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GENERAL CATALOG

2022 - 2023

MLION CORP

INNOVATIVE SOLUTIONS REDEFINED

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WHO WE ARE

Mlion Corporation is a Foundation Solutions company that focuses on Waterfront and Underground construction markets in Asia.

Being a market leader, we listen, understand and provide solutions that are customised to your project requirements.

With local offices and warehouses strategically set up across Asia, we can provide fast, ready stock and technical services to our clients.

THE STRAITS TIMES Singapore's Fastest Growing Companies 2020 statista

ENTERPRISE 50 Celebrating Singapore's Enterprising Spirit

bizSAFE 3

SINGAPORE 1000 SINGAPORE SME 1000 INTERNATIONAL 100

FOREWORD

Eric Leong
Co-Founder/
Chairman & CEO
Mlion Corporation Pte. Ltd

EY Entrepreneur of the Year™
Singapore - Industrial Solutions (2020)

Thank you once again to our customers for giving us their continuous support and trust over the years. Over the last 10 years, Mlion Corporation continuously adapted to the ever changing requirements and needs of the market place and our product lineup has similarly reflected so. Our innovative MHZ Sheet Pile line provides Z Shape Hot Rolled Sheet Piles with all the benefits of a Hot Rolled Sheet Pile in a more efficient Z Shape system; providing cost effectiveness and efficiency for the projects. Our O-Pile lineup has also proven to be an excellent interlock for Steel Pipe Sheet Piles and has gathered more project references across Asia. We look forward to serving you across the Asian region with the same heart and passion as we have done so from the very beginning.

TABLE OF CONTENTS

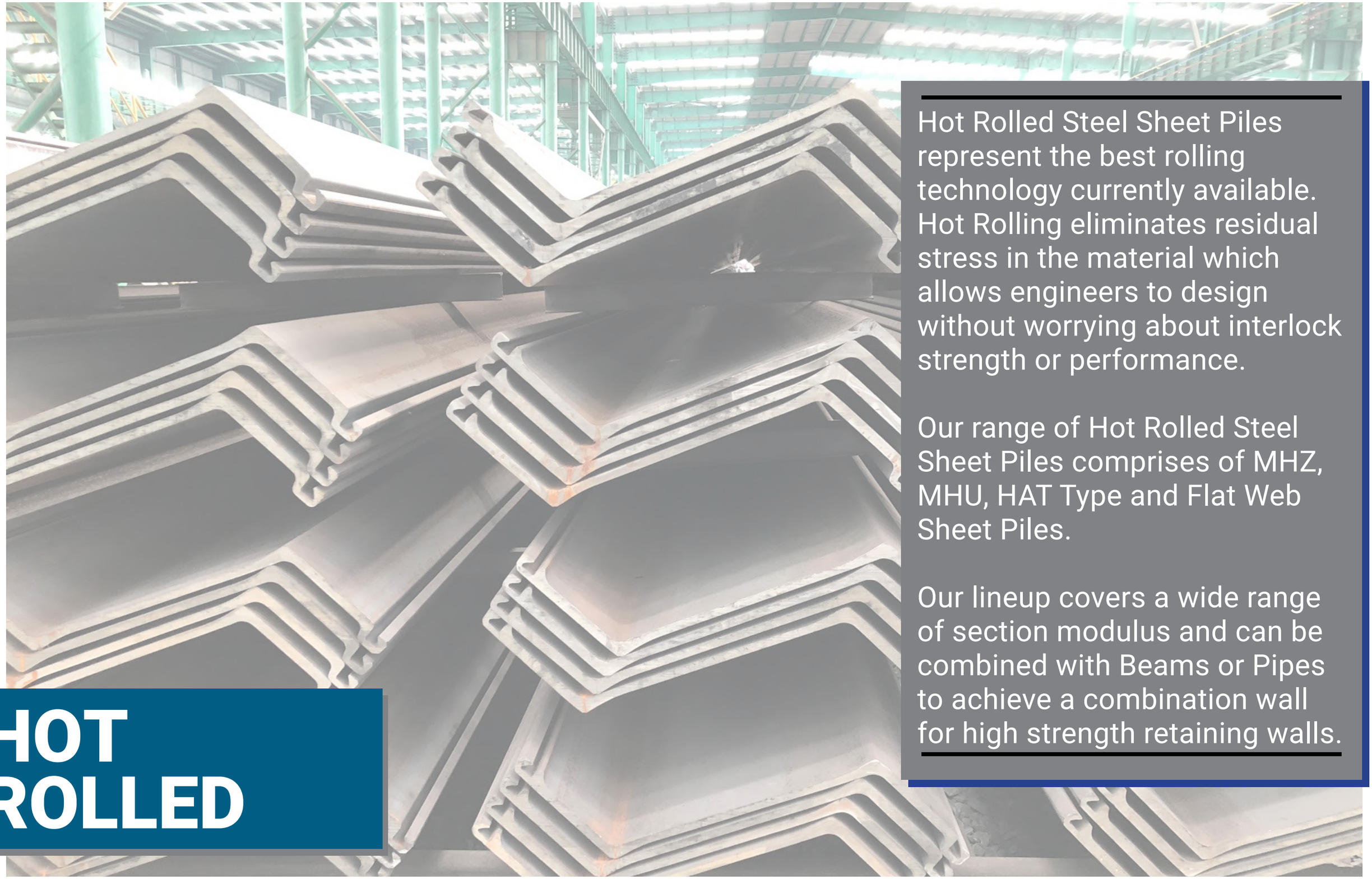
CREATING THE FUTURE OF WATERFRONT AND UNDERGROUND

PRODUCTS

SHEET PILES

- MHZ Hot Rolled
- MHU/JIS Hot Rolled
- HAT Type
- Flat Web Sheet Piles
- Cold Formed Sheet Piles
- Combi Wall
- O-Pile Steel Pipe Sheet Piles

SHEET PILES



HOT ROLLED

Hot Rolled Steel Sheet Piles represent the best rolling technology currently available. Hot Rolling eliminates residual stress in the material which allows engineers to design without worrying about interlock strength or performance.

Our range of Hot Rolled Steel Sheet Piles comprises of MHZ, MHU, HAT Type and Flat Web Sheet Piles.

Our lineup covers a wide range of section modulus and can be combined with Beams or Pipes to achieve a combination wall for high strength retaining walls.

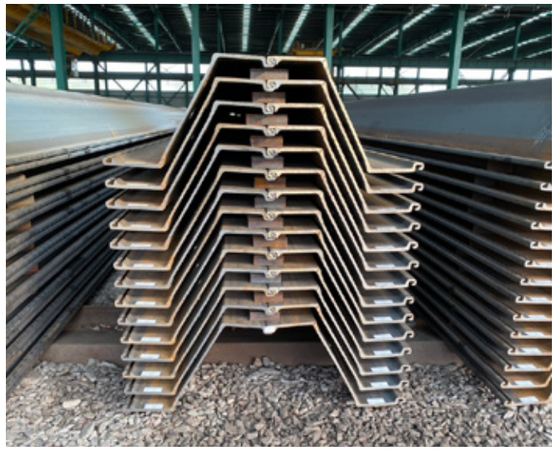
SHEET PILES

MHZ HOT ROLLED

Mlion Hot Rolled Z (MHZ) shape sheet piles are rolled at high temperature through a rolling process from steel blooms. The steel blooms are heated to high temperatures and re-rolled through rollers to form its final shape. Due to this rolling process, the piles will not have any inherent stresses after rolling. The piles contain Larssen interlocks which are tighter and stronger than those of the Cold Formed alternatives and have thickened areas to provide greater strength and stiffness during driving.

The piles are wider in width, ranging from 700mm to 770mm, providing faster piling speed as compared to traditional U shape sheet piles. Its efficient section modulus to weight provides lower overall costs.

MHZ Sheet Piles are designed to meet the challenges of today's waterfront and underground projects. With a complete section modulus range starting from 1252cm3/m up to a market leading 5162 cm3/m, there is always a pile in the range that can suit your project requirements. Steel grades range from S355GP up to S460GP and lengths up to 35m in a single roll.



The MHZ Sheet Pile range has transformed the sheet piling market across Southeast Asia since its introduction in 2018. Being rolled in Asia and stocked locally in many markets that we operate in; we can provide ready access to the piles for fast lead time and quick response to project timelines. Customisation is essential to every project, and we provide customised lengths, steel grade, fabrication and coating where required.

20
SECTIONS AVAILABLE

>460
MPa GRADE OF STEEL

43%
GREATER RESERVE STRENGTH

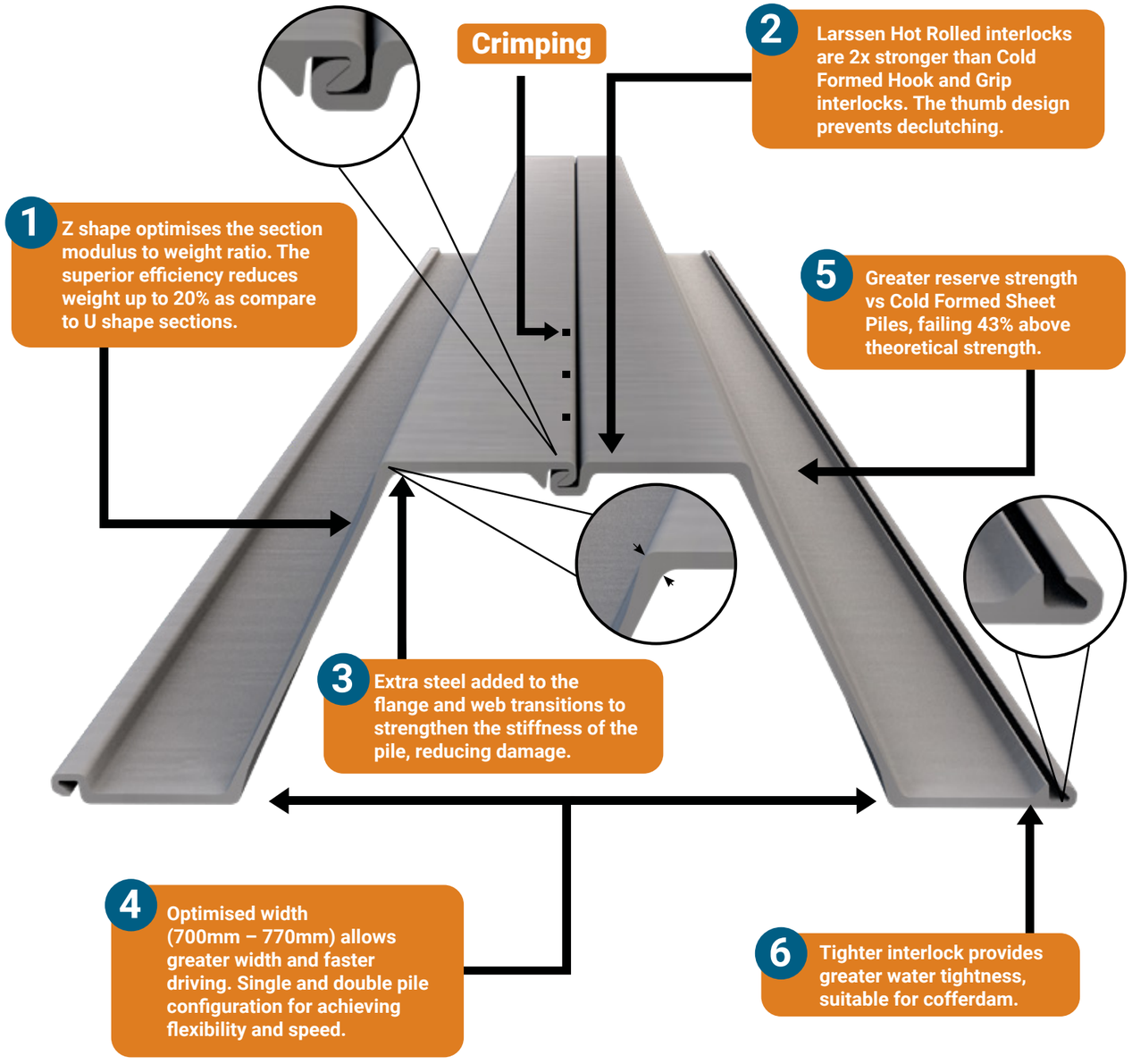
2X
STRONGER INTERLOCK

35M
MAXIMUM LENGTH

CHOOSE MHZ

SHEET PILES

Advantages of MHZ Sheet Piles



1 Z shape optimises the section modulus to weight ratio. The superior efficiency reduces weight up to 20% as compare to U shape sections.

2 Larssen Hot Rolled interlocks are 2x stronger than Cold Formed Hook and Grip interlocks. The thumb design prevents declutching.

3 Extra steel added to the flange and web transitions to strengthen the stiffness of the pile, reducing damage.

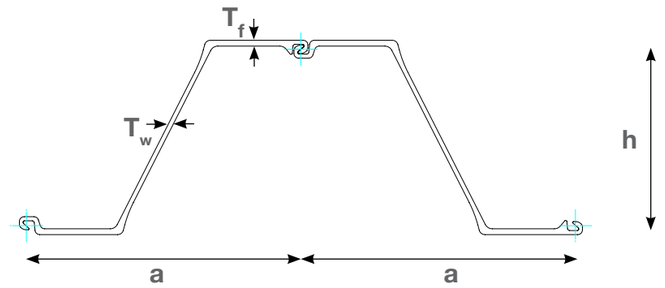
4 Optimised width (700mm – 770mm) allows greater width and faster driving. Single and double pile configuration for achieving flexibility and speed.

5 Greater reserve strength vs Cold Formed Sheet Piles, failing 43% above theoretical strength.

6 Tighter interlock provides greater water tightness, suitable for cofferdam.

Manufacturing Standards: EN 10248

S270GP / S355GP / S390GP / S430GP
Lengths up to 33m long in Single or Double Pile Configuration



SPECIFICATIONS

Section	Width a	Height h	Thickness T^f/T^w	Section Area	Weight	Weight	Moment of Inertia	Section Modulus	Bending Moment	Coating Area (2 sides)
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m	kNm/m	m^2/m
MHZ12-1	770	343.5	8.6/8.5	120.8	72.8	94.5	21496	1252	444.46	1.96
MHZ13-1	770	344	9.1/9	126.5	76.2	99	22433	1304	462.92	1.96
MHZ14-1	770	344.5	9.6/9.5	132.2	79.6	103.4	23370	1357	481.74	1.96
MHZ17-1	700	420	8.5/8.4	132.8	73.3	104.7	36425	1735	615.93	1.97
MHZ18-1	700	420.5	9.1/9	139.1	76.7	109.6	38001	1807	641.49	1.97
MHZ19-1	700	421	9.6/9.5	145.4	80.2	114.6	39578	1880	667.40	1.97
MHZ20-1	700	421.5	10.1/10	151.7	83.7	119.5	41155	1953	693.32	1.97
MHZ24-2	700	459.2	11.3/11.2	174.4	95.8	136.9	55949	2437	865.14	2.05
MHZ26-2	700	460.2	12.3/12.2	187.4	103	147.1	59843	2601	923.36	2.05
MHZ27-1	700	460.7	12.8/12.7	193.6	106.4	152	61641	2676	949.98	2.05
MHZ28-2	700	461.2	13.3/13.2	200.4	110.1	157.3	63740	2764	981.22	2.05
MHZ36-1	700	499.2	15.1/11.2	216.1	118.7	169.6	89753	3596	1276.58	2.18
MHZ38-1	700	500.2	16.1/12.2	230.2	126.5	180.7	94984	3798	1348.29	2.18
MHZ40-1	700	501.2	17.1/13.2	244.4	134.3	191.8	100219	3999	1419.65	2.18
MHZ42-1	700	499.2	18.1/14	260.2	143	204.2	105453	4228	1500.94	2.17
MHZ44-1	700	500.2	19.1/15	274.3	150.7	215.3	110942	4436	1574.78	2.17
MHZ46-1	700	501.2	20.1/16	288.5	158.5	226.5	116159	4635	1645.43	2.17
MHZ48-1	700	503.2	22.1/15	290	159.3	227.6	120467	4788	1699.74	2.17
MHZ50-1	700	504.2	23.1/16	303.4	166.7	238.2	125358	4973	1765.42	2.17
MHZ52-1	700	505.2	24.1/17	317.2	174.3	249	130403	5162	1832.51	2.17
COMPARISON TO U TYPE JIS PILES in SYW295										
Type II	400	100	10.5	61.18	48	120	8740	874	257.83	
Type III	400	125	13.0	76.42	60	150	16800	1340	395.30	
Type IIIA	400	150	13.1	74.4	58.4	146	22800	1520	448.40	
Type IV	400	170	15.5	96.99	76.1	190	38600	2270	669.65	

Weight Advantage of MHZ Sheet Piles vs JIS Type U Sheet Piles

- MHZ12-1 vs Type 2 (21% Less Weight, 43% Stronger)
- MHZ13-1 vs Type 3 (34% Less Weight)
- MHZ 24-2 vs Type 4 (27% Less Weight)

TARGET

- Waterfront Projects
- Infrastructure
- Rail and Tunnels
- Harbours
- Substructure
- Permanent Structures
- Bridges and Wharfs
- River and Flood Control

SHEET PILES

BENDING MOMENT

Sheet Piles are typically compared according to their section modulus (cm3/m).

