

*SFT supplied fenders to PSA Panama International Terminal*



# Fender casualties

***The fender market continues to be competitive with some manufacturers closing shop and others welcoming PIANC's revision of their fender guidelines. World Port Development reports....***

Last year's fender article highlighted the fierce competition among fender manufacturers around the world and the secrecy surrounding the projects they are working on. Well, 2018 saw two major fender manufacturers pulling out of the market completely - Japan-based Bridgestone and Netherlands-based QuayQuip. The reasons for pulling out might not be known to most of us, but it would have been welcome news to other manufacturers aiming to get a larger slice of the cake.

With QuayQuip closing their doors, Germany-based ShibataFenderTeam (SFT) moved quickly to fill the gap in the market by opening their doors to a new office close to Eindhoven, the Netherlands. In March 2019, SFT opened their office with four fender 'specialists' - two engineers to support SFT's engineering team and two other colleagues who will take over ongoing projects.

## **New mixing plant**

In April 2018 we also reported on a new rubber compound mixing plant for SFT in Malaysia. This facility was finally opened in August 2018 and is now fully operational. By opening this facility ShibataFenderTeam claims it is the first fender manufacturer to use the latest-generation compound mixers and associated technology.

Anna-Lena Georg, Marketing Manager at SFT, told *World Port Development* that "the new mixing facility is set up according to the very high Japanese standards of Shibata. Seeing the meticulous performance of the workers and the development from raw material to high-quality rubber compound was an extraordinary experience. Every day's quality control of raw material - and also of finished products is only one example of the high aspiration of the company."

Producing compound according to a project's unique requirements means adapting the compound composition each time. This is essential to produce high-quality rubber fenders. If, for example, the ratio of polymer and carbon black is preset for all future fenders, this will

not only be a problem for the durability of the fenders, but it will also hinder the development of rubber fenders in the future. To inform and educate the industry about the complex issue of rubber compound composition, SFT published the first part of a White Paper Series which was published in the December 2018 issue of *World Port Development*.

The paper covered the correlation between the performance properties of a superior fender and its constituent components. It goes into detail on the raw materials, providing an unbiased view on the correlation of the chemical composition of a rubber fender and its physical properties, especially when it comes to the ratios of fillers and reinforcement agents. A second White Paper will focus on the next step of the fender production - the mixing process.

### Larger vessels

Last year we also touched on the subject of accommodating larger vessels. Of course, this subject matter continues to be an important factor across the industry as it is of utmost importance to have the right fenders installed. Instead of going over 'old ground' there is one major and most important step in the fender design process (and this would count for both large and small vessels) and that is calculating the berthing energy of vessels. If something goes wrong here, the entire waterfront design could be at risk.

These berthing energy calculations could vary substantially between the largest and smallest design vessels, resulting in additional challenges for the fender design. On the one hand, the fender unit has to be suitable and provide sufficient performance for both design vessels and on the other hand, the panel has to be designed for various load cases and impact elevations. All that has to be designed, keeping in mind the restrictions given by the sub-structures, especially for existing quay walls. Altogether, a challenging task for engineers and lack of experience can lead to expensive liability claims for the involved parties.

These relevant parameters are all considered in a Berthing Energy Calculation Tool that SFT launched to support their clients through the berthing energy calculation process. It also offers the option to choose from different design methods and addresses the particulars of a project or region. However, SFT advocates that a tool

can never substitute years of experience and would like to highlight that the results should be seen as a guideline only. The list of suitable fender units based on the calculated energy is long, but typically there are only a few types and combinations that would work properly for a specific project, and therefore it is essential to work together with an experienced fender manufacturer when it comes to choosing the proper fender type and size.

The experienced fender manufacturer will not only focus on the rubber fender itself but will be able to focus on the bigger picture, which includes all fender components and their dependence and interaction between each other. Putting an extensive focus just on the rubber unit and more or less ignoring the requirements of the steel panel and overall design is a dangerous one sided approach to fender design, which unfortunately seems to become common practice in the industry.

### Recent orders

Since our last fender article ShibataFenderTeam reports that it has supplied numerous ports and terminals around the world with fenders including some very interesting projects. One of these projects was for the PSA Panama International Terminal. The 2 million TEUs well-positioned facility is located at the Pacific entrance of the Panama Canal. SFT delivered 55 SPC 1400 Cone Fender systems and 54 Bollards of different types

for the new 750m berth. As the port is located in a highly corrosive environment, special requirements regarding corrosion protection were applied. Most of the hardware was delivered in stainless steel and the panels were equipped with sacrificial anodes.

