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TECHNOLOGY EQUIPMENT CO., LTD
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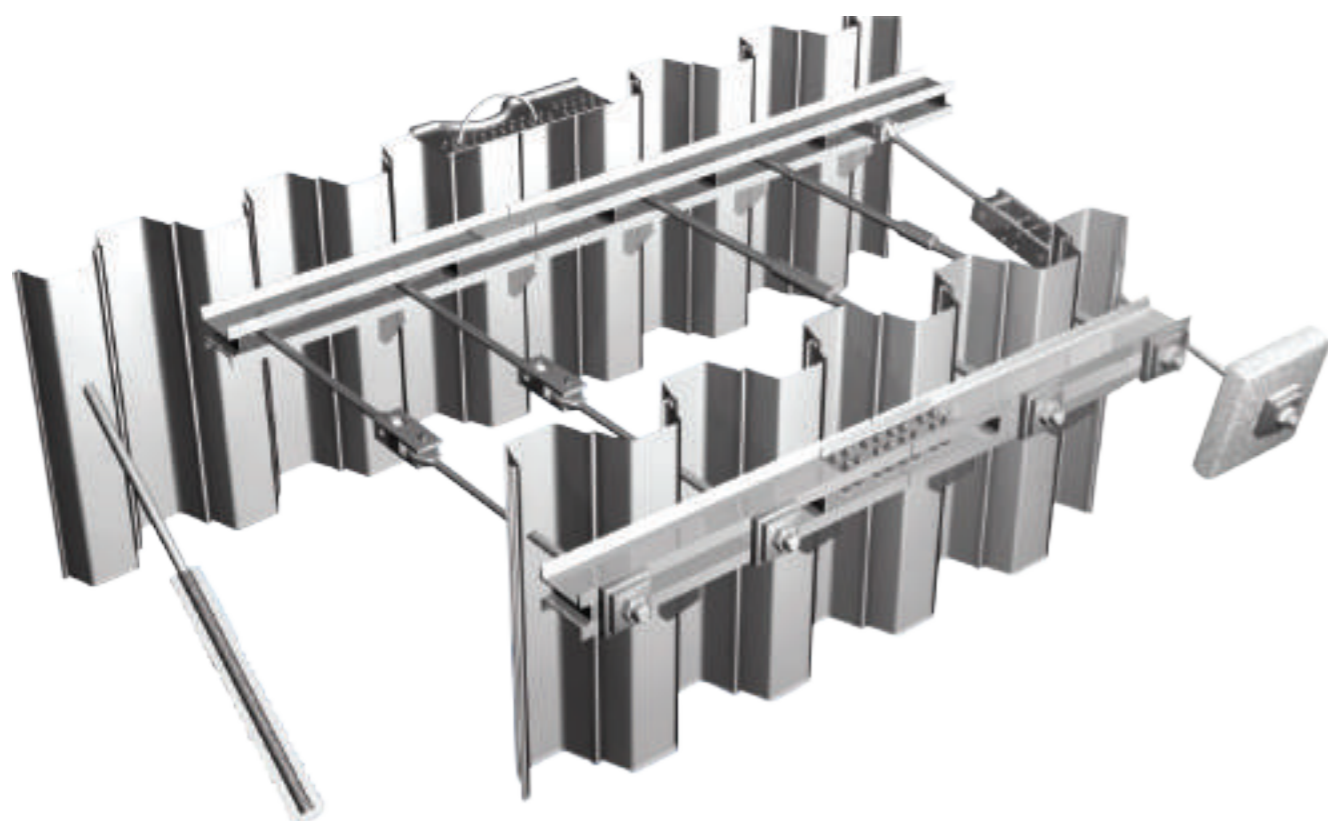
"Agency of Nanjing Grand Steel Piling Co., Ltd"

Steel Tie Rod

Product Catalog | 2015



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The Steel Piling Specialist for Earth

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Nanjing Grand Steel Piling Co., Ltd. is the exclusive combination of designing, manufacturing, testing of steel tie rods in China. Grand Piling can produce the most comprehensive tie rod system in the world, diameter from 20mm to over 300mm, steel grade from S235 S460 up to S1030(minimum yield strength 1030Mpa).



