USER MANUAL: DRILLSHIP

RAPID RESPONSE DAMAGE ASSESSMENT 2024

Contents

Revision History

Date of Revision	Detail of Revision	Approved
September 25, 2019	Added Copyright reference to front page.	RH
	Added note on Page 4 about changes to vessels principal characteristics.	RH
January 10, 2024	Update	FT

If you need Emergency Stability and Strength Analyses, call RRDA now at +1 (281) 872-6161 and email the most recent loading computer output to RRDA@eagle.org.

- All pages of the output should be sent.
- State the voyage number.
- State date and time of the condition.
- Note fuel burn and any other significant revisions to the condition.

Note regarding changes to the principal characteristics of the vessel:

Any changes made to the vessel that revises lightship, hydrostatic particulars or hull strength, must be communicated to RRDA@eagle.org for consideration. For example, a tanker conversion to FPSO or an added mid-body section to a containership. Other conversions apply.

SECTION

1

RRDA Program

1.1 General Information

RRDA maintains a website to provide access to the latest RRDA User Manual and other related documents. The page is found at the following link:

https://ww2.eagle.org/en/Products-and-Services/rapid-response.html

RRDA complies with the following regulations and industry guidelines:

- MARPOL Annex I, Regulation 37.4, as circulated by resolution MEPC.117(52) states that all oil tankers of 5,000 tons deadweight or more shall have prompt access to computerized shore-based damage stability and residual structural strength calculation programs.
- MARPOL 73/78 Annex I, Regulation 37.1 requires a shipboard oil pollution emergency plan (SOPEP) to be carried onboard for all tankers of 150 gross tons or more and all other vessels of 400 gross tons or more.
- U.S. Coast Guard requirements of OPA 90 in 33 CFR 155.240 for oil tankers and offshore oil barges, in which owners are required to have “prearranged, prompt access to computerized shore-based damage stability and residual structural strength calculations.”
- The ISM Code, Section 8, requires the company to establish procedures to respond to potential emergency shipboard situations, including the use of drills and exercises to prepare for emergencies.
- OCIMF Guidelines on Capabilities of Emergency Response Providers.
- IACS Rec. No. 145 Recommendation for the Operation of Shore-Based Emergency Response Services.

The ABS Rapid Response Damage Assessment (RRDA) Program is administered from ABS headquarters in Spring. Texas, USA. The facility provides rapid response damage assessment support during an emergency incident affecting an enrolled vessel’s stability and hull strength.

RRDA maintains an agreement to provide this service and rig-specific data for the MODU is stored electronically at ABS. This data is provided for responding to an emergency on board. RRDA should be considered an extension of the rig’s own shoreside emergency response team capability.

RRDA is activated when the Master or other owner-authorized person calls the RRDA 24-hour emergency number and requests assistance with a vessel emergency incident.

The time required for RRDA to provide accurate analyses for any given scenario affecting stability and strength is dependent on:

1. Receipt of the rig load condition and damage reports, taking into consideration if the vessel has retractable thrusters and if so, their position at the time of the emergency incident.
2. The complexity of the problem

The RRDA Program does not cover salvage engineering, class surveys, or surveys in connection with repairs, damages, conversions, compliance with outstanding recommendations, extensions, lay-up or reactivation, modifications/alterations, riding ship, change of flag or new installations.

When requested by a flag Administration, ABS is obliged to provide details of its evaluations and files. When a rig is classed or issued with a Load Line by ABS, the ABS Classification department will be advised that the RRDA team is evaluating damage on an ABS-classed or Load Line-only rig. The ABS RRDA team will review the most recent available survey status for the vessel and will communicate response activity to the ABS Classification department for consideration. However, a survey by the class surveyor continues to be a requirement for subsequent evaluation of damage and repairs or when a Certificate of Fitness to Proceed[1] is to be issued.

ABS does not act as a principal in the matter of salvage or repairs. ABS can only act in an advisory capacity, leaving it to the client to accept or reject any recommendations ABS may make. ABS has no authority to order or contract for repairs, salvage or other matters.

1.2 Instructions for Validating Enrollment Status

This instruction applies to rigs that are ABS classed only.
(Rigs that are not classed with ABS, will be provided an RRDA Certificate valid for 12 months)

This instruction is intended to ensure that Masters, vessel managers and other parties (Port State Control Officers, Vetting Inspectors, etc.), can easily validate whether a vessel is enrolled in the ABS RRDA Program.

