Oil Companies International Marine Forum

Guidelines on Capabilities of Emergency Response Services

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The OCIMF mission is to be the foremost authority on the safe and environmentally responsible operation of oil tankers, terminals and offshore support vessels, promoting continuous improvement in standards of design and operation.

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The Oil Companies International Marine Forum (OCIMF)
is a voluntary association of oil companies having an interest in the shipment and terminalling of crude oil and oil products. OCIMF is organised to represent its membership before, and consult with, the International Maritime Organization (IMO) and other government bodies on matters relating to the shipment and terminalling of crude oil and oil products, including marine pollution and safety.

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1 Introduction

According to current regulations oil tankers must have prompt access to computerised, shore-based damage stability and residual structural strength calculation programmes. While other vessel types are not currently regulated the principles outlined in this paper may apply to other vessel types, such as gas and chemical tankers.

The means by which this access is arranged is not described in the legislation. The scope of services to be rendered is only described briefly and too vaguely to enforce a performance standard. Capability of the service provider is not addressed in the legislation.

Classification Societies and other entities offer such services to the ship operator, but variations in the level and scope of service provided have been noted. Operators may even elect to provide this service internally without the assistance of external service providers.

Emergency Response Services (ERS) are rarely used, and as such may not attract appropriate priority of emphasis in vessel management. Merely having a service agreement in place does not ensure that, when needed, the quality of service provided meets the need.

Recognising the potential hazards associated with the lack of consistency in the provision and utilisation of ERS, the OCIMF Marine Technical Sub-committee was tasked to form a Working Group to review current systems and practices in the industry, and to make any necessary recommendations for improvement.

The objective of these Guidelines is to clarify and recommend the minimum scope of ERS provision, and to give advice on suggested minimum requirements of competency and capability of ERS service providers.

2 Organisation

To ensure a prompt and reliable service the following minimum services are recommended.

2.1 Appropriate location and equipment

A dedicated ERS room (or suite of rooms) should be available for use by the ERS team at any time. The room should be equipped with:

- Appropriate dedicated equipment to enable the ERS team to communicate with the vessel staff and shore management, by voice and document (multiple telephones, conference phone, multiple Local Area Networks (LAN) and internet connections, and at least one fax machine).
- Computers powered by secure power supplies with appropriate structural and stability analysis software pre-installed.
- Means to display information to all team members (shared computer database or white-boards).
- TV and video recording capability. Providers may wish to consider the ability to receive digital pictures or video direct from the casualty via internet.

2.2 Access to appropriate vessel data

Vessel data should be made available by the vessel operator on inception of service provision, (and not when the casualty occurs), so that the appropriate computerised models of vessel can be prepared by the ERS provider. This data and associated models can be in the form of paper and/or electronic files (see Annex 1 for the minimum documentation recommended).

The service agreement should ensure that the data (drawings and records) are kept up to date. Access to the data should be controlled. Appropriate means of duplication should be used to ensure single point failure does not deny access to data (e.g. duplicate server records, archive copies of paper records).

The service agreement should include the following:

- Description of the ERS.
- Emergency contact details of the ERS.
- Expected standard response times of the ERS.

- Ship-specific Casualty Information Exchange sheets.
- Requirement to update records and vessel data at ERS.
- Requirement to provide the ERS with cargo loading status.
- Drill scope and schedule requirements (one drill annually as a minimum).

Incorporation of, or reference to, the ERS within the Safety Management System (SMS) will ensure that vessel staff are familiar with ERS procedures, as a result of training, exercises, and internal auditing conducted as part of the vessel operator's compliance with International Safety Management Code under SOLAS.

2.3 Business continuity

Service providers should ensure that continuity of service can be maintained when access to buildings, rooms, data or services is interrupted. This should involve the establishment of a business continuity plan, with provision for access to alternate locations, methods of data access and communication whenever deemed necessary.

2.4 Emergency team capability

The service provider should ensure that the emergency team is appropriately resourced and should be competent to assess the full range of stability and structural strength calculations required in the event of any emergency. The provider should establish a single point of contact for all communications. IT assistance should be available at all times.

2.5 Response times

ERS should be available at all times. Vessel staff should be able to contact the service, via a dedicated telephone line. The minimum time period for mustering the response team should be stated in the service agreement. It is recommended that the full ERS team should be available and capable of responding to the vessel in less than two hours.

2.6 Service provider resources

The service provider should have sufficient resources (including facilities) to allow for at least two different incidents to be handled by separate teams.

There should also be sufficient resources to ensure that fully-qualified substitutes and reliefs will be available should the emergency response be extended beyond a certain period (for example if the on-duty team has been mobilised for more than ten hours).

2.7 Communication language

The communication language should be established and agreed between the stakeholders (ERS provider, Vessel, and Vessel operator) at the time of the contract being signed. This is to avert any confusion or miscommunication in an emergency, especially when dealing with different nationalities on board the ships (some ships may have officers and crew not versed with English).

2.8 Level of assistance

Calculation results shall be presented in a manner which can be understood by the people receiving them. Main conclusions of the various assessments carried out during the emergency shall be provided as soon as available through direct communication (phone and/or email).

