is 15.0 feet. What is the new height of the center of gravity?

**61.16 feet**

An ideal mooring system would be \_\_\_\_\_.  
***symmetrical and in equilibrium***

Most large anchors are manufactured with a \_\_\_\_\_.  
***D-type shackle***

What is an advantage of the 6x37 class of wire rope over the 6x19 class of wire rope of the same diameter?  
***Flexibility***

Where would you find the "call sign" or "call letters" of the radio station on your rig?  
***On the Ship Station License***

Lost circulation can cause a kick or blowout by \_\_\_\_\_.  
***reducing the mud level in the well***

When filling fuel-oil tank 4S on the DEEP DRILLER, it is necessary to open valve \_\_\_\_\_.  
***11***

On an offshore drilling rig, the pumps which circulate drilling fluid through the drill string while drilling are called the \_\_\_\_\_.  
***mud pumps***

In MODU drilling operations, the term tripping means \_\_\_\_\_.  
***hoisting drill pipe out of and returning it to the wellbore***

To prevent the riser system from buckling under its own weight, upward tension is provided by the \_\_\_\_\_.  
***riser tensioning system***

To assure safe boarding and launching of a davit-launched liferaft from a MODU, preparation should include which of the following choices?  
***removing any side protective rails and checking that the overside and surface level are clear***

Accumulations of H<sub>2</sub>S gas on a MODU can be dangerous. It is imperative that personnel know that H<sub>2</sub>S gas possesses which of the listed characteristics?  
***heavier than air***

When preparing a MODU for heavy weather, fuel oil day tanks should be \_\_\_\_\_.  
***filled to ensure that sufficient fuel oil is available during a lengthy emergency***

A CO<sub>2</sub> extinguisher which has lost 10% of its charge must be \_\_\_\_\_.  
***recharged***  
See REF1812

After using a CO<sub>2</sub> extinguisher on a MODU, it should be \_\_\_\_\_.  
***recharged***

On a MODU, a fixed carbon dioxide or other approved system must be installed \_\_\_\_\_.  
***where oil or chemical drums are stored***

The limit switches on a MODUs survival-craft winch system \_\_\_\_\_.  
***stop the winch just before the craft reaches the final stowage position***

On offshore drilling units, the lifeboat motors shall be operated in the ahead and astern position at least once each \_\_\_\_\_.  
**week**

A solution to overcome tripping defects is an arrangement of special plates on either side of the flukes, designed to set them in the correct tripping position. These special plates are called \_\_\_\_\_.  
**palms**

The two main types of load cells used in mooring tension gauges are \_\_\_\_\_.  
**distortion and compression**

In securing deck loads for an ocean tow, drill pipe should be \_\_\_\_\_.  
**provided with bulwarks at both ends of their bays**

The COASTAL DRILLER, while in transit, expects the winds to increase to 75 knots. In order to meet the stability and leg strength requirements, the tip-of-can (TOC) position should be at \_\_\_\_\_.  
**60.50 feet**

The full period of motion of the DEEP DRILLER while tripping is 8 seconds and the maximum pitch angle as seen on the inclinometers is 4 degrees. From the standpoint of critical motion, the motion is \_\_\_\_\_.  
**satisfactory, continue tripping**

The regulations regarding Oil Record Books do not apply to MODU's that \_\_\_\_\_.  
**have a valid National Pollutant Discharge Elimination System permit**  
See REF530

You are aboard a vessel which is near a platform engaged in oil exploration. Under U.S. pollution regulations, you may NOT discharge garbage if you are within \_\_\_\_\_.  
**1650 feet (500 meters)**

How often are fire hoses required to be tested on a mobile offshore drilling unit?  
**Once a year**  
See REF1595

Who is responsible for reporting a casualty to a mobile offshore drilling unit?  
**The owner**  
See REF1845

On a MODU, each emergency generator must be tested at least once each \_\_\_\_\_.  
**month**

When is the density of the water required to be logged in the logbook of a MODU?  
**Prior to getting underway when the vessel is floating in fresh or brackish water**

In the case of a casualty involving a MODU, the Master, owner, agent or person in charge shall make the records required by regulation available upon request to \_\_\_\_\_.  
**any Coast Guard official authorized to investigate the casualty**

Injuries resulting in loss of life or incapacitation, aboard vessels, must be reported to the \_\_\_\_\_.  
**U.S. Coast Guard**

When a survival craft drill is held, the person in charge must insure that \_\_\_\_\_.  
**all davits used for launching liferafts are operated**



On all mobile offshore drilling units, the deckhead of each accommodation space must be located above \_\_\_\_\_.

**the deepest load line**

See REF1813

What is the minimum required number of ring life buoys on a MODU?

**8**

See REF1856

All portable fire extinguishers must be capable of being \_\_\_\_\_.

**carried by hand to a fire**

On a MODU, a door that is required to be marked "KEEP CLOSED" is designed to \_\_\_\_\_.

**maintain watertight integrity**

On surface type offshore drilling units, each survival craft must be capable of being launched to the water at the minimum operating draft, under unfavorable conditions of trim and with the unit listed not less than \_\_\_\_\_.

**20°**

Due to the hazards involved with Halon extinguishers on a MODU, the size II extinguisher may only be used \_\_\_\_\_.

**outside**

Semi-portable extinguishers used on inspected vessels are sizes \_\_\_\_\_.

**III, IV, and V**

Beyond the area of state ownership in the U.S. outer continental shelf, the right to drill is controlled by the \_\_\_\_\_.

**Minerals Management Service**

A welding procedure used for joining dissimilar metals used on a MODU would be recorded in the \_\_\_\_\_.

**construction portfolio**

See REF1877

The person or company, either proprietor or lessee, actually operating an oil well or lease is the \_\_\_\_\_.

**operator**

A continual worsening of the list or trim of any floating MODU indicates \_\_\_\_\_.

**progressive flooding**

In the analysis of damaged stability for the DEEP DRILLER, disregarded are the beneficial effects of moorings and \_\_\_\_\_.

**countermeasures**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #4 (Drilling), suffers damage to the port center column below the waterline. Among the tanks from which you should pump is tank \_\_\_\_\_.

**9P**

The most important consideration in the event the Deep Driller suffers damage is \_\_\_\_\_.

**preserve reserve buoyancy**

The COASTAL DRILLER is in transit at the load line draft. It discharges 279.93 kips of weight. The new draft is \_\_\_\_\_.

**10 feet 8 inches**

The COASTAL DRILLER, with no trim, is at a true mean draft of 10 feet and 10 inches. TM is -6,800 ft-kips. Using only tanks 1, 25, and 26, how many kips of drill water must be transferred to level the jack-up?

**Transfer 100 kips from 25 to 26**

On the COASTAL DRILLER, placing the rotary 34 feet aft of the transom and two feet to starboard of the centerline, limits the maximum hook load to \_\_\_\_\_.

**875 kips**

The COASTAL DRILLER, in transit with winds less than 70 knots, has a draft of 10 feet 8 inches. The VM are 541,257 ft-kips, FSML are 32,000 ft-kips, and FSMT are 24,000 ft-kips. The margin on the maximum allowable KG is \_\_\_\_\_.

**23.7 feet**

The height of the metacenter above the keel will vary depending on the \_\_\_\_\_.

**draft and beam of the drilling unit**

For a semisubmersible moored in heavy weather conditions, the leeward lines should be paid out, and the windward lines adjusted so that \_\_\_\_\_.

**several weather lines carry about the same tension**

After jacking down your liftboat you have an unexpected list. You find that the only cause of this list must be a flooded leg. Raising the flooded leg further would adversely affect the boats stability by \_\_\_\_\_.

**raising the KG and increasing the draft which may put you in an unsafe operating condition**

While drilling loaded as shown in Sample Load Form #4 (Drilling), the DEEP DRILLER suffers a sudden unexpected inclination to starboard and forward. Strong winds and high waves are from the port quarter. Among the possible causes, you should consider \_\_\_\_\_.

**failure of mooring lines 7 or 8**

The DEEP DRILLER is loaded as shown in the sample Load Form #3 (Preparing to Drill). If the liquid mud in mud pit #4 (see table 8) is dumped, what would be the new uncorrected height of the center of gravity?

**51.87 feet**

The DEEP DRILLER, at 60.0 feet draft in sea water, has VM = 974,441 foot-long tons, LM = 40,301 foot-long tons, TM = 3 foot-long tons, FSML = 30,572 foot-long tons, and FSMT = 18,732 foot-long tons. What is the longitudinal free surface correction to KG?

**1.69 feet**

While loaded as shown in the DEEP DRILLER Sample Load Form #4 (Drilling), all of the liquid mud is dumped. What is the new height of the longitudinal metacenter?

**61.20 feet**

The DEEP DRILLER, at a draft of 60 feet, has a KGT of 57.11 feet and TCG of 0.5 foot to port. What is the list angle?

**5° port**

The DEEP DRILLER is loaded as shown in the Sample Load Form #2 (Ballasting to Survival). What is the new height of the transverse metacenter if all the bulk materials are discharged?

**64.30 feet**

The DEEP DRILLER, loaded as shown in the Sample Load Form #4 (Drilling), discharges a non-liquid load of 275.8 long tons from a position 130 feet above the keel, 40 feet forward of amidships, and 30 feet to port of the centerline. What is the new TCG?

**0.46 foot**

What is the longitudinal shift in the center of gravity if 200 short tons is moved ten feet to port and 30 feet forward on a MODU with a displacement of 8,960 long tons?

**0.67 foot**

What is the value of KML for the DEEP DRILLER at a draft of 60 feet?

**61.13 feet**

The DEEP DRILLER suffers minor flooding of the port pump room while in transit. If both port bilge pumps fail to dewater the pump room, you may \_\_\_\_\_.

**use port drill water pump**

Bulkheads which form part of the tanks on a MODU are stiffened to withstand \_\_\_\_\_.

**hydrostatic pressure**

The heavier outboard strake of deck plating on a MODU is called the deck \_\_\_\_\_.

**stringer**

The DEEP DRILLER at a draft of 58.0 feet loads 68.94 long tons of ballast. What is the new draft?

**58.5 feet**

The DEEP DRILLER is loaded as shown in the Sample Load Form #2 (Ballasting to Survival). What is the new draft if all the bulk materials are discharged?

**44.27 feet**

Movement of liquid in a tank when a drilling barge inclines causes an increase in \_\_\_\_\_.

**natural rolling period**

The draft at the forward draft mark of a jack-up is 11 feet 3 inches while the draft at the aft draft mark is 12 feet 9 inches. The value of trim is \_\_\_\_\_.

**1 foot 6 inches to the stern**

What is the change in longitudinal moments for the Coastal Driller if 2.0 feet of drill water is transferred from a full drill water tank 23 to an empty drill water tank 1?

**15,565 foot-kips decrease**

A quick and rapid motion of a MODU in a seaway is an indication of a(n) \_\_\_\_\_.

**large GM**

Adding the FSCL to KG yields \_\_\_\_\_.

**KGL**

The International Regulations for Preventing Collisions at Sea contain the requirements for \_\_\_\_\_.

**lighting of mobile offshore drilling units being towed**

What signal must be sounded by a vessel towing a mobile offshore drilling unit through an area of restricted visibility?

**One prolonged and two short blasts**

Which grade of anchor chain is generally used on floating drilling vessels?

**Oil Rig Quality (stud link)**

A helicopter making a round trip from a helo deck with refueling capabilities to an unmanned platform will take 45 minutes each way. The helicopter should be carrying enough fuel to last \_\_\_\_\_.

**2 hours**

The safest device used to secure the end of the pendant wire when it is initially passed to the anchor handling vessel is a \_\_\_\_\_.

**hydraulic deck stopper**

Two types of anchor shackles which are currently available are \_\_\_\_\_.

**D-Type and bow shackles**

Where do fatigue failures of wire rope mooring lines usually occur?

**Near the socketed end fitting adjacent to the anchor**

What is the international calling and distress channel found on all VHF-FM equipped drilling rigs?

