BOLLARD PROOF LTD

non-destructive mobile test device, capable of pulling in combined vertical and horizontal angles

the challenge

Unfortunately, there are increasing examples of bollard failures globally, events which create significant safety challenges for ship owner/operators and ports alike. Mooring bollards are critical pieces of port infrastructure, designed to safely hold vessels during loading and unloading, be it cargo or passengers. The failure of any one mooring point presents two significant safety issues.

The first relates to the bollard itself which, if failing under load, will launch ship ward, either striking the vessel's hull and rebounding, or in some cases clearing the vessel and going airborne for potentially hundreds of metres. It goes without saying that a heavy casting travelling uncontrolled at speed has the potential to inflict serious damage to vessels and surrounding infrastructure, as well as catastrophic injury to people in the flight or debris path. Secondly, the failure of any one mooring point immediately puts additional strain on remaining bollards, creating further jeopardy of overload failure. In both of these scenarios, with bollards becoming compromised a vessel is vulnerable to drift and allision with other nearby marine traffic or infrastructure.

More generally, busy ports have bollards in use on an almost constant basis, inducing normal wear and tear. A bollard is no more invulnerable than any other mechanical system to degradation and therefore over time ports must factor in routine inspection, maintenance and testing of this equipment to make sure it is both safe and fit for purpose. The challenge, until recently, has been how to do this in a manner which accurately reflects 'real-world' conditions.

the innovation

The Bollard Proof test rig is a non-destructive mobile device, capable of pulling in combined vertical and horizontal angles (30° in plan and at 15° vertical increments to a maximum of 75°). The test rig is able to pull bollards to a working load limit of 165t, monitored and measured using a load pin (in the path of the pull). Additionally, a laser monitors the substrate to detect for signs of deflection during the test. At 1.5m, the synthetic rope used for the test is relatively short, with minimal elasticity and therefore minimal stored energy. This means the test is totally safe, preventing sub-standard bollards from moving, even in the event of a failure under load.

The rig accurately simulates mooring line loads on a bollard and its foundations, producing the required load by reacting against the dock structure. This methodology is equally at home on new or old linear quay structures and, as well as for old/legacy type bollards, can be used to test new bollards as a means of non-origin factory product quality verification and for post-installation commissioning.

This is a significant and demonstrable advancement on other methods, such as tug pulls, bollard to bollard pulls or modal analysis, none of which are able to fully replicate the working conditions of a mooring bollard or verify working load limit.

This capability will be further enhanced in 2026 with the introduction of our next generation rig, capable of pulling to 250t.

how it was implemented

Initially our innovation was championed by a handful of UK ports, who were able to look ahead and see both the regulatory need and safety benefits of engaging with a specialist firm like Bollard Proof for the inspection, maintenance and testing of their mooring equipment.

Early work in the UK was focussed with clients such as ABP, Forth Ports and Port Of Tyne, all of whom were enthusiastic supporters of our new test equipment and methodology. We were engaged to carry out multiple tests across their sites in the UK, with a particular focus on operationally significant bollards. Testing and verifying the safety of the mooring bollards was an important step for each of these clients in building up a history of asset type, condition and suitability for daily mooring operations. Recent successful tests can give the asset owner, harbour staff and ships' crews the confidence that mooring arrangements are in good order, mitigating as much as possible the likelihood of damaging failures.

Andrew Hallam, Project Engineer, Associated British Ports:-

"*Bollard Proof have assisted ABP Southampton, undertaking bollard load testing to verify expected safe working loads. The rig is transported on a Hiab lorry allowing for easy transportation and offload into the test position. Working around a busy operational port, the Bollard Proof team were able to work quickly to test multiple bollards in a day. The rig is able to apply a load in multiple vertical and horizontal directions away from the quay to mimic vessel lines*.".

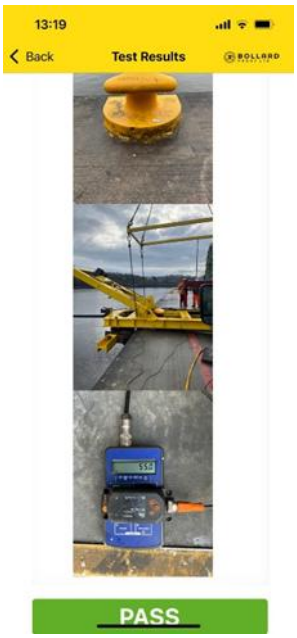
what was the result

Those early clients and test contracts allowed Bollard Proof to hone the equipment and design additional rigs and componentry, enabling us to test more bollards, in innovative new ways. For example, a smaller capacity compact rig was introduced, capable of testing mooring bollards on remote dolphin structures via Multicat vessel.

For bollards set further back from the quay edge or in obstructed areas, additional methodologies allow us to test these types too, following the same techniques and with the same level of accuracy.

