

# Quantitative Risk Analysis for Wreck Removal Contracts

## Part 2: Considerations for the P&I Clubs

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Note: This is the second article written by the author to assist stakeholders in the marine salvage and wreck removal industry to understand and properly implement Quantitative Risk Analysis when confronted with a wreck removal project of significant size and complexity. The series is called Quantitative Risk Analysis for Wreck Removal Contracts. The first article, [Part 1: A Salvage Consultant's Perspective](#), is available at [www.reedmaritime.com](http://www.reedmaritime.com) and [www.wreckrisk.com](http://www.wreckrisk.com). Part 1 provides relevant information and should be read in conjunction with this article.

### Introduction

BIMCO has announced that the introduction of Quantitative Risk Analysis (QRA) in wreck removal contracts over the last few years has prompted a revision to the WRECKSTAGE contract. The revised contract is to be debuted in 2023. The revised contract is said to include an “*optional Risk Allocation Procedure Clause that sets out the parties’ obligation to agree on the allocation of risk at the beginning of the agreement. A risk allocation matrix is set out in a new Annex V. All costs related to the risks accepted by the contractor form part of the lump sum with no additional remuneration. Only in the event of a misdescription or error by the company or a material change in the position or condition of the wreck will the contractor be able to invoke the provisions of the old Clause 4 (Change of Method of Work, Personnel, Craft and Equipment and/or Estimated Time Schedule) for variation costs.*”<sup>1</sup> Parties to the revised contract will now be motivated to understand QRA and consider it as an integrated part of wreck removal method selection, improvement and execution.

The proper implementation of QRA provides the Club with forecasts of their overall exposure for each contractor relative to the other bidders. Overall time and cost exposure becomes the primary metric by which a contractor is selected and not simply “who is the lowest bidder”. Not all QRA processes, software or consultants are the same and the implementation of QRA can be done in various ways, some better and more comprehensive than others. This article reviews a QRA process that has been used successfully for wreck removals and discusses how this process might be used with the revised WRECKSTAGE contract. It is hoped that this paper will provide insights for the P&I Clubs and their stakeholders in understanding and implementing QRA in future contracts.

### Background of QRA in wreck removal contracts

QRA was first introduced into the contracting process for maritime wreck removal operations by CL Risk Solutions.<sup>2</sup> Notable wreck removal contracts that CL Risk Solutions has been involved with include the following:

- **MV SMART**, recovered off Richard’s Bay, South Africa (North of England, 2013-2014)
- Port clearance in Basrah, Iraq (Svitzer, 2013-2015)
- **MV FLINTERSTAR**, recovered from the English Channel (British Marine/QBE, 2015-2016)
- **MV THORCO CLOUD**, recovered from the east bound lane of the Singapore Straits (Standard Club, 2016-2019)

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<sup>1</sup> [www.bimco.org/insights-and-information/contracts/20221027-wreck-removal](http://www.bimco.org/insights-and-information/contracts/20221027-wreck-removal)

<sup>2</sup> It is not known if other Salvage or Risk Consultants have been engaged for this purpose. We would be happy to add their projects to the list below and give credit where credit is due.

- Jack-up Barge **SEA WORKER**, capsized in the North Sea (Standard Club, 2016-2017)
- Recovery of fall pipes lost from the **MV STORNES** in 900m of water in the Norwegian Sea (Standard Club, 2017)
- The disposal of 20,000+ tonnes of mostly hazardous waste from the **MV MAERSK HONAM** in the UAE (Standard Club, 2018-2022)
- Wreck removal of the **MV KOLKATA** in India (North of England, 2018-2019)
- Recovery of fall pipes lost from the **MV STORNES** in 1.2 km of water in the Norwegian Sea (North of England, 2019)
- Wreck removal of the **GBSL Drydock #2** in the Bahamas (British Marine/QBE, 2019)
- Wreck removal of the **MV GOLDEN RAY** in USA (North of England, 2019-2021)

It is assumed that the use of QRA on these projects is what prompted the International Group (IG) and the International Salvage Union (ISU) to consider the inclusion of QRA in the WRECKSTAGE contract. The level of CL Risk Solutions' involvement in these projects was varied based on the desires of their clients. They were not always allowed to implement their comprehensive QRA process in full. For those projects where CL Risk Solutions was able to fully implement their QRA process, risk forecasts for both project timeline and costs were accurate and useful to both the insurer and the contractor. In these instances, the insurer had the increased certainty it desired and the contractor was profitable. The proper application of a comprehensive QRA process is a prerequisite for getting the most out of the process. The Club must consider this when instructing their Salvage Consultant/Risk Engineer.

