

NEWS RELEASE



FOR IMMEDIATE RELEASE

3D Metalforge is Transforming the Maritime Industry

11 May 2022: 3D Metalforge (ASX: 3MF) (“3D Metalforge” or the “Company”), is part of five recent and ongoing consortia to evaluate the effectiveness and benefits of Additive Manufacturing (AM) in the Maritime industry. An overview of activities and results include:

1. 3DMF has produced a range of parts end to end and had them approved by classification bodies for installation on board working ships.
2. Parts are working well so far.
3. 3DMF deployed a range of innovative technologies to prove as many parts of AM to the industry as possible.
4. The work was done in collaboration with leading players – Bureau Veritas and others under the auspices of Singapore Maritime Port Authority.
5. Port applications, a project to develop AM capabilities for the port, including an AM facility within the PSA’s terminal.

Maritime shipping is a key factor in global supply chains and recent disruptions in the industry are having a profound global impact. For this reason, the adoption of additive manufacturing technology in the maritime sector is both timely and opportune.

The five consortia include:

1. 3D Metalforge’s Use of Additive Manufacturing to Produce Pump and Valve parts for a Consortium led by American Bureau of Shipping and including POSHFleet Services Pte Ltd (POSH) and ShipParts.com Singapore Pte Ltd (SP). Valve and pump parts were initially selected as these are rapidly replaced spare parts typically used in moderately critical marine systems, making them ideal for AM. To produce these marine parts, reverse engineering tools, design optimization and build simulation were used to create the AM digital build files for Laser Powder Bed Fusion using Stainless Steel 316L. ABS’ Guide for AM and ASTM/ISO standards were used in developing the inspection test plan for the AM-built parts and the printing machines, and inspection and dimensional checks on the parts. The consortium is also conducting a commercial study on the scalability of distributed AM to prove cost and time savings to end users, and savings on carbon emissions across the supply chain.



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2. 3D Metalforge is leading a consortium together with PSA Corporation, PSA Marine, Bureau Veritas and Professional Testing Services (PTS) to produce a Seawater Pump Impeller. The consortium focused on selecting parts that could be made cost competitively through AM and were suitable to continue in real commercial use. One of the parts selected was a seawater pump impeller and to evaluate the use of a more corrosion and wear resistant material to extend the service life of the impeller. The impeller was printed using Powder Bed Fusion in Inconel 718. The impeller has been functionally tested and inspected by BV and is currently being installed onto a seawater pump at PSA Marine workshop. It will be installed onto a live tugboat for field tests in the first half of 2022.



3. Lloyds Register (LR) is leading a consortium together with LRQA, 3D Metalforge (3DMF), Singapore Polytechnic, Neptune Pacific Lines, Kompressorenbau Bannewitz GmbH and Professional Testing Services (PTS). The consortium chose to print an auxiliary engine turbocharger nozzle ring as a part that operates under harsh conditions of high temperature and faces erosion and corrosion damage from direct contact with engine exhaust flow. Regular maintenance is necessary but is at the expense of downtime and lost efficiency. Procurement of a new part for replacement requires a lead time of approximately six weeks and requires precise planning. AM was selected to optimize the lifespan and performance of the part. 3D Metalforge utilized a qualified blown powder direct energy deposition (DED-LB) for fabricating the selected nozzle ring. The project included an AM production workflow, from DED-LB process development to manufacturing, post-processing, inspection and testing. The use of AM should lead to a leaner production process.



4. Bureau Veritas Marine & Offshore, Innovation, Centre of Alternative and Renewable Energy (iCARE), is leading a consortium comprising 3DMetalforge (3DMF), POSH Fleet Services Pte Ltd (POSH) and Professional Testing Services (PTS) to identify parts that can be



printed and tested, and to create commercial viability and new processes after the project. Parts were select that are sustainable and operationally effective for POSH, and that would result in an improvement in their supply chain management. One of the parts selected is the Wecco connector, a critical part that requires a quick turnaround, but often faces long lead times. Many variations of the part are required to adapt to various manifold types and to meet the requirements of offshore operations. Consortium partners hoped to realize better inventory management, and re-engineering to lower the weight of the part and shorten the turnaround time for production. Parts were successfully reverse engineered, design optimized for AM via

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Laser Powder Bed Fusion, with the design approved by the consortium. Additive manufacturing improved the product lifecycle and supply chain logistics for the end user.

5. Port applications. 3D Metalforge, MPA, ESG, PSA Corporation, and NAMIC have collaborated on a project to develop AM capabilities for the port, including an AM facility within the PSA's terminal. This represents the world's first AM facility within cargo terminal, outfitted with printing technology to enable just-in-time delivery of spare parts to support port operations. The consortium has worked on the printing of two parts to be used in PSA's quay and yard cranes. First, the printing of twist lock pins (length of more than 400mm) using Wire Arc Additive Manufacturing, as these are the most critical components in the crane spreader, and load-bearing member in direct contact with containers. Second, the polymer printing of large rollers (diameter more than 200mm) using Fused Deposition modelling. The use of AM will reduce the lead time for procurement and reduce critical downtime of the equipment. The project includes an ongoing series of extensive fatigue tests, field tests, and qualification checks to ensure a high level of assurance. In time, this capability will be implemented across PSA's global locations building a network of AM facilities, integrated with PSA Cargo Solutions and create a greener, more sustainable and resilient manufacturing supply chain.



Matthew Waterhouse, 3D Metalforge Managing Director, commented: *“Additive manufacturing can address these major industry-wide challenges and enhance the resilience of shipping - the backbone of world trade. The unique process of additive manufacturing allows the production of complex parts in more efficient cost-effective ways to achieve greater functionality, reduce material waste, allow customization of manufactured parts to meet specific requirements, and produce critical components ‘on-demand’ across the globe to reshape manufacturing workflows and improve supply chain efficiency.”*

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ABOUT 3D METALFORGE

3D Metalforge (ASX: 3MF), founded in 2015, is a leading Additive Manufacturing (AM) company that supports a growing multinational industry-leading client base with their

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advanced proprietary 3D additive manufacturing systems. The Company offers a full range of in-house AM printing services from design and engineering, material advisory, diagnostics and testing, to printing and post-production certification to the latest industry and API standards. Its approach to industrial production, its proprietary processes and eco-friendly technology produce high-demand parts faster, better and more cost-effectively with less environmental impact and greater sustainability than conventional manufacturing.

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