Floatover Installation Method
Basic Floatover Manoeuvre
Barge Positioning In-between Jacket Top Structure

Float through Section (front view)

Floatover Section

Floatover Support Frame

Topsides

Control Tug

Barge

Control Tug

Jacket
Barge Docking Over Cone Receivers

Head-on View

- Stabbing cone
- Cone receiver
- Air gap at start (typ. 1.5m)
- Elastomer cell
- Sand jack
Load Transfer – Barge Ballasting Down

Elastomer deflection during load transfer (typ. 350 mm)
Barge Undocking
Completed Floatover
Basic Floatover Manoeuvre Displaying Floatover Barge Anchoring Lines with Tugs Arrangements
Floatover Barge
Anchoring Holding Position

Pre-installed Jacket

Anchor

Deck
Bow enters jacket

Bow tug passes through jacket then pulls barge in against stern tug

Bow moorings adjusted to guide barge bow into jacket

Stern moorings adjusted to maintain barge alignment with jacket

Stern tug provides continuous pull aft

Floatover Barge
Bow Entry
Release Bow Lines

Stern moorings adjusted to maintain barge alignment with jacket

Stern tug continues to pull aft

Release bow mooring

Bow tug continues to pull barge into jacket against pull of stern tug
Slack tow line

Barge ballasted down to transfer AMP1 deck weight onto the jacket legs

Stern moorings partly slackened

Slack tow line

Barge accurately held in position by stiff fenders on jacket legs and barge

Topsides Mating Operation
**Undocking Manoeuvre**

- Stern tug commences undocking
- Stern moorings adjusted to maintain barge alignment with jacket
- Bow tug provides control pull forward
Release bow tow line

Stern moorings automatically go slack

Stern tug continues to undock barge

Release Stern Lines
Barge is Free and is Towed Away, Topsides and Jacket Mating is Complete
Mating System Description
Mating System Summary

- **Automatic barge locating fender system**
  - Rapid barge entry and exit
  - First-time stab in of leg docking cones
- **Elastomeric shock absorbers in deck legs**
  - No dynamic leg to leg contact
- **Barge rapid ballast system**
  - Barge ballast system + large external system
  - Fully reversible at any time during load transfer
- **Deck never relies on hydraulics for support during load transfer**
  - The deck is always supported directly by passive structural elements
  - No risk of uneven support loadings
- **Barge separation assisted by simple pull-out block system**
Barge Fender Systems

- **Steel support frame welded to barge deck**
- **SURGE AND SWAY FENDERS**
  - Steel reinforced hardwood panel down side of barge
  - Timber fender blocks bolted to steel base
- **Jacket leg**
- **HARDWOOD SWAY FENDER FOR DOCKING**
- **SWAY FENDER**
- **SURGE AND SWAY FENDERS**
  - Steel support frame welded to barge deck
Fender System

PLAN OF BARGE

Entry guidance fenders

Bow

Skid rails

Barge Entry

Direction

Stern

Timber fender blocks bolted to steel base

Jacket leg

Hydraulic ram passes through skid rail

Steel reinforced hardwood panel down side of barge

Steel support frame welded to barge deck

Fender bearing plate

Bearing plate

Jacket leg

HARDWOOD SWAY FENDER FOR DOCKING

MOVEABLE SURGE FENDER

FIXED SURGE FENDER
LEG LOAD TRANSFER SYSTEM

1. BALLASTING DOWN (barge docked in Jacket)
2. AFTER LOAD TRANSFER (barge away from Jacket)
3. LOWER ON SAND JACKS (barge away from Jacket)

- Topsides leg (moving due to barge motion)
- Diaphragm attached to leg
- Sliding piston containing shock absorbing elastomer
- Docking cone
- 2.5m gap between legs at floatover
- Docking cone receiver
- Sand jack
- Compressed elastomer
- Motion attenuated by docking cone contacts as leg gap closes
- Docking unit welded to pile after cut-off
- Top of Jacket leg
- Reinforced diaphragm supports deck leg load
- Leg descends on cone receiver controlled by sand jack
- Gap reduced to zero ready for weldout
- Valve
- Sand

Gap between legs after barge removed: NO LEG CONTACTS DURING DYNAMIC PHASE
Support Block Removal

1. Seafastened after loadout

2. Cut Seafastenings during Load Transfer

3. Remove Spacer Blocks as separation starts

4. Remove Support Blocks to release barge
Undocking

Topsides/barge ballasted down and barge ready to depart

Control tug takes away barge leaving topsides mated with jacket

Control tug tows barge clear of jacket

Topsides
Supporting frame
Skid rail
Barge ballasted down
Allowable Sea States For Floatover

Example shows allowable seastate Hs = 2.0 m for waves approaching at 18 deg from bow.

Boundary of maximum allowable seastate for floatover.

Angle of wave approach relative to barge bow.

Platform North (True 35°)
**Floatover Operation Schedule**

**Ballast times are based on:**
- 40,000 te/hour Installed pump capacity
- 30,000 te/hour Firm capacity (allowing for breakdowns and losses)
- 15% additional time for normal operational delays

---

- **Bow tug enters jacket**
- **Barge enters jacket**: 60 min
- **Ballasting: Close air gap**: 35 min
- **Ballasting: Weight Transfer**: 40 min
- **Ballasting: Separate barge**: 10 min
- **Undock barge**: 20 min
- **Barge free**: 2 hours 45 minutes
Floatover Installation Method

Thank You
For further information on our designs and services please contact:

**Singapore Office:**
39, Pandan Road, Singapore, 609281
Tel.: +65 91093201
       +65 68539106

**Malaysia Office:**
11, Jalan 14/2, Taman Tar, Ampang, Salangor, Kuala Lumpur, 68000
Tel.: +60 342665601
Mob.: +60 123210824
       +60 178810807

**Dubai Office:**
Jumeirah Lake Towers,
P.O. Box: 643593,
Cluster C, Goldcrest Executive Tower Office 706, Dubai, UAE.
Tel.: +971 4 447 0897
Fax: +971 4 447 0896
Mob.: +971 567451923
(Main Company Contact)

**Irvine Engineering Pte Ltd - Registered Address:**
60 Paya Lebar Road,
#08-43 Paya Lebar Square,
Singapore, 409051
Tel.: +65 68539106

enquiries@irvineeng.com