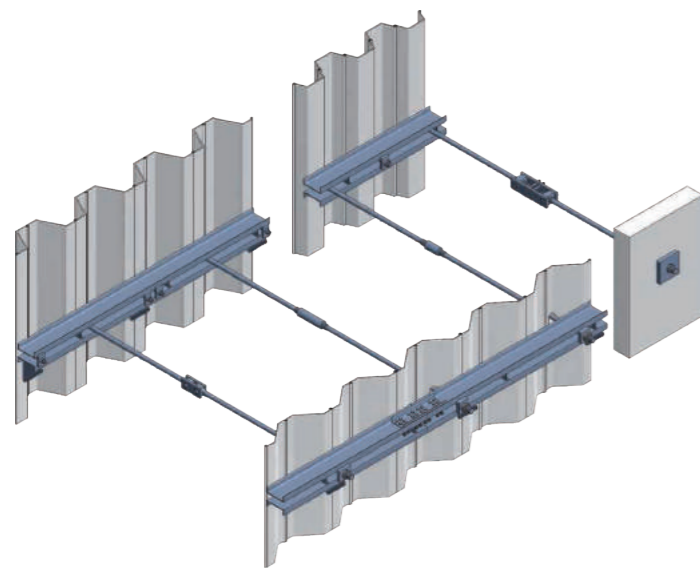
With 4 professional product lines namely forging product line, heat treatment line, machine-work line and surface treatment line, our annual production capacity exceeding 35 thousand tons. Some of our international leading level equipments in the product line like 15m ultra-long electric heating mantles, 15m large-sized ball blast machines, automatic numerical control machines, and 2500t, 2000t, 1000t, 500t forging machines designed and manufactured by ourselves.

There is no order too big or too small for us: Quantity from 2500 tons in Pakistan Qasim port project, to only 3 pieces in UK Poole comb wall system. We can supply tie rod with our sheet piling, pipe pile in a package. We are also pleased to supply tie rod only (By calculation of anchor forces, distance between two adjacent tie rods, angles, soil conditions etc, our engineers team will design the most proper tie rod to suit your project.

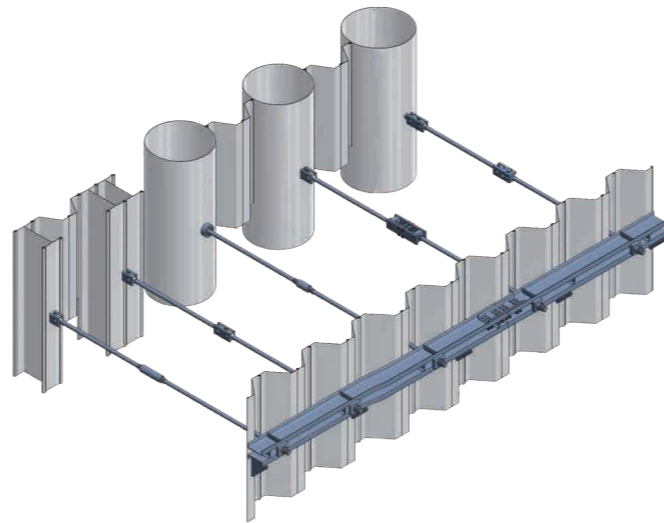


The best and most economical solutions for piling

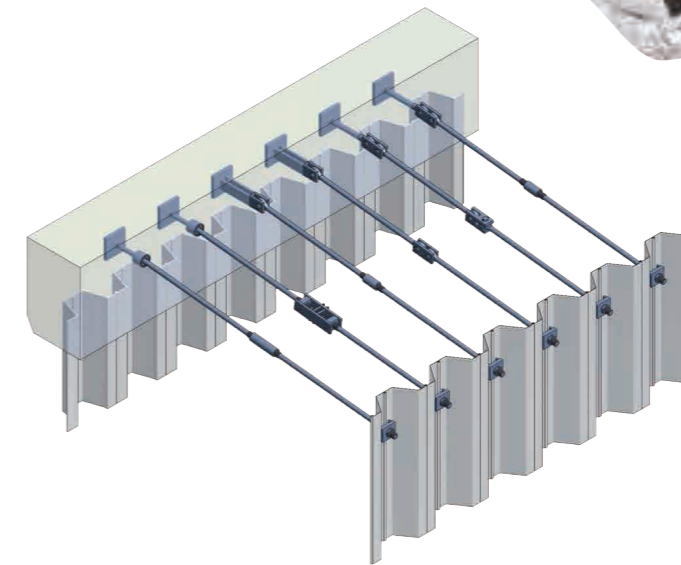
Tie rod systems can be used for marine and geotechnical applications, like coffer dam, sheet pile wall and retaining walls. Retaining load is transferred from wall through waling and tie rod, dead man or pressure grouted anchorage into the ground. The load of tie rods and tie backs may be transferred through a dead man or pressure-grouted anchor into the surrounding ground. For pressure-grouted anchorages the minimum load transfer length can be presumed to equal the bond length along the drill hole surface.



