



Offshore Vessel & Rig Connect – Asia

Offshore Accommodation & Access

Mitigating safety risks related to offshore personnel transfer

20 April 2016

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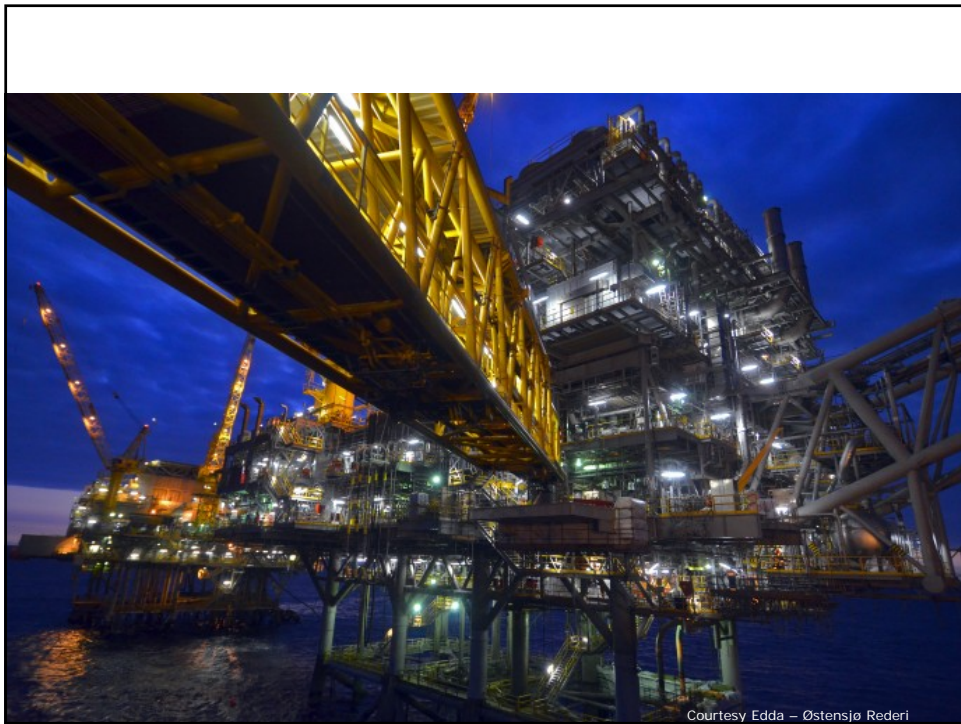




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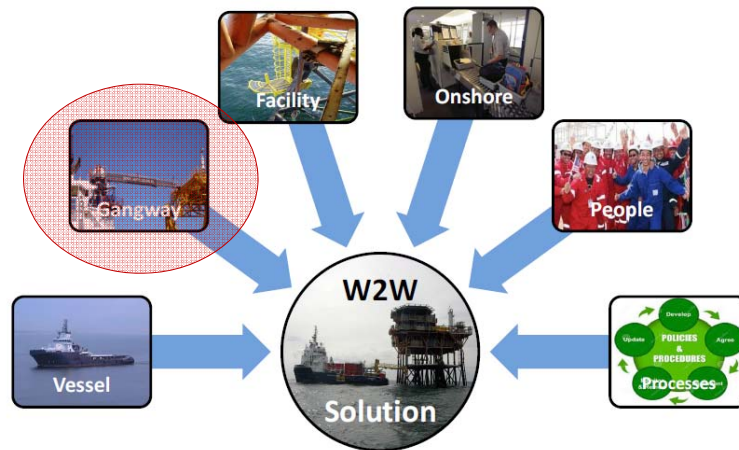
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Walk to Work (W2W) is personnel transfers between a vessel and an offshore facility via a gangway system.



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Components part of W2W



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Certification of offshore gangways for personnel transfer DNVGL-ST-0358

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Main items

Class & regulations
Types of gangways
Design & fabrication
Safety
Functional requirements
Certification



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International Rules & Regulations

Stakeholders - WHO have expectations & requirements to offshore gangways and personnel transfer systems:

- Operator
- Owner of vessel
- Manufacturer
- Class
- Flag state & statutory
- Shelf state



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Certification of offshore gangways for personnel transfer

SUPPORTING vessel notations such as:

- Accommodation Unit
- Wind turbine service vessel

MAIN CHARACTERISTICS:

- Well defined requirements to systems and safety functions
- Focus on integration into the vessel structure and systems
- Clear requirements for manufacturing
- Established list of certification level for sub-components such as winches, hydraulic cylinders, etc.



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Types of gangways

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Type 1: Uncontrolled flow of people, routine personnel transfers



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Type 2: Controlled flow of people, routine personnel transfers



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Courtesy Marine Aluminium/Uptime

Type 3: Controlled flow of people, engineered personnel transfers



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Courtesy MP Industries, Inc

Design & fabrication

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Design & fabrication

- Design loads ($LL=400 \text{ kg/m}^2$) *
- Load combinations
- Design temperature – Td
- Structural categorization
 - Special
 - Primary
 - Secondary
- Materials
- Fabrication and testing

* = Type 1 gangways

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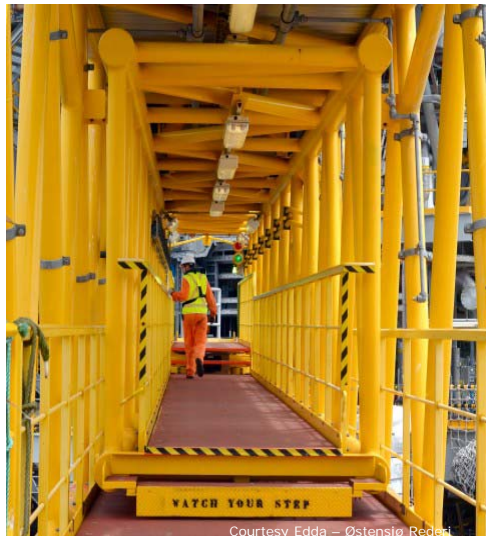
Design & fabrication