It does not provide the true strength of the sheet piles as there are varying steel grades that sheet piles can be produced from.

Q235B = 235 MPa
SY295 = 295 MPa
S355GP = 355 MPa

Typical U shape sheet piles are produced in SY295 (JIS 5528) which is 295 MPa Yield Strength.

MHZ Sheet piles are rolled from EN10248 S355GP grade up to S460GP Steel Grade.

The yield strength of S355GP is 355 MPa, 20% Stronger than SY295 grade steel.

Mlion Corporation recommends using Bending Moment as a more efficient way of comparing alternative sheet piles for replacement.

Bending Moment = Section Modulus x (Yield Strength / 1000)

For Example, if you have a MHU IV (Type 4) Sheet Pile (see page 15),

2270 x 295/1000 = 669.65 kNm/m

Comparing with MHZ 19-1 Sheet pile (see page 10),
1880 x 355/1000 = 667.40 kNm/m

MHZ19-1 has a lower section modulus but overall bending moment is sufficient to replace MHU IV Sheet Piles.

INTERLOCK SLIPPAGE

According to EN1993 Eurocode 3 Part 5, sheet piles, depending on its shape, is susceptible to the effects of interlock slippage. Interlock slippage has the greatest effect when sheet piles have its interlock along the neutral axis of the piling line. This is the case for the U Shape Sheet Piles.

U shape sheet piles are theoretically designed to be piled in a continuous row of piles to form an impervious wall. This calculation method holds true if the piles do not have interlocks separating each sheet from each other. However, practically, it would not be possible to pile a continuous row without having them installed individually or in pairs.

When U shape sheet piles are installed as single pieces, the sheet piles do not transfer the shear strength completely onto the wall, resulting in losses in the overall strength of the wall. This loss needs to be compensated with a beta factor as described in the design code.

REPLACING U TYPE SHEET PILES WITH MHZ

	Type 2	MHZ12-1	BENEFITS
Weight (kg/m²)	120	94.5	21% lighter
Steel Grade (MPa)	295	355	20% Stronger
Bending Moment (kNm/m)	257.83	444.46	72% Stronger

	Type 3	MHZ12-1	BENEFITS
Weight (kg/m²)	150	94.5	37% lighter
Steel Grade (MPa)	295	355	20% Stronger
Bending Moment (kNm/m)	395.30	444.46	12% Stronger

	Type 3a	MHZ13-1	BENEFITS
Weight (kg/m²)	146	99	32% lighter
Steel Grade (MPa)	295	355	20% Stronger
Bending Moment (kNm/m)	448.4	462.92	3.2% Stronger

	Type 4	MHZ20-1	BENEFITS
Weight (kg/m²)	190	119.5	37% lighter
Steel Grade (MPa)	295	355	20% Stronger
Bending Moment (kNm/m)	669.65	693.32	3.5% Stronger

	Type 5L	MHZ36-1	BENEFITS
Weight (kg/m²)	210	169.6	37% lighter
Steel Grade (MPa)	295	355	20% Stronger
Bending Moment (kNm/m)	929.25	1276.58	37% Stronger

CEBU TALISAY PORT

REGION 1 DPWH PROJECTS

DAVAO INTERNATIONAL CONTAINER PORT PROJECT

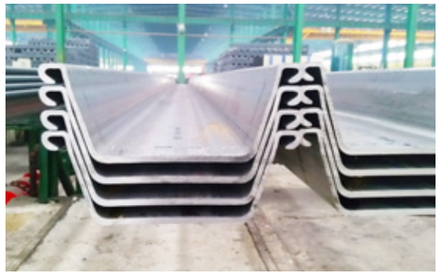
DPWH PROJECT


NLEX PROJECT


MINDANAO, PHILIPPINES

SHEET PILES

MHU HOT ROLLED



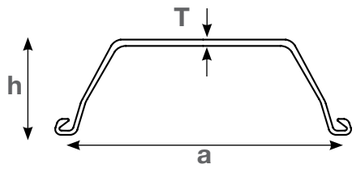
JIS Type Sheet piles have been commonly used in Asia and represents the main stay of the sheet pile market. Its 400mm width is easily driven by excavator vibratory hammers and provides good resale value for temporary usage.

TARGET

- Temporary Excavations
- Underground works
- Bridges and Piers
- Cofferdam
- River Upgrading
- Flood Control
- Reclamation
- Dykes
- Embankments

Manufacturing Standards: JIS 5528 or JIS 5523

SY 295 / SYW295 and SY390 / SYW 390
EN 10248: S355GP
Lengths up to 24m long
***Please enquire for used sheet piles for the following sections.**

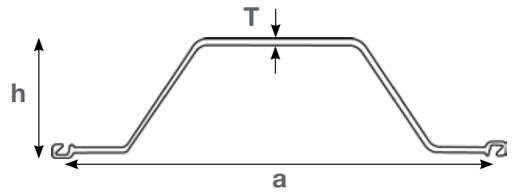


MHU/JIS SHEET PILES

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulus
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm4/m	cm^3/m
IIW	600	130	10.3	78.7	61.8	103	13000	1000
IIIW	600	180	13.4	103.9	81.6	136	32400	1800
IVW	600	210	18.0	135.3	106.0	177	56700	2700
II	400	100	10.5	61.18	48.0	120	8740	874
III	400	125	13.0	76.42	60.0	150	16800	1340
IIIA	400	150	13.1	74.4	58.4	146	22800	1520
IV	400	170	15.5	96.99	76.1	190	38600	2270
VL	500	200	24.3	133.8	105.0	210	63000	3150
VIL	500	225	27.6	153.0	120.0	240	86000	3820

Hat Type Steel Sheet Piles

- 900mm width for faster installation
- Produced in Japan



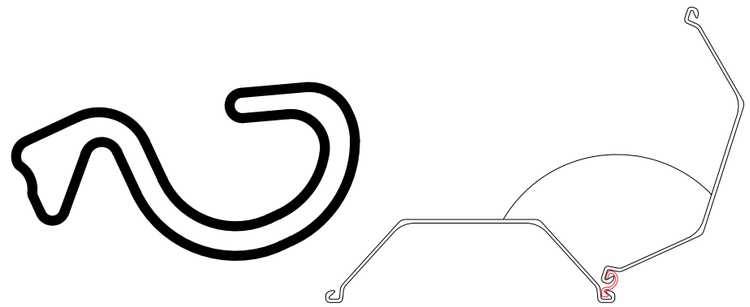
HAT TYPE

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulus
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
10H	900	230	10.8	110	86.4	96	10500	902
25H	900	300	13.2	144.4	113	126	24400	1610
45H	900	368	15	187	147	163	45000	2450
50H	900	370	17	212.7	167	186	51100	2760

CORNER PILES

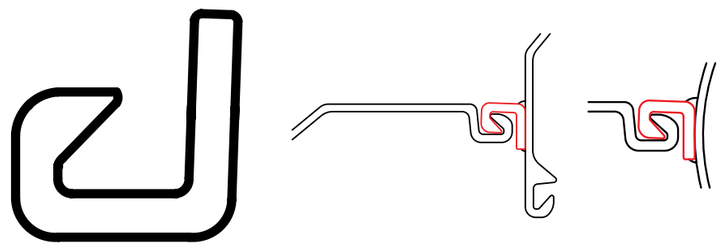
CP1

Lengths: 6-12 M
Weight: 8.4 kg/m
Steel Grade: S355GP based on EN10248 Standard.



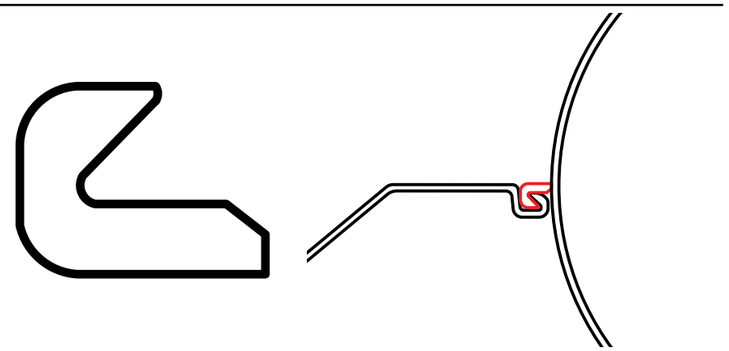
CP2

Lengths: 6-12M
Weight: 9.3 kg/m
Steel Grade: S355GP based on EN10248 Standard.



CP3

Lengths: 6-12M
Weight: 6.27 kg/m
Steel Grade: S355GP based on EN10248 Standard.



SHEET PILES

MHU PROJECTS

CEBU PROJECT


SINGAPORE PROJECT


LTA PROJECT SINGAPORE


IWMF SINGAPORE

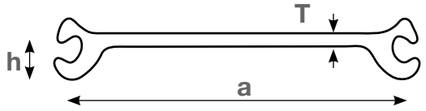

PHILIPPINES


SINGAPORE


PHILIPPINES


PHILIPPINES

FLAT WEB SHEET PILES



Flat Web Sheet Piles boast extremely high tensile strength at its interlocking sections to form large circular cells. These cells works on a gravity structure basis and uses the infill of the sand and gravel to create stability to the structure. Cells can be customised in width and depth.

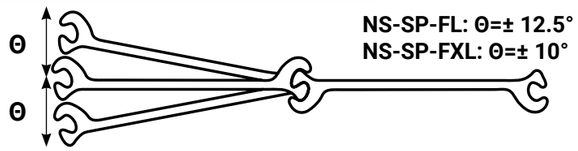
TARGET

- Quary Walls
- Breakwaters
- Bridges and Piers
- Cofferdam
- Islands
- Tunnelling
- Reclamation

Manufacturing Standards: JIS 5523

SYW 295 / SYW 390

DEVIATION ANGLE

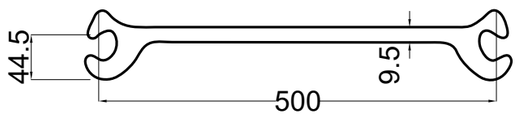


NS-SP-FL: Θ=± 12.5°
NS-SP-FXL: Θ=± 10°

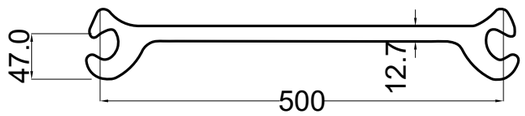
JOINT STRENGTH

Type	Tensile Strength (MN/m)
NS-SP-FL	3.92
NS-SP-FXL	5.88

NS-SP-FL



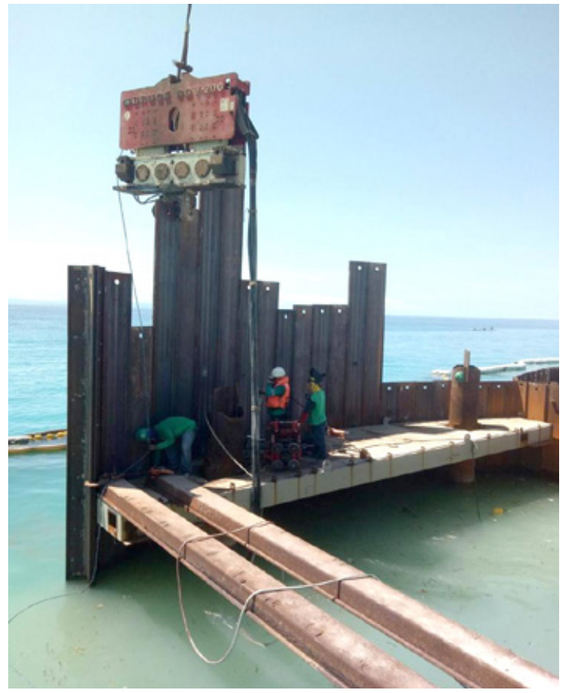
NS-SP-FXL



SPECIFICATIONS

Type	Dimension			Per Pile				Per 1M of Pile Wall Width			
	Effective width a mm	Effective height h mm	Thickness T mm	Sectional area cm²	Moment of Inertia cm⁴	Section Modulus cm³	Unit Mass kg/m	Sectional Area cm²/m	Moment of Inertia cm⁴/m	Section Modulus cm³/m	Unit Mass kg/m²
NS-SP-FL	500	44.5	9.5	78.57	184	45.7	61.7	157.1	396	89	123
NS-SP-FXL	500	47.0	12.7	98.36	245	60.3	77.2	196.7	570	121	154

TAIHEYO CEMENT WHARF



SHEET PILES

COLD FORMED

Our MMZ, MMU and MLL sheet piles have been our original line of sheet piles since 2011.

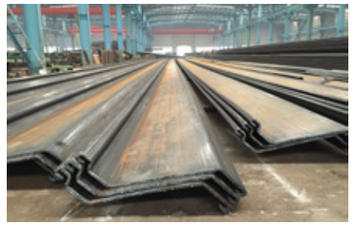
Being rolled in a Cold Formed manner using Coils as the raw material, we can customise any width, height, shape as per customer's requirements.

Interlocks are Hook and Grip. Sheet piles are rolled to EN10249 standards and meet international quality standards.

SHEET PILES

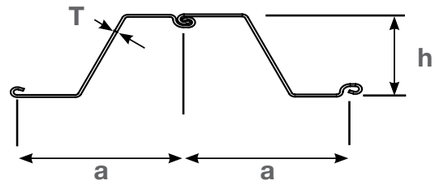
ADVANTAGES OF MMZ SHEET PILES

- Interlocks located away from the neutral axis
- Large width resulting in good installation performance
- Customization to lengths of up to 35m
- Wide range of variable widths and lengths
- Highly efficient section modulus to mass ratio
- Up to 16mm thickness and section modulus of 5000 cm^3/m



Available Steel Grade

- EN 10025: S235 / S275 / S355 / S390 / S420 / S460
- JIS 5528: SY295 / SY390
- ASTM A572: Gr. 43 / Gr. 50 / Gr. 60
- Low Corrosion Steel: ASTM A690 Mariner Steel Grade (345 / 390 / 430)



