Bi-directional Static Load Test (BDSLT)

July, 2025

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- Background and Principle
- Testing Technology
- Test procedures in Drilled Shafts
- Major Domestic Projects
- Overseas Projects

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Background and Principle

Traditional pile test methods

a) Kentledge Method

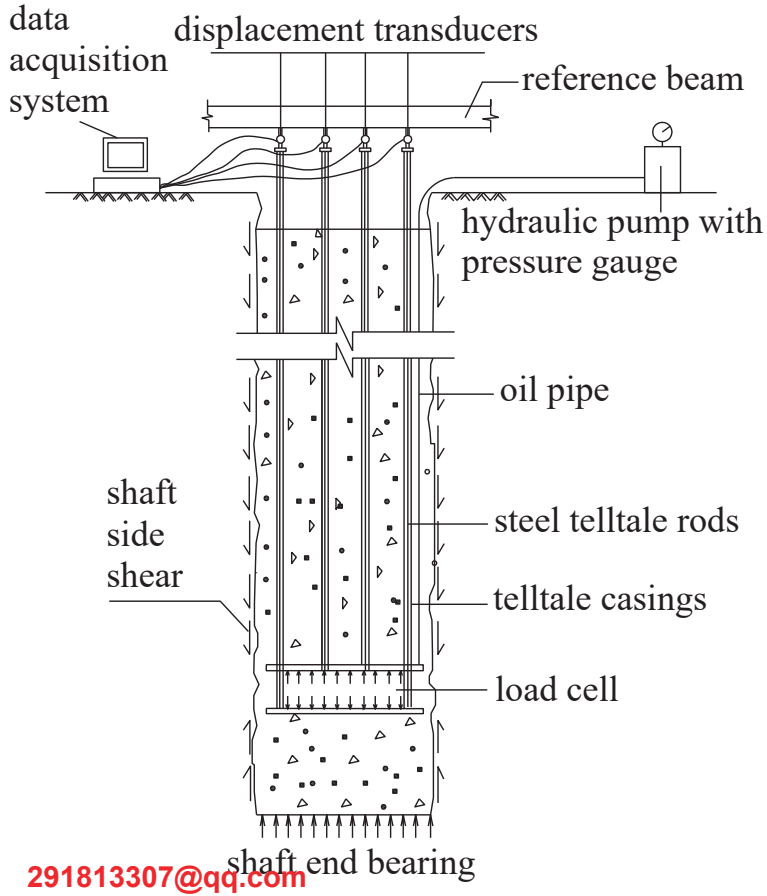
b) Anchor Pile Method

Limit of traditional test method

- Maximum load capacity (51000 kN of Kentledge Method and 70000 kN of Anchor Pile Method
- Require reaction system.
- Limited use in special areas, such as inside buildings, under overpasses, in narrow interstate/highway median strips and offshore.

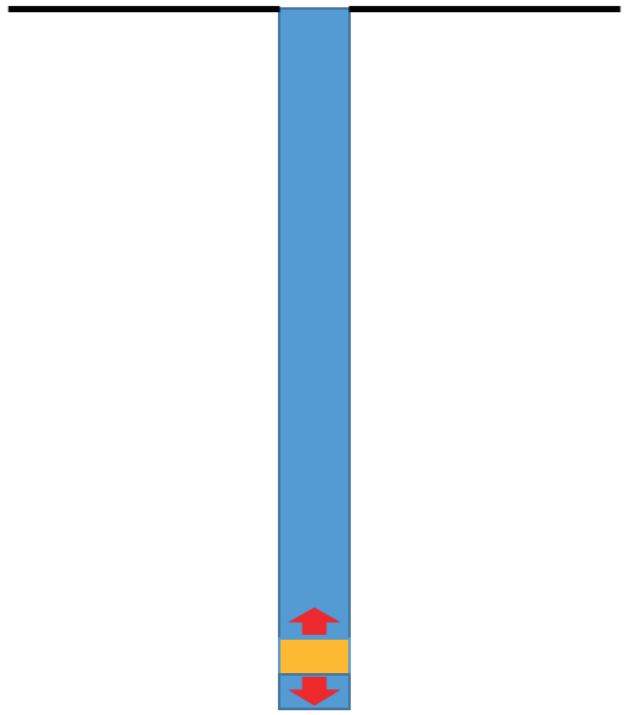
Bi-directional static load test (drilled shaft)

- The load cell (specially designed jacks) is installed in the pile.
- The upper and lower portions of the pile are tested against each other.

