intelligent Multi Safety Link®
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Introduction of Mampaey

Mampaey Offshore Industries is the global market leader in the design, engineering, manufacturing and commissioning of berthing, mooring and towing systems. Over the years our dedication to serve our customers has resulted in several maritime innovations that have driven the new standards in the towing and mooring industry. The developments have contributed to our continuously expanding global customer base. All our products are designed and manufactured to safely withstand the toughest mechanical and environmental conditions.
The *intelligent* Multi Safety Link® (iMSL®) is a next-generation LNG safety communication link. It features unique and advanced functionalities, and Mampaey Offshore Industries complies with global communication standards in the LNG market.
Quality Control and Customer Service

Project Management
From the moment you place a purchase order at Mampaey Offshore Industries our professional project management team will be your point of contact. This concerns the processes of engineering, development, calculations, manufacturing, assembly, certification, documentation, testing, delivery and commissioning.
We have a dedicated team of technical sales engineers, project managers and electrical and mechanical engineers who are all specialised in mooring equipment processes and technology to assist all projects with the accurate know-how from beginning to end.

Custom Solutions
The intelligent Multi Safety Link® is designed for a new generation of LNG assets. This allows us to customise and arrange for the most cost-effective solutions for your project. Our experience of LNG vessels, FSRU, LNG Bunker vessels and hybrid LNG ships and jetties can be readily applied to future requirements.

Testing & Certification
Mampaey Offshore Industries provides tests before delivery of all products. We assure that the product complies with the applicable specifications and standards. All tests are performed in close cooperation with our customers and witnessed by a third party surveyor if requested.
• Factory Acceptance Test (FAT)
• Site Acceptance Test (SAT)
• Certification ATEX/ IEC Ex/ UL
• Certified Production Process

Mampaey Offshore Industries is ISO 9001 quality approved.

All Mampaey systems can be supplied suitable for hazardous area with explosion proof certificates according to the standards such as ATEX/ IEC Ex/ UL/CU TR, etc.
The iMSL® is a high-end Ship-to-Shore Link system which is applicable for the global LNG distribution market e.g. LNG carriers, FSRU's, FLNG, LNG regasification and liquefaction terminals. The Control Module contains all relevant functions and intelligence to facilitate multiple safety links. Connecting both Control Modules through a loopback provides pre-berth full functional indoor end-to-end testing on ship and shore installations.

This provides customers with advanced testing capabilities prior to LNG carrier berthing, far in advance of the industry base line testing. Testing of all critical ESD functions and voice communication systems can now be done entirely indoors with the iMSL® system. The test equipment is integrated in the iMSL® cabinet, reducing the risk of loss and defects and heavy mobile test equipment is no longer required to be carried to the jetty area, which is a proven operational time-saver.

The system is designed in full compliance with ISO28460, ISO20519 and SIGTTO 2009 Guidelines.

Mooring Load Monitoring Data
The intelligent Multi Safety Link® is fully compatible to transmit and receive MLMS data poll-strings as industry standards require. The iMSL® is proven compatible to Yewmac and other party Mooring Load Monitoring data.
Typical System

1. **Control Module 1**
   - User friendly
   - Graphical User Interface - Touch Screen
   - Multi Safety Link for up to five link types
   - Voice Recorder
   - Event log

2. **Control Module 2**
   - Full Functional Test with self-aware software
   - Graphical User Interface - Touch Screen
   - Multi Safety Link for up to five link types
   - 100% functional Backup of Control Module1

3. **Test Module**
   - Operator interface for full functional end to end testing
   - ESD Tx / Rx as simulator of ship (or shore)
   - Integrated Hotphone for testing
   - Integrated PABX Telephony for testing

4. **Power Module**
   - Redundant power supply, with no-break changeover function.
   - Main Power [AC]
   - Backup Power [AC/DC]
Multiple Link Solutions

Fibre-Optic Safety Link
The Fibre-Optic (FO) Safety Link is a common used link for Shore-to-Ship and Ship-to-Ship situations.
The FO Safety Link is used to communicate ESD signals, telecommunications, hotline and data transfer for Mooring Load Monitoring during mooring. This safe optical communication is a primary method for bidirectional exchange of Emergency Shutdown Signals (ESD) and voice communication.
The FO Safety Link in every iMSL® Control Module is proven fully compatible with Furukawa and equivalent compatible Ship-to-Shore Link systems.

