



**BUREAU
VERITAS**

Classification Scheme under Risk Based Inspection

February 2019

**Guidance Note
NI 657 DT R00 E**



GENERAL CONDITIONS

1. INDEPENDENCE OF THE SOCIETY AND APPLICABLE TERMS

- 1.1 The Society shall remain at all times an independent contractor and neither the Society nor any of its officers, employees, servants, agents or subcontractors shall be or act as an employee, servant or agent of any other party hereto in the performance of the Services.
- 1.2 The operations of the Society in providing its Services are exclusively conducted by way of random inspections and do not, in any circumstances, involve monitoring or exhaustive verification.
- 1.3 The Society acts as a services provider. This cannot be construed as an obligation bearing on the Society to obtain a result or as a warranty. The Society is not and may not be considered as an underwriter, broker in Unit's sale or chartering, expert in Unit's valuation, consulting engineer, controller, naval architect, designer, manufacturer, shipbuilder, repair or conversion yard, charterer or shipowner; none of them above listed being relieved of any of their expressed or implied obligations as a result of the interventions of the Society.
- 1.4 The Society only is qualified to apply and interpret its Rules.
- 1.5 The Client acknowledges the latest versions of the Conditions and of the applicable Rules applying to the Services' performance.
- 1.6 Unless an express written agreement is made between the Parties on the applicable Rules, the applicable Rules shall be the Rules applicable at the time of entering into the relevant contract for the performance of the Services.
- 1.7 The Services' performance is solely based on the Conditions. No other terms shall apply whether express or implied.

2. DEFINITIONS

- 2.1 "Certificate(s)" means classification or statutory certificates, attestations and reports following the Society's intervention.
- 2.2 "Certification" means the activity of certification in application of national and international regulations or standards, in particular by delegation from different governments that can result in the issuance of a Certificate.
- 2.3 "Classification" means the classification of a Unit that can result or not in the issuance of a classification Certificate with reference to the Rules. Classification is an appraisalment given by the Society to the Client, at a certain date, following surveys by its surveyors on the level of compliance of the Unit to the Society's Rules or to the documents of reference for the Services provided. They cannot be construed as an implied or express warranty of safety, fitness for the purpose, seaworthiness of the Unit or of its value for sale, insurance or chartering.
- 2.4 "Client" means the Party and/or its representative requesting the Services.
- 2.5 "Conditions" means the terms and conditions set out in the present document.
- 2.6 "Industry Practice" means international maritime and/or offshore industry practices.
- 2.7 "Intellectual Property" means all patents, rights to inventions, utility models, copyright and related rights, trade marks, logos, service marks, trade dress, business and domain names, rights in trade dress or get-up, rights in goodwill or to sue for passing off, unfair competition rights, rights in designs, rights in computer software, database rights, topography rights, moral rights, rights in confidential information (including know-how and trade secrets), methods and protocols for Services, and any other intellectual property rights, in each case whether capable of registration, registered or unregistered and including all applications for and renewals, reversions or extensions of such rights, and all similar or equivalent rights or forms of protection in any part of the world.
- 2.8 "Parties" means the Society and Client together.
- 2.9 "Party" means the Society or the Client.
- 2.10 "Register" means the public electronic register of ships updated regularly by the Society.
- 2.11 "Rules" means the Society's classification rules and other documents. The Society's Rules take into account at the date of their preparation the state of currently available and proven technical minimum requirements but are not a standard or a code of construction neither a guide for maintenance, a safety handbook or a guide of professional practices, all of which are assumed to be known in detail and carefully followed at all times by the Client.
- 2.12 "Services" means the services set out in clauses 2.2 and 2.3 but also other services related to Classification and Certification such as, but not limited to: ship and company safety management certification, ship and port security certification, maritime labour certification, training activities, all activities and duties incidental thereto such as documentation on any supporting means, software, instrumentation, measurements, tests and trials on board. The Services are carried out by the Society according to the applicable referential and to the Bureau Veritas' Code of Ethics. The Society shall perform the Services according to the applicable national and international standards and Industry Practice and always on the assumption that the Client is aware of such standards and Industry Practice.
- 2.13 "Society" means the classification society 'Bureau Veritas Marine & Offshore SAS', a company organized and existing under the laws of France, registered in Nanterre under number 821 131 844, or any other legal entity of Bureau Veritas Group as may be specified in the relevant contract, and whose main activities are Classification and Certification of ships or offshore units.
- 2.14 "Unit" means any ship or vessel or offshore unit or structure of any type or part of it or system whether linked to shore, river bed or sea bed or not, whether operated or located at sea or in inland waters or partly on land, including submarines, hovercrafts, drilling rigs, offshore installations of any type and of any purpose, their related and ancillary equipment, subsea or not, such as well head and pipelines, mooring legs and mooring points or otherwise as decided by the Society.

3. SCOPE AND PERFORMANCE

- 3.1 Subject to the Services requested and always by reference to the Rules, the Society shall:
 - review the construction arrangements of the Unit as shown on the documents provided by the Client;
 - conduct the Unit surveys at the place of the Unit construction;
 - class the Unit and enter the Unit's class in the Society's Register;
 - survey the Unit periodically in service to note whether the requirements for the maintenance of class are met.The Client shall inform the Society without delay of any circumstances which may cause any changes on the conducted surveys or Services.
- 3.2 The Society will not:
 - declare the acceptance or commissioning of a Unit, nor its construction in conformity with its design, such activities remaining under the exclusive responsibility of the Unit's owner or builder;
 - engage in any work relating to the design, construction, production or repair checks, neither in the operation of the Unit or the Unit's trade, neither in any advisory services, and cannot be held liable on those accounts.

4. RESERVATION CLAUSE

- 4.1 The Client shall always: (i) maintain the Unit in good condition after surveys; (ii) present the Unit for surveys; and (iii) inform the Society in due time of any circumstances that may affect the given appraisalment of the Unit or cause to modify the scope of the Services.
- 4.2 Certificates are only valid if issued by the Society.
- 4.3 The Society has entire control over the Certificates issued and may at any time withdraw a Certificate at its entire discretion including, but not limited to, in the following situations: where the Client fails to comply in due time with instructions of the Society or where the Client fails to pay in accordance with clause 6.2 hereunder.
- 4.4 The Society may at times and at its sole discretion give an opinion on a design or any technical element that would 'in principle' be acceptable to the Society. This opinion shall not presume on the final issuance of any Certificate or on its content in the event of the actual issuance of a Certificate. This opinion shall only be an appraisal made by the Society which shall not be held liable for it.

5. ACCESS AND SAFETY

- 5.1 The Client shall give to the Society all access and information necessary for the efficient performance of the requested Services. The Client shall be the sole responsible for the conditions of presentation of the Unit for tests, trials and surveys and the conditions under which tests and trials are carried out. Any information, drawing, etc. required for the performance of the Services must be made available in due time.
- 5.2 The Client shall notify the Society of any relevant safety issue and shall take all necessary safety-related measures to ensure a safe work environment for the Society or any of its officers, employees, servants, agents or subcontractors and shall comply with all applicable safety regulations.

6. PAYMENT OF INVOICES

- 6.1 The provision of the Services by the Society, whether complete or not, involve, for the part carried out, the payment of fees thirty (30) days upon issuance of the invoice.

6.2 Without prejudice to any other rights hereunder, in case of Client's payment default, the Society shall be entitled to charge, in addition to the amount not properly paid, interests equal to twelve (12) months LIBOR plus two (2) per cent as of due date calculated on the number of days such payment is delinquent. The Society shall also have the right to withhold Certificates and other documents and/or to suspend or revoke the validity of Certificates.

- 6.3 In case of dispute on the invoice amount, the undisputed portion of the invoice shall be paid and an explanation on the dispute shall accompany payment so that action can be taken to solve the dispute.

7. LIABILITY

- 7.1 The Society bears no liability for consequential loss. For the purpose of this clause consequential loss shall include, without limitation:
 - Indirect or consequential loss;
 - Any loss and/or deferral of production, loss of product, loss of use, loss of bargain, loss of revenue, loss of profit or anticipated profit, loss of business and business interruption, in each case whether direct or indirect.The Client shall defend, release, save, indemnify, defend and hold harmless the Society from the Client's own consequential loss regardless of cause.
- 7.2 Except in case of wilful misconduct of the Society, death or bodily injury caused by the Society's negligence and any other liability that could not be, by law, limited, the Society's maximum liability towards the Client is limited to one hundred and fifty per-cents (150%) of the price paid by the Client to the Society for the Services having caused the damage. This limit applies to any liability of whatsoever nature and howsoever arising, including fault by the Society, breach of contract, breach of warranty, tort, strict liability, breach of statute.
- 7.3 All claims shall be presented to the Society in writing within three (3) months of the completion of Services' performance or (if later) the date when the events which are relied on were first discovered by the Client. Any claim not so presented as defined above shall be deemed waived and absolutely time barred.