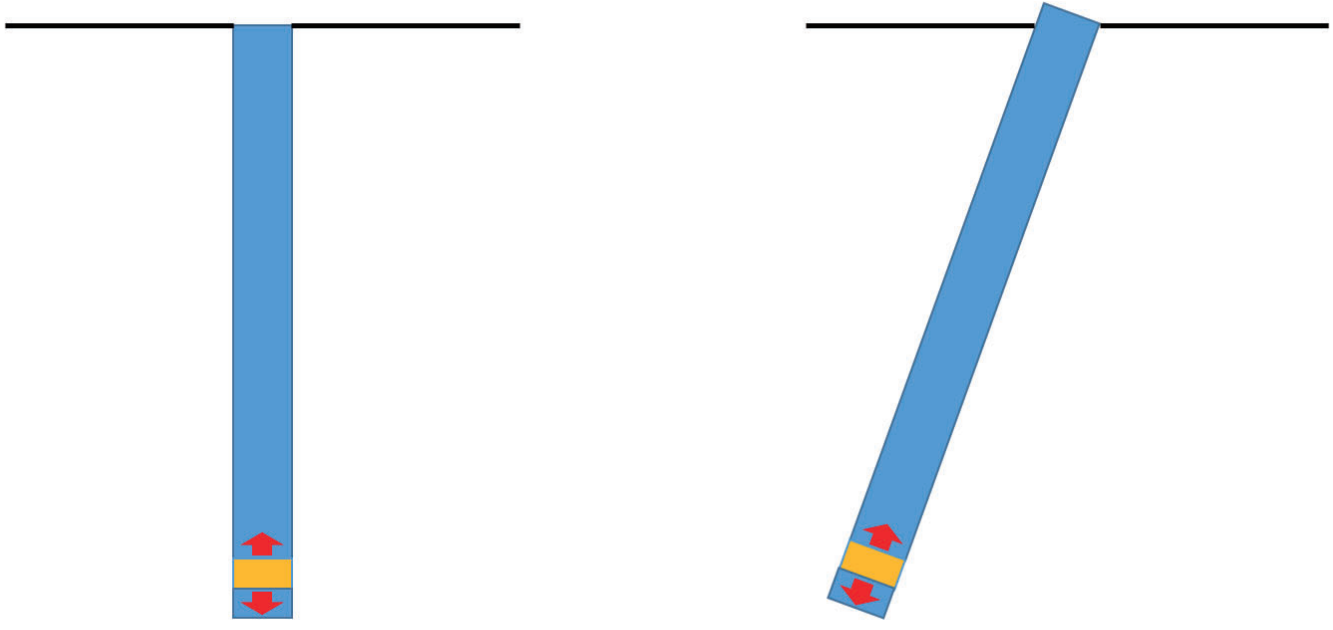


Compressive test and tensile test

- The load cell is installed near the bottom of the pile.
- Both the compressive bearing capacity and the tensile bearing capacity can be tested at the same time.



Vertical pile test and raking pile test



The loading direction is always axial.

