

Memo to:
Petroleumstilsynet

Memo No: M-O-TS/TSI/OFFCLASS-J-66
From: Offshore Classification

Date: 2018-09-29
Prep. By: TSi

Høring: Forslag til endringer i HMS-regelverket for petroleumsvirksomheten og enkelte landanlegg

Vi viser til mottatt høringsbrev datert 2.7.2018 (re.18/916) og takker for invitasjonen til å få delta i høringsrunden.

Vedlagt nedenfor oversendes DNV GL's kommentarer.

Vi står gjerne til disposisjon med nærmere forklaringer eller utdypinger dersom dette skulle være ønskelig.

Med vennlig hilsen

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NR.	FORSKRIFTSREFERANSE	TEMA	KOMMENTAR	INTERN REF.
01	VEILEDNING TIL STYRINGSFORSKRIFTEN Til §18 Analyse av arbeidsmiljøet	DNVGL Comfort Class 1	<p>Det er hyggelig at våre klasseregler finner anvendelse som referansestandard i petroleumsnæringen.</p> <p>Når det gjelder nivå på «comfort rating» gjør vi oppmerksom på at det er få eksisterende offshore-type skip som pr. idag har en comfort rating 1. I henhold til vår database finnes det 6 skip av denne type som har rating 1, utav et totalvolum på ca 700.</p> <p>Erfaringsmessig tror vi også det vil bli vanskelig for eksisterende skip å oppgraderes for å tilfredsstille rating 1 kravene.</p> <p>Rating 1 vil kreve nytanking allerede fra designfasen av denne type skip. Stikkord i denne sammenhengen kan være:</p> <ul style="list-style-type: none"> • Plassering av lugarer i andre områder enn dagens innredningsområder i nærhet av side-thrustere • Nye former for flytende dørker • Bruk av andre typer sidethrustere (RIM-type, supersilent, retractable, etc.) 	
02	VEILEDNING TIL INNRETNINGSFORSKRIFTEN Til §13 Materialhåndtering og transportveier, atkomst og evakueringsveier	DNV GL referanser i nytt syvende avsnitt	<p>Vi setter pris på at våre industri-standarder anvendes som referansestandarder i petroleumsvirksomheten.</p> <p>Vi noterer at det vises til DNVGL ST-0358 for styrkedimensjonering og innfestning av gangbroer, mens sikkerhetskrav hentes fra NORSOK R-002.</p> <p>I denne sammenhengen gjør vi oppmerksom på at DNVGL-ST-0358 dekker både struktur, kontroll og sikkerhetssystemer, og på denne måten gir en helhetlig behandling av teknisk sikkerhet utarbeidet med spesielt fokus på gangbroer.</p> <p>I Vedlegg 1 har vi lagt ved et notat (på engelsk) fra vår fag-enhet for gangbroer med bl.a en «high-level» sammenligning av NORSOK R-002 og ST-0358. Fag-enheten anbefaler at det vises til ST-0358 i sin helhet, bl.a fordi dette er kjente krav som fabrikanter allerede er inneforstått med, og som mange allerede har sertifisert gangbroer i henhold til.</p>	

NR.	FORSKRIFTSREFERANSE	TEMA	KOMMENTAR	INTERN REF.
03	VEILEDNING TIL INNRETNINGS-FORSKRIFTEN Til § 56 Bærende konstruksjoner og maritime systemer	Stryking av referanse til DNVGL-OS-C104 for steds spesifikke analyser	<p>Steds spesifikke analyser av «jack-ups» er normalt ikke inkludert i klassearbeidet. Analysene utføres ofte av en uavhengig konsulent, typisk en «marine warranty contractor».</p> <p>Dersom referansen til DNVGL-OS-C104 fjernes og ingen standard angis som anbefalt referanse, vil analysen i prinsippet kunne utføres i henhold til industri-standarder som SNAME 5.5, ISO 19905-1 eller regler fra et annet klasseselskap enn det enheten var godkjent for (ABS, Lloyds, BV, CCS, Rina etc.).</p> <p>Vi har vedlagt en uttalelse (på engelsk) fra vårt fagmiljø på SSA (site specific assessment) som forklarer forskjeller på OS-C104 og den ofte anvendte ISO 19905-1, og som gir en argumentasjon for at en konsistent innarbeidet god praksis bør videreføres ved å beholde referansen til OS-C104 på norsk sokkel.</p>	