**Channel 16**

The term "lost circulation" refers to situations when drilling fluid is lost by \_\_\_\_\_.

**flowing into drilled formations**

What fitting should you install in the rig piping to a pump to facilitate disconnecting the pump for servicing?

**Union**

A series of trays with sieves that vibrate to remove cuttings from the circulating fluid in rotary drilling operations is called the \_\_\_\_\_.

**shale shaker**

At the instant when a string of casing being run from a MODU is landed in the well head, \_\_\_\_\_.

**the hook load (weight of the casing string) is removed from the MODU**

The joint of the riser in a marine riser system that compensates for heave, the up-and-down motion of a floater, is the \_\_\_\_\_.

**slip joint**

What action should you take if a davit-launched liferaft aboard a MODU cannot be launched because of damage to the davit?

**roll the liferaft over the side**

Individuals who have consumed alcohol within 24 hours prior to exposure to H<sub>2</sub>S can tolerate which of the following?

**smaller than normal concentrations of H<sub>2</sub>S**

See REF1811

While in transit during heavy weather, the crew aboard a semisubmersible should be alert to repeated pounding of waves on the lower bracing. If necessary, the unit should be \_\_\_\_\_.

**ballasted to survival draft**

The instructions for launching lifeboats and liferafts on a MODU must be approved by the \_\_\_\_\_.

**Coast Guard**

See REF1813

Clean air standards referred to as "Grade D" apply to compressed air for use in \_\_\_\_\_.

**filling open-circuit breathing systems**

The preferred agent used in fighting a helicopter crash fire on a MODU is \_\_\_\_\_.

**foam**

After being launched from MODUs, totally enclosed survival craft which have been afloat over a long period require \_\_\_\_\_.

**regular checks of bilge levels**

A life preserver or buoyant work vest is required to be worn on a MODU when a person is \_\_\_\_\_.

**working over water**

Your semisubmersible drilling unit is moored on station and is experiencing winds from the north. What will be the effect if you increase the length of the anchor chains you have deployed to the north?

**It will increase the holding power of those chains.**

The motion that can significantly increase mooring line tension is \_\_\_\_\_.

**sway**

In observing rig motion while under tow, the period of roll is the time difference between \_\_\_\_\_.

**full inclination on one side to the next full inclination on the same side**

While in ocean transit, the COASTAL DRILLER has a roll period of four seconds. What would be the largest angle each side of vertical that does not exceed the design limit of the legs?

**2.0 degrees**

The full period of motion of the DEEP DRILLER while tripping is 7 seconds and the maximum pitch angle as seen on the inclinometers is 4°. From the standpoint of critical motion, the motion is \_\_\_\_\_.

**unsatisfactory, deballast to survival draft**

The requirement to carry an Oil Record Book does not apply to a MODU that \_\_\_\_\_.

**is not equipped to discharge overboard any oil or oily mixture**

See REF530

If you observe any situation which presents a safety or pollution hazard during fuel transfer operations on a MODU, what action should you take FIRST?

**Shut down the transfer operation.**

The person on a MODU who is responsible for maintaining the engineering spaces in a clean and sanitary condition is the \_\_\_\_\_.

**Chief Engineer, or engineer in charge if no chief engineer is required**

See REF1831

Each EPIRB shall be tested using the integrated test circuit and output indicator every \_\_\_\_\_.

**month**

See REF112

On offshore drilling units, the EPIRB on board is required to be tested \_\_\_\_\_.

**monthly**

When must the Master or person in charge of a MODU log the position of load line marks in relation to the surface of the water in the logbook?

**Prior to getting underway**

Lifeboat winches on mobile offshore drilling units are required to be inspected and an entry made in the logbook. How often should this entry be made?

**Every 3 months**

When a fire drill is conducted on a mobile offshore drilling unit, the designated person in charge must ensure that \_\_\_\_\_.

**all personnel report to their stations**

Visual inspections of survival craft on offshore drilling units, to ensure operational readiness, must be conducted at least once a \_\_\_\_\_.

**week**

The helicopter deck on an offshore drilling unit is required to be fitted with perimeter lights in alternating colors of

\_\_\_\_\_.  
**yellow and blue**

See REF1813

On a MODU, how many ring buoys are required to have a buoyant line attached?

**One ring life buoy on each side of the MODU**

See REF1857

An extinguisher with 15 lbs. of CO<sub>2</sub> or 10 lbs. of dry chemical is a size \_\_\_\_\_.

**II**

On offshore drilling units when two means of escape are provided from a space above the main deck, one means of escape must be required for rapid escape to \_\_\_\_\_.

**a weather deck**

On surface type offshore drilling units, each survival craft must be capable of being launched to the water at the minimum operating draft, under unfavorable conditions of trim and with the unit listed not less than \_\_\_\_\_.

**20°**

On offshore drilling units where foam systems are installed on the heliport, the system must be able to discharge continuously for at least \_\_\_\_\_.

**5 minutes**

Fire extinguishers of sizes III, IV, and V are designated as \_\_\_\_\_.

**semi-portable**

The maximum draft to which a MODU can legally be submerged is indicated by the \_\_\_\_\_.

**Load Line mark**

The stamped full weight of a 100 lb. CO<sub>2</sub> bottle is 314 lbs. What is the minimum weight of the bottle before it has to be recharged?

**304 lbs.**

See REF1878

The wooden plug inserted in the vent of a damaged tank of a MODU should be removed in case it is decided to

\_\_\_\_\_.  
**pump from the damaged tank**

See REF163

The best information on the nature and extent of damage on a MODU is obtained from \_\_\_\_\_.

**personnel at the scene of the damage**

The DEEP DRILLER, loaded as shown in Sample Load Form #5 (Survival), suffers major damage which results in flooding in tank C3S. Your best countermeasure is to \_\_\_\_\_.

**pump from 8S**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #4 (Drilling), suffers severe damage to the port aft column below the waterline. You should pump from tank \_\_\_\_\_.

**10P**

In the event of damage to the DEEP DRILLER which results in flooding to one of the lower-hull tanks, pump from

\_\_\_\_\_.  
**nearby undamaged tanks containing ballast**

The COASTAL DRILLER is in transit at a draft of 10.0 feet. It loads 216.43 kips of weight aboard. What is the new draft?  
**10 feet 2 inches**

The COASTAL DRILLER, with no list, is at a true mean draft of 10 feet and 10 inches. LM is 1,699,463 ft-kips. Using only tanks 1, 25, and 26, how many kips of drill water must be transferred to level the jack-up?  
**Transfer 53.1 kips each from 25 and 26 forward to 1**

What is the maximum permitted hook load for the COASTAL DRILLER when 450 kips are in the setback and no other loads are on the cantilever?  
**529 kips**

While the COASTAL DRILLER is in transit at a draft of 10 feet 6 inches, a severe storm is predicted within 12 hours. VM are 541,257 ft-kips, FSML are 32,000 ft-kips and FSMT are 24,000 ft-kips. How much should the KGL be lowered to satisfy the maximum allowable KG criteria?  
**1.96 feet**

If the metacentric height is large, a floating MODU will \_\_\_\_\_.  
**be stiff**

During a storm, the mooring line on a MODU should be long enough so that the angle between the anchor shank and the ocean floor is \_\_\_\_\_.  
**0°**

While drilling loaded as shown in Sample Load Form Number 4 (Drilling), the DEEP DRILLER suffers an unexpected but slowly increasing starboard and forward inclination. The wind and waves are light. This inclination could have been caused by \_\_\_\_\_.  
**ballast tanks equalizing into tank 1S**

When extracting the legs from the soil, the hull of the COASTAL DRILLER may be pulled down until the draft is \_\_\_\_\_.  
**one foot deeper than calculated afloat draft**

The DEEP DRILLER is loaded as shown in the Sample Load Form #3 (Preparing to Drill). If the liquid mud in mud pit #4 (see table 8) is dumped, what would be the new height of the center of gravity corrected for longitudinal free surface effects?  
**53.55 feet**

While underway in a field move with the lower hulls awash, a semisubmersible has an allowable KG of 63.69 feet; KMT is 65.12 and KML is 64.92. The KGT is 56.13 and KGL is 55.89. What is the GML?  
**9.03 feet**

While loaded as shown in the DEEP DRILLER Sample Load Form #4 (Drilling), all of the liquid mud is dumped. What is the new uncorrected KG?  
**52.20 feet**

The DEEP DRILLER, at a draft of 55 feet, has a KGT of 53.05 feet and TCG of 0.5 foot to starboard. What is the list angle?  
**2.9° Starboard**

The DEEP DRILLER is loaded as shown in the Sample Load Form #2 (Ballasting to Survival). What is the new height of the longitudinal metacenter if all the bulk materials are discharged?  
**62.35 feet**

The DEEP DRILLER, loaded as shown in the Sample Load Form #4 (Drilling), discharges a non-liquid load of 275.8 long tons from a position 130 feet above the keel, 40 feet forward of amidships, and 30 feet to port of the centerline. What is the new KGT?

**53.65 feet**

A semisubmersible displacing 17,600 long tons has an LCG 3.2 feet forward of amidships. Bulk, weighing 400 long tons, is loaded into P-tanks located 50.8 feet aft of amidships. What is the new LCG?

**2.00 feet forward of amidships**

The COASTAL DRILLER is loaded as shown in the Sample Load Form Number 1 (Rig Move). What is the new trim angle if 500 kips of weight are shifted aft 60 feet?

**0.61 degrees by the stern**

How many independent bilge systems is the COASTAL DRILLER equipped with?

**2**

In MODU construction, a greater number of watertight bulkheads results in \_\_\_\_\_.

**increased capacity to set flooding boundaries**

On a MODU, the deck stringer is the outboard most deck \_\_\_\_\_.

**plating**

The DEEP DRILLER at a draft of 58.0 feet discharges 1,792.44 long tons of ballast. What is the new draft?

**45 feet**

How much non-liquid deck load can the DEEP DRILLER, loaded as shown in the sample Load Form #4 (Drilling), accept if the weight is placed at a VCG of 130 feet? Ballast added or discharged to maintain draft at 60 feet is done so at 10 feet.

**457.5 long tons**

A MODU with the TCG off the longitudinal centerline inclines to an angle of \_\_\_\_\_.

**list**

A jack-up has 8 inches of trim by the stern. Calculations show that the moment required to change trim one inch is 500 foot-kips. To level the unit, how far must a weight of 50 kips be transferred toward the bow?

**80.0 feet**

What is the change in longitudinal moments for the Coastal Driller if 2.0 feet of drill water is transferred from a full drill water tank 23 to an empty drill water tank 6?

**7,990 foot-kips decrease**

One way to increase the period of roll on a semisubmersible rig while under tow is to \_\_\_\_\_.

**increase tank free surface**

The jettisoning of topside weight from a MODU serves what purpose?

**It lowers the center of gravity.**

Where will you find the requirements for the lights that must be displayed on a mobile offshore drilling unit that is being towed?

**COLREGS**

Under what condition are you allowed to depart from the rules of the road?

**To avoid immediate danger**

Extended cyclical variations in tensions will cause an anchor chain to break due to \_\_\_\_\_.