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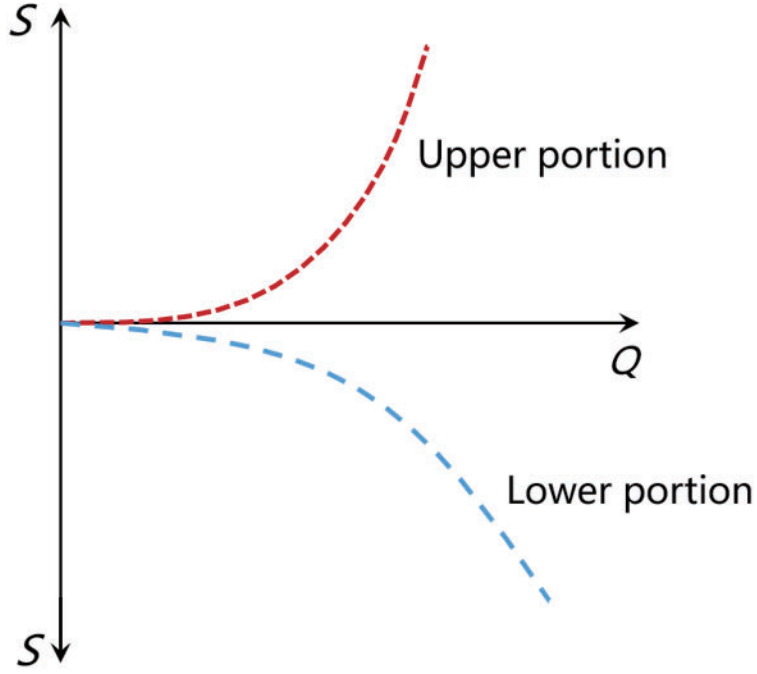
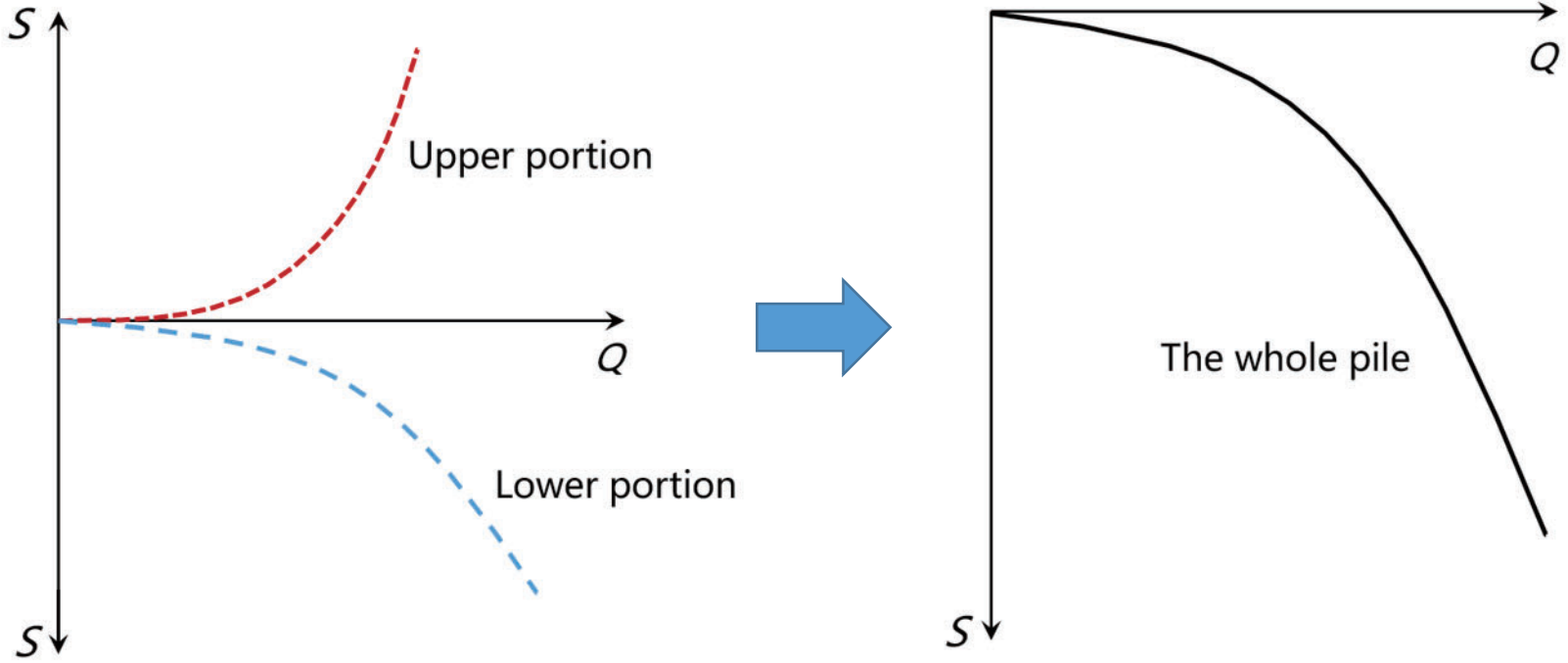
Test results