In Turkmenistan, SFT was awarded a USD6 million contract to supply the fender systems for an entire new port - Turkmenbashi International Seaport, on the eastern coast of the Caspian Sea. The new port is host to a shipyard, as well as passenger, container, ship loading, and dry bulk terminals. More than 300 cone fender systems, custom ferry pier fender solutions, PU corner fenders and wheel fenders for ship lift entry were installed.

The Malaysian office of ShibataFenderTeam, together with their Australian agent Specialist Port Equipment was able to secure a very important and interesting order in Port Moresby, Papua New Guinea, hosts of the 2018 Asia-Pacific Economic Cooperation (APEC) meetings. APEC is a forum for the Pacific Rim economies promoting free trade throughout the Asia-Pacific region. The annual meeting of the economic leaders took place in Port Moresby, from 12th to 18th November 2018. In order to ensure sufficient accommodation for an expected 10,000 delegates, three cruise ships would be berthed in Port Moresby during the event.




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To accommodate one of these ships the old wharf located in downtown Port Moresby needed to be upgraded. Curtain Bros were awarded the civil works contract which included upgrading the fender systems (4 x SPC1100 fender systems were fitted to a modified wharf structure) and installing additional bollards to moor the ship. In total, 16 50t T-Head, four x 50t and two x 80t Staghorn bollards were installed to moor the vessel. Delivery time was critical with cast-in items delivered via air-freight. In addition, the fenders were pre-compressed to break in the fender and prevent any overloading of the structure.

**New PIANC guidelines**

Last but not least, when it comes down to standards on how to produce or select the right fender for your port or terminal, engineers often have to rely on the experience of the fender manufacturer. For years, PIANC has published guidelines for fenders, which have been a well-established reference for the entire marine industry. But unfortunately, it was only a guideline and not a standard as such, which left the interpretation of the guidelines often wide open.

With the aim to bring clarity to the industry PIANC set up a new PIANC Working Group “Guidelines for the Design of Fender Systems” which started work in March 2019. The new MarCom Working Group (WG) 211, consisting of members of the industry, including leading fender manufacturers, focuses on the much needed updates of the guidelines to meet the latest requirements set by stakeholders, and to ensure an approach to fender testing and design that leaves no room for (wrong) interpretation. Content matters include changes in vessel designs and hull pressure requirements, advances in design methods of fender systems, and important research of fender manufacturers.

This might be welcome news for the maritime industry and we can only hope that these new guidelines will ‘guide’ the industry in making the right choice when it comes down to choosing a properly designed fender but there is one major drawback - if those in the Working Group consisting of manufacturers, users and engineers, don’t see eye-to-eye it may take several years before these new guidelines will come together (a similar situation happened with the current guidelines) leaving the industry in ‘limbo’ for some considerable time. 

**Concrete and fender repairs at Pier 13**

Marine Fenders International, Inc. located in California was selected to supply the new fendering system for Pier 13 Naval Station in San Diego, California. Pier 13 is used as a general purpose berth at the Naval Base and needs to be fully functional in order to complete its mission, which is to provide appropriate logistical support for the operating forces of the US Navy. In addition, Pier 13 is heavily used for various naval vessels to berth and is critical to support the combat readiness of the fleet. The fender system had to be designed to have adequate capacity to absorb the energy and resist the forces due to berthing and mooring of the naval vessels without damage to the vessels, pier, or fender system for the conditions specified. The resulting berthing loads were determined based on the berthing energy developed by the moving vessel and the conversion of this kinetic energy into a force and displacement on the fendering system and deck structure. As a result, Marine Fenders International supplied twenty 6 foot diameter x 20 foot long Ocean Guard Netless foam filled fenders and fourteen 8 foot diameter x 20 foot long Ocean Guard Netless foam filled fenders. Some of the main construction features of Ocean Guard fenders include a thermal laminated closed-cell crosslinked polyethylene energy absorbing foam, ultra-heavy duty integral independent swivel end fittings which are internally connected with a heavy duty stud link chain, and a superior nylon filament reinforced non-marking UV resistant urethane skin. The nylon reinforcing is continuous throughout 80-90% of the initial skin thickness. The prime contractor for the project was marine and general engineering contractor Marathon Construction Corporation located in California, specialised in marine and heavy civil construction. The project consisted of the construction of a new fender system to replace the existing fender system and provide general structural repairs to Pier 13. During the work phasing was required and the existing systems needed to remain in service during construction, testing, and commissioning. Critical to the success of this project was also Marine Fenders International’s agent, Lee Composites, which not only assisted on obtaining and administrating the contract but also supplied other materials for this project including secondary, corner rubber fendering systems manufactured by ShibataFenderTeam. 