12 August 2015

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Customised cranes for Yamal LNG

STAHL CraneSystems builds cold-climate cranes for –50 °C

Yamal/Künzelsau | At present one of the most ambitious LNG plants ever built is rising on the Yamal peninsula in Russia. In a region where some years the thermometer never rises above 0 °C, which is not accessible by land and is usually snow-covered, the JSC Yamal LNG Consortium, in cooperation with the French EPC contractor Technip, is building three LNG trains for liquefying natural gas. Russia plans to export liquid gas to both Asia and Europe from 2017 onwards. Operation in the partially open, unheated buildings in these extremes of temperature is a major challenge for the manufacturers of the technical equipment. On the one hand, the correct functioning and reliability of the equipment must be guaranteed, on the other hand explosion protection regulations must be observed. In complex projects of this kind, Technip relies on experienced suppliers, in the case of crane technology on STAHL CraneSystems. The South German experts for crane technology and explosion protection developed six cold-climate cranes of 100 t lifting capacity each to be used in installing and maintaining Yamal LNG's gas compressors.

In addition to the durability of the material, STAHL CraneSystems had to ensure that the explosion protection complied with ATEX directives. As the crane technology components are only ATEX-certified down to –20 °C and recertifying at the renowned German Physico-Technical Test Institute PTB would have taken several years, STAHL CraneSystems opted for their cold-climate crane concept that had already proven itself in other plants in Russia. The idea behind it: all hoist and trolley components are enclosed in housings and equipped with heaters. The temperature inside the housing can be maintained at above –20 °C by means of a separate safety circuit so that the crane is always ready for operation and the explosion protection is constantly maintained. To ensure this, the crane

control evaluates several temperature sensors before the crane can be put into operation. Crane bridges, crab beams, endcarriages and crabs are manufactured from a special low-temperature steel P355 NL1. The notch impact strength of the steel is 27 Joule at –50 °C, which we confirmed in our own tests. Normal steel with a notch impact strength of 27 Joule at +20 °C would become brittle in these extreme conditions.

Reliable technology

Yamal LNG needs cranes with lifting capacities of 100 t in the gas compression units for maintenance work on the heavy gas compressors. This lifting capacity was provided by the AS 7 ZW ex, comprising two coupled AS 7 wire rope hoists – robust, long-lived wire rope hoists from STAHL CraneSystems, field-proven for decades.
For lighter loads and fast hoisting speeds, each of the cranes is equipped with an auxiliary hoist from the SH ex series of wire rope hoists, this is also mounted on the large crab inside the heated housing.

You won't find LNG crane technology in any catalogue

Hoists for LNG plants are not standard solutions, as requirements vary depending on pump manufacturer, systems builder, EPC contractor and country of destination. What is required are thus reliable series products that can be individually adapted. LNG hoists from STAHL CraneSystems are based on the same modular design concept as the series hoists. Even as a modified customised solution, the individual components come from our own series production, their technical structure is well thought through and spare parts supply and simplicity of maintenance are guaranteed for decades. Duration of use is difficult to estimate in particular in the field of energy plants and offshore solutions. Often the previously calculated useful life is exceeded and systems are in use for not just 20 but possibly 30 or 40 years. As with all technical components, regular maintenance and the availability of spare parts is the key to a long service life for crane technology too.

International cooperation

The customised hoists for the first two cranes were completed in Künzelsau in May 2015 and the abnormal load transported to a German crane builder, where the cranes will be built, erected and tested. The cranes will be shipped in Hamburg and travel to Sabetta in north-west Siberia. The crane components for the process modules from Philippine manufacturer AG&P will also be manufactured in Germany and then transported to the construction site in Yamal, where they will be installed in the modules. The LNG plant is to be commissioned in 2017.

Stringent requirements as regards certification and documentation

Not only for the Yamal project: whenever major international projects with global reach are processed, countless certification stages and documentation requirements must be met. It is therefore important for international systems builders and EPC companies to critically assess suppliers' in-house processes: does the crane builder have experience in international projects? Does he not only have the requisite technical expertise but is he also able to manage complex project flows reliably and transparently? Is he himself in a position to provide all the required certifications and material certificates? Particularly in the highly complex environment of LNG plants, only a few crane technology suppliers remain who can answer all these questions in the affirmative with a clear conscience and can support EPC companies with their own experience and research in implementing the project. The leading supplier in this field is doubtless STAHL CraneSystems from Germany. With 85 years' experience in building explosion-protected crane systems and its own sales and engineering department for large-scale international projects, the company is at present equipping around 20 LNG projects per year with its hoists and crane components.

Photo material (lead and detail photos):

Producing the hoists, crabs and housings at STAHL CraneSystems in Künzelsau. In the foreground: the LNG wire rope hoists without their housings. In the background with housing.

Final check: the customised hoists shortly before being delivered to the crane builder.

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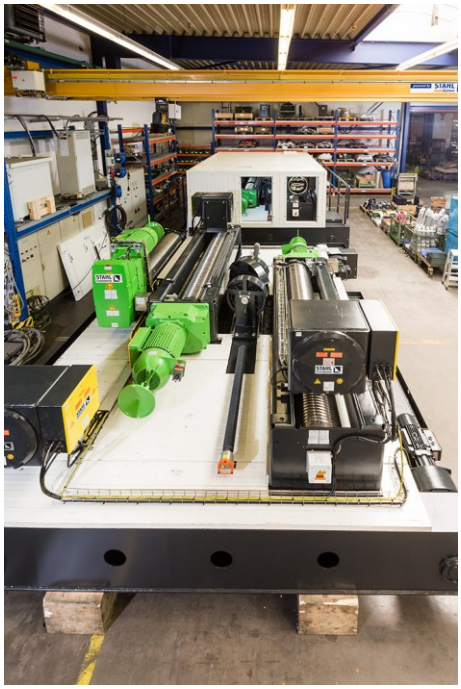

Auxiliary hoist (wire rope hoist SH, left) main hoist (AS 7 twin wire rope hoist, middle-right), controls and heating system on one double rail crab.

Formula for long life and safety: sound workmanship and easily accessible components. The housings can be opened from outside at important points so that maintenance work on the hoists can be carried out quickly and safely even in adverse weather conditions.

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All inside: wire rope hoists and crane control are inside the housing. A heating system ensures that the temperature inside the housing never drops below –20 °C. The system's explosion protection is thus guaranteed even at outside temperatures of –50 °C.

Loading the hoists onto the heavy goods vehicle, next stop: a crane builder in Germany, where the cranes will be erected and accepted. They will be shipped to Sabetta, over 6,000 km away, by sea.

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