



Risks Associated With Moving a Drilling Rig

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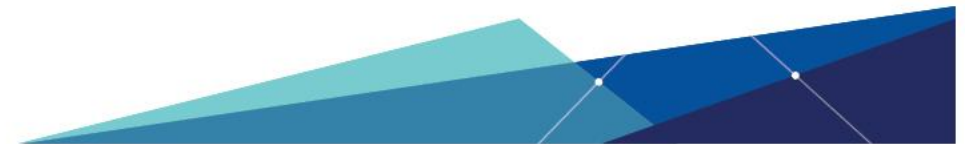
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Introduction



LOC There Are Three Ways to Move a Drilling Rig

Wet Tow	Where the object is towed on its own buoyancy	Highest Risk
Dry Tow	Where the object is towed on a barge	Medium Risk
Dry Transportation	Where the object is transported as deck cargo on a self propelled ship	Lowest Risk



LOC Three Type of Drilling Rig



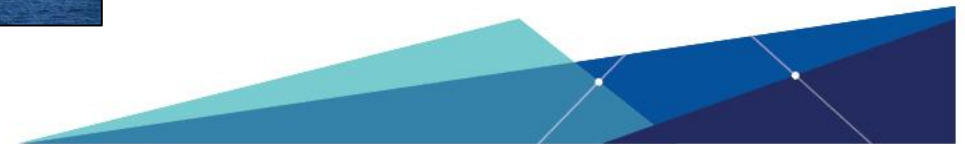
Jack-Up (Self Elevating Platform)



Semi-Submersible



Drill Ship



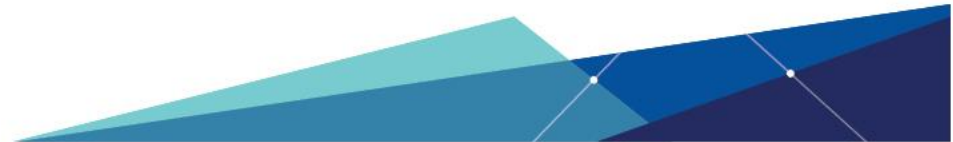
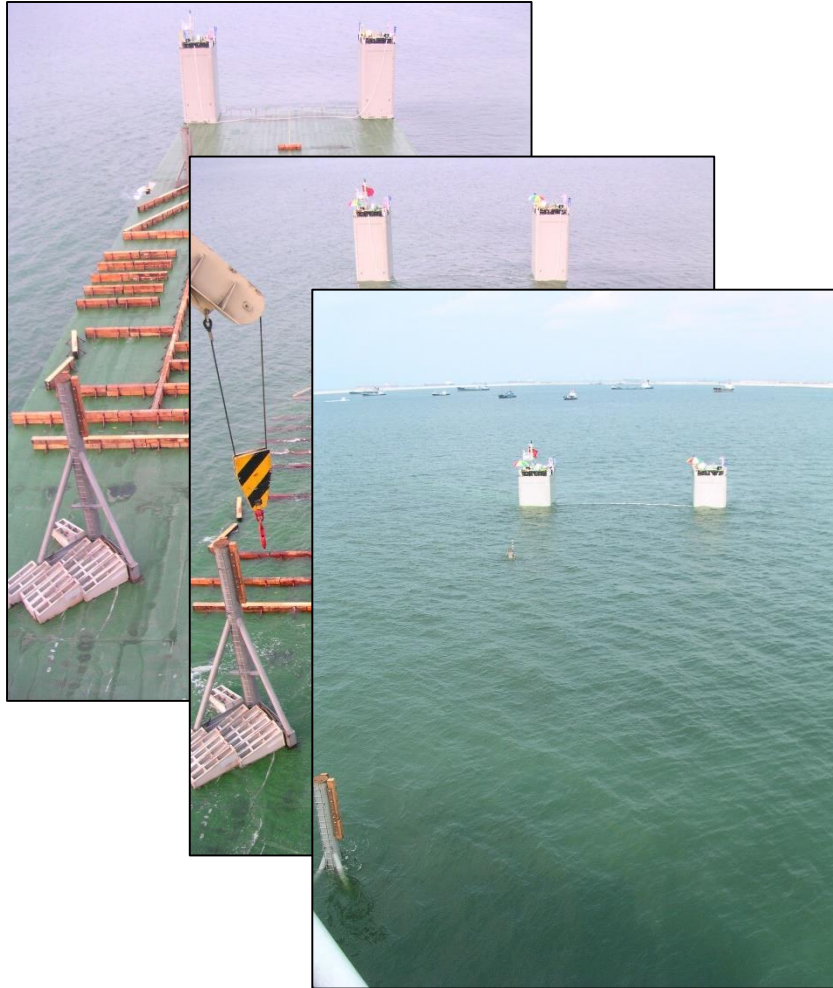