MMZ SPECIFICATIONS

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulus
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MMZ11-1	575	260	8.8	128.7	58.1	101	13860	1066
MMZ11-2	575	260	9.5	138.9	63.2	109	14563	1120
MMZ12-1	670	302	8.5	126.1	66.1	99	18726	1239
MMZ12-2	770	344	8.5	120	72.6	94.2	21413	1302
MMZ12-3	575	260	10	155.9	70.4	122.4	15845	1217
MMZ12-4	700	314	8.5	122.7	67.4	96.3	18889	1202
MMZ13-1	670	303	9.5	136.9	72	107.5	19381	1279
MMZ13-2	770	344	9	125.0	75.6	98.1	22579	1312
MMZ13-3	575	260	10.5	161	72.6	126.4	16540	1272
MMZ13-4	700	315	9.5	134.6	74	105.7	20537	1303
MMZ13-5	700	316	10	140.4	77.2	110.2	21420	1355
MMZ13-6	650	350	8	119.5	61	93.8	22799	1303
MMZ14-1	670	304	10.5	153.6	80.8	120.6	21220	1395
MMZ14-2	770	345	9.5	131.1	79.3	102.9	23396	1355
MMZ14-3	770	345	10	137.2	82.9	107.7	24315	1409
MMZ14-4	700	316	10.3	146.1	80.3	114.7	22258	1407
MMZ15-1	700	420	7	109.2	60	85.7	31087	1480
MMZ15-2	700	450	7	108.4	59.6	85.1	33203	1475
MMZ16-1	575	350	8.5	141.7	63.9	111.2	28009	1600
MMZ16-2	640	400	8	127.4	64	100	32421	1620
MMZ17-1	630	379	8.5	137.1	67.8	107.6	31592	1666
MMZ17-2	700	420	8.5	133	73.1	104.4	37135	1767
MMZ17-3	575	350	9	148	66.8	116.2	29040	1659
MMZ17-4	575	370	9	148.4	67	116.5	31798	1718
MMZ17-5	575	350	9.5	156.2	70.5	122.6	29796	1702
MMZ17-6	675	430	8.5	133	70.5	104.4	36820	1712
MMZ18-1	630	380	9.5	150.4	74.4	118.1	34220	1801
MMZ18-2	700	420	9	139.2	76.5	109.3	37991	1808
MMZ18-3	575	350	9.8	160.1	72.3	125.7	30962	1767
MMZ18-4	575	350	10	163.4	73.8	128.3	31578	1804
MMZ18-5	675	420	9	141.1	74.8	110.8	37990	1808
MMZ18-6	630	381	9.9	157.2	77.8	123.4	35721	1874
MMZ18-7	700	440	9	140.9	77.4	110.6	41587	1890
MMZ19-1	630	381	10.2	163.8	81	128.6	35803	1879
MMZ19-2	700	421	9.5	145.6	80	114.3	39592	1880
MMZ19-3	675	390	10	157.8	83.6	123.9	36367	1865
MMZ20-1	700	421	10	152	83.5	119	41048	1950
MMZ23-1	575	350	11	181	81.8	142.3	40600	2320
MMZ24-1	700	459	11.2	174	95.7	136.7	55768	2430
MMZ19-3	675	390	10	156.6	83	122.9	37475	1921
MMZ20-1	700	421	9.9	152	83.5	119.3	41031	1948
MMZ21-1	575	350	11	189.2	85.4	148.5	36631	2093
MMZ22-1	575	350	11.5	199.1	89.9	156.3	37913	2166
MMZ23-1	575	350	12	208.4	94.1	163.6	39530	2258
MMZ24-1	700	449	10.5	172.4	94.7	135.3	55256	2460
MMZ24-2	575	350	12.5	219.5	99.1	172.3	41558	2374
MMZ24-3	700	480	10	163.3	89.7	128.2	58912	2454
MMZ24-4	700	540	9.5	156.7	86.1	123	66447	2460
MMZ25-1	630	440	10.5	180.8	89.4	141.9	54750	2488
MMZ25-2	675	440	11	183.4	97.2	144	55500	2522
MMZ25-3	575	350	13	227.4	102.6	178.5	43459	2482
MMZ26-1	630	470	11.5	197.7	97.9	155.2	63318	2695
MMZ26-2	700	460	11.5	187.3	102.9	147	59887	2603
MMZ26-3	675	430	12	199.1	105.5	156.3	56023	2605
MMZ26-4	700	500	10	167.3	91.9	131.3	65322	2612
MMZ26-5	700	470	10.5	176.3	96.9	138.4	62047	2640
MMZ27-1	675	460	12	200.3	106.1	157.2	62336	2709
MMZ27-2	630	480	10.5	185	91.5	145.2	65379	2723
MMZ28-1	630	440	12.5	213.6	105.7	167.7	60621	2754
MMZ28-2	700	461	13.2	214.6	118	168.5	65537	2755
MMZ28-3	700	461	12	200.1	110	157.1	64901	2815

SHEET PILES

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulus
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MMZ28-4	700	500	11.2	188.5	103.6	148	70005	2800
MMZ28-5	700	480	11.5	189.4	104.1	148.7	67502	2812
MMZ28-6	700	481	11	184.5	101.4	144.8	66546	2766
MMZ32-1	675	485	12	212.1	112.4	166.5	77985	3215
MMZ34-1	675	500	12	215.9	114.4	169.5	84865	3394
MMZ35-1	675	500	12.5	224.3	118.9	176.1	87685	3506
MMZ36-1	675	485	13	234.1	124.1	183.8	87785	3620
MMZ36-2	700	540	12.2	215.9	118.6	169.5	97450	3609
MMZ36-3	630	490	12.5	235.5	116.5	184.9	88299	3604
MMZ37-1	700	500	13	231.8	127.4	182	92562	3702
MMZ37-2	675	485	13.5	242.5	128.5	190.4	89960	3709
MMZ38-1	675	485	14	249.8	132.4	196.1	91989	3793
MMZ38-2	700	570	13	230.1	126.4	180.6	109180	3830
MMZ39-1	700	560	13.5	239.9	131.8	188.3	110180	3935
MMZ40-1	700	550	13.8	244.2	134.2	191.7	110027	4000
MMZ41-1	700	540	14	251.8	138.4	197.7	111480	4128
MMZ42-1	700	550	14	253.1	139.1	198.7	115747	4209
MMZ42-2	700	550	14.2	258.7	142.1	203.1	115660	4205
MMZ43-1	700	560	14	253.9	139.5	199.3	119843	4280
MMZ43-2	700	560	13.5	248.4	136.5	195	120877	4316
MMZ44-1	700	540	14.5	271.3	149.1	213	118995	4403
MMZ44-2	700	550	14	256.9	141.2	201.7	121091	4403
MMZ46-1	580	540	14.2	291.2	132.6	228.6	124708	4618
MMZ46-2	700	525	15.2	287	157.7	225.3	121241	46.16
MMZ46-3	700	560	15	281	154.4	220.6	129611	4628
MMZ46-4	700	600	14	258.2	141.9	202.7	138283	4609
MMZ48-1	580	570	15	306.6	139.6	240.7	137234	4814
MMZ48-2	580	540	15	306/6	139.6	240.7	137234	4814
MMZ48-3	700	550	15.2	288.4	158.5	226.4	132187	4805
MMZ50-1	580	580	16	322.2	146.7	252.9	145656	5022
MMZ50-2	580	530	15.5	316.9	144.3	248.8	132744	5008
MMZ50-3	700	530	16	302.5	166.3	237.5	133465	5036
MMZ50-4	700	560	16	298.5	164	234.3	140578	5020
MMZ50-5	580	520	15	322.3	146.7	253	133709	5142
MMZ52-1	700	550	16	305.2	167.7	239.6	143742	5226

In 2017, we introduced a new range of MMZ piles which features 700 - 800mm width. This is inline with the trend of moving towards wider and more efficient sections to speed up installation time. Weight have been optimized to provide greater savings compared to standard sections, while retaining the section modulus to meet the design requirements.

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulus
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MMZ 18-800	800	500	8.5	127.1	79.9	99.8	46474	1858
MMZ 20-800	800	490	9.5	141.1	88.7	110.8	49026	2001
MMZ 22-800	800	500	10	149.7	94	117.5	54142	2165
MMZ 23-800	800	530	9.5	147.1	92.4	115.5	61811	2332
MMZ 25-800	800	520	10.5	163.1	102.6	128	65060	2501
MMZ 27-800	800	520	11.5	176.1	110.6	138.2	64919	2670
MMZ 28-750	750	560	10	165.4	97.4	129.8	78780	2813
MMZ 30-750	750	550	11.2	183.2	107.9	143.8	82741	3008
MMZ 32-750	750	560	12	197.2	116.1	154.8	89690	3202
MMZ 23-750	750	530	9.5	150.6	88.7	118.2	61642	2326
MMZ 23-700	700	530	9.5	154.4	84.9	121.2	61450	2318
MMZ 25-750	750	520	10.5	167.4	98.5	131.4	64854	2494
MMZ 25-700	700	520	10.5	171.8	94.5	134.9	64618	2485

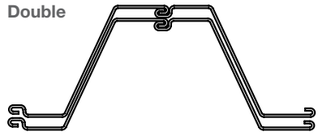
Interlocks

MMZ Interlocks are manufactured to EN 10249-2 Standards. The hook and grip type interlocks provide up to 15-20 degrees in swing angle while ensuring good water tightness in the retaining wall.

Single/Double Piles

Single

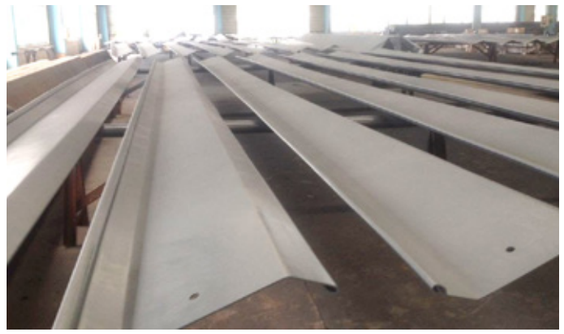
Double



Customers may request for delivery in single-pile or double-pile formats as per piling requirements.

Corner Pile Requirements

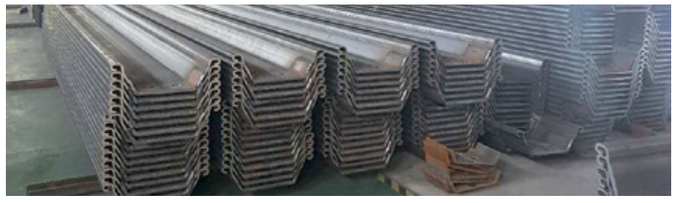
Cold Formed corner connectors for non linear piling and connection to King Piles.

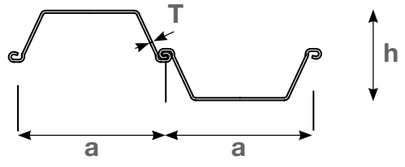


SHEET PILES

ADVANTAGES OF MMU SHEET PILES

- Wide range of up to 4600 cm^3/m
- Ease of piling and handling
- Good for re-use and temporary works





MMU SPECIFICATIONS

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulus
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MMU5-1	600	150	8.5	119.7	56.4	94	3800	508
MMU5-2	600	150	9.5	135.7	63.9	106.5	4162	554
MMU5-3	400	210	6	104.5	32.8	82	5621	535
MMU6-1	600	180	8.5	125.1	58.9	98.2	5464	606
MMU6-2	600	280	6	89.6	42.2	70.3	9038	645
MMU6-3	600	309	6	89	41.9	69.9	10005	647
MMU7-1	600	300	6	92.9	43.7	72.9	10508	700
MMU7-2	600	340	6	95	44.7	74.6	13273	780
MMU7-3	600	310	6.4	93.6	44.1	73.5	10539	680
MMU7-4	600	320	6.5	98.2	46.3	77.1	11872	741
MMU7-5	600	325	6.5	100.8	47.2	79.1	15540	771
MMU8-1	600	360	6	96.1	45.2	75.4	14749	819
MMU8-2	600	340	6.5	102.2	48.1	80.2	14888	875
MMU8-3	600	325	7	109.9	51.8	86.3	14258	876
MMU8-4	750	320	6	87.1	51.3	68.4	13025	813
MMU8-5	600	320	7	103.1	48.5	80.9	12338	770
MMU8-6	600	325	7.3	107.8	50.8	84.6	13355	821
MMU9-1	600	360	6.5	105.1	49.5	82.5	17360	964
MMU9-2	600	330	7.5	115.8	54.5	90.9	15313	927
MMU9-3	750	320	7	101.8	59.9	79.9	14507	906
MMU9-4	600	355	7	111.7	52.6	87.7	16823	947
MMU10-1	600	300	7	114.4	53.9	89.8	19078	1031
MMU10-2	600	310	9	141.7	66.7	111.2	16056	1035
MMU11-1	600	380	7.5	123.3	58.1	96.8	22313	1174
MMU11-2	600	360	8	131.6	62	103.3	20095	1115
MMU11-3	600	400	7	117.5	55.3	92.2	23716	1185
MMU11-4	575	360	8	133.8	60.4	105	19890	1104
MMU11-5	600	310	9.5	148.8	70.1	116.8	17160	1106
MMU12-1	600	380	8.5	140.4	66.1	110.2	22936	1206
MMU12-2	500	360	8	143.9	56.5	113	20701	1150
MMU12-3	700	440	7.5	115.8	64.2	90.9	26978	1225
MMU12-4	600	360	9	147.8	69.6	116	22670	1259
MMU12-5	450	360	9.5	182	64.3	142.9	24930	1384
MMU12-6	600	360	8.5	140.4	66.1	110.2	21600	1200
MMU13-1	675	420	7.5	123.6	65.6	97	28931	1378
MMU13-2	600	310	10	163.9	77.2	128.7	19552	1260
MMU13-3	500	355	8.5	154.6	60.7	121.4	21816	1229
MMU13-4	700	440	8	126.6	69.6	99.4	28765	1307
MMU13-5	700	400	10	159.7	87.8	125.4	31012	1550
MMU13-6	500	340	10	180.1	70.7	141.4	22195	1305
MMU13-7	600	360	10	163.4	77	128.3	23114	1283
MMU13-8	575	360	10	166.1	75	130.4	22786	1265
MMU13-9	400	290	11.5	233.8	73.4	183.5	19546	1347
MMU13-10	600	408	7.5	127.4	60	100	26105	1279
MMU13-11	600	400	8	138.6	65.3	108.8	26720	1335
MMU14-1	750	445	8	126.0	74.2	98.9	31802	1429
MMU14-2	675	435	8	133.1	70.5	104.5	31589	1451
MMU14-3	750	408	8.5	132.2	77.9	103.8	29055	1424
MMU14-4	600	430	8	136.4	64.3	107.1	30273	1407
MMU15-1	675	420	8.5	142.2	75.3	111.6	31944	1520
MMU15-2	500	360	10	183.7	72.1	144.2	25820	1434
MMU15-3	600	422	8.2	145.9	68.7	114.5	32633	1546
MMU16-1	750	440	9	143.6	84.5	112.7	35660	1620
MMU16-2	600	380	9.5	156.7	73.8	123	30400	1600
MMU16-3	600	420	9	159.4	75.1	125.1	33916	1615
MMU16-4	700	450	9	148.0	81.4	116.2	36787	1635
MMU16-5	650	480	8	141.7	72.3	111.2	40508	1687
MMU16-6	750	411	9.3	146.5	86.3	115	33230	1616
MMU16-7	600	430	8.5	154.1	72.6	121	35930	1670
MMU17-1	750	430	9.5	151.3	89.1	118.8	37094	1724
MMU17-2	500	340	11.5	220.9	86.7	173.4	28257	1662
MMU17-3	650	500	8	140.1	71.5	110	41197	1647
MMU17-4	600	460	8.5	153.9	72.5	120.8	38299	1665
MMU18-1	750	460	9	148.8	87.6	116.8	41641	1810
MMU18-2	600	460	9	163.3	76.9	128.2	41410	1801
MMU18-3	600	460	9.5	170.1	80.1	133.5	42006	1825
MMU18-4	750	441	9.3	150.3	88.5	118	39296	1782
MMU18-5	600	430	8.5	154.1	72.6	121	35930	1670
MMU18-6	600	435	9.3	187.0	88.1	146.8	41781	1921
MMU18-7	600	430	9	163.3	76.9	128.2	38919	1810

SHEET PILES

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulos
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MMU20-1	750	460	10	164.6	96.9	129.2	44916	1952
MMU20-2	600	450	10	181.5	85.5	142.5	42013	1867
MMU20-3	600	450	10.5	189.2	89.1	148.5	43245	1921
MMU20-4	750	480	10.5	173.4	102.1	136.1	49525	2063
MMU20-5	700	480	10	179.2	98.5	140.7	48911	2037
MMU20-6	650	540	8	150.1	76.6	117.8	54535	2019
MMU20-7	600	460	9.5	172.2	81.1	135.2	44048	1915
MMU20-8	600	470	9.5	176.7	83.2	138.7	47676	2028
MMU21-1	750	500	10	169.2	99.6	132.8	53069	2122
MMU21-2	600	500	9.5	175.2	82.5	137.5	50293	2011
MMU21-3	400	420	10.5	247.4	77.7	194.2	43670	2078
MMU21-4	600	470	9.2	173.9	81.9	136.5	48615	2068
MMU22-1	600	500	10	191.1	90	150	55161	2205
MMU22-2	600	490	9.5	182.8	86.1	143.5	54083	2206
MMU22-3	600	510	10	192.0	90.4	150.7	59635	2338
MMU23-1	700	500	10.5	191.7	105.4	150.5	56811	2272
MMU23-2	650	540	9	172.0	87.8	135	62640	2320
MMU23-3	750	480	10.5	180.4	106.2	141.6	54701	2278
MMU23-4	600	450	12	227.8	107.3	178.8	51450	2286
MMU23-5	750	505	10	173.4	102.1	136.1	57409	2274
MMU25-1	750	500	11.5	200.6	118.1	157.5	62563	2502
MMU25-2	600	490	11.5	224.7	105.8	176.4	61535	2511
MMU25-3	500	450	12	259.9	102	204	56224	2500
MMU25-4	750	510	10.6	187.5	110.4	147.2	64086	2513
MMU26-1	750	500	12	212.0	124.8	166.4	65330	2612
MMU26-2	500	450	12.5	271.0	106.4	212.7	57454	2552
MMU26-3	650	540	10	193.2	98.6	151.7	69043	2557
MMU26-4	750	540	10	178.3	105	140	69190	2562
MMU27-1	600	500	11.5	230.6	108.6	181	67348	2693
MMU27-2	600	420	15	296.8	139.8	233	57625	2745
MMU28-1	600	500	12	244.8	115.3	192.2	70976	2840
MMU28-2	600	480	13	265.1	124.9	208.1	67764	2823
MMU28-3	600	560	10.2	206.8	97.4	162.3	75158	2683
MMU28-4	600	565	10.5	216.1	101.8	169.6	80813	2860
MMU28-5	600	590	10.8	225.6	106.2	177.1	89362	3029
MMU30-1	500	500	13	299.6	117.6	235.2	75459	3018
MMU32-1	600	452	14	244.0	114.9	191.5	72320	3200
MMU32-2	600	515	14	293.9	138.4	230.7	82664	3211
MMU32-3	750	645	11	207.5	122.2	162.9	102790	3186
MMU32-4	700	560	12	235.7	129.5	185	90815	3245
MMU32-5	670	520	14	275.4	144.8	216.2	82566	3175
MMU32-6	600	595	11.2	233.4	109.9	183.2	91276	3068
MMU32-7	600	600	11.5	242.3	114.1	190.2	96141	3204
MMU32-8	600	605	11.8	251.3	118.4	197.3	102098	3375
MMU35-1	700	560	13	261.3	143.6	205.1	97765	3492
MMU35-2	750	608	12	231.2	136.1	181.5	105070	3456
MMU37-1	750	610	13	256.4	151	201.3	114296	3746
MMU37-2	700	600	13.5	268.9	147.8	211.1	111822	3730
MMU40-1	750	610	14	278.3	163.9	218.5	122670	4021
MMU40-2	700	580	15	304.6	167.4	239.1	115719	3990
MMU43-1	750	610	15	300.6	177	236	132280	4338
MMU43-2	750	615	16	316.6	186.4	248.5	133633	4345
MMU46-1	750	630	16	327.0	192.5	256.7	145784	4628

Interlocks

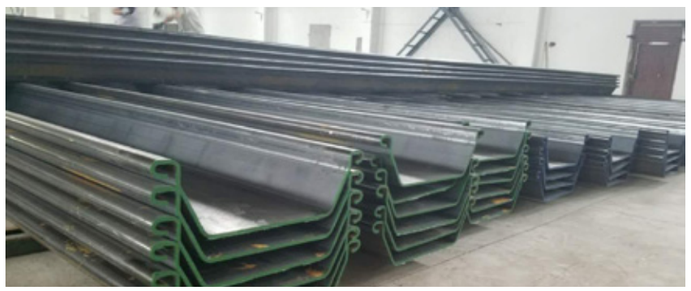
MMU Interlocks are manufactured to EN 10249-2 Standards. The hook and grip type interlocks provide up to 15-20 degrees in swing angle while ensuring good water tightness in the retaining wall.

