

Topics Covered in this Issue:

- Instrumentation & Monitoring
- Vibration monitoring
- Wind farm Surveys
- Foundation Testing
- Transmission Tower Testing
- Materials testing in Ireland

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Remote Reservoir Monitoring - North England

Testconsult rose to the challenge when approached with the task of designing, installing and monitoring an instrumentation system to monitor movement of surrounding open and closed reservoirs during construction works on a United Utilities site in North East Manchester.

The work was commissioned by a major joint venture consisting of GallifordTry, Costain and W S Atkins, who are undertaking construction of a new filter system in a reservoir embankment at a busy Waste Water Treatment works.

The system consists of several 15 meter deep boreholes containing inclinometer tubing and extensometers. Inclinometers are being used to measure any horizontal displacement, whilst vertical movement is detected by the extensometers.

In addition some 30 optical prisms are strategically located around the site on open reservoir embankments, existing buildings and on the concrete panels of the closed reservoir tanks. The prisms are continuously monitored by a fully automatic Total Station which alerts of any 3 dimensional movements above a safety threshold. All data is collected via blue-tooth technology to a central server, where results are analysed daily.

Testconsult is currently employed as the independent Test house, forming part of a 10 year



Total station monitoring prism—on the watch for movement

framework agreement with United Utilities, refurbishing some 192 sites across the UK.

Testconsult can design and install custom built systems to monitor almost any conceivable parameter on civil engineering projects. In remote locations the data acquisition systems can be programmed to alert the client of any alarm situations by SMS message or audible siren.

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New AXILOG Vibration Monitor

Testconsult now supplies and supports a sophisticated but easy to use range of vibration monitors.

The AXILOG system is designed for monitoring vibration levels on constructions sites, buildings and other structures, to identify the risk of damage. Signal processing complies with the Dutch

SER standard, DIN 4150 and BS5228.

The AXILOG can display real time PPV, dominant frequencies in the X, Y, & Z planes, with selectable time intervals.

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New AXILOG vibration monitor, the perfect companion for piling sites

Wind Farm Modeling Consultancy

Pre-planning survey

Prior to planning applications, it is possible to assess the potential noise footprint of a site using sophisticated software. Testconsult engineers use SoundPLAN software, which is a complete environmental noise planning and mapping software package, which includes modules for all types of wind generator.

We are able to produce quick and accurate calculations of noise levels and produce 2D & 3D colour graphical representations of data.

Over the last 30 years numerous countries have developed regulations concerning noise limits and determined how noise levels for existing and planned environments should be established. For existing infrastructure the noise levels can be measured, but if the noise levels exceed the criteria the damage is already done. It is much more economical to cope with noise problems before they arise.

In order to unify noise modelling, many countries issue standards stating how noise simulations are to be made. SoundPLAN conforms to these standards by using the formulas set in the standard's text, making SoundPLAN calculations a standards based approach.

Comprehensive studies involving

any size areas and multiple noise sources can be calculated using this modelling software.

Noise from wind turbines

Noise generated by wind turbines only occurs above the 'cut-in' wind speed and below the 'cut-out' wind speed. Below the cut-in wind speed there is insufficient strength in the wind to generate efficiently and above the cut-out wind speed the turbine is automatically shut down to prevent any malfunctions from occurring.

The principal sources of noise are from the blades rotating in the air and from internal machinery. The blades are carefully designed to minimise noise whilst optimising power transfer from the wind.

Although the source noise levels are fairly low and of a benign nature, wind farms are generally situated in rural environments where there are few other sources of noise. When wind speeds are high this is not a problem since any noise is masked by wind induced noise effects, particularly that of the trees being blown. At lower wind speeds, however, or in particularly sheltered locations, the wind induced background noise may not be sufficient to mask any noise from the turbines. However, under these conditions, the generated noise levels may be so low as to generate very little impact.



Criteria for noise assessment

The Wind Turbine Noise is assessed using the ETSU-R-97 document "The Assessment and Rating of Noise from Wind Farms".

This document describes a framework for the measurement of wind farm noise and contains suggested noise limits, which were derived with reference to existing standards and guidance relating to noise emission from various sources.

The full package

Testconsult have recently been commissioned by a major renewable energy constructor to undertake the testing of materials from a local quarry for classification and compliance. The materials will form the foundations for a new wind farm at a site in Rochdale. Testconsult will also undertake the quality assurance of the concrete and other construction techniques during the erection of approx 15 turbines over the coming year.

From initial desk studies to assess environment impact and site feasibility, through on site monitoring and into final construction, Testconsult can offer the complete service.

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TDR2 on Autostrada Transilvania in Romania

Following successful audits, the TDR2 system has been approved by State Inspectors for use on the Autostrada Transilvania in Romania, currently the largest highway project in Europe, by Bechtel International s.r.l.

Bechtel are currently working on several sections of the new autostrada and testing is being used to assess cast in place foundations, constructed by Bechtel for

new structures.

Bechtel staff have been rigorously trained in Romania by Testconsult engineers, who are also providing technical support.

The TDR2 system is able to provide information on pile length, section and concrete quality.

Used in conjunction with good site records the method is a valuable tool for ensuring checking

the quality of cast in place concrete foundations.

Testing is rapid and is generally carried out whilst piles are at cut-off level, before reinforcement for pile caps are laid. Site disruption is minimal and an instant assessment can be made of the integrity of the foundation.

