



STROTHMANN

Machines & Handling

INNOVATION IN MOTION

P i p e p r o d u c t i o n a t B e r g r o h r



Efficient material flow
with

RoundTrack®

TECHNOLOGY

New Bergrohr production facility based on RoundTracks®

Together with control systems expert H. Klein-knecht & Co. GmbH, STROTHMANN Machines & Handling GmbH has designed a special floor transport system featuring inductive power supply for the production of large steel pipes weighing up to 30 t at Bergrohr, a manufacturer of large steel pipes.

At 5,000 m², the Bergrohr production facility was compact, but so narrow that buffer zones for the production could not be established, and material flow was often interrupted. Having extended the floor space to 15,000 m², the pipe



producer was free to install a modern in-house logistics system. Many work steps lie between the processing of single heavy steel plates (which are ordered and produced especially for the given application) and the final approval of the finished large steel pipes. These include the preparation of the plates, forming the pipes, welding the longitudinal seams, water pressure, ultrasound and X-ray checks and the extended check including the processing of the pipe ends. The giant steel tubes are now transported to these stations on tracks.

RoundTracks® transport pipes weighing 30 t

Bergrohr's large, well-lit workshop gives employees a view of the countryside. STROTHMANN carts carry the pipes, which have diameters between 500 and 2,500 mm and lengths between 3,500 and 12,000 mm, from one step to the next on tracks which are set in the floor. The carts have a maximum speed of 30 m/min. Before the new production facility was built, stationary turning mechanisms were used to realign the pipes. Now, special adjustable mechanisms allow for the rotation of pipes during transportation at a maximum speed of 8 m/min.

RoundTrack® technology as a part of the machine

During these production steps, RoundTrack® technology is employed as a means of transportation and as a production system. After forming the pipe, the longitudinal seams are joined by state-of-the-art welding technology. "The transfer of the pipe into the machine has been consistently implemented with a RoundTrack® base", says Bernd Berg, CEO at Bergrohr. For example, the transport cart, which rolls on tracks, here turns into a component of the welding machine: the feeder cart which carries the pipes is moved into the machine and positioned there. Transponder units in the floor enable position sensing. The RoundTrack® system is insensitive to spray water during the ultrasound quality check. Additionally, cart and RoundTrack® must withstand maximum temperatures of 250° C during the heat treatment, during which pipes remain lying on the cart.

An inductive supply system embedded in the floor ensures the power supply of the vehicles. Drive units, hydraulic units and controls are supplied with energy via line conductor cables in the concrete floor and inductive pick-up systems within the cart. Data is transmitted to the carts via wireless LAN. The complete logistics system, all electrical connections and the higher-level controller were implemented by STROTHMANN's cooperation partner H. Klein-knecht.

Applying new technology

STROTHMANN had already installed RoundTrack® systems for AIRBUS and a major crane producer. Nevertheless, Bergrohr faced a considerable risk, since that kind of technology had never before been employed in the production of large pipes.

Ergonomics and efficiency

The RoundTracks® have not only considerably reduced the noise level in the production hall, but have also greatly improved the plant's efficiency and the working environment. "The employees no longer need to invest as much physical effort, and therefore feel less burdened", explains Berg. Since the pipes are placed on top of the carts, they are at an optimal working height for the employees. "Thanks to the ergonomic relief and increased work safety, we have registered a 50 % increase in productivity", says Berg.

RoundTrack®

TECHNOLOGY

The round, grooveless upper edge of the rail protrudes only few millimeters from the ground. Persons or vehicles can pass over the tracks without any risk of accident. The RoundTrack®-based transportation of pipes within the inter-linked system has considerably facilitated material flow at Bergrohr. "In terms of material flow, we are the international number one in pipe production", adds Berg.

Processes and extensions

After passing through the mentioned stations, the carts move freely through the facility. The higher-level control system either directs them to the next station or moves them to the buffer zone for a short time. The pipes no longer have to pass through a static, fixed series of steps, like they would in a roller conveyor system, which is a great production advantage. Bergrohr can therefore easily implement future extensions, e.g. by integrating additional carts, stations or automation elements into the floor transport system or by changing the sequence of the stations. Additionally, Bergrohr considers selling the technology developed for the plant, thereby showing new production process options to other producers of capital goods. "If others like our technology, they do not need to develop it from scratch all by themselves. We are happy to sell our logistics achievements and share our experiences", says Berg.