- Two Q-S curves.
- Get the tensile bearing capacity of the upper portion pile.
- Get the compressive bearing capacity of lower portion pile.

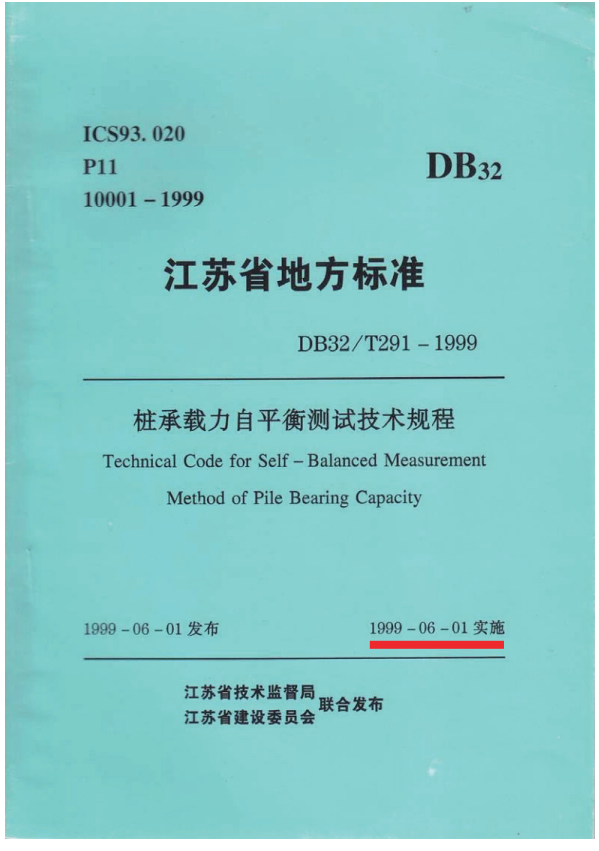


Test results



Converted to the traditional top-down curve of the whole pile.

The first BDSLT code in china (Jiangsu Province)



