Regulatory Briefing

Offshore Accommodation & Access Checklist

Offshore Vessel & Rig Connect Asia

Offshore Accommodation & Access

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Gijsbert de Jong
Market Segment Director
Offshore Service Vessels & Tugs

informa maritime events
OFFSHORE VESSEL & RIG CONNECT Asia

BUREAU VERITAS

Offshore Accommodation Vessels

OAV

- accommodation-work/crane barge (AWB/ACB)
- floating accommodation unit (semi-sub)
- accommodation jack-up/liftboat
- accommodation ship
- multi-purpose offshore support vessel (MPSV)






Crew Transfer Vessels

CTV

aka:
- crewboat
- fast crew supply (FCS) vessel
- fast support intervention vessel (FSIV)
- surfer



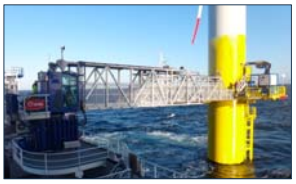



Offshore Access Systems








Key developments

- Development of accommodation-work barges equipped with DP
  - Multi-role capability (flotel, construction, maintenance, subsea)
  - Assisted propulsion on site; DP capability near offshore structures/units
  - Independent assessment of multi-point mooring system (achors) of temporarily moored units → New BV class notation **POSA MU** + ARIANE 8.0 sim tool
- Powering solutions for reducing fuel consupmtion and emissions
  - Finding the right fuel (mix) – fuel oil vs. natural gas or dual fuel?
  - Power distribution: diesel-electric, hybrid, batteries/capacitors as main source of power, DC grid, fuel cells… → New BV class notation **BATTERY SYSTEM**



Key developments

- New designs for self-propelled high capacity accommodation units
  - Large gangway for access to oil & gas platforms (uncontrolled routine passage)
  - Dynamically Positioned (deep water)
  - SOLAS Safe Return to Port (SRtP) compliant (self-propelled ships)
- New designs for Walk-to-Work (W2W) and Service Operation Vessels (SOV) for offshore wind farm accommodation and maintenance support
  - Personnel transfer via motion compensated gangway (W2W) and/or fast daughter craft (benign conditions)
  - Focus on comfort on board and seakeeping characteristics (high workability)



Key developments

- New generation of larger and sophisticated CTVs
  - More than 12 industrial personnel (national regulations permitting!)
  - Increased use of FRP as hull construction material
  - Increasingly sophisticated hullforms (trimaran, SWATH)
- New designs of offshore access systems (OAS)
  - Active or passive motion compensation
  - Transfer of personnel and cargo/equipment, optional liquid transfer lines
  - Motion compensated cranes, manriding with rigid capsules (“frogs”)

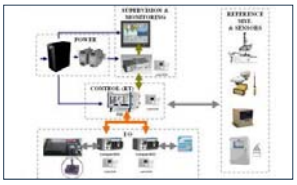


Control software & systems integration

In partnership with ATHENS GROUP

- Increasing OSV complexity, sophistication and integration induces risks
  - Integrated system of systems (DP, PMS, mission and safety equipment, etc.)
  - Computerized control systems: you don’t see the software!!!
- Control system and systems integration testing/verification needed to ensure safety, reliability, dependability, on time delivery and control cost
  - Apply systems hazard analysis techniques to define risk mitigation measures
  - Resolving issues at early project stage: defect prevention, time & cost control
  - Structured, systems engineering approach throughout life-cycle (FEED/design, construction, operation) to ensure continuous safe and efficient operation



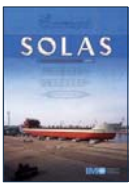


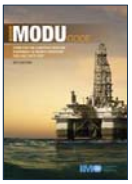
Regulatory framework

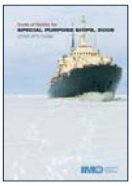
- Do you still see the forest through the trees?
  - International Conventions, Codes & Guidelines, National Regulations, Classification Society Rules & Guidelines, Industry Guidelines, …
  - Lack of compatibility between different regs
  - Differences between regulations of flag states and coastal states!
- Dealing with innovation in vessel/equipment design and operation
  → *Industry develops (much) faster than regulations…*
- Need for cross-industry cooperation on R&D to rationalise/harmonise regs and stimulate innovation!!!