There are two means to confirm if a ship is enrolled in RRDA:

1. Examination of the ABS Class Certificate
   The vessel is enrolled in the RRDA program if the Class Certificate shows “RRDA” in the Additional Notations.
   For example:

   ADDITIONAL NOTATIONS

   RRDA, BWE, CRC(I), TCM, GRAB [20]

2. The Class Record
   Details provided in the ABS Record are available via the internet and provide reference to the RRDA notation as follows:

[1] Class authorization for the rig to transit, issued after recommendations made by the attending surveyor have been completed.

https://ww2.eagle.org/ > Rules and Resources > Databases > ABS Record > Search the Database, Enter vessel name or other search criteria > Search > Click on Vessel found > Scroll to Additional Notations.
For example:

1.3 Types of Analyses for Response and Drills

Using the RRDA HECSALV™ model for the ship, the following useful analyses can be made:

1. Calculation and verification of initial loading condition prior to incident.
2. Calculation of afloat residual stability, and evaluation of compartment flooding effect on stability after damage.
3. Evaluation of possible flooding scenarios due to progressive flooding or additional damage.
4. Calculation of wind environmental force on the unit and evaluation of the impact on the unit.
5. Evaluation of plans for offloading, ballasting or weight transfer sequences to improve residual stability and strength.
6. Calculation of residual strength of ship shaped units following structural damage.
7. Evaluation of residual strength for one way trip to safe location and/or repair facility.
8. Calculation of ground reaction force.
9. Calculation of the bending moment and shear stresses from grounding.
10. Evaluation of plans for refloating.
11. Other calculations as appropriate for the circumstances and conditions.
12. Drifting and oil spills using NOAA's WebGNOME web application.

1.4 Drills

Knowledge about the RRDA program may be improved with regular drill activity. Drills establish mutual expectations and promote a more efficient response should an actual incident occur.

The Crisis Management Team ashore usually exercise their response capability annually and invite RRDA to participate at the appropriate level. Drills may connect the ship directly to RRDA, but it is more common for RRDA to communicate with the DPA/crisis management team ashore, who then relays relevant information to and from the rig. This relieves the OIM/Master of the need to duplicate calls and ensures all parties are using the most current information. (This is most relevant in an actual response)

RRDA's capacity for response may be tested at any time and to the extent the crisis management team deems appropriate. However, general arrangement of drill activity is subject to the following contingencies:

1. Notification is given to RRDA by email (RRDA@eagle.org), with at least one week notice.
2. Any charges to be incurred by the vessel manager are agreed in advance.
3. RRDA may decline a proposed drill time if the drill activity conflicts with other scheduled drill activities previously agreed to by RRDA.
4. RRDA may cease drill activities if RRDA is activated for an actual ship incident.

The extent that RRDA is involved in a drill can vary depending on the operator's requirement. RRDA involvement could include:

1. Live drill role play. RRDA is activated and provides analysis reports and recommendations according to the scenario and information provided by the operator. This tests RRDA's capacity to respond.
2. Pre-drill analyses. RRDA contributes to a drill scenario developed by the operator, providing accurate input data with respect to how the ship will react to a grounding or collision or other serious event. This is done in advance and allows the operator to script a scenario and use RRDA's reports to inject accurate results. For the operator, this validates that RRDA has an accurate model of the ship and that effective analyses can be completed and reports generated.
3. Post-drill reporting. RRDA is requested to provide analyses reports after a drill is completed, using data provided by the operator. This will validate that RRDA has an accurate model of the ship and can provide analyses of the conditions communicated by the operator.
4. Communication drill. Ship or management office calls RRDA's emergency number for a communication drill. This validates the number is correct and that RRDA can be activated. This is done by speaking with RRDA staff directly or, if after normal office hours, by speaking with an RRDA call center operator.

All drill activity is logged with RRDA.

1.5 Training

RRDA offers short training sessions that can be delivered remotely via the Web or by office visit. Contact RRDA@eagle.org for details.