**fatigue**



The hoist line primarily used for lifting personnel on MODU cranes is called the \_\_\_\_\_.  
**whip line**

A device commonly used to secure the pendant wire when it is initially passed to an anchor handling vessel is \_\_\_\_\_.  
**pelican hook**

The major cause of anchor buoy pendant wire failures is \_\_\_\_\_.  
**rough weather**

In a wire rope mooring system, the fairlead sheave should be a minimum of \_\_\_\_\_.  
**18-36 times the diameter of the wire rope**

The generators on your rig have shut down, leaving you without navigation lights. Which emergency signal would you transmit over the VHF radio to alert vessels in the area of your predicament?  
**Security, Security, Security**

Why must the drilled hole be filled with drilling mud when tripping the drill string out of the hole?  
**To prevent reduction of fluid head on the formations**

What does the term "head" mean when applied to a pump?  
**Difference between the discharge and suction pressures**

The series of valves used to control the return flow in well control operations is called the \_\_\_\_\_.  
**choke manifold**

When drilling from a MODU the weight in air of tubular goods on the racks is reduced when run into the drilled hole because of the effect of \_\_\_\_\_.  
**buoyancy of the mud**

For the DEEP DRILLER, the maximum permissible offset which can be tolerated while drilling is \_\_\_\_\_.  
**6% of water depth**

When should the emergency position-indicating radio beacon be activated after abandoning a MODU?  
**Immediately**

What is the minimum concentration of H<sub>2</sub>S that will cause death with short-term exposure?  
**700 ppm**  
See REF1807

A survival craft being used to pick up a person who has fallen overboard from a MODU should approach the person \_\_\_\_\_.  
**against the wind**

Any firefighting equipment that is carried in addition to the minimum required number on a MODU must \_\_\_\_\_.  
**meet the applicable standards**  
See REF1814

The required fireman's outfits required for MODU's are not to be used for any other purpose EXCEPT for the \_\_\_\_\_.  
**self-contained breathing apparatus, when used as protection from gas leaking from a refrigeration unit**

What is the most vulnerable part of the fire main system on board an offshore rig?  
**The fire hose**

When a davit-launched raft is lowered from a MODU, upon becoming waterborne, the raft is released by \_\_\_\_\_.  
**the effects of buoyancy removing the weight of the raft from the hook**

A weight of 1,000 kips is equivalent to \_\_\_\_\_.

**500 short tons**

See REF468

After deploying the anchor, a permanent chain chaser is \_\_\_\_\_.

**stripped back to the rig and secured**

The initial tension set in the mooring system of a MODU establishes the \_\_\_\_\_.

**distance the unit can be offset from the wellbore before the restoring forces oppose the environmental forces**

When cargo aboard a jack-up in transit becomes adrift, the tow vessel should be asked to \_\_\_\_\_.

**turn into the seas**

The motions of the COASTAL DRILLER during a normal transit when wind speeds are less than 70 knots are limited by \_\_\_\_\_.

**leg strength**

The full period of motion of the DEEP DRILLER while tripping is 10 seconds and the maximum pitch angle as seen on the inclinometer is 4 degrees. From the standpoint of critical motion, the motion is \_\_\_\_\_.

**satisfactory, continue tripping**

A person on a fixed or floating platform engaged in oil exploration located 10 nautical miles from nearest land MAY discharge which of the following?

**food waste**

**food, ground to less than 1"**

**paper, ground to less than 1"**

**None of the above**

See REF1829

A small fuel spillage has occurred during helicopter refueling. After the leak has been stopped and fire-control personnel have been notified and are standing by, the next step is to \_\_\_\_\_.

**wash spilled fuel away with a flood of water**

How often must the emergency generator be tested on a mobile offshore drilling unit?

**Once each month**

See REF1832

On offshore drilling units, the Muster List ("Station Bill") must be posted in conspicuous locations and signed by the \_\_\_\_\_.

**Master or person in charge**

See REF198

On offshore drilling units, emergency lighting and each emergency power system must be tested at least once a \_\_\_\_\_.

**week**

The Master or person in charge of a MODU is required to submit a casualty report of an intentional grounding under what condition?

**If it creates a hazard to navigation**

On offshore drilling units, notification shall be given to the Coast Guard of a casualty if a person is injured and unable to perform routine duties for \_\_\_\_\_.

**any amount of time**

It is the responsibility of the person in charge to \_\_\_\_\_.

**be fully aware of the provisions in the operating manual**

On offshore drilling units, each inflatable liferaft must be serviced every \_\_\_\_\_.

**12 months**

Any firefighting equipment that is carried in addition to the minimum required must \_\_\_\_\_.

**meet the applicable standards**

See REF1814

Of the required ring life buoys for a MODU, how many must be equipped with a water light?

**4**

See REF1858

Size I and II fire extinguishers are designated as \_\_\_\_\_.

**portable**

On offshore drilling units, the minimum number of inclined ladders which must be fitted between each weather deck is \_\_\_\_\_.

**1**

Each liferaft, which does not have an indicated maximum stowage height indicated on the liferaft, must be \_\_\_\_\_.

**stowed not more than 59 feet above the lightest waterline**

Where foam extinguishing systems are provided on a MODU, each machinery flat in the protected space must have a(n) \_\_\_\_\_.

**coaming**

The size of fire hydrant hose connections on a cargo vessel must be either 1-1/2 inches or \_\_\_\_\_.

**2-1/2 inches**

The document that certifies the correctness of the load line marks on a MODU is called the \_\_\_\_\_.

**Load line certificate**

See REF487

The construction portfolio may be included as part of the MODU \_\_\_\_\_.

**operating manual**

Progressive flooding on a MODU is controlled by securing watertight boundaries and \_\_\_\_\_.

**pumping out flooded compartments**

The downflooding angle for a MODU is the minimum angle at which \_\_\_\_\_.

**a non-watertight opening is at still water level**

The DEEP DRILLER, loaded as shown in Sample Load Form #5 (Survival), suffers major damage which results in flooding in tank C1P. Your best countermeasure is to pump from \_\_\_\_\_.

**3P**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #4 (Drilling), suffers severe damage to the starboard aft column below the waterline. You should pump from tank \_\_\_\_\_.

**9S**

If the DEEP DRILLER is damaged, the unit is designed to avoid downflooding in wind speeds up to \_\_\_\_\_.  
**50 knots**

The COASTAL DRILLER has a change of trim by the head of 2.0 feet. What is the change of draft at the forward draft marks?  
**1.33 feet**

A semisubmersible, 200 feet in length between draft marks with the LCF 10 feet aft of amidships, records the following drafts: Port Forward 74'-09"; Port Aft 78'-09"; Starboard Forward 69'-09"; and Starboard Aft 73'-09". What is the list?  
**-5.0 feet**

Considering the lightweight changes to the COASTAL DRILLER, what is the maximum permitted hook load permitted when 450 kips are in the setback and 200 kips are in the cantilever pipe rack?  
**529 kips**

While the COASTAL DRILLER is in transit at a draft of 10 feet 6 inches, a severe storm is predicted within 12 hours. VM are 520,462 ft-kips, FSML are 26,000 ft-kips, and FSMT are 25,000 ft-kips. How much should the KG corrected for free surface effects be lowered to satisfy the maximum allowable KG criteria?  
**0.00 feet**

If the metacentric height is small, a floating MODU will \_\_\_\_\_.  
**be tender**

When the air temperature is just below 32°F, snow FIRST adheres to \_\_\_\_\_.  
**horizontal surfaces**

After jacking down your liftboat you have an unexpected list. You find that the only cause of this list must be a flooded leg. The list caused by a flooded leg means your vessel has a(n) \_\_\_\_\_.  
**decrease in the GZ (righting arm)**

On the COASTAL DRILLER, a noticeable increase in the level indicator while extracting the legs from the soil indicates \_\_\_\_\_.  
**one or two legs are stuck**

The DEEP DRILLER is loaded as shown in Sample Load Form #3 (Preparing to Drill). If the liquid mud in mud pit #4 (see table 8) is dumped, what would be the new height of the center of gravity corrected for transverse free surface effects?  
**52.88 feet**

The DEEP DRILLER, at 60.0 feet draft in sea water, has VM = 974,441 foot-long tons, LM = 40,301 foot-long tons, TM = 3 foot-long tons, FSML = 30,572 foot-long tons, and FSMT 18,732 foot-long tons. What is the KG corrected for transverse free surface effects?  
**54.82 feet**

What is the change in the vertical moments for the DEEP DRILLER if 2.0 feet of ballast is transferred from a full ballast tank 3P to an empty ballast tank 10P?  
**556 ft-tons decrease**

The DEEP DRILLER, at a draft of 50 feet, has a KGT of 52.12 feet and TCG of 0.5 foot to port of the longitudinal centerline. What is the list in feet?  
**5.4 feet to port**

The DEEP DRILLER is loaded as shown in the Sample Load Form #2 (Ballast to Survival). What is the new longitudinal location of the center of buoyancy if all the bulk materials are discharged?  
**2.53 feet**

The DEEP DRILLER, at 60.0 feet draft in sea water, has VM = 974,441 foot-long tons, LM = 40,301 foot-long tons, TM = 3 foot-long tons, FSML = 30,572 foot-long tons, and FSMT = 18,732 foot-long tons. What is TCG?

**0.00 feet**

What is the transverse shift in the center of gravity if 200 short tons are placed 10 feet to port of the centerline on a MODU with TCG 0.7 foot starboard of the centerline, and the displacement is 9,000 short tons?

**0.23 foot**

On the DEEP DRILLER, to pump bilge water out of the starboard pump room using both bilge pumps, it is necessary to open valves \_\_\_\_\_.

**39, 40, 41, and 42**

On the COASTAL DRILLER, the level of water in each of two pump bilge pits is monitored by hydrostatic alarm switches connected to a remote panel located in the \_\_\_\_\_.

**OIM's office**

Where is the keel generally located on a MODU?

**Along the centerline of the lower hulls**

In order to withstand fluid head pressure on a MODU, stiffeners are often attached to the bulkhead \_\_\_\_\_.

**plating**

The DEEP DRILLER at survival draft loads 2,068.1 long tons of ballast. What is the new draft?

**60.0 feet**

The DEEP DRILLER is loaded as shown in the Sample Load Form #3 (Preparing to Drill). If all the liquid mud (see table 8) is dumped, what would be the new draft?

**56 feet 10.9 inches**

In the DEEP DRILLER, LCG is obtained from the sum of the longitudinal moments by \_\_\_\_\_.

**dividing by displacement**

A jack-up 180 feet in length with the LCF at 120 feet AFO has a draft of 8 feet at the bow and 11 feet at the stern. What is the trim by the stern?

**3.0 feet**

What is the change in the vertical moments (excluding free surface effects) for the COASTAL DRILLER if 2.0 feet of drill water is transferred from a full drill water tank 23 to an empty drill water tank 6?

**-253 foot-kips**

For a floating MODU, the center of flotation is the point in the waterplane \_\_\_\_\_.

**about which the MODU lists and trims**

Subtracting FSCT from KGT yields \_\_\_\_\_.

**KG**

For the purposes of the International Rules of the Road, a non-self-propelled mobile offshore drilling unit under tow is considered to be a \_\_\_\_\_.

**vessel**

Prior to magnetic particle inspection of anchor chain, the chain should be \_\_\_\_\_.

**sandblasted**

The angle to which a floating MODU, with a negative initial metacentric height, lies while at rest in still water is the angle of \_\_\_\_\_.

***loll***

See REF764

The number of kips necessary to change the true mean draft of a MODU one inch is known as \_\_\_\_\_.

***KPI***

For a MODU with transverse inclination, an increase in GMT causes \_\_\_\_\_.

***list to decrease***

Drilling loads on the COASTAL DRILLER are the combined loads arising from conductor tension, rotary, hook, and \_\_\_\_\_.

***setback loads***

While the COASTAL DRILLER is in transit at a draft of 10 feet 6 inches, a severe storm is predicted within 12 hours. GMT is 98.89 feet. How much should the KG corrected for free surface effects be lowered to satisfy the maximum allowable KG criteria?

***0.00 feet***

The free surface effects of a partially full liquid tank decrease with increased \_\_\_\_\_.

***displacement volume of the MODU***

The DEEP DRILLER is loaded as shown in the Sample Load Form #1 (Transit). Severe motion makes it necessary to ballast down to survival draft. It is decided to check stability at the intermediate draft of 32 feet. If the added ballast has an average VCG of 9.03 feet, and the sum of free surface moments is 56,244 foot-tons, what is the new GML?

***4.06 feet***

While drilling loaded as shown in Sample Load Form Number 4 (Drilling), the DEEP DRILLER suffers an unexpected but slowly increasing port and forward inclination. The wind and waves are light. This inclination could have been caused by \_\_\_\_\_.

***ballast tanks equalizing into tank 1P***

Among the possible causes of unexpected rapid increasing inclination of the floating COASTAL DRILLER is \_\_\_\_\_.

