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"Marine warranty surveying for off-shore projects and issues faced in the current market"

Australia

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Marine Warranty Surveying for Offshore Projects and Issues Faced in the Current Market

A Presentation to:

The Maritime Law Association of Australia & New Zealand

By:

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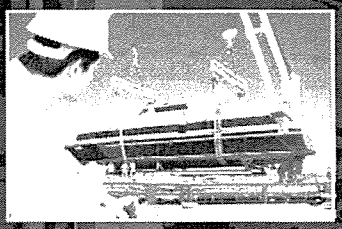

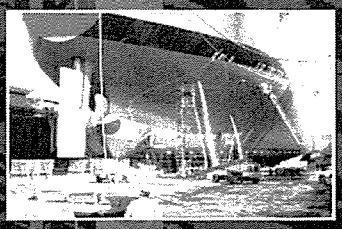

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REFERENCES

[1] Offshore Oil and Gas Insurance, David W. Sharp, 1994.

[2] DNV Rules for Planning and Execution of Marine Operations, Part 1 Chapter 1 – Warranty Surveys, January 1996.

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1. INTRODUCTION

1.1 Historically, the Marine Surveyor's primary role was the inspection of ships and their approval for classification purposes, or to meet flag state rules and regulations. As such Marine Surveyors traditionally worked for Classification Societies, involved in the design stage, construction and commissioning of ships and periodic class inspections of vessels, or for Marine authorities of nation states who play a continued key role in ensuring that national rules and regulations are complied with in the prime interest of safety at sea.

1.2 The advent of the offshore industry, with the exploration and production of hydrocarbons, then broadened the scope of the classification societies. Classification Societies continued to be involved in standard Class activities through the classification of offshore installation vessels an mobile offshore drilling units, but were also empowered to act, generally on behalf of Government bodies, to ensure that permanent offshore production facilities were also designed, constructed and maintained to a proper standard and fit for the location.

1.3 In addition it became apparent, that the marine aspects of the temporary phases of an offshore project involved complex structures and floating facilities and had considerable additional potential risks over and above normal shipping operations. As such these risks needed to covered under specific insurance policies which allowed coverage for operations such as the load out, towage, installation and hook up work thereafter of the project materials. In order to protect their interests in these policies, Underwriters saw the need for an additional specialist independent 3rd party role to review and approve these marine operations on their behalf and thus saw the introduction of another type of Marine Surveyor, the Marine Warranty Surveyor (MWS).

1.4 Class Societies initially performed this role too, but this new requirement also saw rise to specialist firms of Marine Warranty Surveyors. These firms have over time gained the confidence of oil companies and offshore contractors as well as underwriters, the interests of all of whom they protect, and they are now the major providers of this service in most parts of the world.

1.5 The MWS's primary function today remains to see that all reasonable steps are taken and appropriate criteria followed to ensure the safety of the project cargo, structure, unit or vessel throughout the periods from initial load out to final installation in the field or discharge at final destination.

1.6 The aim of this paper is to provide an outline description of the general principles behind Marine Warranty Surveying, the process employed by a Warranty Surveyor to fulfil their primary function and some of the main issues they face in the current Market Place.

2. WHAT IS MARINE WARRANTY

2.1 Terms of reference

2.1.1 The term Marine Insurance Warranty, as used in marine insurance, is based on the UK Marine Insurance Act 1906 and is according to the "Dictionary of Marine Insurance Terms and Clauses" by R.H. Brown 1989, defined as:

> ***"A marine insurance warranty is a promissory warranty by which the assured undertakes that some particular thing shall or shall not be done, or that some condition shall be fulfilled, or whereby he affirms or negatives the existence of a particular state of facts. The assured must comply literally with the terms of a warranty. Compliance in spirit is not acceptable. If the assured fails to comply with the terms of the warranty, the insurer is discharged from all liability under the policy as from the date of breach of warranty, but without prejudice to insured losses occurring prior to such date. A warranty may be "express" or "implied". An express warranty is set out in the policy conditions. An implied warranty does not appear in the policy, but is implied to be therein by law"***

2.1.2 These terms of reference are particularly relevant for the London Insurance Market, but are regulated according to local law in the specific country in question. For example in Norway it is necessary to be able to show a direct causal connection between the accident and the condition resulting in a breach of warranty in order to discharge the insurer from liability.

2.2 Basic Principles

2.2.1 During the construction and installation phases of offshore projects, a Construction All Risks (CAR) and/or Transit insurance policies will be taken out by the Owner, Operator or their Contractor to cover against losses during construction, transport, handling, installation and commissioning activities of the permanent materials.

2.2.2 In most cases the terms of these policies will include a "Marine Warranty Clause" within which the Underwriter(s) who are offering the Insurance will require that an independent Marine Warranty Surveyor (MWS) be appointed to the project to act as marine experts on their behalf.

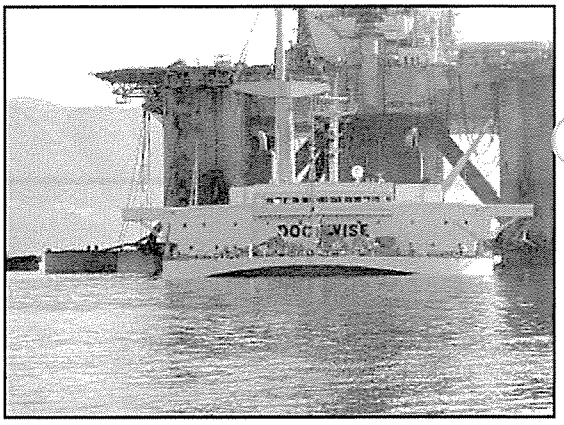
2.2.3 It is the responsibility of the "Assured" (the insured party) to engage the MWS provider either through existing agreement or via commercial Tender. However, the Warranty Surveyor chosen must be acceptable to the Insurer and in many cases only a few specialized Warranty companies will be listed in the policy as acceptable for the performance of the work.

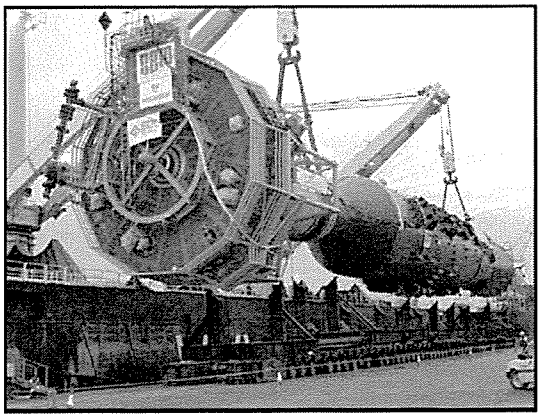
2.2.4 The role of the Marine Warranty Surveyor is to act on behalf of the Insurer and the Assured to ensure that specific project marine operations are performed to recognized codes & standards and within acceptable

risk levels. These risk levels being tolerable to the Insurance interests, to the industry as well as to national and international regulatory bodies where appropriate.

2.2.5 Marine operations are in general all activities pertaining to the sea, but in this context limited according to the definition of designed, non-routine operations of limited duration carried out at sea. This covers the temporary phases in connection with load transfer, transportation and or securing of units at sea, discharge operations and offshore installation activities. Typical marine operations in which the Marine Warranty Surveyor will be asked to provide approval for are shown in Fig 2.1 below:-

- Load out, Float out, Float on/off.
- Towed and Self Propelled Transports.
- Launching, Upending, Positioning of Jackets.
- Setting, Piling, Grouting of jackets and subsea structures.





- Marine Lifting, Lift-off or Mating Operations.
- Transit and Positioning of Jack-ups and semi-submersibles.
- Rigid Pipe & Flexible/cable lay.
- Pipe/cable crossing & Trenching.