New and innovative methods bring wider exposure, and Bollard Proof has continued to build its client base, with multi-year contracts for testing and increasing levels of testing overseas. To date we have proof load tested in excess of 2,000 bollards across the UK and overseas, in locations as diverse as Guadeloupe & Corsica. The next step is to have our new 250t rig stationed permanently in mainland Europe, with others to follow globally.

Bollard Proof produces a certificate for each test, detailing visual inspection, test parameters and results, plus recommendations for maintenance. With the quantity of testing and certification involved, a further innovation has been the introduction of a proprietary software application for customers to use in recalling bollard and test information. The app geo-locates each bollard and holds a photographic record of each test, along with the accompanying certificate. This acts as a valuable asset register for clients and provides an early warning system for bollards which are approaching their next scheduled test date.



conclusion

The demand for in-situ proof load testing of bollards is increasing across the globe at a rapid pace. It is not operationally practical, financially prudent or environmentally justifiable for ports to routinely swap out bollards and their anchorages, and therefore a safe and truly meaningful method for in-situ testing gives port asset managers and ship operators invaluable confidence in the mooring capabilities of berths that have undergone recent testing.

For old bollards or those of unknown provenance, testing can provide ports with the opportunity to upgrade working load limits for use with larger vessels, thereby avoiding costly and disruptive replacement, whilst also establishing their safety and fitness for purpose.

As bollard testing becomes the norm and ultimately becomes mandated through new standards and guidelines (such as that under preparation by PIANC Working Group 231), so ports will need to engage in long-term scheduled maintenance and testing, all of which will contribute to secure maritime operations, ultimately benefiting marine safety and infrastructure integrity. Bollard Proof Ltd is proud to be a key part of the solution to this pressing issue.

A final word from one of Bollard Proof's early proponents:-

"*Bollard Proof have been supportive in developing an enhanced periodic testing regime of existing port bollards and proof testing of any new equipment. The system allowing for simulation of mooring configurations is a positive from previous testing mechanisms and ensures we have documented data around the asset integrity of bollards and certified SWL's*" (Barry Heeps, Port Engineer, Forth Ports Limited).

LINK: https://bollardproof.com/

BOLLARD PROOF LTD

About TT Club

TT Club is the established market-leading independent provider of mutual insurance and related risk management services to the international transport and logistics industry. TT Club's primary objective is to help make the industry safer and more secure. Founded in 1968, the Club has more than 1100 Members, spanning container owners and operators, ports and terminals, and logistics companies, working across maritime, road, rail, and air. TT Club is renowned for its high-quality service, in-depth industry knowledge and enduring Member loyalty. It retains more than 93% of its Members with a third of its entire membership having chosen to insure with the Club for 20 years or more.

International Cargo Handling Coordination Association

Established in 1952, ICHCA International is an independent, not-for-profit organisation dedicated to improving the safety, productivity and efficiency of cargo handling and movement worldwide. ICHCA's privileged NGO status enables it to represent its members, and the cargo handling industry at large, in front of national and international agencies and regulatory bodies, while its Technical Panel provides best practice advice and develops publications on a wide range of practical cargo handling issues. Operating through a series of national and regional chapters, including ICHCA Australia, ICHCA Japan and Correspondence and Working Groups, ICHCA provides a focal point for informing, educating, lobbying and networking to improve knowledge and best practice across the cargo handling chain.

Disclaimer

ICHCA prepares its publications according to the information available at the time of publication. This document does not constitute professional advice, nor is it an exhaustive summary of the information available on the subject(s) to which it refers. Information contained in this document has been compiled with due attention to generally accepted good practice and, where appropriate, regulation. The aim is to share learning to prevent accidents and improve health and safety in cargo handling. References to external links, documents and web sites remain with the copywrite owners. ICHCA International is not responsible for, and cannot guarantee the accuracy of, information on sites that it does not manage; nor should the inclusion of a hyperlink be taken to mean endorsement by ICHCA International of the site to which it points.

Responsibility for health and safety compliance remains with the duty holder. Publications should always be read in conjunction with the relevant national and international legislation and any applicable regulations, standards and codes of practice. It should not be considered as an all-inclusive manual or handbook on any specific aspect of the subject matter to which the publication refers. Every effort is made to ensure the accuracy of the information, but neither ICHCA, the author(s) nor any member of the ICHCA Technical Panel is responsible for any loss, damage, costs or expenses incurred (whether or not in negligence) arising from reliance on or interpretation of the publication. Comments set out in this publication are not necessarily the views of ICHCA or any member of the ICHCA Technical Panel.

The information above, is taken from the entry forms received for the TT Club Innovation in Safety Award and is presented with the entrant's consent. This includes images and graphics. All materials, content, links, copywrite and claims relating to individual entries, products and services, belong to the respective entrants.

Further Advice and Information

ICHCA International also offers a technical advisory service, with input from ICHCA Technical Panel, to answer member regulatory and operational cargo handling queries. For more information contact secretariat@ichca.com or visit www.ichca.com