LNG Terminal & STS Consultants

Capability Overview by Jalship Management

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JALSHIP INTRODUCTION

JALSHIP MANAGEMENT PVT LTD. IS PROVIDING STS SERVICES IN LNG VALUE CHAIN

Our Mission & Vision

To provide our valued clients tailor made solutions resulting in Positive Business Growth & Profit

Economic & reliable Services with speed & proactive Approach

Maintain long term transparent relationship

About the company

Independent LNG Maritime & Logistics consultancy company to provide and assist Global Gas Terminals, LNG Ship Owners, Charterers, LNG Fueled vessels and Industrial Consumers in their search of Commercial and Technical business solutions.

One-stop for complete Terminal compatibility, mooring analysis, using Optimoor to model the vessel motions / loads. Jalship is working with major LNG Ship Owners and Operators and has carried out more than 700 Ship-Shore compatibility studies for LNG terminal around the world.

Conducted world's first LNG bunker vessel mooring and stress analysis for principal European owner. Open Sea STS Dynamic mooring analysis carried out for LNG bunkering operations. The company also carries out Terminal feasibility studies, conducts terminal audit, vessel inspections/ audits for owners and operators.

Complete LNG value chain consultancy and business solution provider covering market feasibility, demand aggregation, LNG offtake, Trucking/ Cryogenic ISO Container supply chain, LNG as a service (USD/ MMBTU), etc.

OUR DIFFERENTIATING VALUE

1 GLOBAL REACH

- Currently we have 25+ client base globally.
- We have worked for Major Indian integrated LNG players and other Global oil and gas giants
- We are also working with LNG Terminal Operators, FSRU, LNG vessels owners and end customers

2 INNOVATION

- Complete end to end small scale LNG value chain provider
- Distribute LNG to end consumer through multi modal routes – inland waterways, railways and trucks
- Transportation LNG through ISO containers on barges
- LNG as a fuel for CGD, industrial off-grid & commercial vehicles

3 OUR TEAM

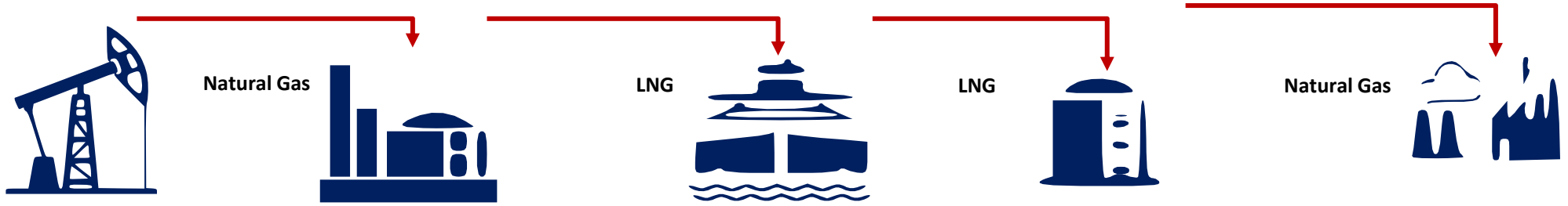
- Diverse Expertise in the field of LNG for an aggregated of more than 100+ years of founders
- Domain knowledge across consulting, industry and technical orientation of team across the LNG value chain

4 ALLIANCES

- Global Alliances with LNG Owners, Terminal, Shipyards, Barge based FSU & FRU providers, LNG Bunker vessel owners, ISO container and road tankers

THE LNG VALUE CHAIN

Gas Production | Liquefaction | LNG transportation | Re-gasification | End-users



Gas Production Facility | Loading Terminal & FLNG | LNG Carrier | Discharge Terminal and FSRU | Bulk End-use (Power, fertilizer, Refinery, Petrochemical) and CGD for local distribution

Jalship Management Pvt Ltd

- FLNG inspection
- Loading terminals Compatibility
- STS Port consultancy

- Ship-Shore Compatibility for LNG Owners and Operators
- LNG Owners support (TMSA, Inspections, KPI monitoring & analysis)
- Commercial fixtures
- Shipyard LNG Consultancy
- LNG Bunker vessel Dynamic analysis
- LNG Fueled vessels SMS and bunkering consultancy

- Terminal SSCS consultancy contract
- FSRU pre commissioning
- LNG terminal construction & commissioning
- FSRU Terminals compatibility
- LNG Ship to Ship
- LPG Terminal construction & commissioning
- LPG Ship to Ship