8. INDEMNITY CLAUSE

- 8.1 The Client shall defend, release, save, indemnify and hold harmless the Society from and against any and all claims, demands, lawsuits or actions for damages, including legal fees, for harm or loss to persons and/or property tangible, intangible or otherwise which may be brought against the Society, incidental to, arising out of or in connection with the performance of the Services (including for damages arising out of or in connection with opinions delivered according to clause 4.4 above) except for those claims caused solely and completely by the gross negligence of the Society, its officers, employees, servants, agents or subcontractors.

9. TERMINATION

- 9.1 The Parties shall have the right to terminate the Services (and the relevant contract) for convenience after giving the other Party thirty (30) days' written notice, and without prejudice to clause 6 above.
- 9.2 In such a case, the Classification granted to the concerned Unit and the previously issued Certificates shall remain valid until the date of effect of the termination notice issued, subject to compliance with clause 4.1 and 6 above.
- 9.3 In the event where, in the reasonable opinion of the Society, the Client is in breach, or is suspected to be in breach of clause 16 of the Conditions, the Society shall have the right to terminate the Services (and the relevant contracts associated) with immediate effect.

10. FORCE MAJEURE

- 10.1 Neither Party shall be responsible or liable for any failure to fulfil any term or provision of the Conditions if and to the extent that fulfilment has been delayed or temporarily prevented by a force majeure occurrence without the fault or negligence of the Party affected and which, by the exercise of reasonable diligence, the said Party is unable to provide against.
- 10.2 For the purpose of this clause, force majeure shall mean any circumstance not being within a Party's reasonable control including, but not limited to: acts of God, natural disasters, epidemics or pandemics, wars, terrorist attacks, riots, sabotages, impositions of sanctions, embargoes, nuclear, chemical or biological contaminations, laws or action taken by a government or public authority, quotas or prohibition, expropriations, destructions of the worksite, explosions, fires, accidents, any labour or trade disputes, strikes or lockouts.

11. CONFIDENTIALITY

- 11.1 The documents and data provided to or prepared by the Society in performing the Services, and the information made available to the Society, are treated as confidential except where the information:
 - is properly and lawfully in the possession of the Society;
 - is already in possession of the public or has entered the public domain, otherwise than through a breach of this obligation;
 - is acquired or received independently from a third party that has the right to disseminate such information;
 - is required to be disclosed under applicable law or by a governmental order, decree, regulation or rule or by a stock exchange authority (provided that the receiving Party shall make all reasonable efforts to give prompt written notice to the disclosing Party prior to such disclosure).
- 11.2 The Parties shall use the confidential information exclusively within the framework of their activity underlying these Conditions.
- 11.3 Confidential information shall only be provided to third parties with the prior written consent of the other Party. However, such prior consent shall not be required when the Society provides the confidential information to a subsidiary.
- 11.4 Without prejudice to sub-clause 11.1, the Society shall have the right to disclose the confidential information if required to do so under regulations of the International Association of Classifications Societies (IACS) or any statutory obligations.

12. INTELLECTUAL PROPERTY

- 12.1 Each Party exclusively owns all rights to its Intellectual Property created before or after the commencement date of the Conditions and whether or not associated with any contract between the Parties.
- 12.2 The Intellectual Property developed by the Society for the performance of the Services including, but not limited to drawings, calculations, and reports shall remain the exclusive property of the Society.

13. ASSIGNMENT

- 13.1 The contract resulting from to these Conditions cannot be assigned or transferred by any means by a Party to any third party without the prior written consent of the other Party.
- 13.2 The Society shall however have the right to assign or transfer by any means the said contract to a subsidiary of the Bureau Veritas Group.

14. SEVERABILITY

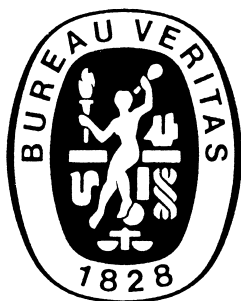
- 14.1 Invalidity of one or more provisions does not affect the remaining provisions.
- 14.2 Definitions herein take precedence over other definitions which may appear in other documents issued by the Society.
- 14.3 In case of doubt as to the interpretation of the Conditions, the English text shall prevail.

15. GOVERNING LAW AND DISPUTE RESOLUTION

- 15.1 These Conditions shall be construed and governed by the laws of England and Wales.
- 15.2 The Parties shall make every effort to settle any dispute amicably and in good faith by way of negotiation within thirty (30) days from the date of receipt by either one of the Parties of a written notice of such a dispute.
- 15.3 Failing that, the dispute shall finally be settled under the Rules of Arbitration of the Maritime Arbitration Chamber of Paris ("CAMP"), which rules are deemed to be incorporated by reference into this clause. The number of arbitrators shall be three (3). The place of arbitration shall be Paris (France). The Parties agree to keep the arbitration proceedings confidential.

16. PROFESSIONAL ETHICS

- 16.1 Each Party shall conduct all activities in compliance with all laws, statutes, rules, economic and trade sanctions (including but not limited to UN sanctions and EU sanctions) and regulations applicable to such Party including but not limited to: child labour, forced labour, collective bargaining, discrimination, abuse, working hours and minimum wages, anti-bribery, anti-corruption, copyright and trademark protection, personal data protection (<https://personal.dataprotection.bureauveritas.com/privacypolicy>).
- Each of the Parties warrants that neither it, nor its affiliates, has made or will make, with respect to the matters provided for hereunder, any offer, payment, gift or authorization of the payment of any money directly or indirectly, to or for the use or benefit of any official or employee of the government, political party, official, or candidate.
- 16.2 In addition, the Client shall act consistently with the Bureau Veritas' Code of Ethics.
<https://group.bureauveritas.com/group/corporate-social-responsibility>



GUIDANCE NOTE NI 657

NI 657 Classification Scheme under Risk Based Inspection

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SECTION 1

GENERAL

1 General

1.1 General considerations

1.1.1 Offshore units are designed to ensure structural integrity against time dependent deterioration mechanisms such as corrosion or fatigue. Nevertheless, even with a proper design, uncertainties associated with deterioration mechanisms have a wide range. So, inspection, maintenance and repair activities effort is required over the service life to ensure structural integrity. Objective of inspection is to identify defects which may originate from design, fabrication, installation or operations and which, by nature, impair structural integrity. Objective of maintenance and repair activities is to restore to a certain extend the structural integrity.

Risk Based Inspection is a means to establish and update the inspection, maintenance and repair plan of systems all along the service life.

The Risk Based Inspection classification scheme as described in the present Guidance Note, finds its background in the risk management and risk assessment frameworks. The goal of these frameworks is to ensure that the risks for those systems are evaluated during the service life and managed in a way that keep these risks within acceptable limits.

1.1.2 With exception of surveys under risk based inspection classification scheme, classification surveys for maintenance of class are covered and described in the Part A, Chapter 2 of the Offshore Rules defined in [2.1.1].

1.1.3 Specific provisions and/or requirements regarding inspection, maintenance and repair activities may be developed using Risk based inspection (see [4.1]) and accepted by the Society as alternatives to the usual prescriptive class requirements.

1.2 Purpose of this Guidance Note

1.2.1 The present Guidance Note describes the processes and the requirements of the Society for the assignment and maintenance of classification of offshore units using inspection maintenance and repair plans based on or supported by risk based inspection, taking into account the equivalence principle (see Part A, Ch 1, Sec 1, [2.3] of the Offshore Rules).

1.2.2 This Guidance Note includes:

- general context of risk based inspection, see Sec 1, and introduces the equivalence principle, see [4.2]
- the principles and requirements for the management of RBI plans and RBI audits see Sec 2

- the principles and requirements for the development of initial RBI plans, see Sec 3
- the principles for updating RBI plans, see Sec 4
- the summary of the documents to be submitted, see Sec 5.

1.2.3 The application of the present Guidance Note does not cover the statutory surveys requirements, which are not within the scope of the classification.

1.2.4 Scope of RBI

In the context of the present Guidance Note, the possible scope of RBI and the possible systems which may be covered by RBI are defined in [3] of Sec 1.

2 Definitions

2.1 General definitions

2.1.1 The following general definitions, taken for the Offshore Rules, are used in this Guidance Note:

- “Society” means the Classification Society with which the unit is classed
- “Offshore Rules” means the Bureau Veritas “NR445 Rules for the Classification of Offshore Units” and other documents issued by the Society serving the same purpose
- “Owner” means the Registered Owner or the Disponent Owner or the Manager or any other party having the responsibility to keep the unit seaworthy, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Offshore Rules
- “Approval” means the review by the Society of documents, procedures or other items related to classification, verifying solely their compliance with the relevant Offshore Rules requirements, or other referentials where requested.
- “Surveyor” means the technical staff acting on behalf of the Society to perform tasks in relation to classification and survey duties
- “Survey” means an intervention by the Surveyor for assignment or maintenance of class, or interventions by the Surveyor within the limits of the tasks delegated by the Administrations
- “Administration” means the Government of the State for assignment or maintenance of class, or interventions by the Surveyor within the limits of the tasks delegated by the Administrations.

2.2 Specific definitions linked to RBI

2.2.1 IMR and IMR Plan

“IMR” means Inspection, Maintenance and Repair activities.

