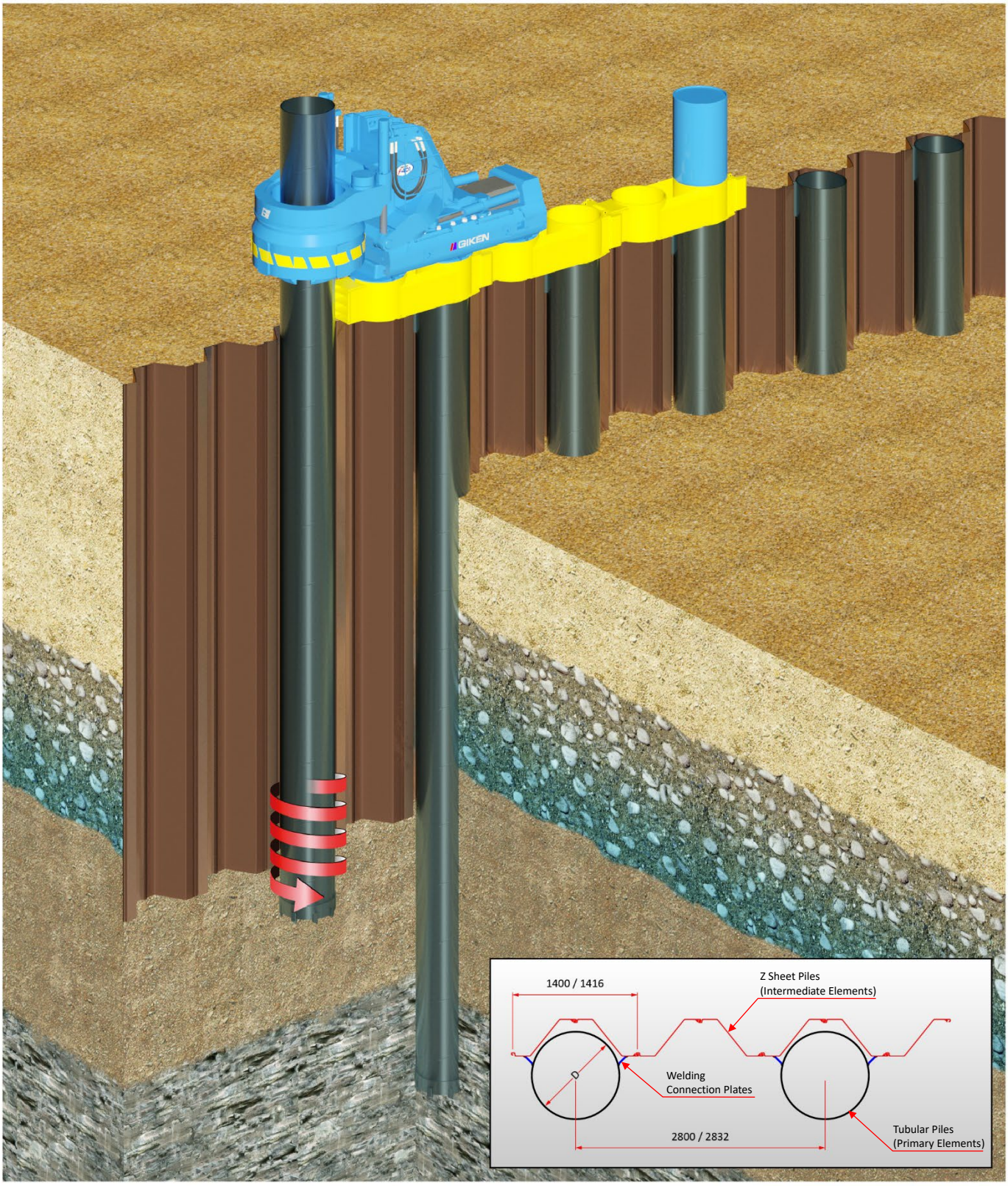
COMBI-GYRO WALL SYSTEM

- High Modulus Steel Combined Wall -

Ver. Tube / Z Wall Vol.2 Construction



GIKEN

Table of Contents

Chapter 1 Introduction

The purpose of this document is to provide practical guidelines for the construction of the Combi-Gyro Wall.

The intended audience for this document is engineers and construction specialists involved in the design, construction, and contracting of foundation elements for infrastructures.

The press-in piling method is commonly used worldwide because of its very quiet operation, ultra low vibration, and flexibility of sizes to suit different wall properties and subsoil conditions.

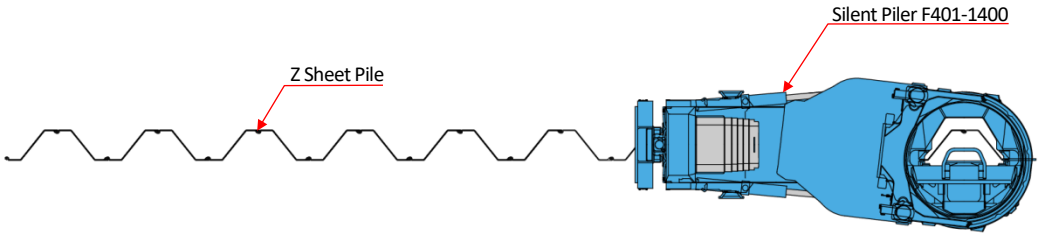
The main attributes of the Combi-Gyro Wall are efficiency of physical wall properties and reusability. The Combi-Gyro Wall comprises steel tubular piles as the primary element and steel sheet piles as the secondary element. The efficiencies of physical wall properties can be optimised in view of the flexibility of pile size and the spacing of tubular piles for the ground conditions and the form of the loading. The Combi-Gyro Wall is installed by the press-in method and pile penetration force is monitored and recorded throughout the piling operation. This thorough monitoring and recording system alleviates concerns of quality control, as well as providing a comprehensive quality control method for a performance-based contracting process.

This document provides a description of construction equipment and procedures of the Combi-Gyro Wall.

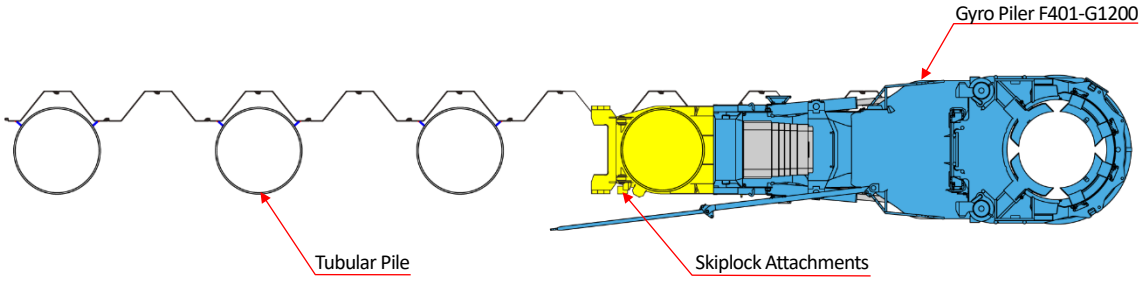
Chapter 2 Standard Procedure

2-1 Overall Procedure

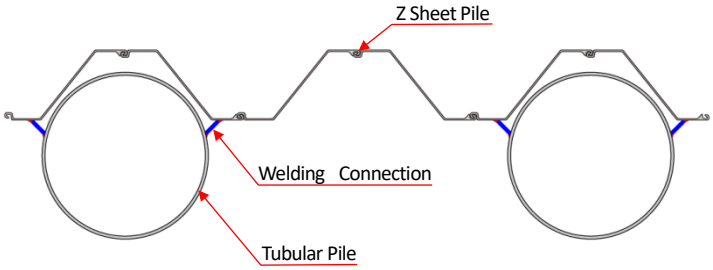
2-1-1 Installation of Sheet Piles



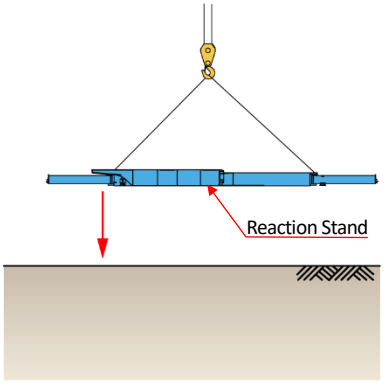
2-1-2 Installation of Tubular Piles



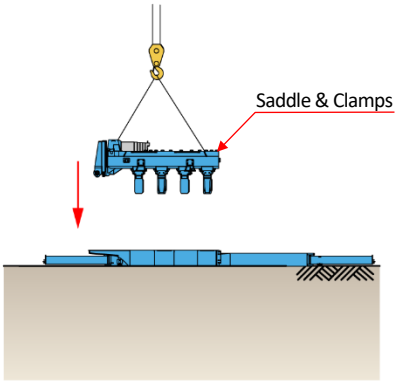
2-1-3 Joining Tubular Piles and Sheet Piles by Welding



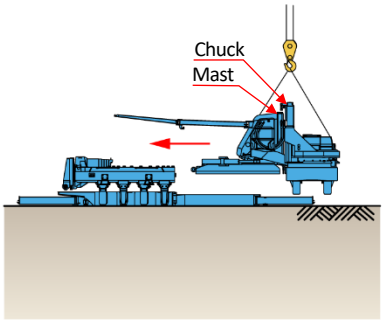
2-2 Initial Piling (Sheet Pile)



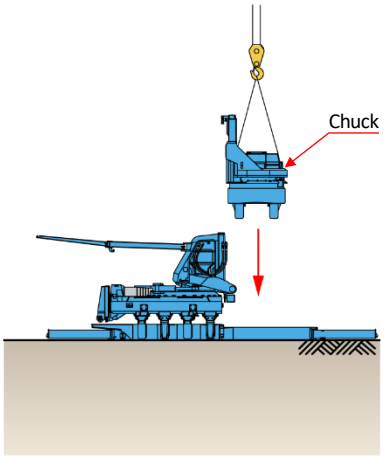
1.Setting of Reaction Stand on level ground



