International Association of Drilling Contractors

Jack-up Committee – Regular Session
March 12, 2015
IADC Offices
10370 Richmond Av
Houston, Tx 77042

Minutes

I. IADC Instructions

Alan Spackman gave the safety briefing for the day. He reminded all about the IADC Antitrust policy and IADC expects everyone to follow the policy at the meeting.

II. Introduction and Welcome

Mike Dowdy opened the meeting at 9:05 by asking all in attendance to provide their name and company affiliation. One attendee was participating by Webinar. Mike thanked everyone for attending.

III. Going On/Off Location

1. ABS Workshop Going On/Off Location: Jim Brekke provided a summary of the ABS/Keppel workshop held on March 5th on the "Jackup Going On/Off Location Analysis". This workshop was an opportunity for ABS to present their results from the ABS/Keppel Joint Development Program to the drilling community, a methodology to evaluate going on location, validation of this method, and to provide a forum to discuss results and offer recommendations. ABS believes the method presented is appropriate for this type of analysis. The next phase will apply the methodology to a specific jackup(s). The objective is to finalize the validation and simplify the method.

2. JRC 2015 Draft; The JRC attempts to cover all the critical issues associated with a rig move. This includes NDT on components. There was concern that the guidelines allows the warranty surveyor to approve a location without a site assessment. It was noted that there is guidance in ISO 19905 (which is referenced in the JRC Draft) on site assessment including when a full site assessment is not necessary at a location.

   Roger Dutton and Marc Dial attended meetings with underwriters in the UK concerning intent of the document and the application. The underwriters believed the guidance described is used in a majority of all rig moves whereas the reality is that a much smaller number of drilling contractors are using the current JRC. The underwriters believed the requirement that the warranty surveyor for the insurer be independent from the drilling contractor was driven by the drilling contractors. It was suggested that if there is no warranty surveyor present on each rig move it is possible that coverage could be denied. This is the time for the drilling contractors to review and comment on this document. The conclusions from the meeting from a rig mover's perspective were that the previous document was more general in guidance and therefore more easily implemented. The new document has a lot of good information but it needs to get away from specifics. The language will result in constraints on the relationship between the warranty surveyor and the contractor.

In general discussion some additional points were made. The drilling contractor's risk management group should review the document. The drilling contractor's legal department should review the relationship between the drilling contractor and the insurer.

An action item was to find out who was on the JRC committee. A check of the web site provided a list from 2012 (see attached). Mike Hoyle, who has provided input to the JRC on behalf of DNV GL, was asked about the committee structure. His reply is quoted below.

> "The JRC is a Lloyds underwriters committee; they have a sub-group that deals with the document in question – by and large they are underwriters with a technical background – I do not know the full listing, but many of them were on the call last year. They consult with others as they see fit. I think there is little we can do apart from cooperating when we get the chance."

3. Other Activities Installation/Retrieval:
    a. ISO19905 Panel 54: Installation/retrieval will be under the ISO19905 site assessment suite of standards. The panel will be convened by Mike Hoyle.

       The plan is that IJUC will provide technical input for the critical issues as was so successful with the SNAME and ISO site assessment documents. Panel 54 will work on a high-level overview to identify issues that need to be included and provide expertise when necessary. In addition to consultant expertise Panel 54 will need drilling contractor expertise.

    b. Installation/retrieval discussion; Mike Dowdy reminded the IJUC members that the jack-up committee continues to need help with identifying issues.

       Colin Nelson shared with the new attendees that the jack-ups are based on the elevated storm. When the Marine Operating Manual (MOM) addresses rig move issues these are typically limited to a single fixed value. Installation/retrieval is more complex than can be satisfied with a single number. He recommended that the group identify cases that should be analyzed which will define limits from an Operator's and drilling contractor's point view. While he was with Transocean and now his current position at BP actual installation/retrieval experiences demonstrates the need to address this issue. Drilling companies and oil companies have a desire to safely move rigs in more harsh environmental conditions. At Transocean, Colin looked at installation/retrieval issues to improve rig design. His experience is that design or assessment for rigs to achieve the optimum installation/retrieval conditions resulted in design cases that required a significantly more robust rig. Economics may not work out for the most desired objective. IJUC needs to be up front with the approach for assessing rigs. If the designer, rig owner, and operator are happy with the current limit (e.g. 5' wave height) then this is the direction. If not, IJUC needs to recognize the problem and provide some methodology. He reminded everyone that tagging bottom may not be the most critical issue to consider.

