INNOVATIVE MOORING & BERTHING

QUICK RELEASE MOORING HOOKS
IMOOR JETTY MANAGEMENT SYSTEM

INTEGRATED BERTHING • MOORING • TOWING SOLUTIONS
OFFSHORE INDUSTRIES
“All Mampaey’s applications are designed, developed and manufactured using the best components according to the latest, globally accepted standards for industrial and process control equipment. Spare parts are available worldwide.”

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PRODUCT DEVELOPMENT CYCLE
Setting the industry standard since 1904

Next to establishing and upholding the highest manufacturing standards, Mampaey’s stable position as global market leader in berthing, mooring and towing solutions is the result of the company’s maintained focus on improvement of their products and overall systems. Keeping the key development factors in-house or under strict supervision has resulted in a solid, fully closed product development cycle with all the essential factors perfectly interlocking. This way of working has and will continue to result in constant innovation, meeting and often preceding the maritime industries’ needs for ever increasing safety standards and higher efficiency.

MARKET EVOLUTION
The ever evolving needs of this maritime sector have enabled Mampaey to recognize and anticipate changing factors at an early stage. Some examples of constantly diversifying features within our industry:
- Heightened safety guidelines
- Increasing complexity in processes & logistics
- Adapted rules & regulations
- Need for minimal to no maintenance
- More versatile, user friendly and easy to install solutions
- Interconnecting, modular systems
- Increased efficiency

CONCEPT DEVELOPMENT
Recognizing changes and perceiving their effects enables Mampaey to react on these opportunities. We establish this through:
- Specialized, in-depth knowledge
- Over a century of experience
- In-house engineering department
- Objective external consultation
- Dedicated suppliers
- Global network
- Interlocking technical specialties

ENGINEERING INNOVATION
When the feasibility study turns out favourable, the development of an actual end product is initiated. The success of engineering our innovations is a result of:
- Continuous dedicated Research & Development (R&D) efforts
- Lab & Field research
- Simulation software (eg. Finite Element Modelling (FEM) and Computational Fluid Dynamics (CFD))
- Prototyping & 3-D modelling
- Test trials
- Practical testing (in cooperation with “launching” clients)

PRODUCT IMPLEMENTATION
After successfully passing the engineering innovation stage, the new or improved product is officially tested by local and global certifying and legislative institutions. The product implementation stage includes:
- Product validation
- Effective trial test runs
- Certification and legislation
- Third party involvement
- Partnered implementation
- Practical end user testing

INDUSTRIAL STANDARDIZATION
In the course of our century long existence many of our newly developed products have become industry standards which are often leading in contractor specifications. The result is a new basis for improvement as market evolution is a continuous and challenging process. This basis leads to:
- Improved efficiency
- Becoming the dominant design
- Market adoption
- Integration in industry specifications

Scan for example cases
QUICK RELEASE MOORING HOOKS (QRMH)
Safe link in the mooring process

Ever since the early 1950's Mampaey is well known for designing, engineering and supplying innovative Quick Release Mooring Hooks (QRMH) to the various oil and gas industries. In the course of all these years the design objective has been the same: the constant improvement of ship handling operations in terms of reliability and safety. The result is a QRMH that releases the mooring lines with minimal effort, even under full load conditions.

Resetting the mooring hook to the operative status requires just one simple action. In the standard versions the QRMH are able to safely handle workloads from 40 up to 200 metric tons. QRMH-units can be supplied in as single, double, triple quadruple or sextuple hook configurations. All QRMH are fully compatible with other iMoor components.

OPTIONAL FEATURES
- Integral capstans
- Remote control system
- Mooring load monitoring system
- Electrical insulation
- Dust protection covers
- Anti rope slip devices (keepers)
- Special coatings
- Special low temperature executions
- Customized designs

SOLID PACKAGE OF QRMH BENEFITS
- Low costs of ownership
- Manufactured from certified steel plates
- Manual releasing requires a minimum effort at full SWL
- Individually tested at 150% of SWL
- Resetting by simple one-man-action
- Coatings in accordance with ISO standards
- Spark-free operation
- Disassembly with standard hand tools
- Installation on concrete structures or steel decks
- Operation 180° horizontally and 45° vertically
- ATEX compliant
- Long proven durability

CAPSTANS
Reduced handling time and weight

Like all Mampaey equipment the capstans are designed and manufactured for safe and economic handling of vessels. Capstans can greatly reduce the handling time of the linesmen needed for mooring. They prevent heavy lifting of mooring lines. In the standard versions the capstans are available from 1 tons up to 3 tons nominal pull. Capstans are often an integral part of a complete ‘Hook Package’. If so required Mampaey capstans can also be supplied as separately freestanding units or as add-on units.

