

Industrial client partners with Leussink to improve efficiency and extend the life of a critical plant part

THE BRIEF:

How do you reproduce something that is one of a kind?

Based on the east coast of Australia, the client, a large industrial business, uses ocean water in the operation of its plant to cool equipment and materials. The salt water moves through the plant via a network of pipes, with the water pumped using a custom-built, cast-iron impeller. Due to the long delivery lead time of the designed cast impellers and a need for better strength and durability of the working vanes, the client started looking into other options.

The company engaged Leussink Engineering to collaborate on and deliver a bespoke mixed flow impeller, which would be a more functional long-term solution as they had multiple pumps with the original designed cast impellers. Leussink was tasked with providing solutions to several key challenges, the most pressing of which was the absence of any existing designs or molds for the impeller. The complexity of the job coupled with the tight timeframe for delivery were additional challenges Leussink needed to overcome in meeting the client's expectations.



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THE SOLUTION:

Reverse engineering to deliver a more durable, more functional impeller

The irregular shape of the impeller meant that a specialist toolkit was required in order to troubleshoot and understand the cause of the broken part. To perform this task, Leussink employed its Tomelleri Portable Metrology solution.

Leussink is the exclusive Australian distributor of the Italian-made Tomelleri range of portable, laser-equipped measuring arms. These are state-of-the-art metrology solutions that offer unprecedented efficiencies in deviation analysis that enable sheer accuracy in reverse engineering work.

Leussink's team of engineers analysed the impeller and concluded that it needed to be scanned and brought into a 3D model. From this 3D model, the team would then create manufacturing drawings to understand the dimensions of the impeller.

Harnessing the precise accuracy of the Tomelleri articulated arm and scanner, the Leussink team captured a complete 3D measurement of the impeller. Once fully calibrated, the Leussink team was able to simulate the working environment of the part. This revealed several design issues with the existing impeller – one of which was the fact that of the impeller's five blades, only one was operating efficiently.

Building upon the original brief for an impeller crafted from a single piece of stainless steel, Leussink was able to diagnose the true issues related to the impeller's fracture. The result was a long-term solution with a more efficient and powerful design.

Leussink advised the client that the final part should be made out of solid 316 stainless steel, which would add strength and durability that would greatly extend its time in service.

THE OUTCOME:

Client receives option for a more functional, more durable impeller

By utilising a Tomelleri portable CMM arm in combination with a Demmeler modular fixturing system, Leussink Engineering presented the client with an option to manufacture a new impeller with improved machining accuracy and durability. In delivering the best solution for this large industrial business, Leussink called upon a range of the available engineering services in its suite, including Metrology and Reverse Engineering.

"The Demmeler and Tomelleri products are so effective for projects like this because they're accurate, they're modular, they're flexible and they can deliver information that we need to be able to reproduce the part," explains Leussink Managing Director Jason Leussink.

"A great solution was to utilise a portable Tomelleri CMM arm together with a Demmeler modular fixturing system, on which we could mount the work piece, scan the data in, import that into our software, then analyse and create manufacturing drawings to reproduce the part."

Leussink Engineering is the exclusive distributor of both Demmeler fixturing tables and Tomelleri metrology equipment and software in Australia & New Zealand.

