

Specialist to Detail – The Industry Gap In Substructures

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Abstract: "Specialist to detail" is the notation encountered on many Structural Engineering plans for some of the most critical and risk prone elements of basements and foundations. These critical elements include pile design, joints, waterproofing, consideration of surrounding structures and environmental sensitivities, and post-tensioned concrete design elements. In the absence of comprehensive Engineering, this detail gap is filled by individual contractors independent of each other and of a holistic Engineering viewpoint. This lack of coordination and resulting interface gaps are some of the primary causes of basement and foundation problems in the construction industry. These gaps result in significant project delays and damages to both the project and surrounding properties, with resultant litigation impacts. This vulnerability is rarely known to clients, who believe they have commissioned sufficient Engineering and due diligence to guarantee overall project success. This paper briefly examines several case studies for consequences of these detail gaps and the advantages of nominating Substructure Engineering as a distinct entity to Structural Engineering to ensure compliance.

Keywords: Substructure, structural, engineering, basement, foundation, detail, gap, piling, pile, waterproofing, concrete, industry, design

1. Defining the gap

Substructure failures are some of the biggest impacts on cost and time that can face construction projects; both in terms of the project itself and on surrounding areas. Resolution of these failures can be extremely difficult and have an enormously damaging impact on the fortunes of developers and clients.

Clients have the reasonable expectation when contracting a Structural Engineer to design a project that all high-risk substructure elements have been detailed by that Structural Engineer to a standard that can then be reasonably expected to be built with low risk. This is sadly not the case when it comes to industry practice with substructure design.

It is common industry practice of appointed Structural Engineers to leave critical elements of substructures - the piling and diaphragm wall design, waterproofing, critical joints and post-tensioning or detailing - with a tag "Specialist to Detail" (or similar) and simply leave the missing element to the Builder and their sub-contractors to resolve.

Examples extracted from recent (real life) project documentation are presented below².

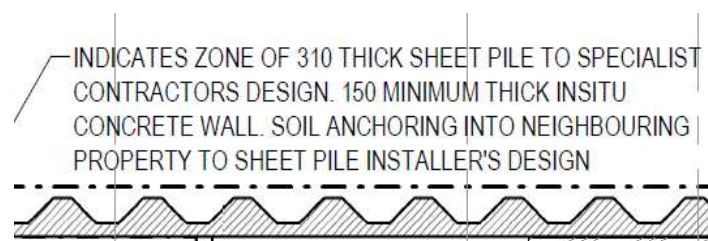


Figure 1 – (above) Sheet piling on boundary, with anchoring into adjoining property via "Sheet Pile Installer's Design" despite the presence of major services immediately adjacent to this wall

² For obvious reasons, any documentation or case examples for these projects have been "debadged" – the knowledge of these projects to the authors is the result of forensic or insurance investigations or the result of their own design solutions.