“IMR plan” means an action plan that includes provisions for IMR. It shall detail for each action:

- scope of action
- window and time to completion
- responsibilities, actors, tools and procedures to perform action.

2.2.2 RBI and RBI plan

- “RBI” means Risk Based Inspection
- “RBI plan” means IMR plan established by means of risk analysis. As such, a RBI plan includes provisions for IMR.

2.2.3 RAC

“RAC” means Risk Acceptance Criteria. A risk assessment criterion is the maximal acceptable value of risk level evaluated during risk assessment.

2.2.4 Items & components

The scope of work of the RBI plan addresses several systems and sub-systems. The basic atoms of these systems and sub-systems are named “components” in the present Guidance Note. “Items” is a generic term of the RBI scope and ranges from one component up to all components, all sub-systems and all systems.

As an example, typical structure breakdown of a hull might range from a tank (system level) down to a weld (component level).

2.2.5 Survey findings

“Survey findings” are defined as:

- all indications on items reported by the Surveyor
- thickness measurements from the thickness measurement company
- inspection findings and indications reported by the Owner and inspection companies, if any.

2.2.6 Mitigation action

“Mitigation action” means maintenance and/or repair action which, when performed, reduces a specific risk.

2.2.7 RBI Classification scheme

A RBI survey system may be considered as an alternative to the continuous survey system for hull, mooring and systems covered by it. When such a system is approved and implemented, intervals between two consecutive surveys may exceed 5 years. It is called “RBI Classification Scheme”.

2.3 Specific definitions linked to risk

2.3.1 Event

Occurrence or change of a particular set of circumstances.

2.3.2 Hazard

Source of potential harm.

2.3.3 Risk

Effect of uncertainty on objectives. In this definition, effect means positive or negative deviation from what is expected.

In this Guidance Note, it is expressed in terms of a combination of the consequences of an event and the associated likelihood of occurrence of that event.

2.3.4 Risk Level

Magnitude of the risk, estimated by combining consequences and likelihoods of threats.

2.3.5 Hazard Identification

Process of finding, recognizing and describing threats.

2.3.6 Risk analysis

Process to understand the nature of risk and to estimate the risk level.

2.3.7 Risk evaluation

Process of comparing the risk analysis results with risk acceptance criteria to determine the status of the risk level.

This status is used for decision making purpose.

Examples of status of risk level are: acceptable, tolerable, not acceptable.

2.3.8 Risk assessment

Overall process of hazard identification, risk analysis and risk evaluation.

2.4 Specific definitions linked to risk management

2.4.1 Risk management

Coordinated activities to direct and control an organisation with regards to risk.

2.4.2 Risk Management framework

Risk management framework is a set of elements that provide the foundations and organisational arrangements for designing, implementing, monitoring, reviewing and continuously improving risk management throughout the organisation.

The foundations include the policy, objectives, mandate and commitment to manage risk.

The organisational arrangements includes plans, relationships, accountabilities, resources, processes and activities.

The risk management framework is embedded within the organisation’s overall strategic and operational policies and practices.

The risk management framework aims at assisting the organisation in integrating risk management into significant activities and functions. The effectiveness of risk management will depend on its integration into the governance of the organisation, including decision-making. This requires support from stakeholders, particularly top management.

2.4.3 Risk management policy

As a component of the risk management framework, the “Risk Management Policy” is a document that clearly describes the organisation’s objectives and commitment to risk management. The commitment should include, but is not limited to:

- the organization’s purpose for managing risk and links to its objectives and other policies
- reinforcing the need to integrate risk management into the overall culture of the organization
- leading the integration of risk management into core business activities and decision-making
- authorities, responsibilities and accountabilities
- making the necessary resources available
- the way in which conflicting objectives are dealt with
- measurement and reporting within the organization’s performance indicators.

3 Scope of RBI classification

3.1 Principles

3.1.1 As a general principle, the RBI framework may be applied to all classed items of an offshore unit. Offshore units are complex system. As an example, the hull part of FPSO’s involves an enormous set of structural components submitted to various degradations mechanisms. This complexity has to be tackled and correctly managed when it comes to establishing its IMR plan. This complexity is usually addressed by using system engineering considerations, modelling the facility in components, sub-systems and systems.

3.1.2 Considered systems

In the framework of the RBI classification scheme described in the present Guidance Note, the following systems may be considered for the scope of the RBI plan:

- hull structure and related equipments located inside tanks
- mooring anchoring system
- offloading buoy structure and related equipments located inside tanks, if any
- risers.

Relevant items regarding the safety aspects, such as means of accesses, hatches, handrails, etc. are to be part of the scope of the RBI plan.

3.1.3 Other systems

Systems other than those described in [3.1.2] might be considered for the scope of the RBI. The Owner is to submit these other systems to the Society for agreement.

3.1.4 As part of the scope of RBI of the hull part, equipments located in the cargo area may be taken into account in the development of IMR plans, in particular when inspection and maintenance of equipment interact with inspection and maintenance of structural parts.

3.2 Agreement

3.2.1 The scope of any RBI classification is to be subject to an agreement between the Owner and the Society. This agreement shall define and list all items to be included in the RBI classification.

3.2.2 All classed items that are not part of the scope of RBI classification are under usual class regime.

4 Overview of RBI

4.1 General

4.1.1 Objective of RBI

The objective of RBI is to provide IMR plans driven by risks levels considered acceptable and as low as reasonably possible.

4.1.2 RBI is generally understood as a methodology to establish inspection plan and mitigation actions plan based on risk control. The risk management framework aims at keeping control on the risks levels over the lifespan of the unit.

4.1.3 A general framework for decision making has to be defined. This framework is to be based on risk analysis: all failure scenarios which may occur in the presence of structural degradation mechanisms have to be analysed for one or several IMR plan(s). A particular IMR plan may be selected for application only if all Safety and Environmental and asset criteria from RAC are fulfilled. By this way, risk assessment enables the Owner to control the damaged state of the facility along the service life.

4.1.4 Added value

Having recourse to RBI approaches helps in:

- Having a proper understanding of the structural behaviour of the unit in presence of degradation mechanisms.
- Being pro-active in the maintenance and repair activities, thereby reducing unplanned maintenance and repair events. As an example, planned maintenance of painting campaigns, highlighted by RBI analysis, helps in reducing repair costs.
- Proper decision making with regard to structural integrity: operational risk is evaluated or quantified in terms of safety, environment and economics, and compared to the corresponding RAC.
- Structuring and supporting the Owner’s organisation in charge of the maintenance of the considered structure.

The refined qualitative RBI and quantitative RBI provide in-depth insight on the risks with regards to specific area/situations. They provide valuable contribution in the decision making process and both determination and updating of the RBI plan.

4.1.5 Establishing and managing RBI plans

RBI process within the classification scope deals with IMR plans:

- To be established initially:
 - either prior or at the beginning of the service life
 - or while the unit is already in service, before the end of term of classification (typically, within 15 months before end of term).
- To be updated after each renewal survey, taking into account observed or forecasted changes. These changes might be inspections/surveys outcomes, environmental, operational and operating conditions, organisational, regulations, legislations, etc.

These IMR plans shall be developed and updated in reference to the Equivalence Principle. Development of an initial inspection plan has to be done in accordance with the prescriptions given in Sec 3. Development of an updated IMR plan has to be done in accordance with the prescriptions given in Sec 4. The process for managing an IMR plan and its relation to classification is done in accordance with the prescriptions given in Sec 2.

4.1.6 RBI is to include the following elements and is to give provisions for all of them:

- scope of IMR: What to inspect/maintain/repair?
- time of actions: When to inspect/maintain/repair?
- method: How to inspect/maintain/repair?
- mitigation actions: What mitigation actions to take based on observed or forecast changes?

4.1.7 RBI takes into account, at minimum:

- design, and conversion drawings if relevant
- survey records
- mitigation records
- operational and environmental conditions
- risk management framework of Owner

to develop and update IMR plans.

4.2 Equivalence principle

4.2.1 IMR plans established using RBI may be accepted as alternatives to survey plans corresponding to class maintenance requirements from the Offshore Rules provided that they are deemed to be equivalent to the Offshore Rules. This equivalence principle is defined in the Offshore Rules Pt A, Ch 1, Sec 1, [2.3].

4.2.2 The RBI plan based on the equivalence principle as described in [4.2.1] deals with both initial IMR plans and IMR plans updated after inspections and surveys. It can be implemented at delivery or after several years in service when the continuous scheme of classification has been chosen by the Owner.

4.2.3 Interrelations between RBI and class

In case the IMR plan established using Risk Based Inspection (referred hereafter to specific provisions) are to be used as an alternative to usual prescriptive class plan, this plan is to be justified and submitted to the Society for approval. In particular, this IMR plan is to be justified in terms of the maintenance of the structural integrity as long as this plan is applicable. Once approved, and after completion of initial RBI audit, RBI scheme with IMR plan enters into force as classification requirements and is to be implemented by the Owner for maintenance of class. Specific provisions are then reflected in a class memorandum. Such provisions indicate references of the IMR plan, which includes:

- the scope of RBI
- the periodicity of inspection of items
- the inspection and mitigation actions.