U and Z type sheet piling wall



High modulus wall



Concrete wall

From very beginning of material ordering until the final finished products, every procedure is under control and traceable as per ISO 9001 system. Product quality and delivery time are 100% guaranteed.



Preparing materials for rods, plates, nuts, turnbuckles.etc



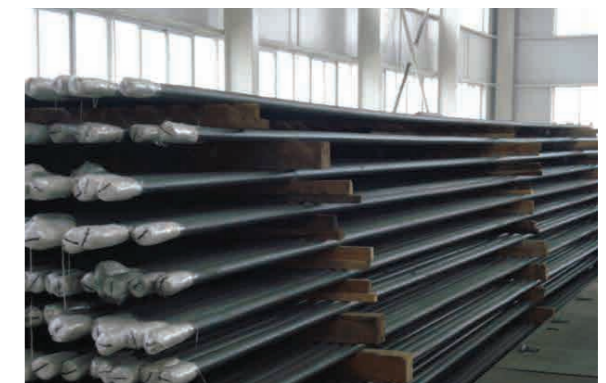
Breaking load testing of the whole tie rod system



Upset ends forging for shank, so that threads can be made



Sand blasting and painting



Heat treatment and eye ends forging



Final testing and loading



Thread	ΦD	Weight	Grade 460		Grade 500		Grade 550		Grade 650		Grade 700	
			YL(Kn)	UL(Kn)	YL(Kn)	UL(Kn)	YL(Kn)	UL(Kn)	YL(Kn)	UL(Kn)	YL(Kn)	UL(Kn)
M48x5	40	9.86	578	767	628	817	691	942	817	1068	880	1106
M56x5.5	45	12.48	732	970	795	1034	875	1193	1034	1352	1113	1400
M60x5.5	50	15.41	903	1198	982	1276	1080	1473	1276	1669	1374	1728
M68x6	55	18.65	1093	1449	1188	1544	1307	1782	1544	2019	1663	2091
M72x6	60	22.2	1301	1725	1414	1838	1555	2121	1838	2403	1979	2488
M76x6	65	26.05	1526	2024	1659	2157	1825	2489	2157	2821	2323	2920
M85x6	70	30.21	1770	2348	1924	2501	2117	2886	2501	3271	2694	3387
M90x6	75	34.68	2032	2695	2209	2872	2430	3313	2872	3755	3093	3888
M95x6	80	39.46	2312	3066	2513	3267	2765	3770	3267	4273	3519	4423
M100x6	85	44.54	2610	3461	2837	3688	3121	4256	3688	4823	3972	4994
M105x6	90	49.94	2926	3881	3181	4235	3499	4771	4135	5407	4453	5598
M110x6	95	55.64	3261	4324	3544	4607	3899	5316	4607	6025	4962	6238
M115x6	100	61.65	3613	4791	3927	5105	4320	5890	5105	6676	5498	6912
M125x10	105	67.97	3983	5282	4330	5628	4762	6494	5628	7360	6061	7620
M135x10	115	81.54	4778	6336	5193	6751	5713	7790	6751	8829	7271	9140
M140x10	120	88.78	5202	6899	5655	7351	6220	8482	7351	9613	7917	9953
M150x12	125	96.33	5645	7486	6136	7977	6750	9204	7977	10431	8590	10799
M155x12	130	104.19	6106	8097	6637	8628	7300	9955	8628	11282	9291	11680
M160x12	135	112.36	6584	8731	7157	9304	7873	10735	9304	12167	10020	12596
M165x12	140	120.84	7081	9390	7697	1006	8467	11545	1006	13085	10776	13547

Note:

1.YL stands for yield strength of the tie rod. UL stands for the ultimate tensile load of the tie rod. Yield and ultimate tensile loads are un-factored.