- LNG ISO Containers
- LNG Road Tankers

GLOBAL REACH: WE HAVE 8 STS BASE GLOBALLY AND MULTIPLE STS OPERATIONS ONGOING

Ship to Ship base locations

RESOURCES: STS EQUIPMENTS

STS BASE	CARGO	HOSES	FENDERS	TUG BOAT	ERC / ERS	MOORING MASTERS
Batangas Philippines	LNG	Provided by Client				Based in India & Malaysia
Skaw Denmark	LNG	Owned	Rental	By Port	Owned	Based in Belgium
UAE (Dubai & Khorfakkan)	LNG, LPG, Oil	Owned (LPG & Oil)	Owned	To hire	Provided by Client	Based in UAE
Sohar, Oman	LPG, Oil	Owned	Owned	To hire		Based in Oman & UAE
Shri Lanka (Trincomalee)	LPG	Owned	Owned	To hire		Based in India
India (Kolkata, Jaigarh & Vadinar)	LPG & Oil	Owned	Owned	Owned		Based in India
Singapore	LNG	Owned	Rental	By Port	Owned	Based in Singapore
Bangladesh (Kutubda Island)	LPG	Owned	Owned	Provided by Client		Based at India and Bangladesh
Myanmar	LNG	Owned	Provided by Client	Provided by Client	Owned	Based in Malaysia and India

RESOURCES: LNG STS EQUIPMENTS INVENTORY

1. 4 Cryo hoses (8 inch x 25 m each)
2. Insulation gasket and bolt sleeves for hose connection
3. 4 PERC
4. 1 HPN2 cabinet.
5. ESD system for PERC operation
6. Flanges and gaskets for PERC and HPN2 connection
7. 2 representative (1 service engineer and 1 LNG Supdt) for the entire operation
8. 8 Hose saddles

RESOURCES: LPG STS EQUIPMENTS INVENTORY

Location	Fender	Hoses	Adaptor	D-shackle	Mooring rope
Kolkata (India)	4 nos (4.0 x 2.5) + 3 nos (5.5 x 2.5) + Baby fenders	10 Nos (8 inch x 10m)	4 Nos	12 Nos	21 Nos
Trincomalee (Sri Lanka)	4 Nos (6.5 x 3.3) + 2 (1.5 x 1.0)	4 Nos (8 inch x 10m)	2 Nos	6 Nos	20 Nos
UAE	4 Nos (6.5 x 3.3) + 2 (1.5 x 1.0)	16 Nos (various)	8 Nos		
Oman	4 Nos (6.5 x 3.3) + 4 (1.5 x 1.0)	11 Nos (various)			
Bangladesh	8 Nos (4.0 x 2.5) + 4 (1.5 x 1.0)	8 Nos (8 inch x 10m)	4 Nos	12 Nos	24 Nos

Oil hoses / LPG hoses

EXPERIENCE

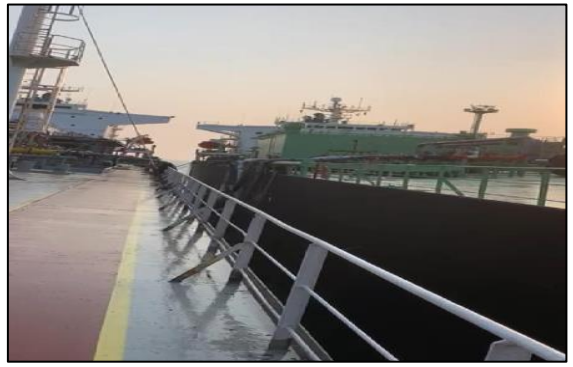
STS BASE	CARGO	NUMBER OF OPERATIONS	CLIENT
Philippines	LNG	18	Major LNG Terminal Operator
UAE	LNG, LPG, Oil	960	Traders / Oil Majors
Oman	LPG, Oil	186	Traders / Oil Majors
Bangladesh	LPG	288	LPG Vessel Owner
Sri Lanka	LPG	22	LPG Traders
India	LPG	205	LPG Traders
Myanmar	LNG	12	LNG Trader & Owner
Singapore	LNG	2	LNG Supplier

EXPERIENCE (PHOTOGRAPHS)