The Owner is to include those specific provisions in his maintenance management system. Concurrently with class annual surveys and class renewal surveys, the class Surveyor is to verify that the system is properly implemented and controlled by the Owner. Should a class surveyor identify a lack of control, he may decide to cancel the RBI scheme application and to come back to the prescriptive scheme of classification.

SECTION 2

RISK MANAGEMENT AND CLASS PROCESSES

1 General

1.1 Background

1.1.1 The RBI process within the classification scheme is a continuous process. The main driver, with regards to the structure and its integrity, is keeping the levels of risks for personnel, environment and asset, acceptable and as low as reasonably possible. Inspection and maintenance activities provide basic input to the evaluation of the actual structural risks levels. Additional input might include, for example, structural (re)-assessments. Mitigation actions are key elements that provide risk reduction measures, ensuring the risks levels remain acceptable. The risk management framework sets up the necessary processes both on Owner side and Society side to ensure that during the service life of the structure:

- the necessary actions are undertaken for maintaining the risks to the desired/required levels
- the procedures, trained personnel and internal organisation for managing the risk for structures are in place.

2 Risk management

2.1 Reference

2.1.1 The application of RBI within the Society class scheme relies on the risk management principles, risk management framework and risk management processes, as defined in ISO 31000:2018. This Sec 2 describes a set of processes for managing risk based inspection plans, in line with ISO-31000:2018. These processes are integral part of the RBI classification scheme.

2.2 Risk management process overview

2.2.1 Main steps

Within the RBI classification scheme, the risk management process is the following:

a) Initial RBI classification scheme setup

- the Owner is to setup a risk management policy that drives the management of the risk for structures in the Owner's organisation
- an initial RBI plan is to be setup and to be sent for approval to the Society
- if approved, the Society performs an initial RBI audit to ensure the management processes for the risks for structure, on Owner side, are active: that is ensuring that Owner actors are aware of the RBI plan and its management processes and Owner management and procedures.

- upon successful RBI audit, the RBI Classification scheme is implemented and a memorandum is endorsed to reflect it on the classification certificate.

This process and its prescriptions are described in [3.1].

b) RBI Classification scheme

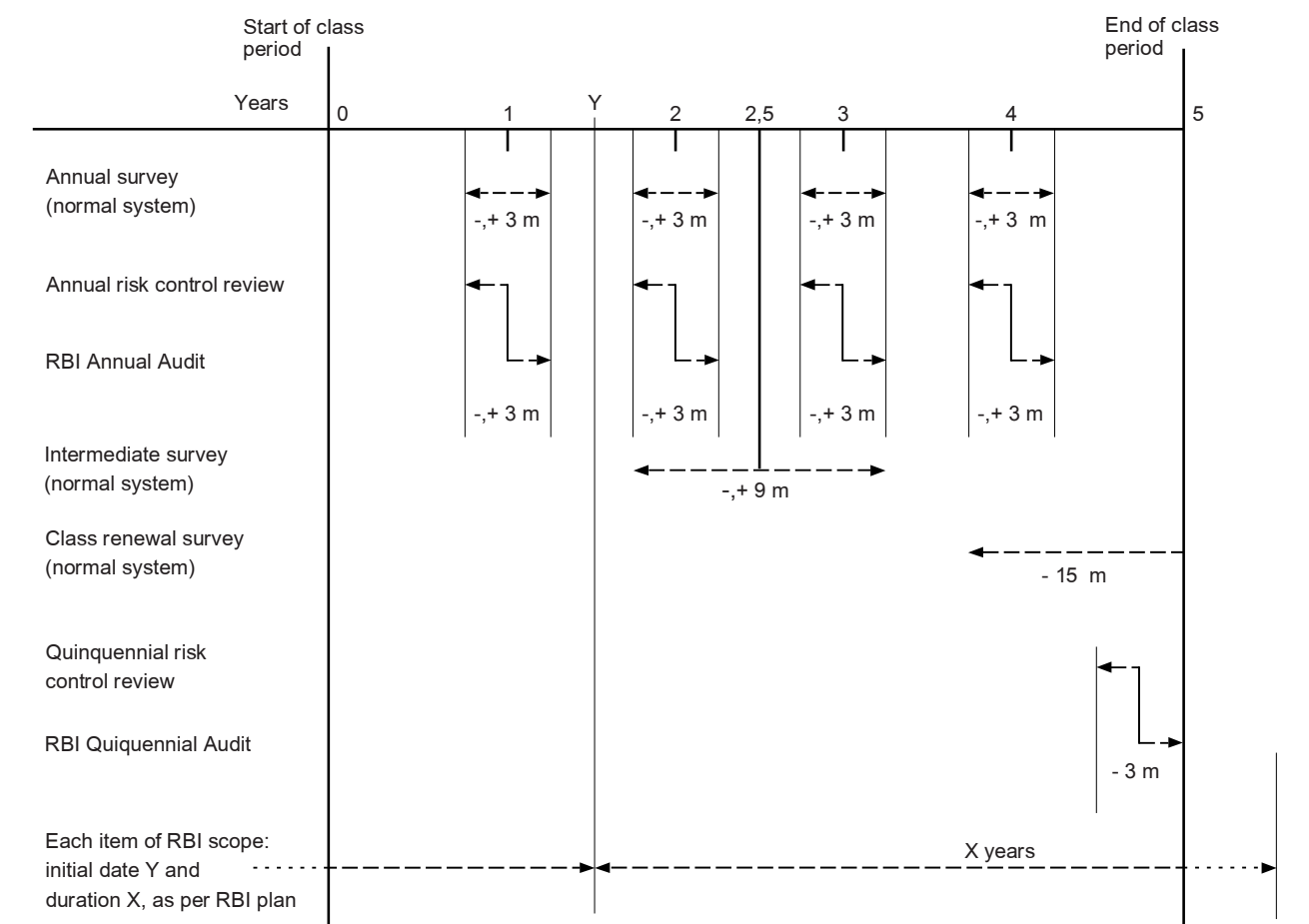
Once the initial RBI classification setup is in place, the risk management processes for structures, includes the following activities:

- Annual risk control review followed by an annual RBI audit. Purpose of these two annual activities is to ensure the risk management processes are running and to ensure that abnormal situations are tracked. The results of the annual RBI audit is a trigger for maintenance of the RBI classification scheme. This process and its prescriptions are described in [3.2] and [3.3].
- Activities between annual risk control review. As part of the risk management process, the Owner is to follow the RBI plan and track and report to the Society any significant changes which might strongly impact the risks levels determined during the risk workshop described in Sec 3, [5.1.1]. This process and its prescriptions are described in [3.4].
- Every five years, a renewal risk control review followed by a renewal RBI audit. The renewal RBI audit is related to the RBI processes. Purpose of these two quinquennial activities is to ensure that the risk management processes are running, to ensure that abnormal situations are tracked and to review and update the RBI plan. During the RBI updating, inspection and surveys records, mitigation actions, operational activities as well as organisational changes are reviewed in depth. Risk and risks levels are reviewed and re-evaluated, the RBI plan updated and submitted to the Society for approval. Once approved, the Society performs a renewal RBI audit to ensure the management processes for the risks for structure, on Owner side, are active. Upon successful audit, the RBI Classification scheme is confirmed through amendment of memorandum, as necessary. This process and its prescriptions are described in [3.5] to [3.8].

2.2.2 Time line

The link between the class survey dates, risk control reviews and audits is given in Fig 1.

Figure 1 : links between surveys dates, risk control review dates and RBI audit dates



3 RBI class Process

3.1 Initial RBI classification setup

3.1.1 Risk management commitment

A risk management policy document, related to risk management of the items that are part of the RBI scope, is to be submitted by the Owner to the Society, for information. In particular, this document is to clearly convey the Owner’s objectives and commitments to risk management for the considered systems of the RBI scope. Reference for such risk management policy is section 5 of ISO-31000:2018.

3.1.2 RBI approach and methodology

The Owner is to submit its RBI approach and methodology to the Society for information. As a required condition for the application of the RBI classification scheme, this RBI approach and methodology is to comply with the present note requirements.

3.1.3 It is up to the Society to review and to recognise RBI approach and methodology proposed by the Owner as a consistent approach for decision making under uncertainties.

3.1.4 Initial RBI plan

An initial RBI plan is to be established, as described in Sec 3. As part of the process for establishing this initial RBI plan, a

Risk Workshop is to be held with main stakeholders, which includes Owner, Society representatives and inspection company representatives, as required in Sec 3, [5.1.1]. This Risk Workshop is to be organized by the Owner. The methodology(ies) used to establish the inspection plan and mitigation actions plan are to comply with definitions and requirements in Sec 3 and Sec 4.