2.Above table are only commonly used size, we can also produce tie rod in 20mm diameter, and up to over 300mm.Steel grade S235 S355 S835 S1080 are also available upon request

3.Our tie rod is upset threads.The threads is suggested bigger than the diameter of the shank,which is to make the best uses of the rod system .The thread length is normally 300 mm per side, or as per request. We can also make the threads in the middle of the rods.

4.The bearing plates,nuts,and other accessories are scientifically designed to withdraw the minimum yield load and tensile load mentioned in above table.

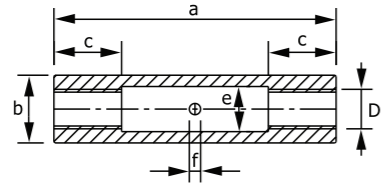


Steel tie rod system

Turnbuckles, sockets, nuts

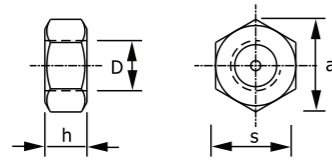
Nominal diameter D	inch	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6
	mm	M39	M45	M52	M56	M64	M72	M76	M85	M90	M95	M100	M110	M115	M120	M125	M130	M140	M145	M150

Turnbuckles



a inch / metric	mm	350	400	450	450	500	500	550	550	550	550	550	550	550	550	550	550	550	550	550	550
b Ø inch	mm	63.5	70	82.5	88.9	101.6	108	114.3	121	139.7	139.7	152.4	159	168.3	177.8	191	191	203	216	219.1	219.1
b Ø metric	mm	63.5	73	82.5	88.9	101.6	108	114.3	127	133	139.7	152.4	165.1	168.3	177.8	191	191	203	216	219.1	219.1
c	mm	40	45	50	60	65	70	75	85	90	95	100	110	115	120	125	130	130	130	130	130
e	mm	45	50	55	64	70	75	80	88	96	102	106	116	122	130	135	140	150	150	160	160
f Ø	mm	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
weight, inch	kg	5.4	7.1	11.3	13.2	19.1	19.9	24.7	25.1	38.7	35.5	44.8	44.7	51.2	58.3	70.7	66.4	73.2	86.9	86.5	86.5
weight, metric	kg	5.4	8.1	11.3	13.2	19.1	19.9	24.7	30.1	32.5	35.5	44.8	51.4	51.2	58.3	70.7	66.4	73.2	86.9	86.5	86.5

Hexagonal nuts



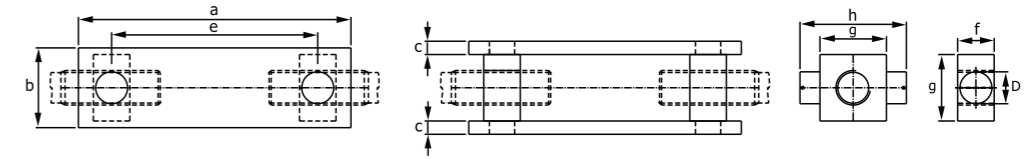
a	mm	69	81	92	98	110	121	127	139	150	156	167	179	191	202	208	219	231	242	254
s	mm	60	70	80	85	95	105	110	120	130	135	145	155	165	175	180	190	200	210	220
h	mm	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
	kg	0.5	0.7	1.1	1.4	1.9	2.4	2.9	3.8	4.6	5.2	6.4	7.6	9.1	10.9	11.8	13.9	16.1	18.8	21.5



Hinge turnbuckles, shackle joints, universal joints

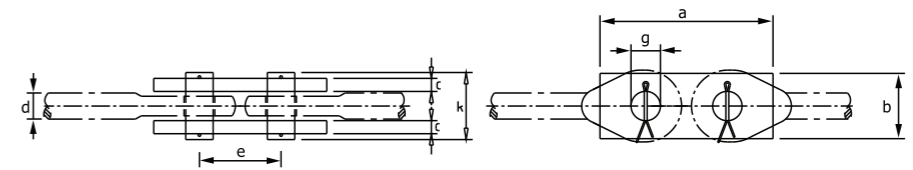
Nominal diameter D	inch	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6
	mm	M52	M56	M64	M72	M76	M85	M90	M95	M100	M110	M115	M120	M125	M130	M140	M145	M150	M150	M150