Application of IMO instruments depends on Flag!

- SOLAS Convention
  - Applies to (propelled) ships engaged on international voyages
  - All passenger ships and cargo ships ≥ 500 GT
- MODU Code
  - Applies to mobile offshore drilling units,
  - May also be applied to other similar units (e.g. semi-submersible accommodation unit, self-elevating accommodation unit)
  - Level of safety level equivalent to SOLAS and ICLL
- SPS Code
  - Applies to special purpose ships ≥ 500 GT
  - *Mechanically self-propelled ship which by reason of its function carries on board more than 12 special personnel*
  - Level of safety equivalent to SOLAS



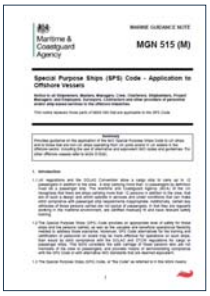




Background to the (heated) SPS Code debate

- *Special personnel means all persons who are not passengers or members of the crew […] and who are carried on board in connection with the special purpose of that ship or because of special work being carried out aboard that ship*
- *The Code is not intended for ships used to transport and accommodate industrial personnel that are not working on board*

- But, some flag states consider
  - industrial personnel synonymous with special personnel
  - the SPS Code to provide an appropriate level of safety for offshore service vessels (training and certification of industrial personnel on board under SPS Code)
- To extend or not to extend (application of the SPS Code to industrial personnel), that's the question …



National regulations for CTVs carrying > 12 IP

- Germany: *Code für den Bau, die Ausrüstung und den Betrieb von Offshore-Servicefahrzeugen* (*Code für Offshore-Servicefahrzeuge*), 2014
  → High speed craft for transportation of offshore service personnel not working on board, with POB ≤ 60 including ≤ 12 passengers
- UK: *Draft Interim Code for High Speed Offshore Service Craft (HS-OSC)*
  → High speed vessel < 500 GT and POB ≤ 60 (incl. ≤ 12 passengers) which is used to convey industrial personnel
- Based on principles of SPS Code, see also UK MCA MGN 515
- Basis formed by IMO HSC Code 2000 requirements for cargo ships
  - Adapted requirements for damage stability, fire-safety and LSA
  - Requirements for condition, training and LSA of offshore service personnel / industrial personnel (never mind IMO…)
- Requirements between German and British Code not fully indentical, but point in the same direction
  → *Opportunity for North Sea/EU wide harmonisation?*

Industrial Personnel – Back to the drawing board?

Background	Lack of coherent regulatory framework for the carriage of more than 12 industrial personnel on board vessels engaged on international voyages
IMO action	Develop definition of industrial personnel and mandatory standards
Status	New work programme pending policy decision by MSC 96 (May 2016)
Entry into force	??

- Key points
  - MSC 95 (Jun 2015) did not approve MSC Circular with definition of industrial personnel proposed by SDC 2 (Feb 2015) as interim measure
  - Consideration that industrial personnel definition and technical standards should be connected and consistent with existing conventions/codes
  - SDC 3 (Feb 2016) expert group listed eight (8) options for consideration by MSC 96
  - *Urgent need for adequate and harmonized safety standards in the offshore energy sector!*

Industrial Personnel – Key points

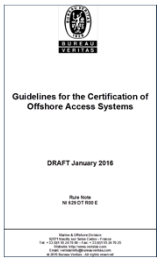
- Definition of industrial personnel (IP)
  - Interpretation impacts other criteria (technical standards to be applied)
  - Appropriate standards of medical fitness and safety/emergency training to be defined (equivalency between industry standards, non-mandatory IMO instruments or STCW standards to be considered)
- Technical/safety standards
  - Consensus on amending 2008 SPS Code as first step/interim solution (application to accommodation/transfer of IP straightforward, except for HSC)
  - Starting point to address safety standards for definitive mandatory solution
  - Separate (or combined) solution to be developed for HSC
- Personnel transfer
  - Recognised as one of most dangerous procedures
  - To be addressed at appropriate future stage during further development on (mandatory) instrument