3.1.5 Initial RBI plan class review

The whole dataset, and particularly the assumptions used in [3.1.2] and [3.1.4] is to be submitted to the Society for information. The aim of the review is to ensure that:

- these assumptions are recognised by the Society. To that purpose, the Society may request a baseline inspection or alternatively additional inspections and/or thickness gauging of concerned structures and relevant items that are part of the RBI scope
- appropriate RAC are being used in accordance with Sec 3, [2.1]
- the methodology(ies) used comply with the Society requirements.

3.1.6 Initial RBI plan approval

The initial RBI plan is to be submitted to the Society for approval.

3.1.7 The inspection, maintenance and mitigation actions plans are established over a certain period of time, at minimum until the next renewal risk control review, when they are to be updated and submitted for approval. The agreement is only valid until the next renewal risk control review.

3.1.8 In case the submitted RBI plan and its methodology is not deemed equivalent to the Offshore Rules by the Society, the usual classification scheme (normal or continuous) will apply, as per the requirements Part A of the Offshore Rules.

3.1.9 Documents to be submitted for initial classification setup

In the context of the initial RBI classification setup, the list of documents to be submitted to the Society includes:

- Owner Risk management policy and corresponding internal procedures
- list of documents given in Sec 3, [1.3]
- initial RBI plan.

3.1.10 Initial RBI audit

An initial RBI audit is to take place upon successful approval of the initial RBI plan. This initial RBI audit aims at establishing and confirming that:

- the risk management policy procedures and organisation within Owner's organisation, with regards to structural risk management, are in place and active
- the people in charge of the follow-up of the RBI plan and the RBI processes are effectively trained and informed of the RBI class approach and Owner risk management policy
- the RBI plan is in place and running.

The initial RBI audit is to review:

- a) the risk management policy document
- b) the effective awareness and training level of people in charge of the RBI plan within Owner's organisation
- c) the initial RBI plan.

3.1.11 Entry into force of RBI scheme of classification

Upon successful initial RBI audit, the RBI scheme of classification is implemented for five years with endorsement of a memorandum detailing the extent of the RBI scope and mitigation actions scope, as defined in the initial RBI plan, together with reference to the approved RBI plan.

3.2 Annual risk control review

3.2.1 The Annual risk control review is part of the risk management process. Its goal is to ensure that:

- a) normal or abnormal degradation of the structure performance is acknowledged and tracked by both the Owner and the Society
- b) consecutive corrective action are defined and planned as part of the risk management process, in case of outstanding conditions

- c) deviations from the IMR plan are tracked and consecutive corrective actions are defined and planned to keep the risk levels in accordance with the RAC.

3.2.2 The Society shall be part of the annual risk control review process.

3.2.3 Documents to be submitted

To prepare the annual risk control review, the documents used for the review as described in [3.2.4] are to be submitted to the Society prior the review.

3.2.4 Main process

The main process to be followed includes, but is not limited to, the following points:

- Review of the Owner risk management policy. Significant changes are to be examined.
- Review of the inspection and mitigation actions:
 - planned and performed
 - planned and not performed
 - not planned and performed
 - performed ahead schedule or performed with delay.
- Review of the survey reports, load master records, outcomes of the survey findings, and mitigation actions.
- In case of outstanding structure condition (including class recommendations) or significant changes in operating conditions, a risk re-assessment of all concerned items is to be performed. The RBI plan is to be updated accordingly as described in Sec 4, and submitted to Society for approval.

3.2.5 Conclusive report

The outcome of annual review of the risks for the structure is a conclusive report. It is to document the review and is to be submitted to the Society for approval.

3.3 Annual RBI audit

3.3.1 The purpose of this annual RBI audit is to verify that the RBI scheme of classification is being correctly applied and followed, in particular that abnormal structural risks changes are properly addressed. The annual RBI audit shall also include provision for the changes inside Owner's organisation and changes to Owner's risk management policy.

3.3.2 The annual RBI audit is carried out upon completion of the annual risk control review. This annual RBI audit is to take place during the class annual survey window, see Fig 1.

3.3.3 The elements used for the annual risk control review and the elements produced during the annual risk control review are to be made available for the annual RBI audit.

3.3.4 Classification

The outcome of the annual RBI audit might lead to:

- endorsement of a class recommendation and/or observation
- revoke RBI classification scheme.

3.4 Owner activities between annual risk control reviews

3.4.1 The RBI classification scheme applies for inspections, maintenance and repair activities planned as part of the RBI plan. The Owner is responsible for ensuring implementation and follow-up of the RBI plan. Owner internal procedures, including the risk management policy document, are to provide a rational and managerial support to ensure completion of the IMR plan.

3.4.2 The Owner is to report to the Society any abnormal situation, accidental event, out of range specification/situation that impact structure and systems integrity and which nature can raise the risks levels of the concerned systems.

In such situation, the Owner or the Society might request a risk re-assessment (see Sec 4), leading potentially to an update of the RBI plan. As part of this update, monitoring, mitigation actions and further inspections might be defined to remedy to the situation.

3.4.3 Changes to Owner's risk management policy are to be reported to the Society, at the latest before it enters in force within the Owner's organisation.

3.5 Renewal risk control review

3.5.1 Every five years, an in-depth review of the RBI plan and associated risk levels is to take place. Such a review aims at keeping the risks levels acceptable and as low as reasonably practicable, by:

- providing a global and in-depth review of the structure actual condition to all stakeholders
- highlighting deviations from forecast condition and from previous risks assessments
- highlighting abnormal situations related to topics such as operations, structure condition, degradation processes, environmental conditions, etc.
- updating the RBI plan according to the observed/foreseen changes in structure condition.

3.5.2 A Risk update Workshop is to be performed (see Sec 4), involving all relevant stakeholders. Representatives of Owner, Society and inspection company(ies) are to attend. This workshop is to be organized by Owner. The methodology(ies) used to update the inspection plan is to comply with definitions and requirements in Sec 3 and Sec 4.

3.5.3 The main activity of the workshop is the update of the RBI plan, as described in Sec 4. It consists in a risk re-assessment of the considered systems, given new information related to the systems conditions, risk management processes, operations conditions and environmental conditions. The RBI plan is updated accordingly.

3.5.4 Document to be submitted to the society

Prior the renewal risk control review, the following documents are to be submitted to the Society:

- any change to the documents used for the initial classification setup

- inspection and survey reports
- mitigation action reports
- list of documents given in [3.2.3].

3.5.5 Updated RBI plan approval

Upon completion of the risk update workshop, the updated RBI plan is to be submitted by the Owner for approval by the Society.

3.6 Renewal RBI audit

3.6.1 Every five years, an in-depth RBI audit is to take place. The renewal RBI audit is carried out upon successful completion of the renewal risk control review. This renewal RBI audit is to take place during class renewal survey window (see Fig 1).

3.6.2 The purpose of this renewal RBI audit is to verify that the RBI scheme of classification is being correctly applied, and that Owner's people in charge of the RBI plan are informed of changes coming from the quinquennial RBI plan update.

3.6.3 The elements produced during the renewal risk control review are to be made available for the renewal RBI audit. This includes, but is not limited to, the following documents:

- Owner organisation for structural risk management framework
- RBI plan update document approved by the Society:
 - inspection plan update
 - mitigation action plan update.

3.7 Classification

3.7.1 Upon completion of satisfactory renewal RBI audit, the RBI scheme of classification is confirmed through amendment of memorandum, as necessary. This memorandum details the extent of the RBI scope together with reference of the updated approved inspection and mitigation plans.

3.7.2 The outcome of the renewal RBI audit might lead to:

- endorsement of a class recommendation and/or observations
- revoke RBI classification scheme.

3.8 RBI classification maintenance and withdrawal

3.8.1 The RBI Classification scheme might be revoked, if the requirements in the present Guidance Note are not met. In that particular case, the usual classification scheme (normal or continuous) will apply at the date of revoking, as per the requirements Part A of the Offshore Rules. It may therefore lead to additional surveys especially when periodicity of inspections had exceeded 5 years during the RBI scheme period.

SECTION 3

DEVELOPMENT OF INITIAL RBI PLAN

1 General

1.1 RBI Principles

1.1.1 The RBI plan established by the Owner is to follow the general principles and the prescriptions given from [1.2] to [1.3].

1.1.2 Once established, this RBI plan is to be managed as per risk management processes as described in Sec 2, [2.2].

1.2 Steps of RBI

1.2.1 It is a requirement that the working process of RBI analysis for offshore units is structured and targeted to assess and control risks. Thus, any RBI study is to include the following steps:

- definition of the scope of the RBI: this is a description of all structural and non structural items to be included in the scope of the RBI scheme of classification
- definition of RAC, described in Article [3]
- risk workshop, as described in Article [5], with the objectives:
 - identification of main hazards and degradation mechanisms
 - to identify the failure scenarios for all items
 - to assess, for each failure scenario of related items, the associated risks levels, and determine the most critical items which will be submitted, if required, to refined analysis, which might include quantitative RBI analysis
 - to establish, for each failure scenarios, the impact of the mitigation actions on risks level for the items of the RBI scope and the risk levels for these mitigation actions
- refined qualitative RBI analysis, if required (see [4.2]). Output of such analysis can be used as input to the risk workshop
- quantitative RBI analysis, if required (see [4.3]). Output of such analysis can be used as input to the risk workshop
- establishment of the IMR plan, see [6], based on the risk workshop results and companion refined risk qualitative analysis(es) and/or companion quantitative risk analysis(es). This IMR plan is to be submitted to the Society for approval on the basis of the equivalence principle.