***flooding due to hull damage***

The DEEP DRILLER is loaded as shown in the Sample Load Form #3 (Preparing to Drill). If all the liquid mud (see table 8) is dumped, what would be the new height of the transverse metacenter?

***62.94 feet***

The DEEP DRILLER, at a draft of 19 feet, has a KGL of 59.91 feet and an LCG of 1.57 feet. What is the trim angle?

***0.3° by the stern***

Because of the presence of 75 knot winds, the DEEP DRILLER is at survival draft. KGT is 3.24 feet less than the maximum allowed. What is the value of GMT?

***5.32 feet***

The DEEP DRILLER suffers minor flooding of the starboard pump room. If both starboard bilge pumps fail to dewater the pump room, you should use the \_\_\_\_\_.

***starboard drill water pump***

The DEEP DRILLER is loaded as shown in the Sample Load Form #1 (transit). What is the new metacentric height corrected for transverse free surface effects if the entire contents of Salt Water Ballast Tanks 1P and 1S are discharged? (Use KMT = 375.38 feet)

***306.79 feet***

How long shall the Master or person in charge of a MODU maintaining an unofficial logbook retain this logbook on board?  
**Until the next inspection for certification**

See REF1595

A qualified person must be assigned as the second in command of a lifeboat on a MODU if the lifeboat has a capacity of more than \_\_\_\_\_.

**40 persons**

See REF1838

The person-in-charge of a mobile offshore drilling unit must be designated by the \_\_\_\_\_.  
**owner or his agent**

The Master or person in charge of a MODU is required to log \_\_\_\_\_.  
**information on emergency training drills**

Records which must be retained on board after report of casualty to a MODU include the \_\_\_\_\_.  
**tour reports**

On a MODU, where MUST the fire control plan be posted?  
**Control Center**

On a mobile offshore drilling unit it is required to \_\_\_\_\_.  
**record the length of each abandonment drill in the rig's log book**

Each life jacket light that has a non-replaceable power source must be replaced \_\_\_\_\_.  
**on or before the expiration date of the power source**

On a MODU, a fire pump may be used for other purposes if \_\_\_\_\_.  
**a separate fire pump is available for use on the fire main**  
See REF1850

On a MODU, hand portable extinguishers are size(s) \_\_\_\_\_.  
**I and II**  
See REF1865

Power operated cranes used on a MODU must not be powered by \_\_\_\_\_.  
**gasoline engines**

Each drilling unit equipped with helicopter fuel storage tanks must have the tanks installed as far as practicable from the \_\_\_\_\_.  
**landing area and sources of vapor ignition**  
See REF1832

On offshore drilling units, the fire main system must have enough fire hydrants so that each accessible space may be sprayed with at least \_\_\_\_\_.  
**two spray patterns**

On offshore drilling units each ring life buoy must be marked, in a contrasting color, with the unit's \_\_\_\_\_.  
**name and port of registry**

When may a work vest be substituted for a required life preserver?  
**At no time**

A record of the types and strengths of steels used on a MODU must be included in the \_\_\_\_\_.

**construction portfolio**

See REF1871

A construction portfolio prepared for each new offshore drilling unit must be approved by the \_\_\_\_\_.

**U.S. Coast Guard**

The stability which exists after the unintentional flooding of a compartment on a MODU is called \_\_\_\_\_.

**damage stability**

The maximum angle at which the intact stability curves are valid for MODU's is the angle for \_\_\_\_\_.

**downflooding**

The DEEP DRILLER, loaded as shown in Sample Load Form #2 (Ballast to Survival), suffers major damage which results in flooding in tank 1S. Your best countermeasure is to \_\_\_\_\_.

**pump from 2S**

The DEEP DRILLER is loaded as shown in Sample Load Form #4 (Drilling). While the unit is deballasting, starboard valve 19 fails in the closed position. You may deballast from tank 9S by pumping from tank 8S by opening valves 20 and \_\_\_\_\_.

**18**

The COASTAL DRILLER is experiencing a single amplitude roll angle of 1 degree and a roll period of 7 seconds. What is the maximum recommended water depth for elevating?

**150 feet**

For a MODU with list, a decrease in GM will cause the angle of inclination to \_\_\_\_\_.

**increase**

Weights added or discharged at the center of flotation on the COASTAL DRILLER while floating will change the \_\_\_\_\_.

**true mean draft**

During an ocean tow when the winds are less than 70 knots, the maximum allowable KG for the COASTAL DRILLER is \_\_\_\_\_.

**65.00 feet**

The COASTAL DRILLER is loaded as shown in the Sample Load Form Number 1 (Rig Move). If the contents of 6 and 7 drill water tanks are discharged, what would be the new height of the transverse metacenter?

**136.38 feet**

What are the maximum vertical moments, including free surface moments, permitted on the DEEP DRILLER at a draft of 60 feet if the winds are less than 70 knots?

**1,059,885 foot-tons**

In anticipation of heavy weather, it is decided to deballast the DEEP DRILLER to survival draft. The marine riser should be disconnected, pulled, and laid down. After doing so, the riser tension will be \_\_\_\_\_.

**zero**

While drilling loaded as shown in Sample Load Form Number 4 (Drilling), the DEEP DRILLER suffers a sudden unexpected starboard and aft inclination. The wind and waves are light. What might have caused the inclination?

**The drilling crew has dumped the mud.**



The DEEP DRILLER, at a draft of 60 feet, has 3,765 ft-tons of transverse moments. How much ballast should be transferred between tanks 1P and 1S to level the unit in list?

**25.1 long tons**

The DEEP DRILLER, at a draft of 19 feet, has a KGL of 59.91 feet and an LCG of 1.57 feet. What is the trim angle?

**0.3° by the stern**

What is the new location of the transverse center of gravity if 200 short tons are discharged from 10 feet to port of the centerline on a MODU with TCG 0.7 foot starboard of the centerline, and the displacement is 9,000 short tons?

**0.94 foot starboard of centerline**

What is the minimum required GML for the DEEP DRILLER in winds less than 70 knots while at a draft of 60 feet?

**2.63 feet**

The DEEP DRILLER is observed to be level at a draft of 60.0 feet. At the same time, the calculated load form shows the displacement to be 17,845 long tons, total longitudinal moments 51,466 foot-tons, and total transverse moments -10,000 foot-tons. What is the longitudinal location of the missing load?

**-40.57 feet**

In the DEEP DRILLER, VCG is obtained from the sum of the vertical moments by \_\_\_\_\_.

**dividing by displacement**

The longitudinal free surface correction of a floating MODU displacing 12,000 kips is 1.20 feet. What would be the new FSCL if 2,400 kips of solid variable loads are added?

**1.00 foot**

What is the change in longitudinal moments for the DEEP DRILLER if 103.48 long-tons of ballast is transferred from a full ballast tank 1P to an empty ballast tank 10S?

**21,913 foot-tons decrease**

Aboard the DEEP DRILLER, the drill water pump may be used to provide drill water to the deck and \_\_\_\_\_.

**supplement the bilge pumps**

Reinforcing frames attached to a bulkhead on a MODU are called \_\_\_\_\_.

**stiffeners**

See REF455

In MODU construction, beam brackets are triangular plates that join the deck beam to a \_\_\_\_\_.

**frame**

Structural stress on a MODU can be reduced by \_\_\_\_\_.

**even and symmetrical variable loading**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #5, discharges 137.88 long tons. The resulting trim by the stern is 3 feet and list to port is 2 feet. What is the draft at the starboard forward draft mark?

**41 feet 6 inches**

With no environmental forces on the DEEP DRILLER, the average of the forward drafts is 61.0 feet, and the average of the aft drafts is 59.0 feet. KGL is 51.13 feet. What is the value of LCG?

**2.35 feet**

A jack-up 210 feet in length is level during transit. The LCF is 140 feet aft of the bow. How much weight should be applied at the bow to level the jack-up if 150 kips are loaded at the transom?

**75 kips**

An elevated jack-up weighs 17,000 kips. Its center of gravity is located 110 feet aft of frame zero (AF0). What would be the new LCG if the cantilever (weight 900 kips) and drill floor (weight 800 kips) were skidded 70 feet aft?

**117.0 feet AF0**

Because there is a possibility of fuel oil being discharged overboard from a full fuel oil tank, it is decided to transfer 25 kips from tank 14 to tank 20. See COASTAL DRILLER Sample Load Form Number 1 (Rig Move). What would be the change in longitudinal moments with this transfer?

**565 ft-kips**

On a semisubmersible drilling unit, decreasing riser tension reduces \_\_\_\_\_.

**KG**

When a mobile offshore drilling unit on the waters of the U.S. Outer Continental Shelf has more than one obstruction light, the lights must be operated to flash \_\_\_\_\_.

**at the same time**

You are on a semisubmersible being towed and are concerned that a fishing vessel is not taking sufficient action to avoid you. To signal your concern, you should \_\_\_\_\_.

**sound five or more short blasts on the whistle**

When anchoring in an area with a soft bottom, the fluke angle of an anchor should be set at \_\_\_\_\_.

**30°**

A measurement device for inspecting anchor chain is the \_\_\_\_\_.

**go-no-go gauge**

When using a crane for transferring personnel in a basket, the load hook must be equipped with a \_\_\_\_\_.

**safety latch**

What is the advantage of a single streamlined fluke anchor over a double fluked anchor of similar weight?

**It has increased holding power.**

Thirty-five percent of the breaking strength of an anchor cable is generally accepted as the \_\_\_\_\_.

**safe operating load**

When lifting loads from a boat in heavy weather, the load should be taken when the boat \_\_\_\_\_.

**reaches the crest**

On a MODU, the possibility of a blowout makes which type of diesel engine shutdown desirable?

**Air inlet shut-off valve**

The element used to keep weight on the bit at a constant value in spite of up-and-down movement of a MODU during floating drilling operations is the heave or drill string \_\_\_\_\_.

**compensator**

The connected joints of pipe, usually made of three joints of pipe approximately 90 feet long, racked in the derrick when making a trip are called a \_\_\_\_\_.

**stand**

What is a pinion in a jacking system?

**Gearwheel**

A well kick while drilling from a MODU will cause \_\_\_\_\_.

**increased fluid level in the mud pits**

Requirements for H<sub>2</sub>S preparation and equipment usage aboard MODU's in U.S. offshore waters are administered by the which of the following organizations?

**Minerals Management Service**

See REF1807

Who is responsible for lowering the survival craft?

**Helmsman**

Which of the following would be the most probable location to encounter explosive and flammable gasses on a MODU?  
**on the drill floor and liquid mud handling areas**

A hurricane has recurved to the northeast and its forward speed is 20 knots. Your MODU is located 600 miles northeast of the hurricane's center. How long will it take for the hurricane center to reach your position if it holds its present course and speed?

**30 hours**

The objective of shoring the damaged area of a MODU is to \_\_\_\_\_.

**support and hold the area in the damaged position**

At the required fire drill, all persons must report to their stations and demonstrate their ability to perform the duties assigned to them \_\_\_\_\_.

**in the Muster List ("Station Bill")**

See REF1820

Automatic mechanical ventilation shutdown is required for CO<sub>2</sub> systems protecting the \_\_\_\_\_.  
**machinery spaces**

Each EPIRB required on a MODU shall be stowed in a manner which will permit \_\_\_\_\_.

**it to float free if the unit sinks**

According to the MODU regulations, the capacity of a liferaft is required to be marked \_\_\_\_\_.

**on a sign next to the liferaft**

Installing tandem anchors on the same mooring line is referred to as \_\_\_\_\_.

**piggybacking**

An effective braking system for windlasses on rigs in deep water is a(n) \_\_\_\_\_.

**electrical regenerative braking system**

Consideration should be given in planning for the mooring orientation in a new location so that in adverse weather a crane is available to off-load the supply vessel on what side of the unit?

**Leeward side**

When a semisubmersible rig under tow veers from side to side on its tow line, the best way of controlling the action is to \_\_\_\_\_.

**trim by the stern**

What is the length of the catenary when the DEEP DRILLER is anchored in 600 feet of water and the anchor line tension is 170 kips?