- Height
- Clear width
- Walkway – toe board
- Handrails
- Access & Waiting area

Operational angles:

- +/- 10 deg
- +/- 20 deg - enhanced slip resistant walk way

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Courtesy Edda – Østensjø Rederi

Design & fabrication

- Hydraulic system
- Accumulators
- Hydraulic cylinders
- Control and monitoring
- Wireless remote control



Courtesy Marine Aluminium/Uptime

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SAFETY

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SAFETY CONCEPTS

- Parking and precautions against wind loads
- Fire protection
- Operators cabin
- Operator in control
- Break-away system
- Automatic protection system
- Manual protection system



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SAFETY CONCEPTS

- Continuous monitoring
- Alarms
- Ranking of safety functions



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Courtesy of the Aluminium/Upti

SAFETY CONCEPTS

Ranking of safety functions

Event	Ref.	Indication	Alarm	Auto protect ([6.8])
Overloading	[6.10.1]	X	X	X
Movements outside operational limitations	[6.10.2]	X	X	X
Emergency stop	[6.10.3]	X	X	X
Failure in control system	[6.10.6]	X	X	
Failure in safety system	[6.10.7]	X	X	
Loss of support landing area	[6.10.9]	X	X	X
Loss of power	[6.10.10]		X	X
Fire/gas	[6.3]		X	X

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Generic Risk Contributors

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Safety - essential safety functions to reduce risk

Overloading

– automatic protection:

- Lateral, vertical, axial
 - Automatic protection system
 - Manual protection system
- The MPS shall operate under all conditions, including failure in the main power supply and failure in control system, and shall override all other functions when activated.



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Safety - essential safety functions to reduce risk

Loss of support landing area

- Automatically be brought to safe state
- Loss of support in landing area shall not cause sudden drop gangway tip.
- Shall be maintained even under loss of main power.



Courtesy Marine Aluminium Uptime

Safety - essential safety functions to reduce risk

Movement outside operational limitations

May lead to stress beyond the gangways structural strength and to operational hazards.

- Limit switches – i.e. upper limit protection (redundancy)
- After activation of a limiting device, movement in the reverse direction - to a safer position - shall be possible
- Luffing winches shall be equipped with upper and lower limiters.



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Safety - essential safety functions to reduce risk

Dangerous gangway movements

Dangerous movements or unintentional movements due to malfunction in the gangway's control system may lead to operational risks.

- Manually operated emergency stop
- Warning/alarm notifying the operator that the emergency stop has been activated
- The emergency stop command shall over-ride all other commands except the MPS



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Safety - essential safety functions to reduce risk

Lack of visibility

Blind zones and poor sight

- Camera



Lack of communication

Lack of communication between the operator and the other participants in the operation may lead to operational hazards.

- Two-ways communicating system
- Able to operate the communication system without moving his hands from the main control levers

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Safety - essential safety functions to reduce risk

Lack of braking/holding capacity

May lead to falling walkway

- Fail-safe brakes - failure of the brake's control system shall lead to automatic activation of the brake.

Lack of load holding capacity due to missing hydraulic refilling or loss of hydraulic pressure, may lead to falling walkway.

- Hydraulic system to be designed to maintain hydraulic refilling
- Fitted with load holding valves on all main circuits protecting against unintended movements in case of hose rupture



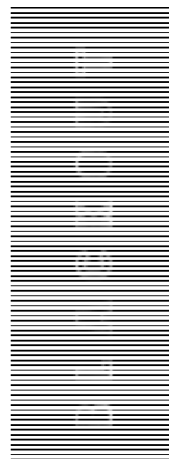
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Safety - essential safety functions to reduce risk

Black-out / shutdown of power

Blackout/shutdown may lead to gangway stopping in an unsafe position.

- Connected to independent emergency power supply
- Rated to handle gangway at full LL
- Emergency operation: "Hold to run" type of activation



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Certification

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Certification

Design verification
Building survey
Testing (FAT/SAT)
(FMEA)



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Certification

Certificate requirements for offshore gangways

Object	Certificate type		Additional description
Slewing rings	VL	DNV GL product certificate	
Hydraulic cylinders	VL	DNV GL product certificate	Applicable also for accumulators
Winches	VL	DNV GL product certificate	for wire luffing gangways
Sheaves	VL	DNV GL product certificate	Product certificate (PC) issued by manufacturer certificate will be satisfactory for un-welded sheaves
Wire ropes	CG4	Certificate of test and thorough examination of Wire Rope	Alternatively ILO form No. 4
Transmission gears and brakes	PC	Product certificate issued by manufacturer	Applicable when transmitting braking forces for luffing and telescoping
Slewing gear	PC	Product certificate issued by manufacturer	Also other transmission gears for non-critical applications
Hydraulic components	TR-T	Test report, test	except mountings

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Certification

Additional requirements for motion compensating systems

Object	Certificate type		Additional description
Control and monitoring system	VL	DNV GL product certificate	
EL-motors with rating 100 kW and above	VL	DNV GL product certificates	
Motor starters and frequency converters with rating 100 kW and above	VL	DNV GL product certificates, or, type approval (TA) certificates	
Slip rings, 100 kW and above	VL	DNV GL product certificate	

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