CAPSTANS’ BENEFITS
- Certified for Zones 1 and 2 or non-hazardous areas
- Maintenance free. Lubricated for life
- 3-Phase squirrel cage induction motor with direct vertically mounted planetary gear reducer providing required output, torque and speed
- Foot switch and/or push button operation
- Local non-reversible or reversible type motor starter
- Optionally equipped with mechanical or electric braking device
- Single- and dual speed capstans available

SPECIAL VERSIONS
- Increased pull capacity available
- Perpendicular gearbox with horizontal motors
- Low temperature executions

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SPECIAL VERSIONS
- Increased pull capacity available
- Perpendicular gearbox with horizontal motors
- Low temperature executions
**SINGLE HOOK ASSEMBLY**

- Type: MHC.000.401.000 = Mooring unit with capstan
- Type: MHX.000.401.000 = Mooring unit without capstan

**DRAWING NUMBER**

- Number of hooks: one
- Mooring hook unit with a square or rectangular baseplate
- Capacity each hook

**DIMENSIONS**

- Cap. = Capacity mounting base in kN
- Wt. = Weight in kilograms, excl. capstan
- X. = Number and size of HD bolts
- S.W.L. = Safe working load in kN

**TYPICAL DESIGN**

- Drawing number
- Number of hooks: one
- Mooring hook unit with a square or rectangular baseplate
- Capacity each hook

**DOUBLE HOOK ASSEMBLY**

- Type: MHC.000.402.000 = Mooring unit with capstan
- Type: MHX.000.402.000 = Mooring unit without capstan

**DRAWING NUMBER**

- Number of hooks: two
- Mooring hook unit with a square or rectangular baseplate
- Capacity each hook

**DIMENSIONS**

- Cap. = Capacity mounting base in kN
- Wt. = Weight in kilograms, excl. capstan
- X. = Number and size of HD bolts
- S.W.L. = Safe working load in kN

**TYPICAL DESIGN**

- Drawing number
- Number of hooks: two
- Mooring hook unit with a square or rectangular baseplate
- Capacity each hook

**CAPACITIES**

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**DIMENSIONS**

- Cap. = Capacity mounting base in kN
- Wt. = Weight in kilograms, excl. capstan
- X. = Number and size of HD bolts
- S.W.L. = Safe working load in kN
TRIPLE HOOK ASSEMBLY

MH.C.000.403.000 = Mooring unit with capstan
MHX.000.403.000 = Mooring unit without capstan

Number of hooks: three
Mooring hook unit with a square or rectangular baseplate
Capacity each hook

TYPICAL DESIGN

Cap. = Capacity mounting base in kN
Wt. = Weight in kilograms, excl. capstan
X. = Number and size of HD bolts
S.W.L. = Safe working load in kN

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dimensions are in millimeters

QUADRUPLE HOOK ASSEMBLY

MH.C.000.404.000 = Mooring unit with capstan
MHX.000.404.000 = Mooring unit without capstan

Number of hooks: four
Mooring hook unit with a square or rectangular baseplate
Capacity each hook

TYPICAL DESIGN

Cap. = Capacity mounting base in kN
Wt. = Weight in kilograms, excl. capstan
X. = Number and size of HD bolts
S.W.L. = Safe working load in kN

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dimensions are in millimeters
IMOOR SYSTEM: THE COMBINED SOLUTION
Ultimate control, monitoring and safety

IMOOR MODULES
The iMoor system is based upon a modular design and typically comprises the following:
- Remote Control System (RCS) for remote release of quick release mooring hooks
- Berthing Approach System (BAS) assists pilots and crew by closely measuring the ship’s speed, distance and angle to the jetty
- Mooring Load Monitoring System (MLMS) keeps a close and constant eye on the mooring lines’ loads
- Environmental Monitoring System (EMS) collects and displays relevant water- and weather information
- Central Monitoring System (CMS) displays and stores all iMoor data