SECTION

2

Communications

2.1 Activating/Notifying RRDA Team

To activate the ABS RRDA team, the client is to establish verbal communication using the phone numbers provided below. RRDA is most commonly contacted by the crisis management team including the Designated Person Ashore (DPA), Offshore Installation Manager (OIM) or vessel Master, depending on company policy.

MOST IMPORTANT: Do not attempt to initiate an RRDA response using email only.

24-hour Emergency Numbers:
Primary: +1 (281) 872-6161
Alternate: +1 (281) 820-8697

For Consideration:

1. Do not collect all the information before calling. Initiate contact with RRDA immediately and provide additional information when it is available.
2. Always establish verbal communication with RRDA first. RRDA email is monitored during normal office hours only so email communications received after normal office hours will probably not connect to RRDA personnel within the time needed for an effective emergency response.

2.2 Time to Respond

The RRDA team will respond immediately to calls received during office hours. After office hours and during weekends or holidays, your call will be taken by a call center representative who will then alert RRDA and relay message details. This process is expected to take about 30 minutes or less. An RRDA Team Leader will call you back using the contact details given, and when it is confirmed that the RRDA team is required, the Team Lead and other staff will immediately travel to the RRDA facility. It is expected that RRDA will arrive at the office within two hours after the initial call is made.

2.3 Office Hours

During normal office hours, as listed below, a member of the ABS RRDA team can be expected to answer the incoming call directly. If personnel are temporarily unavailable, the line will automatically transfer to a call center operator who will take note of critical details and then relay that information to RRDA personnel directly.

Monday through Friday 7:30 a.m. to 4:30 p.m. (0730 to 1630) – Central U.S. Time

Note: Non-emergency inquiries relating to RRDA are welcomed by phone or email. Such inquiries should be made by email (RRDA@eagle.org) or using the ABS main number (+1 (281) 877-6000).

2.4 After Office Hours

After office hours and during holidays, any emergency call directed to RRDA using the +1 (281) 872-6161 and the +1 (281) 820-8697 numbers will be answered by the ABS RRDA call center. The caller will be asked for a contact name, vessel name and IMO number, call back number and nature of the incident. The call center operator will then connect directly with RRDA personnel to initiate the RRDA response and you will be called by the RRDA Team Leader directly thereafter.

2.5 Action After Voice Notification

After the initial phone contact has been established and RRDA activation is confirmed, an email documenting the rig's status should be sent to RRDA.

Email: **RRDA@eagle.org**

FOR INFORMATION NEEDED BY RRDA, GO TO Section 4.

SECTION

3

Information Sharing

3.1 Information Requirements

Emergency protocols are not prescriptive. In an emergency, phone conversations and email exchanges with RRDA will establish the mutual communications and information requirement that is relevant to the incident. Priority of information required by RRDA will be discussed with respect to the specifics of the incident. Effort will always be made to ensure that information requested from the vessel is important and relevant to the requirement. Early and transparent sharing of information is key.

FOR INFORMATION NEEDED BY RRDA, GO TO Section 4.

3.2 Load Condition Before the Incident

MOST IMPORTANT!

The rig's loaded condition must be provided to RRDA. Without this information, analysis results will be unreliable. Summary and detailed load distribution should be provided, including all variables and setback, as applicable.

The load condition should be sent to RRDA as output from the loading computer. If the rig personnel routinely sends the load condition information to RRDA, this should be identified during the initial contact and is also noted in the reporting format provided in this manual.

3.3 Collision/Damage/Flooding (Not a Grounding Event)

The goals of RRDA are to identify the resulting damaged condition, to maintain stability, monitor hull stress and to limit pollution. Analyses will examine the rig's vulnerability to reduced stability caused by buoyancy loss and increased free surface. Shifted variable loads may result in asymmetric load inducing list and increasing the likelihood of deck edge immersion and down flooding over time. Collision may cause substantial damage to the side and deck and will reduce the residual hull strength. Explosion is another type of event requiring special analyses of the strength and the subsequent effect of changes to internal subdivision.

The potential for pollution can be limited by transferring fuel oil away from the damaged area either into alternate tank volume on board or by transfer/offload.

FOR INFORMATION NEEDED BY RRDA, GO TO Section 4.