Thereafter, calculations should be presented in writing and should be self-explanatory, properly documented and include at least the following:

- Executive summary.
- Description of the damage.
- Any assumptions of hypotheses made.
- Calculation results.
- Detailed conclusions.
- Main advice or recommendations.

Advice or recommendations should:

- Be both quantitative and qualitative.
- Give an opinion on the stability and/or strength assessment carried out.
- Advise on any additional areas to be further inspected.

2.9 Demobilisation

The emergency response team should remain available until reception of formal written notice of demobilisation from the vessel operator.

2.10 Reporting

The service provider should submit a final report to the vessel operator. This should include all the information included in *Level of assistance* above and also:

- A copy of all communications and relevant information exchanged during the emergency.
- Calculation booklets.
- Notes.

The following additional services may be considered.

2.11 Additional expertise

Additional expertise in specialist areas may be needed, within a specified time frame, whether from internal resource or external providers. The ability to provide advice in the following areas should be considered:

- Fire safety.
- Oil spill response.
- Piping services.
- Machinery.
- Salvage.

2.12 Environmental data

It is recommended that a dedicated meteorological data service provider is available, so that the emergency team can provide accurate assessment of weather loading on the vessel structure and effect of sea and swell on vessel stability. The following actual and forecast data should be available:

- Sea and swell wave height.
- Sea and swell wave return period.
- Wind/wave directions.
- Tide and current.

Weather routing advice may also be made available to the emergency team through:

- Electronic charts.
- Vessel automatic tracking system (AIS) data.

2.13 Vessel loaded condition

The current loaded condition of the vessel should be available from a source other than the vessel to enable the ERS team to complete accurate stability and stress assessments if the vessel is unable to communicate details or the crew have abandoned the vessel.

Consideration may also be given to the ability of the ERS provider to receive data on the vessel's loaded condition after each load or discharge of cargo and for storage of the data for as long as deemed necessary. Data should also be available to estimate the quantity of fuel and water on board.

3 Competency

The competency and capability of ERS team members is vital to the level of response. To ensure that team members are, and remain, appropriately qualified and trained, the following should be undertaken.

3.1 Initial training

The ERS team members should receive initial training in emergency response operations and participate in simulation drill(s). The training process should include some form of competency assessment to provide confidence in the ability of the team member to perform.

3.2 Training and exercises

The appropriate level of competency of team members should be maintained and improved through

regular skills training and education courses. Individual records of training and exercises should be maintained.

Consideration should be given to team member participation in experience exchange seminars to ensure lessons are learned from industry experience.

3.3 Simulation drills

The ERS team should conduct frequent simulation drills to ensure team member familiarity with the following:

- Roles and responsibilities within the team.
- Procedures (including information exchange protocols).
- Locations and equipment.
- Software.
- External organisations.

The drills also enable communication information to be checked (telephone numbers, email addresses, etc). It is recommended that the operator carry out drills with the ERS provider on an annual basis to ensure that the vessel operator staff are familiar with ERS procedures.

4 Stability assessment

The primary requirement of the ERS is to provide shore based damaged stability calculations. In order to provide reliable results, it is recommended that ERS provider complies with the following minimum standards.

4.1 Calculation models and software

Stability calculations should be made using an accurate calculation model on stable, pre-tested computer software. The ship stability calculation model should be prepared in advance and be ready for use. It should accurately reflect the vessel in terms of numbers, location, extent, naming and capacity of compartments.

The stability software should be pre-tested and configured so that calculations of abnormal conditions can be conducted (for example, to calculate stability in the event of flooding due to collision or grounding or if significant steel mass has been lost from the vessel).

4.2 Standard casualty information exchange

Predefined ship-specific casualty information exchange sheets agreed by service provider and vessel operator should be used to ensure that the casualty information exchanged between vessel and ERS is accurate and easily recorded.

5 Structural strength assessment

The initial structural strength assessment should comprise a rapid assessment of the damage condition. This assessment should help to check that the vessel is in a condition to remain safely afloat, and define the immediate corrective actions recommended to ensure the safety of the crew. If pollution is considered to be a risk, it is essential that cargo management is exercised to mitigate the risk of any possible release.

Depending on the extent of the damages a second tier of structural strength assessment may be needed. This more detailed analysis should enable operators to decide whether the vessel can resume her voyage, or discharge her cargo and sail to the nearest repair yard, while mitigating risk of pollution. This assessment should establish sailing restrictions (these are likely to include weather, bending moments, shear stresses, etc.) and/or recommended sailing with an escort if applicable.

5.1 First tier: Immediate Structural Strength Analysis

5.1.1 Initial longitudinal strength calculation

The ERS provider should be able to assess the longitudinal strength in the damaged condition within two hours of receipt of the description of the damages and loading condition information.

This should be accomplished using software that considers vessel hydrostatics and weight distribution curve. Results should include hull girder bending moment and shear force distribution in the damaged situation and comparison with allowable limits. The maximum allowable values should be assessed according to the new section modulus calculated taking into account the reported damage and should be based on the worst case scenario. If relevant, grounding forces should be included.