Bangladesh

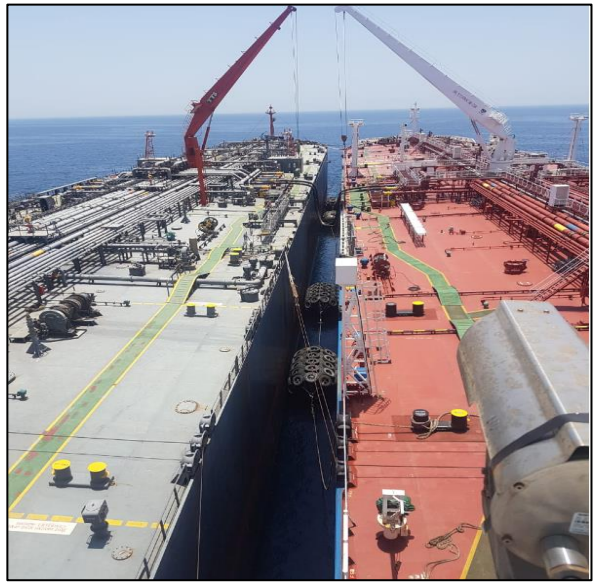
Sandheads, India

Sri Lanka



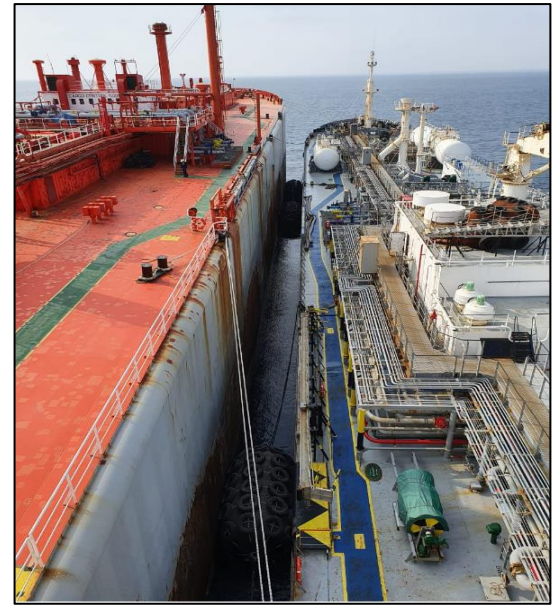
Paradip

Skaw, Denmark



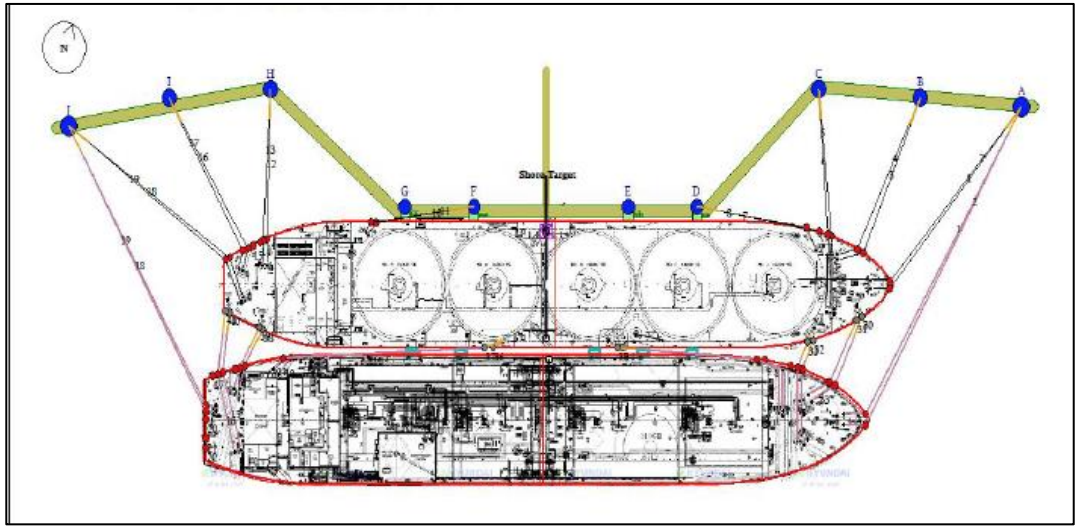
Sohar, Oman

Dubai



Khorfakkan

RESOURCES – OPTIMOOR SOFTWARE



Summary of the result, with full result given in Appendix C & D:

Case	Draft (m)	Current		Wave		Wind		(Host Vessel)				(Guest Vessel)			
		Speed(kn)	Dir (deg)	Height / Period	Direction (deg)	Speed (kn)	Direction (deg)	Peak line Tension Tonnes	Max Exc., Fwd /Aft/ Out Sway (m)	Highest Fender Thrust / Compression / Pressure	Mooring Inclination	Peak line Tension Tonnes	Max Exc., Fwd/Aft Out Sway (m)	Highest Fender Thrust / Compression / Pressure	Mooring Inclination
1	Host 9.02 m / Guest 11.60 m HAT 1.70 m	2.0	100	1.00 m / 4.0 sec	160	40	160	12h & 13h-H, 16h & 17h-I / 16%	0.04 / **0.38**	aa-214 / 0.43 / 9.6	2 deg to **8 deg**	16g-41h / 17%	0.43 / **1.48**	**b-179 / 1.65 / 8.5**	**-9 deg** to 2 deg
2			260	1.00 m / 4.0 sec		40		12h-H / 18%	-0.06 / 0.24	aa-116 / 0.23 / 5.2		16g-41h / 19%	0.27 / 0.98	b-68 / 1.02 / 3.2	
3			100	1.00 m / 4.0 sec	240	40	240	7h & 8h-D / 19%	0.21 / 0.21	aa-139 / 0.28 / 6.2		8g-34h & 9g-35h / 22%	**0.63** / 1.13	b-102 / 1.29 / 4.8	
4			260	1.00 m / 4.0 sec		40		7 & 8h-D / 17%	0.14 / 0.07	aa-47 / 0.09 / 2.1		**8g-34h & 9g-35h / 23%**	0.61 / 0.54	b-26 / 0.56 / 1.2	
5	Host 11.25 m / Guest 9.40 m HAT 0.00 m	2.0	100	1.00 m / 4.0 sec	160	40	160	16h & 17h-I / 18%	0.06 / 0.36	**aa-231 / 0.47 / 10.4**	**-2 deg** to 3 deg	8g-34h & 9g-35h / 14%	0.34 / 1.40	b-145 / 1.50 / 6.9	0 deg to **18 deg**
6			260	1.00 m / 4.0 sec		40		12h & 13h-H / 17%	-0.05 / 0.21	aa-113 / 0.23 / 5.1		15g-40h & 16g-41h / 16%	0.26 / 1.05	b-72 / 1.06 / 3.5	
7			100	1.00 m / 4.0 sec	240	40	240	**8h-D, 16h & 17h-I 18h & 19h-J / 20%**	**0.23** / 0.21	aa-158 / 0.32 / 7.1		8g-34h & 9g-35h / 20%	0.56 / 0.94	b-66 / 1.01 / 3.1	
8			260	1.00 m / 4.0 sec		40		7h & 8h-D 16h & 17h-I / 17%	0.13 / 0.06	aa-47 / 0.10 / 2.1		**8g-34h & 9g-35h / 23%**	0.61 / 0.57	b, c, d & e-27 / 0.57 / 1.3	
9	Single line failure	2.0	260	1.00 m / 4.0 sec	240	40	240	7h & 8h-D / 17%	0.13 / 0.07	aa-47 / 0.09 / 2.1		8g-34h / 29%	0.97 / 0.51	e-25 / 0.53 / 1.2	

