DRIVE SYSTEMS
FOR ACCESS SHAFTS

CASE STUDY: ELECTROMECH

NORD DRIVESYSTEMS

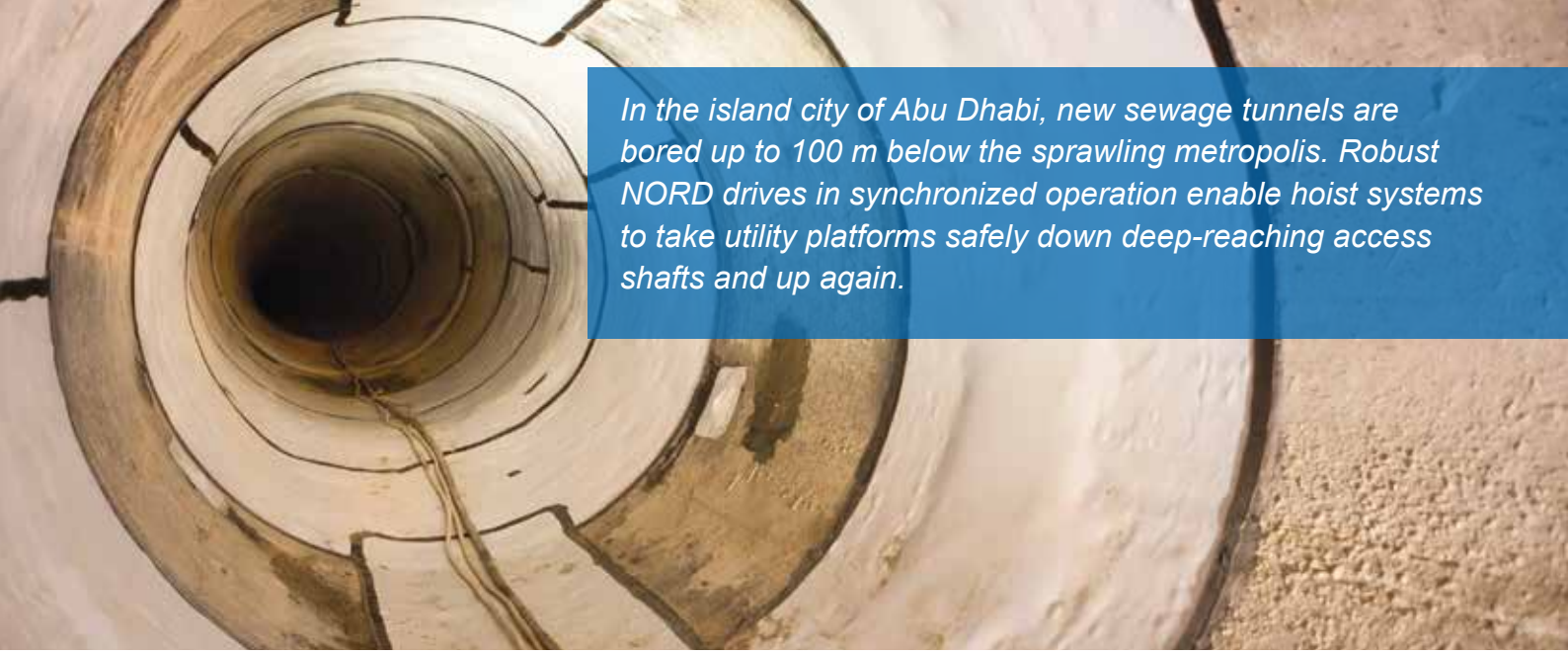
Sewer tunnel construction in Abu Dhabi.

Hoist systems in lockstep.

Safe passage through the access shaft.

NORD helical bevel geared motors.

NORD frequency inverters.



In the island city of Abu Dhabi, new sewage tunnels are bored up to 100 m below the sprawling metropolis. Robust NORD drives in synchronized operation enable hoist systems to take utility platforms safely down deep-reaching access shafts and up again.