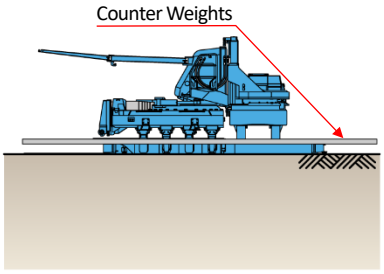
2.Fixing of Saddle & Clamps to Reaction Stand



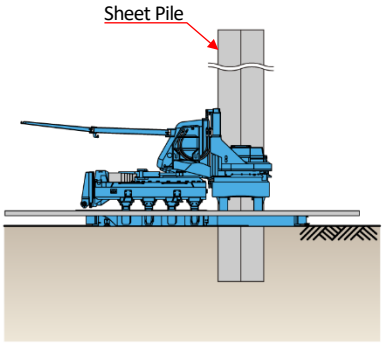
3(a).Fixing of Mast (or Preassembled Mast and Chuck) to Saddle



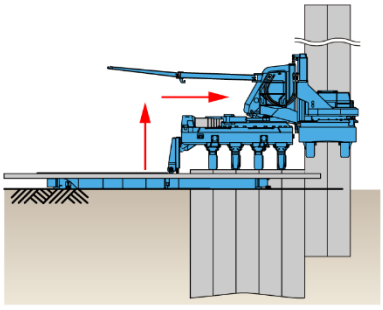
3(b).Fixing of Chuck to Mast (if Chuck is separately assembled)



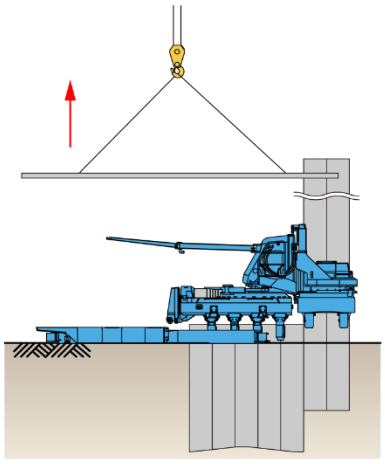
4.Loading of counter weights



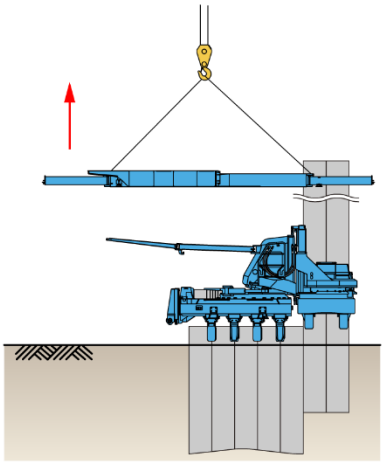
5.Pitching and installation of first pile



6.Installing of piles until Silent Piler can operate solely on reaction piles

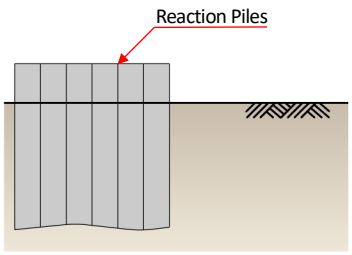


7.Removing of counter weights



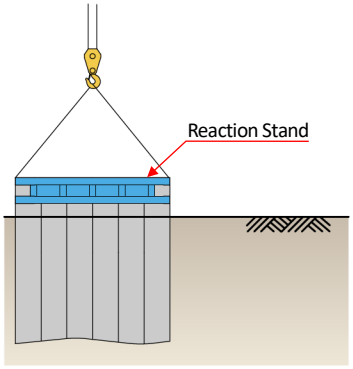
8.Removing of Reaction Stand and initial piling is completed

2-3 Initial Piling (Tubular Pile)

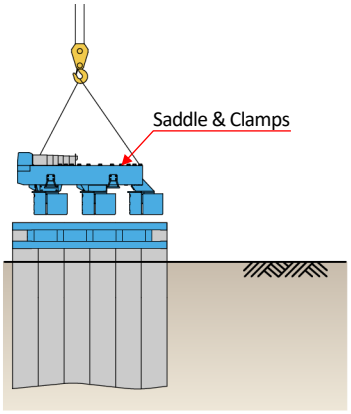


1.Installing of sheet piles as reaction piles

Note: The sheet pile length for initial reaction force is determined by site conditions

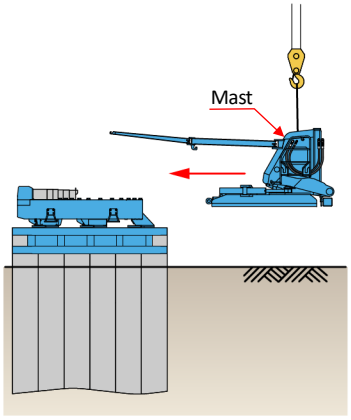


2.Fixing of Reaction Stand to reaction piles by bolts and welds



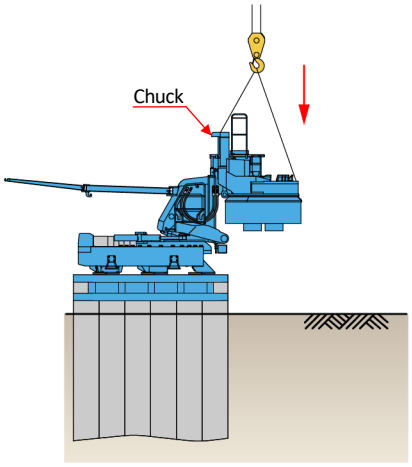
3.Fixing of Saddle & Clamps to Reaction Stand

Saddle & Clamps:
10.25 ton (Ø 800mm)
11.00 ton (Ø 1000mm)
11.00 ton (Ø 1200mm)



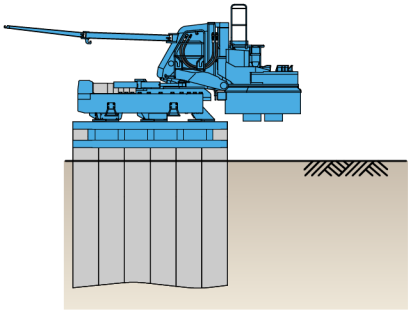
4.Fixing of Mast to Saddle

Mast: 8.80 ton



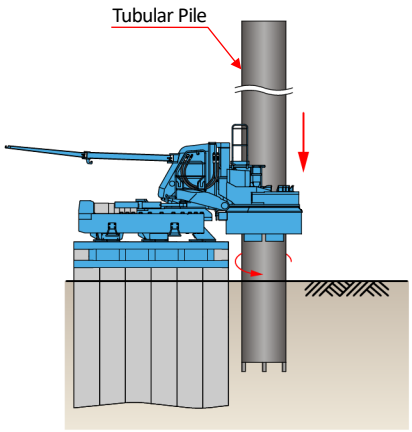
5.Fixing of Chuck to Mast

Chuck:
12.80 ton (Ø 800mm)
12.80 ton (Ø 1000mm)
13.20 ton (Ø 1200mm)

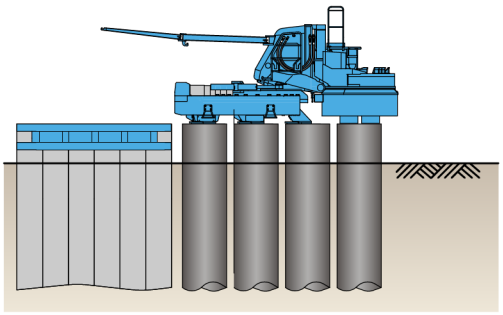


6.Completion of assembly of Gyro Piler F401-G1200

Total mass of Gyro Piler F401-G1200
31.85 ton (Ø 800mm)
32.60 ton (Ø 1000mm)
33.60 ton (Ø 1200mm)

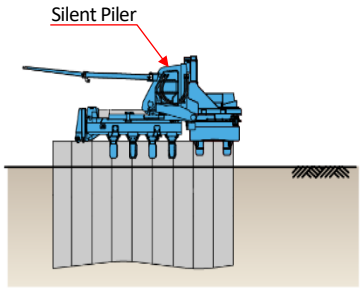


7.Installing of tubular pile

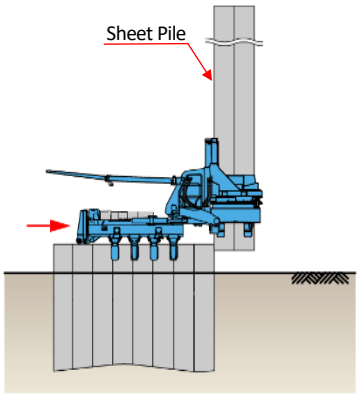


8.Completion of initial piling

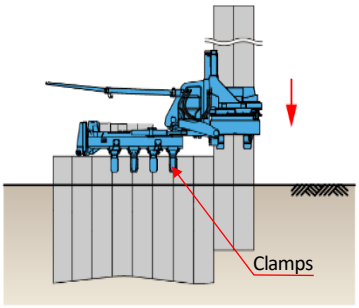
2-4 Installation Working Procedure (Sheet Pile)



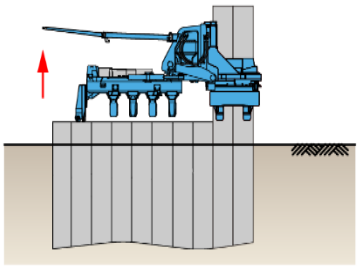
1.Installing of pile to prescribed depth



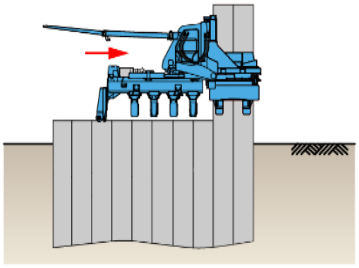
2.Pitching and installation of next pile



