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Preparing the right mix

Charging crane from Austrian CraneSystems also works fully automatically

Georg Fischer Automotive manufactures around 35,000 tons of castings from nodular cast iron (spheroidal graphite cast iron) at its site in Herzogenburg in Austria with a workforce of 235 every year. The company specialises in crankshafts, exhaust manifolds, turbocharger housings, integral manifolds, brake carriers and differential housings for passenger cars and utility vehicles. The cast iron for the parts is made from raw materials in exactly defined proportions. To this end, the foundry sends "recipes" to the raw material mixing plant, a large hall shrouded in dark grey dust with 25 separate bunker areas with heaps of metal and scrap that tower metres high. There containers are filled with the right quantities of different materials and transported to the smelting furnace via a rail system. The mixing plant commissioned a modern charging crane from Austrian CraneSystems last August. The fast high-tech crane from STAHL CraneSystems' Austrian crane-building partner works both manually and fully automatically.

Just like a chef mixes his ingredients, so does the crane operator the different types of metal according to the foundry's recipe. The composition needed is sent to him by the control system and shown on the display in his crane cab. For this, the crane controller communicates with the foundry's charging system by Profibus link.
In manual operation the crane operator drives to one of the numbered bunkers and picks up the bulk material by magnet – a maximum of five tons per lifting movement. The display shows information on the amount of material that has been picked up and the amount still missing from the particular bunker. The crane operator can release excessive quantities of material from the magnet in fine steps at the touch of a button, thereby allowing exact proportioning of his ingredients. The casting ingredients are unloaded into a material container. The two containers for this are located in a frame underneath the crane bridge, or in other words, always there where the crane is. The distances in the 60-

metre long hall, the number of bunkers that are to be used and the required charging rate of 15 t/h necessitate high crane and crab speeds and thus a robust construction. The crane bridge can be accelerated smoothly up to 63 m/min by four drives. The cross travel speed is 40 m/min and the lifting speed 20 m/min. An SH wire rope hoist from STAHL CraneSystems with a high FEM classification of 3m (ISO M6) serves as hoist for these exacting demands.

The crane takes over the night shift

Apart from manual operation during the day, the crane is also equipped for automatic operation at night. In this mode the crane automatically drives to the raw material bunkers required by the foundry's recipe, picks up the required quantities and fills the material containers as specified. Depending on the composition, it takes up to a maximum of 20 minutes to fill a container in continuous automatic mode.

The heart of the crane is a double-girder trolley with special headroom equipped with STAHL CraneSystems' SH 6025 wire rope hoist with true vertical lift. A calibratable weighing system on the trolley frame of the crane is used for exact determination of the weight that has been picked up. STAHL CraneSystems helped to develop and build a part of this demanding crane technology. The exact position of the crane and travel carriage must be known for automatic operation. The position is therefore determined redundantly by multiple safe absolute angle encoders to monitor the long travel, cross travel and rope drum and by an additional laser-based distance measuring system between the crane bridge and hall wall.

Safety requirements in automatic mode

For safety reasons, the hall must be completely empty of people when the crane is working in automatic mode. This must be confirmed at ground level with a switch before automatic mode can be activated. The doors are locked electrically. Automatic mode is started at the height of the crane operator's entrance, about eight metres above the hall floor.

The bunkers can only be refilled in manual mode, but it is possible to fill the cycle boxes by lift truck to a limited extent in automatic mode as well.

Strong partner in Austria

Not even 12 months passed between placement of the order at the end of November 2014 and successful final acceptance including automatic operation on 7 November 2015. Austrian CraneSystems had only two weeks during the summer break of Georg Fischer Automobilguss to dismantle the old system and install the new crane, which, thanks to careful planning and competent execution, proved no problem for the Austrian crane builder. The partnership between Georg Fischer Automobilguss and Austrian CraneSystems, which has existed since 2007, was strengthened further by this project. With its innovative special crane, Austrian CraneSystems has once again shown that Austria is capable of handling tricky, challenging projects and can implement demanding special solutions quickly and in compliance with all applicable standards.

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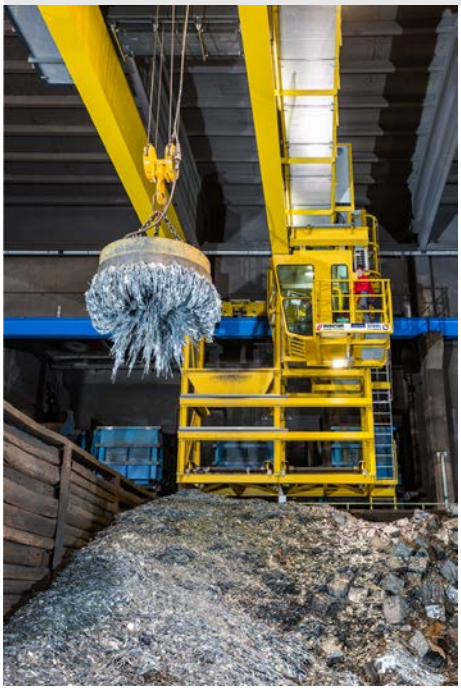
Photos (lead and detailed photos):

During charging, the portal crane drives through the hall of the raw material mixing plant to the storage bunkers at speeds of up to 63 m/min.

Metallic bulk materials of different grades and composition are stored in 25 separate bunkers – the ingredients for new castings.



The magnetic gripper can pick up five tons of metal per lifting cycle. The material containers are located under the crane bridge to enable short distances during loading.

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Thanks to the compact dimensions of the trolley and wire rope hoist, the new crane system could be integrated into the existing hall and still offer the required lifting height.

Powerful technology in the tightest of spaces: The SH wire rope hoist in the typical red of Austrian CraneSystems is designed for especially high loads and is the optimum choice for demanding processes.

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