Circular Cofferdams

With up to 20 degrees flexibility in the interlocks, a circular excavation can be carried out with MMU sheet piles effectively.

Corner Pile Requirements

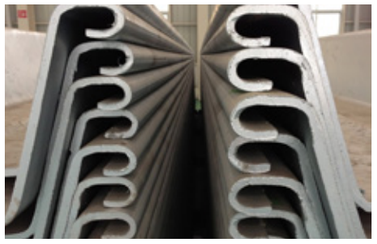
Cold Formed corner connectors for non linear piling and connection to King Piles.

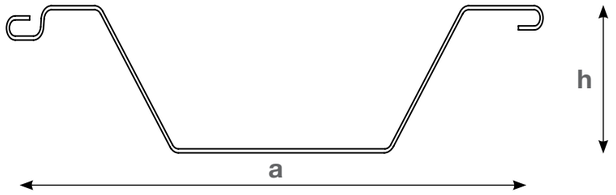


SHEET PILES

ADVANTAGES OF MLL SHEET PILES

- Replaces JIS Hat Type Sheet Piles
- Ease of piling and handling
- Can be welded together with H Piles to form Stronger Sections





MLL SPECIFICATIONS

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulos
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MLL2-1	700	146	4	56.1	30.8	44	1945	266
MLL2-2	900	155	4	53.2	37.7	41.8	2415	284
MLL3-1	700	147	5	70.3	38.6	55.2	2427	330
MLL3-2	700	148	6	84.1	46.2	66	2907	392
MLL4-1	600	249.5	3.5	60.9	28.7	47.8	5883	470
MLL4-2	700	149	7	98.1	53.9	77	3352	450
MLL5-1	700	150	8	112.1	61.6	88	3814	508
MLL5-2	705	152	8	113.1	62.6	88.8	3950	519
MLL5-3	750	250	4	63.6	37.4	49.9	6582	526
MLL5-4	600	250	4	69.7	32.8	54.7	6711	537
MLL6-1	700	251	5	82.5	45.4	64.8	8408	670
MLL6-2	750	251	5	81.0	47.7	63.6	8441	672
MLL7-1	921	252	6	91.2	65.9	71.6	9941	789
MLL7-2	750	252	5.7	93.8	55.2	73.6	9604	763
MLL8-1	750	252	6	98.1	57.8	77	10138	804
MLL8-2	750	252	6.2	101.4	59.7	79.6	10470	830
MLL9-1	750	253	7	115.2	67.8	90.4	11810	933
MLL9-2	900	253	7	107.6	76	84.5	11607	917
MLL9-3	700	311.5	5.5	99.4	54.6	78	14634	939
MLL9-4	900	312	7	92.9	65.6	72.9	13931	893
MLL10-1	750	254	8	131.5	77.4	103.2	13345	1050
MLL10-2	900	254	8	122.8	86.8	96.4	13138	1034
MLL10-3	900	313	7	109.2	77.2	85.7	16317	1042
MLL11-1	750	255	9	150.2	88.4	117.9	15256	1196
MLL11-2	900	255	9	140.0	98.9	109.9	14983	1175
MLL11-3	700	312.5	6.5	117.7	64.7	92.4	17327	1108
MLL12-1	1400	314.5	8.5	115.3	126.7	90.5	19077	1213
MLL12-2	1540	349	8.5	111.7	135.1	87.7	21966	1259
MLL12-2	900	314	8	124.8	88.2	98	18436	1174
MLL12-3	900	348	7	114.9	81.2	90.2	21125	1214
MLL12-4	1340	314.5	8.5	116.7	122.7	91.6	19040	1210
MLL13-1	1400	315.5	9.5	127.4	140	100	20973	1330
MLL13-2	1540	349.5	9	117.6	142.2	92.3	22949	1312
MLL13-3	750	347.5	7	129.8	76.4	101.9	23218	1342
MLL13-4	900	349	8	131.2	92.7	103	23944	1372
MLL13-5	1340	315.5	9.5	128.9	135.6	101.2	20916	1326
MLL14-1	1400	316	10	133.4	146.6	104.7	21919	1387
MLL14-2	1400	316.5	10.5	139.9	153.7	109.8	22678	1432
MLL14-3	1540	350	9.5	123.4	149.3	96.9	23847	1362
MLL14-4	1540	350.5	10	129.6	156.7	101.7	24977	1425
MLL14-5	750	348	7.5	137.6	81	108	24529	1414
MLL14-6	1340	316.5	10.5	141.4	148.8	111	22593	1428
MLL14-7	900	316	10	156.4	110.5	122.8	22978	1454
MLL15-1	750	348.5	8	147.1	86.6	115.5	26256	1512
MLL15-2	900	350	9	147.6	104.3	115.9	26683	1525
MLL16-1	1260	379	8.5	130.4	129.1	102.4	31326	1653
MLL16-2	750	349	8.5	158.1	93.1	124.1	28026	1613
MLL17-1	1400	423.5	8.5	126.0	138.5	98.9	36954	1745
MLL17-2	750	349.5	9	167.4	98.5	131.4	29618	1702
MLL18-1	1260	380	9.5	144.5	142.9	113.4	34659	1823
MLL18-2	1400	424	9	132.4	145.5	103.9	38234	1802
MLL18-3	750	350	9.5	176.7	104	138.7	31305	1798
MLL18-4	1600	449	8.5	122.7	154.2	96.3	41530	1850
MLL19-1	1260	381	10	151.2	149.5	118.7	35936	1886
MLL19-2	1400	424.5	9.5	139.4	153.1	109.4	40303	1898
MLL19-3	750	350.5	10	186.0	109.5	146	33050	1893
MLL20-1	1260	381.5	10.5	161.8	160.1	127	39065	2047
MLL20-2	1400	425	10	145.2	159.6	114	41428	1948
MLL20-3	1600	450	9.5	136.9	172	107.5	46336	2059
MLL22-1	1400	475	10	150.1	165	117.8	52048	2191
MLL22-2	1600	451	10.5	149.8	188.2	117.6	49213	2182
MLL23-1	1600	474.5	9.5	144.1	181	113.1	55650	2345
MLL24-1	1260	426.2	11.2	178.2	176.3	139.9	52149	2446
MLL24-2	1400	476.2	11.2	169.0	185.8	132.7	58512	2457
MLL25-1	1600	475.5	10.5	158.7	199.4	124.6	60208	2532
MLL26-1	1260	427.2	12.2	194.1	192	152.4	55990	2621
MLL26-2	1400	477.2	12.2	183.7	201.9	144.2	62045	2601
MLL27-1	1600	476.5	11.5	172.5	216.6	135.4	65401	2745
MLL28-1	1260	428.2	13.2	211.7	209.4	166.2	60145	2808
MLL28-2	1400	478.2	13.2	199.9	219.7	156.9	66192	2768

SHEET PILES

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulos
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MLL28-3	1500	509.2	10.2	166.8	196.4	130.9	72606	2851
MLL29-1	1400	510.2	11.2	179.6	197.5	141	74056	2902
MLL30-1	1500	510.2	11.2	179.0	210.7	140.5	76918	3015
MLL31-1	1400	511	12	193.6	212.8	152	79733	3120
MLL32-1	1400	511.5	12.5	201.9	221.9	158.5	80906	3163
MLL32-2	1500	511	12	192.7	226.9	151.3	82772	3239
MLL33-1	1400	512	13	209.3	230	164.3	84655	3306
MLL40-1	1160	549.5	13.5	249.3	227	195.7	111652	4064
MLL42-1	1160	550	14	259.2	236.1	203.5	115910	4215
MLL44-1	1160	550.5	14.5	274.9	250.3	215.8	121797	4420

Section	Width a	Height h	Thickness T	Section Area	Weight	Weight	Inertia	Section Modulos
	mm	mm	mm	cm^2/m	kg/m	kg/m^2	cm^4/m	cm^3/m
MLT1-1	600	78	6	80.9	38.1	63.5	704	180
MLT1-2K	600	78	6	81.8	38.5	64.2	726	185
MLT1-3	650	78	6	79.4	40.5	62.3	700	180
MLT1-4	550	78	6	79.9	34.8	62.7	698	178
MLT1-5	500	78	6	84.6	33.2	66.4	688	176
MLT1-6K	742	92	6	69.8	40.7	54.8	896	194
MLT1-7K	400	50	6	70.7	22.2	55.5	250	100
MLT1-8K	400	48	4	47.1	14.8	37	165	69
MLT1-9	300	36.5	3.4	48.4	11.4	38	84	46
MLT1-10	330	37	4	51.7	13.4	40.6	99	53
MLT1-11	400	36.6	3.5	43.3	13.6	34	85	47
MLT1-12	400	37	4	49.7	15.6	39	92	53
MLT2-1	600	80	8	108.0	50.9	84.8	942	237
MLT2-2K	742	94	8	93.4	54.4	73.3	1200	254
MLT2-3K	600	80	8	108.4	51.1	85.1	970	241
MLT2-4K	742	93	7	81.5	47.5	64	1045	225
MLT2-8	880	152	4	59.6	41.2	46.8	1897	251
MLT3-1	880	154	6	89.6	61.9	70.3	2848	372
MLT4-1	880	156	8	122.4	84.6	96.1	3880	500

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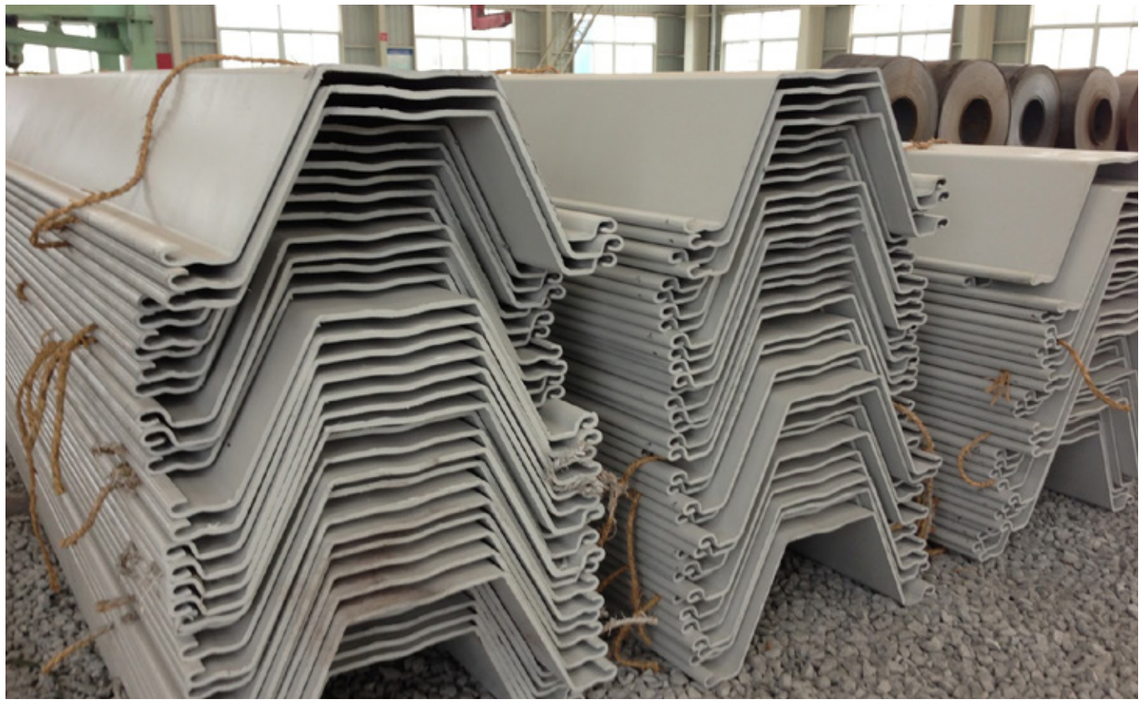
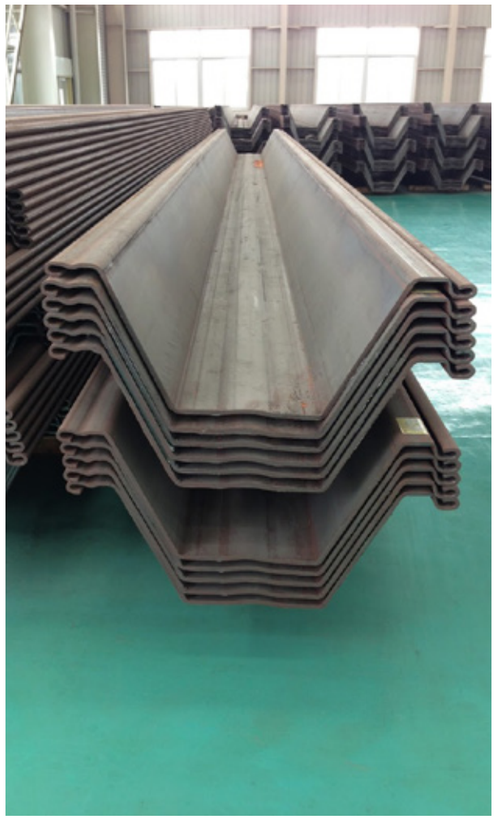
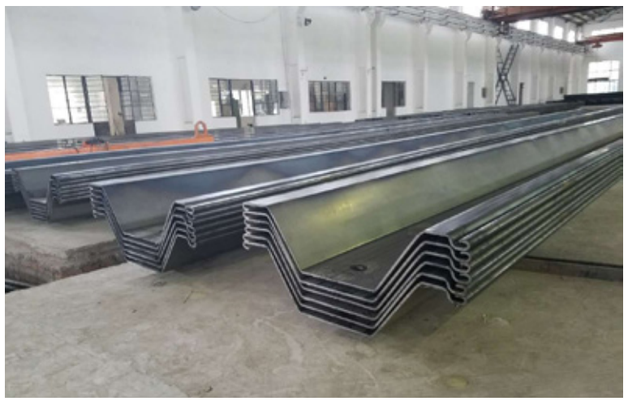






COMBI WALL

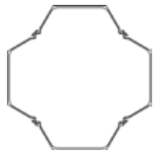
BOX PILES

Box Piles are an efficient way in which combination walls can be easily created. They use existing sheet pile sections available such as MHZ, or MHU sheet piles and weld together to form a box. These boxes can be paired with single sheets to form a strong wall. When sheet piles are welded to form a box, the piles act as a King Pile and have bearing capacity.