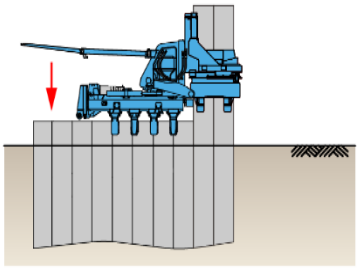
3.Installing of pile until the pile has sufficient bearing capacity



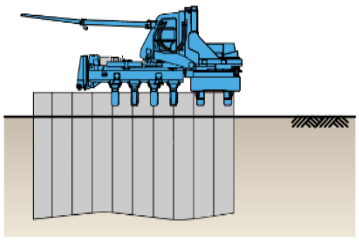
4.Releasing of clamps and raising machine body



5.Moving of machine body forward

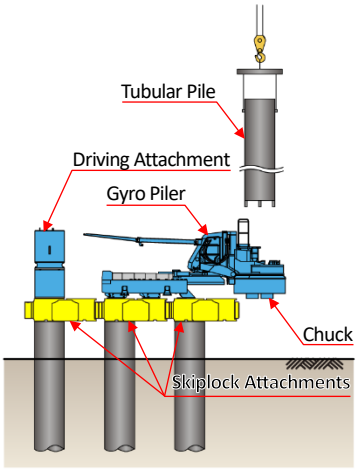


6.Lowering of machine body and gripping reaction piles

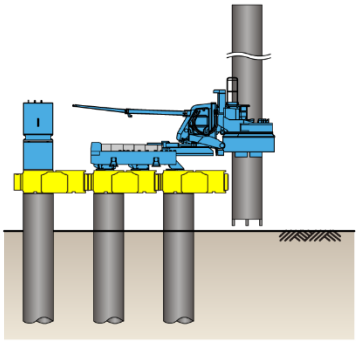


7. Completion of pile installation

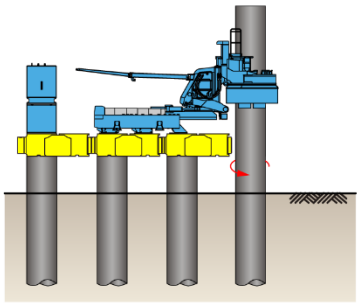
2-5 Installation Working Procedure (Tubular Pile)



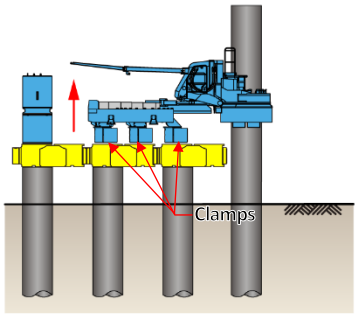
1.Pitching of tubular pile into chuck



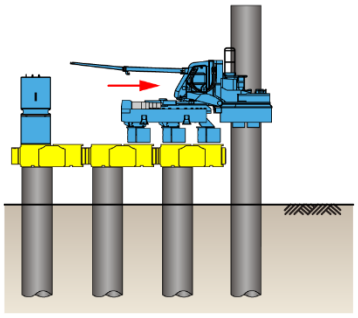
2.Aligning of pile to installation tolerances



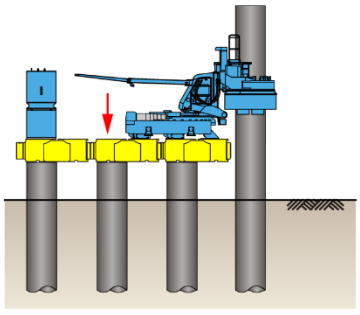
3.Installing of pile until the pile has sufficient bearing capacity



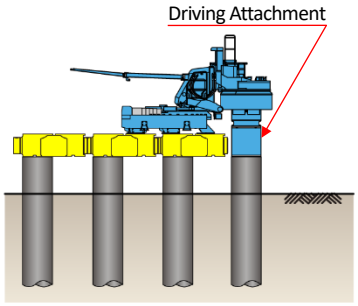
4.Releasing of Clamps and raising machine body



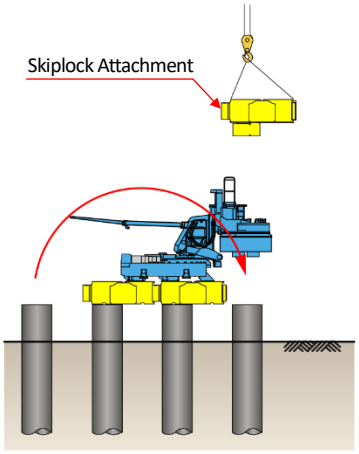
5.Moving of machine body forward



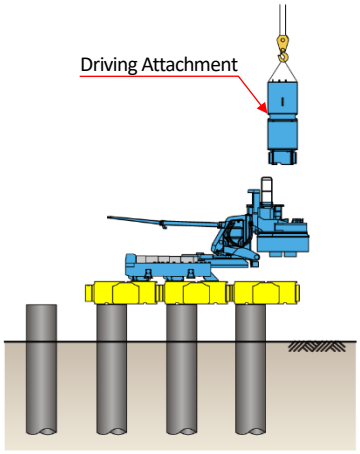
6.Lowering of machine body and gripping Skiplock Attachments



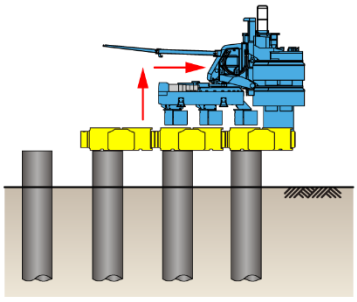
7.Pitching of Driving Attachment onto top of pile and installing pile to prescribed depth



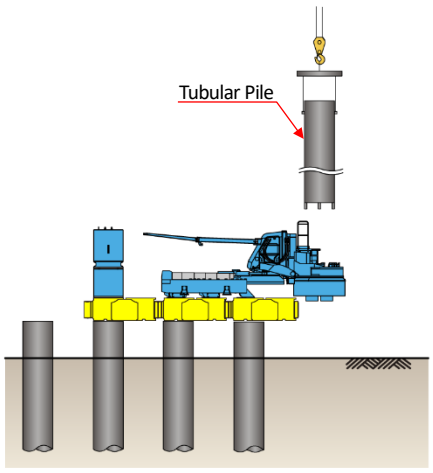
8.Relocating of rear end Skiplock Attachment to front end



9.Pitching of Driving Attachment onto Skiplock Attachments

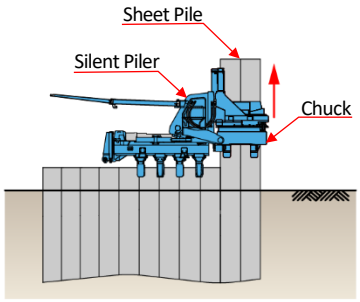


10.Self-moving of Gyro Piler
(Repeating sequence 4-6)

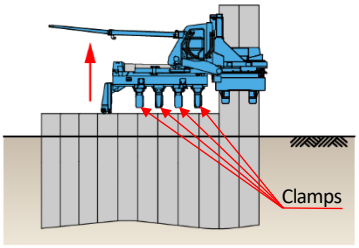


11.Repeat 1-10 until completion

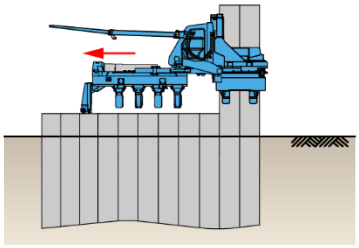
2-6 Extraction Working Procedure (Sheet Pile)



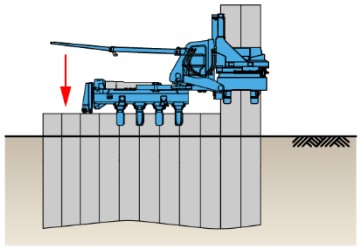
1.Partial extraction of sheet pile with
Silent Piler



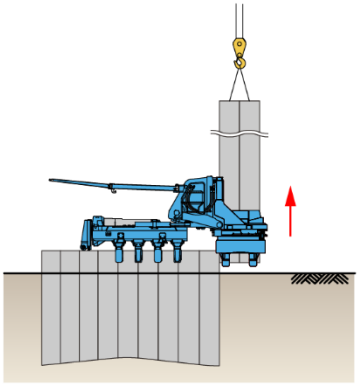
2.Releasing of Clamps and raising
machine body



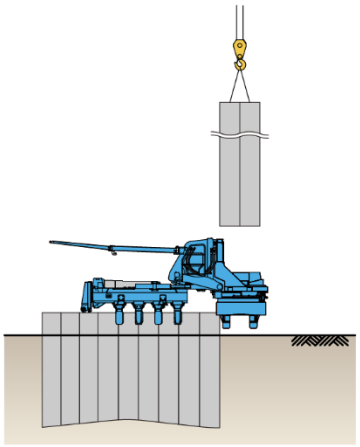
3.Moving of machine body rearward



4.Lowering of machine body and
gripping reaction piles

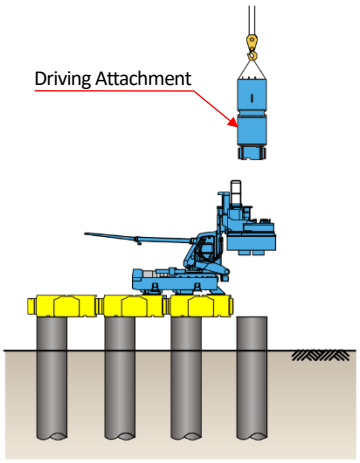


5.Completion of pile extraction

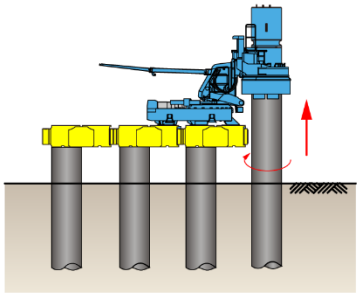


6.Handling and stacking of sheet pile
Repeat 1 to 6 until completion

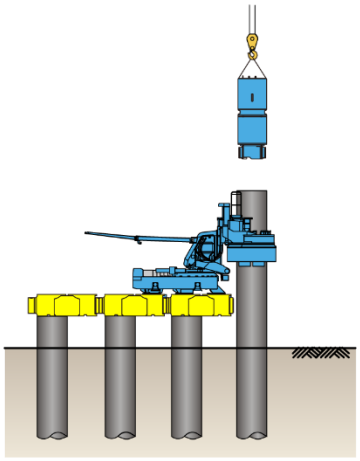
2-7 Extraction Working Procedure (Tubular Pile)



