

STANDING STRONG, EVEN WHEN THE EARTH IS SHAKING

CASE STUDY: JAMAA AL- JASAIR-MOWQUE, ALGIERS

The third-largest mosque in the world, featuring the highest tower built in Africa, and all that in area with earthquake risks: In order to make this structure as safe as possible, the company Maurer Söhne GmbH & Co. KG has assembled earthquake bearings with the electric torque multiplier alkitronic EFCip and delivered these to Algeria.

COMPANY PROFILE

Munich, Germany based Maurer Söhne GmbH & Co. KG has its origin in steel construction, and is today a specialist in the field of “forces in motion”. The core competences of the company include building protection systems, amusement rides, research and development and the construction of steel structures. Spread around the world, Maurer Söhne GmbH is active internationally, employing approx. 1,000 staff on production sites in Munich, China, India and Turkey.

INITIAL SITUATION

Currently, the third-largest mosque worldwide is being built in Algiers. In this huge complex, planned by a German team of architects, there will be enough space for 30,000 worshippers in the main prayer hall, but there will be also residential units, parks, a cultural center, and much more – in short, a completely new suburb for the city of Algiers will be constructed by the year 2016. With 256 meters in height, the minaret will be one of the tallest buildings in Africa. However, this construction is carried out in an area where earthquakes are frequent.



Figure 1: The planned Jamaa al-Jasair mosque in Algiers. Photo courtesy: KSP Jürgen Engel Architekten

SOLUTION

In order to keep the mosque damage-free in possible earthquakes and so as not to endanger human lives, the engineers of the company Maurer Söhne GmbH & Co. KG have found a solution: The steel builders from Munich delivered 250 earthquake bearings, which were installed in August 2012 underneath the mosque and the minaret. “These earthquake bearings consisting of several parts provide for a destruction-free motion of the structure,” says Manfred Krämer, Head of Bearing Construction at Maurer Söhne GmbH & Co. KG.

The individual components of the bearings must be bolted together, in order to ensure this earthquake protection level. “Especially suitable is our electric torque multiplier alkitronic EFCip”, says one of the alkitronic area sales managers.

The advantages of this tool lie in the torque of 2800 Nm on M36 HV bolts, in the high repeatability, which exceeds the precision of a manual torque multiplier and saves the workers a great of time and effort, all through the ergonomic operation of the electric torque multiplier.



Figure 2: The mosque under construction. Photo courtesy: KSP Jürgen Engel Architekten



Figure 3: Der alkitronic EFCip 70 in use for the mosque in Algiers. Photo courtesy: Maurer Söhne GmbH

“With the use of the EFCip, the strain reduction and the increase of quality were significant.”

This assessment is shared by Manfred Krämer of Maurer Söhne GmbH & Co. KG: “Considering the quantity of 1,000 bolts that had to be tightened in the series of 250 bearings, the strain reduction and the

increase of quality were significant.” Also his evaluation of the alkitronic service is positive, with “all issues in bolting directly addressed and resolved; and the bolts tight enough to withstand bombings.”

TECHNICAL DATA OF THE EFCip

- ✓ Automatic shut-off system guarantees reaching high repeat accuracy of $\pm 3\%$ for the same bolting application
- ✓ Electrical data:
Universal AC Input 100 V - 253 V, frequency 45 Hz - 66 Hz Power max. 2000 W, protection category I.
Protection class IP 54 (standard)
- ✓ Low running costs due to maintenance-free, low-wear, brushless synchronous motor with excellent efficiency
- ✓ Permanently higher joint quality compared to ratchet torque tools by continuous rotation of the square drive
- ✓ Ergonomic and comfortable operation: The 360 degree rotating handle prevents reaction forces from being transferred to the operator