3.3.1 Collision Management and Considerations

a. Ingress should be managed to the extent possible and water ingress to large spaces has to be very carefully considered. Free Surface Effect cannot, under any circumstances, be underestimated.
b. Unless it is clear that pumps are incapable of improving the ingress rate, pumping should continue, at least until alternate recommendations have been considered.
c. If the hull side is breached to the extent that seawater passes freely into a space, the space is no longer considered to contribute to buoyancy or stability. If the space boundary is intact but contains water due to another cause, such as failure of ballast tank or piping or flow via an opening on deck, the space remains considered intact and contributing to stability. However, the effects of free surface and reduced righting moment will be of particular interest.
d. Because the pressure differential reduces as balance occurs, the rate of seawater ingress will decrease as the water depth in the space. Therefore, the pumping capacity to discharge a flooded space may not be adequate to prevent initial flooding, but the same capacity might prevent the space from becoming fully flooded as the ingress rate slows. This may be of no concern or advantage for tank spaces that can be allowed to flood completely, but in machinery spaces, limiting ingress to the lowest possible height will be critical. Also, depending on pump type, the added pressure at the inlet may increase the pump's efficiency as the water level in a space rises.
e. Oil outflow from damaged fuel tanks depends on the induced movement of oil, whether because the tank's fill height creates a head pressure compared to sea level, or (and) oil is displaced out of the tank by ingress of seawater with a higher specific gravity. If seawater ingress into the tank is rapid, seawater will cover normal tank suction arrangements, preventing suction on the oil. Therefore, pumping must be commenced without delay for the successful transference of oil from a damaged tank, if necessary. The effectiveness of the transfer will depend on water ingress rate versus pumping capacity.

3.3.2 Post-Collision Assessment Considerations

a. Was this collision a T-bone or side-swiping contact?
b. What is the other vessel name and IMO number? (RRDA will do a search of the Web to source a photograph of the ship)
c. Other vessel draft at the bow. This information is useful when considering the extent and location of the damage. For example, damage sustained from contacting a cruise ship with an enormous bulbous bow and extensive bow flare is expected to be different to that of a more standard shaped bulk carrier.
d. Did the rig take a list? How much? Why? Is the rig still settling?
e. Is fuel being lost from a tank? At about what rate? Take ullages.
f. Is seawater entering the rig? If so, take soundings.
If spaces are dry, damage may be isolated to above the waterline. It is critical that damage above the waterline remains isolated to above the waterline. If, for whatever reason, the rig is listing toward the damaged side, the condition should be checked and options weighed.

3.4 Grounding

FOR INFORMATION NEEDED BY RRDA, GO TO Section 4.

The analysis of ground reaction is more complex when thrusters are considered. Thrusters are vulnerable to contact loads and may shear and separate from the hull, allowing the rig to float free and move further inshore. RRDA will consider thrusters as pinnacle contact loads where seafloor contact is occurring and can modify reactions according to hull draft reports. Accurate reactions will be used in determining the extent to which lightering arrangements must be planned, or if the rig can be refloated without lightering. Reported flooding and the effect of the tide will be considered, as well as whether there is capacity to internally redistribute load by transferring variable, fuel or by changing ballast. Level of stress in the hull will be considered based on the bottom contact details provided to RRDA.

3.4.1 Comments and Considerations after Grounding

a. **Anchors**
Deployment of anchors should be considered in order to arrest movement onto the lee shore or obstruction. Clearing anchors from the hawse in a controlled condition is preferred, subsequently either walking the chain or letting go, depending on the water depth close-in and whether the seafloor is rising gently of shelving rapidly.

b. **Drafts**
Your initial report to RRDA should include a best estimate of the drafts aground *and the time that the drafts were taken*. RRDA's analysis result is contingent on the accuracy of drafts and the change that occurred as a result of the rig grounding. It is acknowledged that drafts may be difficult to obtain and confidence in the accuracy of draft readings may be low due to wave action on the hull. Even so, this data is critical. Best efforts are needed to establish a baseline and fine-tuning for improvement can always be done as the situation settles, as daylight comes, and as support arrives.

i. An attending boat or tug is probably the best way to acquire good drafts and soundings about the hull.
ii. If boats are not available, depending on conditions and equipment on board, the drafts may best be determined by observing the height, or freeboard, from the waterline to the deck or another fixed structure. Location of each reading must be carefully noted on the General Arrangement plan.

c. **Thrusters**
Clearly indicate whether thruster height is to be considered in the grounding condition and any known loss or damage to thrusters. Consider whether the thrusters can be retracted, or the extent to which any damage sustained will prevent the thruster(s) from retracting.

d. **Ground description**
An accurate ground description must be provided when possible. RRDA team can apply the shape of the contact area to their model when this information is provided. This allows for a more detailed assessment of how the rig will react to changes in loads. It is also important in determining a more complete assessment for hull stresses that are greatly influenced by bottom support and is essential for planning and monitoring purposes.