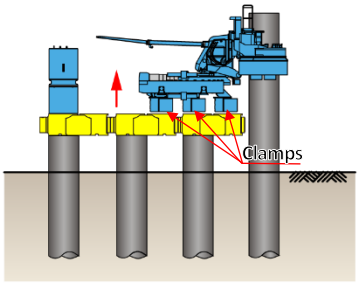
1.Pitching of Driving Attachment into tubular pile



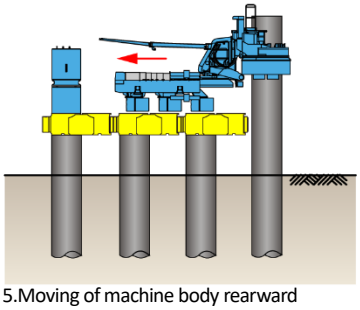
2.Partial extraction of tubular pile with Driving Attachment



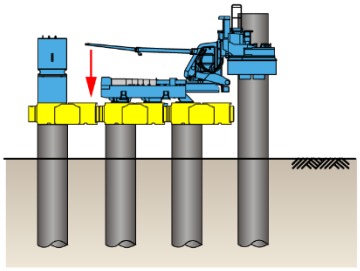
3.Removing of Driving Attachment



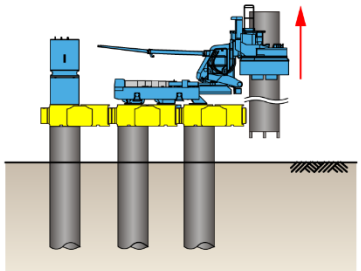
4.Releasing of Clamps and raising machine body



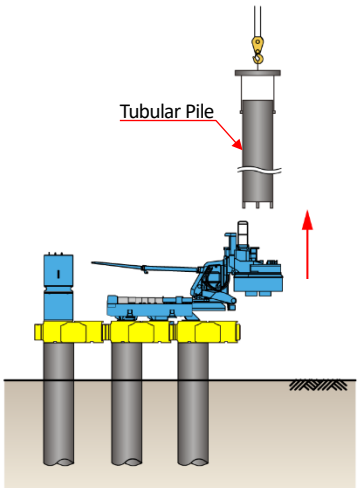
5.Moving of machine body rearward



6.Lowering of machine body and gripping Skiplock Attachments



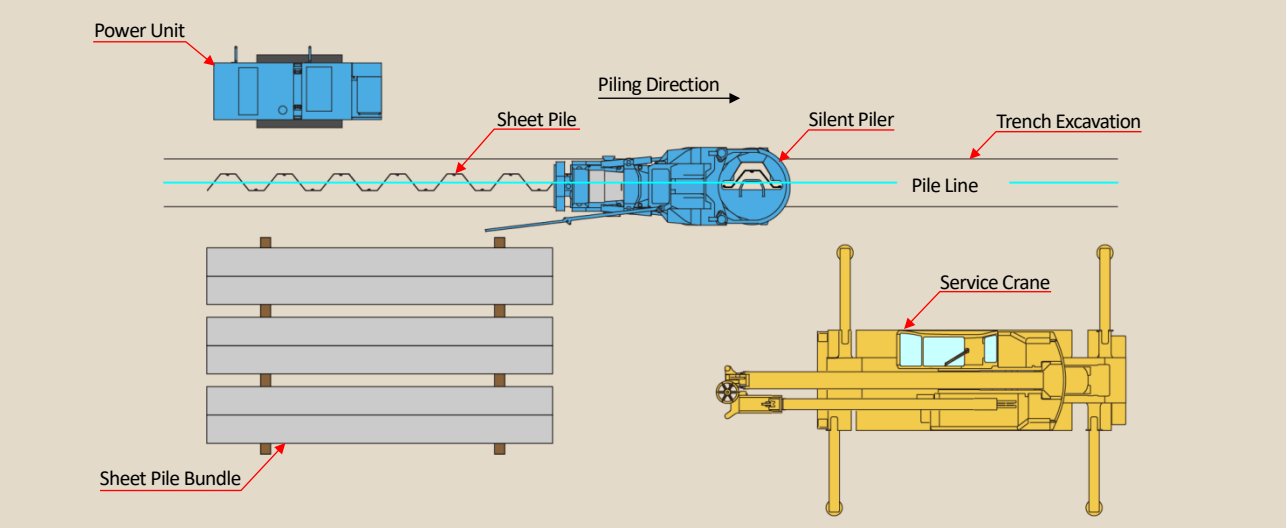
7.Completion of pile extraction



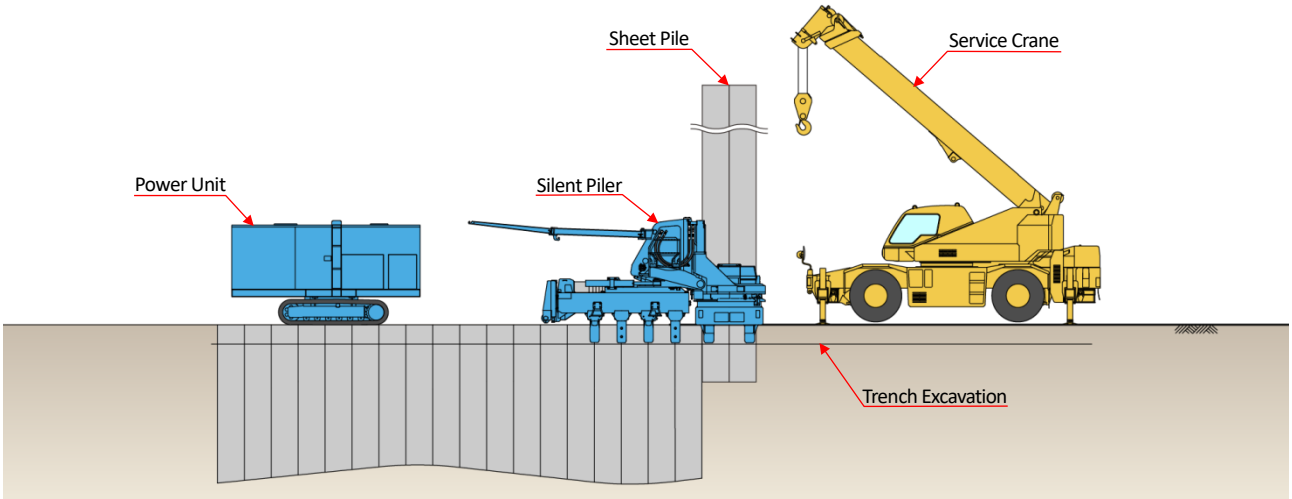
8.Handling and stacking of tubular pile
Repeat 1 to 8 until completion

Chapter 3 Work Layout

3-1 Standard Operation of Sheet Piling (Above Ground)