IMOOR BENEFITS
- Reduces: operational costs, jetty- and fender damage, ship’s- and installation’s down time
- Enlarges: control, monitoring and safety
- Enables: stand alone functionality, local data recording, monitoring shipping discharge & loading, histogram trends
- Increases: durability and overall jetty economy
- Introduces: clear day-, night- and bad weather visibility, flexible data entry, multifunctional display
- Includes: modular expandability, turn key installation, low maintenance, small amount of spare parts
**HOLDING DOWN BOLTS**

- **Anchor-Bolts for New Concrete**
  - X: M48, M56, M64, M72, M80, M90
  - A: 1150
  - B: 200 x 180
  - C: 25
  - Dimensions are in millimeters

- **Anchor-Bolts for Existing Concrete**
  - X: M48, M56, M64, M72, M80, M90
  - A: 1150
  - Dimensions are in millimeters

- **Anchor-Bolts for Steel Deck**
  - X: M48, M56, M64, M72, M80, M90
  - A: 600
  - Dimensions are in millimeters

Other anchor-bolt designs are available upon request.

**FREESTANDING CAPSTANS**

- **Freestanding Capstans**
  - Motor Size
    - 3 kW: 970, 910, 320, Ø22, 500, 12xM20
    - 4 kW: 970, 910, 320, Ø22, 500, 12xM20
    - 5.5 kW: 1016, 956, 320, Ø22, 500, 12xM20
    - 7.5 kW: 1016, 956, 320, Ø22, 500, 12xM20
    - 11 kW: 1016, 956, 320, Ø22, 500, 12xM20
    - 15 kW: 1016, 956, 320, Ø22, 500, 12xM20
  - Dimensions are in millimeters

Special capstan constructions are available upon request.

**TYPICAL DESIGN**

Installation
OPTIONAL FEATURES
Other features are available upon request.

- Anti-Rope-Slip-Device “Keeper”
- Dust Protection Cover
- Low Temperature Executions
- Safe Locking Device (standard feature)

SPECIAL CONSTRUCTIONS
Mampaey also provides special customized assemblies. Below some examples.

- Quick Release Mooring Pulley
- Break-Off-Bolt Construction
- Special Base-Plate for installation onto existing anchor-bolts
- Replacing Bollards for Quick Release Mooring Hooks
- Special Adapted Hooks for installation into existing assemblies

REVAMPING
Mampaey is specialized in revamping projects such as replacing bollards, new units onto existing anchor-bolts and new hooks into existing assemblies.

- Back to Back Assembly
- Sextuple Hook Assembly
- Replacing Bollards for Quick Release Mooring Hooks
REMOTE CONTROL SYSTEMS (RCS)
Safe grip on mooring hooks

In case of emergency the hooks can be released from a distance – for instance a jetty control room – by remote control. With this option the hooks can be released individually or simultaneously. The remote control system is compatible with iMoor enabling central control from various locations and portable devices such as PDA’s. Local hook control can be obtained with push buttons. Open- or closed hook indications can be transmitted to the remote control panel or displayed by iMoor application software.

ELECTRIC REMOTE CONTROL SYSTEM (ERCS)
The release mechanism of the mooring hook is operated by an electric solenoid mounted on the hook.

HYDRAULIC REMOTE CONTROL SYSTEM (HRCS)
The release mechanism of the hook is operated by a hydraulic cylinder mounted on the hook. Hydraulic pressure is provided by a hydraulic power pack fitted on each mooring unit.

REMOTE CONTROL PANEL
There are several in- and outdoor configurations including pushbutton panels, virtual panels on computer screen, explosion proof - ATEX certified - panels.

MOORING LOAD MONITORING SYSTEMS (MLMS)
Constant watch on mooring lines

Ultimate safety is obtained by Mampaey’s mooring load monitoring system. MLMS keeps a close and constant watch on the forces occurring in the mooring lines. Immediate action can be taken in the event of possible slack or overload situations which are detected by MLMS in an early stage. Load information is displayed in real time, alarms can be preset upon SWL requirements. The retrievable MLMS-data can be used as a specific estimate for the number of mooring lines required for safe mooring.