CHZ Box

CHU Box

CHU Triple Box



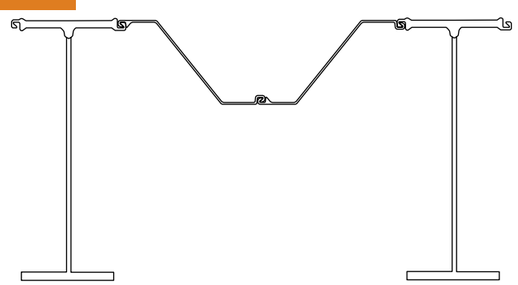
CHU Quad Box

PIPE + MHZ

Pipes have traditionally been able to withstand both transverse and axial load. When CP2 interlocks and MHZ Sheet Piles are coupled together, it can easily form a strong combination wall. The benefit of pipes is the ability to customise the Outside Diameter, Thickness and Steel Grade to cater to the required strength of the wall. The MHZ sheet piles then act as an intermediary sheet piles and cutoff wall.

BEAM + SHEET PILES

Advancements in rolling techniques have enabled us to build up beams with Hot Rolled Flanges with interlocks to thread MHZ Sheet Piles. The resulting Beam acts as a King Pile providing the required stability and load bearing of the wall. The intermediary MHZ sheet piles help to transfer the load and cut off any soil erosion behind the wall.



For high strength retaining walls that require section modulus larger than 5200 cm^3/m, a combination wall will be required. A combi-wall is a combination of a king pile together with sheet piles or interlocking elements to provide a continuous wall to retain the soil behind it. This can be in the form of Steel Pipe Sheet Piles (O-Pile refer to page 45), or Pipe-Sheet Piles Combi Wall, Beam-Sheet Piles Combi Wall and Box Pile Configurations.

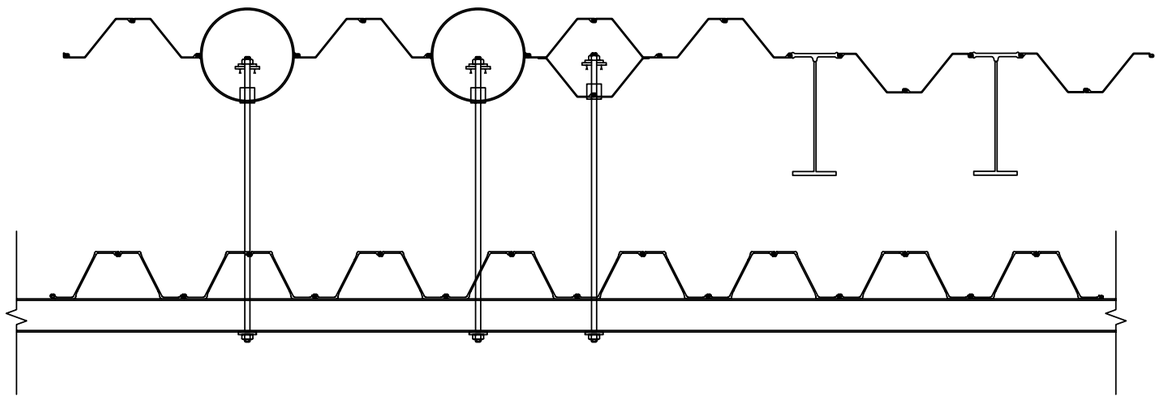
Advantages of Combi Wall

- High Strength Retaining Walls
- King Piles can provide greater retaining capacity
- Load Bearing Capacity
- Connectors available for different applications

Available Steel Grade

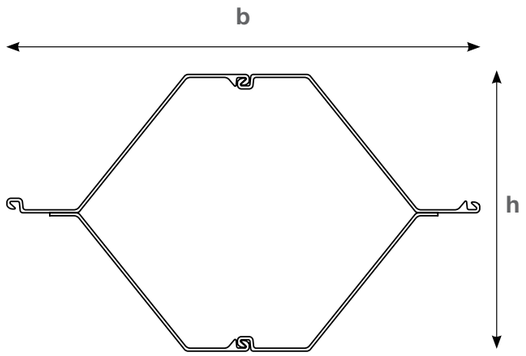
- EN 10025: S235 / S275 / S355 / S390 /S420 / S460
- JIS 5528: SY295 / SY390
- ASTM A572: Gr. 43 / Gr. 50 / Gr. 600
- Low Corrosion Steel: ASTM A690 Mariner Steel Grade (345 / 390 / 430)

Infinite Possibilities

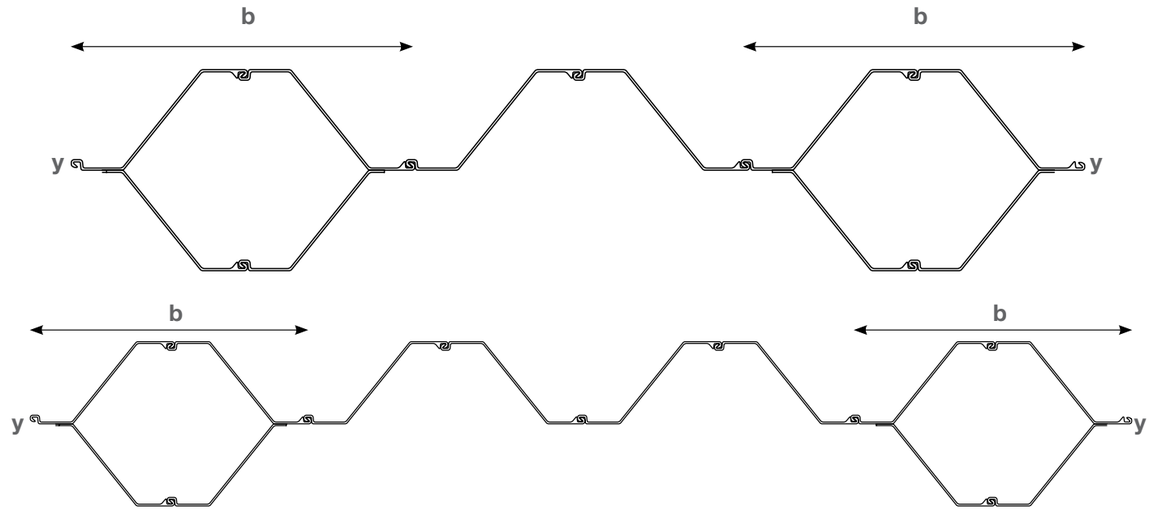


With our diverse range of Combi Wall Solutions, we are able to create infinite possibilities of solutions for our customers. Our in-house design team will be able to find the right combination of King Piles, matched with Sheet Piles and Tie Rods for your project. Customers can provide their soil investigation so that our engineers can calculate the corresponding wall requirements. The Pipes, Sheet Piles and Tie Rods can be delivered to your project site directly from our production facilities.

SHEET PILES



CHZ Box Piles are made up of 4 pieces of MHZ Sheet Piles. The combination provides a very strong structure that can be driven into the ground to form the King Pile. The existing interlocks act as the interlocking element with intermediary sheet piles to lower the overall wall weight. Customising the number of intermediary sheet piles will result in varying strengths required for the wall. Fabrication can be done in factory or on site by customers.



CHZ BOX PILES

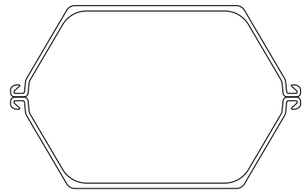
Section	Width b	Height h	Perimeter	Section Area	Total Section	Mass	Moment of Inertia		Election Section		Min. Radius of Gyration	Coating Area
							y-y	z-z	y-y	z-z		
	mm	mm	cm	cm^2	cm^2	kg/m	cm^4	cm^4	cm^3	cm^3	cm	m^2/m
CMHZ 12-1	1540	687	389	328	5431	257	175060	557990	5075	6985	23.1	h3.67
CMHZ 13-1	1540	688	389	344	5446	270	183440	584640	5310	7320	23.1	3.67
CMHZ 14-1	1540	689	390	360	5461	283	191840	611300	5545	7655	23.1	36.7
CMHZ 17-1	1400	839	391	330	6015	259	265280	457950	6300	6285	28.3	3.69
CMHZ 18-1	1400	840	391	347	6029	272	277840	479790	6590	6590	28.3	3.69
CMHZ 20-1	1400	842	392	379	6058	297	303090	523460	7170	7195	28.3	3.69
CMHZ 24-2	1400	918	407	436	6616	342	412960	596900	8965	8260	30.8	3.85
CMHZ 26-2	1400	920	407	469	6645	368	444300	641850	9625	8900	30.8	3.85
CMHZ 28-2	1400	922	408	503	6674	395	475810	686880	10285	9510	30.8	3.85
CMHZ 36-1	1400	998	434	534	7215	419	627000	710770	12525	9895	34.3	4.12
CMHZ 38-1	1400	1000	435	570	7245	447	667900	757530	13315	10550	34.2	4.12
CMHZ 40-1	1400	1002	436	606	7275	476	709010	804300	14105	11205	34.2	4.12
CMHZ 42-1	1400	998	443	646	7267	507	744440	855860	14870	11915	34.0	4.11
CMHZ 44-1	1400	1000	434	682	7298	535	785620	902800	15660	12570	33.9	4.11
CMHZ 46-1	1400	1002	434	718	7328	564	827030	949760	16455	13225	33.9	4.11
CMHZ 48-1	1400	100	435	710	7346	558	845530	931330	16745	12965	34.5	4.13
CMHZ 50-1	1400	1008	435	746	7376	586	887420	977550	17540	13620	34.5	4.13
CMHZ 52-1	1400	1010	436	782	7406	614	929550	1023800	18335	14255	34.5	4.13

SHEET PILES

CHU DOUBLE PILES

Section	Width b	Height h	Perimeter	Section Area	Total Section	Mass
	mm	mm	cm	cm^2	cm^2	kg/m
CMHU 25-2	750	495	245	281	3034	220.8
CMHU 601-2	600	349	188	118	1604	92.5
CMHU 18-2	600	473	212	196	2184	153.8
CMHU 22-2	600	494	220	219	2347	172.3
CMHU 28-2	600	499	226	259	2468	203.6
CMHU 607-2	600	499	223	291	2461	228.3

2 pieces of MHU Sheet piles welded together forms a CHU Box. U shape sheet piles only require welding to form and no cutting or additional fabrication works are required. Slotting single sheet piles in between the king piles, allow for different wall strengths and weight efficiencies to be achieved.

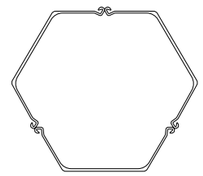


Moment of Inertia		Election Section		Min. Radius of Gyration	Coating Area
y-y	z-z	y-y	z-z		
cm^4	cm^4	cm^3	cm^3	cm	m^2/m
104810	166600	4235	4240	19.3	2.19
18210	50630	1045	1605	12.3	1.62
58020	78300	2455	2470	17.2	1.86
73740	88960	2985	2800	18.3	1.94
96000	103560	3850	3260	19.2	2.00
108800	109200	4360	3435	19.3	1.97

CHU TRIPLE BOX PILES

Section	Width b	Height h	Perimeter	Section Area	Total Section	Mass
	mm	mm	cm	cm^2	cm^2	kg/m
CMHU 25-3	1038	931	364	422	7106	331.3
CMHU 18-3	877	790	315	294	4931	230.7
CMHU 22-3	912	801	326	329	5174	258.4
CMHU 28-3	938	817	336	389	5356	305.4
CMHU 607-3	928	809	331	436	5345	342.4

3 pieces of MHU Sheet Piles welded together forms a CHU Triple Box. These king piles provide greater bearing capacity as compared to standard CHU Boxes.

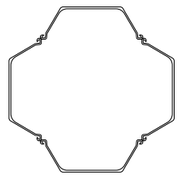


Moment of Inertia		Election Section		Min. Radius of Gyration	Coating Area
y-y	z-z	y-y	z-z		
cm^4	cm^4	cm^3	cm^3	cm	m^2/m
469030	469030	9995	9035	33.3	3.24
227330	227330	5475	5185	27.8	2.76
268440	268440	6310	5890	28.6	2.87
330290	330290	7720	7040	29.1	2.96
367400	367400	8585	7935	29.0	2.92

CHU QUADRUPLE BOX

Section	Width b	Height h	Perimeter	Section Area	Total Section	Mass
	mm	mm	cm	cm^2	cm^2	kg/m
CMHU 25-4	1266	1266	482	563	12020	441.6
CMHU 18-4	1095	1095	417	392	8231	307.6
CMHU 22-4	1115	1115	432	439	8556	344.6
CMHU 28N-4	1120	1120	445	519	8799	407.2
CMHU 607-4	1120	1120	440	582	8782	456.6

4 pieces of MHU Sheet Piles welded together forms a CHU Quad Box. These king piles provide greater bearing capacity as compared to standard CHU Boxes.

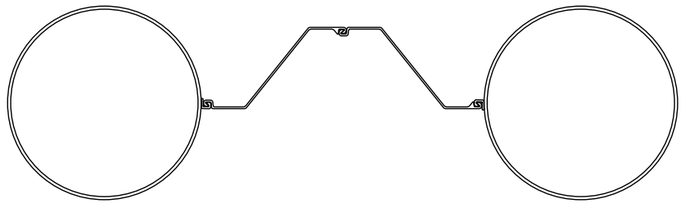


Moment of Inertia		Election Section		Min. Radius of Gyration	Coating Area
y-y	z-z	y-y	z-z		
cm^4	cm^4	cm^3	cm^3	cm	m^2/m
1064910	1064910	16820	16820	43.5	4.30
507240	507240	9270	9270	36.0	3.65
593030	593030	10635	10635	36.8	3.80
725730	725730	12955	12955	37.4	3.93
811100	811100	14480	14480	37.3	3.87

SHEET PILES

MHZ18 COMBI WALL

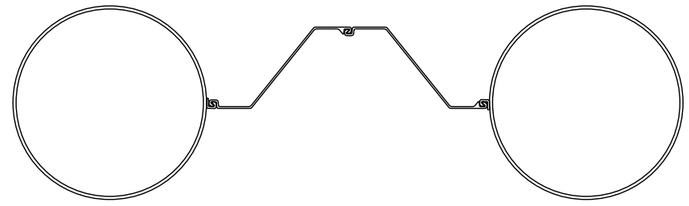
Various pipe sizes can be combined with a pair of MHZ18-1 sheet pile. These walls can be customised to suit varying soil conditions as well as corrosion factors. MHZ18-1 provides good driving capability and acts as a suitable cut off wall and intermediary sheet piles in a combination wall. Length of the MHZ18-1 may be shortened to 60% of the overall length of the pipes to save on wall weight and increased efficiency.



Pipe Dimensions		Intermediate Sheet Piles = double MHZ18-1			
Diameter (mm)	Thickness (mm)	M60% (kg/m²)	M100% (kg/m²)	I (cm⁴/m)	W (cm³/m)
914	10	133	158	144510	3162
	12	151	177	167991	3676
	14	170	195	191157	4183
1016	10	137	162	182863	3600
	12	157	182	214016	4213
	14	177	202	244795	4819
1220	10	146	168	279350	4580
	12	168	191	329738	5405
	14	190	213	379623	6223
1420	10	153	174	400624	5643
	12	177	198	475135	6692
	14	200	222	549008	7733
1520	10	156	176	471484	6204
	12	181	201	560079	7369
	14	205	226	647967	8526
1620	10	158	179	549294	6781
	12	184	204	653351	8066
	14	210	230	756628	9341
1820	10	164	183	726096	7979
	12	191	210	865279	9509
	14	218	237	1003535	11028
2020	10	169	186	931595	9224
	12	197	215	1111606	11006
	14	225	243	1290537	12778
2500	10	178	194	1544344	12355
	12	209	225	1846130	14769
	14	240	255	2146457	17172
2850	10	184	198	2099377	14732
	12	216	230	2511523	17625
	14	249	263	2921923	20505

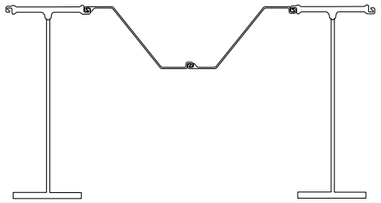
MHZ24 COMBI WALL

Various pipe sizes can be combined with a pair of MHZ24-2 sheet pile. MHZ24-2 may be selected due to its thickness and meeting corrosion criteria and design life. MHZ24-2 is often considered for harder soil conditions and its increased thickness helps aid driving. Length of MHZ24-2 may be shortened to 60% of the overall length of the pipes to save on wall weight and increase efficiency.