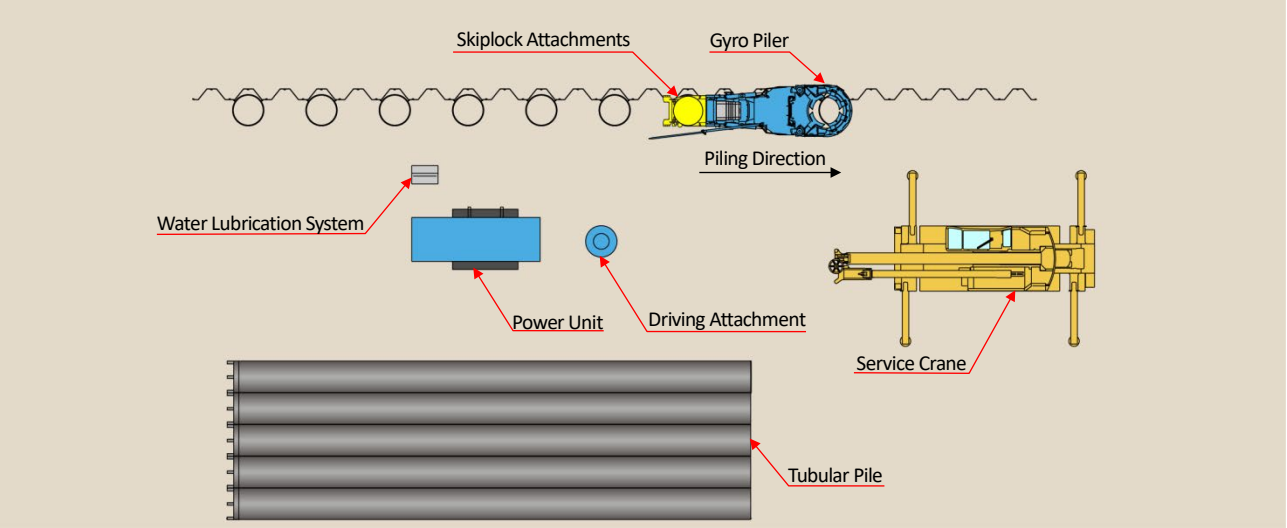


Plan View

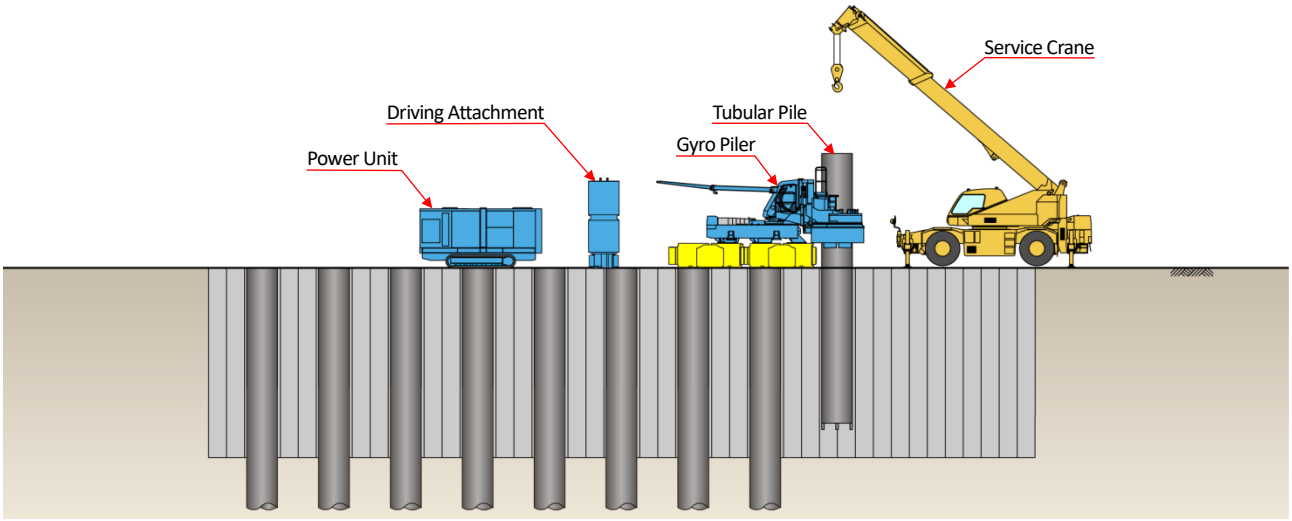


Sectional View

3-2 Standard Operation of Tubular Piling (Above Ground)

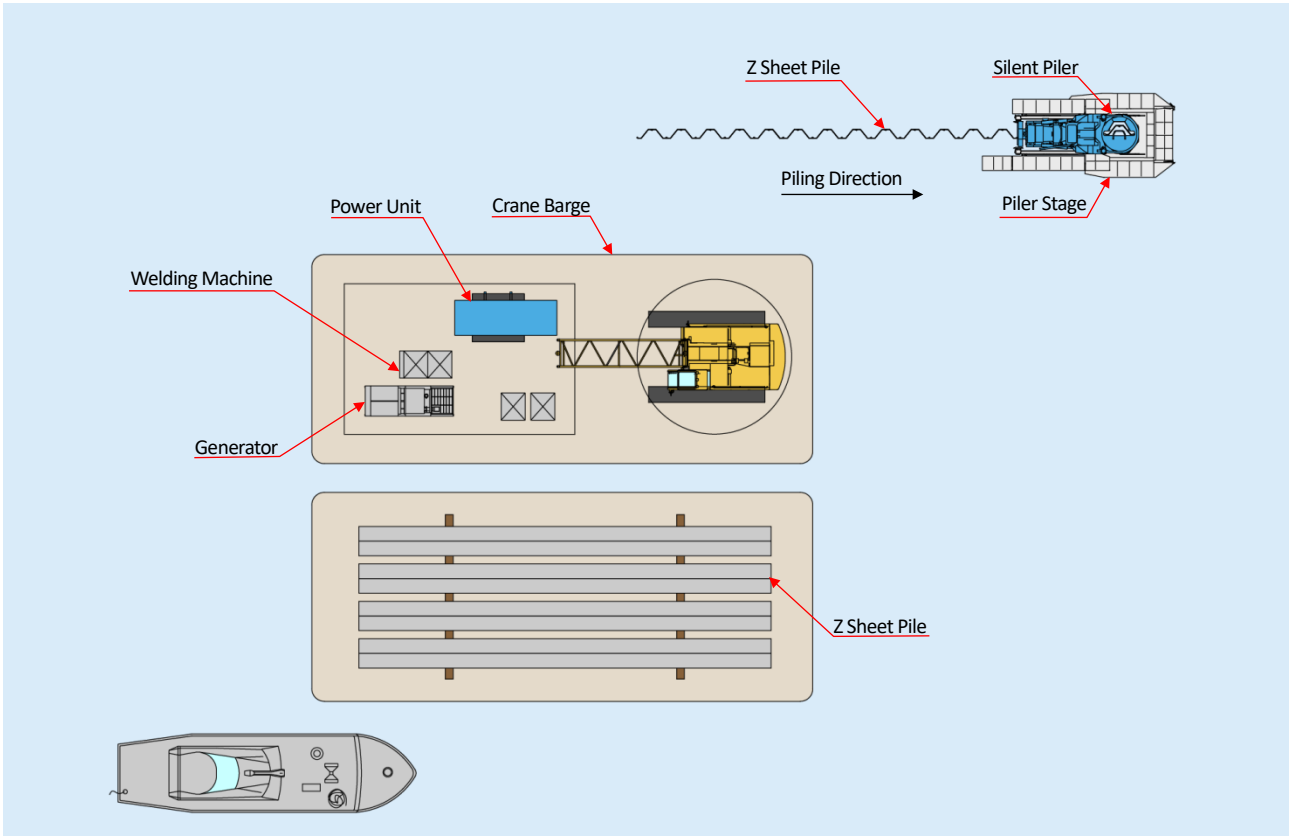


Plan View

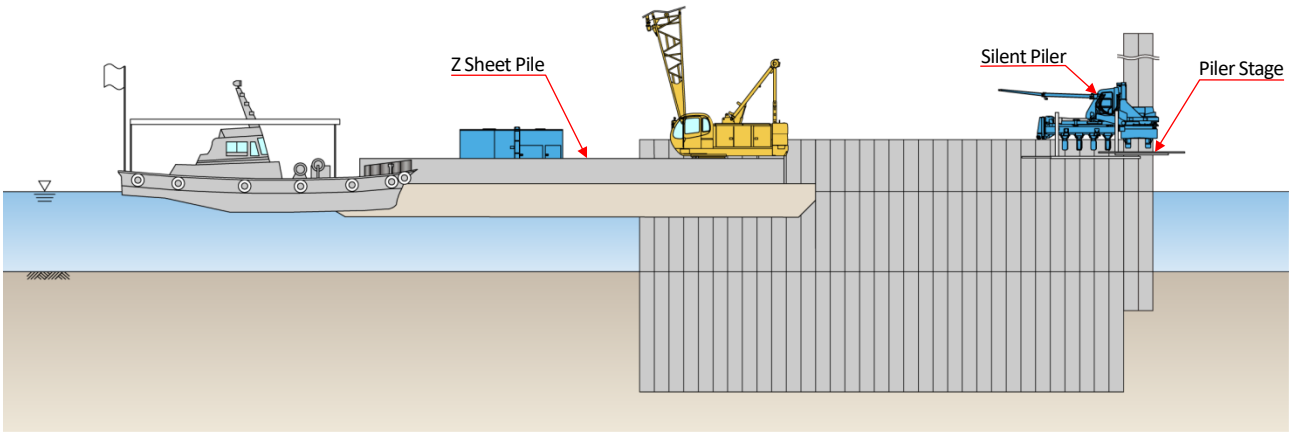


Sectional View

3-3 Standard Operation of Sheet Piling (Above Water)

