

INNOVATIONS IN MODERN EXCAVATION SUPPORT SYSTEMS

How best practices in product design and manufacturing led to Shore Hire's
Australian-made Hydraulic Bracing System - The Shore Brace 400

SHORE HIRE PTY LTD | WHITEPAPER

shorehire.

SHORING, PROPPING, & TRAFFIC EQUIPMENT FOR HIRE



In order to shore large, four-sided excavations, it is essential to have a system that is not only adaptable and durable, but is also designed to withstand the test of time.

Shore Hire's Shore Brace 400 is purpose-built to meet these exact requirements, and more.

This whitepaper explores the innovative Shore Brace 400 system developed by Shore Hire, a leading provider of temporary works solutions. This document outlines the current limitations of traditional shoring systems, highlights the potential benefits of a superior solution, and delves into Shore Hire's approach to ideation, sustainable design and best practice prototyping.

First, the specifications of the Shore Brace 400 are detailed, along with a comparative analysis of its advantages over other solutions. Finally, this whitepaper discusses the future of hydraulic bracing and provides a comprehensive summary of the key points covered.

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01.

CURRENT LIMITATIONS OF TRADITIONAL SHORING SYSTEMS

Shoring, in construction, refers to using a solution or product to support an excavation and/or reinforce a trench.

Excavation support will typically involve something like a shoring box being braced against two sides of a trench to retain the cut excavation face. While traditional shoring systems, such as shoring boxes, are an essential part of construction projects and the industry, they are not without their limitations.

One of the limitations of using larger shoring boxes is their weight when fully built, leading to challenges with transportation, handling, and installation. This is due to the heavy equipment required to move and manoeuvre the boxes around a construction site. Their heavy weights can also cause traditional shoring systems to have limited adjustability, due to their fixed dimensions, sizes, and panel lengths. This lack of adjustability can pose several limitations, such as the shoring box having to align with precise excavation dimensions due to site constraints. This can be expensive and lead to delays in a project.

Another limitation is that shoring boxes come in set sizes and are only adjustable by way of variable strut sizes. If you need to achieve greater than normal depths or load capacities, or if your excavation is a unique shape, the fixed capacity and geometry of trench boxes can limit the operator, especially in tighter access sites. Crossing services across an excavation trench is another challenge where shoring boxes can be limiting in some cases due to the enclosed face of the panel.

These limitations may lead to increased labour costs, longer project durations, and an inability to complete certain applications; especially those excavations that are quite large, and where safety issues need to be enhanced due to scale and, therefore, may require a more controlled method of installation.



**LONGER
PROJECT
DURATIONS**



**INCREASED
LABOUR
COSTS**



**CAN'T COMPLETE
CERTAIN
PROJECTS**





02.

THE UPSIDE: HOW A BETTER SOLUTION CAN CREATE SAVINGS AND BOOST PRODUCTIVITY

Shore Hire recognised the above limitations and set out to develop a better solution, taking on board a large amount of customer feedback and implementing their own best practices in product development. This ultimately led to the creation of their innovative Australian Made Hydraulic Bracing System – The Shore Brace 400.

The Shore Brace 400 is a modular hydraulic bracing system comprising of extension beams of various sizes. These beams are double-pinned and connected to a high-load 1250kN capacity hydraulic ram. The system can be designed to support rectangle, square, or multi-sided excavations up to 15m without cross supports, and potentially further beyond these dimensions dependent on the engineering design.

In true Shore Hire fashion, the product innovation is iterative, meaning soon after launching the Shore Brace 400 to market, the need for a high-capacity hydraulic strut was identified. The new solution addressed the need to eliminate the often-cumbersome requirement for multiple cross-bracing props to be used. So, Shore Hire developed the Shore Strut 400. This 1250kN hydraulic strut is the perfect complimentary product to the Shore Brace 400 system and has quickly become a core part of Shore Brace 400 engineered designs.

02.

THE UPSIDE: HOW A BETTER SOLUTION CAN CREATE SAVINGS AND BOOST PRODUCTIVITY

Why is the Shore Brace 400 so innovative?

The Shore Brace 400 system is yet another exciting addition for Shore Hire; it's powerful, resourceful and made and engineered right here in Australia.