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Testconsult Ireland Win 3 Major Contracts



Hot on the heels of providing materials testing services for the newly opened Dublin Port Tunnels, the N7 Monasterevan By-Pass and the Kinnegad to Kilcock section of the N4, Testconsult Ireland has picked up 3 major materials testing contracts;

Carlow Bypass : Testconsult Ireland has been awarded a 24 month contract to provide materials testing on the new Carlow bypass project (picture above). The dual carriageway will bypass the town of Carlow and includes three grade separated junctions, 13 road bridges, one river crossing, one rail crossing, two farm accommodation access structures. The main contract was awarded to Ascon Limited.

Castleblayney Bypass : Testconsult Ireland is starting work on the 16km Castleblayney Bypass, which is on the key N2 arterial route

from Dublin to Derry and forms part of the Trans-European Road Network. This is the first greenfield 2+1 road to go into construction in Ireland and Testconsult Ireland is providing materials testing services for the contract. This project together with the Ashbourne Bypass which is nearing completion, the Carrickmacross Bypass - opened to traffic in January of this year - and the Monaghan Bypass project which is schedule to open soon will ensure that the N2 is a high quality route to and from the Border and North West region. The main contractor on the project is Gama.

M50 Upgrade: Phase 1 of upgrade includes upgrading the 5km stretch of the M50 between the N4 (Galway Rd) and the Ballymount interchange from existing dual carriageway to 3 lanes. Free-flowing interchanges will be created at the Red Cow, Liffey Valley and Ballymount

roundabouts. Testconsult Ireland is providing materials testing services for the contract, which was awarded to SIAC-Ferrovial M50 Joint Venture, (partnership between SIAC Construction Ltd and the major Spanish Construction Company Ferrovial Agroman S.A.) . Works are expected to be completed by mid 2008.

Testconsult Ireland materials testing laboratories are located in Portlaoise in the Irish Midlands. From this location they are well placed for serving the capital Dublin as well as Limerick to the West and Cork to the South. The laboratory is UKAS accredited for all major soils, aggregate, concrete and bituminous materials tests and can also provides on-site laboratories where required.

Structural Testing

Testconsult Ireland also has a structural testing and investigation department which carries out condition surveys of structures, load testing, pile testing, bridge investigations, pull out testing, lift beam testing, noise and vibration monitoring and instrumentation services.

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Transmission Tower Testing

Following trials in the UK, the TDR2 and BGCMAP systems, both designed and manufactured by Testconsult Equipment, are being used by several utility asset management companies in the UK, USA and Australasia.

The equipment is lightweight, rugged and easy to use in the field by assessment teams, alongside other survey work.

The BGCMAP system can measure the Polarisation Resistance, corrosion current I_{Corr} and E_{corr} of buried metal which can indicate the rate of corrosion below ground. GPS is also incorporated to check on location.

The TDR2 system is used to check the continuity and depth of the foundation, and the powerful

interpretation software used with the TDR can be used to simulate the shape and measure any changes in pile properties, such as cracks, poor concrete or shaft enlargements or bells.

Even in remote access a number of towers can be checked in a day, providing a rapid means of assessing the condition and dimensions of existing tower foundations, either as a maintenance tool or for obtaining information prior to increasing the capacity of a line.

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Voiding in tower foundation detected by NDT methods

Choosing the Right Pile Test for the Job

Earlier this year, Testconsult published a paper titled ‘*The re-use of foundations and the role of NDE techniques*’. The paper includes a table which has since often been referred to and provides a quick reference guide on the application and limitations of various test methods. This has been reproduced below. The full version of this informative paper can be downloaded from our website.

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Table 2: Guidance on NDE Test Methods

Test Method	Measurements	Access	Limitations
Low Strain Seismic	Pile length and depth to major anomalies.	Direct access to pile head required – preferably not in contact with structure	Max depth 30 diameters in cohesive soils. Suitable for pre-cast piles.
Low Strain TDR	Pile length, depth to major anomalies, dynamic stiffness and mobility. Indication of concrete quality and section.	Direct access to pile head required – preferably not in contact with structure	Max depth 30 diameters in cohesive soils. Suitable for pre-cast and cast-in-place piles.
Impedance Profile	Impedance versus depth gives discrete assessment of concrete quality/section	As TDR	As TDR
Parallel Seismic	Pile Continuity only	50mm diameter tube needs to be installed within 400mm of pile side and grouted in place with access to pile head or cap	Limited to depth tube can be installed. Can be influenced by rock interfaces.
Electro-magnetic	Depth of sheet piling, permanent casing and or reinforcement	90mm diameter tube needs to be installed within 200mm of pile. Access to pile head.	Limited to depth tube can be installed. Can be influenced by other ferrous materials in soil.
High Strain Simbat	Load capacity, pile continuity, distribution of forces on pile shaft and at toe.	Pile cap needs to be constructed on pile head and separated from pile cap/structure.	Unable to predict effect of creep. Need to mobilize base of pile to predict ultimate capacity.



Pile Testing in Rhodes

Late last year, Testconsult supplied its most sophisticated integrity testing system—the TDR2 to Harris Associates of Athens. To ensure that the equipment is used to its full advantage, training was recently arranged on a live contract on the island of Rhodes.

Whilst the equipment is very easy to operate in the field, it is essential that users have a grasp of the basic theory of operation and know how to interpret results correctly.

Testconsult provide a comprehensive training and support program with all equipment we sell.

We also provide technical presentations on foundation testing to consulting engineers and government departments, to enable the theory, advantages and limitations of test methods to be understood. If you are interested in this service, please contact us.

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Foundation assessment in the Med

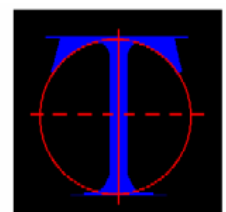
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