- Subsea structures Installation operations.
- High value, Project Critical or Long lead Item Cargo Shipments on general cargo vessels.
- Road, air or rail transportation of cargos en-route to shipment load out location.

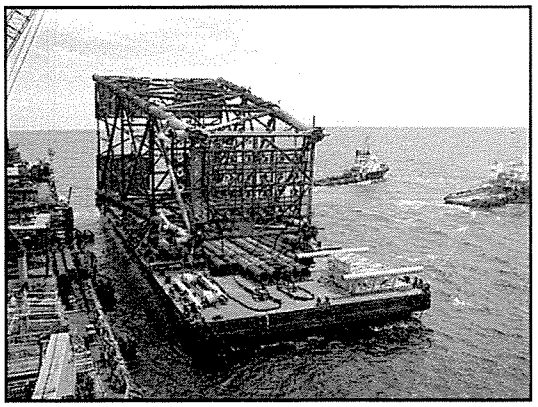


Figure 2.1 – Typical Marine Operations Covered by Marine Warranty Survey

2.2.6 By ensuring adherence to recognised industry Standards for some or all of these types of operations, through the use of an MWS, the Insurer will potentially achieve reductions in insurance claims against the project policies. It is important, however, to be aware of the fact that a Warranty Surveyor can only reduce not eliminate risk.

2.2.7 The scope of the approval activities to be performed by the MWS are agreed between the Assured and the Insurer often with input from the chosen MWS, based on the proposed project activities and the associated risk levels for these activities.

2.2.8 The procedures used by the MWS for the completion of the defined scope will vary depending on the operation in question but will in general include operational procedures and engineering review, site and marine vessel and equipment surveys and attendance during specific marine operations. The Warranty Surveyor will require; that satisfactory plans and procedures are designed and prepared according to agreed codes or standards for the operation, that satisfactory preparations are carried out to the extent and in the manner approved for the operation, that the marine operations are then performed in accordance with the approved procedures and carried out in compliance with the governing codes, standards or overriding regulations of the region.

2.2.9 When the required documentation has been approved, the prevailing environmental conditions have been found acceptable, and the necessary site, vessel and equipment surveys have been completed to the Warranty Surveyor's satisfaction, a Marine Operation Declaration (More commonly known as a Certificate of Approval) will be issued by the MWS, thus authorising the operation in question to proceed.

2.2.10 Importantly if MWS approval is not provided prior to the commencement of a particular scope defined operation or is recinded during the course of that operation then the Assured can be called in Breach of their Warranty and this will allow the Insurer to avoid the policy in the event of an incident. (See section 5.4 - Breach of Warranty).

3. WHY DO WE NEED MARINE WARRANTY SURVEY

3.1 Since the start of the insurance market Insurers have always recognized that marine operations are high risk due to their very nature. As touched on briefly earlier, the advent of the offshore industry led underwriters to consider the level of governance required of the policies being underwritten in respect to large infrastructure projects due to the potentially high value of the claims that were possible. And claims do happen!

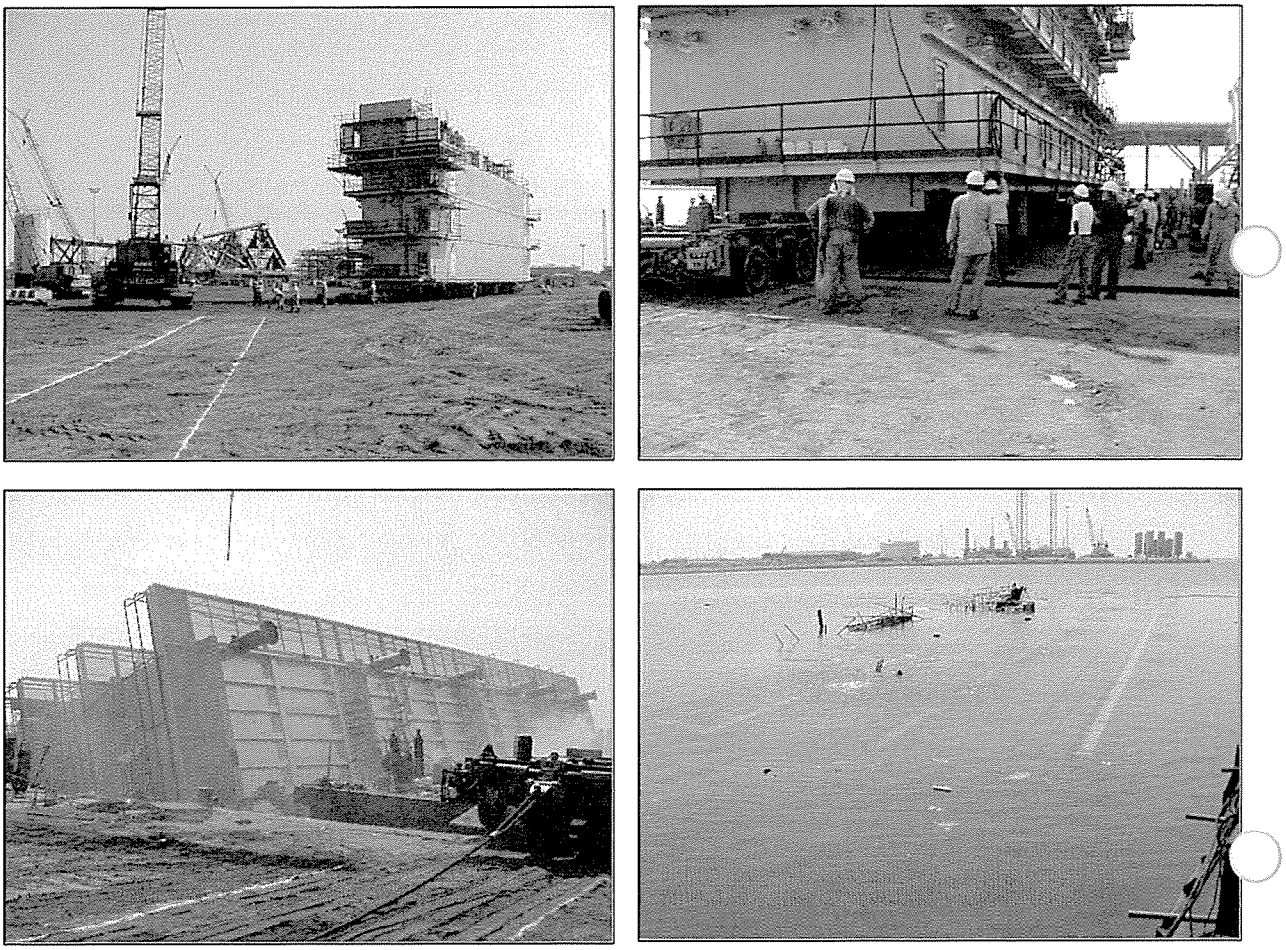


Figure 3.1 – Total Loss of a Topsides Accommodation Module During Load out

3.2 As the underwriting community is predominantly financially biased it is recognized that there would be difficulties in the Insurers themselves providing the required level of marine technical oversight of the larger marine projects. Thus in order to protect their interests in these policies, there is a need for an additional specialist independent 3rd party role to review and approve the marine operations on their behalf. That role being performed by the Marine Warranty Surveyor.

3.3 There are also several other key reasons why Insurers and their clients see a great benefit in the appointment of an MWS on their larger projects. Discussions with leading underwriters and Operators in the market have indicated the main of these to be as follows:-

- ***Independence:*** As an independent 3rd party the Warranty Surveyor is not constrained by the same financial or contractual motives as perhaps an Operator or their Contractor would be when performing operations assessments. This is particularly important with respect to EPC/EPCM (Engineering, Procurement, Construction & Management) type contracts where Contractors in particular can be far more commercially driven.