LOC Types of Drilling Rig Move

Field Move	Short move within the oil or gas field between wells often largely within the drilling configuration	<24 hours
Location Move	Move between fields, with the drilling rig often loaded with some drilling related variable deck load having due regard for season, route and points of shelter etc.	24-72 hours
Ocean Move	Typically a move between different geographic locations	> 1 week



LOC A Typical Loading (For both Dry Tow and Dry Transportation)





Selecting the Right Method for a Rig Move





Key Considerations – When Selecting a Rig Move Type

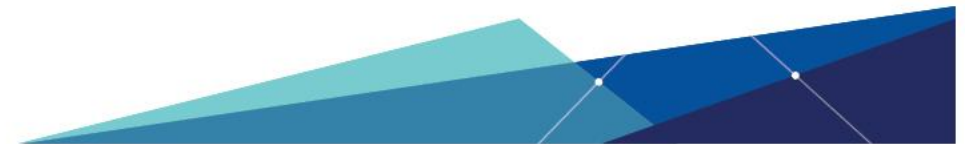
- Distance / Duration
- Route / Season
- How quickly is the rig required?
- Drilling Rig Limitations
 - Leg strength
 - Air gap
 - Wave height
- Availability of Marine Spread ... but is it the correct one?





Matching the Transport Vessel to the Drilling Rig

- As vessels have become larger (wider beam up to 79 metres) their ability to transport larger drilling rigs has also increased. However the larger vessels also still transport smaller drilling rigs too.
- So why is it important?
 - It's the same as being in a rowing boat.....
- Sometimes a different transportation vessel would be more favourable to the drilling rig structure.
- However the cargo owner might have to wait or pay more for that vessel. Commercial pressures often come to bear. This can be “managed” with heading control or routing, but there are new risks introduced.





Credit: Ugland/GPO





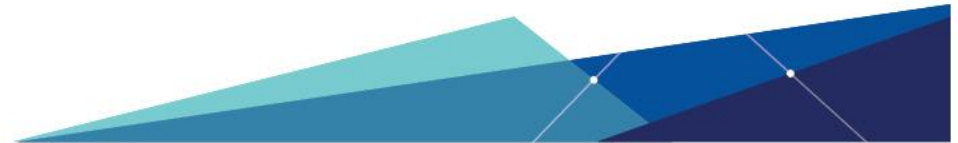
Overview of Key Risks





Overview of Key Risks

Risk	Wet Tow	Dry Tow	Dry Transportation
Weather	Often Most Vulnerable	In-between Wet Tow and Dry Transportation	Often Least Vulnerable
Tow Line(s)	Single Point of Failure?		N/A
Rig Weight / Centre of Gravity	Within Operations Manual OK	Impact on Motions and Accelerations	
Allowable Leg Loading	Limiting	Generally Less Limiting than Wet Tow	More Manageable but Perhaps More Limiting
Cribbing and Seafastening	Internal Seafastening Only	Cribbing and seafastening loads plus internal seafastening	





JRC Scope of Work





LOC

JRC's "Rig Location & Move Code of Practice" (JR2019-005)

- Basis for the Certificate of Approval:
 - *The Marine Warranty Surveyor will issue a COA for each critical operation as defined in the relevant scope of work, provided they are satisfied, so far as possible, that the operations are conducted in accordance with:*
 - *recognised codes of practice for design and operations;*
 - *best industry practice appropriate for the vessel(s), equipment and location(s);*
 - *vessel(s) and equipment being used within defined safe operating limits;*
 - *current Marine Operations Manual. When an operation is conducted outside the Marine Operations Manual, this is subject to a formal management of change process, with senior leadership, technical authority and MWS approval*





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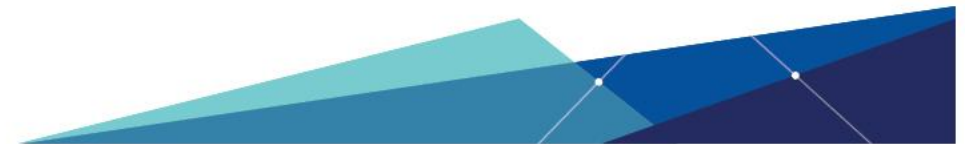
- In General the MWS shall review:
 - *calculations;*
 - *drawings;*
 - *procedures;*
 - *certificates;*
 - *manuals;*
 - *relevant reports;*
 - *routing plans;*
 - *site specific metocean and geotechnical data;*
 - *tow route metocean criteria;*
 - *Classification status, including Conditions of Class, results from previous survey, and timing of next;*
 - *MOU specific requirements for number of vessels and bollard pull.*





