STEEL SHEET PILING

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The steel sheet piling industry is buoyant at the moment, with demand increasing within both the UK and world markets. However, after the UK’s only sheet pile manufacturer, Corus, ceased production in 2004, stockists and installation contractors have had to look further afield for a cost-effective and reliable source of materials. The Arcelor Group, based in Luxembourg, is the largest European supplier of hot rolled steel sheet pile sections, but the dramatic rise in world demand for sheet piles has inevitably resulted in longer production and delivery periods. It has therefore recently been viable to also import sheet piles from Japan. Nippon Steel Corporation produce ‘U’ section sheet piles which are rolled to Japanese Standard JIS A 5523, Grades SW 235 and SW 390. These comply with the chemical, compositional and mechanical property requirements of BS EN 10248-1:1996 for both Grades S 276 GP and S 355/390 GP steels respectively.

The rising demand for sheet piles has been partly driven by their rapidly increasing use for permanent structures, in addition to their traditional use for temporary works. In particular, steel-intensive basements (ref. SCI Document P275) are now being specified by clients and consultants in preference to concrete contiguous or secant piled walls, as cost and programme savings are usually available. From a waterproofing viewpoint, sheet pile walls are much more inherently watertight than concrete piles and can achieve 100% watertight basement grades 3 to 4, to BS 8102:1990, after the interlocks have been sealed by welding, without the need for a concrete liner wall or drained cavity. The sheet pile walls can also be designed to resist significant axial loads from the structure above.

Technological advances in piling plant and installation methods also now facilitate sheet piles being installed in an environmentally acceptable way in terms of noise and vibration, which is important for city centre and residential areas. The days of extensive percussive driving have, thankfully, now gone. Silent vibration-free hydraulic pile presses and high-frequency, variable-moment vibrohammers are now the norm, which when used in conjunction with pre-loaded in dense or stiff soils, and even weak rocks, allow sheet pile installation where previously not considered feasible.

Sheet Piling UK Ltd (SPUK) have been at the forefront of the promotion of steel-intensive basement structures for the last ten years and, through design innovation and expertise, have been involved with the design and installation of some of the largest and technically challenging basement structures in the UK and Ireland to date.

In this day and age, the environmental aspects of the manufacture, usage and sustainability of materials are always a consideration, and steel sheet piles should be no exception. Although it is probably not immediately obvious, sheet piles can be considered to be the ‘environmentally friendly’ option! Most steel manufacturers now make new steel from scrap metal rather than the natural raw materials. Thus, recycling is encouraged and waste landfill reduced. Once installed, sheet piles can be extracted and re-used many times which cannot be said for concrete piles. Indeed SPUK recently extracted some sheet piles that had been in the ground for approximately 60 years. Due to their undamaged condition and very little, if any, corrosion loss, the same sheet piles were then re-used on another contract. Now, that is recycling! The installation of sheet piles is also not dependent upon potentially harmful materials to the environment such as bentonite slurry or concrete.

Case Study – LAPPS QUAY, CORK: SPUK designed and installed the first ever two storey sheet piled basement in Cork, Ireland, immediately adjacent to the River Lee. The size of the basement structure was approximately 100m x 60m, and 7.5m deep. An extensive temporary gravity cofferdam structure was also required to enable the removal and replacement of the existing river frontage walls, and the construction of the new basement structure below the river bed level. The prevailing soils were highly permeable gravels, and the 17m long Arcelor PU.25 sheet piles were installed with a Bauer RT16G Telescopic Leader Rig mounted with a high frequency vibrohammer. The sheet piles were temporarily supported by ground anchors, tie rods, or internal steel propping until the permanent reinforced concrete slabs were completed to provide the permanent supports. The sheet pile interlocks were welded up and a steel puddle flange water bar plus hydrophilic strip provided at the sheet pile basement slab joint to provide a Grade 2, 100% watertight basement structure.

Based on the success of this scheme, several other single and two storey sheet piled basements have since been constructed in Cork by SPUK.

For further information visit Sheet Piling UK’s website at: www.sheetpilinguk.com

Aerial view of the site during the basement construction.