Once the IMR plan has been developed, it undergoes the following steps:

- approval of IMR plan by the Society
- implementation of the RBI plan by the Owner
- follow-up and updating of the RBI plan, based on annual and quinquennial frequencies.

The output of RBI study consists in inspection, maintenance and repair (IMR) action plans fulfilling RAC and based on risk assessment. This RBI plan is to be maintained and updated as described in Sec 4.

1.2.2 The steps listed in [1.2.1] are mandatory. The way by which these steps are developed and implemented may vary and depends on the selected RBI methodology.

1.3 Information to be submitted to the Society

1.3.1 General

RBI study is to be performed under the responsibility of the Owner and results submitted to the Society.

1.3.2 Information to be submitted to the Society prior the risk workshop

The following inclusive list of information, but not exhaustive is to be submitted to the Society for information:

- RBI Study:
 - scope of RBI, including, if relevant, equipment considerations
 - all relevant structural drawings and non structural drawings pertaining to the items of the scope of RBI
 - RBI approach and methodology
 - Owner RAC
 - inspection Matrix or equivalent
 - refined qualitative RBI analyses, if any
 - quantitative RBI analyses, if any. This has to include stochastic description of random variables
 - every document used to perform the RBI analysis (in particular reference documents quoted in the above documents) may be required
 - any engineering or risk studies that complement the knowledge of the structural integrity, given survey findings results or repairs (reinforcements) activities
- for existing in-service offshore units:
 - inspection and survey reports, including thickness measurements and NDT inspections outcomes
 - mitigation action reports.

1.3.3 Information to be submitted to the Society after the risk workshop

- RBI Study:
 - risk workshop outcomes
 - refined qualitative RBI analyses if any
 - quantitative RBI analyses, if any, including stochastic description of random variables
 - every document used to perform the RBI analysis (in particular reference documents quoted in the above documents) may be required.

2 Scope of RBI classification

2.1 General

2.1.1 Refer to Sec 1, [3] for the principles, considered systems and agreement for the scope of RBI classification.

3 Risk acceptance criteria

3.1 Class acceptance

3.1.1 The RAC are to be set at minimum according to the standard practice of the industry.

3.1.2 Specific requirements about RAC may be imposed by various Administrations and / or Authorities. If it is the case, it is mandatory that the RAC used in the RBI plan fulfil these specific requirements.

3.1.3 The RAC to be used for the RBI study are to be submitted to the Society for information.

3.1.4 Referring to the equivalence principle, RAC are to provide equivalent or better risk levels than the implicit ones of the Offshore Rules. The Society reserves the right to reject RAC which are considered to provide higher risks levels than the implicit ones of its Offshore Rules.

3.2 Principles

3.2.1 Risks to be considered

In the context of the present Guidance Note, the RAC shall, at minimum, consider the following risks:

- risk to Personnel (risk of injury, loss of lives)
- risk to the Environment (risk of pollution)
- risk to the Asset (economical risk).

3.2.2 Additional RAC, such as reputation, etc. might be used at the discretion of the Owner. Such criteria are not part of the requirements of the Society.

3.2.3 Risk level evaluation

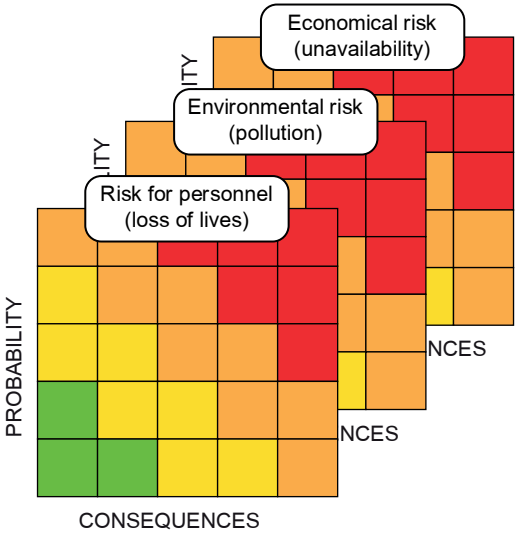
The computed risks levels, using either qualitative risk analysis or quantitative risk analysis for personnel, environment and asset (see [4.1.1]), are to be lower than their respective maximum acceptable values.

3.2.4 Definition of the acceptable risk values may use risk matrices (see Fig 1).

3.2.5 RAC and reliability methods

RAC may be checked using maximum acceptable values of the annual probability of failure. In that case, the calculated annual probability of failure is to be lower than the maximum acceptable annual probability of failure. This checking may be done at component and/or system level. Maximum acceptable values for the annual probability of failure shall be derived from the maximum acceptable values of the various risks.

Figure 1 : example of risk matrices for personnel, environment and asset



3.2.6 RAC scaling

RAC are generally defined at facility level and thus relations between all considered and relevant systems, sub-systems and components shall be taken into account when RAC have to be derived at the component, sub-system or system level. In particular, the RBI methodology is to include provisions for the RAC for all items for which risks are evaluated.

4 Risk assessment

4.1 General

4.1.1 Risk assessment process

Qualitative and/or quantitative methods may be used to perform risk assessment. These methods are complementary to each other.

Whatever the RBI methodology is, the risk assessment process of the systems submitted to RBI for class is to follow the usual steps:

- hazard Identification
- assess frequency (likelihood) and the severity (consequences) of hazardous event
- assess risk level
- compare risk level to Owner risk acceptance criteria.

4.1.2 Engineering criteria

The risk analysis is to take into account degradation mechanisms and corresponding engineering criteria that defines the failure. As a basis, the engineering criteria for corrosion is to be the ones defined in the Offshore Rules, Pt A, Ch 2, App 1, [4].

Alternatives to the Offshore Rules might be proposed provided that they are supported by sound scientific considerations, and is subject to the Society agreement.

4.2 Qualitative RBI

4.2.1 Qualitative RBI is mandatory. It is the basis of the risk workshop described in Article [5].

4.2.2 Refined qualitative RBI

Refined qualitative RBI analysis may be also developed if:

- There is no critical element that justifies having recourse to quantitative RBI. In that case, refined qualitative RBI analysis, based on the results of the risk workshop, will give a better understanding of the facility in terms of safety, environmental and asset damage risks.
- There are no quantitative degradation models applicable to one or several items. In that case, refined qualitative RBI analysis using specific inputs will give the risk level of the most critical items which should have been analysed using quantitative RBI if quantitative degradation models had been available.

4.2.3 Risk level evaluation

Risk level is to be evaluated using both likelihood of failure and consequence of failure and is to be compared with the RAC.

4.2.4 Qualitative RBI analysis that does not meet the requirement described in [4.1] and [4.2] may only be used as input to the RBI workshop. In that case, development of RBI plan based on these qualitative analyses is not allowed.

4.3 Quantitative RBI

4.3.1 Quantitative RBI is applied, if required, for the most critical items as identified during the Risk Workshop or during preliminary analysis(es). Quantitative RBI is optional.

4.3.2 Quantitative RBI analysis that do not meet the requirement described in [4.1] and [4.3] can only be used as input to the RBI workshop. In that case, development of RBI plan based on these quantitative analyses is not allowed.

4.3.3 Quantitative models for degradation mechanisms

Quantitative RBI is based on quantitative probabilistic models for fatigue, corrosion and other degradation modes, provided degradation models are available.

All uncertainties are to be taken into account including model uncertainties.

The annual probability of failure of a component is computed and compared to the acceptable annual probability of failure or used to compute the annual probability of failure at system level. It is a requirement that the best available and recognised quantitative degradation models (fatigue, corrosion, others) are used in the quantitative RBI step.

Use of quantitative probabilistic models requires to identify basic random variables and to define a stochastic description of these variables.

It is a requirement that the best available and recognised practices are used for defining this stochastic description.

4.3.4 Likelihood of failure

Quantitative RBI uses numerical values of parameters for the probability and consequence evaluation of the risk analysis. As a minimum, fatigue lives of structural components as calculated at the design stage and expected corrosion rates of the various structural areas of the hull should be

used. Low Cycle fatigue should be considered, in particular for those offshore hulls designed without proper consideration for this kind of phenomenon.

4.3.5 Probability of detection curves (PoD curves)

Each inspection method is characterised by a probability of detection curve (PoD curve) which characterises its reliability in terms of detection. To calculate the probability of failure of an item along time given an inspection has been performed, the PoD curve of the relevant inspection method is to be used. This calculation process is known as the “reliability updating” process.

4.3.6 Updating of probabilities

Bayesian updating is used to update the annual probability of failure given inspection results or mitigation action consequence. Alternative methods for updating probabilities are to be agreed with the society prior usage. Due to the fact it is not possible to anticipate the results of fatigue (crack size) or corrosion measurements (remaining thickness), the updating process is generally based on a-priori assumptions of detection or no-detection.

