FUGRO Mohammed VI Tower, Morocco

Fugro LOADTEST have performed Osterberg-cell® Static Load Testing of barrettes in Morocco.

Client: SOLSIF MAROC
Period: November 2017
Location: Rabat, Morocco

PROJECT SUMMARY

Fugro has successfully completed a comprehensive full-scale load-testing programme on Morocco's longest barrettes as part of the foundation design verification for the planned Mohammed VI Tower construction in Rabat, Morocco. The 250 metre high Mohammed VI Tower is designed to be visible from a distance of 50 kilometres and is scheduled to be the tallest tower in Africa. With a total area of 102,800 m^2, the building consists of a tower set on a podium, to resemble a rocket on its launch pad.

Full scale bi-directional static load testing using Osterberg-cells was utilised as the method which is specifically appropriate for the high test loads required on barrettes of this size and bearing capacity. The results obtained allowed confirmation, and potential optimisation, of the foundation design without the need for costly and time-consuming installation of reaction shafts used in traditional top down load testing.

Several instrumentation systems were fitted on the barrettes at more than 60 m in depth and concreted lengths of over 59 m. The instrumentation included O-cell® loading assemblies capable of in excess of 40 MN and vibrating wire strain gauges placed along the length of the barrettes which allowed assessment of the mobilised load distribution with depth.

Located on relatively soft ground near the western coast, the tower will rest on long barrettes to transfer the foundation load to deeper more competent load-bearing soil. Deep foundation contractor SOLSIF MAROC constructed the two 2700 mm x 1200 mm test barrettes and Fugro Loadtest provided the unique load-testing O-cell® technology and measurement instrumentation for the testing programme.

TEST RESULTS

The tests revealed both the upwards and downwards geotechnical behaviour of the barrettes under loading allowing Cemsolve® to model the movements above and below the O-cell® to determine the ultimate skin friction, ultimate end bearing load and barrette base stiffness. Combining these upwards and downward models using Cemset®, the barrette load vs. settlement at design level was be assessed.

CONCLUSIONS

The O-cell® tests were able to safely mobilise both the end bearing and the skin friction, revealing the full geotechnical behaviour of the barrettes. These results were critical for the tower foundation designers who relied upon these results to design a safe and cost-effective foundation solution for the impressive and prestigious Mohammed VI project with confidence.

Using the O-cell bidirectional testing methodology provides a safer solution to traditional top down techniques and negates the requirement for test anchors or kentledge systems, resulting also in a more cost effective a full-scale static load test.

O-cells positioned within their bearing plate assembly.
Transportation and lifting supports are cut during installation

Fugro Loadtest: Full-scale bi-directional load test in progress

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