One notable benefit is enhanced efficiency, which can be achieved through the system's versatility. This is because it allows for the combination of various sizes to cater to a wide range of excavation applications and shapes. With engineering review and the addition of the high-load Shore Strut 400 much larger and more complex perimeter projects can be supported; typically by bracing trench sheets, sheet piles or concrete piles, and capping beam shoring walls. The bracing system can also be used for a variety of trench shoring applications, including large tank installations, interceptor chambers, pump stations, stormwater pits, gross pollutant traps, bore pits, lift wells, and more.



Another substantial benefit of the Shore Brace 400 is the reduction of labour requirements. The system promotes time and cost savings by enabling the pre-building of equipment when feasible; optimising efficiency and greatly reducing space requirements on-site. The inclusion of a motorised standard hydraulic pump also greatly simplifies ram adjustment; streamlining install and removal processes for greater productivity.

02.

THE UPSIDE: HOW A BETTER SOLUTION CAN CREATE SAVINGS AND BOOST PRODUCTIVITY

“One major plus to using our Shore Brace 400, separate from the product itself, is our ‘build drawings.’ These are detailed step-by-step assembly guides, specific to each customer’s unique design. They lay out exactly how to assemble the gear, saving customers on a lot of headaches and lost time on-site.

ASH EVANS
NATIONAL SHORING MANAGER



The Shore Brace 400 contributes to improved project timelines through its suite of features but also through Shore Hire’s technical on-site team, who guide their customers through the installation process; providing build drawings for a clear, step-by-step approach. This ensures a smooth and efficient project execution, saving time, money, and resources. With its fully modular Australian-made design, the Shore Brace 400 is tailor-made for Australian job sites; offering an engineering solution to meet excavation requirements safely, effectively, and efficiently.

Benefits



REDUCTION IN
LABOUR REQUIREMENTS



IMPROVED
PROJECT TIMELINES



TAILOR-MADE
AUSTRALIAN DESIGN



ENHANCED EFFICIENCY
AND VERSATILITY

02.

THE UPSIDE: HOW A BETTER SOLUTION CAN CREATE SAVINGS AND BOOST PRODUCTIVITY

A large and uniquely shaped excavation called for an innovative shoring solution on this job.

Shore Hire's expert technical team created a detailed bracing design utilising the Shore Brace 400.

▶ [CLICK TO LEARN MORE](#)

Case Study: Hydraulic Bracing - Mulgrave



03.

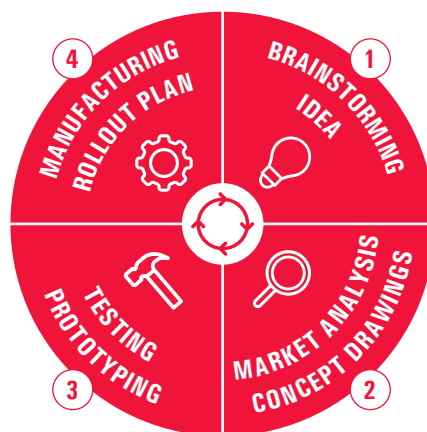
THE THINKING STAGE: HOW SHORE HIRE IDEATES NEW SOLUTIONS

Shore Hire's commitment to continuous improvement and innovation was crucial in driving the development of the Shore Brace 400.



Shore Hire's approach to solution ideation and innovation emphasises combining customer feedback and market research.

Shore Hire applies a customer-centric approach to product development, valuing feedback as one of the most crucial assets. They engage with customers regularly, gathering insights on product performance, safety nuances, and overall usability. This feedback is then methodically incorporated into research and development initiatives, to ensure every product reflects the evolving needs and challenges of the industry.



03.

THE THINKING STAGE: HOW SHORE HIRE IDEATES NEW SOLUTIONS

By harnessing years of experience within the team, and leveraging the constant feedback we get from our long-term customer relationships, we're able to stay ahead of market trends and maintain a customer-centric design philosophy.