ICS93. 020
P11
10001 – 1999

DB32

江苏省地方标准

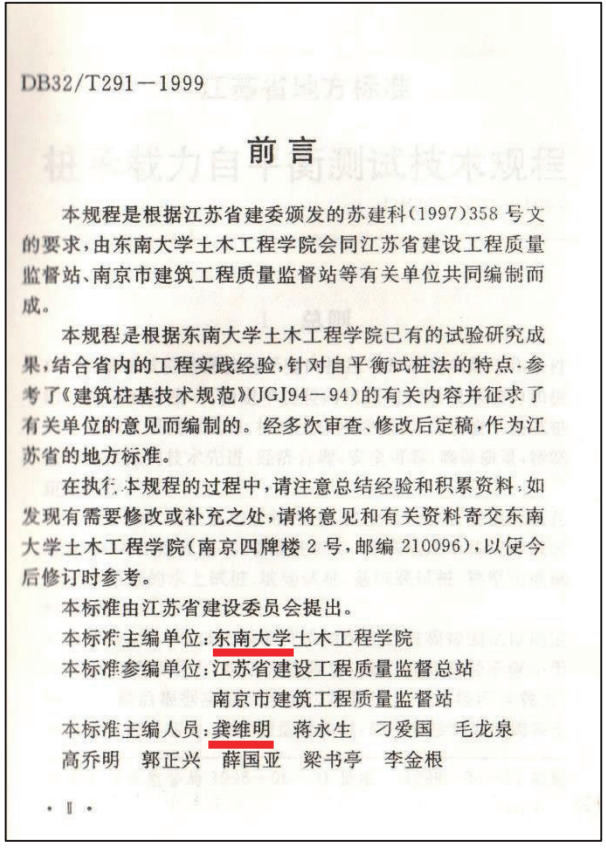
DB32/T291 – 1999

桩承载力自平衡测试技术规程

Technical Code for Self – Balanced Measurement
Method of Pile Bearing Capacity

1999 – 06 – 01 发布　　1999 – 06 – 01 实施

江苏省技术监督局
江苏省建设委员会　联合发布



DB32/T291—1999

前 言

本规程是根据江苏省建委颁发的苏建科(1997)358 号文的要求，由东南大学土木工程学院会同江苏省建设工程质量监督站、南京市建筑工程质量监督站等有关单位共同编制而成。

本规程是根据东南大学土木工程学院已有的试验研究成果，结合省内的工程实践经验，针对自平衡试桩法的特点，参考了《建筑桩基技术规范》(JGJ94—94)的有关内容并征求了有关单位的意见而编制的。经多次审查、修改后定稿，作为江苏省的地方标准。

在执行本规程的过程中，请注意总结经验和积累资料，如发现有需要修改或补充之处，请将意见和有关资料寄交东南大学土木工程学院(南京四牌楼 2 号，邮编 210096)，以便今后修订时参考。

本标准由江苏省建设委员会提出。

本标准主编单位：东南大学土木工程学院

本标准参编单位：江苏省建设工程质量监督总站
南京市建筑工程质量监督站

本标准主编人员：龚维明　蒋永生　刁爱国　毛龙泉
高乔明　郭正兴　薛国亚　梁书亭　李金根

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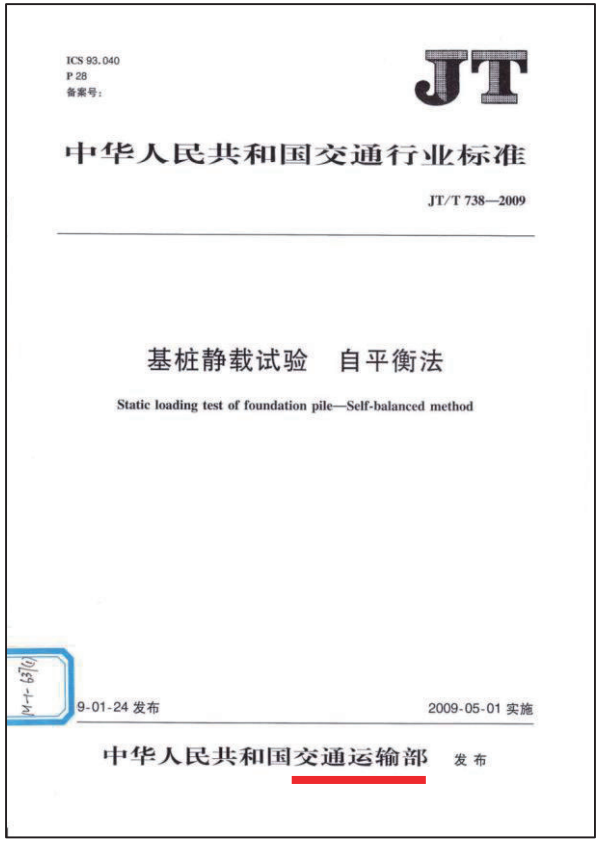
Major Industrial Standards (DDSB Editor-in-Chief)