- ***Operations Experience:*** Operator & Contractors project teams will generally be focused on just one project at a time for long periods, typically 3-5 years. As such it is possible that an individual may only work on between 5 & 10 major projects in their working lives. In comparison a Warranty Surveyor may be working on several projects every year and a large warranty surveying company may well be involved in over 100 projects in that same year. Thus the MWS has a much broader exposure and archive knowledge of global offshore projects, the possible risks involved with marine operations, and previously encountered problems with particular types of operations. This is of great importance when evaluating and mitigating the risks associated with the major marine operations.

- ***Marine & Engineering Expertise:*** Operator and Contractor project teams are becoming ever smaller all the time. Along with this contraction there has been a trend towards commercial and planning weighted teams and away from a marine and engineering bias. This has been exacerbated by a lack of marine and engineering personnel entering the industry causing a steady reduction in available qualified & experienced personnel. Matched with a recent dramatic increase in the number of projects being undertaken this has led to many projects being under resourced in respect to experienced Marine qualified personnel. The MWS can help to fill this gap and provide both Marine and engineering expertise/advice to the project when required. In many cases a large warranty surveying firm will have the following key disciplines at their disposal amongst others:-

  - Master Mariners
  - Naval Architects
  - Structural and Civil Engineers
  - Marine/ Offshore Engineers
  - Subsea & Pipelines Engineers
  - Geotechnical Engineers

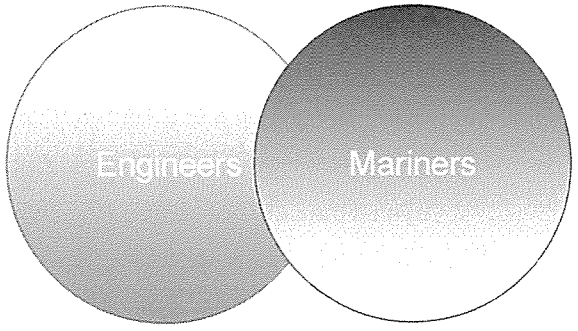


Figure 3.2 – Synergy of Engineer & Mariner Expertise

They also offer an organization where there is a common approach between Engineers and Mariners which can at times be difficult to achieve within an internal project organization.

4. MARINE WARRANTY SCOPE DERIVATION

4.1 Initial Risk Assessment

4.1.1 The risk level of any operation is dependant on the probability of any possible hazard occurring and the consequence of that event should it occur. For marine operations the consequences are mainly related to the three areas; damages or loss of units and/or objects involved, delay or production down time and personnel injuries or fatalities. With the exception of personal safety, the different parties involved in assessing the overall risk level of any operation will generally have a different focus on the possible consequences depending on their roles and responsibilities in any given project.

4.1.2 The marine insurance interests in a project are in most cases focused on the avoidance of any claims due to damages to the insured objects whether these be permanent materials, vessels or equipment. As such any Insurance Warranty Clause within a policy covering such operations will be specifically tailored to the perceived risk level to these items during the performance of the marine operation(s) to be covered under the policy.

4.1.3 Figure 4.1 below illustrates the normal combinations of consequence and initial probability of failure which result in what would be considered "intolerable risk" and "tolerable risk" levels. The border area between intolerable and tolerable risk is know as the *"ALARP* - As Low As Reasonably Practicable" region. Operations that initially fall in this area would generally require some actions to be taken in order to be considered as a tolerable.

Probability of Hazard	CONSEQUENCES				
	Minor	Severe	Fatal	Catastrophic	Disastrous
Likely	W2	W3			
Reasonably probable	W1	W2	W3		
Unlikely	W0	W1	W2	W3	
Remote		W0	W1	W2	W3
Extremely remote			W0	W1	W2
Theoretically possible				W0	W1

Intolerable Risk
Border area (ALARP)
Tolerable Risk

RANGE OF TYPICAL MARINE OPS

Figure 4.1 – Consequence and Probability Matrix

4.1.4 Definitions of the consequences listed in Figure 4.1 above are;

Minor:	*An* event that causes local damage to the unit and/or light personnel injuries.
Severe:	*An* event that causes large damage to unit and/or serious personnel injuries.
Fatal:	An event threatening the overall integrity of the unit and/or cause fatalities.
Catastrophic:	An event that causes loss of entire unit and/or a number of fatalities.
Disastrous:	An event that causes loss of entire unit and/or a very large number of fatalities.

4.1.5 The objective of any planning process is to ensure that no operations are approved to be carried out with "intolerable risk". Unfortunately critical marine operations are by there nature high risk. Thus the purpose of insurance warranty is to endeavour to ensure that suitable steps are put in place and that all operational hazards have been considered in order to mitigate or control the higher risk operations thus reducing the associated risk to ALARP.

4.1.6 The initial risk assessment and outline assessment of the requirements of the Warranty clause will be performed by the Insurer at the time of tender for the policy in order to set the ranges for their premiums.

4.2 Scope Definition Process

4.2.1 This requires a dialogue between the Insurer, Assured and the Warranty Surveyor and will be based on the initial risk assessment performed by the Insurer. In general for this purpose four different warranty scope levels are used (denoted from W0 to W3 in Figure 4.1 above) and further described in Table 4.A below.

Risk Level	Warranty Level	Warranty Scope
Simple operations **and** high redundancy	**W0**	**No Warranty** Basic quality level for marine operations no warranty approval required
Well controlled simple operations **or** operations with high redundancy	**W1**	**Limited Scope of Warranty** Warranty approval to be issued either based on documentation review only (e.g. MoDU location approval) or surveys on site (e.g. Lashing of ship cargos). The most relevant alternative to be selected by the warranty surveyor
Complex **or** weather sensitive operations	**W2**	**Standard Scope of Warranty** As W1 but including both evaluation of design documentation and operational procedures and pre-operation verification surveys (e.g. towed barge transportation)
Complex **and** weather sensitive Operations	**W3**	**Full scope of Warranty** As for W2 but including on-site surveillance during the operation (e.g. Skidded loadout, Jacket launch, topsides lift, float-over, complex subsea installation)

Figure 4.2 – Warranty Levels

4.2.2 In practice it is sometimes difficult to define probability levels for some operations directly, and therefore the final selection of the Warranty Level will be dependant on relevant criteria to the operation in question. With due consideration to these criteria the Insurer will allocate a final risk level to each key marine operation and a risk differentiated Marine Warranty scope will be a defined. Criteria which can be used for this consideration will include:-