Hinge turnbuckles



a	mm	510	520	570	590	750	760	770	780	780	820	820	840	860	860	880	880	900	900	900
b	mm	90	105	115	125	140	145	165	189	200	220	240	260	260	280	280	300	320	320	320
c	mm	20	25	25	30	30	35	35	40	40	40	40	45	45	50	50	50	50	50	50
e	mm	410	410	450	450	550	550	590	590	580	570	560	560	550	550	550	550	550	550	550
f	mm	55	60	70	80	80	80	95	95	105	115	125	135	150	150	160	160	170	170	170
g	mm	100	100	110	120	120	150	170	180	190	205	220	230	240	260	280	280	290	290	290
h	mm	160	170	180	200	210	240	260	280	290	310	320	330	350	370	390	390	400	400	400
kg, total		23	30	45	57	81	96	115	136	152	185	209	245	281	310	398	416	476	476	476

Shackle joints



a	mm	170	190	235	255	280	302	335	358	390	420	450	530	560	600	640	660	680	700	740
b	mm	65	75	90	105	115	125	140	145	165	180	200	220	240	260	260	280	280	300	320
c	mm	20	20	20	22	25	28	30	33	35	37	40	40	40	45	45	50	50	50	50
e	mm	100	110	135	145	160	170	190	200	215	235	250	285	300	320	335	350	355	370	390
g	mm	34	40	50	52	60	65	72	77	82	87	92	97	102	112	117	122	127	132	142
k	mm	95	105	125	135	145	165	165	180	185	195	205	210	215	220	235	240	255	260	265
kg, incl. pin		4	6	9	13	16	23	29	36	44	58	69	88	101	119	141	157	179	198	225



Nanjing Grand Steel Piling can produce almost any kind of tie rods, different connections, different ends, length adjustment, vertical movable rods..etc. But generally for tie rod in steel piling industry all over the world, most commonly used types are as below.

Classification by connection methods



Turnbuckle/coupler and hinge joint



Turnbuckle/coupler and 2 hinge joints



Turnbuckles/coupler and cardan joint



Turnbuckle/coupler and 2 cardan joints

Note: Other joint types such as hinge turnbuckles, T-head connection are also available, please send your project drawings or contact our engineers for help

Classification by end finish



Both ends fork terminations



Fork termination and spade termination



Both ends spade termination



Spade termination and rod terminations

Note: Spade termination and fork termination are normally for high modulus combined walls. Thread ends termination are for sheet pile walls.

Tension Grade	Normal Diameter mm	Min Yield Strength Mpa	Min Tensile Strength Mp	Elongation %
S235	20-300	235	375	26
S355	20-300	355	510	21
S460	30-250	460	610	19
S550	30-250	550	750	17
S650	40-230	650	850	15
S700	40-230	700	900	15
S830	40-230	830	1030	10



Steel elements may be oversized to allow for loss of cross sectional area due to corrosion. Depending on the ground conditions EN 14199 is suggesting the following loss of thickness of bare steel in the ground may be considered:

Soil condition	Corresponding soil corrosiveness	Yearly loss of steel due to corrosion [mm]
Undisturbed natural soils (sand, silt, clay, schist,...)	Low	0.012
Polluted natural soils and industrial grounds	Medium	0.030
Aggressive natural soils (swamp, march, peat,...)	Medium	0.033
Non-compacted, non-aggressive fills (clay, schist, sand, silts,...)	Medium	0.022
Non-compacted and aggressive fills (ashes, slag,...)	High	0.058

The values above are for guidance only. Local conditions should be considered and suitable values taken into account.

According to British Standard BS 8002 "Earth Retaining Structures" provision should be made for corrosion of tie rods of not less than 0.05 mm/year.