       Malcolm Sharples advised that installation/retrieval should be an assessment document and not a design document. The nature of a rig move results in a large number of variables. This complexity results in too many variable for a design document.

Ken Schaudt cautioned against prescriptive requirements when you are dealing with conditions that cannot be clearly defined. For example, say the MOM states a fixed value (5'), if you do not strictly follow this then you are operating outside the MOM. Ken Schaudt advised the group that legal consequences do occur with such specific guidance when the lawyers get involved. Also, you may find, as he has, that the drilling contractor must justify their action even when they are working to something less than the stated limit in the MOM. Malcolm Sharples supported this observation to consider the legal ramifications with language incorporated in the MOM. As a suggestion, the MOM could provide general guidance with specific guidance delegated to other sources. This raises the question of how will these issues be addressed in any methodology that suggests a different, possibly larger value than is recommended by the MOM?

Some highlights of the discussion on installation/retrieval are:

- Analysis are helpful to understand the rig's limits but an experienced-qualified mariner on the rig has a better understanding of the conditions for going on/off locations.
- Mike Dowdy suggested that an assessment will provide for allowable motions for going on location but when coming off location, then the rig mover needs current seastates at the location.
- Ken Schaudt noted that change of mode from floating to elevating back to floating were critical conditions.
- Roger Dutton suggested that a good assessment and instrumentation for installation with rig mover's experience would be helpful for installation. When coming off location, seastate is only one of the questions that need to be answered. You need to know other variables such as pulling legs in the current seastate which may be a bigger problem than just getting into the water.
- Malcolm Sharples suggested the first step would be for rig movers, marine warranty surveyors, and drilling contractors who have actually moved rigs write antidotes of problems experienced, the class of the rig, characteristics of the location, and approach to resolve the condition to capture the problems. Then write some principles based on judgement for rig moves.
- Location soils, weather (wave/current & wind) and infrastructure are considerations. Type of soils at the location (soft or stiff). Existing spudcan holes also need to be investigated.
- Warren Weaver added that one problem to consider is moving a rig without a fully operational elevating system. If the elevating system lacks redundancy or is not robust, then this can present problems during installation/retrieval.

Dave Lewis is to post the minutes of the October 21st meeting on the IADC website after submitting the draft for review.

c. Towing Safety Advisory Committee report: This report was an outgrowth of the Kulluk investigation and provides recommendations going forward. As part of the recommendations in the report, four subcommittees will be setup to address specific

issues with towing MOUs. The subcommittee only have a few companies that participate in IJUC. The IJUC needs to become familiar with this committee, especially where their recommended actions will impact jack-up transit, and become active so that drilling contractor can contribute to the recommendations on towing of these rigs. Dave Lewis will post TSAC Subcommittee Task 14-01 MODU Kulluk ROI Final Report "Review of and recommendations based on the Report of Investigation Into the Grounding of the Mobile Offshore Drilling Unit (MODU) Kulluk", November 2014.

The next meeting will be March 25th-26th, 2015. No one in attendance at the IJUC meeting was planning on attending.

Warren Weaver will follow-up with NOSAC for a statement. We need to be sure people with offshore experience are involved.

Malcolm Sharples advised that manning requirements for towing in USCG is from regulation. In the case of the Kulluk, the Captain of the tow was overruled by shore based operations which resulted in changes by the tow vessel. The tug provided shackles which they stated had the required capacity. The original tow was an inside route. This raises the question of who is responsible to make decisions. Colin Nelson agreed this is a concern. The Kulluk was a blue water tow which is not an area where the USCG Center is actively involved, their primary focus appears to be in the area of intercoastal issues. The companies that provide MOU tows could be a resource to the task force for recommendation on requirements for transit.