BARRY CROWLEY
HEAD OF ENGINEERING

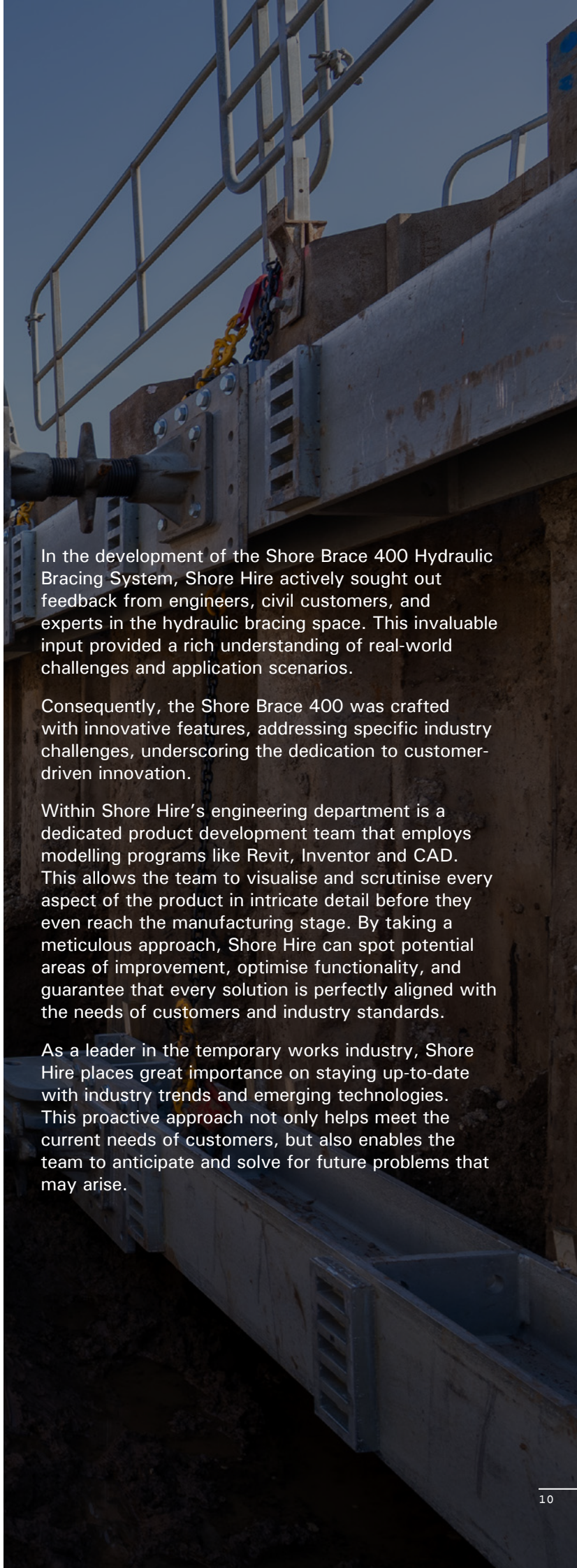


In the development of the Shore Brace 400 Hydraulic Bracing System, Shore Hire actively sought out feedback from engineers, civil customers, and experts in the hydraulic bracing space. This invaluable input provided a rich understanding of real-world challenges and application scenarios.

Consequently, the Shore Brace 400 was crafted with innovative features, addressing specific industry challenges, underscoring the dedication to customer-driven innovation.

Within Shore Hire's engineering department is a dedicated product development team that employs modelling programs like Revit, Inventor and CAD. This allows the team to visualise and scrutinise every aspect of the product in intricate detail before they even reach the manufacturing stage. By taking a meticulous approach, Shore Hire can spot potential areas of improvement, optimise functionality, and guarantee that every solution is perfectly aligned with the needs of customers and industry standards.

As a leader in the temporary works industry, Shore Hire places great importance on staying up-to-date with industry trends and emerging technologies. This proactive approach not only helps meet the current needs of customers, but also enables the team to anticipate and solve for future problems that may arise.



04.

THE DESIGN STAGE: KEEPING SUSTAINABILITY FRONT OF MIND

Sustainability needs to be a key consideration in all modern construction practices.

Incorporating sustainable practices not only conserves resources but also minimises waste, reduces carbon emissions, and curtails energy consumption. Moreover, with increasing awareness and regulatory measures, stakeholders are demanding sustainability, making it essential to stay competitive in the market and reinforce a strong reputation.

Sustainability has always been at the core of Shore Hire's product design philosophy, which is particularly evident in the development of the Shore Brace 400.

Shore Hire has a strong commitment to minimising environmental impact through material selection, energy efficiency, and recyclability. The team is dedicated to sustainable and responsible temporary works solutions.



“In our pursuit of operational excellence at Shore Hire, we believe that reducing waste isn't just a responsibility; it's a commitment to innovation. By optimising our processes and embracing a culture of continuous improvement, we not only minimise waste but also pave the way for a more resourceful and resilient future in manufacturing.

NATHAN SPINNER
SHORE HIRE MANUFACTURING MANAGER

04.

