

Press release

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Dynamic soil compaction in the desert of Kuwait: Bauer duty-cycle cranes in durability test

- Sea City project in Kuwait's desert will create future living space for up to 250,000 people
- Extensive soil compaction measures required
- Six BAUER MC 96 duty-cycle cranes in use under extreme conditions

Al Khiran, Kuwait – The Sabah Al Ahmad Sea City project is truly impressive: For this artificial city in the Al Khiran region of Kuwait, roughly 300 km of canals were constructed in the desert. What makes this project unique: While comparable artificial settlements in the Gulf region typically involve extensive backfill on the coast to obtain land for artificial living spaces, the Sea City project was designed precisely the other way around. The canals were excavated in the existing soil and then flooded with seawater. The goals of this project are also monumental in other aspects: The development of this gigantic project, involving billions of dollars in investments, is planned for a construction period totaling 46 years subdivided into ten phases. This project will create living space for up to 250,000 people: a planned settlement that will feature comprehensive infrastructure upon completion including all necessary utilities as well as a whole range of luxurious prestige buildings.

BAUER Dynamic Compaction (BDC)

But how can you construct large buildings on desert sand? By using dynamic soil compaction, for example. The method is particularly suited for increasing the bulk density of non-cohesive, friable soils and loose mixed soils with a low fine aggregate content, which makes it ideal for the subsoil composition in desert regions. “And because the pore water is pressed out of the subsoil, in the event of an earthquake there is also a lower risk of soil liquefaction,” explains Steffen Fuchsa, Head of the duty-cycle crane division at BAUER Maschinen GmbH.

Fully automated hoist control

Here is how dynamic soil compaction works in practice: Steel plates weighing a total of 25 t are welded together into structures known as pounders (drop weights). A duty-cycle crane hoists them up into the air and then lets them fall to the ground in a controlled free-fall up to fifteen times, forming a crater as a result of the impact. The kinetic energy emitted on impact penetrates into deeper soil strata and leads to compaction via forced re-packing of the grains. The hoist functions of the Bauer duty-cycle crane are controlled fully automatically during these work cycles, which means that the equipment operator merely has to enter the desired target parameters into the intelligent machine controls, for example the degree of compaction and the required number of impacts for that purpose. Once the cycle has ended, the equipment moves to the next defined compaction point.

This results in a grid of craters. After this initial phase, to ensure compaction over the entire area, the points between the individual craters are worked on with the pounders during the second phase. These overlapping, offset measures followed by backfilling the craters and further compaction ultimately result in a load-bearing construction surface.

Bauer's robust duty-cycle cranes

On the project in Kuwait, six BAUER MC 96 duty-cycle cranes are currently in use. "In their basic design, our duty-cycle cranes are extremely stable and robust specialist foundation engineering equipment designed for high dynamic loads," remarks Steffen Fuchsa. This is clear to see in the solid steel construction components of the upper and undercarriages as well as the boom. On the other hand, highly robust and powerful diesel engines are built into Bauer's MC duty-cycle cranes. The coordinated hydraulic system transfers this power to the hoists. "This alone makes Bauer's duty-cycle cranes the optimal equipment for dynamic soil compaction."

Extreme challenges

Nevertheless, the challenges posed by the method of dynamic soil compaction for specialist foundation engineering equipment in general, and in this case in particular, are extreme: Due to the sheer magnitude of the ground surface requiring compaction and the tight timeline, the equipment on the project in Kuwait is in operation around the clock. And there are also regional particularities: The temperatures in the equipment during continuous operation in the extreme desert heat make it necessary to ensure cooling for the equipment at all times. And last but not last there is the omnipresent sand, which penetrates every crack if the sealing is insufficient. To prevent this, various protective devices (e.g. on the cooler) were attached to the duty-cycle cranes in operation.