**1493 feet**

See REF292

When floating, the appropriate leg horizontal must be aligned in the center of the \_\_\_\_\_.

**center of each upper guide structure**

The number of certificated able seamen and lifeboatmen required on a MODU is stated in the \_\_\_\_\_.

**Certificate of Inspection**

How long must the records of tests and inspections of fire fighting equipment on board a MODU be retained on board?

**Until the next inspection for certification**

See REF1595

If not attached to the nozzle, each low-velocity spray applicator on a MODU must be stowed \_\_\_\_\_.

**next to the fire hydrant to which the fire hose is attached**

See REF1839

On offshore drilling units, a fire drill must be conducted at least once a \_\_\_\_\_.

**week**

The Master or person in charge of a MODU shall ensure the crane record book shows the \_\_\_\_\_.

**date and description of each failure**

Regulations require certain records to be retained on board a MODU for how long after the report of a casualty?

**3 months**

On a MODU, where must the fire control plan be posted?

**Pilot house**

How often must CO2 systems be inspected to confirm cylinders are within 10% of the stamped full weight of the charge?

**annually**

When must the Master of a vessel log the position of load line marks in relation to the surface of the water in the Official Logbook?

**Prior to getting underway**

Each fire hose coupling on a MODU must have threads that meet the specifications of the \_\_\_\_\_.

**National Standard Fire hose Coupling**

See REF1851

The light on a life jacket must be replaced \_\_\_\_\_.

**when it is no longer serviceable**

See REF307

The design specifications for cranes and crane foundations on MODU's are set and published by the \_\_\_\_\_.

**American Petroleum Institute**

Each hose in the fuel transfer system for helicopter refueling must meet the standards of the \_\_\_\_\_.

**Federal Aviation Administration**

See REF1870

On offshore drilling units, each fire station is required to be fitted with a hose which has a nominal length of \_\_\_\_\_.

**50 feet**

On Offshore Drilling units, in addition to the life jackets stowed at each berth location, life jackets must be stowed at each work station and \_\_\_\_\_.

**each industrial work site**

Each buoyant work vest must be \_\_\_\_\_.

**U.S. Coast Guard approved**

According to the regulations for mobile offshore drilling units, "industrial personnel" are considered to be all persons carried on the MODU for the sole purpose of carrying out the industrial business of the unit, except for \_\_\_\_\_.  
**the crew required by the Certificate of Inspection**  
See REF1871

Temporary Certificates of Inspection for offshore drilling units are effective until the \_\_\_\_\_.  
**permanent Certificate of Inspection is issued**  
See REF1871

Damage stability of a MODU is the stability \_\_\_\_\_.  
**after flooding**

A semisubmersible with a negative GM flops to an angle of \_\_\_\_\_.  
**loll**

While the DEEP DRILLER is loaded as shown in Sample Form #4 (Drilling), casing is accidentally dropped over the starboard side. Because the sounding level and starboard inclination are rapidly increasing, you decide that tank 1S is damaged. Your best countermeasure is to \_\_\_\_\_.  
**deballast from tank 2S**

The DEEP DRILLER, while loaded as shown in the Sample Load Form #4 (Drilling), suffers damage to the port center column below the waterline. Pumping from tanks 2P and 9P is not sufficient to prevent increasing port list. You should consider counterflooding in tank \_\_\_\_\_.  
**C2BS**

Scouring usually occurs with soils such as \_\_\_\_\_.  
**sand**

The COASTAL DRILLER has a trim of 2.13 feet by the stern. The draft at the forward draft marks is observed to be 8.0 feet. The draft at the center of flotation is \_\_\_\_\_.  
**9.42 feet**

Aboard a MODU, multiplying a load's weight by the distance of the load's center of gravity from the centerline results in the load's \_\_\_\_\_.  
**transverse moment**

While in ocean transit at a draft of 10 feet, the Coastal Driller has a maximum allowed KG of \_\_\_\_\_.  
**65 feet**

The COASTAL DRILLER is loaded as shown in the Sample Load Form Number 1 (Rig Move). If the contents of 6 and 7 drill water tanks are discharged, what is the new height of the center of gravity corrected for longitudinal free surface effects?  
**50.79 feet**

Keeping the draft of a MODU at or below the load line mark will insure that the unit has adequate \_\_\_\_\_.  
**reserve buoyancy**

The KG of the DEEP DRILLER increases from 57 feet to 59 feet while drilling at a 60 foot draft during an ice storm. What action should be taken?  
**Reduce the deck load until you reach the allowable KG for draft**

Among the possible causes of unexpected rapidly increasing inclination of the DEEP DRILLER while on location is \_\_\_\_\_.  
**flooding due to column damage**

The DEEP DRILLER is drilling on location at a 60 foot draft. Waves are approaching within 2 feet of the underside of the spider deck. You should \_\_\_\_\_.

**suspend drilling operations and deballast to a 45 foot draft**

The DEEP DRILLER is loaded as shown in the Sample Load Form #5 (Survival) when an unexpected slowly increasing port list and bow down trim occurs. A leak in C1P is found. By deballasting from ballast tanks 2P and 3P, the inclination slowly decreases. The increase in the transverse free surface correction is \_\_\_\_\_.

**0.18 foot**

The DEEP DRILLER is level at a draft of 60 feet in calm water. What is the value of the righting moment?

**0 foot-tons**

The DEEP DRILLER, loaded as shown in the Sample Load Form #4 (Drilling), discharges a non-liquid load of 275.8 long tons from a position 130 feet above the centerline. What is the improvement in KGT?

**1.16 feet**

A MODU displacing 28,000 long tons has a KG of 60 feet. A weight of 500 long tons is discharged from a VCG 150 feet. The change in KG is \_\_\_\_\_.

**1.64 feet**

What are the maximum vertical moments, including free surface moments permitted on the DEEP DRILLER at a draft of 60 feet if the winds are greater than 70 knots?

**942,120 foot-tons**

The DEEP DRILLER is loaded as shown in the Sample Load Form #2 (Ballasting to Survival). What is the metacentric height corrected for transverse free surface effects if 100.76 long tons of ballast are added to Ballast Tank #8S to replace the discharge of all bulk materials?

**12.13 feet**

A semisubmersible 300 feet long and an LCF of 0 (amidships) is in transit with hulls awash and an MT1" of 87.67 foot-tons. Work on the BOP (weight 263 long tons) requires that it be moved aft 12 feet. What is the resulting trim change?

**3.0 feet**

A semisubmersible, 200 feet in length between draft marks with the LCF 10 feet aft of amidships, records the following drafts: Port Forward 64'-09"; Port Aft 68'-09"; Starboard Forward 59'-09"; and Starboard Aft 63'-09". What is the trim?

**4 feet by the stern**

What is the decrease in longitudinal moments for the Deep Driller if 2.0 feet of ballast is transferred from 1S to 10P?

**14,609 ft-tons**

On the DEEP DRILLER, to use the drill water pump to supplement the bilge pumps, it is necessary to open valves 28 and \_\_\_\_\_.

**26**

In MODU construction, bulkheads in the quarters are generally \_\_\_\_\_.

**non-structural**

Stanchions prevent the entire deck load on a MODU from being carried by the \_\_\_\_\_.

**frames and beam brackets**

The mean draft of a MODU is the draft \_\_\_\_\_.

**midway between the forward and aft draft marks**

The DEEP DRILLER, at a mean draft of 45 feet, has a three-foot trim by the stern and a two-foot list to port. What is the draft at the starboard forward draft mark?

**42.5 feet**

For a MODU with trim, an increase in GMT will cause the inclination to \_\_\_\_\_.

**decrease**

A jack-up 180 feet in length with the LCF at 120 feet AF0 has a true mean draft (draft at LCF) of 10 feet. If the trim is 3 feet by the stern, what is the draft at the stern?

**11.0 feet**

A floating jack-up with displacement of 15,000 kips has its LCG 106 feet aft of frame zero (AF0). If 200 short tons are loaded at 20 feet AF0 and 400 short tons are loaded 149 feet AF0, what is the new LCG?

**106.0 feet**

Because there is a possibility of fuel oil being discharged overboard from a full fuel oil tank, it is decided to transfer 25 kips from tank 14 to tank 13. See COASTAL DRILLER Sample Load Form Number 1 (Rig Move). What would be the change in longitudinal free surface moments?

**674 ft-kips increase**

On a semisubmersible drilling unit, decreasing riser tension increases \_\_\_\_\_.

**GM**

The requirements for obstruction lights on mobile offshore drilling units apply on all waters \_\_\_\_\_.

**over the Outer Continental Shelf and on waters under the jurisdiction of the United States**

Your jack-up is being towed along a shipping channel. You are concerned that a vessel that is overtaking you is coming too close to pass safely. You must \_\_\_\_\_.

**sound five or more short blasts on the whistle**

REF024

Tonnage is a measure of the size or cargo carrying capacity of a ship. The term derives from the taxation paid on tons or casks of wine, and was later used in reference to the weight of a ship's cargo; however, in modern maritime usage, "tonnage" specifically refers to a calculation of the volume or cargo volume of a ship. Tonnage should not be confused with Displacement which refers to the loaded or empty weight of the vessel itself. Gross tonnage (often abbreviated as GT, G.T. or gt) is a unit less index related to a ship's overall internal volume. Gross tonnage is different from gross register tonnage.[1] Neither gross tonnage nor gross register tonnage is a measure of the ship's displacement (mass) and should not be confused with terms such as deadweight tonnage or displacement. Gross tonnage, along with net tonnage, was defined by The International Convention on Tonnage Measurement of Ships, 1969, adopted by the International Maritime Organization in 1969, and came into force on July 18, 1982. These two measurements replaced gross register tonnage (GRT) and net register tonnage (NRT). Gross tonnage is calculated based on "the moulded volume of all enclosed spaces of the ship" and is used to determine things such as a ship's manning regulations, safety rules, registration fees, and port dues, whereas the older gross register tonnage is a measure of the volume of certain enclosed spaces. Net tonnage (often abbreviated as NT, N.T. or nt) is a dimensionless index calculated from the total moulded volume of the ship's cargo spaces by using a mathematical formula. Defined in The International Convention on Tonnage Measurement of Ships that was adopted by the International Maritime Organization in 1969, the net tonnage replaced the earlier net register tonnage (NRT) which denoted the volume of the ship's revenue-earning spaces in "register tons", units of volume equal to 100 cubic feet (2.83 m<sup>3</sup>).[1] Net tonnage is used to calculate the port duties and should not be taken as less than 30 per cent of the ship's gross tonnage.[2] Net tonnage is not a measure of the weight of the ship or its cargo, and should not be confused with terms such as deadweight tonnage or displacement. Also, unlike the net register tonnage, the net tonnage is unit less and thus can not be defined as "tons" or "net tons". Gross register tonnage (GRT, grt, g.r.t.) a ship's total internal volume expressed in "register tons", one of which equals a volume of 100 cubic feet (2.83 m<sup>3</sup>). It is calculated from the total permanently enclosed capacity of the vessel. The ship's net register tonnage is obtained by reducing the volume of non-revenue-earning spaces i.e. spaces not available for carrying cargo, for example engine rooms, fuel tanks and crew quarters, from its gross register tonnage.[1][2] Gross register tonnage is not a measure of the ship's weight or displacement and should not be confused with terms such as deadweight tonnage or displacement. Gross register tonnage was defined by the Moorsom Commission in 1854. Gross and net register tonnages were replaced by gross tonnage and net tonnage, respectively, when the International Maritime Organization (IMO) adopted The International Convention on Tonnage Measurement of Ships on 23 June 1969. The new tonnage regulations entered into force for all new ships on 18 July 1982, but existing vessels were given a migration period of 12 years to ensure that ships were given reasonable economic safeguards, since port and other dues are charged according to ship's tonnage. Since 18 July 1994 the gross and net tonnages, dimensionless indices calculated from the total moulded volume of the ship and its cargo spaces by mathematical formulae, have been the only official measures of the ship's tonnage.[3] However, the gross and net register tonnages are still widely used in describing older ships. Deadweight tonnage (also known as deadweight abbreviated to DWT, D.W.T., d.w.t., or dwt) is a measure of how much weight a ship is carrying or can safely carry.[1][2][3] It is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew.[1] The term is often used to specify a ship's maximum permissible deadweight, the DWT when the ship is fully loaded so that its Plimsoll line is at the point of submersion, although it may also denote the actual DWT of a ship not loaded to capacity. Deadweight tonnage was historically expressed in long tons but is now usually given internationally in tonnes.[4] Deadweight tonnage is not a measure of the ship's displacement and should not be confused with gross tonnage or net tonnage (or their more archaic forms gross register tonnage or net register tonnage). A ship's displacement or displacement tonnage is the weight of the water that a ship displaces when it is floating; the term is defined ordinarily such that the ship's fuel tanks are full and all stores are aboard. The term is applied usually to naval vessels. Displacement is the actual weight of the ship, since a floating body displaces its own weight in water (Archimedes' principle).[1][2] Another way of thinking about displacement is the weight of the water that would spill out of a completely filled container were the ship placed into it. A number of synonymous terms exist for this maximum weight, such as loaded displacement, full load displacement and designated displacement.[3] As a measurement of weight, displacement should not be confused with similarly named measurements of volume or capacity such as net tonnage, gross tonnage, or deadweight tonnage. The density (weight per unit of volume) of water can vary. For example, the average density of seawater at the surface of the ocean is 1025 kg/m<sup>3</sup> (10.25 lb/ga, 8.55 lb/US gallon); fresh water on the other hand has a density of about 1000 kg/m<sup>3</sup> (10.00 lb/ga, 8.35 lb/US gallon).[3] Consider a 100-ton ship passing from a saltwater sea into a freshwater river. It always displaces exactly 100 tons of water, but it has to displace a greater volume of fresh water to amount to 100 tons. Therefore it would sit slightly lower in the water in the freshwater river than it would in the saltwater sea. It can be useful to know a ship's displacement when it is unloaded or loaded partially. Terms for these measurements include light displacement, standard displacement, and normal displacement. These terms are defined below.