Certification of Offshore Access Systems (OAS)

- Rapid growth of market for OAS, in particular for W2W gangways
- Regulatory framework generally unclear
  - No international technical standard for OAS certification
  - Current certification based on standards and class rules for offshore lifting appliances (e.g. EN 13852) with limited scope
- Special consideration required for:
  - Type of operation: wind turbine ≠ floating production unit, environmental conditions, …
  - Compatibility between OSV and OAS (operating envelope)
  - Safety systems: redundancy principles, emergency procedures, etc.
  - Control systems and system integration (active systems)
- *Standards needed before accidents happen (could jeopardize entire W2W concept!)*

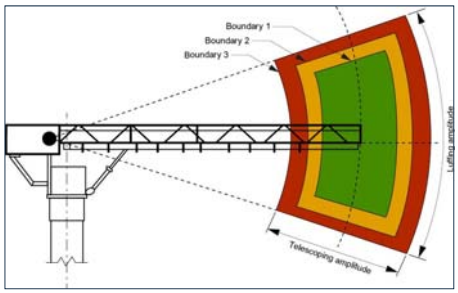
BV Guidenace Note NI629 – Introduction

- Gangways types:
  - Active OAS: motion compensation during transfer
  - Passive OAS: free-flow during transfer
- Transfer categories:
  - Cat 1 – Non-routine transfer: control of the number of persons on gangway and permanent presence of gangway operator
  - Cat 2 – Routine transfer: limited control over number of persons on gangway
- Safety principles to be supported by risk analysis (FMEA)
- Guidance for design, structural assessment, control systems and testing
- Vessel station keeping capabilities (DP2)
- Additional class notation **OAS**
- Publication March 2016



BV Guidenace Note NI629 – Introduction

- Functional requirements
  - Operating envelope to allow for maximum ship motions
  - Motions amplitude consistent with DP system offset
  - Emergency disconnection system
  - Return to safe position in case of loss of contact or power



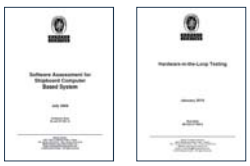
- Control and monitoring systems
  - Availability in case of power loss (UPS)
  - Two level alarms: evacuation (1st) and emergency disconnection (2nd)
  - Traffic light system: green, amber, red
  - Safety features ranking (EN 13852)

Order of precedence	Safety feature
1st	Emergency stop Manual disconnection
2nd	Automatic disconnection
3rd	Other limiters
4th	Indicators

BV Guidenace Note NI629 – Introduction

- Mechanical and machinery systems
  - Single failure should not lead to dangerous situation
  - Failure detection
- Operator control
  - Dedicated and permanent operator control mandatory for OAS Cat 1 (non-routine transfer)
  - Communication systems

- Risk analysis
  - Compliance with safety principles to be demonstrated by FMEA
- Control software
  - PLC considered safety critical (NI425 Cat III system)
  - Control software testing for active OAS in accordance with NR632 “Hardware-in-the-loop testing”



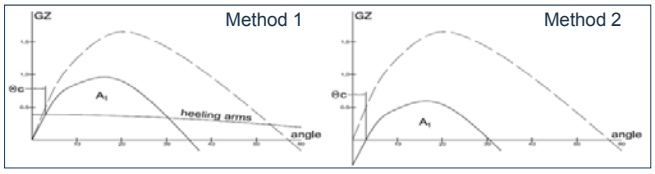
Lifting

Background	No harmonised international standard for stability during lifting operations Safety critical operation!
IMO action	Develop lifting stability requirements in scope of IS Code amendments
Status	SDC 3 (Feb 2016) proposal sent for approval to MSC 96 (May 2016)
Entry into force	1 January 2017?

- Basic principles
  - Applies to vessels involved in lifting operations using lifting appliances (crane, A-frame, etc.) or other means (e.g. winch)
  - Not for anchor handling (dedicated regs)
  - Differentation between lifting operations in exposed and non-exposed waters
    Non-exposed: environmental impact on lifting operation is *negligible*
  - Avoidance of resonant roll at all times!