ICS 93.040
P 28
备案号:

JT

中华人民共和国交通行业标准

JT/T 738—2009

基桩静载试验 自平衡法

Static loading test of foundation pile—Self-balanced method

9-01-24 发布 2009-05-01 实施

中华人民共和国交通运输部 发布

UDC

P

中华人民共和国行业标准

JGJ

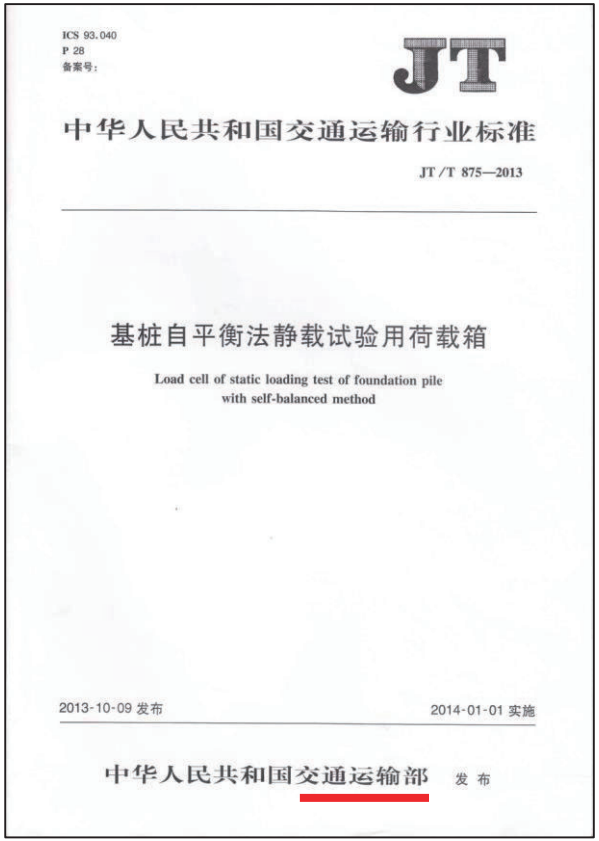
JGJ/T 403－2017
备案号 J 2337－2017

建筑基桩自平衡静载试验技术规程

Technical specification for static loading test of
self-balanced method of building foundation piles

2017－02－20 发布 2017－09－01 实施

中华人民共和国住房和城乡建设部 发布



ICS 93.040
P 28
备案号:

JT

中华人民共和国交通运输行业标准

JT/T 875—2013

基桩自平衡法静载试验用荷载箱

Load cell of static loading test of foundation pile
with self-balanced method

2013-10-09 发布 2014-01-01 实施

中华人民共和国交通运输部 发布

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Partial Patents

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Major Award

International Prize for Technological Inventions (second class)