REF097



Fires are divided into five different "classes"- A, B, C, D, and LFG. These classes indicate either the type of fuel involved or special dangers. The class also indicates the type of extinguishing agent to use and certain techniques that should or should not be used on that fire. Ordinary combustibles Class A fires consist of ordinary combustibles such as wood, paper, fabric, and most kinds of trash. They may be extinguished by water, wet chemical suppression, or dry powder. Flammable liquid and gas These are fires whose fuel is flammable or combustible liquid or gas. The US system designates all such fires "Class B". These fires follow the same basic fire tetrahedron (heat, fuel, oxygen, chemical reaction) as ordinary combustible fires, except that the fuel in question is a flammable liquid such as gasoline, or gas such as natural gas. A solid stream of water should never be used to extinguish this type because it can cause the fuel to scatter, spreading the flames. The most effective way to extinguish a liquid or gas fueled fire is by inhibiting the chemical chain reaction of the fire, which is done by dry chemical and Halon extinguishing agents, although smothering with CO<sub>2</sub> or, for liquids, foam is also effective. Halon has fallen out of favor in recent times (except for aircraft fire extinguishment systems) because it is an ozone-depleting material; the Montreal Protocol declares that Halon should no longer be used. Chemicals such as FM-200 are now the recommended halogenated suppressant. Electrical Electrical fires are fires involving potentially energized electrical equipment. The US system designates these "Class C". This sort of fire may be caused by short-circuiting machinery or overloaded electrical cables. These fires can be a severe hazard to firefighters using water or other conductive agents, as electricity may be conducted from the fire, through water, to the firefighter's body, and then earth. Electrical shocks have caused many firefighter deaths. Electrical fire may be fought in the same way as an ordinary combustible fire, but water, foam, and other conductive agents are not to be used. While the fire is or possibly could be electrically energized, it can be fought with any extinguishing agent rated for electrical fire. Carbon dioxide CO<sub>2</sub>, NOVEC 1230, FM-200 and dry chemical powder extinguishers such as PKP and even baking soda are especially suited to extinguishing this sort of fire. PKP should be a last resort solution to extinguishing the fire due to its corrosive tendencies. Once electricity is shut off to the equipment involved, it will generally become an ordinary combustible fire. Metal Class D fires involve combustible metals - especially alkali metals like lithium and potassium, alkaline earth metals such as magnesium, and group 4 elements such as titanium and zirconium. Metal fires represent a unique hazard because people are often not aware of the characteristics of these fires and are not properly prepared to fight them. Therefore, even a small metal fire can spread and become a larger fire in the surrounding ordinary combustible materials. Certain metals burn in contact with air or water (for example, sodium), which exacerbates this risk. Masses of combustible metals do not usually represent great fire risks because heat is conducted away from hot spots so efficiently that the heat of combustion cannot be maintained. In consequence, significant heat energy is required to ignite a contiguous mass of combustible metal. Generally, metal fires are a hazard when the metal is in the form of sawdust, machine shavings or other metal "fines", which combust more rapidly than larger blocks. Metal fires can be ignited by the same ignition sources that would start other common fires. Care must be taken when extinguishing metal fires. Water and other common firefighting agents can excite metal fires and make them worse. The National Fire Protection Association recommends that metal fires be fought with dry powder extinguishing agents that work by smothering and heat absorption. Different metals require different agents and for a particular metal agents cannot necessarily be substituted for one another. The most common agents are sodium chloride granules and graphite powder. In recent years, powdered copper has also come into use. These dry powder extinguishers should not be confused with those that contain dry chemical agents. The two are not the same, and only dry powder should be used to extinguish a metal fire. Using a dry chemical extinguisher in error, in place of dry powder, can be ineffective or actually increase the intensity of a metal fire. Cooking oils and fats (kitchen fires) Class K fires involve unsaturated cooking oils in well-insulated cooking appliances located in commercial kitchens. Fires that involve cooking oils or fats are designated "Class K" under the American system. Though such fires are technically a subclass of the flammable liquid/gas class, the special characteristics of these types of fires, namely the higher flash point, are considered important enough to recognize separately. A special class K extinguisher will safely smother the fire by turning the oil into a foam. A water mist can also be used to extinguish such fires. As with Class B fires, a solid stream of water should never be used to extinguish this type because it can cause the fuel to scatter, spreading the flames. Appropriate fire extinguishers may also have hoods over them that help extinguish the fire. Sometimes fire blankets are used to stop a fire in a kitchen or on a stove. Flammable liquids give off flammable vapors at or below a temperature of 80°F. Within this class, there are three grades, based on their Reid Vapor Pressure and flash point. All liquids that burn may be grouped into these five grades. It is apparent that flammable liquids are those that may be ignited at temperatures below 80°F whereas the combustible liquids must be heated to above 80°F before they will flash. Class IA flammable liquids have a flash point below 73 °F (22.8 °C) (the upper end of the common range of room temperature) and a boiling point below 100 °F Class IB flammable liquids have a flash point below 73 °F (22.8 °C) and a boiling point greater than or equal to 100 °F (37.8 °C) Class IC flammable liquids have a flash point greater than or equal to 73 °F (22.8 °C) and below 100 °F (37.8 °C) Class II combustible liquids have a flash point greater than or equal to 100 °F (37.8 °C) and below 140 °F (60 °C) Class IIIA combustible liquids have a flash point greater than or equal to 140 °F (60 °C) and below 200 °F (93.3 °C) Class IIIB combustible liquids have a flash point greater than or equal to 200 °F (93.3 °C) Grade A refers to a flammable liquid with Reid vapor pressure of 14 pounds per square inch absolute (psia) or more. Think of a Grade A cargo as a very volatile liquid that gives off lots of vapor even at relatively low temperatures...so much vapor, in fact, that the vapor can

build up considerable measurable pressure inside a closed test container. Grade B refers to a flammable liquid with a Reid vapor pressure of more than 814 pounds (psia) but less than 14 pounds Grade C refers to a flammable liquid with a Reid vapor pressure of 814 pounds (psia) or less and a flash point of 80°F or below. Gasoline with a Reid vapor pressure of 7.4 pounds (psia) and a flash point of -40°F is an example of a grade C cargo. Since gasoline's primary hazard is its flammability it is a Subchapter D cargo rather than a Subchapter O cargo where properties other than or in addition to flammability are regulated. Grade D refers to a combustible liquid with a flash point above 80°F, but below 150°F. One example is Diesel oil that is either a Grade D or a Grade E liquid depending upon its flash point, which can vary between 110°F and 190°F. Grade E refers to a combustible liquid with a flash point of 150°F or above. "Bunker C," or heavy industrial fuel oil, is an example of a Grade E liquid. Liquefied flammable gas (LFG): Any flammable gas with a Reid Vapor Pressure (RVP) above 40 pounds and that has been changed from a gas to a liquid state. 46 CFR 30.10-39. Liquefied natural gas (LNG): C<sub>1</sub> and C<sub>2</sub> hydrocarbons that can be liquefied either by refrigeration or by pressurization at ambient temperatures. Reid Vapor Pressure is the pressure exerted by the vapor of a liquid as determined by laboratory tests in a Reid Apparatus at a standard temperature of 100°F, expressed in pounds per square inch (absolute) (psia) according to standards established by the American Society for Testing Materials (ASTM). It is now government policy to accept meaningful civilian standards, such as this ASTM standard, wherever possible rather than to develop and enforce separate government standards.

REF112

An EPIRB is an emergency locating radio beacon that transmits a radio signal. You must stow an EPIRB so that it will float free if the vessel sinks. Keep it easily accessible for testing and use.

REF130

46 CFR 108.417(b)

REF1595

46 CFR 109

REF163

Plugging a tank vent with a wooden plug may prevent the tank from filling completely.

REF164

Flooding boundaries are the bulkheads and decks restricting the partially flooded area from the flooding boundary. If partially flooded compartments become completely flooded, the flooding boundaries may not hold. There may be hidden cracks or leaky stuffing tubes or the bulkheads may not be able to withstand the pressure put on them. In other words, just because a flooding boundary seems safe one minute is no sign that it will be safe the next. Therefore, repair party personnel should keep on reinspecting and should make sure the boundaries hold (even so far as to add shoring if bulkhead or overhead strength is in question.)

REF166

An "accumulator" contains hydraulic oil under pressure and is ready to do "work". An accumulator is an "unfired pressure vessel" (i.e., one that does not use an outside source of heat) in which energy is stored at high pressure in the form of a gas or a gas and hydraulic fluid. An example of an accumulator would be a tank that stores hydraulic fluid under pressure that, when released, can be used to start a lifeboat engine. Such an accumulator can be designed to recharge itself as the engine runs (assuming that the engine will run) or can be recharged manually by using a hand pump.

REF1695

—INTERNATIONAL— Lights and Shapes RULE 24 Towing and Pushing (a) A power-driven vessel when towing shall exhibit: (i) instead of the light prescribed in Rule 23(a)(i) or (a)(ii), two masthead lights in a vertical line. When the length of the tow, measuring from the stern of the towing vessel to the after end of the tow exceeds 200 meters, three such lights in a vertical line; (ii) sidelights; (iii) a sternlight; (iv) a towing light in a vertical line above the sternlight; and (v) when the length of the tow exceeds 200 meters, a diamond shape where it can best be seen. —INLAND— Lights and Shapes RULE 24 Towing and Pushing (a) A power-driven vessel when towing astern shall exhibit: (i) instead of the light prescribed either in Rule 23(a)(i) or 23(a)(ii), two masthead lights in a vertical line. When the length of the tow, measuring from the stern of the towing vessel to the after end of the tow exceeds 200 meters, three such lights in a vertical line; (ii) sidelights; (iii) a sternlight; (iv) a towing light in a vertical line above the sternlight; and (v) when the length of the tow exceeds 200 meters, a diamond shape where it can best be seen.