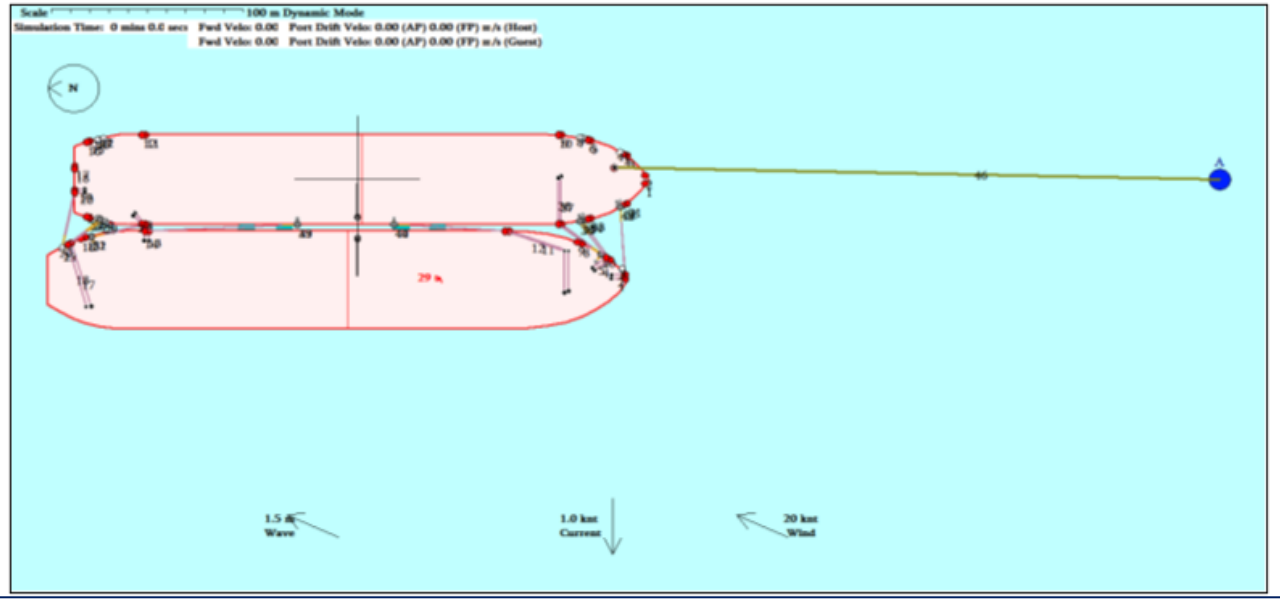
Mooring Arrangement

Eduard Toll moored Port side alongside with LNGC 175K at Honningsvag Anchorage

Six lines forward and four lines aft were used and arranged in 2 / 2 / 2 forward and 2 / 2 aft configurations from Eduard Toll to LNGC 175K.

Two lines forward and four lines aft were used and arranged in 2 forward and 2 / 2 aft configurations from LNGC 175k to Eduard Toll. LNGC 175k with Port side Anchor.

