LOADTEST
O-Cell® Technology in Kiev, Ukraine

Project:	**Solomenka Project**
Location:	Kiev, Ukraine
Foundation Contractor:	Bauer-Altis Ltd
Foundation Engineers:	Katzenbach Engieneure
Project Description:	Our project took us to the capitol city of Ukraine, Kiev (Kyiv). This beautiful historic city is now a thriving modern metropolis. This was the location of an interesting project undertaken in the heart of the Solomenka District opposite the Voksal Central Train Station.

This prestigious project required detailed geotechnical information from the pile testing. Little was previously know about the soil properties in this area, making preliminary pile testing essential before main piling works could commence.

The testing requirements were that the test pile should be founded in the underlying clay and marl formations and the sandy soil deposits above the marl should be isolated from the loading. Conventional top-down techniques would not be possible unless measures were taken to provide a friction free length of 26 metres through the sandy overburden. The mechanism of the bi-directional test does not require concreting to ground level nor is any form of shaft friction isolation required, making the method ideal for this project.

Lifting of multi-level cage at Solomenka, Kiev

Bi-directional load test arrangement:

To ascertain the properties and loading characteristics of the soil strata, consisting of Clays and Marl, it was considered that a multi-level bi-directional test would be most appropriate. The upper O-cell level would provide reaction to test the upper section of the pile within the clay, leaving a 5 metre socket section into the Marl deposits to be tested by the lower O-cell assembly. The test pile consisted of an 880 mm auger bored pile with multilevel O-cell® assemblies located at depths of 0.5 m and 5.5 m above the pile toe. Each assembly was made up of two 330 mm diameter O-cells. The pile was bored to a depth of 37.80 m with the final concrete level stopped approximately 26 m below ground level.

Piling opposite Voksal Central Train Station, Kiev

Pile Test:

The test procedure required the top section to be loaded first using the lower shaft friction and end resistance as reaction. After expansion of almost 100mm the cells were unloaded and left to drain creating a gap between the upper and middle pile sections approximately 5.5 metres from the pile toe. The lower O-cells were then pressurized to evaluate the skin friction of the mid-section using the base as reaction. Once the mid-section had moved upwards by approximately 100 mm, the top section re-engaged to provide additional reaction to determine the end bearing capacity. The test was completed once the O-cells in the bottom assembly had opened to their full 150mm expansion.

O-cell Test in progress

Conclusions:
Isolation of pile sections on the test pile was only possible by using to advantage the multilevel bi-directional technique. The inclusion of strain gauges within the pile section gave mobilised unit friction values previously unmeasured in these materials.