Electrical Safety Link
The Electrical Safety Link is a standard integrated link in the intelligent Multi Safety Link® (iMSL®) system. It establishes a physical connection to enable Shore-to-Ship and Ship-to-Ship communication and to provide Emergency Shutdown Signals (ESD) for cargo transfer operations. The Electrical Safety Link supports Hotphone, Private and Public Line voice communication and data communication for transmission of Mooring Load Monitoring data. The Electrical Safety Link is designed such that it supports the use of the original Vantage AF Series 37-way Pyle connectors and the Miyaki type connectors.

Pneumatic Safety Link
The Pneumatic Safety Link comprises of a pneumatic module together with a pneumatic umbilical and reel. The pneumatic module is connected to and controlled by the iMSL® Control Module. The Pneumatic Safety Link is designed according to SIGTTO recommendations and is fully compatible with all other SIGTTO compatible pneumatic Ship-to-Shore links which are available on most LNG terminals and LNG carriers.
- Emergency Shut Down only
- Pressurised air line between LNG Carrier & LNG Terminal (or ship-to-ship)
- Pressure monitoring & dump valve at ship side or shore side
- Numerous Ex/d/e and Non Hazardous Solutions for Air Interface Board
- Snap-tite male/female quick connector – coupler SVHN8-BF ½
All links comply with ISO 28460, SIGTTO 2009 guidelines
Reels and Connector Boxes

Mampaey Offshore Industries have developed a common design storage reel that can be used in several link solutions including Electrical, Fibre-Optic and Pneumatic.

Benefits of the jetty reel solution:

- Complete robust modern design of integrated frame and weather cover, fabricated in 316 stainless steel suitable for harsh marine environments.
- Compact sizes.
- All surfaces brushed, primed and paint powder coated to high industry standards.
- Cable systems not susceptible to excessive heat build-up within the enclosure.
- Access doors opening from available sides for ease of operation, cleaning, maintenance and test.
- External connector receptacle to reduce impact of damage due to vessel emergency break-away.
- Inbuilt Fibre-Optic or Electrical loopback options for full testing.
Hotphone and Communication

The iMSL® facilitates the Hotphone, plant and public line voice communication for the Pyle / Miyaki Electrical link and Fibre–Optic in special Iwatsu mode. The Hotphone is a heavy-duty wall or desktop-mounted phone system. The dial-less Hotphone is used with LNG ship–to–shore links and is fully compatible with the now obsolete Iwatsu TS3 unit used on Furukawa ship–to–shore communications systems. It is dual mode for both private line mode and hotline (Iwatsu) mode.

Voice Communication Recording
The iMSL® Control Module is capable of recording all voice communications managed by the Control Module. These recordings can afterwards be used for reviewing, analysis or training purposes. This includes:

- Fully automated voice communication recording function of each channel when off–hook.
- Telephone conversations are stored as common type audio files and separately identified.
- Voice recordings can be replayed with any standard audio player on any PC or device.
Innovative Features and Unique Elements

• One control module handling all links (Electric + Fibre-Optic + Pneumatic).
• A single solution for operational, testing and backup purposes.
• Fully ISO28460 compliant LNGC ship-side boxes solution.
• Automated voice recording.
• Electrical pin configurator that allows LNG carriers to dynamically adapt to the many different electrical configurations found at LNG terminals.
• Ship-to-Ship Transfer can be achieved over Fibre-Optic Link with 100% functionality.
• Full active testing for ESD, Telecoms and Mooring Load Monitoring as standard for Pyle Electric links and Fibre-Optic links with standard architecture.
• Shipyard solution with minimized cable to supply and install.
• Standard iMSL® has 200% multiple link redundancy, with back-up of each link as standard with secondary module. More than offered by any other vendors known standard solution.
iMSL®

Benefits

**High Compatibility:**
Multi Link solution compatible with all existing industry equivalent standards and existing SSL installations.

