Motor Retrofit Enhances Material Handling System at World's Tallest Bottling Plant

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Established in 1965, Swire Coca-Cola HK Limited, a wholly owned subsidiary of Swire Beverages, is the leading soft drink manufacturer in Hong Kong. Its factory in Shatin has an annual output of more than 64 million units and is Hong Kong's largest beverage factory and the world's tallest bottling plant. With 18 floors, it has more than 70,000 square meters of usable space.

The Challenge: Preventing Container Hoist Breakdown

Jebsen Industrial has been a partner of Swire Coca-Cola for decades. An approved specialist contractor in mechanical handling and lifting installations, it designed and built a customized container hoist system for the Shatin plant more than 20 years ago. This system is a key component of Swire Coca-Cola's multi-storey warehousing concept, enabling efficient and cost-effective transport of containerized goods within the production plant and warehouse. Jebsen Industrial also provides a range of services to Swire Coca-Cola, including ongoing maintenance, training, spare parts supply, and consulting.

The material handling solution designed for Swire Coca-Cola by Jebsen Industrial is based around a Demag container hoist. Since its installation, it has been run by a direct current (DC) motor. After 20 years, however, this DC drive was outdated. In addition, Demag would no longer support the old control system due to evolution of the controller cards.

With Jebsen Industrial as its regional partner, Demag serves Asia's construction, warehousing, and manufacturing industries with locally designed and built material handling solutions. The company was established in Singapore in 1972 as a joint venture of Jebsen Industrial's sister company Jebsen & Jessen (SEA) and Germany's Demag Cranes & Components.

Risk Evaluation

The lack of ongoing support from Demag for the DC motor controller meant that Jebsen Industrial would no longer be able to source suitable spare parts with which to maintain the container hoist motor. As Swire Coca-Cola's technology partner, Jebsen Industrial strongly advised the company that this situation could have very costly consequences. Given that the Demag container hoist is a crucial part of Swire Coca-Cola's mechanical handling system and essential to factory operations, production at Hong Kong's largest soft drink manufacturer could immediately cease if the container hoist were to break down.

The Solution: Retrofitting with Minimal Disruption

With the client's best interests in mind, Jebsen Industrial recommended that Swire Coca-Cola retrofit an upgraded Demag AC inverter drive. While DC motors have delivered variable-speed operation in many applications over many years, AC drives now offer far more precise speed control to provide more stable operation with a smoother lift.

Jebsen Industrial had three reasons for specifically suggesting that Swire Coca-Cola upgrade the system through retrofitting rather than buying a completely new material handling system.

- Retrofitting is more economical, with an investment of only 10% of the cost of new equipment.
- Adopting a new system would be unnecessarily complex and involve redesigning equipment and processes throughout the factory.
- Setting up an entirely new system would be more time consuming, forcing Swire Coca-Cola to shut down production for a longer period of time.

Demag **Dedrive Pro Frequency Inverter**

The product chosen for the critical retrofitting project was Demag's Dedrive Pro. Ranging from 1.5kW to 560kW for 380V to 690V systems, these high-performance frequency inverters are the industry-leading choice wherever fast but gentle acceleration and braking are required, along with the ability to handle unpredictable loads.

The Dedrive Pro provides either variable torques at constant speed or variable speeds at constant torque. For Swire Coca-Cola, the latter option was selected because its container hoist needs to deliver variable travel, lifting, turning and slewing motions, regardless the given load. The system's "Direct Torque Control" provides constant torque, even at low frequencies. This offers unmatched precision-controlled braking and helps ensure that process sequences remain smooth, precise, and reliable, even under arduous operating conditions. This solution not only offers reliable protection for the transported loads, but also ensures the safety of the installation.

Precise Planning

"Putting its trust in Jebsen Industrial's expertise and our knowledge of the material handling technologies and processes on which its Shatin plant relies, Swire Cocoa-Cola decided to proceed with the retrofitting project in early

2013," explained Ms. Rachel Cheung, General Manager of Technical Services Division, Jebsen Industrial. "It was clear from the outset that very thorough and precise planning would be needed to design an effective solution and implement it with minimal disruption to factory operations."

With input from retrofitting experts at MHE-Demag, Jebsen Industrial and Swire Coca-Cola agreed to a seven-day window for the onsite installation and commissioning work. This was seen as extremely challenging but it was the maximum that the factory's production schedule would allow. Swire Coca-Cola would have to shut down its entire production line to allow for the installation of the new motor controller and the commissioning of the renovated container hoist.

With overall responsibility for project planning, the Jebsen Industrial Technical Services team did everything in its power to avoid any delay. It communicated closely with MHE-Demag (SEA) and Demag Germany to ensure that all the correct parts and components were delivered on schedule for assembly and that the upgraded AC drive and necessary spare parts were shipped to Hong Kong in time for the scheduled installation. The team also had to coordinate with an engineer from MHE-Demag to ensure he would be available onsite in Hong Kong exactly when required to help commission the new system.

On-time Deployment

From the initial design through to the final delivery of materials in Hong Kong took six months and required very precise and detailed planning. Jebsen Industrial's familiarity with the Swire Coca-Cola factory and its technologies and processes, garnered over more than two decades as its installation and maintenance partner, was of great advantage.

Four engineers from Jebsen Industrial and their colleague from MHE-Demag then joined the Swire Coca-Cola team onsite to deploy the new system in late 2013. The complete retrofitting of the container hoist motor, including installation, commissioning, and testing, was completed within six days rather than the scheduled seven – much to Swire Coca-Cola's satisfaction.

Since then, the Jebsen Industrial engineers have made frequent checks of the container hoist to ensure the equipment continues to operate efficiently. There have been no problems with the new system and Swire Coca-Cola now has a safer and more reliable AC drive with high dynamic response to handle its high volume of variable loads.

For More Information

For more information about Jebsen Industrial solutions for the building technology and solutions industry, please send an email to indenquiry@jebsen.com or visit the website at: www.jebsenindustrial.com