- Divers or ROV may be used for reporting the contact area. Divers are essential for determining the location of single or multi pinnacle contact areas, including contact by thrusters.
- Contact area(s) can also be reported by soundings taken around the rig using a lead line or other device. Use the form provided for reporting. Sketches are greatly encouraged.
- Use an attending pilot boat, tug or FRC to obtain soundings around the ship.
- Be aware that softer bottom materials like mud and clay tend to mound and rise against the bow and will create seemingly odd or questionable depth readings. Trust your readings and report as measured.
- Be aware that strong currents may cause scouring and deposit, moving sand around the hull, causing variations in the sounding.

e. **Damage**
Structural bottom damage frequently occurs during grounding. This can be local buckling with hull plate cracks and tearing having little effect on longitudinal strength. Alternatively, it can be gross deformation over large areas of the bottom with impact to the inner bottom structure and bulkheads. Identifying the extent of damage under these circumstances will undoubtedly be hindered due to limited or zero access. Voids and tank spaces may be flooded and inaccessible.

f. **What if?**
Potential deterioration of onboard conditions must be considered, specifically with respect to the integrity of rig systems that are initially intact and operational but could fail later. For example, piping. It may be that fuel oil could have been transferred away from the damaged area immediately following grounding, but subsequent buckling loads on the lower structure disables piping ceasing any opportunity for transfer or lightering the fuel. In which case, special effort by salvors may be required to remove fuel, introducing the potential to become a pollution event.

g. **Refloating**
Before the rig is allowed to refloat, particularly when flooding and structural damage are identified, RRDA will analyze the refloat condition to ensure that the condition gives sufficient stability and strength margin.
When significant buoyancy is lost due to hull breaches with flooding in several spaces, salvors may deem it necessary to induce buoyancy using low pressure compressed air inside the damaged spaces. This forces sea water back out of the hull, reduces ground reaction and improves the afloat

condition. With the rig afloat, temporary patches can be applied and the rig dewatered to the extent needed to meet the requirements of the recovery plan.

h. **Unaccountable list after refloating?**
Based on the reported load condition, RRDA will determine the drafts, list and prior to the refloat. If the ship refloats with a “mystery list,” but there is good confidence regarding weights on board and the extent of flooding, the possibility that damaged spaces may have taken on heavy sea floor material into damaged spaces should be considered. The extent to which such unintended loading affects list and trim depends on the heeling moment, the rig’s initial stability, and the volume and relative density of the material deposits.

3.5 Lightering

Lightering of the rig may be required for refloating following a grounding event, or to mitigate risks associated with hull stresses, stability, or pollution. The rig will develop the plan for lightering, while RRDA may provide supporting analyses that consider the effects of damage to assist in the plan development.

3.6 Moving a Damaged Rig

Authorization for moving a damaged rig is contingent on reviews by flag, the classification society, Coastal State and perhaps the Port Authority. Other stakeholders also contribute to the process of recovery. Many of these considerations remain outside of RRDA’s scope; however, when a rig sustains damage that affects hull strength and stability has been sustained, RRDA will continue to provide analyses that determine the margin of strength and stability for the proposed transit route. This work relies on the review of accurate damage assessment reports that are usually provided by the attending class surveyor.

3.7 Drifting and Oil Spill

FOR INFORMATION NEEDED BY RRDA, GO TO Section 4.

Working closely with the client, the RRDA team will be able to assist in providing predictive areas and timeframes of potential risks of drifts and oil spill monitoring. There are two steps taken for predicting the oil spill transport and fate:

1. First, RRDA analyzes the incident and estimates the total volume and the time duration of the oil spill using the HECSALV™ tool and/or client input.
2. Second, RRDA predicts the oil spill transport and fate over a number of days following the initial release of oil using NOAA’s WebGNOME.