JRC's "Rig Location & Move Code of Practice" (JR2019-005)

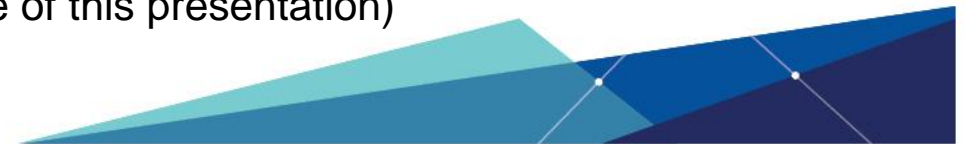
- In General the MWS shall carry out suitability surveys that:
 - *establish that the relevant items are suitable for the proposed operations;*
 - *make known, in clear terms, in writing to the Assured the recommendations to be implemented prior to commencement of the proposed operations;*
 - *review Meteorological and Oceanographic (metocean) conditions and, where appropriate, incorporate requirements as to metocean conditions in the recommendations in the COA;*
 - *observe and record the preparations for the proposed operations;*
 - *attend and witness critical function tests or relevant assurance tests;*





Wet Tow Typical High Level MWS Scope of Work

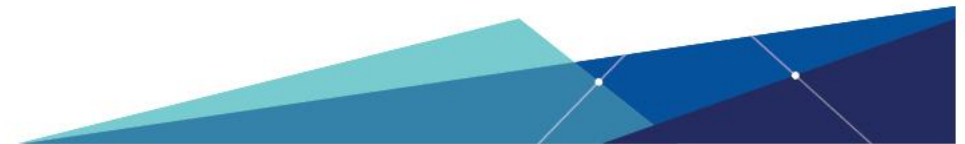
- Review:
 - Jacking Down Operation
 - Tow and Positioning Calculations and Methods
 - Towage or Transportation Manual / Towmaster Instructions / MODU Ops Manual
 - Contingency Planning for Emergencies (Bunkering, bad weather, etc.)
- Attend:
 - Tug and Tow Equipment Suitability Survey
 - Tow Operation
 - Going on Location (includes location approvals – outside of this presentation)





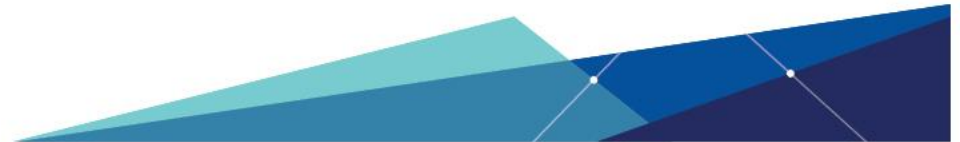
Dry Transportation Typical High Level MWS Scope of Work

- Review:
 - Metocean and Routing
 - Tow and Positioning Calculations and Methods
 - Transportation Manual and MODU Ops Manual
 - Contingency Planning for Emergencies (Bunkering, bad weather, etc.)
- Attend:
 - Tug and Tow Equipment Suitability Survey (For Loadout)
 - Transportation Vessel Suitability
 - Loadout (and Discharge)





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Mitigations





Mitigations

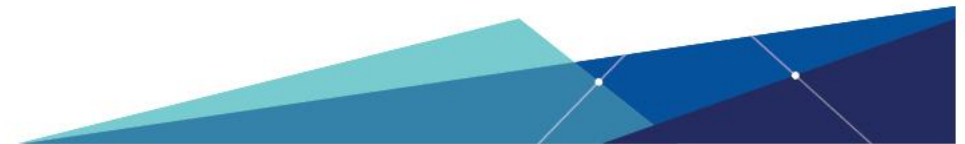
- Engineering for the Transport Manuals – Must be readable
 - Metocean
 - Motions / Accelerations
 - Bollard Pull Requirements
 - Seafastening
 - Cribbing
 - Leg Strength – leg securing (and/or leg length reduction)
- Redundancy
- Crew Experience





Mitigations

- Weather Forecasts
- Weather Routing
 - Heading Control
- Real-Time Cargo Monitoring (OCTOPUS etc.)
- Voyage Simulation
 - SafeTrans
 - Model Tests





Mitigations

- The MWS!
 - SOMWS MODU Certified
 - The ideal mix of engineering and marine input – it cannot be done by one person alone
 - Detached from commercial and schedule
 - Broad experience to call upon
 - Early engagement
 - Late engagement may mean risk are already locked in







Summary





Summary

- No two transports have the same risk profile
- Transports should be “crew proof”
- Mitigations should not be the starting point (heading control for example)
- Tools are available that work in real-time and look ahead to aid the Master in his decision-making process
- Crew experience is key (as are the engineering departments)
- The MWS adds value – they should be included as early as possible





Any questions?

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