FULLY COMPATIBLE iMOOR MODULE
As the MLMS-system is compatible with Mampaey’s iMoor components, information about loads in comparison with – for instance – local conditions can be measured with the additional environmental monitoring system. This information can be displayed on different portable devices such as PDA’s and pagers.
BERTHING APPROACH SYSTEM (BAS)
Keeping a close eye on the berthing process

Two (eye safe) Lasers, a Large LED Display (LLD), audio alarms and hand-held devices (pagers, PDAs, laptops, etc.) make for an innovative approach system that leaves no room for uncertainty. Mampaey’s BAS can operate as a ‘stand alone’ system and typically consists of:

- High quality, robust, ATEX-approved, eye safe Lasers.
- Highly visible Large LED Display (LLD), clearly indicating distance, speed and angle with integrated “traffic lights” for speed warnings.
- Independent traffic light display can also be provided.

Before berthing and after the berthing process has been completed, the LLD can be put to further use displaying mooring- and/or environmental information. High quality handling data, tuned to achieve the best possible accuracy at the fastest refreshing speed.

After the vessel is moored to the fenders the system will monitor the fender deflection & drift-off and generate alarms. Jetty and ship’s safety is assured by i-moor’s adjustable alarm settings for the ship’s speed and angle during the berthing process.

ENVIRONMENTAL MONITORING SYSTEM (EMS)
Monitors all environmental factors

Clear and present display of all meteorological and oceanographic quantities is of importance for safe berthing & mooring.

Mampaey’s EMS can operate as a ‘stand alone’ system and typically consists of:

- Weather Station (measuring wind speed & direction, air pressure, air temperature, humidity and precipitation)
- Current Sensor (measuring current speed & direction and seawater temperature)
- Wave & Tide Sensor

In addition sensors for visibility, wave direction, specific gravity, current profiles, etc. can also be provided. The ideal location for i-Moor’s EMS-sensors is stipulated by the Jetty lay out & orientation, global location and environmental circumstances.
IMOOR SYSTEM
Safe, sound and solid jetty management

As all other products, the IMoor system is an ‘in house’ development by Mampaey Offshore Industries. Design, programming and testing are conducted in the best possible manner. All according to the high quality, industrial standards of our company. The Mampaey IMoor Software Package is SCADA based and can easily be customized to client’s requirements and be interfaced to other systems. Complete and simultaneously monitoring and controlling several jetties. Information can be distributed via the internet and thus be shared globally and/or by the ship’s crew.

OPTIONAL FEATURES PROVIDE MORE CONTROL AND SAFETY
• Interface to Distributed Control System (DCS) – to provide IMoor data to client’s main computer system.
• Interface to Ship to Shore Link (SSL) – to provide IMoor data to client’s main computer system.
• Interface to Emergency Shut Down System (ESD) – for emergency remote release of hooks from client’s ESD.
• Automatic Identification System (AIS) - can be an integrated part of IMoor.
• Closed Circuit Television (CCTV) provide a clear view of the Jetty and the Vessel. Images can be displayed on the Jetty computer.
• Other Interfaces and Monitoring Possibilities

CENTRAL MONITORING SYSTEM (CMS)
In control of IMoor

The relevant information from the various sensors is post processed on PLC’s and further transmitted to (and visualized by) the Jetty Computer. This form of local processing ensures the stand alone functionality of the main modules.

Histogram trends can be provided for each vessel as ship’s data is stored centrally. Specific data bases include mooring schedules, rope tension limits, trend logs, event- & alarm archives and configurable, emergency release information. Typical IMoor applications, such as mooring load monitoring, remote hook release & hook status, berthing approach data and meteorological & oceanographic info as well as AIS or CCTV images can be made visible. All information can be distributed locally or globally and be monitored via LAN, WLAN, UHF or the internet (for instance on board of the vessel).

ENGINEERING, COMMISSIONING AND TRAINING

All electrical, mechanical and IT engineering is carried out by Mampaey’s in house engineering department. In order to get the best possible product design, Mampaey uses 3-D modelling and Finite element analyses of all equipment. After completion of installation, the equipment can be commissioned and started up by Mampaey’s engineers. Professional training of jetty and control room personnel can be performed on site location or at Mampaey’s premises.
ADDITIONAL INTEGRATED BERTHING, MOORING AND TOWING SOLUTIONS

Offshore Hooks

Mooring Hooks

Towing Hooks

Load Test & Calibration

Mooring Buoys

Commissioning & Training

Due to continuous development Mampaey Offshore Industries reserves the right to alter the specifications presented in this document without further notice.