**High Availability:**
Multiple redundancy and back-up design, minimizing potential downtime.

**High Reliability:**
Functional active end-to-end operational testing and system testing.

**Web-based manuals:**
Content searchable format for precise fact finding and troubleshooting. Allows operator to use web translation services if required.

**Voice Recording:**
Control Module manages the recording off all voice communications.
iMSL® Small Scale

The cargo transfer of environmental or cryogenic liquids and gases from ships requires a linked Emergency Shut Down (ESD) system to ensure a controlled shutdown of the transfer operation, in the case of a detected emergency. For this ISO20519 ESD link the iMSL® Small Scale solution is practical and has backward compatibility to the existing LNG and bunkering market. The iMSL® Small Scale has a 5 pin 'SIGTTO type' primary Electric link and a Pneumatic back-up link that are failsafe and independent as reasonable practical with independent connection points for Ship-to-Shore link.
Features:

- Emergency shut-down shall be fail-safe and transmitted by an Electric or Pneumatic link.
- For bunkering above 150 m³/h Mampaey Offshore Industries offers both links in accordance with ISO20519.
- Robust 5-pin standard electrical umbilical plugs & sockets as of SIGTTO recommendations.
- Maintains fundamental electrical isolation between Ship-to-Shore and Ship-to-Ship.
- Ability to test the link for pre-berth checks operation.
- Certified Intrinsically safe for use within Zone 1 Hazardous Areas.
- Option ‘Pendant’ function for Manual Trip.
- Maintain backward compatible to old and new installations from 1986 onwards.
- Back-up link system, as independent as reasonably practical.
- Simplest retrofit solution of any vendor, and the system can be self-installed and self-commissioned.
The iMSL® Small Scale offers a common main panel suitable for ship or shore installation, this is complimented by selectable options of ship-side or jetty-side connection points. Mampaey Offshore Industries offers all types of industry standard connectors for ESD link including original type MTL & Icore compatible 5pin.

<table>
<thead>
<tr>
<th>Electric Link</th>
<th>Primary Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGTTO link</td>
<td>5-pin type link (MTL compatible)</td>
</tr>
<tr>
<td></td>
<td>Master/Slave Select</td>
</tr>
<tr>
<td></td>
<td>Pendant Option</td>
</tr>
<tr>
<td></td>
<td>Connector Box for each Bunker station (e.g. Post &amp; Starboard)</td>
</tr>
</tbody>
</table>

| Portable Cable        | Umbilical Link 25m                               |
|                       | Test & Pendant Devices                            |
|                       | Portable Reel or Carry-case Options               |

<table>
<thead>
<tr>
<th>Pneumatic Link</th>
<th>Back-up Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic link</td>
<td>3/8” snapite type with Trip Pressure Setting</td>
</tr>
<tr>
<td></td>
<td>(using ship instrument air supply)</td>
</tr>
<tr>
<td></td>
<td>Connection assembly for each Bunkerstation</td>
</tr>
<tr>
<td></td>
<td>(e.g. Port &amp; Staboard)</td>
</tr>
</tbody>
</table>

| Portale Cable         | Umbilical Link 25m                               |
|                       | Test & Pendant Devices                            |
|                       | Portable Reel or Carry-case Options               |
According to guideline ISO20519, ISO28460, SIGTTO 2009 Guidelines, OCIMF 2017 Recommendation

Other links – Back-up:
Different vendors, parties and technical societies have commissioned studies into types of ESD link for Small Scale and bunkering of LNG. We have compatible solutions to the majority of alternative link types.

Auxiliaries: Telecoms
All LNG Bunker operations require two independent means of communication. This should be available at all times between the person in charge of the LNG Supplier, the person in charge of the LNG Receiver and all manifold watchmen. For practical and flexible bunkering operations, we provide a range of fixed and portable radio solutions (including for hazard areas). Mampaey Offshore Industries recommend integrated below-desk radio solutions where bunkering communications are required in enclosed spaces.
Our Offices and Agents near you

Head Office: The Netherlands