SECTION

4

Useful Forms

The following forms and illustrations are intended to be used for efficiently communication of important information to RRDA. The expectation is that these can be quickly completed by hand and copied to a PDF file for emailing to RRDA@eagle.org.

For editable versions of these forms, contact RRDA@eagle.org.

Initial Incident Report

Date and Time	UTC or Local (?)
Rig Name	
IMO Number	
Flag State	
Incident Type	
Location (Block & Lat/Long)	
Preferred Contact Name	
Preferred Telephone	
Preferred Email	
CC. Email(s)?	

Stability computer output report has been sent to rrda@eagle.org? (Most important)	YES NO
Load conditions are sent routinely on this rig and RRDA has the condition	YES NO N/A

ENTER COMMENTS RELATING TO THE ABOVE OR OTHER USEFUL INFORMATION HERE:

Follow-up Incident Report

Ref. Date and Time			(Local/GMT)
Rig Name			
Position	Latitude	Longitude	
Nature of Incident			
Contributing Information	Hull spaces are breached	Y N	(write note below)
	Pollution to the sea	Y N	(write note below)
	Hull structure is known to be damaged	Y N	(write note below)
	Has cargo moved internally or been lost	Y N	(write note below)
	Density of water body		kg/m3
	Ballast system is operational	Y - @ about	m3/hr. N
	Cargo pumps operational	Y - @ about	m3/hr. N
	E.R. bilge system is operational	Y - @ about	m3/hr. N
	Propulsion is available	Y N	
	Steering is available	Y N	
	Anchors are available	Y N	
	Swell height (m) and period (sec)		
	Wind speed (knots) and direction		
	Photos of damage or associated subject	Y N	

Rig is Afloat	Under keel clearance		(m or ft)
	Heel/list (°)		P or S
	Max. roll angle (°) and period (sec)		
	Approx. steady heading		
	Seas breaking on deck	Y N	
	Main deck openings secure	Y N	(write note below)
	Deck edge immersed	Y N	
	Other vessel I.D. (if collision) Name and ship type		

Rig is Aground	Time of grounding (very important)	(Local/GMT)
	Accurate drafts (very important)	Notate to rig sketch below
	Time drafts taken (very important)	Notate to rig sketch below
	Tides: times and range	If requested by RRDA
	Heel	Y N (Add note below)
	Heading	
	Where is bottom contact	Notate to rig sketch below
	Integrity of thrusters	Comment below
	Soundings about the rig	Notate to rig sketch below
	Nature of seabed	
	Underwater survey of contact area and damage report	Y N (write note below)

ENTER COMMENTS RELATING TO THE ABOVE OR OTHER USEFUL INFORMATION HERE:

Oil Spill	Position	Latitude	Longitude
	Start	Date	Time
	Amount		
	Duration		
	Oil Type		
	Location		
ENTER COMMENTS RELATING TO THE ABOVE OR OTHER USEFUL INFORMATION HERE:			

Additional Details About a Grounding Incident

Rig Name:			
Date:			
1. Drafts - Aground			
Units	Meters	Feet	
Time	-hrs.	Local	UTC
--	Forward	Amidships	Aft
Port			
Starboard			
List of Heel		Degrees	P S
2. Approximate Area of Ground Contact			
Outline the approx. contact area on the hull outline.			
3. Provide water depths (W.D.)			
Water depth values to the extent needed.			
Measured by a boat or tug?			
Measured from ship's deck?			
4. Rig Heading			
-Degrees (T)			

			W.D.				
			FR#				
W.D.						**W.D.**	
FR#						**FR#**	
W.D.						**W.D.**	
FR#						**FR#**	
W.D.						**W.D.**	
FR#						**FR#**	
W.D.						**W.D.**	
FR#						**FR#**	
W.D.						**W.D.**	
FR#						**FR#**	
			W.D.				
			FR#				

Convenient Sketch for Any Incident

Rig NAME: **DATE and TIME:** **UTC/LOCAL**

USE THIS DIAGRAM TO ILLUSTRATE ANY ADDITIONAL PERTINENT INFORMATION LIKE GROUND CONTACT AREA, PINNICLES, AREA DAMAGED, BUCKLING or CRACKS, HULL BREACH, WATER DEPTHS, FREEBOARDS, DRAFTS, OBSTRUCTIONS, ETC.