IV. IJUC Projects Reports

1. Hurricane Calibration: Dave Lewis reported that Doug Stock was out of town and had advised he would likely not have access to the internet to call in. On his behalf, Dave reported that he met with Doug Stock on February 26th to discuss the analysis of the Ensco 69. At the very least the unit will be analyzed based on a snap shot evaluation for the maximum condition. Digital Structures and Lewis Engineering Group (LEG) will use the LEG FEA model of the Ensco 69. It is hoped this model will be used in Digital Structures EPD program to assess the Ensco 69 for the hurricane loadings as described by the hindcast predictions based on the time history from the hindcase. This will result in a study similar to the completed dynamic response work. The component stress will be checked at full capacity (load and resistance factors set to zero). Jim Brekke noted the measurements were very significant because the natural period was observed to shift under extreme loading, presumably due to the foundation softening. Dave Lewis is to contact Digital Structures to expedite the completion of the dynamic response report.

   The Glomar Adriatic III will be investigated once the Ensco 69 work is complete. Warren Weaver noted that there were several elevating system failures found after the hurricane event (B.N. This should be addressed as appropriate in the review of the capacity results). This will allow for using the lessons learned from the Ensco 69 work to be applied to the AD3.

2. GoM Annex & TRS Area: Dave Lewis reported on the February 26th meeting of the Gulf of Mexico Annex. Those in attendance believed the committee should continue. The committee discussed the effect of the new API 2Met on the GoM Annex. It is generally believed that this will not affect the metocean criteria but the new airgap rules may require consideration of regional requirements which match the east-central-west region's 1000-year limits. At the

meeting it was suggested that an argument can be made that jack-ups should not be treated like fixed platforms. The GoM subcommittee discussed survival criteria. A recommendation was made to do a screening study based on the current API 2Met 100-year criteria of the rigs that were exposed to Hurricanes Katrina and Rita.

Malcolm Sharples suggested that the rigs which survived should be evaluated to determine the overestimate of wave forces. Jim Brekke noted an OTC paper that documented an analysis of two Transocean rigs in the path of Katrina , using advanced foundation analysis to show the rig expected to be lost was lost and and the rig expected to survive did survive.

Mike Dowdy suggested that consideration of new studies should take into account existing work before new studies are commissioned.

V. PROPOSED PROJECTS:

Two proposals were offered for consideration by IJUC. Both proposals are a result of work by the ISO 19905-1 Panels to address questions or challenges to the current specification guidance.

1. Sage Study Proposed 1) Clay over deep sand & 2) revisions for deep penetration in clay: Jack Templeton was unable to attend the morning session because of an emergency. He arrived after the completion of the discussion on his project. Dave Lewis provided a description and purpose of the project for the meeting

   This work is associated with Panel 4-Geotechnical. This study has two related elements, deep penetrations in clay over sand and proposed revisions to the current stiffness and capacity values allowed by the present standard.

   The consensus in the geotechnical community is that the current approach under-predicts the capacity for cases of clay over sand. This work would have a direct benefit to the third rig that was instrumented in Hurricane Rita, the Rowan Paris, which survived. The foundation conditions at this location are those proposed in the study. Dave Lewis believes the results of the Rowan Paris instrumentation response could be used with the Sage study.

   The second part of the Sage proposal is to address a UWA (University of Western Australia) paper which was based on the results of centrifuge test and more recent FEA methods. The UWA recommendations to Panel 4 would result in a significant degrading of the foundation capabilities. The recommendation to Panel 4 would result in a reduction in the foundation stiffness. The UWA recommendations also reduce the allowable horizontal and vertical capacities by 50%. Should these recommendations be adopted jack-ups which have been approved for locations using the current ISO document would be found unacceptable. Jack Templeton (SAGE) feels the UWA work is good but the different conclusions from his study, which is the basis for the current ISO guidance, and the UWA conclusions is a result of material properties, specifically plasticity index. His proposed solution would be to modify the current guidance by the inclusion of a material factor.

   Many of the contractors recommended the consultant should defend the IJUC work on the basis that observations and analysis has demonstrated the adequacy of the current ISO document guidelines. They ask why additional funds would be needed to address a completed issue. Dave Lewis noted that Jack Templeton has been doing this with Panel 4 and UWA. However, the work presented by Panel 4 has been peered reviewed and this work is being considered representative of the performance of the spudcan. The comments by UWA on the previous

SAGE work deal with perceived limitations of the previous study which include the spudcan was wished in place, the FEA element size was too large, and the new methodology better reflected actual performance. To refute this type of analysis will require an analysis that demonstrates why our results are valid. This requires man-hours and an expensive software license.