The QRA process implemented by CL Risk Solutions is often referred to as “**the xpoSure Process**”. The heart of this process is their proprietary xpoSure© software. The xpoSure Process is a comprehensive project management tool that is intended for contractor selection, contract negotiations and for **Project Risk Management** throughout project execution. CL Risk Solutions has used this process over the last 20 years on numerous projects across various industries including but not limited to offshore energy, civil works, real estate and defense.

### **Risk Based Contracting (RBC) - Contractor Selection & Contract Negotiations**

The xpoSure Process is one in which an independent Risk Engineer is instructed by the Club to perform a standard risk analysis for all the contractors' proposals using the same process, the same software and the open and transparent input from the contractors. This process facilitates a rigorous comparison of the various proposals during contractor selection and provides the Club with a relative and quantitative measure of the Club's overall exposure for each contractor. Ideally the Club will want to select the contractor who minimizes their overall exposure. The lowest bidder's qualified lump sum proposal does not necessarily guarantee the lowest overall exposure for the Club. The ability to compare contractor's proposals based on the overall exposure to the Club makes contractor selection and contract negotiations more effectual. It also provides justification for contractor selection internally within the Club, with the International Group (IG) or with the re-insurance market when necessary.

The xpoSure Process begins with a **Risk Model** for each contractor's proposal. The Risk Model is comprised of the contractor's **methodology**, **baseline schedule** including normal productivity and workability uncertainties, **baseline costs** including quantity and price uncertainties, profit and uplifts and a **Risk Register**. The first three items in the Risk Model incorporate what have been traditionally submitted by a contractor. The Risk Register is the identification, quantification and allocation of all the risks for each contractor's proposal. The risks included in the Risk Register are those risks that have a significant **Cost Effect** or **Time Effect** on the project. A typical large wreck removal will have from 25-50 risks in the Risk Register. Details on how this process works are provided in [Part 1](#) of this series.

### What happens to the risks accepted by the contractor?

The Risk Register includes project management risks, technical risks, operational risks, logistical risks and health & safety risks. These are risks that are controlled by the contractor and which the contractor is best able to mitigate. For these reasons the contractor is encouraged, but not forced, to accept these risks. The contractor is paid a **Risk Premium** for all the risks that they accept. The reasonable range for the Risk Premium is calculated using QRA. This premium is then negotiated and mutually agreed between contractor and insurer based on this risk profile and is paid on top of the contractor's baseline costs. The Risk Premium is the Club's cost for the increased certainty they desire.

As a starting point for the negotiation, contractors are asked to quote a Risk Premium taking into account the agreed allocation of risks in the Risk Register and the corresponding Contractor Risk Forecast as discussed below. Contractors are free to bid any amount for this Risk Premium based on the confidence they have in their own proposal or how competitive they intend to be to win the project and still make a reasonable profit. Acceptance of the Risk Premium quoted by the contractor remains subject to the scrutiny and acceptance of the Club and their salvage consultants both from a project and a business continuity perspective.

The contractor can use the Risk Premium to mitigate and manage all the risks. If a particular risk does not occur then the residual funds accrue to the contractor. This accrual motivates the contractor to be proactive in mitigating all the risks to maximize their profits. The premium provides compensation to the contractor in the event that the risk occurs.

### What happens to the risks not accepted by the contractor?

The Risk Register also includes workability risks, environmental & meteorological risks, political & security risks, legal & regulatory risks, reputational risks and financial risks (e.g. exchange rates, inflation, local taxes etc.), over which the contractor has less control and is thus less likely to accept **Risk Ownership**. The contractor is asked to accept these risks when it is mutually agreed that they are the best party to effectively manage them. Contractors are willing to discuss these risks and have accepted many of them on past projects. When the contractor does accept one of these risks it is included in the calculation of the Risk Premium as discussed above. The risks that the contractor chooses not to accept are handed back to the Club in full or occasionally in part (e.g. above a certain mutually agreed cap). This process is known as **Risk Sharing**. The intent of the Risk Sharing is to assign each risk to the party best able to mitigate and bear that risk.