THE DESIGN STAGE: KEEPING SUSTAINABILITY FRONT OF MIND

Shore Hire always prioritises durable design. As a rental company, the practice of reusing means that the lifespan of all equipment is greatly extended, reducing the need for frequent replacements, and conserving precious resources. Incorporating a modular design for the Shore Brace 400 was also critical to facilitate easy repairs and part replacements, further minimising waste.

The Shore Brace 400 is constructed with galvanised steel for maximised strength and durability. Steel is an ideal construction material. Not only is it safe, cost-effective, highly efficient, adaptable, and resistant to many environmental factors; it's recyclable and eco-friendly.

According to the Australian Steel Institute,

[Steel] can be recycled again and again without compromising on quality. It can then be reused and repurposed, enabling its participation in the circular economy. Its high strength and reinforcing capacity enable the reduction of construction material use, conserving energy and resources, and allows future-proofing of structures to be modified or extended later.

Manufacturing Waste Statistics*



40% OF WASTE MATERIALS ARE NOT RECYCLED



12.8 MILLION TONNES OF MANUFACTURING WASTE GENERATED



#1 SECTOR FOR WASTE PRODUCTION

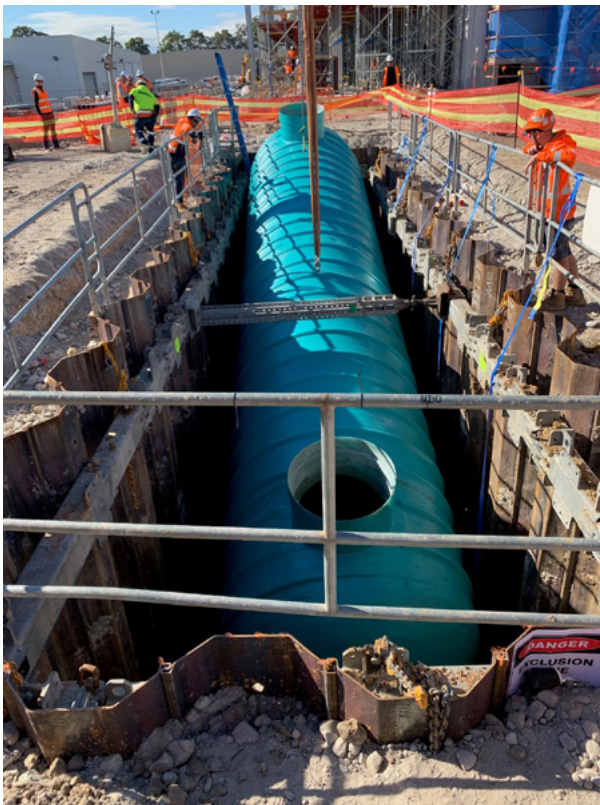
*Australian Bureau of Statistics 2020

04.

THE DESIGN STAGE: KEEPING SUSTAINABILITY FRONT OF MIND

In manufacturing, Shore Hire has always had a focus on sustainability. The manufacturing team opts for energy-efficient processes, minimises water usage, and employs waste-reduction techniques.

Further to this, Shore Hire collaborates with suppliers who uphold sustainable practices to ensure the environmental impact of raw materials sourcing is reduced.



“As an Australian, family-owned business, the fact that our manufacturing is also in Australia is a huge part of our strategy. Manufacturing locally allows us to maintain strict quality control standards throughout the production process. We can closely oversee every step, from sourcing raw materials to the final inspection, ensuring that our products consistently meet the highest quality benchmarks. This commitment to quality is non-negotiable because we understand that our customers rely on our equipment for their safety, productivity, and ultimately their projects’ success.

NATHAN SPINNER
SHORE HIRE MANUFACTURING MANAGER

05.

THE BUILD STAGE: BEST PRACTICE PROTOTYPING PHILOSOPHY

Shore Hire's product development team always focuses on user-centered design and this was no different in the case of the rigorous development cycle of the Shore Brace 400.



One of our 14 organisational values is 'Continuous Improvement & Innovation' and this is a key mantra for our product development team. Our role is to always be looking at improving what we already have, as well as creating completely new solutions to solve our customer's problems.

BARRY CROWLEY
HEAD OF ENGINEERING

By understanding the challenges and requirements of their clients, Shore Hire ensures that new equipment and solutions cater specifically to user needs. Gathering feedback from users, on-site observations, rigorous testing and in-depth feedback sessions all help the team clearly outline the product design objectives.