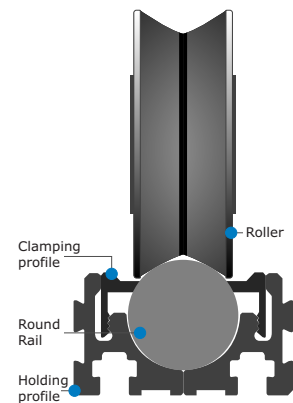
From steel plates to Bergrohr pipes

Bergrohr pipes are manufactured from heavy steel plates ordered and produced according to the intended purpose of the pipes. After passing through the reception inspection, an optional sandblast treatment and the edge treatment, they are transported to the pipe molding station, where the steel plates are bent into shape by a three-roll bending machine. Afterwards, the plate edges are bent and the pipe is handed over to welding technicians, who join the longitudinal seams through state-of-the-art multi-layer welding, including submerged arc welding from the inside and outside. The pipe is then calibrated through a heat treatment which includes an ultrasound check, followed by water pressure, ultrasound and X-ray checks. The last steps before the final inspection are a mechanical test and the processing of the pipe ends. The final inspection includes a measurement check, a visual inspection, weighing and marking the pipe with the manufacturer's name.

Contact-free energy transmission

In this application, contact-free energy and data transfer were integrated into the proven RoundTrack® system. Energy transmission is based on the induction principle: the primary coil is laid along the tracks in the hall floor, the secondary coil is installed within the cart. This system is the first to allow for the wireless transmission of a large electrical output. Data is transmitted via wireless LAN, which enables users to operate the transport carts within the production line. The carts can be positioned with millimeter precision thanks to transponders. The transport system can carry loads up to 30 t. It has a low noise level, requires little maintenance and little downtime and ensures a high degree of efficiency. Requiring neither cables nor batteries, it is particularly suitable for flow production facilities due to its excellent running characteristics. Moreover, the round, grooveless upper edge of the rail protrudes only few millimeters from the ground, which means that persons or other transport vehicles can pass over the tracks without any risk of accident.

No longer equipped with conductor rails or trailing cables, the new system is designed to improve safety and reliability in energy supply and reduce downtime and maintenance efforts. Induction enables contact-free transmission of electrical energy from a fixed conductor to one or more mobile consumers. Electromagnetic coupling is carried out via an air gap. Since sparks do not occur, this contact-free energy supply method is suitable for use in hazardous environments, underwater applications or in connecting components in hermetically sealed enclosures. Induction is preferably used in applications requiring the bridging of long distances at a high speed.



Company background Bergrohr

Founded in 1896, the family enterprise Bergrohr, which is headquartered in Siegen, Germany, is one of the internationally leading manufacturers of large steel pipes for demanding applications, e.g. energy infrastructures like oil, gas or water pipes or chemical process plants. The pipes are also used in large-scale steel constructions such as offshore platforms or in port, hall and bridge building applications. Bergrohr specializes in the production of small and medium lots and customer-specific manufacturing via cutting-edge welding technology, e.g. multi-layer welding, bending and testing methods. Pipe production includes the processing of heavy steel plates, pipe forming, welding, heat treatment and testing. The new BERG-LAY® method, which allows for the processing of special plate widths and the production of steel pipes from multiple layers of different materials, is an internationally unique feature of the product portfolio.



PressRoomAutomation



RoundTrack®-Technology



IndustrialAutomation

Innovation in Motion

Since the foundation of the company in 1976 STROTHMANN has become a synonym for innovations in transportation and material handling equipment. Over the years STROTHMANN has gained vast experiences in press shop automation and is well known as specialist supplier of **press to press transfer systems**, blank destackers, sophisticated centring units and highly dynamic loading and unloading feeders; including gripper and tooling systems.

The **RoundTrack®-Technology** allows new approaches in manufacturing system engineering (flow- and pulse assembly lines). The rails are easy to install, and due to the low rolling resistance heavy loads like aeroplane body sections and big electrical transformers can easily be moved.

The patented, highly dynamic LinearRobots and Gantries form the basis in the field of **industrial automation** and handling technology, to realize logistic and automation solutions in the wood processing industry, automotive, machine tool and other fields of the industry.



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