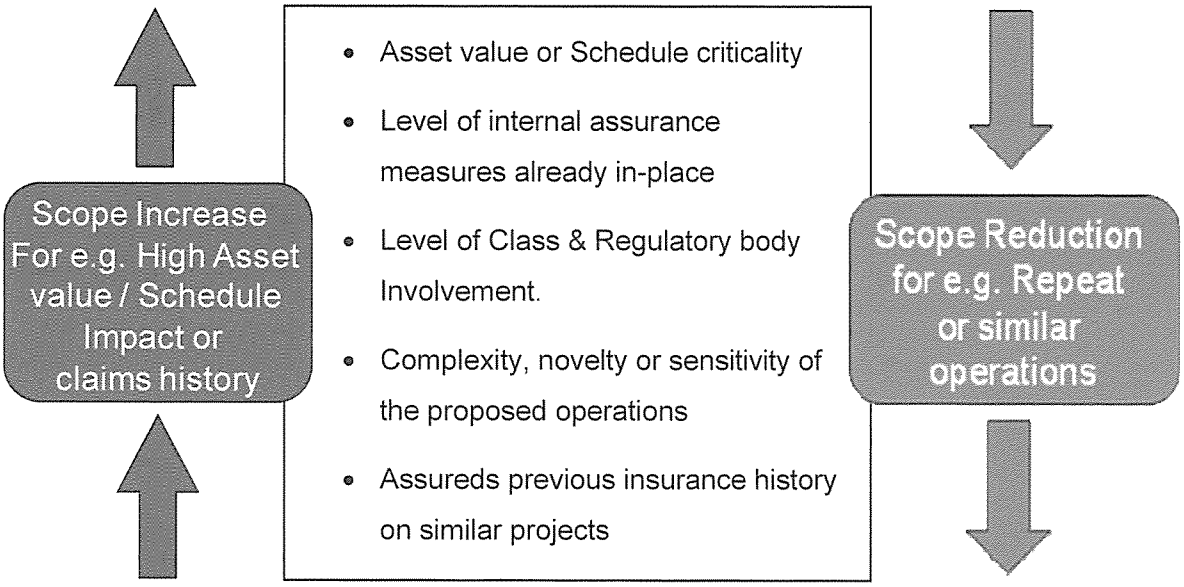


Figure 4.3 – Criteria Affecting MWS Scope Levels

4.2.3 During the performance of the project it is the responsibility of the Warranty Surveyor to evaluate the warranty level specified by the Insurer for the specific operations. If at any time it is felt that the chosen level may be inappropriate for the final physical operation to be performed then it is necessary for the MWS to advise the Assured of the recommended level of coverage. The assured shall then as appropriate advise the Insurer. The aim shall be that all operations are carried out with risk levels "tolerable" to both the Insurer and the Assured and their subcontractors.

4.2.4 The Assured party will always have the option to increase the scope of the Warranty Surveyor over and above the minimum requirements of the Insurer in order to achieve increased internal project assurance levels but the scope may not be reduced without recommendation from the MWS and/or prior consent of the Insurer.

4.3 Example Work Scope

4.3.1 To illustrate the final likely involvement of the MWS in a project, Fig 4.4 below provides an example MWS work scope for the typical operations involved in the load out, transportation, Launch & Upending, Setting and Piling of an offshore jacket.

Marine Operation	Review Engineering & Procedures Documents	Attend Marine Operation Preparation	Issue Vessel Survey or Attendance Report	Issue Certificate of Approval for Commencement	Monitor Marine Operation
Jacket Transport & Tow Vessel Surveys	-	-	X	-	-
Jacket Initial Skidding to Load out Area	X	X	X	-	X
Jacket Load out onto transportation Barge and Seafastening	X	X	X	X	X
Jacket Towed Transportation to site	X	X	X	X	-
Jacket Launch, Up-end, & Wet Tow	X	X	X	X	X
Jacket Set-down/Installation	X	X	X	X	X
Jacket Pile Handling & Piling (1st Pile only)	X	X	X	X	X

Figure 4.4 – Example MWS Marine Operation Scope of work

4.3.2 Normally a similar matirx will be generated for each critical marine operation to be performed within the entire infrastructure project in question. The combined library of these matrices will form the defined MWS scope for that project.

5. MARINE WARRANTY PROCEDURES

5.1 The Role of the Warranty Surveyor

5.1.1 The role of the Marine Warranty Surveyor is to act on behalf of the Insurer and the Assured to ensure that specific project marine operations are performed to recognized codes & standards and within acceptable risk levels. These risk levels being tolerable to the Insurance interests, to the industry as well as to national and international regulatory bodies where appropriate.

5.1.2 In order to achieve this he or she will be required to ensure that:-

- Satisfactory plans and procedures have been prepared for a given operation.
- That these plans are supported by suitable engineering calculation in accordance with recognized codes and standards.
- That any major equipment proposed for use during the operation is both suitable and suitably certified for its intended purpose and is to be operated by appropriately qualified persons.
- That suitable consideration has been taken as to the particular risks of an operation and that appropriate mitigation has been made.
- That preparations and testing is carried out prior to commencement of the operation to an extent and in a manner suitable for the operation in question.
- That the marine operations once commenced are performed in accordance with the approved procedures.
- That the work is carried out in compliance with the governing codes rules, regulations or project specifications in force.

5.2 Tools Available to the Warranty Surveyor

5.2.1 The typical work methods or tools available to and applied by the Marine Warranty Surveyor in order to fulfil his/her roll are as follows:-

- Verification of established or proposed operational limitations or design criteria.
- 3rd party review and verification of design calculations, drawings, operational manuals and procedures.
- Independent engineering verification calculations as required to confirm accuracy of those presented by the project.
- Attendance at project planning meetings, constructability reviews, Hazard Identification (HAZID) and Hazardous Operation (HAZOP) assessments and any pre operations risk assessments and tool box talks as required.

- Site Surveys and approval Surveys during construction and commissioning of the items to be installed.
- Suitability Surveys of vessels and equipment to be used.
- Site witnesses of preparations prior to operations commencement.
- Attendance during operation for surveillance according to approved procedures.

5.2.2 The extent to which each of the above tools are used on any given project is dependent on the requirements of the underwriter, the specifics of the project in question and the Warranty Surveyors judgement as to the level of details required to satisfy himself that any given operation has been well planned, well engineered and well prepared.

5.3 The Approval Process

5.3.1 The tools available to the MWS can generally be broken down into two catagories being Desktop activities and Site activities. These activities are combined to achieve the overall Approval process. The generall workflow of this process is presented in Fig 5.1 below. In practice one or more of these activities may be occuring simultaneously for various marine operations within a given project but in general this is the process that is followed for the approval of a single marine operation.