Most popular anti-corrosion methods are:

1. Zinc rich epoxy paint, thickness normally between 60-100um

2. Hot dip Galvanizing

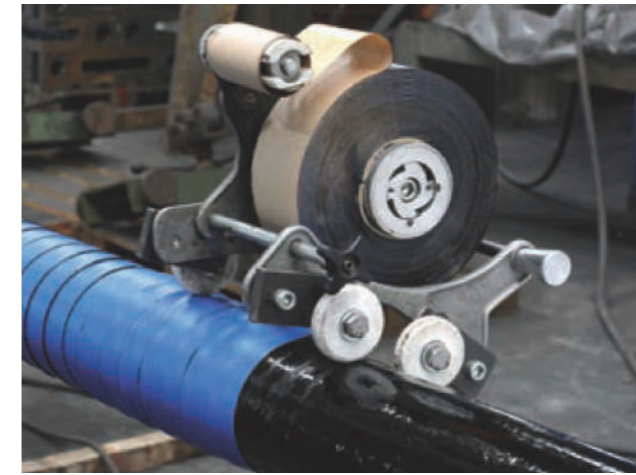
Minimum average zinc thickness 85um (or 610gram per m) standard: S729:1971

Hot-dip galvanization has a long track record for being a good corrosion protection to steel.

3. Denso Wrapping

Denso tape is a grease impregnated tape that provides technical and cost advantages over traditional duct and grout or sacrificial corrosion methods