5 Risk workshop

5.1 General

5.1.1 A risk workshop is to take place with the objective to facilitate the completion of the various tasks of the RBI study and to facilitate the understanding for Class.

5.1.2 This Risk Workshop is to be part of the RBI methodology used. It is required as part of the risk management process, as stated in Sec 2, [3.1] and in Sec 2, [3.5].

In the context of initial RBI step-up, it is called Risk Workshop. In the context of the RBI updating it is called Risk update Workshop. The overall process to follow is the same for both.

5.2 Activities

5.2.1 General

The Risk Workshop follows the general process of risk assessment to evaluate the risks of the various items of the scope of RBI. It uses the RAC to assess the status of risk levels of all the items. Items with high and/or unacceptable risks levels are selected for mitigation actions, through a risk based decision process, described in [6.3].

5.2.2 Reviews

The workshop is to start with a review of the documentation available with regards to the RBI scope of work. This includes, if relevant, and non limited to:

- review of the items of the scope of RBI
- review of design and architecture of the facility and review of its design criteria
- review of construction, installation records and history
- review of in-service structural modifications
- review of environmental conditions

- review of operations
- review of inspections and surveys findings
- review of repair and maintenance activities
- review of Owner risk management framework
- review of RAC and Owner risk assessment procedures.

5.2.3 Hazard Identification

Identify the main hazard linked to the considered items. This includes review the failures modes on all items, such as corrosion, buckling, high stress concentration area, fatigue (including low cycle fatigue), wear, global strength, leakages, etc. In the identification process, consideration is to be made for local areas as well as larger parts of the structure.

5.2.4 Risk assessment

If available, a review of pre-existing risk and engineering analyses outcomes is to be performed. They are to be used as input to the risk assessment for inspection and mitigation actions.

During the Risk Workshop, the various participants contribute to:

- the evaluation of the likelihood of the various failure scenarios
- evaluation of the consequences of the failure scenarios, for the risk to personnel, environment and asset
- evaluate the risk level of the failure scenarios and compare with risk acceptance criteria.

The outcome shall serve as a basis for establishing the inspection frequencies, of the various areas under consideration and tanks of the offshore unit.

5.2.5 Mitigation actions

Usually, it is highly recommended that, during the Risk Workshop, for each failure scenario, a review of the existing barriers to the risks and the possible mitigation actions takes place. The process to be used is the one described in [6.3].

5.3 Main actors

5.3.1 The risk workshop is to involve:

- Society side:
 - RBI experts from the Society
 - people with a strong knowledge of the facility such as people involved in the Classification of the facility, structure expert, etc
 - people in charge of surveys such as Society surveyors
- Owner side:
 - RBI contractor: it is the organisation performing the RBI study. As such, it is to manage and lead the risk workshop
 - people with a strong knowledge of the design and construction of the unit structure and its history, such as people involved in engineering steps, construction follow-up
 - people who know the operations on-board the unit, such as the OIM (Offshore Installation Manager) and any other people with same kind of knowledge
 - people in charge of in-service inspection from the Owner side

- if relevant, Process and Utility people (persons who know both the operations and the risk associated to the equipments and utilities located on the Topsides part of the unit - risk of explosion/fire, - and who know the risk that initial events from the process part lead to damages or degradation mechanisms to the hull)

- Inspection contractor(s):

- people having a good knowledge of the facility and its inspections.

6 Establishing RBI plan

6.1 Main process

6.1.1 As a rule, the RBI plan has always to be determined and reviewed using human expert judgement, based on risk assessment results.

6.1.2 Relationships between the RBI plan, the conditions of the items, the failure mechanisms and the associated risks have to be explicitly determined, stated, shared amongst all stakeholders, tracked in time and documented in the RBI plan. This process is supported by the risk management framework which is to ensure awareness and understanding to all stakeholders of the risks for the considered items.

6.2 From risk to inspection

6.2.1 Inspection Matrix

When using qualitative risk analysis to establish risk level for the items, their inspection frequency might be set using a correspondence matrix between risk levels and inspection frequency. This matrix is called inspection matrix. It is to be established based on Owner risk matrix, validated by the Owner and submitted to Society for information.

6.3 Mitigation actions

6.3.1 Main process

In the process of establishing IMR plans based on risk assessment, the decision making of the mitigation actions is to be performed by comparing the risk levels of various mitigation actions alternatives and select the most appropriate one. It is to be performed using the following steps:

- evaluation of the structural risk level without mitigation action
- evaluation of the structural risks levels with mitigation actions; this includes evaluation of the risk of performing the mitigation itself: risk to personnel for entry and/or performing work into confined space for example. Several mitigation actions alternatives might be considered
- comparison of the two aforementioned risks evaluations, i.e. with and without mitigation action, to support decision making on the mitigation actions
- documenting and reporting of the whole decision process through steps a) to c).

SECTION 4

UPDATING OF RBI PLAN

1 Updating of RBI plan

1.1 General

1.1.1 A RBI plan (initial one or updated one) is to be checked and updated to ensure that the risks levels related to the items remain acceptable and as low as reasonably practicable. This process of updating the risks knowledge is part of RBI classification scheme and has its foundations in the risk management processes, such as described in Sec 2.

1.1.2 RBI plan updating occurs either as part of the quinquennial risk control review, or when outstanding situation occurs and requires a risk re-assessment and RBI plan updating.

Survey findings, inspection reports and monitoring reports, maintenance and repair reports, operational and environmental conditions are the basis to develop updated RBI plans. When appropriate, other relevant elements that might need to be considered as well shall be part of the RBI plan updating.

1.1.3 The RBI plan is to be updated according to the general principles and the prescriptions given in [2.2].

2 Updating process

2.1 Documents to be submitted to the Society

2.1.1 Prior the quinquennial risk control review, the documents / information to be submitted to the Society are similar to those of the collection of information task, listed in [2.2.2]. Additional information has to include:

- inspection and survey reports
- mitigation action reports
- if relevant, report on the evaluation of the condition of the unit
- additional relevant structural/risk analyses, if any.

2.2 Steps to be performed

2.2.1 The updating of RBI plans is a process which includes the following three steps, described more in depth below:

- collection of information
- risk update workshop
- other activities.

2.2.2 Collection of information

The collection of information step is to gather all relevant information which allows deep knowledge about the condition of the items, and any changes (past or future) that, by nature, might impact the items condition or its maintenance. This includes, but not limited to:

- all previous survey and inspection findings
- monitoring data
- maintenance and repair activities reports
- changes in operations and operating conditions, including lightweight survey report
- changes in environmental conditions
- structural changes, such a revamping or upgrading
- incidents and accidents reports
- changes in the Owner company RAC or in Administrations RAC
- changes in the Owner company management framework.

Origin of damages should be investigated with the objective to consider and determine the most appropriate action/mitigation plan to address them.

The collection of information step is also to provide insight on deviation of IMR activities from the previous RBI plan, by tracking IMR activities that where:

- planned and performed
- planned and not performed
- not planned and performed
- performed ahead schedule or performed with delay.

Following this tracking of deviations of IMR activities, a risk management framework coherence check is to be performed, see [2.4.3].

As part of the collection of information, it is to be checked that the RAC used previously and the Owner's risk evaluation procedures remain unchanged. The updated IMR plan is to comply with Owner's risk evaluation procedures and RAC that are currently in force.

2.2.3 Risk update workshop

The Risk update Workshop, is similar to the Risk Workshop as described in Sec 3, [5.1.1]. It includes the following activities:

- Review of Owner risk management policy: current processes in place, current team including responsibility, accountability and authority to manage the risks for the items within the scope of the RBI. A review of the Risk Management coherence check is to be performed.

- Update knowledge on main previously identified hazards and degradation mechanisms. Foreseen degradation mechanisms have to be anticipated in the updating process, so that the updated RBI plan, at the time it enters in force, incorporates the foreseen changes (for example, at the end of coating life, corrosion is expected to extend and occur more frequently and has to be anticipated in the RBI update).
- Review of both the inspection and mitigation actions:
 - planned and performed
 - planned and not performed
 - not planned and performed
 - performed ahead schedule or performed with delay
 - inspections, surveys and mitigation actions outcomes.
- Update knowledge on the most critical items, which will be submitted, if required, to quantitative RBI analysis. New items might be identified as critical items during the update.
- Evaluation and update of structural risk levels, mitigated and unmitigated, given the survey findings and changes. Establish for each failure scenarios, impact of mitigation actions on risks level for the items and risks levels for those mitigation actions: unmitigated and mitigated risks shall be evaluated, to assess the appropriateness of the mitigation actions.
- Ensure that RAC are met. If not, mitigation action shall be evaluated in terms of risk reduction, ensuring that the mitigated risk remain acceptable. In the case corrective actions remains ineffective, the RBI Classification scheme might be revoked as stated in Sec 2, [3.8.1].