5.1.2 Midship 2-D section

The recommended minimum structural strength assessment to be undertaken is the calculation of the new section modulus in way of the damaged cross section. This calculation should show stress level compared to admissible as well as buckling behaviour and hull girder ultimate strength capacity.

To facilitate this calculation, a 2-D Midship section model should be prepared for the vessel in advance.

5.1.3 Additional 2-D sections

When the ship is damaged outside of the parallel body, additional 2-D sections should be prepared, when deemed necessary and relevant, in less than three hours upon request.
See above Midship 2-D section for methodology and expected results.

5.2 Second tier: Post initial response Detailed Structural Analysis

5.2.1 3-D beam model analysis

To better assess the structural strength of primary members in way of the damaged area, the service provider should be able to perform a 3-D beam local analysis.

This model shall reflect the damaged structure, being free from boundary conditions. Local static and dynamic loads and global loads when deemed necessary shall be applied. All meshing, loading, balancing and boundary conditions should be clearly described in a relevant calculation memo.
Results should show stress levels compared to admissible values and buckling behaviour including comparison with expected stress level in intact case.
A minimum standard response period for production of the 3-D beam model analysis should be defined in the service agreement.

5.2.2 3-D finite elements analysis

If deemed necessary, ERS provider should be able to perform global and local strength assessment based on a 3-D Finite Element Model (FEM) calculation.

The FEM should cover the area of interest and exclude boundary conditions. All meshing, loading, balancing and boundary conditions must be clearly described in the calculation report. In case of a three cargo hold model, the service provider should refer to the methodology described in the Common Structural Rules for Double Hull Oil Tankers.

Results should show stress levels compared to admissible values and buckling behaviour including comparison with expected stress levels in the intact case.

A minimum standard response period for production of the 3-D FEM analysis should be defined in the service agreement.

Annex 1: Recommended basic documentation

The quality of the Emergency Response Services (ERS) depends directly on the technical documentation available. The vessel operator should be responsible for ensuring that vessel data is checked, validated, and maintained current when changes are made to the vessel. The list of documents should include but is not limited to;

Key Drawings

- General arrangement drawing.
- Capacity plan.
- Hull lines drawing (or off-set tables).
- Midship section drawings.
- Profile and decks drawings.
- Shell expansion drawings.
- Cargo holds structure drawings.
- Engine room structure drawings.
- Fore part structure drawings.
- Aft part structure drawings.

Main Data

- Permissible still-water bending moments and shear forces.
- Longitudinal distribution of lightship weight.
- Loading manual and/or trim and stability manual (with longitudinal strength calculation).
- Freeboard Report including coordinates (X, Y, Z) of all openings (e.g. doors, air pipes, ventilators, hatches) located on exposed decks with indication of their means of closing.

Annex 2: International Regulations

MARPOL: Annex 1, Chapter 5, Regulation 37[4]

"All oil tankers of 5,000 tonnes deadweight or more shall have prompt access to computerised shore-based damage stability and residual strength calculation programmes"

US Regulation CFR 33 #155.240: Damage stability information for oil tankers and offshore oil barges

(a) Owners or operators of oil tankers and offshore oil barges shall ensure that their vessels have prearranged prompt access to computerised, shore-based damage stability and residual strength calculation programmes
(b) Vessel baseline strength and stability characteristics must be pre-entered into such programmes and be consistent with the vessel's existing configuration
(c) Access to shore-based programmes must be available 24 hours a day
(d) At a minimum, the programme must facilitate calculation of the following:

- Residual hull girder strength based on reported extent of damage.
- Residual stability when the vessel's compartments are breached.
- The most favourable off-loading, ballasting, or cargo transfer sequences to improve residual stability, reduce hull girder stresses, and reduce ground-force reaction.
- The bending and shear stresses caused by pinnacle loads from grounding or stranding.

US Regulation CFR 33 #155.4030: Required salvage and marine fire fighting services to list in response plans

15 steps salvage process:

Assessment and survey:
1. Remote Assessment and consultation.
2. Begin assessment of structural stability.
3. On-site salvage assessment.
4. Assessment of structural stability.
5. Hull and bottom survey.

Stabilisation:
7. Emergency towing.
8. Salvage plan.
9. External emergency transfer operations.
10. Emergency lightering.
11. Making temporary repairs.
12. Diving services support.

Specialised salvage operations:
13. Special salvage operations plan.
14. Subsurface product removal.
15. Heavy lift 1.

ISM Code: Regulation 8: Emergency Preparedness

8.1 The Company should identify potential emergency shipboard situations, and establish procedures to respond to them.
8.2 The Company should establish programmes for drills and exercises to prepare for emergency actions.
8.3 The safety management system should provide for measures ensuring that the Company's organisation can respond at any time to hazards, accidents and emergency situations involving its ships.

And more generally:

Shipboard Oil Pollution Emergency Plan (SOPEP) with Vessel Response Plan

Oil Pollution Act - OPA'90