VEDLEGG 1:**VEILEDNING TIL INNRETNINGS-FORSKRIFTEN - Til §13 Materialhåndtering og transportveier, atkomst og evakueringsveier**

Recerence is made to 2018-07_Forslag til endringer i HMS-regelverket

Nytt syvende avsnitt skal lyde: For gangbroer mellom fartøy og enklere innretninger bør følgende brukes:

a) DNVGL-ST-0358 for styrkedimensjonering og innfesting til fartøy,

b) DNVGL-RU-SHIP Part 6 Chapter 5 Section 16,

c) NORSOK R-002 kapittel 4.

Items a) and c)

It appears that the intention is to combine the structural requirements of a product standard (i.e. DNVGL-ST-0358 Offshore gangways) with the safety requirements (related control systems) from NORSOK -R002 Ch 4. However, DNVGL-ST-0358 covers both structural and control system/safety system requirements.

NORSOK-R002 requirements have been derived from the specifics of offshore lifting appliances and should be interpreted on a case-by-case basis when applied for equipment other than lifting appliances, such as offshore gangways. This may lead towards an inconsistency between interpretations depending on the designer and certification body and lack of transparency related to what and how the requirements have been implemented into the actual design.

DNVGL-ST-0358 has been based on the requirements in DNV 2.22 Lifting appliances (now DNVGL-ST-0378), but tailored for the specifics of offshore gangways and walk-2-work operations. DNVGL-ST-0358 has been first published in December 2015 and revised in September 2017, thus incorporating lessons learned during its first 21 months of being used by the large majority of offshore gangways designers/manufacturers.

Gangways certified in accordance with DNVGL-ST-0358 would already have built-in the strength, functional and safety features required for offshore personnel transfers to be performed in a consistently safe manner. Operational safety is addressed in terms of continuous availability to abort an operation in case of a single failure in the power supply, power system or control system

A high-level gap analysis is provided below to highlight the similarities between the 2 standards with regards to safety requirements. It can be stated that, generally, the principles governing the 2 standards are in line, however ST-0358 provides a transparent set of requirements optimized for the specifics of

offshore gangways to which the clear majority of offshore gangway manufacturers are already familiar and have already incorporated into the gangways certified after December 2015.

Reference NORSOK R- 002	Status* Applicable/ Not applicable	Note
Ch 4 4.1 Safety goals	A	General requirements; similar safety goal setting requirements as per DNVGL-ST-0358
Ch 4 4.2 Fitness for use	N/A	DNVGL-ST-0358 provides general requirements applicable for walk2work equipment. Selection and use of the equipment according to the site-specific conditions, as required by R-002, is not regulated (defined and/or followed-up) by DNVGL in either DNVGL-ST-0358 or DNVGL-RU-SHIP Part 6 Chapter 5 Section 16
Ch 4 4.3 Reliability and availability	N/A	Certification according to DNVGL-ST-0358 addresses operational reliability in terms of structural strength, fatigue life and operational safety. Operational safety is addressed in terms of continuous availability to abort an operation in case of a single failure in the power supply, power system or control system. General equipment availability and 'down-time' as required by R-002 are not part of DNVGL's certification scope
Ch 4 4.4 Principle of safety integration	A	DNVGL certification provides the minimum set of requirements (structural, functional, control system) enabling an equipment to be operated safely. DNVGL certification does not address risks associated with any other phases (i.e. transport, assembly, disabling, scrapping and dismantling) Good engineering practices addressed by: <ul style="list-style-type: none"> • Design: references to applicable design standards, material selection standards • Fabrication: requirements for adequate traceability (material certificates, welding procedures, etc.), quality assurance (personnel qualifications, etc.), production quality (NDT requirements) • Comprehensive testing programmes covering structural, functional and safety/failure aspects DNVGL certification scheme for Offshore gangways as per DNVGL-ST-0358 represents a 'medium level design verification', ref DNVGL-SE-0480 App B.4.4/DNV-OSS-308 App B D 400.
Ch 4 4.5 Inherently safe design measures	A	In line; DNVGL-ST-0358 provides goal setting requirements leading to a fail-safe design (ref Sec 6)
Ch 4 4.6 Safeguarding and complementary	N/A	Certification as per DNVGL-ST-0358 ensures that all protective measures applicable to the equipment during operation are implements into the design of the equipment. Operational safety related protective measures are not part of DNVGL-ST-0358 or DNVGL-RU-SHIP Part 6 Chapter 5 Section 16