4. Above plus PVC pipe protection



Denso Tape wrapping



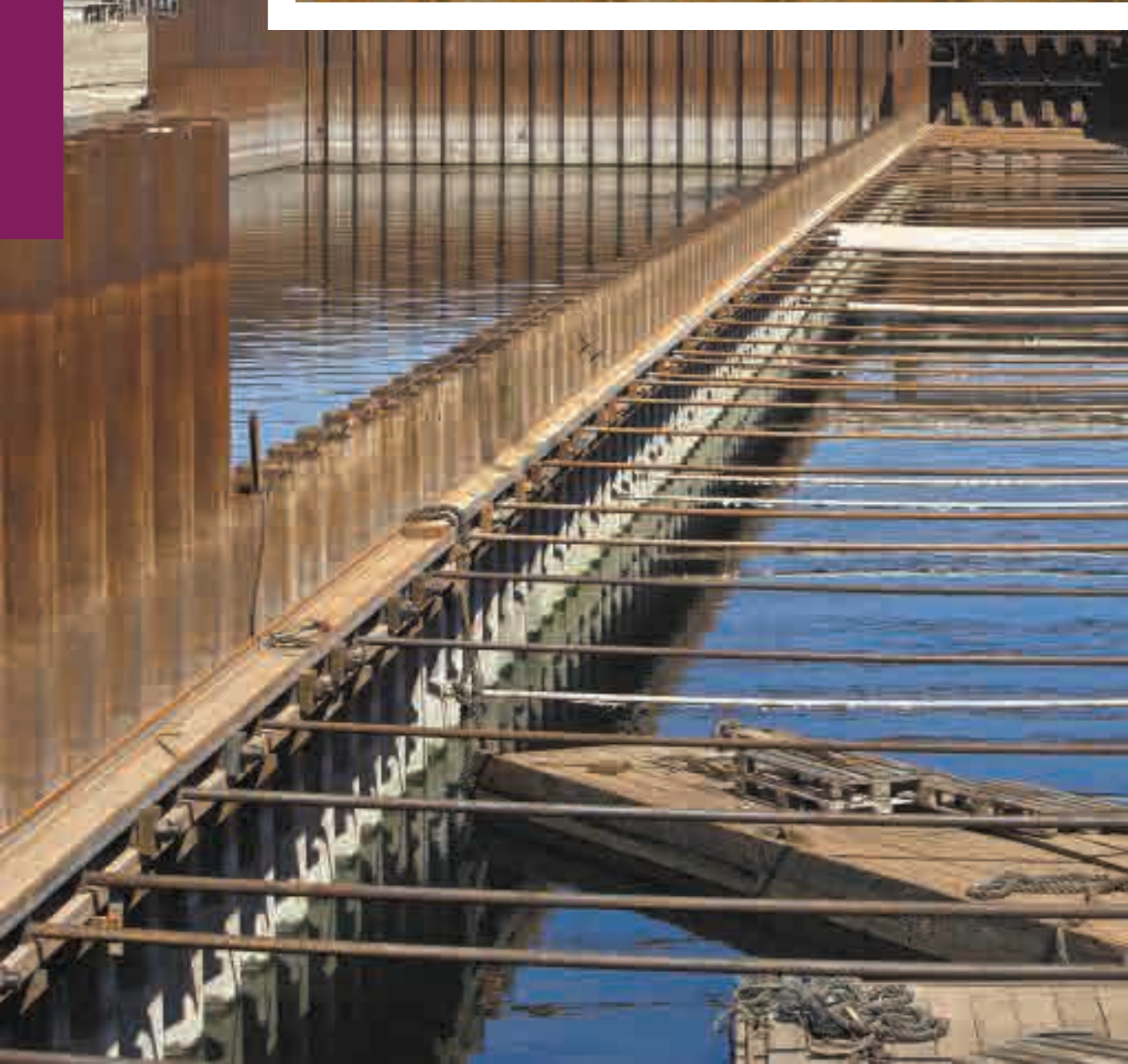
Epoxy paint coating

Wailings transmits forces from sheet piling to anchorages. It is simultaneously used for aligning and stiffening the wall. Additional forces thus resulting can not be determined accurately. Wailings made of two spacer connected channel sections are preferred because they can be fixed centrally by waling bolts to the wall. The problems of handling and assembling can be minimized by using this arrangement. Other variations of waling section can be used such a pair of H beams or possibly a capping beam and H beams combination..Necessary walling joints should be located in the respective zero points of moments.

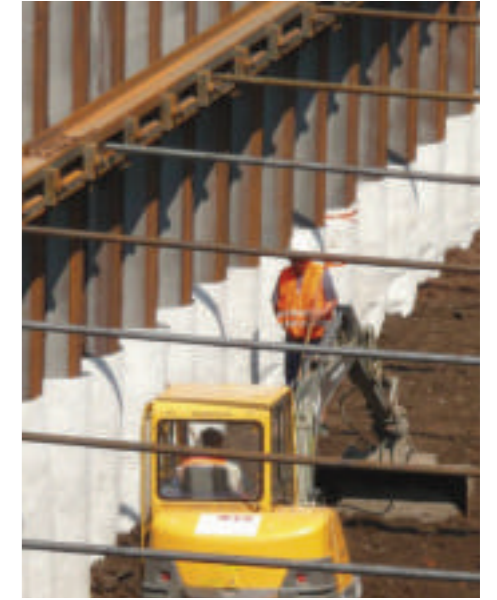
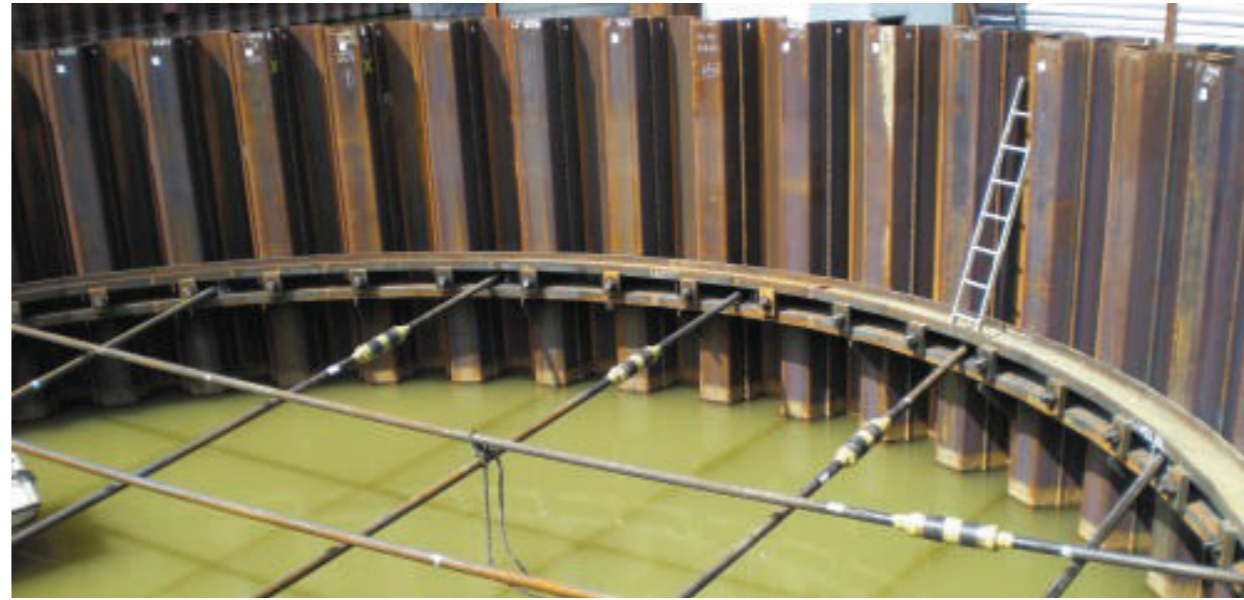