Rather than aiming for a perfect prototype in the initial stages, the team adopts an iterative approach. Early-stage prototypes are usually simple, enabling the team to quickly test fundamental concepts and features. As the design progresses, the prototypes evolve, gradually integrating more detail and functionality, until a final site-ready prototype that closely resembles the finished product is achieved. Iterations continue from this point forward, with many Shore Hire products from over a decade ago still being improved to this day.

Equipping the team with innovative tools like augmented reality (AR), computer-aided design (CAD) software, and in-house 3D printing allows Shore Hire's designers to create detailed 3D models of equipment. These prototypes enable the team to visualise, test, and modify designs in a virtual and live environment prior to fabrication prototyping. This saves on both manufacturing time and resources.

Given the critical nature of Shore Hire's equipment – which is often responsible for supporting vast loads and ensuring worker safety – the choice of materials in prototyping is paramount. The team will closely emulate the final materials that will be used, even in early prototypes, to ensure the prototypes offer a realistic representation of the end products' functionality, weight and strength.

06.

THE NITTY GRITTY: SPECIFICATIONS AND FEATURES OF THE SHORE BRACE 400

Shore Hire’s Shore Brace 400 has a range of specifications and features that make it Shore Hire’s strongest and most popular hydraulic bracing system to date, including:



The system can support rectangular, square, or multi-sided excavations up to 15m or greater, with or without the need for cross supports, depending on the engineering design.



The Shore Brace 400 features composite legs with a simple corner pin connection for fast and easy assembly, installation, and extraction.



Fully modular system; the length and size of the extension beams range from 0.5m to 8m.



The system is designed and certified to both AS 4100, Steel Structures and AS 5047, hydraulic shoring and trench lining equipment.



The Shore Brace 400 comes with a range of accessories such as; corner strut bracing, hanging chains, horizontal struts, edge protection, ladder safe platforms, davit arms, petrol ram pumps, pin extractors, and more. These components work together to create a secure and stable structure and assist with easy install and removal.



Shore Brace 400 Specifications

DESCRIPTION	LENGTH (MM)	SECTION (MM)	WEIGHT (KG)
500mm Extension	500	356x368	420
1000mm Extension	1000	356x368	600
2000mm Extension	2000	356x368	835
4000mm Extension	4000	356x368	1275
6000mm Extension	6000	356x368	1705
8000mm Extension	8000	356x368	2135
Shore Brace Ram Unit	2150-3150	400x400	1415

06.

THE NITTY GRITTY: SPECIFICATIONS AND FEATURES OF THE SHORE BRACE 400



Shore Brace 400 extensions range in length from 0.5m to 8m pin-to-pin dimension, and are connected to each other via 4:3 female and male fingers using a $\Phi 60$ mm pin and 2 No. M24 Grade 8.8 bolts with nuts and washers.



The Shore Brace 400 features a double-acting (DA) joint for high load capacity in reverse bending (hogging moment) applications and an option for a single-pinned joint for high load capacity in typical bending (sagging moment) applications.



06.

THE NITTY GRITTY: SPECIFICATIONS AND FEATURES OF THE SHORE BRACE 400



The Shore Brace 400 system uses environmentally friendly water-based hydraulic fluid, which incorporates lubricants to keep seals and O-rings in good working order. The system can be activated either by a DA manual hand pump or a motorised double-acting pump to give you as much flexibility on your project as possible.



The hydraulic ram assembly comprises inner and outer sleeved steel box sections, housing a DA hydraulic ram to provide up to 1m of leg adjustment.



The DA hydraulics mean the rams can be pumped both in and out, providing improved operation and simplicity.