protective measures		
Ch 4 4.7 Information for use	A	Requirements that may be considered equivalent are provided by DNVGL-ST-0358 Table 2-1 operational manual required as part of the approval documentation package
Ch 4 4.8 Strength proportion	A	In line
Ch 4 4.9 Maintenance	N/A	Certification according to ST-0358 does not specifically address maintenance related aspects. DNVGL-RU-SHIP Part 6 Chapter 5 Section 16 requires and provides the specifications for periodical follow-up to be witnessed by DNVGL
Ch 4 4.10 Quality management system	N/A	Not required by DNVGL-ST-0358. Production quality management is ensured through practical requirements as per applicable fabrication standards, i.e. DNVGL-OS-C401, DNVGL-RU-SHIP-Pt4Ch8 and 9, etc..
Ch 4 4.11 Risk assessment	N/A	DNVGL certification scheme for Offshore gangways as per DNVGL-ST-0358 represents a 'medium level design verification', ref DNVGL-SE-0480 App B.4.4/DNV-OSS-308 App B D 400. The requirements in ST-0358 have been based on a Risk assessment taking into account operational and equipment particularities relevant for offshore gangways.
Ch 4 4.14 Verification	A	Certification according to ST-0358 requires a DNVGL (3rd party) assessment of the design fabrication follow-up and testing of the equipment
Ch 4 4.15 Qualification of new technology	A	equivalent

DNVGL's proposal would therefore be for not limiting the requirement's scope to only the structural aspects of DNVGL-ST-0358, but rather a reference to the complete scope of the standard.

VEDLEGG 2:**VEILEDNING TIL INNRETNINGS-FORSKRIFTEN - Til § 56 Bærende konstruksjoner og maritime systemer****Global structural strength of jack-ups**

Reference is made to the proposed changes to PSA framework regulation dated 2018-07.

Til § 56 Bærende konstruksjoner og maritime systemer

Tredje ledd om stedspecifikke analyser av flyttbare oppiekkbare innretninger i samsvar med DNVGL-OS-C104 strykes.

Fjerde avsnitt blir nytt tredje avsnitt osv.

Begrunnelse

Teksten ble opprinnelig laget for vise til DNV-OS-standardene i stedet for klassereglene. Nå er OS-standardene så innarbeid at referansen ikke lenger har noe grunnlag. I tillegg er teksten mangelfull da den ikke viser til Sjøfartsdirektoratet som hovedreferanse, og er også problematisk om ABS og Lloyds skal inkluderes som anerkjent classeselskap.

Økonomiske og administrative konsekvenser

Siden det er rammeforskriften § 3 som regulerer forholdet, vurderes endringen å ikke ha konsekvenser.

In the following text, DNVGL understanding of PSA requirements and the role of classification for this type of units are described. This to support the argument that PSA should consider keeping the reference as is, or revise the requirements for site specific assessments.