When a contractor hands a risk back to the Club the risk is not forgotten. The xpoSure Process produces two Risk Forecasts for each proposal.

- The **Contractor Risk Forecast** is provided to the contractor. This forecast is based on the contractor's Risk Model, the risks that the contractor has accepted and the corresponding agreed Risk Premium. This forecast is the basis for the contractor's commercial proposal.
- A separate **Company Risk Forecast** is provided to the Club. This forecast is based on the contractor's proposal plus all the risks that the contractor has given back to the Club (i.e. **Company Risks**). It is this forecast that provides the relative measure of the Club's overall exposure for each contractor given the various methodologies, agreed Risk Premiums and Risk Allocations proposed. The Club can then select the contractor that provides the most attractive overall risk exposure.

The contractor is not exempt from mitigating a particular risk just because they have not accepted that risk. The contractual responsibilities for the contractor to mitigate a risk they have not accepted, and how the contractor will be remunerated should that risk occur, are covered by **Additional Clauses** in the contract. The agreement of these clauses is part of the contract negotiations and allow both parties to be commercially creative in dealing with a particular risk. Variation orders are incorporated as part of the Additional Clauses.

The goal of the xpoSure Process is to have the contract all but negotiated with each contractor before contractor selection. This includes finalization of the Risk Register, Risk Sharing, Risk Premium and the necessary Additional Clauses to cover those risks not accepted by the contractor.

The xpoSure Process iteratively results in significant work method improvements throughout the contracting process (with preferred bidders) and during the start-up stages after contract signing (with the selected contractor) which are measurable and provable improvements in time, cost, safety and environmental considerations.

### **Project Risk Management (PRM)**

The xpoSure Process goes beyond just contractor selection and contract negotiation. The ultimate purpose of the process is as a comprehensive Project Risk Management tool that extends from contract signing through project execution. PRM keeps the Club fully engaged in the management of the project up to completion of the project.

PRM under the xpoSure Process includes **Rolling Risk Forecasts** during project execution to maintain risk oversight and provide the Club with a true metric of where the project stands. These forecasts are useful for operational risk control, internal reporting within Contractor and Club, cash flow projections and reports to the IG and re-insurers. All the Risk Forecasts can be used for Club compliance with the fair value reporting requirements including Internal Quality Assurance, Solvency and Internal Financial Reporting Standards (IFRS).

### **Why WRECKSTAGE?**

The WRECKSTAGE contract has been the only contract used to date on projects where the xpoSure Process has been implemented in wreck removal. This has more to do with the acceptance of this contract by the industry and not because the xpoSure Process requires it. The xpoSure Process can be used with any form of contract including a WRECKSTAGE, WRECKFIXED or WRECKHIRE. It can also be used with EPC type contracts (e.g. FIDIC or CRINE) commonly used in marine and offshore energy related projects. The process can even be used to determine the best form of contract for the project and has resulted in some cases with a bespoke contract. The form of contract is preferably not a starting point but a deliverable from the risk based contracting process.

### **How does the xpoSure Process work with the revised WRECKSTAGE contract?**

The revised WRECKSTAGE contract will ideally leave the procedural details of the QRA process at the discretion of the parties involved. This will allow Salvage Consultants and Risk Engineers to develop and offer their own QRA processes. The P&I Club can then choose their preferred qualified consultants and the QRA process that works best for them.

### Risk Allocation

BIMCO has proposed an “*optional Risk Allocation Procedure Clause that sets out the parties’ obligation to agree on the allocation of risk(s)...*”. The xpoSure Process accomplishes risk allocation in meetings with the contractor during the tender process where individual risks are identified and quantified in the Risk Register. Once identified and quantified, the contractor can accept or reject risks. These risks are then included in either the Contractor Risk Forecast or the Company Risk Forecast. Either way, all the risks are included in the calculations of the overall exposures for the Contractor and the Club.