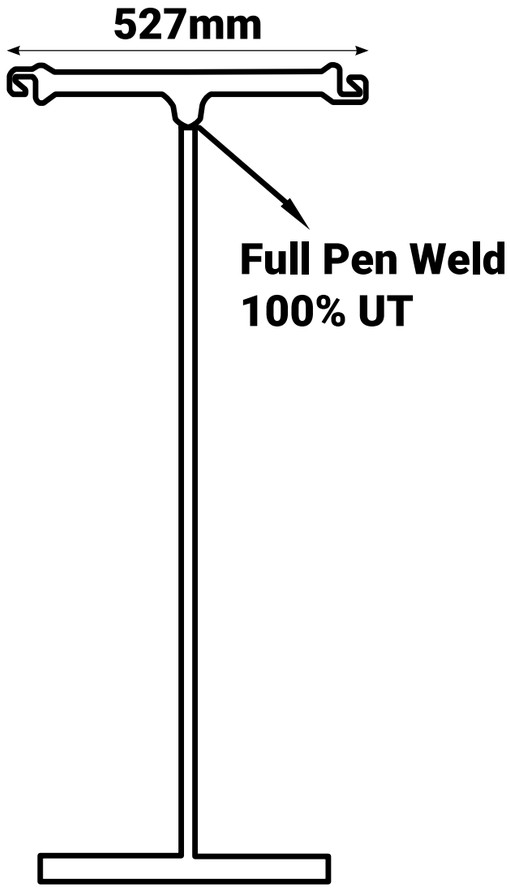
Pipe Dimensions		Intermediate Sheet Piles = double MHZ18-1			
Diameter (mm)	Thickness (mm)	M60% (kg/m²)	M100% (kg/m2)	I (cm⁴/m)	W (cm³/m)
914	10	142	175	155138	3395
	12	161	193	178618	3908
	14	179	212	201784	4415
1016	10	147	178	193053	3800
	12	166	197	224206	4414
	14	186	217	254985	5019
1220	10	154	183	288764	4734
	12	176	205	339152	5560
	14	198	227	389037	6378
1420	10	161	187	409385	5766
	12	185	211	483896	6815
	14	208	235	557769	7856
1520	10	163	189	479950	6315
	12	188	214	568546	7481
	14	213	239	656433	8637
1620	10	191	166	557486	6883
	12	217	192	661543	8167
	14	242	217	764820	9442
1820	10	171	194	733788	8064
	12	198	221	872971	9593
	14	225	248	1011227	11112
2020	10	175	197	938845	9296
	12	204	226	1118856	11078
	14	232	254	1297787	12849
2500	10	184	203	1550716	12406
	12	215	234	1852502	14820
	14	246	265	2152828	17223
2850	10	189	207	2105231	14774
	12	222	239	2517377	17666
	14	254	272	2927777	20546

SHEET PILES



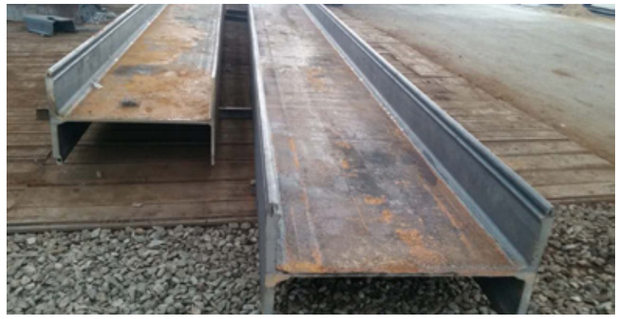
FLANGE

HZZ BEAM PROPERTIES					Per Single Section			
	Height (h)	Height (h)	Thick (T)	Cross Sec Area (a)	Weight (m)	Moment of Inertia (Iy)	Elastic Modulus (Sx)	Plastic Modulus (Sx)
Section	mm (in)	mm (in)	mm (in)	cm^2 (in^8)	kg/m (lbslft)	cm^2 (in^2)	cm^2 (in^2)	cm^2 (in^2)
HZZ 2323A	800	610	14	403.51	316.65	437.008	11.237	12.725
	315	24.02	0.551	62.54	212.79	10,500.0	685.6	776.4
HZZ 2323B	880	690	14	414.72	325.44	545.338	12.715	14.362
	34.65	27.17	0.551	64.28	218.69	13.1028	775.8	876.2
HZZ 2323C	960	770	15	433.67	340.23	670.738	14.305	16.193
	37.8	30.31	0.591	67.22	228.63	16,115.8	872.8	988.0
HZZ 3023A	1000	810	16	477.85	375.25	804.676	15.517	18.578
	39.37	31.69	0.630	74.07	252.17	19,333.9	946.8	1,133.5
HZZ 3023B	1080	890	17	499.62	392.28	967.112	17.280	20.716
	42.52	35.04	0.669	77.44	263.61	23,236.7	1,054.3	1264.0
HZZ 3023C	1180	990	18	526.60	413.47	1,195.163	19.563	23.504
	46.46	38.98	0.709	81.62	277.85	28,716.1	1,193.6	1,434.0
HZZ 3023D	1180	990	19	536.59	421.17	1,203.566	19.720	23.755
	46.46	38.98	0.748	83.17	283.02	28,918.0	1,203.2	1,449.4
HZZ 4023A	1000	810	18	529.25	415.03	881.974	16.101	20.365
	39.37	31.69	0.709	82.03	278.90	21,191.1	982.4	1,242.5
HZZ 4023B	1080	890	19	552.64	433.32	1,059.734	17.962	22.708
	42.52	35.04	0.748	85.66	291.19	25,462.1	1,095.9	1,385.5
HZZ 4023C	1180	990	20	581.91	456.01	1,309.622	20.384	25.769
	46.46	38.98	0.787	90.20	306.44	31,466.2	1,243.7	1,572.3
HZZ 4023D	1180	990	21	591.64	463.78	1,318.115	20.550	26.020
	46.46	38.98	0.827	9170	31166	31,670.2	1,253.8	1,587.6
HZZ 4030A	1000	810	18	559.26	438.98	962.292	18.497	22.015
	39.37	31.89	0.709	86.69	294.99	23,120.9	1,128.5	1,343.2
HZZ 4030B	1080	890	19	582.62	457.26	1,153.497	20.546	24.481
	42.52	35.04	0.748	90.31	307.28	27,715.0	1,253.6	1,493.7
HZZ 4030C	1180	990	20	611.92	479.95	1,421.639	23.200	11.675
	46.46	38.98	0.787	94.85	322.53	34,157.6	1,415.5	712.3
HZZ 4030D	1180	990	21	621.65	487.72	1,429.849	23.354	27.943
	46.46	39.98	0.827	96.36	327.75	34,354.8	1,424.9	1,704.9



HZZ Beams are custom rolled to incorporate an interlock on both sides of the flange hence eliminating the need for any additional interlocks or grooves in the flange.

A Built up beam consisting of a Web and a Bottom Flange undergoes full penetration weld to form an entire H Section. The complete beams form a rigid King Pile which serves as the main wall of the structure resisting the load and surcharges behind the wall it retains.



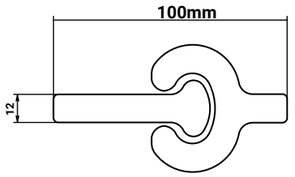
SHEET PILES

O-PILE STEEL PIPE

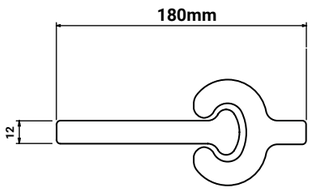
O-Pile systems are a rapidly expanding construction method that utilise pipes to form extremely strong foundations, barriers and retaining walls in a cost-effective way.

O-Piles are steel pipes with welded-on patented connectors that form a continuous or combined steel wall. O-Piles offer a stronger, more efficient, and cost-effective alternative to high modulus wall using beams and heavy Z or U-Type sheet piles.

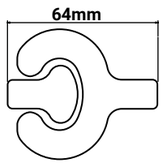
O-Pile L-T
100mm Width



O-Pile P-T
180mm Width



O-Pile DTH
(DTH Applications)



TARGET

- Waterfront Projects
- Infrastructure
- Rail and Tunnels
- Harbours
- Underground
- Substructure
- Bridges
- Utilities
- Environmental Protection

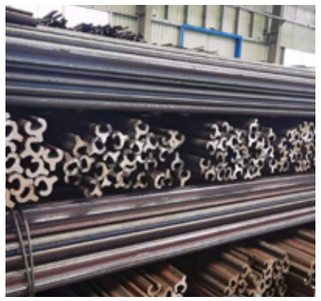
O-PILE TECHNICAL ADVANTAGES

Reasons why engineers and designers now consider O-Pile system to be superior:

• Efficiency: In traditional combi-wall systems like HZM and Pipe Sheet Pile, weight and strength are increased linearly. In Pipe-Pipe Wall, a given wall thickness has almost negligible weight increase as pipe diameter increases, while strength increases.

• Capacity: The load bearing capacity of O-Piles are significantly higher than Z and U shape sheet piles. In many cases, they could eliminate crane rail footings on the quay side.

• Connectors: O-Piles connectors are designed specifically for the application of Pipe-Pipe walls, hence they are easier to weld and install as compared to other Pipe-Pipe wall methods. The interlocks are hot extruded to provide unmatched strength and elongation characteristics that resist extremely high tension and rotational forces to more than 3400 kN/m.



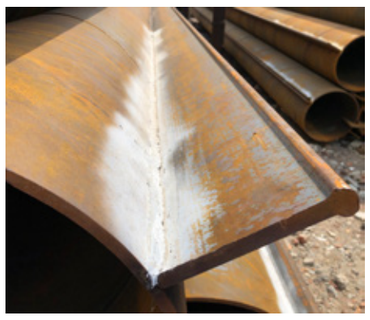
SHEET PILES

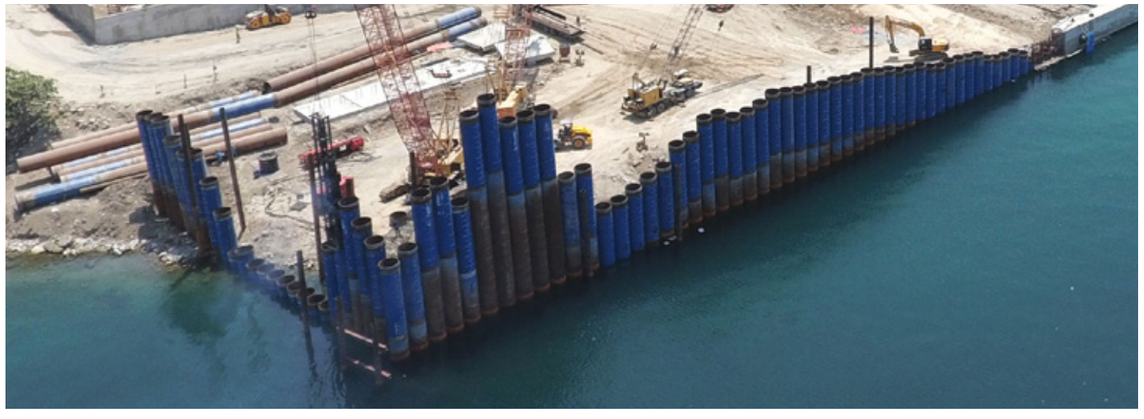
WATERPROOFING O-PILE

If your O-Pile project involves cofferdams, de-watering, tunnels, cutoff walls for site remediation, or any application where water leakage presents a challenge, then sealed O-Piles will be an excellent solution. WADIT, a globally-proven sheet piling interlock sealant, is highly effective on O-Pile interlocks and can meet the most challenging waterproofing needs.

The O-Pile connectors can be supplied with WADIT already filled in. They can be delivered to the pipe manufacturer, or to the job site, for welding onto the pipe piles. The length from interlock to stem of the interlock ensures that the sealant is not affected by heat generated from welding. Applying WADIT in a factory environment is preferred, as it eliminates site preparation and application, and it speeds up construction.

WADIT sealant, used in conjunction with O-Pile pipes and connectors, is increasingly the “go-to” solution for engineers and designers looking for an effective waterproofing option that is strong, economical, safe and convenient.





SHEET PILES

O-Pile Configuration With 180mm Connectors

Name	G	Wy	Jy	b	OD	t
	kg/m²	cm³/m	cm⁴/m	mm	mm	mm
0 51	163.4	5,145	231,503	1080	900	9
0 65	181.0	6,459	322,944	1180	1000	10
0 71	197.4	7,083	354,171	1180	1000	11
0 79	198.9	7,925	435,884	1280	1100	12
0 86	215.5	8,622	474,210	1280	1100	12
0 95	217.1	9,543	572,606	1380	1200	12
0 103	233.9	10,313	618,769	1380	1200	13
0 105	218.4	10,468	680,401	1480	1300	12
0 113	235.4	11,314	735,396	1480	1300	13
0 122	252.4	12,156	790,134	1480	1300	14
0 132	253.9	13,236	926,541	1580	1400	14
0 142	271.0	14,151	990,591	1580	1400	15
0 153	272.5	15,311	1,148,327	1680	1500	15
0 163	289.7	16,299	1,222,427	1680	1500	16
0 175	291.2	17,538	1,403,039	1780	1600	16
0 186	308.5	18,599	1,487,927	1780	1600	17
0 188	292.5	18,779	1,596,201	1880	1700	16
0 199	310.0	19,917	1,692,964	1880	1700	17
0 211	327.4	21,052	1,789,379	1880	1700	18
0 212	311.3	21,237	1,911,336	1980	1800	17
0 224	328.8	22,449	2,020,387	1980	1800	18
0 237	346.4	23,656	2,129,068	1980	1800	19
0 238	330.1	23,848	2,265,519	2080	1900	18
0 251	347.8	25,133	2,387,596	2080	1900	19
0 264	365.4	26,413	2,509,281	2080	1900	20
0 266	349.0	26,610	2,661,034	2180	2000	19
0 277	383.1	27,690	2,630,573	2080	1900	21
0 280	366.8	27,969	2,796,876	2180	2000	20
0 293	384.5	29,323	2,932,304	2180	2000	21
0 307	402.2	30,673	3,067,317	2180	2000	22
0 310	425.2	30,961	3,250,936	2280	2100	21
0 324	445.2	32,389	3,400,865	2280	2100	22
0 338	465.2	33,813	3,550,356	2280	2100	23
0 326	426.9	32,597	3,585,672	2380	2200	21
0 341	447.0	34,103	3,751,283	2380	2200	22
0 356	467.0	35,604	3,916,434	2380	2200	23
0 371	487.2	37,101	4,081,126	2380	2200	24
0 342	428.5	34,234	3,936,893	2480	2300	21
0 358	448.7	35,817	4,118,972	2480	2300	22
0 374	468.9	37,396	4,300,567	2480	2300	23
0 390	489.0	38,971	4,487,680	2480	2300	24
0 405	509.2	40,542	4,662,310	2480	2300	25
0 375	450.2	37,533	4,503,933	2580	2400	22
0 392	470.5	39,189	4,702,757	2580	2400	23
0 408	490.7	40,843	4,901,075	2580	2400	24
0 425	510.9	42,490	5,098,888	2580	2400	25
0 410	472.0	40,984	5,123,004	2680	2500	23
0 427	492.3	42,715	5,339,313	2680	2500	24
0 444	512.6	44,441	5,555,093	2680	2500	25

Pipe Thickness

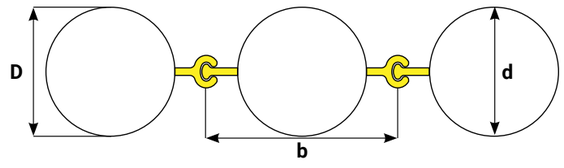
Pipe Diameter (mm)

mm	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
800	0 40 146.2																	
900	0 46 147.3	0 51 163.4	0 57 179.5															
1000		0 58 164.6	0 65 181.0	0 71 197.4														
1100		0 65 165.5	0 72 182.3	0 79 198.9	0 86 215.5													
1200			0 80 183.4	0 88 200.2	0 95 217.1	0 103 233.9												
1300				0 96 201.4	0 105 218.4	0 113 23.4	0 122 252.4											
1400					0 114 219.5	0 123 236.7	0 132 253.9	0 142 271.0										
1500						0 133 237.9	0 143 255.2	0 153 272.5	0 163 289.7									
1600						0 143 238.9	0 154 256.4	0 165 273.8	0 175 291.2	0 186 308.5								
1700							0 165 257.4	0 176 275.0	0 188 292.5	0 199 310.0	0 211 327.4							
1800								0 188 276.0	0 200 293.6	0 212 311.3	0 224 328.8	0 237 346.4	0 249 364.0					
1900									0 213 294.7	0 226 312.4	0 238 330.1	0 251 347.8	0 264 365.4	0 277 383.1				
2000										0 239 313.5	0 252 331.3	0 266 349.0	0 280 366.8	0 293 384.5	0 307 402.2			
2100									0 310 425.2	0 324 445.2	0 338 465.2							
2200									0 326 426.9	0 341 447.0	0 356 467.1	0 371 487.2						
2300									0 342 428.5	0 358 448.7	0 374 468.9	0 390 489.0	0 405 510.1					
2400										0 375 450.2	0 392 470.5	0 408 490.7	0 405 509.1					
2500											0 410 472.0	0 427 492.3	0 444 512.6					

FORMULAS

D, d, e: use values in cm **b: use values in m**

(all weight calculations shown feature an intermediate length ratio of 60% for connectors and alternating king piles)



Section Modulus:

$$Jy = \frac{\pi}{64} \times \frac{D^4 - d^4}{b}$$

$$e = D / 2$$

$$Wy = Jy / e$$

Panel Weight:

$$A = \frac{\pi}{4} \times (D^2 - d^2)$$

$$G_{pipe} = A \times 0.785$$

$$G = \frac{\frac{G_{pipe} + R \times G_{pipe}}{2} + (12.66 + 17.8) \times R}{b}$$

STEEL PIPES

- Spiral Steel Pipes
- Longitudinal Steel Pipes
- Pipe Roofing
- Pipe Accessories

STEEL PIPES

SSAW & LSAW PIPES

Spiral Submerged Arc Welded (SSAW) steel pipes have been used as main retaining elements in foundation design due to its ability to withstand high vertical loads as well as retaining soil and earth pressures when used in conjunction with O-Piles or sheet piles. These pipes are made from steel hot rolled coils which range from 8mm - 25mm in thickness. Outside diameter for pipes ranges from 200mm - 3000mm. SSAW steel pipes also allow continuous production of complete length without any joints up to 90m.

