

Multiple Product Handling on Jetties

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ABSTRACT

The problem of being limited in space and/or strength of an existing jetty and available budget is not new. A solution, offered by Kanon Loading Equipment B.V. from The Netherlands, is revolutionary: a Marine Loading Arm carrying up to four dedicated product lines.

LAYOUT OF EXISTING JETTIES LIMITS FUTURE EXPANSION

A lot of plants and terminals are limited in their expansion and changeovers to new products, because the existing jetties were not designed for larger or additional Marine Loading Arms. Depending on the dimensions, a single Marine Loading Arm will require 3 – 4 metres of space on a jetty.

Companies who want to handle several different products on a jetty and need to transfer these products through dedicated pipelines are faced with high costs to expand or reinforce their jetties.

Due to limited budgets these companies often have to make a concession to their requirements and will have to choose to work with hoses to meet their operational goals. This can be a problem for those companies who have a policy not to use hoses for the transfer of their products because of safety and/or local health and safety regulations.

LOADING EQUIPMENT

Kanon Loading Equipment is specialised in the design and marketing of Marine, Rail and Road liquid transfer and safety systems. The loading systems are in operation for the widest range of liquid products, from cryogenic to high temperature applications, including the most hazardous and/or corrosive fluids.

With this range, Kanon successfully supplies the chemical, pharmaceutical, petro-chemical, and food industries as well as tank storage terminals either direct or through international engineering contractors, such as JGC, Chiyoda, Toyo, Kvaerner, Foster Wheeler and Technip.

Kanon supplies both European market and export markets like the Middle East, Asia & Pacific, the USA and



Figure 1
Marine loading arm in operation

Africa. The worldwide deliveries also include service, installation, erection, commissioning and training. They are co-ordinated from the head office in The Netherlands and from the local facilities, which are based in Malaysia and South Africa. The organisation is ISO/VCA certified.

In response to the various challenges of the market, adequate Research & Development capabilities are used to design tailor-made solutions. This requires close co-operation and partnership with the customers, in order to achieve the optimal solution.

CHANGING MARKET DEMANDS

Marine loading arm design has basically not changed since rigid ship loading systems became available on the market, some 30 years ago. The reason for this can be found in the low-risk approach at project realisation, calling for proven design. This has encouraged suppliers of marine loading arms to offer one or two basic designs only. This results in a situation where the actual loading practice at the jetty must be adjusted to the type of marine loading arms available, also in cases where special circumstances would require special solutions.

However, an optimised match between loading equipment and the loading environment on jetties requires adjustments on the loading equipment as well, in those

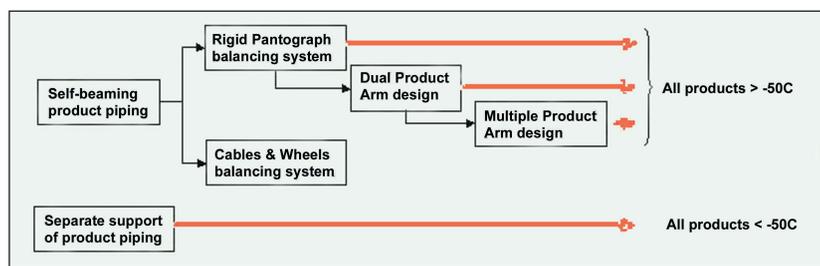
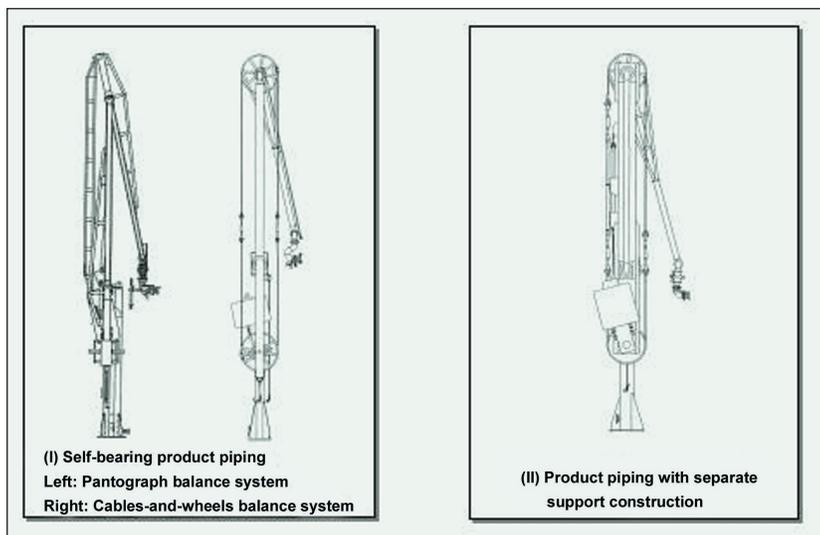