REF180

If you see a man fall overboard shout "man overboard" in a loud voice: quickly pass the word to the bridge. Throw the man overboard a ring life buoy as a data marker. Quick turn: The quick turn is the traditional response to a man overboard emergency on a sailboat. Despite many new approaches, it is still a robust strategy and often the best method. Certainly when the crew is shorthanded, or when the vessel is in heavy weather, the quick turn method has a lot of merit because it avoids a jibe. The quick turn is essentially a figure eight. On a sailboat it consists of the following steps:

Change course to a beam reach and hold for 15 seconds

Head into the wind and tack, leave the jib fluttering

Veer off until the boat is at a broad reach

Turn upwind until the vessel is pointing at the victim; at this point the vessel should be

Slacken the mainsail until the vessel comes to a stop with the victim in the lee side of

Anderson turn: The Anderson turn is a maneuver used to bring a ship or boat back to a point it previously passed through, often for the purpose of recovering a man overboard, an emergency situation in almost all circumstances. The Anderson turn is most appropriate when the point to be reached remains clearly visible. For other situations, a Scharnow turn or a Williamson turn might be more appropriate. Both will require more time before returning to the point in question.

If the turn is in response to a man overboard, stop the engines.

Put the rudder over full. If in response to a man overboard, put the rudder toward the person

When clear of the person, go all ahead full, still using full rudder.

After deviating from the original course by about 240 degrees (about 2/3 of a complete circle)

Stop the engines when the target point is 15 degrees off the bow. Ease the rudder and back

If dealing with a man overboard, always bring the vessel upwind of the person. Stop the vessel in the water with the person well forward of the propellers. Williamson turn: The Williamson turn is a maneuver used to bring a ship or boat under power back to a point it previously passed through, often for the purpose of recovering a man overboard. It was named for John Williamson, USNR, who used it in 1943 to pick up Tim Williamson (USMMA 2002) who had fallen overboard.

However, according to Uncommon Carriers by John McPhee, the maneuver was originally called the Butakov pipe and was used in the Russo-Japanese War as a way of keeping guns at the same distance from an enemy. The Williamson turn is most appropriate at night or in reduced visibility, or if the point can be allowed to go (or already has gone) out of sight, but is still relatively near. For other situations, an Anderson turn (quickest method) or a Scharnow turn might be more appropriate. The choice will in large part depend on prevailing wind and weather conditions. It was also used by U.S. Navy nuclear submarines to clear their sonar dead zones.

Put the rudder over full.

If in response to a man overboard, put the rudder toward the person (e.g., if the person is

After deviating from the original course by about 60 degrees, shift the rudder full to the

When heading about 20 degrees short of the reciprocal, put the rudder amidships so that ve

Bring the vessel upwind of the person, stop the vessel in the water with the person along

If dealing with a man overboard, always bring the vessel upwind of the person. Stop the vessel in the water with the person well forward of the propellers. Scharnow turn: The Scharnow turn is a maneuver used to bring a ship or boat back to a point it previously passed through, often for the purpose of recovering a man overboard. It was developed by and named for Ulrich Scharnow. The Scharnow turn is most appropriate when the point to be reached is significantly further astern than the vessel's turning radius. For other situations, an Anderson turn or a Williamson turn might be more appropriate.

Put the rudder over hard. If in response to a man overboard, put the rudder toward the person

After deviating from the original course by about 240 degrees, shift the rudder hard to the

When heading about 20 degrees short of the reciprocal course, put the rudder amidships so

If dealing with a man overboard, always bring the vessel upwind of the person. Stop the vessel in the water with the person well forward of the propellers.

#### REF1806

A sheave or pulley wheel is a grooved wheel often used for holding a belt, wire rope, or rope and incorporated into a pulley. The sheave spins on an axle or bearing inside the frame of the pulley. This allows the wire or rope to move freely, minimizing friction and wear on the cable. Sheaves can be used to redirect a cable or rope, lift loads, and transmit power. The words sheave and pulley are sometimes used interchangeably.

#### REF1807

Hydrogen sulfide (H<sub>2</sub>S) is a gas that causes dizziness, asphyxiation (i.e., suffocation), and death. H<sub>2</sub>S can paralyze your breathing system. It smells like rotten eggs but very quickly deadens your sense of smell. It is often produced by spilled sewage and is often found in crude petroleum (i.e., "sour" crude). Sewage produces deadly gases, such as hydrogen sulfide and methane. When sewage decomposes it also removes oxygen from the air.

#### REF1808

Threshold Limit Values (TLVs®) refer to airborne concentrations of chemical substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse effects.

REF1809

By composition, dry air contains approximately 78.09% nitrogen, 20.95% oxygen, 0.93% argon, 0.04% carbon dioxide, and small amounts of other gases. Oxygen is approximated to be 21% because its actual value leans closer to 21%.

REF1810

“Acceptable ceiling concentrations. An employee’s exposure to a substance listed in Table Z-2 shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the substance in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under “acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift.”

REF1811

Correct answer. “Among the conditions which may compromise a person’s tolerance to H<sub>2</sub>S are any pulmonary, respiratory, bronchial, or heart problems. Other medical considerations include an eye infection, diabetes, epilepsy, hypertension, and alcoholism (or persons who have consumed alcohol within 24 hours of exposure).”

REF1812

46 CFR 107.235(B)(1)

REF1813

46 CFR 108

REF1814

46 CFR 108.103

REF1815

46 CFR 108.423(d) 46 cfr part 95 fire protection equipment.pdf.10-10(g)

REF1816

46 CFR 108.497

REF1817

46 CFR 108.635

REF1818

46 CFR 108.699

REF1819

46 CFR 108.901, 46 CFR 109 (b) (2)

REF1820

46 CFR 109.213(f)(2)(i)

REF1821

46 CFR 109.337(b)

REF1822

46 CFR 109.435

REF1823

46 CFR Table 107.235

REF1824

SDC 46 CFR 108.181(c)

REF1825  
46 CFR 108.637(a)

REF1826  
§ 109.503 Emergency signals. (1) The signal to man emergency stations is a rapid succession of short soundings of both the general alarm bell and the whistle, if a whistle is installed, for a period of not less than 10 seconds.

REF1827  
33 CFR 151.19(a)

REF1828  
33 CFR 151.19(c)

REF1829  
33 CFR 151.53(b)(2)

REF1830  
46 CFR 108.901(b)(2)

REF1831  
46 CFR 109.203(b)

REF1832  
46 CFR 109.211(a)(2)

REF1833  
46 CFR 109.213(c)(2)

REF1834  
46 CFR 109.213(f)(2)(v)

REF1835  
46 CFR 109.223

REF1836  
46 CFR 109.301(e)

REF1837  
46 CFR 109.323(c)

REF1838  
46 CFR 109.323(c)(2)

REF1839  
46 CFR 109.331(E)

REF1840  
46 CFR 109.339 46 CFR 108.633

REF1841  
46 CFR 109.414(a)

REF1842  
46 CFR 109.415(a)

REF1843  
46 CFR 109.433(b)

REF1844  
46 CFR 109.435(a)

REF1845  
46 CFR 4.05-1(a)

REF1846  
46 CFR 108.170(a)

REF1847  
46 CFR 108.417(a)

REF1848  
46 CFR 108.417(a) 46 cfr part 95 fire protection equipment.pdf.10-5(d)

REF1849  
46 CFR 108.417(b) 46 cfr part 95 fire protection equipment.pdf.10-5(e)

REF1850  
46 CFR 108.417(c)

REF1851  
46 CFR 108.425(b)(1)

REF1852  
46 CFR 108.445(a) 46 cfr part 95 fire protection equipment.pdf.15-30(a)

REF1853  
46 CFR 108.495(a)

REF1854  
46 CFR 108.495(b)

REF1855  
46 CFR 108.499

REF1856  
46 CFR 108.580(a)

REF1857  
46 CFR 108.580(a)(2)(i)

REF1858  
46 CFR 108.580(a)(2)(ii)

REF1859  
46 CFR 108.597(A) 46 CFR 160.031

REF1860  
46 CFR 108.631(b)

REF1861  
46 CFR 108.703(a)

REF1862  
46 CFR 108.703(b)

REF1863

Stringer: A term applied to a fore-and-aft girder running along the side of a ship and also to the outboard strake of plating on any deck. The side pieces of a ladder or staircase into which the treads and risers are fastened. Stringer Plates: A term applied to the outboard plates on any deck, or to the plates attached to the top flanges of a tier of beams at the side of a vessel.

REF198

The Station Bill 46 CFR 199.80 46 CFR 108.901 The Station Bill (now called a Muster List) lists your emergency station and also which lifeboat or life raft you are assigned to. You are required to read the Muster List as soon as you report aboard ship. The signal for "boat stations" (i.e., preparing to launch lifeboats and inflatable life rafts to abandon ship) is more than six short blasts and one long blast on the whistle followed by the same signal on the general alarm bells. When you hear this signal, go to your assigned station. A continuous blast of the whistle for at least 10 seconds and the same signal on the General Alarm bells is the fire and emergency signal. When you hear this signal, go to your fire station. If you are on watch in the engine room, start the fire pump and supply water under pressure to the fire main. During drills, one short blast of the whistle signals the crew to lower the boats. Two short blasts means to stop lowering the boats. Three short blasts is the signal to dismiss the crew from the drill. Additional emergency signals are assigned by the Master. Emergency duties must be comparable to regular duties.

REF215

46 CFR 108.455(a) 46 cfr part 95 fire protection equipment.pdf.15-35(a)

REF243

If you have to abandon ship, jump feet first from the windward side. Remain in the area where the vessel sank.

REF269

46 CFR 108.580(C)(1), 46 CFR 133.80, 46 CFR 199

REF291

A ship at sea moves in six degrees of motion: heave, sway, surge, roll, pitch and yaw. The first three are linear motions. Heaving is the linear motion along the vertical Z-axis, swaying is the motion along the transverse Y-axis, and surging is the motion along the longitudinal X-axis. Rolling is a rotation around a longitudinal axis, pitching is a rotation around the transverse axis and yawing is a rotation around the vertical axis. HEAVE: The alternate rising and falling of a vessel in a seaway. SWAY: A vessel's motion from side to side. SURGE: A vessel's transient motion along her fore and aft axis. ROLL: Motion of the ship from side to side, alternately raising and lowering each side of the deck. The oscillating motion of a vessel from side to side due to ground swell, heavy sea, or other causes. PITCHING: The alternate rising and falling motion of a vessel's bow in a nearly vertical plane as she meets the crests and troughs of the waves. YAWING: To turn from side to side on an uneven course.

REF292

A catenary is the curve or dip in a line caused either by the line's own weight or by weight attached to the line. If a towline is stretched taut between two vessels any shock loading is transmitted directly through to both vessels.

REF307

46 CFR 109.301(f)(4)

REF455

Stiffener: An angle bar, T-bar, channel, etc., used to stiffen plating of a bulkhead, etc.

REF468

In the United States, a kip is a non-SI unit of force that equals 1,000 pounds-force, used primarily by architects and engineers to measure engineering loads. It is equivalent to one half of a U.S. ton. Although uncommon, it is occasionally also considered a unit of mass, equal to 1,000 pounds, i.e. one half of a U.S. ton. One use is as a unit of deadweight to compute shipping charges. 1 kip = 4448.222 newtons = 4.448222 kilonewtons (kN) The name comes from combining the words "kilo" and "pound"; it is occasionally called a kilopound. Its symbol is kip, or less frequently, klb. When it is necessary to clearly distinguish it as a unit of force rather than mass, it is sometimes called the kip-force (symbol kipf or klbf). Note that the symbol kp usually stands for a different unit of force, the kilopond or kilogram-force.

REF487

46 CFR 31.25; 46 CFR Parts 42, 44, and 45. 31.25–1 Load lines required—TB/ OCL. All tank vessels of 150 gross tons or over, or 79 feet in length or greater, navigating the oceans, coastwise waters, and Great Lakes are subject to the regulations in parts 42 to 45, inclusive, subchapter E (Load Lines), of this chapter, as applicable.