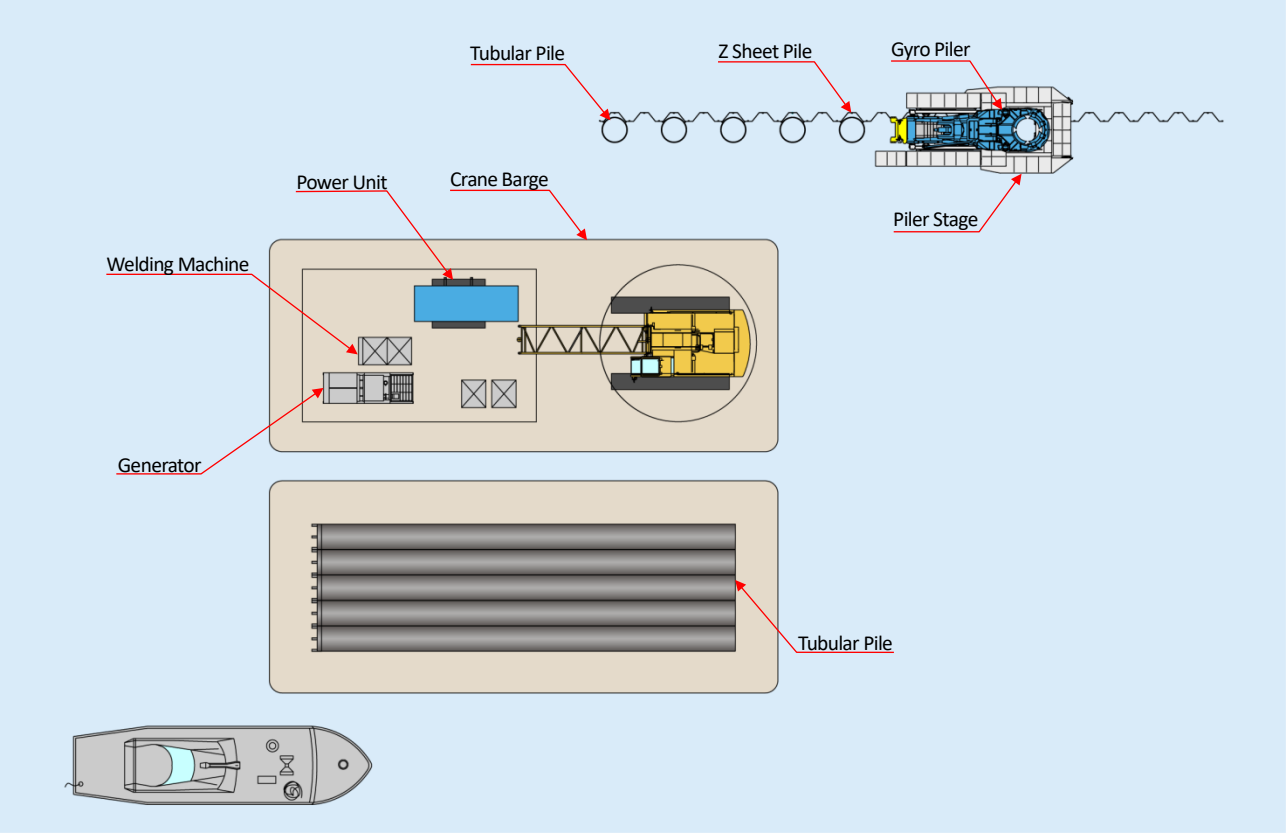


Plan View

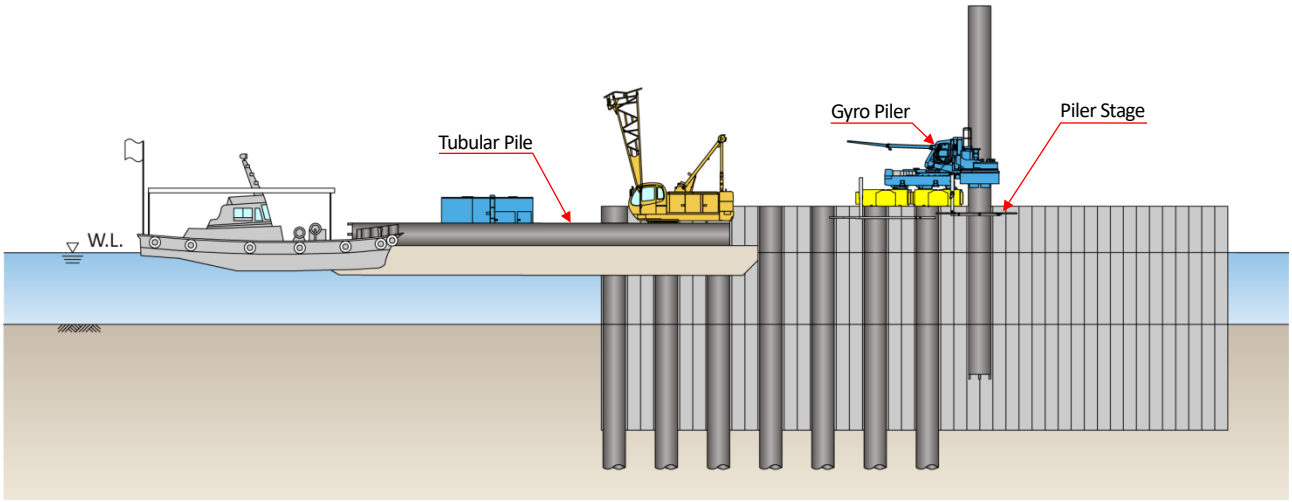


Sectional View

3-4 Standard Operation of Tubular Piling (Above Water)

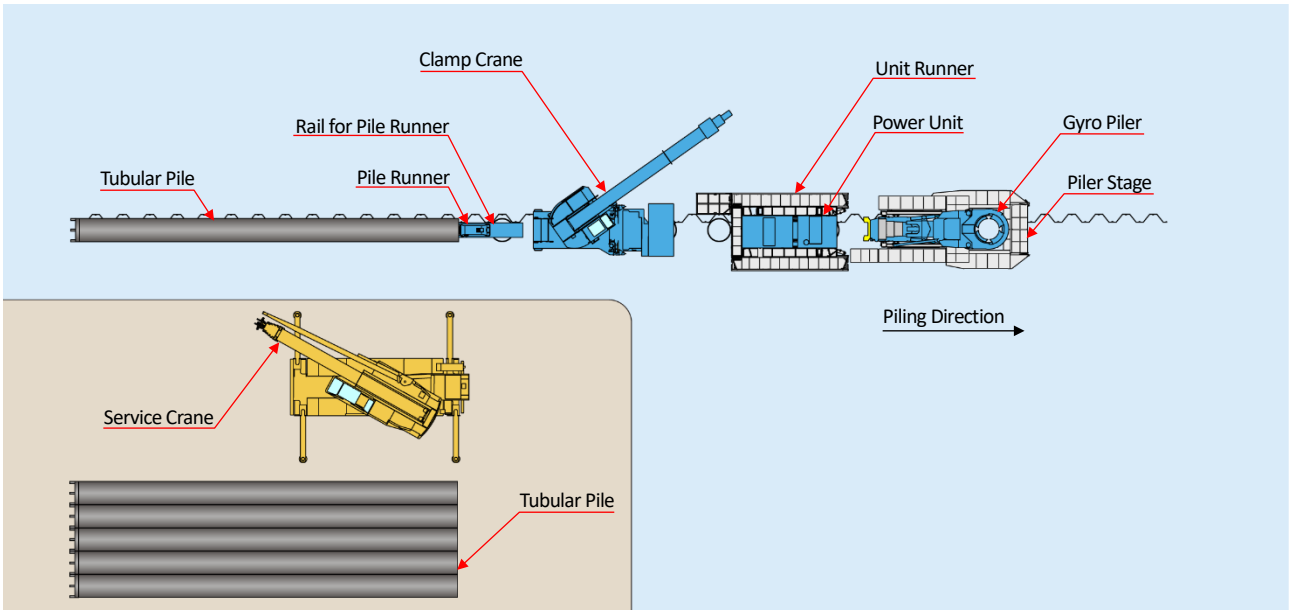


Plan View

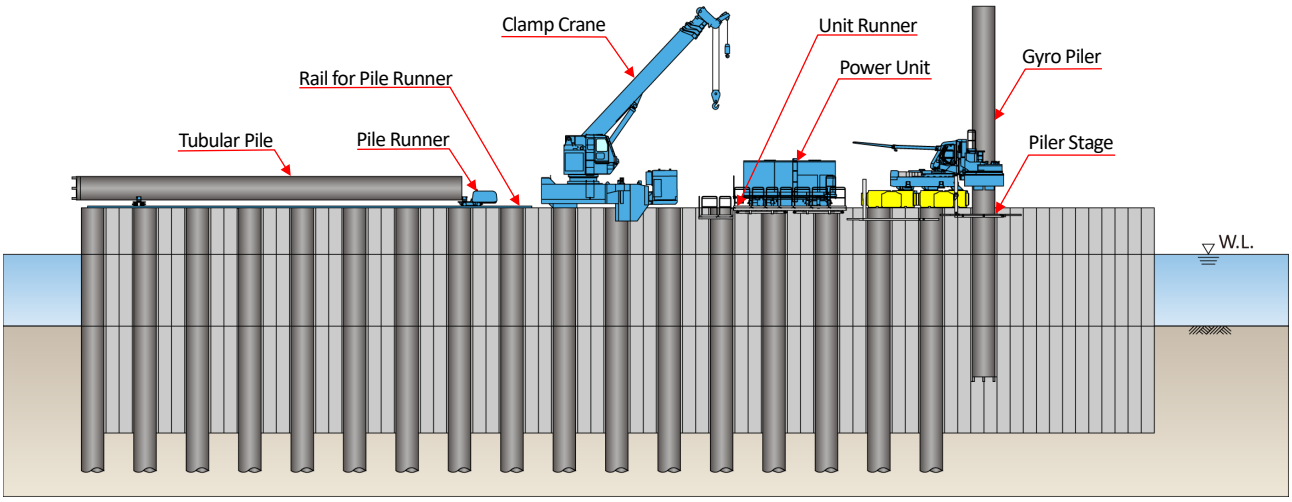


Sectional View

3-5 GRB Operation (Non-staging Method)



Plan View



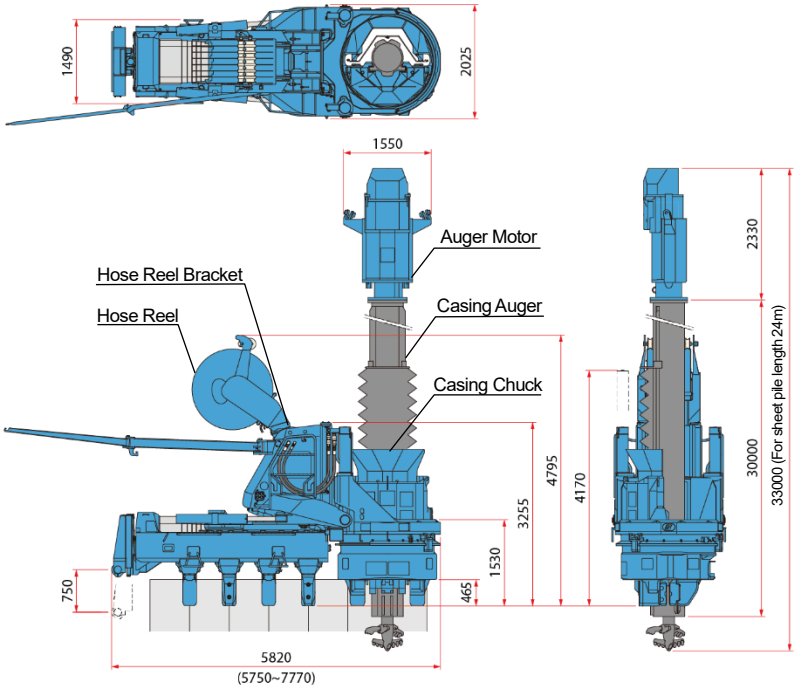
Sectional View

Chapter 4 Machine Specification

4-1 Machine Specification (for Sheet Piling)