Where project requirements request for Longitudinal Submerged Arc Welded (LSAW) steel pipes, we can produce diameters of up to 1422mm in OD with plates of up to 50mm in thickness. We cover a wide range of API amd EN standard steel grades.

Mills which we represent are API Certified and we do provide 3rd Party Inspections for our customers.

Available Steel Grade

- EN 10025: S235 / S275 / S355 / S390 / S420 / S460
- API 5L X42 / X46 / X52 / X56 / X60 / X65 / X70 / X80
- ASTM A572: Gr. 43 / Gr. 50 / Gr. 60
- Low Corrosion Steel: ASTM A690 Mariner Steel Grade (345 / 390 / 430)

OVERSIDE DISCHARGING ONTO BARGE

QUALITY ASSURANCE

Intertek · MOODY INTERNATIONAL · BUREAU VERITAS

Quality is of paramount importance to us. That is why we partner up with internationally recognised Intertek, Moody International and Bureau Veritas to do our 3rd party inspections and testing. From Ultrasonic to Magnetic Particle Tests, nothing is left to chance.

PRODUCT RANGE AND PROPERTIES

MLION CORPORATION manufactures a complete range of welded pipes for construction applications for the most demanding conditions and services.

Pipes are manufactured in accordance to project specifications and National or International Standards such as: API, EN, DNV and ISO.

MLION CORPORATION provides full customisation on steel grade, length and customised profiles other than those shown, to meet site challenges.

TOLERANCE

Be assured that we will not cut corners or try to save costs by reducing on thickness and lengths. Inform us on your minimum thickness requirements and we will adhere strictly to it.

SPIRAL SUBMERGED ARC WELDING PIPES

Production Capacity for SSAW Pipes

Outside Diameter	Wall Thickness																			
	Inch	0.25	0.28	0.31	0.34	0.38	0.41	0.43	0.47	0.5	0.56	0.59	0.625	0.69	0.75	0.81	0.88	0.94	1.0	
	mm	6.35	7.11	7.87	8.74	9.53	10.31	11.13	11.91	12.70	14.27	15.09	15.88	17.48	19.05	20.62	22.23	23.83	25.4	
mm																				Inch
406.4																				16
457.2																				18
508.0																				20
558.8																				22
609.6																				24
660.4																				26
711.2																				28
762.0																				30
812.8																				32
863.6																				34
914.4																				36
965.2																				38
1016																				40
1066.8																				42
1117.6																				44
1168.4																				46
1219.2																				48
1270.0																				50
1320.8																				52
1371.6																				54
1422.4																				56
1473.2																				58
1524.0																				60
1574.8																				62
1625.6																				64
1676.4																				66
1727.2																				68
1778.0																				70
1828.8																				72
1879.6																				74
1930.4																				76
1981.2																				78
2032.0																				80
2082.8																				82
2133.6																				84
2184.4																				86
2235.2																				88
2286.0																				90
2336.8																				92
2387.6																				94
2438.4																				96
2489.2																				98
2540.0																				100

Up to X80 Steel Grade or 555 MPa

Up to X52 Steel Grade or 360 MPa

Up to X42 Steel Grade or 290 MPa

STEEL PIPES

LONGITUDINAL SUBMERGED ARC WELDING PIPES

Production Capacity for LSAW Pipes

	Wall Thickness																	
	Inch	0.25	0.31	0.38	0.43	0.5	0.59	0.69	0.81	0.94	1.0							
	mm	6	10	14	16	18	20	22	24	28	32	36	40	44	48	52	56	60
mm																		Inch
406.4																		16
457.2																		18
508.0																		20
558.8																		22
609.6																		24
660.4																		26
711.2																		28
762.0																		30
812.8																		32
863.6																		34
914.4																		36
965.2																		38
1016																		40
1066.8																		42
1117.6																		44
1168.4																		46
1219.2																		48
1270.0																		50
1320.8																		52
1371.6																		54
1422.4																		56
1473.2																		58
1524.0																		60
1574.8																		62
1625.6																		64

Up to X80 Steel Grade or 555 MPa

Up to X52 Steel Grade or 360 MPa

Up to X42 Steel Grade or 290 MPa

STEEL PIPES

PIPE ROOFING

Interlocking Steel Pipe Roofing are commonly used in excavations and tunneling works which require minimal disruption to major services and roads. We have increasingly seen projects utilising such a method in Singapore as well as in built-up areas like Hong Kong.

MLION CORPORATION has embarked on several projects in Asia providing interlocking pipe solutions. We are able to fabricate and deliver various interlocks as per design requirements.

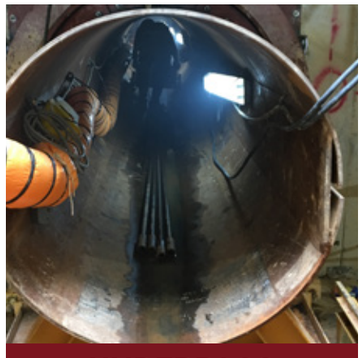
Tees

Plate welding

Slitting of Pipe

Alignment Fit

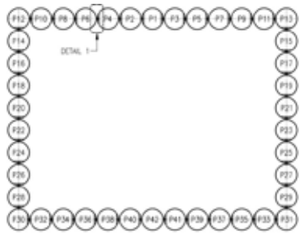
Production process for completing 1 drive of pipes for pipe roof using L-T Interlocks.



UNDERPASS

TUNNELLING

TYPICAL LAYOUT OF ROOF

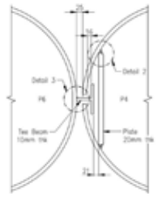


Pipe roofs are used when a tunnel is required to be built below a critical service such as major road or a building, where a cut and cover method of construction is not possible.

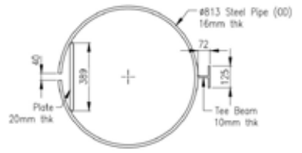
MLION'S TECHNICAL ADVANTAGES

Reasons why engineers and designers now choose Mlion for Pipe Roofing:

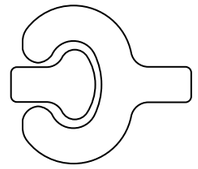
- **TRB Production: Three Rolled Bend pipes are the most ideal method for such production as we can ensure accuracy in pipe dimensions and straightness of the pipes. Spiral Welded pipes are not able to meet such strict tolerances required for such projects.**
- **Tolerances: We can control diameter of up to 0.5% from nominal value and wall thickness of up to +/-3%. Straightness can be controlled to achieve 0.2% of length or 3mm over any 1m distance. This allows splicing compatibility of pipes.**
- **Welding Fit ups: All our pipes are layed out in the factory to ensure the compatibility of interlocks and pipe dimensions. Alignment and readings are then taken before they are shipped out. This is to ensure Tunnel Boring Machine can function easily and succeeding pipes can be driven easily.**



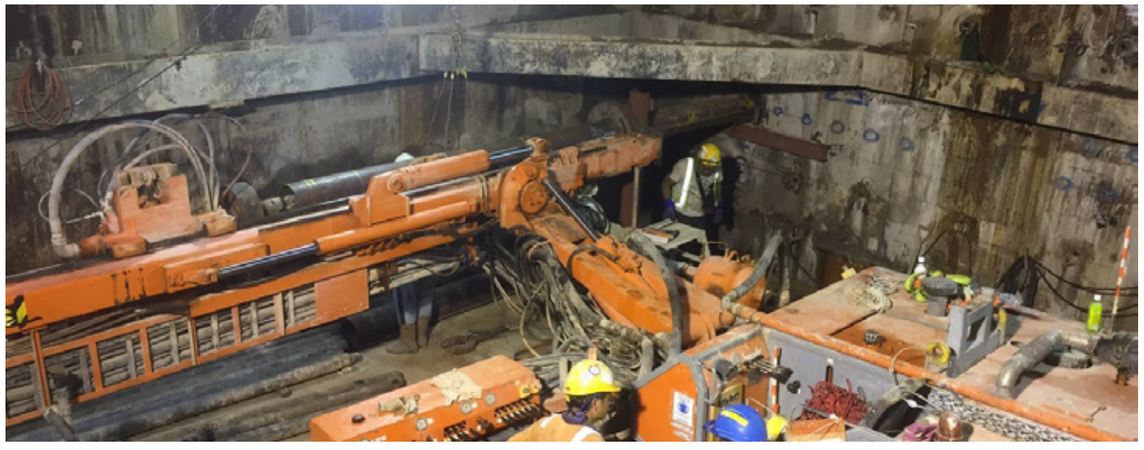
L-T Interlocks



Typical Connection Details for mini-TBM



O-Pile DTH (DTH Applications)



Pipe Roof using DTH Hammer with O-Pile DTH Interlocks

An alternative method of installing a pipe roof is to use a Down-the-hole (DTH) Hammer which can be coupled with a O-Pile DTH Interlock. DTH method of installation gives greater speed as compared to Tunnel Boring Machine Methods.

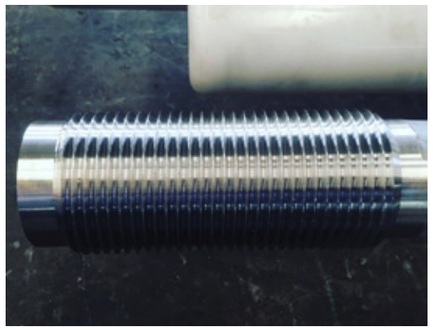
O-Pile DTH provides the best interlocks to ensure straightness and drilling control during the boring process. The interlocks have been tested and proven successful in MTR Hong Kong projects through hard soil and rock conditions.

LONG & FLAT PRODUCTS

- Tie Rods
- Beams, Bars & PC Strands
- Metro Decks
- Plates and HRCs

LONG AND FLAT PRODUCTS

TIE RODS



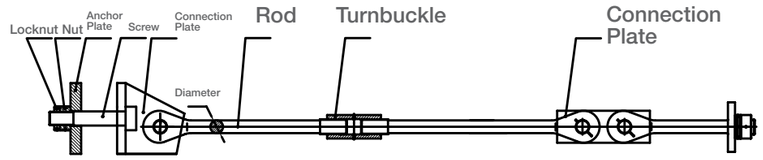
Tie Rods provide load transfer from the main wall to the anchor wall. It can be mated onto varying main walls such as O-Pile Walls, Sheet Piles and Combination Walls. Due to the modular nature of Tie Rods, lengths can be customised and connected through turn buckles and connection plates.

With industry leading forging technology, our Tie Rods are produced with Eyelets at the ends and threads are Upset End. Upset End production technology reduces wastage in the bar width compared to traditional tie rod techniques which cut threads into the round bars, reducing the effective diameter.

SPECIFICATIONS

Tension Grade	Nominal Diameter	Min Tensile Strength	Min Yield Strength	Minimum Elonga-tion	Reduc-tion of Area	Impacting Energy J				
	mm	MPa	Mpa	%	%	20°C	0°C	-20°C	-40°C	-50°C
345	20 - 210	470	345	21	50	34	34	34	27	-
460	20 - 210	610	460	19	50	-	50	45	34	27
550	20 - 180	750	550	17	50	-	39	39	27	27
650	20 - 150	850	650	15	45	-	34	34	27	27

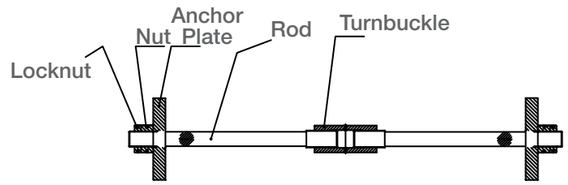
TYPE D2 STEEL TIE RODS



Min Diameter : 35mm
Max Diameter: 210mm
Threads: Up to 410mm

Our flagship Type D2 Steel Tie Rods are made from upset ends with eyelets. The eyelets provides a hinge point for the rods to transfer loadings in the most efficient manner. The couplers, turnbuckles or articulated joints provide freedom in motion for the rods to tension at precise points required as per requirements.

TYPE D2 STEEL TIE RODS



Min Diameter : 20mm
Max Diameter: 210mm
Threads: Up to 410mm

Our Type II Steel Tie Rods are made with upset ends. The whole cross section of the shaft can be stressed without any reduction due to notch factor. This equates to reduced weight, lower cost, easier handling and a more uniform elongation across the bar.

LONG AND FLAT PRODUCTS

BEAMS, BARS & PC STRANDS

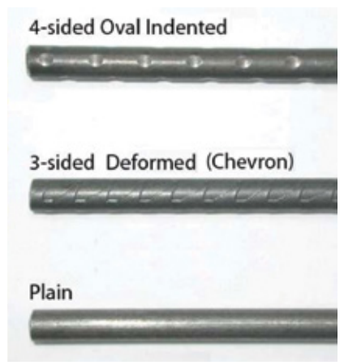
- Wide Flanged Beams
- Metric: 100 x 100 to 900 x 300
- Inch: W4 to W27
- H Bearing Piles
- Metric: 200 x 200 to 400 x 400 / Inch:
- Inch HP8 - HP 14
- I Beams
- Equal Angles
- Unequal Angles
- Channels

Available in internationally recognized standards for sizes and steel grades such as ASTM, JIS, BS and KS etc.

- 10mm / 13mm / 16mm / 20mm / 22mm / 25mm / 28mm / 32mm / 40mm / 50mm
- In bundles of 2 tons
- Conforming to BS 4449 (Grade 460/500), ASTM A615 or PNS Standard.
- Fixed Rate Contracts for long term project requirements

Reinforcement Bars used in concreting works and general construction purposes.

- 4mm / 5mm / 6mm / 7mm / 8mm / 9.53mm - 15.70mm
- High Tensile Up to 1770 kN breaking load
- International Standard ASTM A416-05, Grade 270 / BS 5896-80 / AS 1311-87
- 3000 kg per coil or other packing requirements
- Low Relaxation



Useful for prestressed concrete piles, poles, plank, railways and agricultural structures.


SINGAPORE

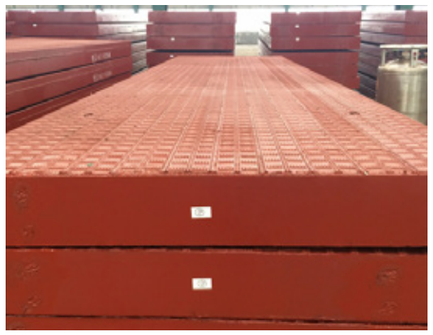

SINGAPORE


SINGAPORE


SINGAPORE

LONG AND FLAT PRODUCTS

METRO DECKS



Metro Decks are commonly used as temporary steel roadways when cut and cover excavation is in process. This could be for tunnelling works or for road diversion usage. Checkered surfaced beams are welded into box-like structures for easy installation.

MLION CORPORATION is able to supply the checkered beams or finished products fully fabricated. Innovations such as fabricating them into 15m pieces to speed up installation was introduced in the recent MRT Thomson East Coast Line projects.

We can supply both new and used metrodecks to customised sizes as per your project requirements.

LONG AND FLAT PRODUCTS

USED PLATES

BRAND NEW PLATES

PLATES & HRCs

We source from a variety of locations worldwide to provide you with the best prices for your requirements.

COMMON STEEL GRADE WHICH WE SUPPLY:

- EN 10025 Standard
- API 5L
- ASTM

ARMOUR PLATES AND ABRASION RESISTANT PLATES

- Abrasion Resistant Plates: AR 450 / 500 and 550 Grades
- Armour Plates: 3mm - 400mm with Yield Strength 800-1250 N/mm^2
- Tested in compliance to MIL-A-46100D and other certifications.