2. Keppel-Digital Structures; Additional load cases in ISO19905-1: This proposal is a result of concerns in Panel 3 with determining the dynamic response of jack-ups when the wave period is around the jack-up's natural period. The panel's concern is that due to wave cancelation the maximum dynamic response may be missed. The proposed study is to determine if the current recommendations are adequate, un-conservative, or possibly over-conservative. Should the study's conclusions suggest the current method requires modification then recommendation would be made to Panel 3.

VI. MAY OGP/ISO MEETINGS

Mike Hoyle, convener of WG7, John Stiff, convener of Panel 53 – Floaters, and Doug Stock, Convener seismic ISO panel and the jack-up panel, were unable to attend because of the ISO TC67/SC7 meetings or due to other travel the same week as the IJUC meeting.

It was suggested that the drilling contractors become familiar with ISO 19901-9 SIM (structural integrity management). This has a companion document in API. Initially the work will focus on fixed steel platforms. The jack-up committee position is that these documents should not be applied to MOUs which are in class. The drilling contractors and others in the MOU industry need to continue to follow this work to ensure that ISO 19901-9 applies to only non-IACS classed structures.

Half of the funding for updating the seismic maps in ISO 19901-2 has been approved. The parties are working on clauses in the agreement. Draft of ISO/DIS 19901-2 is expected to be issued in April 2015.

Colin Nelson advised the group that seismic requirements and maps in these documents are important issues. IADC needs to focus on this work and where the seismic committee is being too conservative to encourage them to seriously consider their direction. BP has performed a seismic analysis on jack-ups using the comprehensive approach. This study showed the structure is satisfactory but when failures occurred these were in the foundation. The foundation is where studies need to focus. Based on the complexity and time required to do an analysis, if a jack-up does not pass the screening study then Colin believes that BP will have difficulty justifying the use of a jack-up for that location with the cost and time issue required for these types of seismic studies being a big contributor to the decision. (*Post Meeting Note*: There is a proposal for a JIP by the Center for Geotechnical Modeling (CGM) UC Davis to do seismic centrifuge studies of jack-ups. It would be beneficial to obtain the funds to pursue this opportunity. This JIP was reported first at the IJUC meeting in July 2014. An outline of this JIP, provided by Mike Hoyle, is included in the references).

Panel 10 through John Stiff and Mike Hoyle continue to work on the issue related to jack-ups working in the arctic. It is believed by Panel 10 the current wording in ISO 19906 would exclude jack-ups, even on a seasonal basis. This could not only affect jack-ups in Canada but also in Alaska.

VII. OTHER BUSINESS

1. IADC Committees: IADC has two types of committees: Standing Committees, such as the IJUC, and Division Committees. Division Committees can be formed under the direction of an IADC

Division Vice President. For example, Lyndol Dew, as VP of IADC's Offshore Division could form a committee to address an area of concern to the Offshore Division.

2. Resource group for Marine Operations: API is working on marine operations issues which will fall under API RP-2MOP. This work should be focused on fixed or other structures that fall under the API umbrella. Alberto Morandi offered to send some information. It was noted the OCC does not have a similar group. (*Post Meeting Note*: ISO TC67/SC7/WG9 is about to start the work to update the parallel ISO 19901-6.)

VIII. NEXT MEETING

Place: IADC Offices
Host: 3Dent Technology
Date: June 18th, 2015
Time: 9:00 am

IX. REFERENCES

The following documents represent presentations at the meeting, documents distributed at the meeting, or references related to subjects discussed. These documents are available under the resource tab for the IADC jack-up committee.

1. TSAC Subcommittee Task 14-01 MODU Kulluk ROI Final Report "Review of and recommendations based on the Report of Investigation Into the Grounding of the Mobile Offshore Drilling Unit (MODU) Kulluk", November 2014.
2. Presentation to 36th ISO/TC67/SC7 Meeting; Presentation by ISO Workgroups 3; ISO 19901-1 Metocean;
   ISO 19901-2 Seismic; ISO 19901-3 Topsides; ISO 19901-9 SIM Structural Integrity Management. ISO 19902 Fixed Steel Structures;
3. Presentation to 36th ISO/TC67/SC7 Meeting ISO 19905: Progress report to SC7 meeting of 11th/12th March 2015, by DNV GL, Mike Hoyle, 2015-03-11
4. UC Davis Brochure for Seismic Analysis using centrifuge.
5. JIP Outline subjects for centrifuge tests of seismic response of jack-up.