Nanjing grand steel piling Co., Ltd carries regular stock of 40,000 tons for hot rolled U steel channel and H beams. Shipment immediately .Length are normally 6m 9m and 12m.Steel grade in S235 and S355.Grand piling can do all fabrication works in its China factory, like drill holes, painting, welded back to back doubles, fabrications of support console, spacers, with bolts and nuts. So that clients only need to assembly easily at construction site.

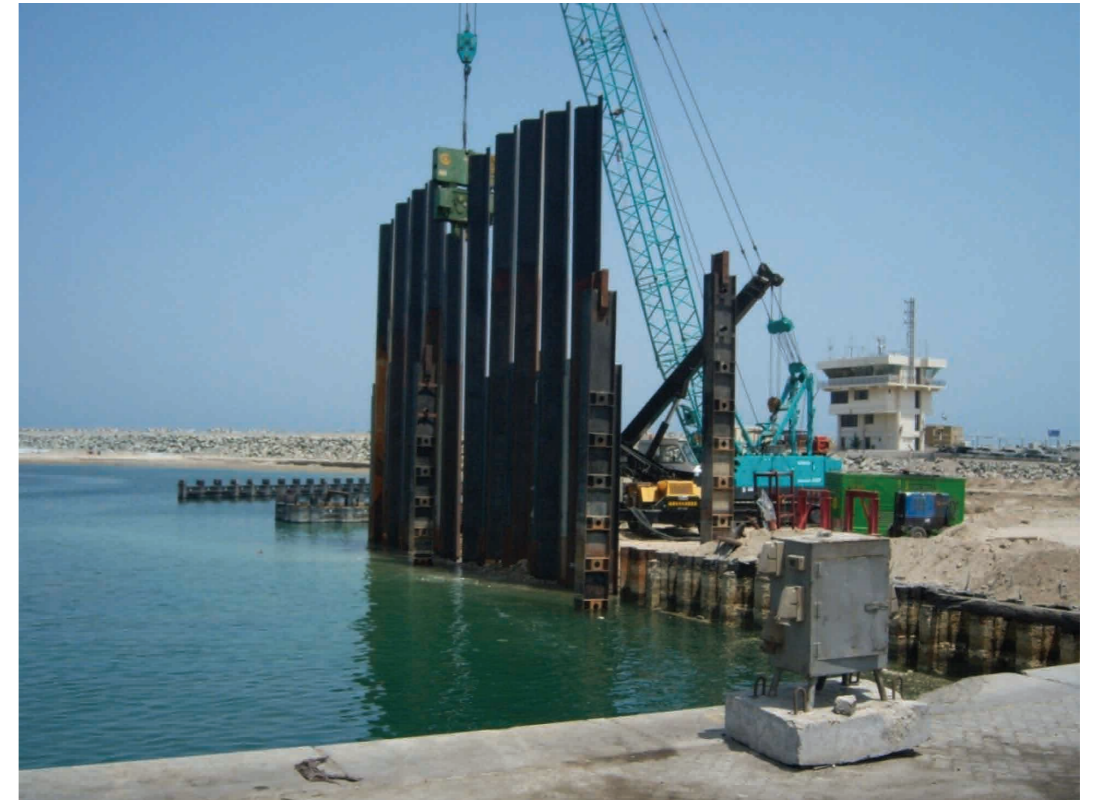
Portsmouth docks,UK



Convention Centre Bridge-Piling, Melbourne,Australia



Water front tower Dubai marina, Dubai



Other projects