Smart assistance systems

"One of the major challenges when executing this method is to always roll the rope perfectly up and down into the groove of the hoist, otherwise there is excessive wear on the rope, which causes high costs for the operator," explains Steffen Fuchsa. "Bauer has developed and in some cases even patented several smart solutions for this problem which are unique features of the MC series. The active rope tightening system and the winding assistant should be mentioned here, they make the difference in daily operation compared to competing products."

From practice, for practice

The division head emphasizes: "All the optimizations we have made on our duty-cycle cranes in recent years specifically for the BDC method are the result of numerous practical applications in which our equipment has demonstrated its performance capacity."

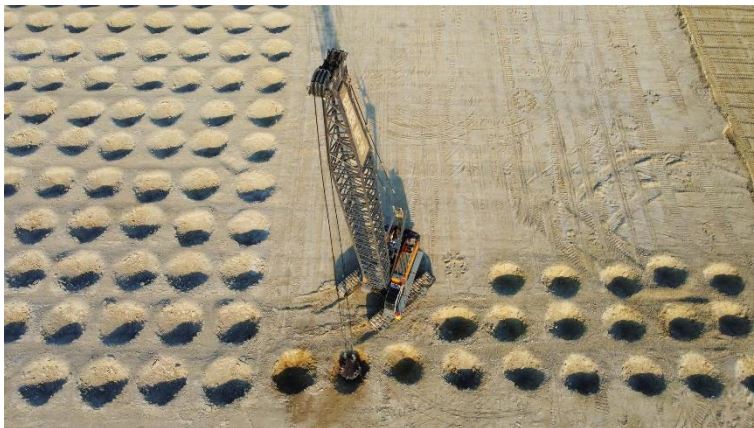
Dynamic soil compaction with Bauer duty-cycle cranes – Go to video:

<https://youtu.be/KHI-2aPbc0c?feature=shared>

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(1) Soil compaction for the Sabah Al Ahmad Sea City construction project – a total of six BAUER MC duty-cycle cranes are being used in Kuwait under extreme conditions.



(2) After the initial phase, to ensure compaction over the entire area, the points between the individual craters are worked on with the pounders during the second phase.

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About BAUER Maschinen Group

For almost 60 years, equipment from Bauer has represented the highest performance and quality and constant innovation. The BAUER Maschinen Group is the world market leader in the development and manufacture of specialist foundation engineering equipment. BAUER Maschinen GmbH, which is also the holding company for a number of subsidiaries, designs and builds large-diameter drilling rigs, duty-cycle cranes, trench cutters, grabs and vibrators as well as the related tooling at its plants in Schrobenhausen, Aresing and Edelshausen. The subsidiaries manufacture state-of-the-art mixing and separation equipment as well as rotary drive systems and equipment for drilling small-diameter boreholes and wells. The BAUER Maschinen Group also operates manufacturing facilities in the USA, China, Malaysia, Italy, Singapore and Turkey. A component supplier within the Group is Schachtbau Nordhausen. The company operates a global sales and service network. More at <https://equipment.bauer.de/en>.

About Bauer



The BAUER Group is a leading provider of services, equipment and products dealing with ground and groundwater. The Group can rely on a worldwide network on all continents. The Group's operations are divided into three forward-looking segments with high synergy potential: Geotechnical Solutions, Equipment and Resources. Bauer profits enormously from the collaboration of its three business segments, enabling the Group to position itself as an innovative, highly specialized provider of products and services for demanding projects in specialist foundation engineering and related markets. Bauer therefore offers suitable solutions to the world's greatest challenges, such as urbanization, the growing infrastructure needs, the environment, as well as water. The BAUER Group was founded in 1790 and is based in Schrobenhausen, Bavaria. In 2023, it employed about 12,000 people and achieved total Group revenues of EUR 1.8 billion worldwide. More information can be found at <https://www.bauer.de/en>. Follow us on [Facebook](#), [LinkedIn](#), [Instagram](#) and [YouTube](#)!