ABRASION RESISTANT

RAIL SOLUTIONS

- Rails
- Crane Rail Welding
- Crane Rail Accessories

SHEET PILES

RAILS

In 2016, MLION CORPORATION was appointed as the distributors of Gantrex Rail Products in the Philippines. Gantrex is a worldwide leader in Crane Rail Solutions with 40 years of experience supplying to major ports and infrastructural projects.

GERMAN SERIES RAIL
DIN 536

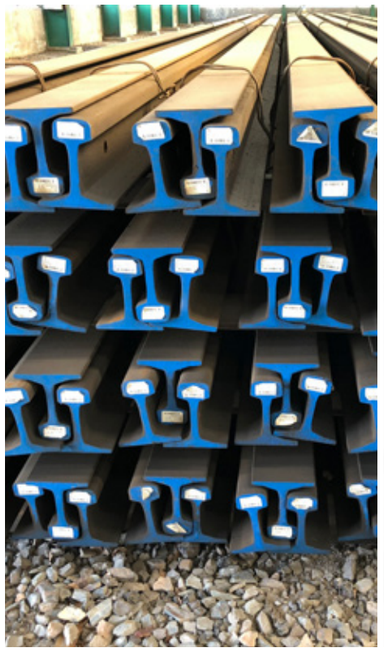
Standard: DIN 536							
Size	Dimension (mm)				Weight(kg/m)	Material	Length(m)
	Head(mm)	Height(mm)	Bottom(mm)	Web(mm)			
A55	55	65	150	31	31.8	700A	10-12
A65	65	75	175	38	43.1	700A	10-12
A75	75	85	200	45	56.2	900A	10-12
A100	100	95	200	60	74.3	900A	10-12
A120	120	105	220	72	100	900A	10-12

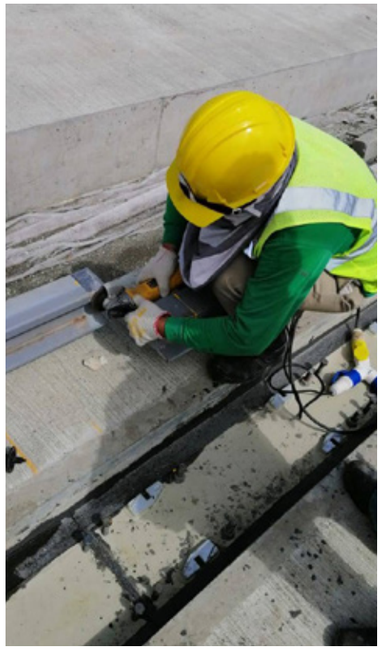
JIS SERIES RAIL
JIS E1101

Standard: JIS E1103-91/JIS E1101-93							
Size	Dimension (mm)				Weight(kg/m)	Material	Length(m)
	Head(mm)	Height(mm)	Bottom(mm)	Web(mm)			
JIS 15KG	42.86	79.37	79.37	8.33	15.2	JIS EStandard:	9-10
JIS 22KG	50.8	93.66	93.66	10.72	22.3		9-10
JIS 30 A	60.33	107.95	107.95	12.3	30.1		9-10
JIS 37 A	62.71	122.24	122.24	13.49	37.2		10-25
JIS 50 N	65	153	127	15	50.4		10-25
CR 73	100	135	140	32	73.3		10-12
CR 100	120	150	155	39	100.2		10-12

GB HEAVY RAIL
38kgs/m, 43kgs/m, 50kgs/m

Size	Material (Grade)	Standard	Standard Dimension (mm)				Theory Weight (kgs/M)	Length (M/pc)	Packed in Bundle with Iron Wire (pcs/bundle)
			Head	Height	Bottom	Web			
38kgs/m	U71Mn	GB2585- 2007	68.00	134.00	114.00	13.00	38.73kgs/m	12, 12.5	10
12kgs/m	Q235	GB2585- 2007	70.00	140.00	114.00	14.50	44.65kgs/m		
15kgs/m	Q235/55Q	GB2585- 2007	70.00	152.00	132.00	15.50	51.51kgs/m		





GB LIGHT RAIL
8kgs/m - 30kgs/m

Size	Material (Grade)	Standard	Standard Dimension (mm)				Theory Weight (kgs/M)	Length (M/pc)	Packed in Bundle with Iron Wire (pcs/bundle)
			Head	Height	Bottom	Web			
8kgs/m	Q235	Q/YG01- 2014	24.00	63.50	52.50	6.50	8.42kgs/m	6	55
12kgs/m	Q235	GB11264- 2012	38.10	69.85	69.85	7.54	12.2kgs/m	6	36
15kgs/m	Q235/55Q	GB11264- 2012	42.86	79.37	79.37	8.33	15.2kgs/m	6,8,9,10	28
18kgs/m	Q235/55Q	GB11264- 2012	40.00	90.00	80.00	10.00	18.06kgs/m	6,8,9,10	21
22kgs/m	Q235/55Q	GB11264- 2012	50.80	93.66	93.66	10.72	22.3kgs/m	6,8,9,10	21
24kgs/m	Q235/55Q	GB11264- 2012	51.00	107.00	92.00	10.90	24.46kgs/m	6,8,9,10	21
30kgs/m	Q235/55Q	GB11264- 2012	60.33	107.95	107.95	12.30	30.1kgs/m	6,8,9,10	15

GB CRANE RAIL
QU70, QU80, QU100, QU120

Standard: YB/T5055-93							
Size	Dimension (mm)				Weight(kg/m)	Material	Length(m)
	Head(mm)	Height(mm)	Bottom(mm)	Web(mm)			
QU 70	70	120	120	28	52.8	U71Mn	12
QU 80	80	130	130	32	63.69	U71Mn	12
QU 100	100	150	150	38	88.96	U71Mn	12
QU 120	120	170	170	44	118.1	U71Mn	12

CRANE RAIL WELDING

Aluminothermic Welding is the recommended method of welding 2 rails to form a seamless continous rail which produces good performance and durability. We provide welding services and guarantee the performance of the welding.


ALUMINOTHERMIC WELDING


RAIL PREPARATION


SAND MOULD

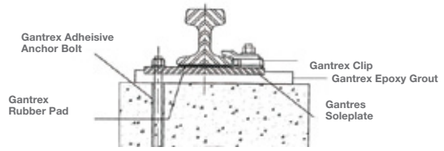

RAIL WELDING

GANTREX®
ON TRACK. WITH YOU.

CRANE RAIL ACCESSORIES

PROJECTS SUPPLIED:

- Manila North Harbour Port Inc.
- Sarangani Power Station
- Sem Calaca Power Plant
- MPGC Power Plant Bataan
- Manila North Harbour Port
- MICT Berth 7
- Port of Batangas
- Davao International Container Terminal
- Capitol Steel
- Oro Cement Davao



As a Gantrex Distributor, we are able to provide the following accessories for your Crane Rail projects.

• **CLIPS**: Clips are essential in holding down the rails onto the anchoring base. Adjustable weldable clips provide ease in maintenance and installation. Dependent on the side loading of the crane, the clips strength requirements can be better determined. For durability, we recommend galvanized, forged bottom parts and hot vulcanized rubber nose type clips for your projects.

RailLok Series of Clips W15 / W20 / W25 / W30

• **PADS**: Pads are material which help transfer and soften loading of the crane onto the rails. They ensure longer lasting rails and reduce maintenance over the lifespan of the usage. We recommend new RailLok pads which are extremely durable, with a high tensile re-inforced steel sandwich in the material. Gantrex's RailLok pads built on the reputation of MK6 pad, has a proven track record and has been used for many port projects around the world.

Holding Down Bolts or Anchor Bolts

• **CEMENT BASED GROUT**: Both Epoxy and Cement are commonly used as trench materials, but due to ease and availability, we will recommend Cementous Grout for projects.

Gantrex 035 cementous grout is a suitable material for projects. It is a high performance non-shrink grout mix which is specially developed and manufactured in Europe for crane rail usage. They are packed in 25kg bags and can be mixed on site for immediate usage.

• **SOLE PLATES**: Sole plates should be a minimum steel grade of EN 10025: S235 or JIS Standard SS400B Steel grade.

• **SUPERVISION**: In conjunction with Gantrex, MLION CORPORATION is able to provide supervision for your projects and welding training if required. We recommend Aluminothermic Welding for appropriate splicing of the rails on site.

Our supervision would include checking of method statements, installation procedures, alignment of rails and a 2 day course to teach welders the correct way of conducting Aluminothermic Welding.

SERVICES

- Pile Driving Equipment
- Sheet Pile Driving Services
- New/Used Heavy Equipment
- Fabrication

PILE DRIVING EQUIPMENT

PILE DRIVING EQUIPMENT

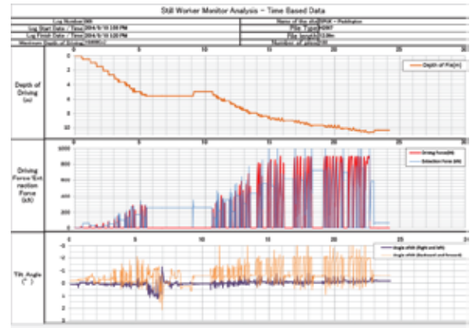
Mlion Corporation owns and operate a fleet of heavy equipment to compliment our supply of materials. We provide leasing of Silent Press in Pilers and Excavator Vibratory Hammers in various locations that we operate in. The equipment comes with skilled operators to assist customers in their project.

KOWAN STILL WORKER

SPECIFICATIONS	
STILL WORKER	ZU-100
MAX PRESSING-IN FORCE	1,000KN
MAX DRAWING-OUT FORCE	1,100KN
STROKE	750MM
PRESSING-IN SPEED	3.0~36.0m/min
TILTING DEVICE	2.4~28.0m/min
MAST ROTATION	180 Degrees
APPLICABLE SHEET PILES	MHZ PROFILE MMU PROFILE
OPERATION SYSTEM	WIRELESS RADIO SYSTEM & CABLED REMOTE-CONTROL
MOVING SYSTEM	SELF-MOVING
GREASES	BIODEGRADEABLE GREASES
WEIGHT	11,900KG

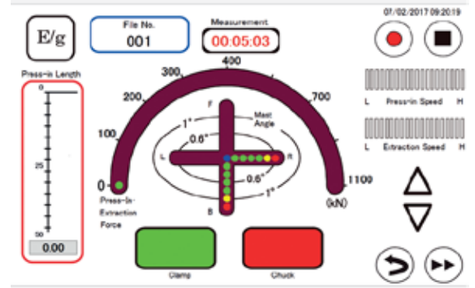
KOWAN PRESS-IN MONITORING SYSTEM

- Input soil data; SPT/N Values
- Records press-in force - time data
- Records press-in force - depth data
- Records press-in force - mast tilt position - time and depth
- USB data storage
- Digital Machine monitor
- Tough pad option
- Printout
- Remote access and live monitoring



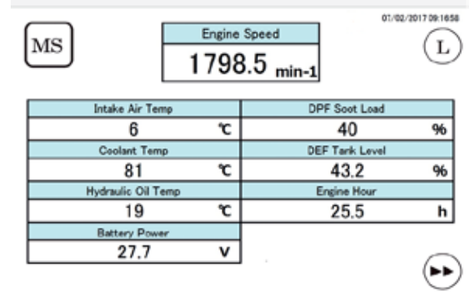
Kowan Data Logger

- Chuck up/down position
- Chuck open/close data
- Clamps open/closed data
- Drive/extraction tonnage



Kowan Power Pack/ Engine Data Logger

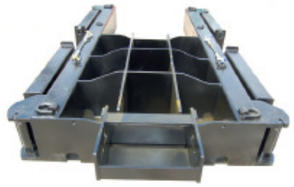
- Records and Monitors engine functions

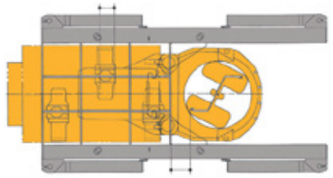


PILE DRIVING EQUIPMENT

Start

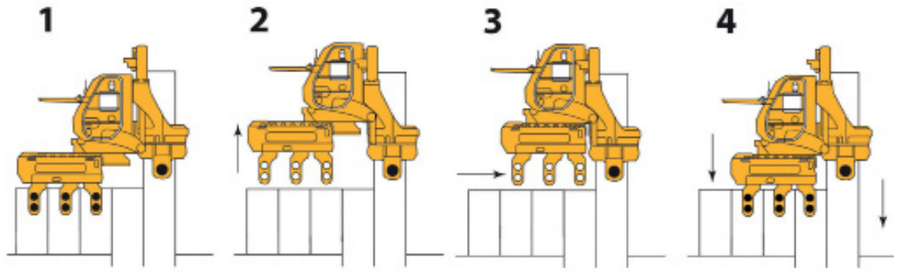
The Still Worker is set on a reaction stand with kentledge in the form of piles, concrete or still weights. The first four sheet piles are then pressed in from the stand.





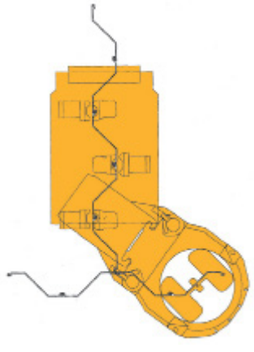
Self Travel

The Still Worker moves by elevating its travel carriage while supporting itself on the last installed pile. The travel carriage then slides forward and lowers itself, drops onto the installed piles and continues its hydraulic installation process. After the fourth pile is driven, the Still Worker will have walked off the reaction and will be using the installed pile as reaction.



Corners

The Still Worker presses in the dummy piles then uses these to work from, extracting them at a later date.

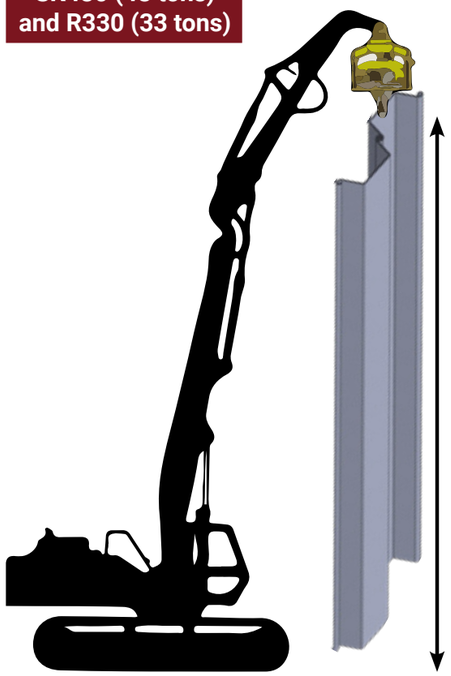


DRIVING SERVICES

SHEET PILE DRIVING SERVICES

MLION CORPORATION leases driving equipment such as Excavator with vibratory hammer attached for driving steel sheet piles, pipe casings and H-Beams. Our equipment has the ability to drive 14m in single length piles and extract them respectively.

Models Available: SK480 (48 tons) and R330 (33 tons)



14 Meters above from the ground

NEW/USED EQUIPMENT

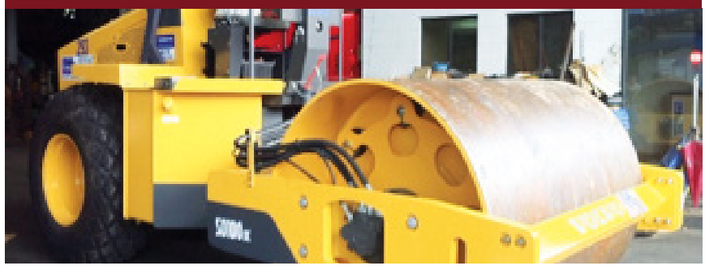
NEW/USED EQUIPMENT

MLION CORPORATION also provides the sale of new/used heavy machinery for earth moving, mining and road/retaining wall construction.

EXAMPLE:
MOTOR GRADER, BULLDOZER, EXCAVATORS, CRANES AND MANY MORE

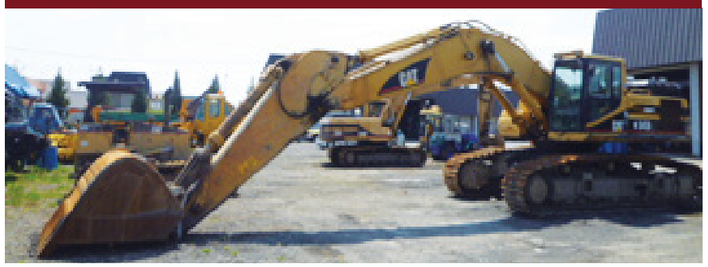
ROUGH TERRAIN CRANES

DRUM ROLLERS



WHEEL LOADERS

EXCAVATORS



CRAWLER CRANES

EXCAVATORS

FABRICATION

Mlion Corporation provides fabrication upon request for projects such as built up beams, stud bolts, splicing, pile shoes, catwalk and fabricated structures.

FABRICATION