### Company Risks

In cases where the current WRECKSTAGE contract has been used, the xpoSure Process prefers to strike Clause 4 (*Change of Method of Work, Personnel, Craft and Equipment and/or Estimated Time Schedule*) and

Clause 7 (*Delays*) from the contract and to deal with all the risks equally. In exchange for the deletion of these clauses, the contractor is protected by the agreed Risk Premium for the risks that they accept and any Additional Clauses to deal with specific risks that they do not accept. It is not yet clear how the risks that the contractor does not accept will be handled in the revised WRECKSTAGE contract. Ideally the new contract will create an opening for individual Clubs to establish their own governance for those risks that the contractor does not accept (i.e. Company Risks).

Specific risks not included in the *Risk Allocation Matrix* should, in principle, still be included in the Risk Register. Risk not accepted by the contractor should otherwise be covered by an Additional Clause and included in the Company Risk Forecast else the goal of quantifying the Company's overall exposure will be lost. These risks would remain part of the Company Risk Forecast throughout project execution. The contractor could be committed to mitigate those risks on behalf of the Club and the contractor would be duly compensated.

### **What should a P&I Club do if they want to implement QRA?**

Implementing QRA on a wreck removal contract requires knowledge of how the process works, the different ways in which QRA can be implemented and what the Club wants to achieve by implementing QRA on a project. The QRA process should begin with a set of **Contracting Principles** for the specific wreck removal project. The following are points for the Club to consider (in no particular order) that may help with the development of these principles.

- ▶ Do we want to use QRA on this project?
- ▶ What is our goal for using QRA?
  - Do we intend to use overall exposure as a metric for contract negotiations and contractor selection? How will this be done?
  - Do we intend to use QRA deliverables for Project Risk Management during contract execution?
- ▶ Do we prefer to sign a single lump sum contract with a single contractor or is it better to break the project down into separate contracts and possibly more than one contractor?
- ▶ What form of contract do we prefer?
  - Do we prefer to use the WRECKSTAGE contract?
    - Do we prefer to strike Clause 7?
    - Do we prefer to strike Clause 4?
  - Should we consider another form of contract or a bespoke contract?
  - Do we leave the form of contract as an option for the bidders?
  - Do we allow the tender process to determine the best form of contract?
- ▶ Which Salvage Consultants and Risk Engineers are qualified to implement QRA on our behalf and in the way in which we want it implemented?
- ▶ Development of a comprehensive and efficient Invitation to Tender (ITT)
  - Specific instructions on how the tender will be run and how QRA will be used.
  - Request specific items from the prospective contractors
    - Methodology
    - Baseline Schedule
    - Baseline Costs
    - Risk Register
    - Proposed Risk Premium

- Final contract terms and conditions including Additional Clauses as necessary
- ▶ Do we use QRA on other project contracts?
  - Oil spill contracts
  - Waste management contracts
  - Vessel disposal contracts
- ▶ Do we combine the other project contracts in the QRA process to assess our true exposure for the entire project?

## Summary

The inclusion of a QRA option in the WRECKSTAGE contract is welcomed. QRA is a powerful tool that can be good for all project stakeholders. Complete details of the revised WRECKSTAGE contract have yet to be revealed and more will be known once the revised contract and the corresponding Explanatory Notes are revealed. Stakeholders will be required to learn the ways in which QRA can be implemented and select a QRA process that meets their expectations. It is hoped that the stakeholders are given the freedom to adopt a QRA process of their choice.

## The Series continues

This is Part 2 of a series of articles entitled **Quantitative Risk Analysis for Wreck Removal Contracts**. Part 3 of this series is currently being written. Part 3 will be more technical in nature. It will provide more detailed information on the efficacy of the Monte Carlo simulation method, how the Risk Model is developed, how the Risk Premium is calculated and how the Risk Allocation Matrix in the revised contract might be populated. Part 3 should be available for distribution in May 2023. Further additions to the series are being considered, including “*The Contractor’s Perspective*” with input from those on the other side of the table.

Reed Maritime and CL Risk Solutions are both available to discuss how your Club can approach QRA. This can be done remotely or in person. We would be happy to prepare a presentation or have a simple discussion and Q&A session. You can contact the author at (<https://reedmaritime.com/contact/>).