Boiler feed pump retrofit cuts losses

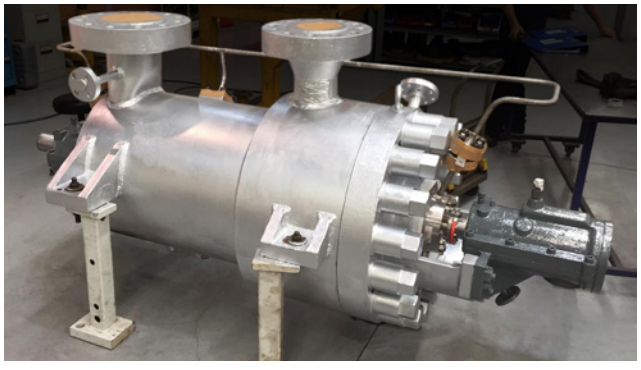
Having been installed for well over 40 years, the original boiler feed pumps in a liquified natural gas (LNG) plant in South East Asia were showing signs of their age. The original design for the installation intended seven pumps to be in service while the remaining two offered reserve capacity that enabled maintenance to be completed without interrupting the boilers.

Unfortunately, several decades in service had taken their toll, and the situation had reached such a point that all nine pumps were required to be in operation simultaneously to keep up with the demand from the boilers.

> *By adapting design concepts from Sulzer pumps, our engineers have managed to improve the performance of the existing pump and complete all calculations to verify the existing barrel design would be safe in operation with the new upgrades incorporated. A final hydro test and site acceptance test was conducted to test the barrel, pipework and pump performance to confirm its integrity and performance after upgrades.*
>
> **Manish Talwar, Head of Retrofits Pumps Services, Asia Pacific**

The Sulzer difference

- **Retrofit achieved 95% of original performance figures.**
- **5% efficiency improvement over originals with new GSG pumps and 10% vs the “as found”.**
- **Design expertise from an OEM with the local knowledge and manufacturing facilities to create pumps in accordance with API, ASME, BS EN and ISO standards.**
- **Sulzer has comprehensive diagnosis and testing facilities that identify issues and provide confirmation of design durability.**
- **Sulzer has specialist manufacturing capabilities that can create bespoke pump designs that fit the existing footprint of the original pumps, minimizing installation time.**



The challenge

The customer needed immediate assistance with two pumps, which required repair and upgrade work to bring them close to their original performance figures. Due to the age of the pumps and the extended lead times for replacement parts from the pump original equipment manufacturer (OEM), Sulzer needed to find an effective solution.

- Six of the nine pumps had leakage figures of around 25 m^3/hour, which equated to 10% losses.
- Plant needed to remain operational throughout repairs.
- Sulzer was required to deliver a fast response as well as a more cost-effective solution than that offered by the original OEM.

The solution

- New parts were designed and manufactured using state-of-the-art equipment, including 3-dimensional laser scanning technology.
- The engineering models were used to provide a route for manufacture with the latest techniques to produce the new parts in the shortest lead time.
- Sulzer also updated the design of the drive coupling, replacing the gear coupling with a membrane coupling.
- At the same time Sulzer discussed the replacement of the remaining seven pumps with new, custom-made models from Sulzer’s GSG range of boiler feed pumps.

Customer benefit

- The innovative manufacturing method greatly reduced the lead time compared to traditional casting techniques.
- As well as creating new parts, Sulzer installed a membrane coupling, which offers stable performance by absorbing damping vibration and easy maintenance.
- The payback period for the pump upgrades were calculated to be less than three years.
- The new Sulzer GSG pumps will be designed so that they can be installed on exactly the same footprint as the originals and easily connected to the pipework.
- The new pumps will deliver a 5% increase in efficiency over the 'as-new' figures of the original pumps.
- The increased efficiency of the new Sulzer GSG pumps mean that the power input required will be 6% less than the originals, which will provide on-going long-term savings for the customer.
- The repair and replacement program will help in extending the LNG plant's license to supply gas to the national grid for another 50 years.

Project data

- Nine original boiler feed pumps designed to run as seven in service and two on standby.
- Pump efficiency had deteriorated to such a point that all nine pumps were required to maintain sufficient supply to the boilers.
- New GSG pumps will provide greater durability thanks to the improved metallurgy and modern engineering design principles.

Pump specification	As found	After overhaul	Future parameters
Manufacturer	Japanese 3rd party	Japanese 3rd party	Sulzer
Pump model	BB5 8 stage	BB5 8 stage	GSG 100-300/8
Rated flow (m^3/h)	251	251	251
Discharge head (m)	976.6	976.6	976.6
Efficiency (%)	64	74.2	78.9
Power (kW)	995.69	858.81	807.65
Temp (°C)	110	110	110
S.G	0.954	0.954	0.954

Applicable markets
Oil and gas, petrochemical, power generation

Applicable products
GSG boiler feed pump

Contact
res_psameretrofitspecialists@sulzer.com

www.sulzer.com
A10285 en 8.2019, Copyright © Sulzer Ltd 2019