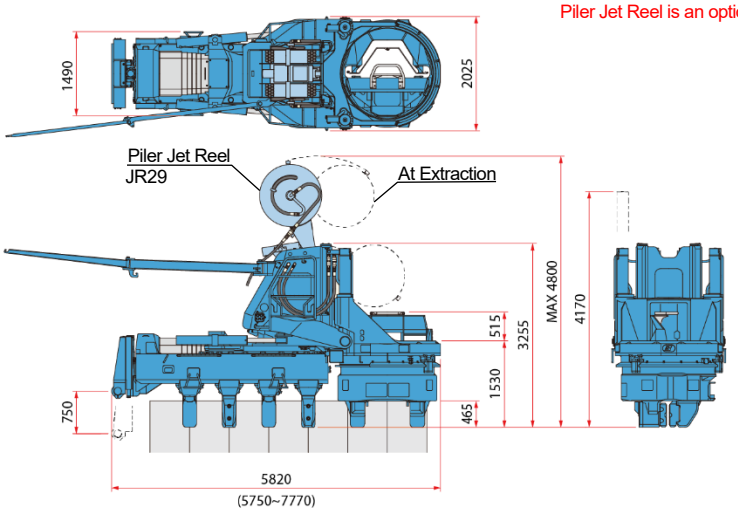
4-1-1 Silent Piler F401-1400

Super Crush Mode F401 - C1400



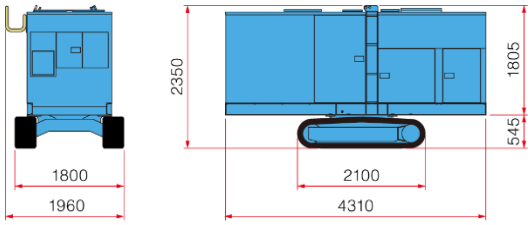
Standard / Water Jetting Mode F401 - 1400

Piler Jet Reel is an optional item



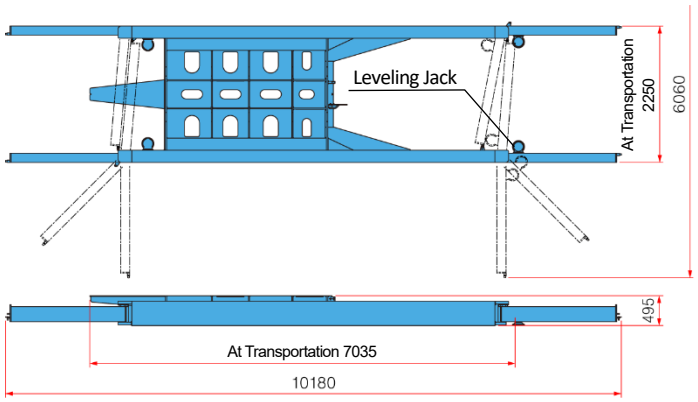
SILENT PILER		F401
Applicable sheet piles		Z Sheet Piles 559 ~ 708 mm (Super Crush Mode 572 ~708 mm) U Sheet Piles 600, 700 mm with WU Chuck Attachment
Max. Press-in Forse		1200 kN (Super Crush Mode) 1500 kN (Standard / WJ Mode)
Max. Extraction Forse		1600 kN
Stroke		1000 mm
Press-in Speed		1.3 ~ 27.0 m / min (Standard Mode)
Extraction Speed		1.0 ~ 20.2 m / min (Standard Mode)
Control System		Radio Control
Movement		Self - Moving
Mass	Super Crush Mode (Main Body, Piler Jet Reel, Casing Chuck)	30670 kg
	Water Jetting Mode (Main Body, Piler Jet Reel)	26850 kg
	Standard Mode (Main Body)	25600 kg
Hose Reel		**HR17E**
Mass (Standard)		2770 kg (including Hose Reel Bracket)
Pile Auger		**PA20**
Applicable pile length (Standard)		Max 24 m*
Mass	Auger Motor	2540 kg
	Casing Auger	18260 kg
Total Mass		20800 kg
		*Up to 30m with modification
Piler Jet Reel		**JR29**
Applicable pile length		Standard 16.0 m
Mass		1250 kg

4-1-2 Power Unit EU 300K4



Power Unit		EU300K4
Power Source		Diesel Engine
Rated Output	Power Mode	265 kW (322 ps) / 1800 min^{-1}
	Eco Mode	236 kW (287 ps) / 1600 min^{-1}
	Super Eco Mode	206 kW (250 ps) / 1400 min^{-1}
Fuel Tank Capacity		600 L
Hydraulic Reservoir		Piler Eco Oil 630 L
Urea Additive Tank Capacity		38 L
Moving Speed		1.4 km / h
Mass		7250 kg (with 20m Hose)

4-1-3 Reaction Stand



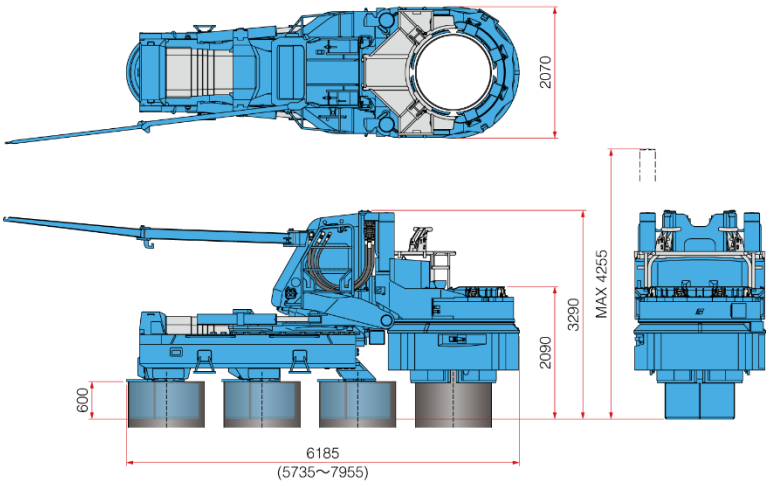
Reaction Stand (with Leveling Jack)	
Mass	3950 kg

The above specifications are subject to alteration without prior notice.

4-2 Machine Specification (for Tubular Piling)

4-2-1 Gyro Piler F401-G1200

for Ø 1200mm

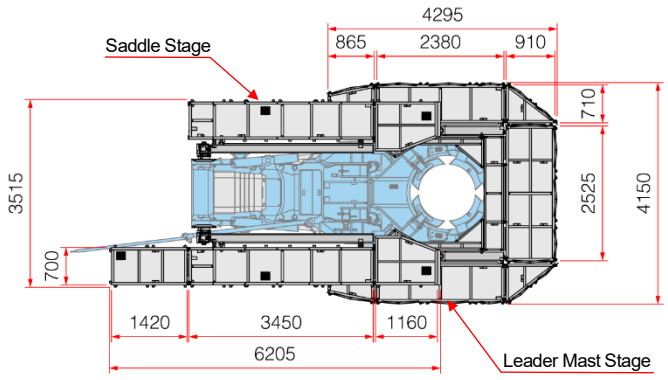


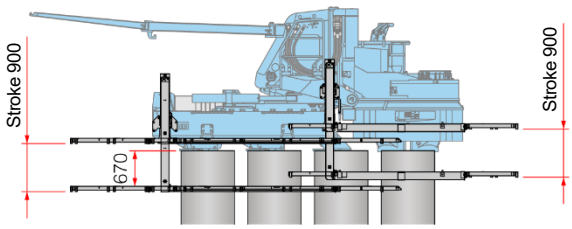
SILENT PILER		F401-G1200
Applicable sheet piles	Tubular Pile Ø800, 1000, 1200 mm Tubular Sheet Pile Ø800, 1000 mm*1	
Max. Press-in Force	with Chuck Rotation*2	1500 kN
	without Chuck Rotation	2000 kN
Max. Extraction Force	with Chuck Rotation*2	1600 kN
	without Chuck Rotation	2200 kN
Chuck Rotation Torque	900kN·m (Emergency use up to 1050kN·m)	
Chuck Rotation Velocity	MAX 11.0 min^{-1}	
Stroke	1000 mm	
Press-in Speed	0.7 ~ 4.9 m/min	
Extraction Speed	0.7 ~ 3.5 m/min	
Applicable Pile Spacing	for 800mm	850 ~ 1320 mm
	for 1000mm	1050 ~ 1320 mm
	for 1200mm	1250 ~ 1505 mm
Control System	Radio Control	
Mass	for 800mm	31850 kg
	for 1000mm	32600 kg
	for 1200mm	33600 kg

*1 For Tubular Sheet Piles (Tubular Piles with external interlocks), optional Chuck jaws are required.

