



**9th International Workshop on Micropiles
London 10th – 13th May 2009**

Static Load Testing of Piles in Restricted Access - An Opportunity for Change

PART 1- Urban works

Speaker: Stuart Bradshaw – Managing Director

Static Load Testing of Piles in Restricted Access Catalysts for Change

Current situation implies only dynamic testing is possible due to access constraints.

Dynamic testing for micropiles not universally accepted without cross reference to static load results (refer EN 14199:2005, cl.9.3.3 and EN1997-1:2004, cl. 7.5.3).

Design optimisation by reduction of factor of safety not acceptable with dynamic testing alone (refer EN1997-1:2004, cl. 7.4.1).

Restricted access piling has typically lower production rates than conventional large rig piling = comparatively high **COST**(£, \$, €) per Kilonewton.

Economics, sustainability and technology advances calls for greater micropile capacities year on year = **RISK**.

Static Load Testing of Piles in Restricted Access Prerequisites for Change

- Lightweight
- Modular
- Mobile
- Erectable by hand by two people
- High capacity - Strength
- High capacity - Stiffness
- Certifiable to local standards
- Scalable?



Static Load Testing of Piles in Restricted Access

Test Beam Design Constraints

Conventional beam splice using web and flange plates ideally suited to deep heavy beams

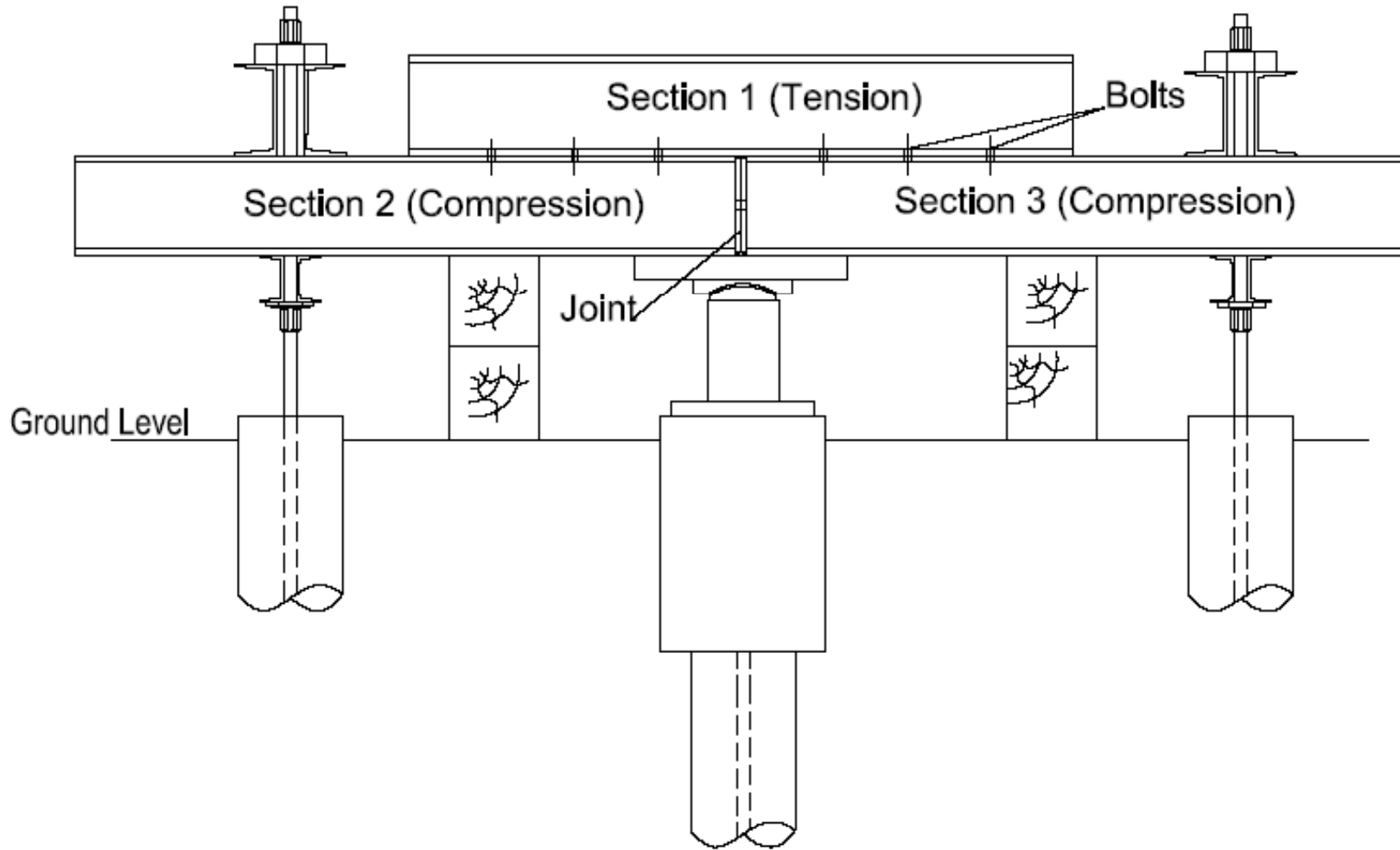
Small section beams = high flange loadings

Small section conventional beam splice requires a large number of large diameter bolts

Large bolt holes results in overstressed flanges

Large numbers of bolts produces “long joints”(ref. Steel Designers Manual, 5th Ed. p674)

Static Load Testing of Piles in Restricted Access Design Breakthrough



Static Load Testing of Piles in Restricted Access Lightweight Modular Test Beam Arrangement



Static Load Testing of Piles in Restricted Access Developments to Date

Current (UK) capacity of 1200 kN using parallel main beam sections, 2, 3 or 4 anchor piles

Development for Canada, capacity increased to 2500 kN with a weight saving as seen at ISM Toronto 2007

Lightweight, each complete beam section splits into 3 further sections each weighing 70 to 80 kg

Potential higher capacity using further parallel beams - SCALEABILITY

Erectable in very tight spaces using manpower only

Preliminary, (trial) or “model pile tests” can and have been used to shorten pile lengths on lower productivity mini/micro piling contracts in the UK

Protected by UK Patent No. GB2433125B, with other worldwide patents pending.

Static Load Testing of Piles in Restricted Access Tension Testing



Tension testing can be carried out by inverting the beams and using adjacent reaction piles/direct bearing onto suitable reaction surface

Static Load Testing of Piles in Restricted Access

Everyone's a Winner

Contractor – provides a competitive edge, shorter piles equals lower tender price

Consulting Engineer – reduces design risk by providing a way to validate designs using static techniques rather than relying on dynamic test results

Client – more efficient pile design equals lower overall cost

Financial Institutions – reduces overall project risk

Static Load Testing of Piles in Restricted Access

Case Study 1- Harrow on the Hill, London

- Restricted vehicular access – narrow lane
- High value contract
- Untried piling method in London Borough



- Two trial piles tested, to max. test load 1150 kN
- Approving authority satisfied with FoS =2.0
- Outcome overall client saving & happy engineer

Static Load Testing of Piles in Restricted Access

Case Study 2- Lifeboat Bar, Belfast

- Compression test to 720kN in very restricted access beneath 12 stories of scaffolding
- Testing required to validate engineers design.





The End

Thanks for Listening

Any Questions???



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PART 2- Load Testing and Eurocode 7