TUNNEL CONSTRUCTION
Hoist systems

GEARED MOTORS
Helical bevel geared motors

FREQUENCY INVERTERS
Cabinet-mounted inverters

PROJECT CHALLENGE

Water consumption in the Emirate of Abu Dhabi amounts to a staggering 550 l per person per day. With its population rising by leaps and bounds, the metropolis recently initiated the construction of an all-new, state-of-the-art sewage and wastewater recycling system with a greatly enhanced capacity. A gravity-driven system based on new tunnels deep underground is to collect all wastewater and deliver it to a large-scale pumping station on the coast.

From darkness to the light of day. – The tunnels beneath the highly developed urban area are constructed via trenchless excavation. Indian crane manufacturer ElectroMech was contracted to manufacture and install large gantry systems at a number of access shafts, where utility platforms can be lowered and lifted to move personnel, machinery, and material into the tunnels and out again.

Hoists in lockstep. – Given a tunnel boring phase of at least two years from start to finish, these hoists call for very robust drive solutions that can be relied on for minimal maintenance requirements. Also, several drives assigned to the same crane must perform in perfectly synchronized operation: in order to safely take people, material and tools up and down long rides on a moving platform, geared motors working in pairs need to ensure that the platform remains level at all times. In addition to this crucial functional requirement, the climate of the Persian Gulf region featuring extraordinary heat is another factor to consider: all drive technology has to be tough enough to weather these conditions.

FOCUS ON THE CUSTOMER

ElectroMech

ElectroMech Material Handling Systems (India) Pvt. Ltd. was founded in 1979. The engineering company has seen rapid growth in recent years and is now the largest crane systems manufacturer with a commanding market share in India. ElectroMech offers suitable solutions for a wide range of applications in manufacturing plants and infrastructure projects. Based in Pune, the company manufactures a comprehensive range of hoist and crane systems.

“We greatly appreciate both the pre-sales and after-sales services rendered by NORD, and we trust in their proven level of excellence.”

TUSHAR MEHENDALE,
ELECTROMECH MANAGING DIRECTOR

APPLICATION SOLUTION

For the main as well as for auxiliary hoist applications in Abu Dhabi, ElectroMech and NORD DRIVESYSTEMS have co-engineered drive solutions based on helical bevel geared motors. The gears work at an efficiency of more than 95 percent. These geared motors come in special UNICASE grey cast-iron housings, which are extremely resilient and provide excellent protection against harsh outdoor conditions.

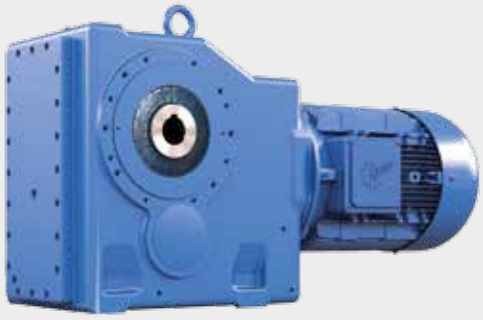
Dynamic duo. – Each crane employs two drums for hoisting. Each of these is equipped with a geared motor that is connected to and controlled by a frequency inverter. The heavy-duty helical bevel geared motors provide for 110 kW rated power and 1,200 Nm torque. The entire system was automated to achieve a perfectly synchronized operation of the main hoist’s two drums using encoder feedbacks. They must work exactly in lockstep with each other to ensure that the utility platform in the access shaft can be lifted and lowered without ever tilting to one side.