*2 An external power source is required for Chuck rotation
(200V - 50/60 Hz, 220V - 60Hz, Min. 30KVA, 3 phases)

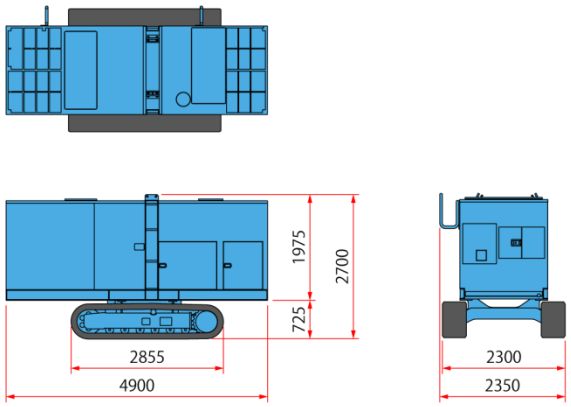
4-2-2 Piler Stage ST48





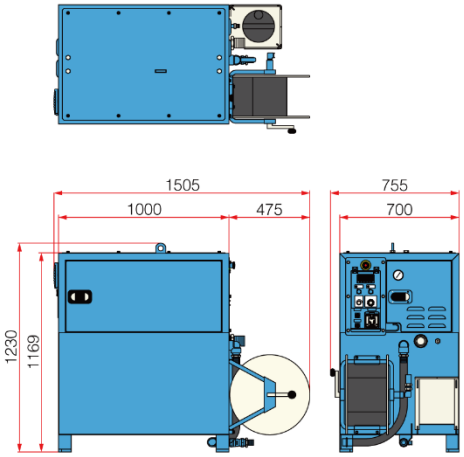
Piler Stage		ST48
Load Capacity	Leader Mast Stage	550 kg (When set both sides) 300 kg (When set one side only)
	Saddle Stage	300 kg
Mass	2035 kg	

4-2-3 Power Unit EU 500C3



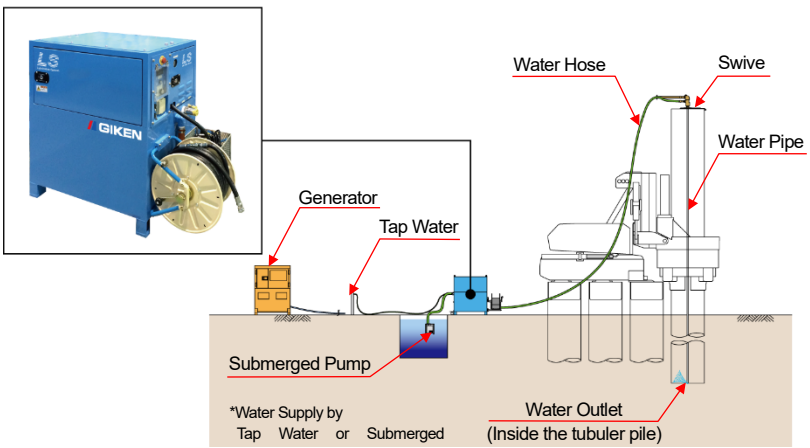
Power Unit		EU500C3
Power Source		Diesel Engine
Rated Output	Power Mode	377 kW (513 ps) / 1800 min^{-1}
	Eco Mode	335 kW (456 ps) / 1600 min^{-1}
	Super Eco Mode	293 kW (399 ps) / 1400 min^{-1}
Fuel Tank Capacity		850 L
Hydraulic Reservoir		Piler ECO Oil 660 L
Moving Speed		1.4 km/h
Mass		10950 kg (with 30m Hose)

4-2-4 Water Lubrication System OP114A



Lubrication System	OP114A
Input Voltage (3 phases)	AC200V, 50 / 60 Hz, 24 KVA or more
Water Pump Discharge Rate	Max. 60 L / min
Water Pump Discharge Pressure	Max. 6 MPa
Outer Tank Capacity (W×D×H)	1505 × 755 × 1230 mm
Water Tank Capacity	300 L
Mass (without water)	410 kg

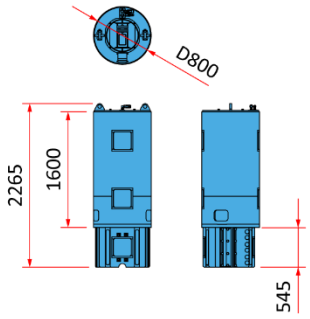
The above specifications are subject to alteration without prior notice.



4-2-5 Driving Attachment

Driving Attachment AM69A

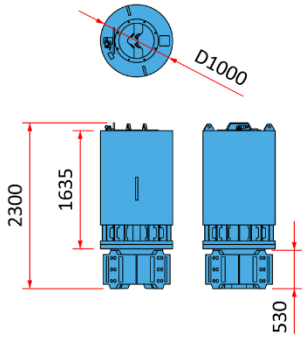
D800mm Form



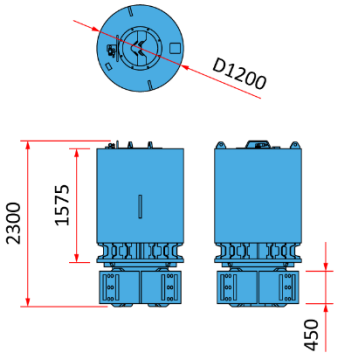
Driving Attachment	AM69A
Applicable Closure Pile (Equal Angle Section)	200 × 200 × t20 - 25 250 × 250 × t20 - 25
Mass	2000 kg

Driving Attachment AM105

D1000mm Form

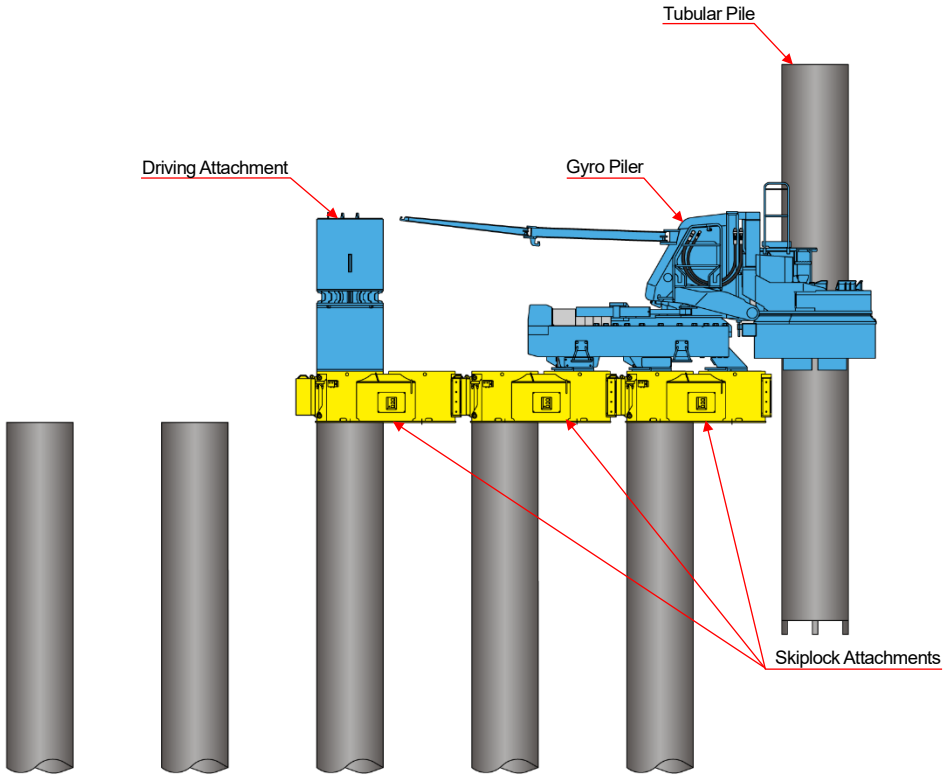


D1200mm Form

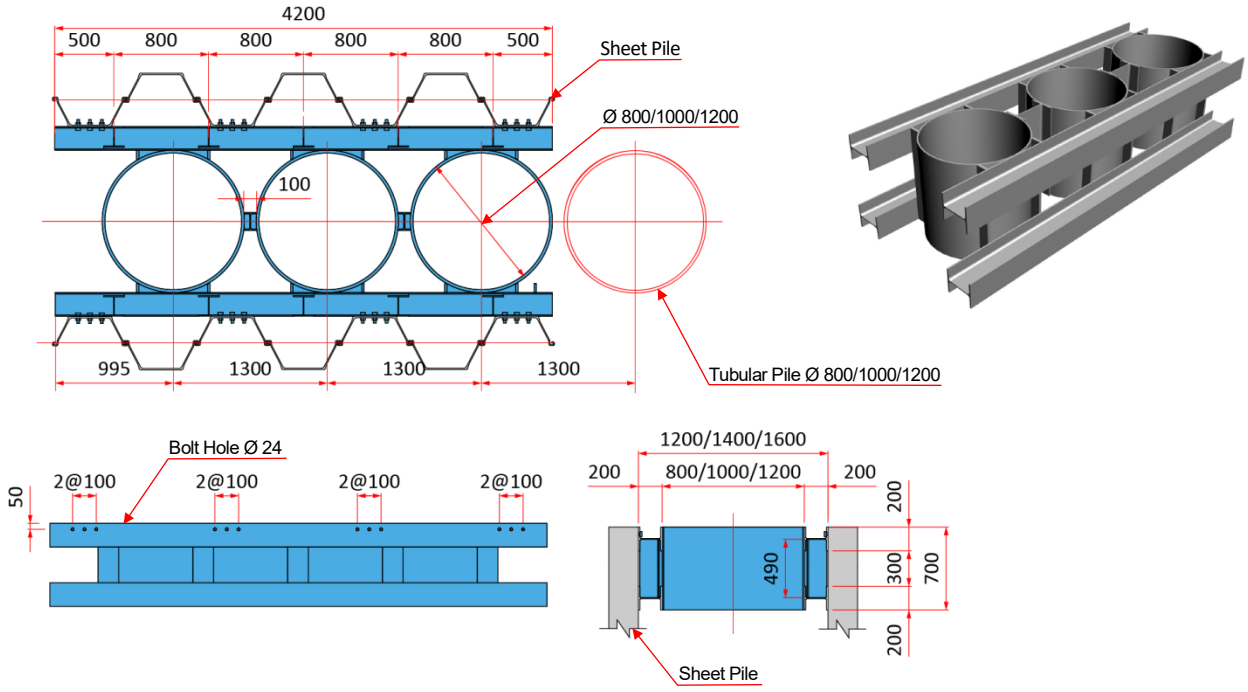


Driving Attachment	AM105
Applicable Closure Pile (Equal Angle Section)	200 × 200 × t20 - 25 250 × 250 × t20 - 25
Mass	3300 kg (D1000mm Form) 4500 kg (D1200mm Form)

4-2-6 Skiplock attachment (AM157)



4-2-7 Reaction Stand



GIKEN Construction Solutions Company

www.giken.com

CONTACT US

Ver2.0EN04 / 09 Jun 2023