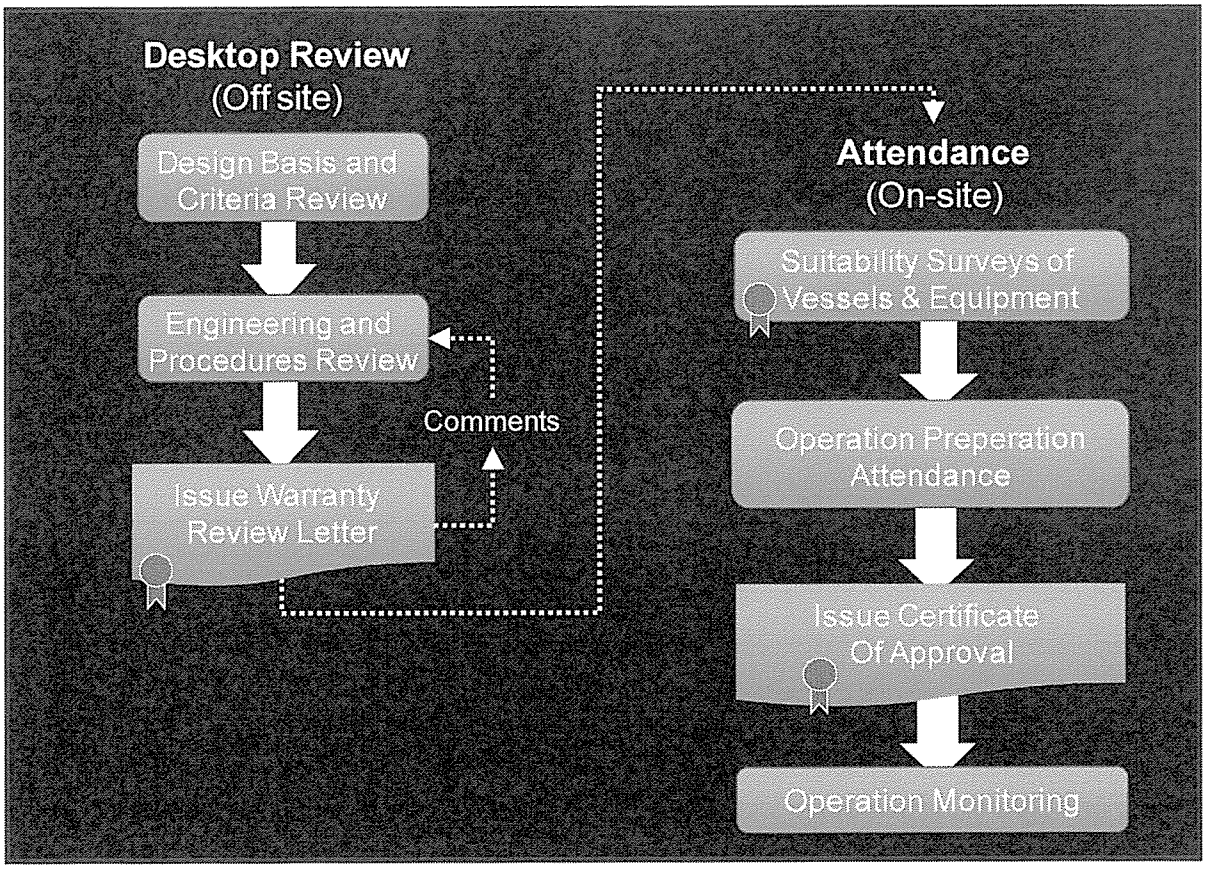


Figure 5.1 – Marine Warranty Approval Process

5.3.2 Desktop Review Activities:-

5.3.2.1 A front end review of the proposed project design basis, specifications and limiting criteria is performed. The criteria in question will range from the structural steel codes, to be used to check the design of the structures to be installed for the installation design loads, to the weather limits under which the operation will be performed which will be the major component for the installation loads experienced.

5.3.2.2 On occasion where the project has no pre-defined criteria to propose, the MWS may be asked to recommend the limiting criteria to be used based on their experience from previous operations that they have approved and may have been performed in the same area, utilising the same equipment or similar operational techniques.

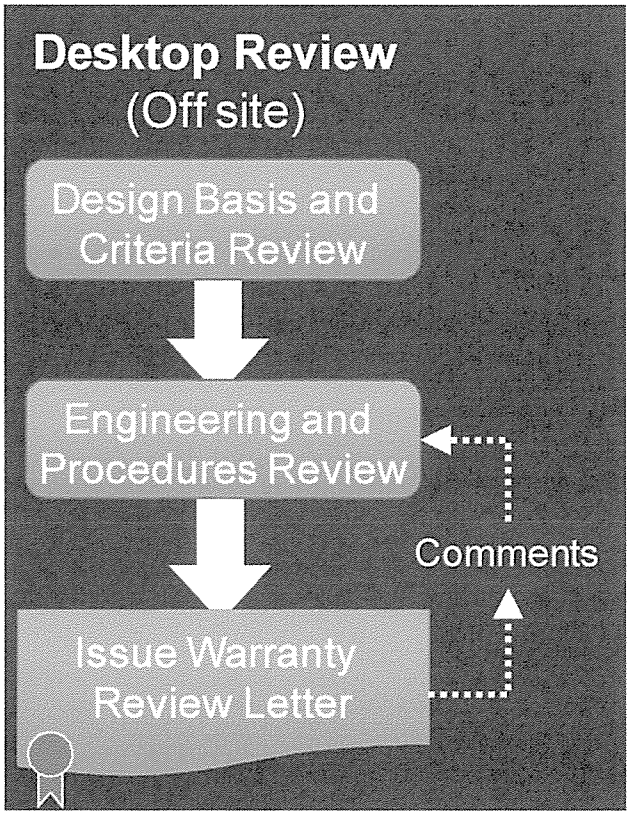


Figure 5.2 – Desktop Review Activities

5.3.2.3 The basis of design and limiting criteria set at this time shall then become governing and will be used by the MWS as a point of reference during their later review of the project engineering calculations and procedures to ensure compliance.

5.3.2.4 The MWS will then review the list of engineering calculations, procedures and supporting documentation that will be generated by the project and will identify and advise the project of those documents that they will require to review and approve and any others required for information. They will also at this time inform the project whether there appears to be any documents which would be expected but which appear to be absent from their intended list of deliverables.

5.3.2.5 Once received the documentation will be reviewed by a relevant discipline engineer. It is often the case that particular procedures or calculations may need to be reviewed by more than one discipline in order that the suitable level of warranty checking can be achieved. During any given project it is common for various disciplines to be used to review the documentation including Master Mariners, Naval Architects, Structural/Civil Engineers, Marine/Offshore Engineers, Pipeline/Subsea Engineers and Geotechnical Engineers amongst others.

5.3.2.6 These discipline Surveyors will review the documentation in accordance with the Company & Client Project specifications, the agreed design basis and limiting criteria, Industry codes and standards, International Marine regulations and as appropriate their own Marine Warranty Guidelines.

5.3.2.7 The outcome of this review including any associated comments which the MWS company may have will be collated and presented to the Assured or their contractor in the form of a Marine Warranty Review letter which indicates the status approval atatus of the document e.g:-

C	***= Conformance***	***= (Approved)***
NC	***= Non-Conformance***	***= (Not Approved)***
TQ	***= Technical query***	***= (Not Approved Until Technical Issue Addressed)***
A	***= Advice***	***= (Advice Provided But Reply Not Required, Approved)***

5.3.2.8 A document becomes approved once all indicated non conformances or technical queries have been addressed and only then at this time can the document be considered as accepted by the MWS for use for the operation(s) in question.

5.3.2.9 As part of the review process the MWS will also take part in various project planning meetings, constructability reviews, Hazard Identification (HAZID) and Hazardous Operation (HAZOP) assessments to ensure suitable mitigation is taken to any identified risks identified in these reviews.

5.3.3 Attendance Activities:-

5.3.3.1 Marine operations by their nature involve vessels. It is required that the main vessels to be used within any given operation be surveyed by the MWS to confirm their suitability for the proposed operation(s). Several key requirements are checked which include:-

- Vessel specifications/capacities have been accurately presented.
- Vessel is in good operational condition.
- Vessel's equipment and performance is well suited to the task in question.
- Vessel has the required statutory certification for the proposed type of operation and location to be performed.
- Vessel is adequately manned and managed with suitably qualified personnel who have relevant experience for the proposed activities to be performed.

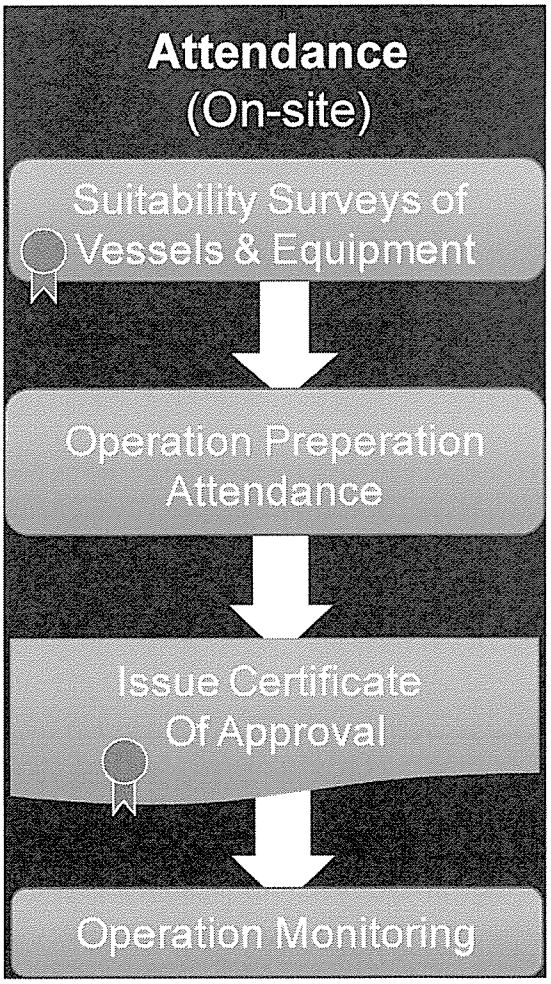


Figure 5.3 – Site Attendance Activities

5.3.3.2 The types of vessels for which such an audit will be required will include:-

- Transportation Barges.
- Towing Vessels and Anchor Handling Tugs.
- Commercial Cargo Vessels (scheduled to carry project cargo).
- Survey & Supply Vessels.
- DSV (Dive Support Vessels) and MSV (Multipurpose Support Vessels).
- Flexible Lay, Reel Lay & Pipe Lay Vessels.
- Sheer Legs, Crane Barges and Semi Submersible Heavy Lift Vessels etc...

