

Prevention is better than the cure

03 March 2022

Following recommended maintenance procedures ensures long-term compressor availability

Well-planned maintenance of any equipment is essential for long-term reliability and efficiency. Following the routine servicing carefully detailed in the operator's manual may seem obvious, but this is crucial to preventing potential downtime caused by avoidable issues. This is especially important for equipment, such as reciprocating compressors, that form a vital part of multi-million dollar marine gas transport vessels and need to operate reliably round-the-clock.

Anthony Cornes, Key Account Manager – Marine Service Solutions at Burckhardt Compression looks at the importance of following the correct maintenance procedures.

Like most large pieces of equipment, each compressor is specifically designed for a particular application. Using the most appropriate materials and components, which are tailored to the individual application, each build is unique. To reflect this, the installation and operation manuals will often have information that is exclusive to a particular machine.

Expert advice

Reciprocating compressors are similar in principle to internal combustion engines and share concepts in lubrication, cooling and reciprocating pistons. The precision engineering of the design affords excellent reliability, which is supported by regular inspections and maintenance, as detailed by the OEM.

Each aspect of operation is carefully explained with cautionary notes about the consequences of poor maintenance to emphasize the importance of following procedures and using the right materials and components. For the lubrication systems, this is relatively obvious since all the moving parts rely on the correct specification of oil to perform reliably. The associated heaters and filtration systems need to be checked regularly to ensure a long service life.

The coolant system for a gas compressor is similar to that of a car or truck, in that it requires glycol to be added to the coolant water. This not only increases the boiling point of the coolant, but it also provides anti-corrosive properties to protect the internal galleries of the compressor and the heat exchanger.

Glycol is used in marine applications, not because of the probable low ambient temperature, but due to the low suction temperature of the gas, which is related to the type of gas and its composition. In a land-based application, the compressor may be exposed to much lower temperatures and if it is stationary without antifreeze, the cylinder blocks could crack if the coolant froze as a consequence of incorrect maintenance.

Mini case study: Check-list caution

As part of the delivery of a new LNG vessel, all the equipment and systems are checked and commissioned prior to hand-over to the customer. This should involve a series of checklists and actions to ensure that everything is ready for the first day

of full operation. The consequences of making assumptions or not following this system are highlighted in a recent example.

As part of a new build, Burckhardt Compression had delivered two boil-off gas (BOG) compressors to an LNG transport vessel. The design was based on numerous criteria that had been established during the project planning phase. The coolant water specifications were part of this information package provided by the customer because they could affect the materials used in the construction of the compressor.

Furthermore, the overall compressor cooling system is separate from the compressors and beyond the scope of Burckhardt Compression. Following on from installation, any treatment of the cooling water, such as the addition of biocide, anti-freeze or anti-corrosion additives and maintaining proper mixture is a responsibility that is retained by either the shipyard or the vessel's owner.

Predictive maintenance

As with all equipment, manufacturers provide an owner's manual that offers all the information required to operate and maintain the machinery. In today's world where modern servicing routines are more proactive, manufacturers such as Burckhardt Compression encourage predictive maintenance practices to optimize performance and minimize downtime. A flexible approach includes both regular maintenance schedules and predictive practices to ensure the continued reliable and efficient operation of the equipment.

After less than one year in service, the vessel reported coolant in the compressor oil system and requested Burckhardt attend to investigate and provide technical support. When Burckhardt's engineers came on board to carry out this inspection,

they found that the coolant galleries around the cylinders were more corroded than they expected. Further investigation showed that the correct, specified mixture of glycol had not been installed by the responsible maintenance team during the commissioning process and as a result, some corrosion was found in the cooling jacket of the cylinders as well as in the pipework to the compressor.

While this was not an immediate problem, left unchecked, the corrosion could cause serious damage. A plan was formulated where the compressors could continue to operate, having installed new coolant with the correct mixture of glycol, and the damaged parts would be replaced during the first dry-dock maintenance period.

Ongoing support

Thankfully, the Burckhardt Compression service team discovered the issue and established the extent of the damage before it had an impact on the performance of the vessel. However, there is little consolation that this whole situation could have been avoided had the correct maintenance procedures been followed.

To resolve the situation, the cylinders and the pipework needed to be replaced. Aside from the time required to complete this work, the overall project cost was considerable. Burckhardt Compression has supported the operator with a comprehensive inspection report and planning for the new components that will be installed to ensure continued, reliable operation of the compressors.

Image captions:



Image 1: Laby®-GI Compressor skid package for marine applications



Image 2: Corrosion caused to cylinder water chamber due to an incorrect glycol mixture



Image 3: Cylinder water chamber after cleaning

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About Burckhardt Compression

Burckhardt Compression is the worldwide market leader for reciprocating compressor systems and the only manufacturer and service provider that covers a full range of reciprocating compressor technologies and services. Its customized compressor systems are used in the gas gathering and processing, gas transport and storage, refinery, chemical, petrochemical as well as in the industrial gas and hydrogen mobility and energy sectors. Burckhardt Compression's leading technology, broad portfolio of compressor components and the full range of services help customers around the world to find the optimized solution for their reciprocating compressor systems. Since 1844, its highly skilled workforce has crafted superior solutions and set the benchmark in the gas compression industry.

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