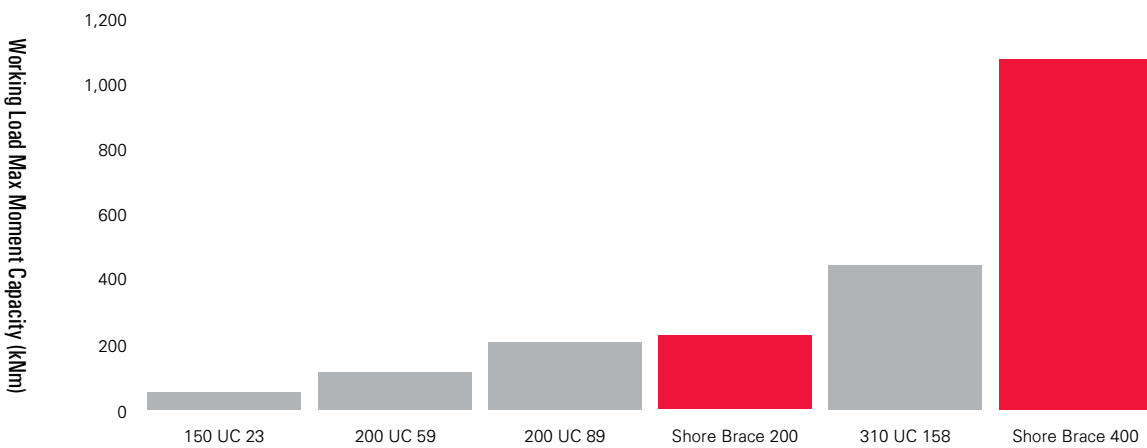


07.

HOW THE SHORE BRACE 400 STACKS UP AGAINST OTHER SOLUTIONS

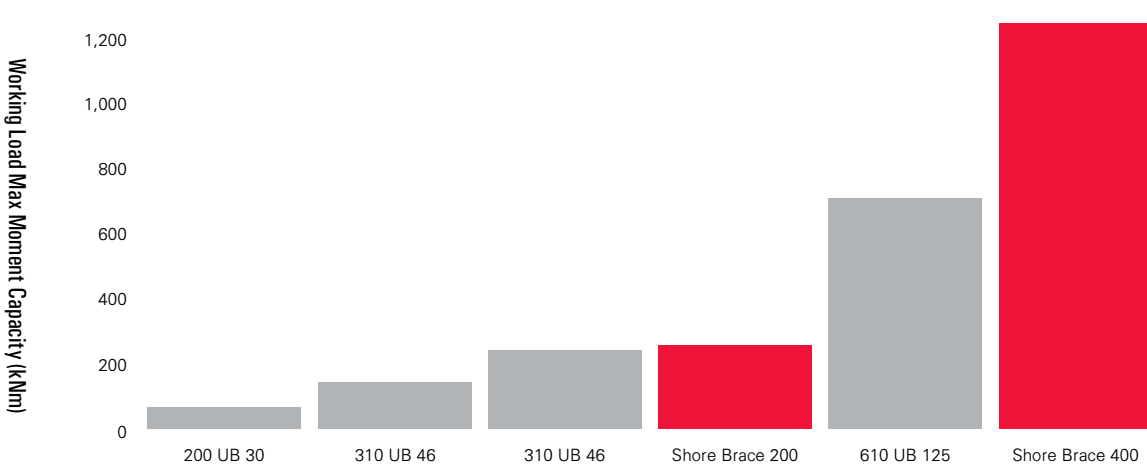
In this section, a comparative analysis is conducted to evaluate how the Shore Brace 400 measures up against other available modular and structural steel waler designed in the market in terms of strength.

Comparison table of Shore Brace 200 vs Shore Brace 400 vs hot rolled Grade 300 Universal Column steel sections:



Welded Beams and Welded Columns have been excluded from a comparative design due to the lead times and uncompetitive fabrication costs associated with them.

Comparison table of Shore Brace 200 vs Shore Brace 400 vs hot rolled Grade 300 Universal Column steel sections:



08.

LOOKING AHEAD: THE FUTURE OF HYDRAULIC BRACING

The importance of ensuring safety and stability in excavations and construction projects cannot be overstated.



The Shore Brace 400 stands as a testament to Shore Hire's leading capabilities in customer-centric design, development, engineering and manufacturing.

Over the coming years in the hydraulic bracing space, we expect to see the integration of smart technologies within hydraulic bracing systems. Sensors, real-time data analytics, and predictive maintenance are anticipated to play pivotal roles in the space. Such enhancements will not only optimise the bracing system's performance but also prolong its lifespan and reduce operational costs.

Additionally, environmental considerations will most likely drive the development of more eco-friendly hydraulic fluids and sustainable materials for bracing components.

Moreover, as urban spaces become more congested, the demand for efficient and compact shoring solutions will surge. Hydraulic bracing systems, such as the Shore Brace 400, will continue to evolve and will remain an indispensable tool in construction applications for years to come.

As with all Shore Hire solutions, improvement and iterations on the Hydraulic Bracing Systems will continue. As customer demands increase for systems that are bigger and better, Shore Hire will continue to apply a proactive response to these demands through product development.

IF YOU WOULD LIKE TO LEARN MORE,
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RANGE OF PRODUCT INFORMATION, TECHNICAL
DATA, CAD BLOCKS, AND MORE.



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