Classification requirements – general

All units under DNVGL class have been approved for a set of design criteria which form the generic operational environmental limits of the unit. In operation, it is the owner/operator's responsibility to operate within the specified approved parameters. Where significant deviations from the approved operational and survival conditions

occur, the limits shall be evaluated separately. This is typically covered by a site specific assessment for the actual rig location. The SSA will also verify the capacity of the soil, which is not covered by newbuild classification.

Jack-ups on Norwegian continental shelf

In general, all jack-ups operating on Norwegian shelf follow Section 3 of the Framework Regulations. This allow for applying NMA regulations with supplementary classification rules provided by a NMA recognised MOU classification society.

AoC

For obtaining AoC the following requirements, but not limited to, shall be fulfilled:

- The unit shall hold a valid class certificate
- A site specific assessment (SSA) in line with OS-C104 and a letter confirming verification of SSA by independent party shall be submitted to PSA.

Consequence of modification

If reference to DNVGL-OS-C104 is removed the SSA may in principle be carried out according to SNAME 5.5, ISO 19905-1 or rules of other classification societies (ABS, Lloyds, BV, CCS, Rina etc.).

PSA may then consider if the intention with Section 3 of the Framework Regulations are still maintained.

This will also lead to the unit being examined according to a different safety format and safety level than initially designed for. In the below text, examples are provided of gaps between ISO19905 and DNVGL-OS-C104.

Structural

1. Buckling. The ISO standard has adopted a high strength steel buckling curves from SSRC, applicable for typical jack-up chords and braces. DNVGL commented on the background for using these curves through a Norwegian ballot process for accepting ISO19905, as we are not able to identify the basis and origin for this curve. The comment was closed based on internal discussions in the ISO panels, but the supporting background material has not been issued. As per our knowledge, no other standards nor classification societies has adopted this buckling curve.
2. #2 The kinematic reduction factor (KRF) of ISO19905 can be calculated based on formulas, and will in general produce a significant lower KRF than class rules (0.86).

The combined effect of the two above gaps may result in units being significantly higher utilized in operation than compared with the Class approved design.

Geotechnical

DNVGL-OS-C104 refer to DNVGL-RP-C104 for requirements and guidance for SSA, which again points to DNV Classification note 30.4, which has recently been replaced by DNVGL-RP-C212. The reference will be updated in DNVGL-RP-C104.

There are some differences between using ISO19905 or DNVGL-OS-C104 that is important with respect to foundation stability and soil-structure interaction.

1. Both ISO19905 and DNVGL-OS-C104 allow to rely upon preloading for assurance of foundation stability during operation, with similar requirements for how to document that. However, when preloading capacity of the rig is not sufficient, the foundation capacity will have to be documented through calculations making use of the site specific soil shear strength data. DNVGL-RP-C212 specifies that this should be performed using factored shear strength parameters using a material factor of 1.25 applied to characteristic strength parameters, in accordance with Norsok general requirements to foundation stability. ISO 19905 specifies to us a “low estimate” of the shear strength parameters, which is non-specific and open to interpretation.
2. The new generation rigs with larger diameter spudcans equipped with skirts allows these rigs to operate for more severe conditions related to weather and/or water depth compared to older rigs. Higher foundation capacity and higher moment restraints for the legs are achieved. The latter is beneficial for reducing the

structural utilisation in the top of the legs and in the locking systems. ISO19905 has no requirements or guidance for performing site assessment of such foundations. Practice has then been to extrapolate the approach for traditional rigs that relies upon preload, using a simplified calculation of vertical capacity in the same manner as vertical preload for traditional rigs, as basis for evaluating the foundation performance for combined loading that includes a moment. This is a very simplified and inaccurate approach that may often be unconservative. DNVGL-RP-C212 specifies that for such rigs analyses for combined loading (V,H,M) using FE models should be performed. Also, such analyses should account for effects of cyclic loading on the soil performance, and DNVGL-RP-C212 provides guidance for that. Nothing similar is given in ISO19905.

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