New Products & Technologies

Wider Straight Web Type Steel Sheet Piling*

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1 Introduction

For straight web type steel sheet piling which is to be used for constructing quays and embankments in deep water, wider straight web type steel piling 500 mm wide has been developed. This product features excellent workability and is economical.

The new wider type is based on the configuration of the product and of the interlock of the straight 400 mm wide web type steel sheet piling (conventional), which has been used extensively in the past. The wider type satisfies the needs of sheet piling users for a higher slenderness ratio. The development of this new wider type is outlined below.

2 Cross Section of Wider Type

A comparison of cross-section dimensions and properties for the wider type and conventional type is shown in **Table 1**. For the same cell diameter, a steel weight reduction of more than 8.0% is possible when the wider type is used. A comparison of cell weights is shown in **Table 2**.

3 Quality Characteristics

The revolution angle per pile of the wider type is larger than for the conventional type based on a decreased number of component piles, and tension in the circumferential direction is also increased. The interlock form and the dimensions of the wider type are designed to provide better interlock performance than the conventional type, without increasing the cross sectional area over that of the conventional type. Rotary performance and the measured values of interlock strength are shown in **Figs. 1** and **2**. Both characteristics of the wider type indicate better performance than for the conventional type.

4 Construction Test

When marine construction using a steel sheet pile cellular method is executed, the conventional practice is

Table 2 Comparison of cell weight

	Number of sheets used	Weight/pile (t)	Weight/cell (t)	Cell weight ratio (%)
Conventional type KSP-FX	170	1.344	228.501	100
Wider type KSP-FXL	136	1.544	210.003	91.9

Notes 1) Diameter of cell 21.658 m, steel grade SY30, length 20.0 m

Table 1 Dimensions and properties

	Sheet pile	Dimensions: Width W (mm)	Height h (mm)	Thickness t (mm)	Cross Sectional Area/Pile (cm²)	Weight: Per pile (kg/m)	Weight: Per linear meter of wall (kg/m²)	Moment of Inertia: Per pile (cm⁴)	Moment of Inertia: Per linear meter of wall (cm⁴/m)	Section Modulus: Per pile (cm³)	Section Modulus: Per linear meter of wall (cm³/m)
Conventional type	KSP F	400	44.5	9.5	69.07	54.2	136	190	525	47.8	120
	KSP-FX	400	47.0	12.7	85.06	67.2	168	224	666	56.1	142
Wider type	KSP-FL	500	44.5	9.5	78.57	61.7	123	184	396	45.7	89
	KSP-FXL	500	47.0	12.7	98.36	77.2	154	245	570	60.3	121

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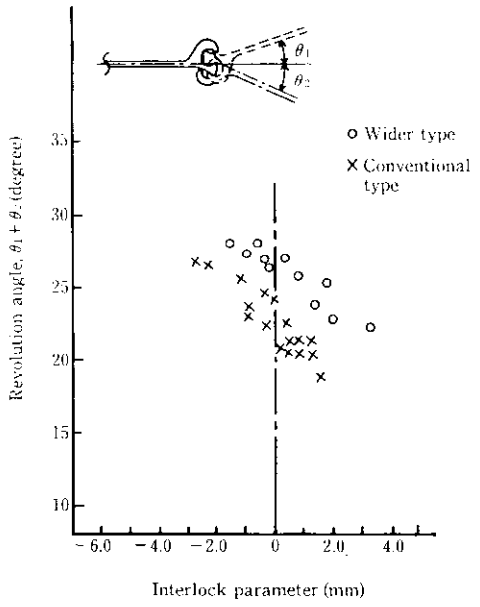

Fig. 1 Comparison of revolution capacity between wider type and conventional type

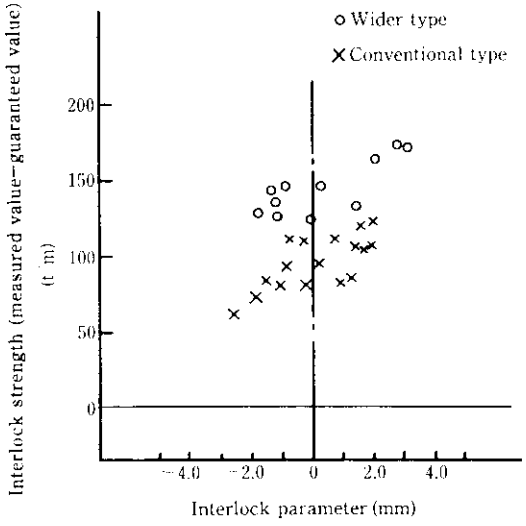

Fig. 2 Comparison of interlock strength between wider type and conventional type

to assemble sheet piles in a cylindrical configuration in the work area (including offshore) near the predetermined construction site, hoist the assembly with a high capacity floating crane and transport it to the site, where the sheet pile cylinders are driven consecutively to the prescribed depth using vibro-hammers. A construction test using a guide frame of the type used in actual construction is shown in **Photo 1**. The hoisting down time for each samples as shown in **Fig. 3** is almost the same as that for non-loading condition (during hoist-down of a single pile). Resistance at the time of interlocking is small, indicating excellent workability.

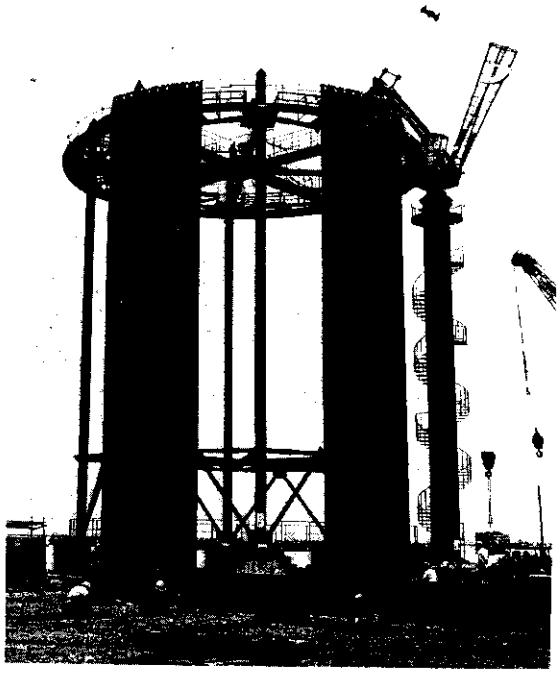

Photo 1 Construction test for cell

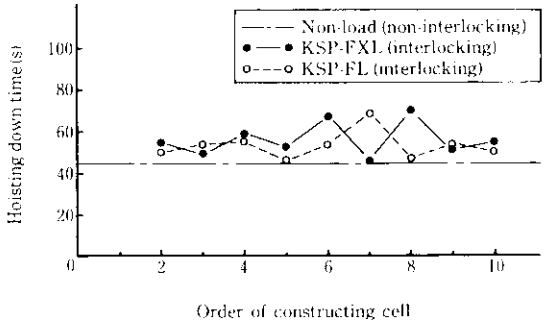

Fig. 3 Comparison of cell hoisting down time in construction between KSP-FXL and KSP-FL

5 Concluding Remarks

The wider straight web type steel sheet piling (500 mm wide) is more workable and economical than conventional straight web type steel sheet piling and is expected to provide full satisfaction to users.

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