REF488

46 CFR 42.07-45(d)(1)

REF491

46 CFR 42

REF519

PETEX V 46 CFR 107.231

REF530

33 CFR 151.25 Oil Record Book. (a) Each oil tanker of 150 gross tons and above, ship of 400 gross tons and above other than an oil tanker, and manned fixed or floating drilling rig or other platform shall maintain an Oil Record Book Part I (Machinery Space Operations). An oil tanker of 150 gross tons and above or a non oil tanker that carries 200 cubic meters or more of oil in bulk, shall also maintain an Oil Record Book Part II (Cargo/Ballast Operations). (b) An Oil Record Book printed by the U.S. Government is available to the masters or operators of all U.S. ships subject to this section, from any Coast Guard Sector Office, Marine Inspection Office, or Captain of the Port Office. (c) The ownership of the Oil Record Book of all U.S. ships remains with the U.S. Government. (d) Entries shall be made in the Oil Record Book on each occasion, on a tank to tank basis if appropriate, whenever any of the following machinery space operations take place on any ship to which this section applies— (1) Ballasting or cleaning of fuel oil tanks; (2) Discharge of ballast containing an oily mixture or cleaning water from fuel oil tanks; (3) Disposal of oil residue; and (4) Discharge overboard or disposal otherwise of bilge water that has accumulated in machinery spaces. (e) Entries shall be made in the Oil Record Book on each occasion, on a tank to tank basis if appropriate, whenever any of the following cargo/ ballast operations take place on any oil tanker to which this section applies— (1) Loading of oil cargo; (2) Internal transfer of oil cargo during voyage; (3) Unloading of oil cargo; (4) Ballasting of cargo tanks and dedicated clean ballast tanks; (5) Cleaning of cargo tanks including crude oil washing; (6) Discharge of ballast except from segregated ballast tanks; (7) Discharge of water from slop tanks; (8) Closing of all applicable valves or similar devices after slop tank discharge operations; (9) Closing of valves necessary for isolation of dedicated clean ballast tanks from cargo and stripping lines after slop tank discharge operations; and (10) Disposal of oil residue. (f) Entries shall be made in the Oil Record Book on each occasion, on a tank-to-tank basis if appropriate, whenever any of the following operations take place on a fixed or floating drilling rig or other platform to which this section applies— (1) Discharge of ballast or cleaning water from fuel oil tanks; and (2) Discharge overboard of platform machinery space bilge water. (g) In the event of an emergency, accidental or other exceptional discharge of oil or oily mixture, a statement shall be made in the Oil Record Book of the circumstances of, and the reasons for, the discharge. (h) Each operation described in paragraphs (d), (e) and (f) of this section shall be fully recorded without delay in the Oil Record Book so that all the entries in the book appropriate to that operation are completed. Each completed operation shall be signed by the person or persons in charge of the operations concerned and each completed page shall be signed by the master or other person having charge of the ship. (i) The Oil Record Book shall be kept in such a place as to be readily available for inspection at all reasonable times and shall be kept on board the ship. (j) The master or other person having charge of a ship required to keep an Oil Record Book shall be responsible for the maintenance of such record. (k) The Oil Record Book for a U.S. ship shall be maintained on board for not less than three years. (l) This section does not apply to a barge or a fixed or floating drilling rig or other platform that is not equipped to discharge overboard any oil or oily mixture. (m) This section does not apply to a fixed or floating drilling rig or other platform that is operating in compliance with a valid National Pollutant Discharge Elimination System (NPDES) permit. (Approved by the Office of Management and Budget under control number 1625–0009) [CGD 75–124a, 48 FR 45709, Oct. 6, 1983; 48 FR 54977, Dec. 8, 1983, as amended by CGD 88– 002A, 55 FR 18582, May 2, 1990; USCG–2000– 7641, 66 FR 55571, Nov. 2, 2001; USCG–2006–25150, 71 FR 39209, July 12, 2006; USCG–2006–25556, 72 FR 36328, July 2, 2007]

REF559

Synchronous rolling is caused by the ship's rolling period becoming synchronous or resonant with the wave period. When this occurs, the ship heels over and, in exceptional circumstances, is rolled further over by the action of the wave. ... It causes a twisting along the ship, leading to extra rolling motions

REF764

Metacenter: The highest point to which G may rise and still permit the vessel to have positive stability. Found at the intersection of the line of action of B when the ship is erect with the line of action of B when the ship is given a small



inclination. Center of Gravity: That point at which all the vertically downward forces of weight are considered to be concentrated; the center of the mass of the vessel.

REF776

Angle of loll is the state of a ship that is unstable when upright (i.e. has a negative metacentric height) and therefore takes on an angle of heel to either port or starboard. When a vessel has negative metacentric height (GM) i.e., is in unstable equilibrium, any external force applied to the vessel will cause it to start heeling. As it heels, the moment of inertia of the vessel's waterplane (a plane intersecting the hull at the water's surface) increases, which increases the vessel's BM (distance from the centre of Buoyancy to the Metacenter). Since there is relatively little change in KB (distance from the Keel to the centre of Buoyancy) of the vessel, the KM (distance from Keel to the Metacentre) of the vessel increases. At some angle of heel (say 10°), KM will increase sufficiently equal to KG (distance from the keel to the centre of gravity), thus making GM of vessel equal to zero. When this occurs, the vessel goes to neutral equilibrium, and the angle of heel at which it happens is called angle of loll. In other words, when an unstable vessel heels over towards a progressively increasing angle of heel, at a certain angle of heel, the centre of buoyancy (B) may fall vertically below the centre of gravity (G). Angle of list should not be confused with angle of loll. Angle of list is caused by unequal loading on either side of centre line of vessel. Although a vessel at angle of loll does display features of stable equilibrium, this is a dangerous situation and rapid remedial action is required to prevent the vessel from capsizing. It is often caused by the influence of a large free surface or the loss of stability due to damaged compartments. It is different from list in that the vessel is not induced to heel to one side or the other by the distribution of weight, it is merely incapable of maintaining a zero heel attitude.

REF778

When the object is lifted, the center of gravity of the object shifts to the head of the boom, causing a rise in the center of gravity and loss of stability.

REF784

The life raft on board ship are released or launched in to the water by three different methods: 1) Auto release with Hydrostatic Release Unit (HRU). 2) Manually launching. 3) Launching by Davits. Auto Release with Hydrostatic Release Unit (HRU): The life raft HRU plays an important role when it comes to saving life during abandon ship situation. SOLAS 74 clearly specify the requirements for construction and positioning of the HRU at the life raft. The Working of HRU: ■HRU acts as a connecting media between life raft container and ship deck, where it is stored. ■The HRU comes in action under the pressure of water exerted on HRU when the ship sinks below 4m of water level. ■The HRU consists of a sharp knife or chisel which is used to cut the strap lashed over the container carrying life raft, but it still holds the painter at the weak link. ■The HRU is connected to the container through a lashing arrangement which can be disengaged quickly by means of slip hook when launching the raft manually. ■The HRU is connected to a strong point on deck through a weak link. ■When vessel sinks, the HRU cuts the rope and the container floats to the surface of water. ■As vessel sinks further, the tension in the painter causes the life raft to inflate out of the container. ■The tension acting on the weak link will cause it to break making the life raft free from the ship. ■When vessel sinks, the HRU cuts the rope and the container floats to the surface of water. Manual Launching Procedure of Life raft: ■Check that one end of the painter of the raft is well secured to a strong point on ship's deck or structure. ■Remove the lashing from the container of the raft and open the way to portable rail if available. ■Check the ship side where the raft to be launched is clear. ■Two people should lift the container from both sides horizontally and throw the container. ■Make sure the painter is still fixed at a strong point so that the raft should not be waved away by waters. ■Pull the painter with a hard jerk to fire the gas bottle to inflate the raft. ■The life raft will take 20-30 sec to inflate. ■Board the life raft one by one using ladder or rope. ■Avoid sharp objects like knives, shoes and other sharp objects etc which may damage the raft surface. ■When everybody is aboard, after a headcount, cut the painter with a sharp knife. Launching Raft by Davit: ■Open the lashing and remove the raft container from HRU by opening the manual slip hook or bottle screw arrangement. ■Tie up the one end of the painter of raft into a strong point at deck. ■Keep the container in the open and attach the davit hook to the given eye in the canister/ container ■Take up the raft load by davit and keep the container hanging at embarkation deck area. ■Pull the painter and inflate the raft. Have a thorough check on the inflated raft. ■Start boarding the raft without the shoes and other sharp object. ■After the boarding is completed, check the bottom is clear and release the securing lines, if any. ■Someone inside the raft will detach the hook of the davit from the raft when the raft is just above the water. ■The davit operating person will board the raft either by jumping in to the sea, raft or by other boarding means if provided. ■Cut the painter and cast away the raft from ship.

REF786

Hydrostatic Release Unit (H.R.U.) is designed for E.P.I.R.B's and Liferrafts. The H.R.U. is a mechanical device that will operate automatically when immersed to a certain depth in water, to release a liferaft, or any other device requiring liberation under these conditions. The H.R.U is installed as part of the liferaft stowage lashing system, (on the INBOARD

SIDE of the liferaft), being fitted between a deck plate, or liferaft cradle, and the lashing. The liferaft painter is secured to a WEAK LINK (breaking strength 2.2 +/- 0.4 kN) and this in turn is fitted at the deck attachment of the H.R.U. Liferafts that have not been launched in the usual manner are taken down with the sinking vessel. At a depth of between 1.5 to 4 meters (or 5 to 12 feet), the water pressure is sufficient to depress an internal diaphragm in the HRU and operate the release mechanism. Once released, the liferaft container will then float free of the sinking vessel and rise towards the surface, with the painter line paying out as the vessel continues to sink. When all the free length of the painter line is paid out, the inflation mechanism of the liferaft is activated, the liferaft inflates, bursting open the container, and continues to rise to the surface. At this point of inflation, the WEAK LINK parts and allows the liferaft to continue to float to the surface ready for boarding by survivors.

REF796

Bollard pull

REF800

GROUND TACKLE COLOR MARKINGS Note: 1 fathom = 6 feet. There are 15 fathoms (90 feet) in a shot of anchor chain. The tools that are required for color marking an anchor chain are a wire brush, paint brush, rags, and paint (red, white, blue, and yellow enamel paint). • 15 fathoms (1 shot). The detachable link is painted red, and one link on each side is painted white. • 30 fathoms (2 shots). The detachable link is painted white, and two links on each side are painted white. • 45 fathoms (3 shots). The detachable link is painted blue, and three links on each side are painted white. • 60 fathoms (4 shots). The detachable link is painted red, and four links on each side are painted white. • 75 fathoms (5 shots). The detachable link is painted white, and five links on each side are painted white. Paint each link in the net to last shot yellow. The yellow alerts you that you are running out of chain. Paint each link in the last shot red. This method is used through the entire marking procedure alternating red, white, and blue for detachable links as appropriate. WIRE MARKINGS In addition to color markings, wire markings may also be used. The purpose of the wire marking is to let you count the shots by feel during blackout conditions or if the markings on the chain are worn off or rusted over. • 1st shot. One turn of wire on the first stud from each side of the detachable link. • 2d shot. Two turns of wire on the second stud from each side of the detachable link. • 3d shot. Three turns of wire on the third stud from each side of the detachable link. • 4th shot. Four turns of wire on the fourth stud on each side of the detachable link. • 5th shot. Five turns of wire on the fifth stud on each side of the detachable link. • 6th shot. Six turns of wire on the sixth stud on each side of the detachable link.

REF819

WILDCAT : A special type of drum whose faces are so formed as to fit the links of a chain of given size.

REF969

An anemometer is a device for measuring wind speed, and is a common weather station instrument. The term is derived from the Greek word anemos, meaning wind, and is used to describe any airspeed measurement instrument used in meteorology or aerodynamics. The first known description of an anemometer was given by Leon Battista Alberti around 1450. Anemometers can be divided into two classes: those that measure the wind's speed, and those that measure the wind's pressure; but as there is a close connection between the pressure and the speed, an anemometer designed for one will give information about both.