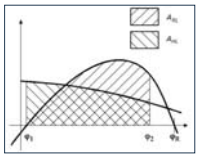
Lifting – Application & methodology

- Application of criteria if heeling moment or VCG increase due to lifted exceed specified threshold
- Two acceptable calculation methods
  - Method 1: lifted weight, LCG and VCG included in vessel loading condition, but TCG applied as external heeling moment on GZ curve
  - Method 2: lifted weight, LCG, VCG and TCG all included in vessel loading condition, whereby the GZ curve incorporates heeling moment due to lift
  - Method 2 basis for “standard method”, method 1 for “alternative method”
  - *Method 2 more precise and better suitable for offshore operations (e.g. on-board loading computer)*

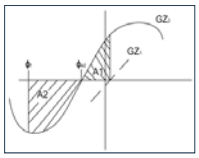


Lifting – Stability criteria standard method

- Standard criteria during lifting
  - Maximum equilibrium heel angle based on design limits of lifting appliance
  - Minimum feeeboard to be greater than highest value of 1.00 m and 75% of maximum H_S in exposed waters; reduced to 0.50 m in non-exposed waters
- Alternative criteria for lifting operations conducted under environmental and operational limitations
  - No deck immersion
  - Minimum area ratio 1.4 under wind load (maximum speed) → *Wind moment applied as external heeling lever!*
  - Minimum area under GZ curve (0.03 m·rad)

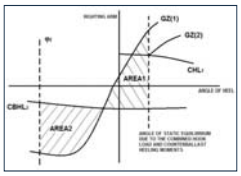


- Sudden loss of hook load
  - Applicable when using counter ballast
  - Minimum area ratio 1.4 in exposed waters; reduced to 1.0 in non-exposed waters



Lifting – Stability criteria alternative method

- Standard criteria during lifting
  - Minimum residual area between righting and heeling lever 0.080 m·rad in exposed water; reduced to 0.053 in non-exposed waters
  - Maximum equilibrium heel angle based on 10 degrees, deck immersion (watertight hull) and design limits of lifting appliance
- Sudden loss of hook load
  - Applicable when using counter ballast
  - Minimum residual area between Area 2 and Area 1 to be greater than 0.037 m.rad in exposed waters; reduced to 0 in non-exposed waters



- *Note: no comparative studies performed between the two methods*
  - *Each method considered acceptable based on long term experience (primarily in Europe for method 2, primarily in North America for method 1)*
  - *It is left to the flag state to decide on the acceptability of each method*

Lifting – Additional considerations

- Model tests or direct calculations demonstrating ship survivability after sudden loss of hook load as alternative complying with regular criteria
  - Effects of wind and waves to be taken into account
  - Maximum dynamic roll amplitude of ship after loss of load will not cause immersion of unprotected openings
  - Methodology to be accepted by Administration (flag state)
- Resonant roll conditions to be avoided during lifting operations
- Guidance in preparing stability information
  - Loading conditions
  - Stability booklet
  - Operational and planning booklet
    → Risk assessment procedures to check if planned operation can be considered to be carried out in non-exposed waters

DP Guidelines – A welcome upgrade

Background	Current IMO DP Guidelines MSC/Circ.645 do not reflect industry technical developments and wider application (e.g. deep water ops)
IMO action	Develop update based on technology and industry guidance advances
Status	Correspondence Group to report to SSE 3 (Mar 2016)
Entry into force	?