Arrangement for LNGC Eduard Toll with 175K at Honningsvag Anchorage



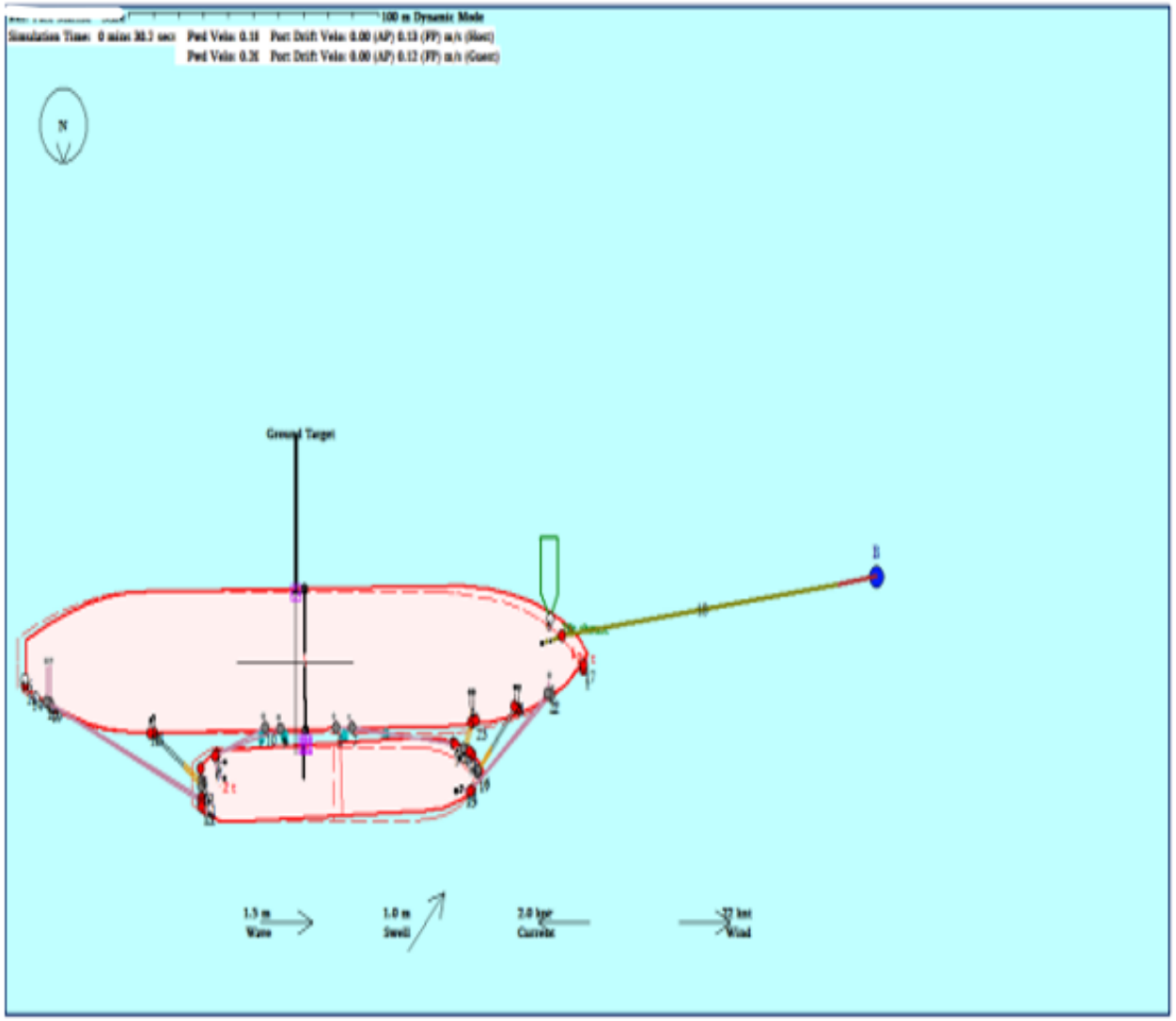
RESOURCES – STS ASSESSMENT

Ship to Ship Compatibility

Following key element to be assessed for the STS compatibility for the product transfer (Ref OCIMF STS guidelines -2.1.1).

- Dimension limitation
- Manifold criteria
- Crane criteria
- Manifold height above water
- Mooring Equipment criteria
- Emergency criteria

STS compatibility criteria for daughter vessel	[redacted]	Mother vessel
Length (LBP) – in Meter	112.66	165.00
Length Overall (LOA min) – in Meter	119.29	174.20
Maximum Beam– in Meter	18.24	28.03
Maximum Displacement	10409.11	38041.40
Minimum Parallel Mid Body– in Meter	44.25	46.00
Maximum Draft in Meters	6.59	10.64
Maximum Freeboard in Meters	5.96	14.41
Minimum freeboard (> twice the fender diameter)in Meter) (≥ 5)	3.87	7.41
No of Hose and size-In inch	1x 8"	2x 8"
Suitable support on the ship-side available (Gunwell)	Crane	Yes
Maximum Allowable Manifold Height above the Water– in Meter	7.48	12.40
Manifold Crane with a minimum reah and SWL	4.8 meter X 5 T	3 meter X 5T
Min Hose Length in Meters	17.09	17.09
Reducer to be used (Size/standard)	8"	8"
Vapour recovery Yes/No	NA	NA
SWL of the Bollard	64T	50T
Fitted mooring line MBL	57T	53T
Break rendering	22.50T	42.40 T



STS MOORING MASTERS

Sl No.	Name	Years with JSM	STS Experience	Qualification/ Previous Job	Location
1	Capt. SS	3 years	50+	Master Marine + Ex Jabel Ali, Bahrain & JNPT Pilot	Dubai, U.A.E.
2	Capt PY	4 years	200+	Master Mariner + Ex Fendercare STS Master	India
3	Capt. JP	5 Years	200+	Master Mariner (Class I) DCE (Oil & Chemical)	Dubai, U.A.E.
4	Capt. BK	9 Years	200+	Harbour Pilot - Jaigarh Port	Dubai, U.A.E.
5	Capt. Md. MH	2 Years 4 months	82	Pilot and Beaching Master	Bangladesh
6	Capt. NM	1 Years 9 Months	68	Master Mariner (Class I) with DCE (LPG)	Bangladesh
7	Capt. VB	8 Months	45	Pilot – JSW Jaigarh Port	India
8	Capt. UP	8 Months	95	Pilot Kolkata Port Trust 26 years	India

JALSHIP MANAGEMENT SERVICES

- STS Service provider
  - Mooring Masters and POAC
  - LNG STS equipments
  - Fenders and Hoses
  - Tugs and Support crafts
  - STS assessment
  - Joint Plan of Operation (JPO)
  - Mooring analysis
- Mooring Master & POAC training
- STS & LNG Bunkering Simulation and training

THANK YOU