5.3.3.3 In many cases it is necessary for specialist equipment to be retrofitted onto the installation vessels or to be used in the loading from shore to transport vessel of the project cargo items. It is therefore similarly important that these critical items of equipment be surveyed as well as the vessels and where appropriate the MWS will attend and witness their testing. It shall be ensured that all critical equipment such as cranes, rigging, winches, jacking systems, ballasting systems, and so on, are fully certified prior to the operation.

5.3.3.4 During preperation activities immediatley prior to the commencment of critical marine operation, whether this be onshore or offshore, the MWS will generally have one attending surveyor whose discipline corresponds to the activity requiring surveillance and approval. Where multi-disciplines are required the primary attending surveyor will call upon additional personnel as required.

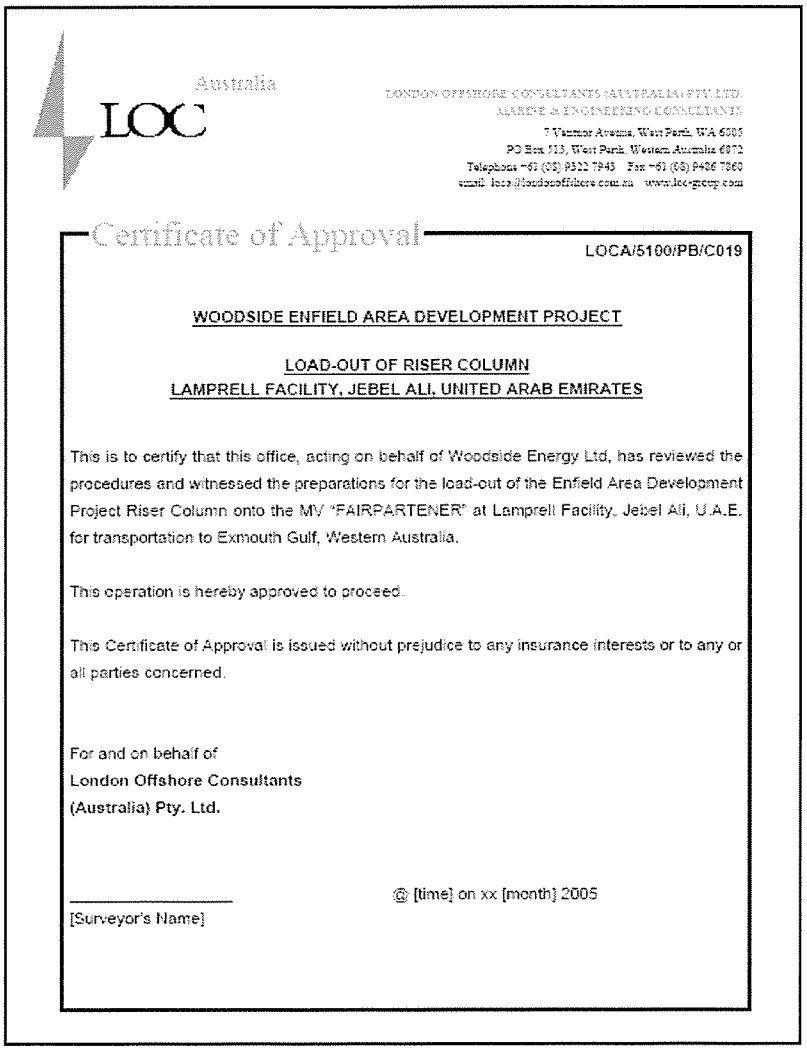
5.3.3.5 During this period the attending surveyor will ensure the following amongst others:-

- All neccessary equipment preperations and function testing has been completed.
- That all certification for key equipment has been compiled and is valid.
- That all relevant engineering and procedures documents have been issued and are approved.
- That all the key personnel involved with the operation have been fully briefed through relevant pre-operations meetings and tool box talks.
- That the neccessary communications protocols for the operation have been finalised and conveyed to the neccesary parties.
- That the prevailing and forecast environmental conditions such as wind, wave, current, tide height, waterdepth, visibility etc are within the approved design limits for the operation.

5.3.3.6 Any non-conformances found by the attending surveyor in relation to the above, or any of the other standard checks performed for specific operation types, will be brought to the attention of the Assured's attending site representatives together with recommendations of how they may be rectified.

5.3.3.7 On satisfactory completion of the preparations for an operation and prior to the operation commencing the attending MWS shall issue the Marine Warranty Certificate of Approval granting permission for the operation to procede.

5.3.3.8 Certificates of Approval are required for each of the Scope defined marine operations as previously agreed wih the Insurer. The issue of the Certificate is the culmination of the Marine Warranty Process and is often reflected as a hold point or milestone in the project inspection plan. These Certificates are the main deliverable to the Insurer in the event of a claim. The Certificates are further supported by the previously issued Marine Warranty review letters and any vessel sutiability survey reports and site attendance reports provided by the MWS as evidence to the insurer that the Assured has abided by the terms of the Warranty Clause within their insurance policy.



Australia

LOC

LONDON OFFSHORE CONSULTANTS (AUSTRALIA) PTY LTD.
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Certificate of Approval

LOCA/5100/PB/C019

WOODSIDE ENFIELD AREA DEVELOPMENT PROJECT

LOAD-OUT OF RISER COLUMN
LAMPRELL FACILITY, JEBEL ALI, UNITED ARAB EMIRATES

This is to certify that this office, acting on behalf of Woodside Energy Ltd, has reviewed the procedures and witnessed the preparations for the load-out of the Enfield Area Development Project Riser Column onto the MV "FAIRPARTENER" at Lamprell Facility, Jebel Ali, U.A.E. for transportation to Exmouth Gulf, Western Australia.

This operation is hereby approved to proceed.

This Certificate of Approval is issued without prejudice to any insurance interests or to any or all parties concerned.

For and on behalf of
London Offshore Consultants
(Australia) Pty. Ltd.

@ [time] on xx [month] 2005

[Surveyor's Name]

Figure 5.4 – Example Certificate of Approval

5.3.3.9 Following the issue of the Certificate of Approval, and following commencment of the operation, the MWS will then remain at site to witness the ongoing activities to ensure that the parties performing the works are following the approved procedures and continue to operate within the agreed limiting criteria through to the safe competion of the activity. Where the long duration of an operation, such as a towage operation or long pipe lay campaign, precludes the ability for the MWS to remain at site throughout the duration of the operation only the more critical parts of the operation will be physically witnessed. However, monitoring will continue in the form of a review of the daily weather forecast and project progress reporting,

5.4 Breach of Warranty

5.4.1 A breach of Warranty is effectively the failiure of the Assured to abide by the terms of the Warranty Clause(s) within there insurance policy. Such an event may allow the Insurer to avoid the policy in the event of an incident or damage occuring to an insured item during the period of the breach.

5.4.2 Breach of Warranty generally occurs in one of two ways being; failure of the Assured or their Contractor to receive a Certificate of Approval from the MWS for a scope defined operation prior to the commencement of that operation or; failure to adhere to the operational procedures previously approved by the MWS during the performance of an operation. Such a situation may arise if and when there is a physical deviation from an approved procedure required by the installation Contractor for operation completion but this deviation has not been presented to the Warranty Surveyor for approval prior to implementation.