- Key points
  - Maintaining heading explictly included (in addition to maintaining position)
  - Proposal to add DP class 0
  - Updated functional requirements
  - Reference to industry operational checklists (e.g. OSAG)
  - Inclusion of FMEA for DP class 2 & 3
  - Consideration for certification or FSAVD

DP Guidelines in detail

- Technical requirements upgrades
  - Each thruster on to be capable of being individually remotely controlled independently of DP control system
  - Manual control control of thruster by individual and common joystick in case of failure of DP control system (consider sensor input)
  - Guidance on UPS and firewalling
  - Galvanic isolation including power supplies and internal cable routing for equipment class 3 sensor (type) separation
  - Waiver for cables and piping system requirements if alternative fire and flooding detection systems installed (protecting power system integrity by disconnecting individual power supplies)
  - New definition of essential non-DP related systems which could cause DP system failure

IGF Code – Gas fueled ships becoming mainstream

Background	Increased demand for gas as alternative fuel for marine powering Environmental and (future) fuel cost considerations
IMO action	Develop mandatory code for safety of gas-fuelled ships
Status	Adopted by MSC 95 (Jun 2015)
Entry into force	1 January 2017

- Key points
  - Minimise risk to ship, crew and environment
  - Provisions for arrangement, installation, control and monitoring of machinery, equipment and systems using low flashpoint fuels, such as LNG
  - Mandatory risk analysis
  - Can already be applied today (if flag ok)
  - See also IACS LNG bunkering guidelines

Polar Code – Arctic (oil & gas) operations

Background	Melting of polar ice opens prospects for shipping and offshore activities
	Increasing traffic in polar waters poses safety and environmental risks
IMO action	Develop mandatory code for safety of gas-fuelled ships
Status	Adopted by MSC 94 (Dec 2014) and MEPC 68 (May 2015)
Entry into force	1 January 2017 (expected)

- Polar Ship Certificate, including operational limitations
  - Ice conditions : ice class, ship category
  - Low air temperature : assigned of Polar Service Temperature
  - High latitudes : primarily though provision of suitable communication equipment
  - Remote areas : primarily location of SAR assets and expected time to rescue
- Polar Water Operation Manual (PWOM)
- Exemptions for existing ships

Polar Code – Arctic (oil & gas) operations

- Applicable requirements are function of ship category
  - Category A ship : ship designed for operation in polar waters at least in medium first-year ice, which may include old ice inclusions
  - Category B ship : ship not included in Category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions
  - Category C ship : ship designed to operate in open water or in ice conditions less severe than those included in Categories A and B
- Key technical requirements
  - Materials exposed to low temperature (Polar Service Temperature)
  - Hull & propulsion plant (IACS Polar Class)
  - Stability (ice accretion and impact)
  - Winterisation (de-icing, escape/survival)
  - Pollution prevention (double hull)

Operational limitations – POLARIS

- Consideration for introduction of Polar Operational Limit Assessment Risk Indexing System (POLARIS)
- Calculated Risk Index Outcome (RIO) determines permissible entry into ice regime with our without speed limitation, based on:
  - Ice type (heavy multi-year ice to new ice) and concentration (10/10 to 1/10)
  - Ship category (A, B, C) and ice class (IACS PC1 to FSICR IC)

RIO_{SHIP}	Cat A & B (PC 1-PC7)	Category C (< PC7, incl. FSICR IAS-IC)
RIO ≥ 0	Operation permitted	Operation permitted
-10 ≤ RIO < 0	Limited speed operation permitted	Operation not permitted
RIO < -10	Operation not permitted	Operation not permitted

- Consideration for independent operation and escorted operation
- Correction for decayed ice (summer conditions)

Voilà la *checklist*…

OAV

- ☐ SOLAS cargo ship + SPS Code (+ SRtP)
- ☐ MODU Code (check flag/coastal state and field operator requirements)
- ☐ SOLAS passenger ship (+ SRtP)
- ☐ Class rules (OSV, wind farm service vessel/SOV)
- ☐ Class standards for certification of offshore access systems (e.g. motion compensated gangways)
- ☐ *Future mandatory IMO standards for offshore service vessels carrying more than 12 industrial personnel on board*

CTV

- ☐ HSC Code
- ☐ National regulations (check flag/coastal state)
- ☐ Class rules (crewboat, fast wind farm support vessel/CTV)

Supporting innovation in the offshore industry
We are with you, all the way

For further details please contact us:
Bureau Veritas - Marine & Offshore Division
67/71 Boulevard du Chateau - 92200 Neuilly-sur-Seine, France
osv.tug@bureauveritas.com

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