2.2.4 Other activities

Other activities might be required to complete the updating process, depending on the findings of the collection of information step, risk update workshop outcome, and RBI methodology used. These are, but not limited to:

- if required, perform structural analysis(es) to update knowledge on the structural integrity of the unit considering its actual and foreseen structural condition

- refined qualitative RBI analysis, if required (see Sec 3, [4.2])
- quantitative RBI analysis, if required (see Sec 3, [4.3]).

Results of these activities are to be used as input to the risk updating workshop.

2.3 Risk acceptance criteria

2.3.1 Updated plans are to fulfil the RAC which are in force.

2.3.2 In case RAC has been changed since initial RBI plan, a specific Management of Change procedure is to be established and agreed with the Society. It should highlight the impact of changes on the RBI plan and overall risk levels. The whole risk results of the risk screening are to be examined and updated in light of the new RAC.

2.4 Class provisions

2.4.1 Class provision for repair

Class provisions for repair to be defined, as part of the updated IMR plan, are given in Offshore Rules Pt A, Ch 2, Sec 1, [1.1.1] and Pt A, Ch 2, Sec 1, [1.4.2], and are endorsed as Recommendations and/or Observations.

2.4.2 Specific provisions for repair may be accepted by the Society by reference to the equivalence principle (see Sec 1, [4.2.1]). Structural monitoring may be accepted as a mitigation measure by the Society if deemed relevant.

2.4.3 Risk Management coherence check

Deviations from planned IMR activities should be challenged in the light of the risk management framework and Owner's internal procedures and policies. This is to be performed as part of the collection of information and investigated during the Risk update Workshop. Corrective actions to the situation are to agreed between the Owner and the Society and stated as part of the Class specific provisions.

In the case corrective actions remains ineffective, the RBI Classification scheme might be revoked as stated in Sec 2, [3.8.1].

SECTION 5 DOCUMENTS TO BE SUBMITTED

1 General

1.1 Purpose

1.1.1 This Section describes the documents to be submitted for each steps of the RBI class process. The mentioned list of document is the minimal basis and the Society reserves the right to require more documents as deemed necessary.

The main considered steps are:

- initial RBI plan
- initial RBI audit
- annual risk control review
- annual RBI audit
- renewal risk control review
- renewal RBI audit
- updating RBI plan.

Table 1 : Minimal list of documents to be submitted to the Society, as part of the initial RBI plan elaboration

Prior to Risk Workshop	Prior to RBI Study	<ul style="list-style-type: none"> • Owner Risk management policy document and corresponding internal procedures • Owner Organisation for structural risk management framework 	I
		RBI approach and methodology and all assumptions used	I
		Inspection Matrix or equivalent	I
		Owner RAC	I
		Scope of RBI, including, if relevant, equipment considerations	G
	RBI Study documents	Agreed Scope of RBI, including, if relevant, equipment considerations	I
		All relevant structural drawings and non structural drawings pertaining to the items of the scope of RBI	I
		Refined qualitative RBI analyses, if any	I
		Quantitative RBI analyses, if any. This has to include stochastic description of random variables, degradation models and related variables, computational procedures and validation	I
		Every document used to perform the RBI analysis (in particular reference documents quoted in the above documents) may be required	I
		Any engineering or risk studies that complement the knowledge of the structural integrity, given survey finds results or repairs (reinforcements) activities	I
	For existing in-service offshore units	<ul style="list-style-type: none"> • Inspection, reports, including NDT reports • Survey reports • Thickness measurements reports • Inspection reports A resume of surveys and inspection findings is to be provided	I
		A detailed spreadsheet (planning format) with all IMR activities that where: <ul style="list-style-type: none"> • planned and performed • planned and not performed • not planned and performed • performed ahead schedule or performed with delay 	I
		Mitigation action reports: maintenance and repair activities reports	I
		Historical Structural changes, if any	I
		Engineering structural evaluation and risk evaluations due subsequent to changes related to the facility	I
After Risk Workshop	Output of RBI study	Risk workshop outcomes	I
		Refined qualitative RBI analyses if any	I
		Quantitative RBI analyses, if any. This has to include stochastic description of random variables, degradation models and related variables, computational procedures and validation	I
		Every document used to perform the RBI analysis (in particular reference documents quoted in the above documents) may be required	I
		The initial RBI plan (including inspection, maintenance and mitigation actions)	A

1.1.2 Type of document submission

Documents to be send to the Society are either to be send for information or to be send for approval.

In the following tables:

- ‘I’ stands for ‘to be send to the Society for Information’
- ‘A’ stands for ‘to be send to the Society for Approval’
- ‘R’ stands for ‘to be send to the Society for information on request’
- ‘G’ stands for ‘to be send to the Society for Agreement’.

2 Minimum list of documents to be submitted for each step

2.1 Initial activities

2.1.1 Initial RBI plan

The documents to be submitted for initial RBI plan are listed in Tab 1.

2.1.2 Initial RBI audit

The documents to be submitted for initial RBI audit are listed in Tab 2.

2.2 Annual activities

2.2.1 Annual risk control review

The documents to be submitted for iannual risk control review are listed in Tab 3.

2.2.2 Annual RBI audit

The documents to be submitted annual RBI audit are listed in Tab 4.

2.3 Quinquennial activities

2.3.1 Renewal risk control review

The documents to be submitted renewal risk control review are listed in Tab 5.

2.3.2 Renewal RBI audit

The documents to be submitted renewal RBI audit are listed in Tab 6.

Table 2 : Minimal list of documents to be submitted to the Society, as part of the initial RBI audit

During initial RBI audit	<ul style="list-style-type: none">• Owner Risk management policy document and corresponding internal procedures• Owner Organisation for structural risk management framework	I
	Elements used for the annual risk control review	R
	Elements produced during the annual risk control review	R
	Initial RBI plan	I

Table 3 : Minimal list of documents to be submitted to the Society, as part of the annual risk control review

Prior to Annual Risk Control Review	A detailed spreadsheet (planning format) with all IMR activities that where: <ul style="list-style-type: none">• planned and performed• planned and not performed• not planned and performed• performed ahead schedule or performed with delay	I
	Inspection and survey reports, including a resume of surveys and inspection findings	I
	Mitigation action reports	I
	Load master records	I
	Initial and if any, updated RBI plan(s)	I
	Documents and/or statements related to changes in: <ul style="list-style-type: none">• operational conditions• environmental conditions• structures due to repairs or facility upgrading• Owner Risk management policy document and corresponding internal procedures	I
After Annual Risk Control Review	Conclusive Report of the Annual risk control Review; If relevant, Risk re-assessment report and subsequent Risk updating report	A

Table 4 : Minimal list of documents to be submitted to the Society, as part of the annual RBI audit

During annual RBI audit	<ul style="list-style-type: none">• Owner Risk management policy document and corresponding internal procedures• Owner Organisation for structural risk management framework	I
	Elements used for the annual risk control review	R
	Elements produced during the annual risk control review	R
	Risk re-assessment, and consequent RBI updating, if any	I
	Conclusive report of the Annual Risk Control Review	I

Table 5 : Minimal list of documents to be submitted to the Society, as part of the renewal risk control review

Prior Risk Workshop	Prior RBI updating study	Changes in the Owner company RAC or in Administrations RAC	I
		Changes in the Owner company management framework and/or changes in corresponding internal procedure and/or organisation	I
		Changes in RBI approach and methodology, change in any assumptions used	G
	RBI study documents	<ul style="list-style-type: none">• Inspection, reports, including NDT reports• Survey reports• Thickness measurements reports• Inspection reports A resume of surveys and inspection findings is to be provided	I
		A detailed spreadsheet (planning format) with all IMR activities that where: <ul style="list-style-type: none">• planned and performed• planned and not performed• not planned and performed• performed ahead schedule or performed with delay	I
		Mitigation action reports: maintenance and repair activities reports	I
		Incidents and accidents reports	I
		Changes in operations and operating conditions, including lightweight survey report	I
		Changes in environmental conditions	I
		Structural changes, such a repairs, revamping or upgrading	I
		Engineering reports on the structural evaluation of the condition of the unit, if any	I
		Additional relevant structural/risk analyses, if any.	I
		Refined qualitative RBI analyses, if any	I
		Quantitative RBI analyses, if any. This has to include stochastic description of random variables	I
		Every document used to perform the RBI analysis may be requested	R
After Risk Workshop	Output of RBI Study	Risk workshop outcomes	I
		Refined qualitative RBI analyses if any	I
		Quantitative RBI analyses, if any. This has to include stochastic description of random variables, degradation models and related variables, computational procedures and validation.	I
		Every document used to perform the RBI analysis (in particular reference documents quoted in the above documents) may be required	R
		The updated RBI plan (including inspection, maintenance and mitigation actions)	A

Table 6 : Minimal list of documents to be submitted to the Society, as part of the renewal RBI audit

During Renewal RBI audit	<ul style="list-style-type: none">• Owner Risk management policy document and corresponding internal procedures• Owner Organisation for structural risk management framework	I
	Elements used for the Renewal Risk Control Review	R
	Elements produced during the Renewal Risk Control Review	R
	Updated RBI plan, including inspection and mitigation actions	I



Move Forward with Confidence

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