5.4.3 It is the duty of the Warranty Surveyor to inform the Assured when for any reason there is the potential for, or an actual breach of warranty. When a breach of warranty situation has in the MWS's opinion occurred, the Warranty Surveyor will notify the Assured in writing, informing them of breach of warranty and the reasons for this. The Certificate of Approval for the marine operation in question becomes at the same time invalid.

5.4.4 When/if the condition leading to the breach of warranty is resolved or no longer exists, the Warranty Surveyor may revalidate the marine operation Certificate of Approval. If there are reasons to believe that damages have occurred during the time of the breach of warranty, a reservation to this effect may be stated on a new declaration.

5.4.5 The ability for an Insurer to avoid the policy in the event of an incident occuring during a breach of warranty, or any incident thereafter will be dependant on the terms of reference of the policy and any local reglatory laws that may be applicable.

6. ISSUES FACED IN THE CURRENT MARKET

6.1 Key Risk Drivers

6.1.1 Marine Operations have always been high risk due to their very nature and the marine environment itself will always be the predominant risk factor to be considered when planning and executing marine based projects.

6.1.2 Over time the other major risk factors associated with standard marine operations have been well evaluated through review and through experience gained and there is a good understanding within the industry of how to mitigate these risks.

6.1.3 However, in the current market there are some key risk drivers that have evolved and which are leading to less quantifiable but equally serious risks. Some of these main drivers in marine projects today are as follows:-

- ***Shortage of Suitable Vessels & Equipment***
- ***Shortage of Marine Qualified Personnel***
- ***Increasingly shorter project Schedules***
- ***Increasingly Tighter Project Budgets***
- ***Materials & Equipment Quality and Traceability***
- ***Resource Availability***

6.1.4 There are of course other risk drivers which can have an effect, but those listed above are the ones being seen to propagate into incident occurrences and resulting claims in the current market. The effect of these drivers is further discussed in sections 6.2 to 6.7 below;

6.2 Shortage of Suitable vessels and Equipment

6.2.1 There has been a significant lack of suitable vessels and equipment in the market to cope with the increased demand in the industry. In the last couple of years there has been a significant amount of new building going on but supply has still been short of demand particularly in certain vessel & equipment types. This situation has lead to a "*make do and mend*" mentality within the industry

6.2.2 Vessels are regularly moving from one project directly to the next with insufficient time and emphasis being given to the necessary maintenance of the vessels them selves and the key equipment they carry (e.g. cranes, Lay spreads, ROV's etc). This is also true of the major land based equipment items being used for activities such as fabrication and load out.

6.2.3 The lack of suitable vessels & equipment has also led to a trend in the use of vessels and equipment that may be of marginal or in some cases insufficient capability for the marine operations proposed or the retrofitting of non standard equipment onto the selected vessels.

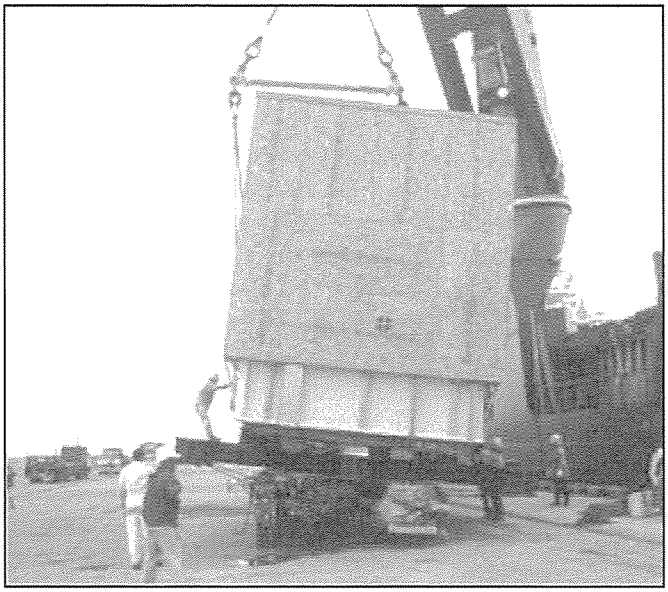


Figure 6.1 – Trailer of insufficient capacity used for cargo discharge

6.2.4 Additionally due to the tight schedules that most of the vessels and equipment are working on it is often the case that a specific vessel say, may become unavailable at the last minute due to schedule delays on the previous job. This leaves the project needing to make short notice substitution of that vessel. The replacement can often be of a lesser specification than the original vessel and often this late change will mean that the relevant project engineering and procedures require last minute ammendment opening the door for error.

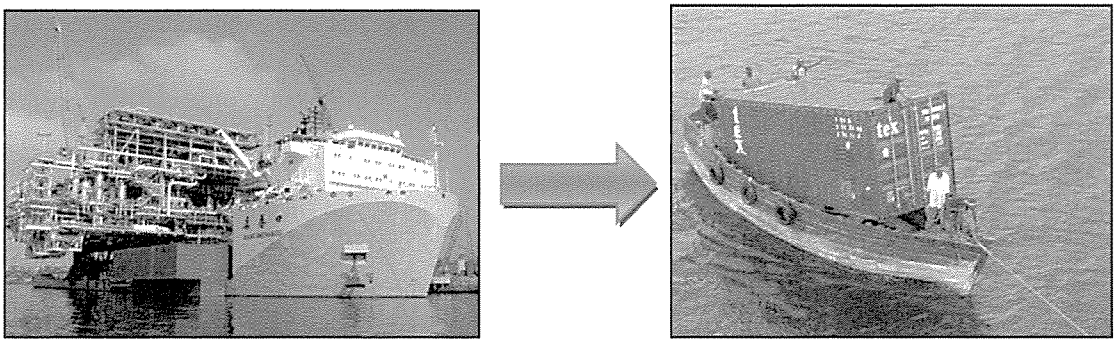


Figure 6.2 – The problem of late vessel substitution

6.2.5 Clearly all of these issues are of significant concern when considering the risks involved when performing a major marine operation.

6.3 Shortage of Marine Qualified Personnel

6.3.1 The current personnel resource shortage is a significant contributor to the risks in today's marine projects. The following are the main issues associated with this problem;

- Critical design engineering & procedure writing being carried out by unsuitably qualified or insufficiently experienced personnel.
- Physical site works being carried out by unsuitably qualified or insufficiently experienced personnel.
- Lack of qualified supervision.
- General overworking of those who are suitably qualified or experienced.

6.3.2 The first two of these are the most significant. Planning of any marine operation and particularly highly sensitive operations requires an understanding of the marine environment and the behaviour of vessels and equipment in different situations and the forces that will be imparted on the project materials.

6.3.3 If those performing the design and writing the procedures and/or those performing the works at site are not suitably trained or experienced then they will not be as likely to consider all of the required aspects appropriately which can lead to, as a minimum, difficulties in performance of the work at site, and at worst a potential major incident similar to the one shown in Figure 3.1 earlier in this paper which resulted in a significant Insurance claim.

6.4 Increasingly Shorter Project Schedules

6.4.1 Project schedules are becoming tighter and tighter all the time. On many projects this has now led to engineering phases which would have traditionally been performed in series now being performed in parallel or even the removal of some engineering phases completely.

6.4.2 This in turn leads to a lack of the proper level of engineering and procedural checking in the design phase, thus reducing the reliability of design which in turn increases risk.