Figure 2 (top)
Two basic types of marine

Figure 3 (above)
Kanon Roadmap

cases where the jetty design has its limitations.

Years ago, Kanon Loading Equipment did recognise this challenge for further optimisation. The development programme was carried out in close co-operation with customers, enabling engineers to design solutions, which could be evaluated in the actual marine loading circumstances, resulting in a field-proven design.

CONVENTIONAL MARINE LOADING ARM DESIGN

Marine loading arms consist of three main parts of piping for product transfer: Riser, inboard arm and outboard arm. An important issue in designing marine loading arms is the balance situation of the movable parts (inboard- outboard). A proper balancing is needed for a manual operation possibility and also for obtaining a safe situation in case of malfunction of an eventual control system. The common marine loading arm-balancing design is based on the use of a rotating counterweight assembly.

Marine loading arms can be divided into two basic types (Figure 2):

I) Marine Loading Arms with self-bearing product pipe construction (products > -50C)

II) Marine Loading Arms with separate support construction for the product transfer piping (products < -50C, or high corrosive medium properties).

Marine loading arms with a self-bearing product pipe construction (I) offer substantial benefits compared to the ones with separate support construction (II):

- The loads on the jetty are considerably lower as a result of a lower wind load.
- Lower weight due to a straight and slim design.

- Lower bending moment on the jetty caused by dead load.

When applying a rigid pantograph system instead of a cable-and-wheel system for connecting the outboard arm and the rotating counterweight assembly, even more benefits can be obtained:

- 'Maintenance-free', as no regular checks are needed for cables.
- No influence on balance occurs during the actual movements due to the rigid construction.
- A further lowered wind load.

THE KANON ROADMAP FOR PRODUCT DEVELOPMENT

It's no wonder why Kanon has chosen the self-bearing product piping type with rigid pantograph balancing system for further development (Figure 3). The combined advantages have provided the way for a marine loading arm design which seamlessly matches with the vision of providing cost-effective, high quality, custom made, marine loading arms against an absolute minimum level of required maintenance.

The first development was the introduction of a dual product-line. The self-supporting design, with a double riser design and a symmetric layout of the inboard- and outboard arm structure, results in surprisingly low bending moments imposed on the jetty deck.

Based on the experience with the dual product line Marine Loading Arm that was introduced in 1997, Kanon have developed them even further. This has resulted in a revolutionary type of Marine Loading Arm, the Multi-Product Marine Loading Arm, consisting of one up to four hard piped product lines, with an optional 'piggy-back style' vapour return line.

They are especially suited for plants and terminals which are limited in their expansion or changeovers to new products.

The Multi-Product Marine Loading Arms prove the innovative strength of Kanon Loading Equipment in loading arm design through partnership, tailored to the customer's specific circumstances.

IF YOU HAVE ANY ENQUIRIES REGARDING THE CONTENT OF THIS ARTICLE, PLEASE CONTACT:

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