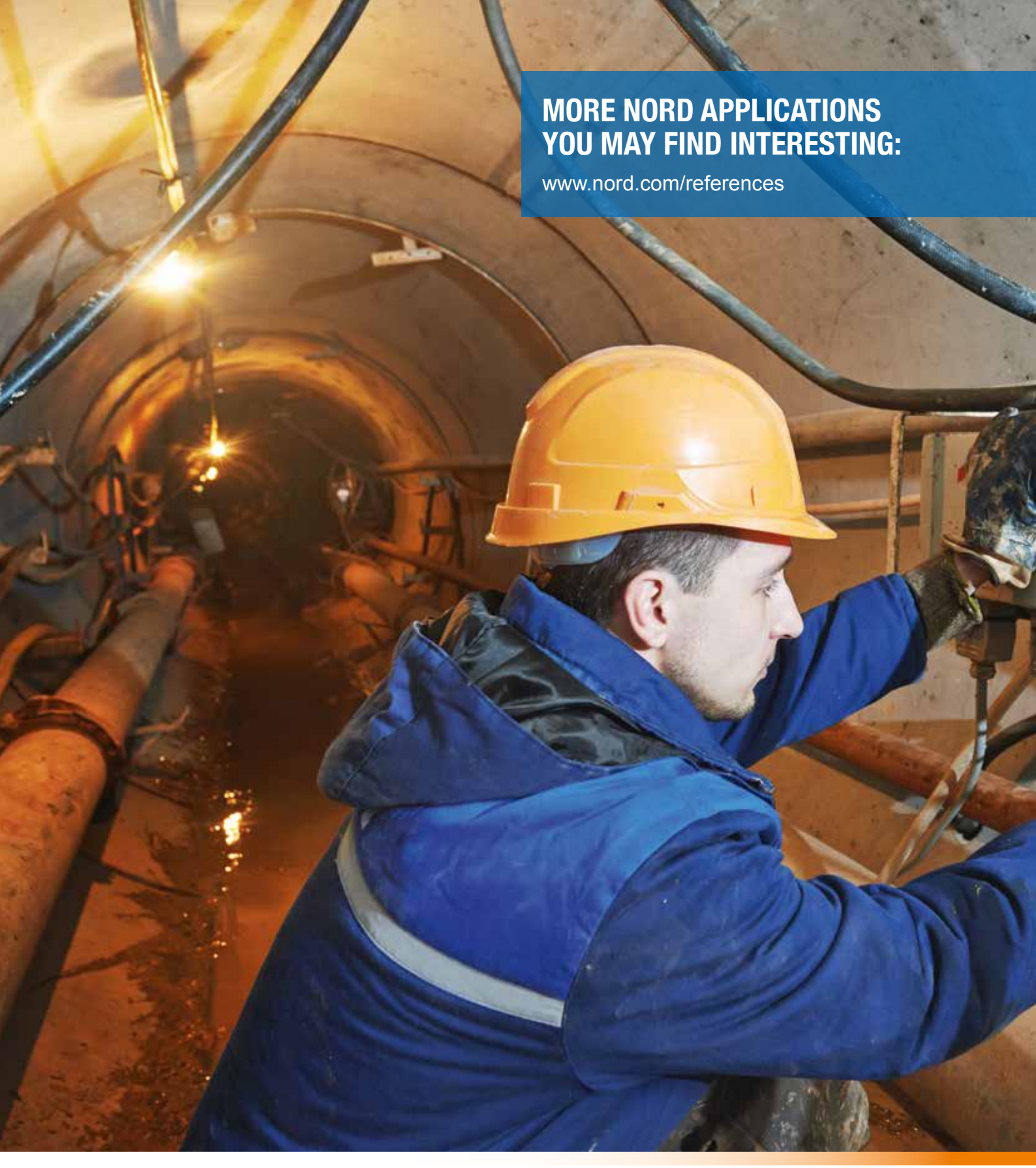
Joint solutions. – Proper operation within a mere ±5° of tilt is ensured by NORD frequency inverters that feature field-oriented control technology, which provides for constant speeds under changing loads and very high torques during start-up. This solution comprising two-stage helical bevel geared motors and frequency inverters is only the latest in a series of collaborative projects undertaken by NORD and ElectroMech: over the course of several years, the two partners have implemented a substantial number of application-specific drive solutions for various hoist systems.

Perfect balance. – Synchronized hoist drives keep platforms riding in the shaft in a level position.

FOCUS ON THE PROJECT

In this tunnel construction project, the precisely synchronized operation of NORD‘s drive system pairings is absolutely vital, since ElectroMech‘s gantry cranes must take platforms down a considerable distance of 90 m at several of the access shafts. Measuring 4 to 5.5 m across, the main tunnel for the Gulf Emirate‘s “Strategic Tunnel Enhancement Programme” (STEP) will eventually extend for about 40 km beneath the city and its environs. Once completed, the new sewage system will be able to dispose of 800,000 m³ of wastewater per day.





MORE NORD APPLICATIONS YOU MAY FIND INTERESTING:

www.nord.com/references

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