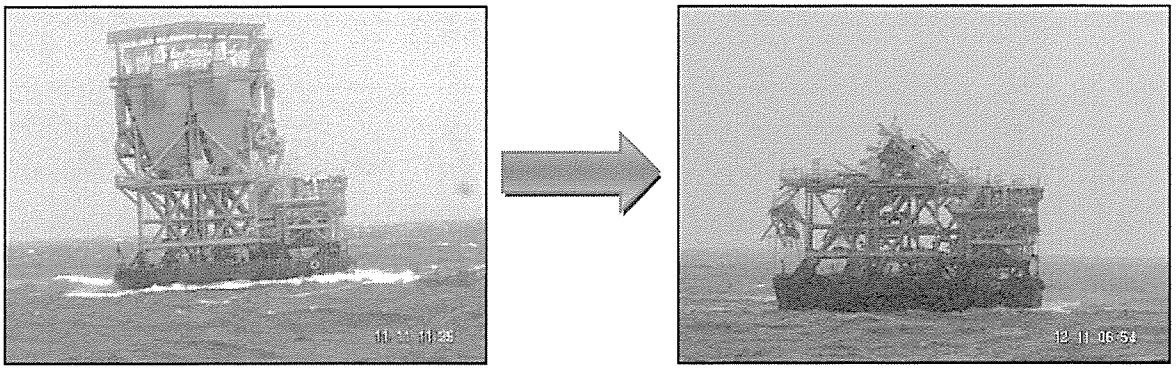


Figure 6.3 – Structural Collapse Due to Failure to Design Module for Sea Transportation Forces

6.4.3 As warranty surveyors we are also noticing that project documentation is being received for review later and later thus reducing the time for proper assessment and constructive comment. Additionally we have seen a general lowering of the quality of the documents received. Both of these factors can be attributed to a lack of time available for their preparation as well as a lack of personnel resources to prepare them.

6.4.4 Also tighter project schedules lead to a constant pressure to reduce operational schedules during site installation operations which invariably causes a pushing of the boundaries of the safe environmental limits for design of the operation and reduces the level of caution observed with respect to remaining within these limits during the performance of the works.

Figure 6.4 – Adherence to the Defined Operational Environmental Criteria is Critical

6.4.5 Another key impact of the shorter schedules is that it has brought the fabrication and shipment schedules of an increasing number of the long lead vendor supplied equipment and components onto the project schedule critical path. As such the importance that needs to be placed on the safe and timely transport of these items needs to be significantly increased. However, in many cases little attention is being paid to a lot of these transportations when in fact the loss or damage to one of these items could have significant impact on the project completion.

6.5 Increasingly Tighter Project Budgets

6.5.1 Although related to project schedule in many ways, project budgets and the contracting strategy employed in order to try to manage these budgets have some key risk impacts of their own.

6.5.2 As highlighted briefly earlier in this paper there has over the years been a gradual shift of emphasis in the make up of Operator and Contractor project teams with a trend towards more commercial and planning weighted teams and away from a marine and engineering bias.

6.5.3 In parallel with this there has been a significant shift in what is considered as a successful project strategy which now regularly centres around reduction of project costs at all cost.

6.5.4 This want to constantly reduce the overall project budget can be a key driver in the increase in risk to a project as it often leads to the incorrect selection of contractors, equipment and operation methodologies

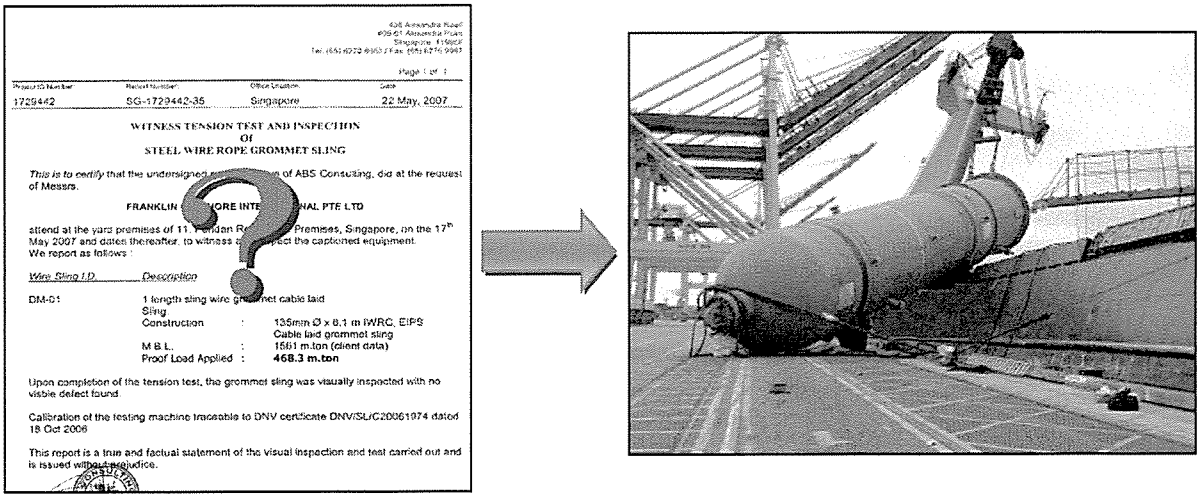
with the cheapest cost option often chosen irrespective of technical review and advice proffered by the more experienced technical parties in-house.

6.5.5 The cheapest option is virtually never the best technical alternative and as such will nearly always increase the risk of incident on a project.

6.6 Materials & Equipment Quality and Traceability

6.6.1 Due to the increased activity in the marine industry as a whole there has been an unprecedented demand for the raw materials and equipment items required for marine based project work. The sourcing of these materials has thus spread to less traditional routes and with it the level of quality control and quality of the supporting documentation for these materials and equipment has been seen to diminish rapidly.

6.6.2 Often equipment and material is being presented without suitable traceability or documentation. A trend of failures in equipment and materials is being seen, often when utilised well below their reported capacities.



WITNESS TENSION TEST AND INSPECTION
OF
STEEL WIRE ROPE GROMMET SLING

Project ID Number	Report Number	Office Location	Date
1729442	SG-1729442-35	Singapore	22 May, 2007

This is to certify that the undersigned [illegible] of ABS Consulting, did at the request of Messrs.

FRANKLIN [illegible] PTE LTD

attend at the yard premises of 11 [illegible] Premises, Singapore, on the 17th May 2007 and dates thereafter, to witness [illegible] the captioned equipment. We report as follows :

Wire Sling I.D.	Description		
DM-01	1 length sling wire grommet cable laid		
	Sling		
	Construction	:	135mm Ø x 8.1 m IWRC, EIPS Cable laid grommet sling
	M.B.L.	:	1561 m.ton (client data)
	Proof Load Applied	:	468.3 m.ton

Upon completion of the tension test, the grommet sling was visually inspected with no visible defect found.

Calibration of the testing machine traceable to DNV certificate DNVSLIC20061974 dated 18 Oct 2006

This report is a true and factual statement of the visual inspection and test carried out and is issued without prejudice.

Figure 6.5 – Importance of Materials and Equipment Traceability for safe operations

6.6.3 It is therefore apparent that fabrication quality and the monitoring of the fabrication process is not what it should be in order to maintain the required standard for the industry. It is thus essential that the individual projects afford greater emphasis and control on the placing of orders with reliable contractors and only source materials from trusted distributors and this philosophy needs to be maintained irrespective of cost or schedule which are often the major cause for poorly procured items.

6.7 Resource availability

6.7.1 The decreasing availability of the oil, gas & mineral resources has led to increased exploration in less familiar environments. This move away from the previously well understood norms leads to a pushing of the traditional boundaries and a move into new areas such as deeper water, ice fields, or land based sites without existing infrastructure for example.

6.7.2 In turn novel un-tried installation methodologies are often required in order to complete the required projects. However, these new methodologies or techniques are rarely able to be paired with vessels, equipment or personnel which are specifically designed or are familiar with these new environments.

6.7.3 There is thus a period of heightened risk within the industry every time there is a move into a new area of exploration, the adoption of a new technique, or a new equipment design until such time as lessons are learned and changes adopted and a knowledge base can be accrued.