国家技术发明奖

证 书

为表彰国家技术发明奖获得者，特颁发此证书。

项目名称：深基础自平衡法承载力测试成套技术开发及应用

奖励等级：二等

获 奖 者：戴国亮（东南大学）

中华人民共和国国务院

2019 年 12 月 18 日

证书号：2019-F-310-2-02-R02

国家技术发明奖

证 书

为表彰国家技术发明奖获得者，特颁发此证书。

项目名称：深基础自平衡法承载力测试成套技术开发及应用

奖励等级：二等

获 奖 者：龚维明（东南大学）

中华人民共和国国务院

2019 年 12 月 18 日

证书号：2019-F-310-2-02-R01

国家技术发明奖

证 书

为表彰国家技术发明奖获得者，特颁发此证书。

项目名称：深基础自平衡法承载力测试成套技术开发及应用

奖励等级：二等

获 奖 者：薛国亚（南京东大自平衡桩基检测有限公司）

中华人民共和国国务院

2019 年 12 月 18 日

证书号：2019-F-310-2-02-R05

Testing technology

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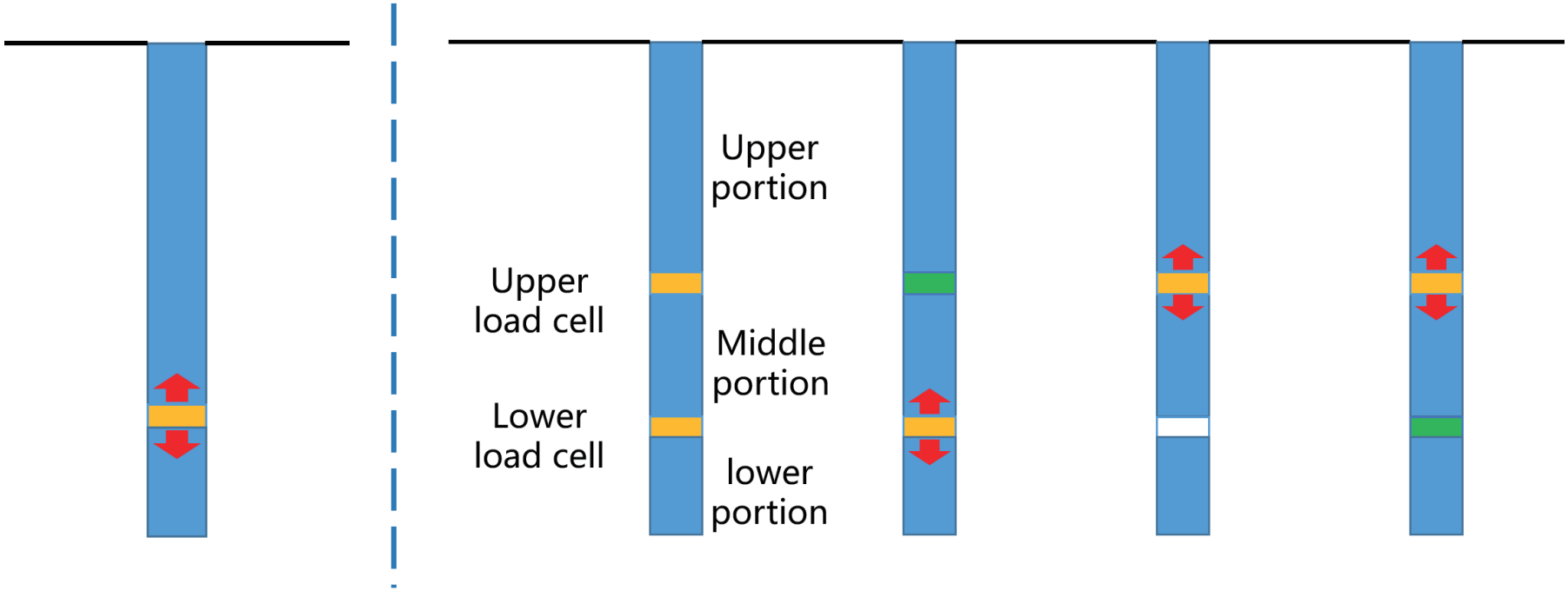
Various test techniques



Single load cell

Double load cells

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Main types of the load cell

Annular load cell for caisson

Load cell for bored pile

Load cell for PHC

Recyclable load cell for steel pile

Rectangular(L) load cell

Oval load cell

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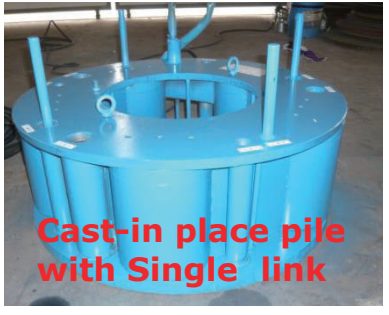
Digging pile


Cast-in place pile


Cast-in place pile with Single link


Cast-in place pile with double link


Punching pile


Pile with guiding object


Steel pipe pile


Recyclable O-cell


Lateral O-cell


Diaphragm Wall


caisson


pile of Wangdong bridge

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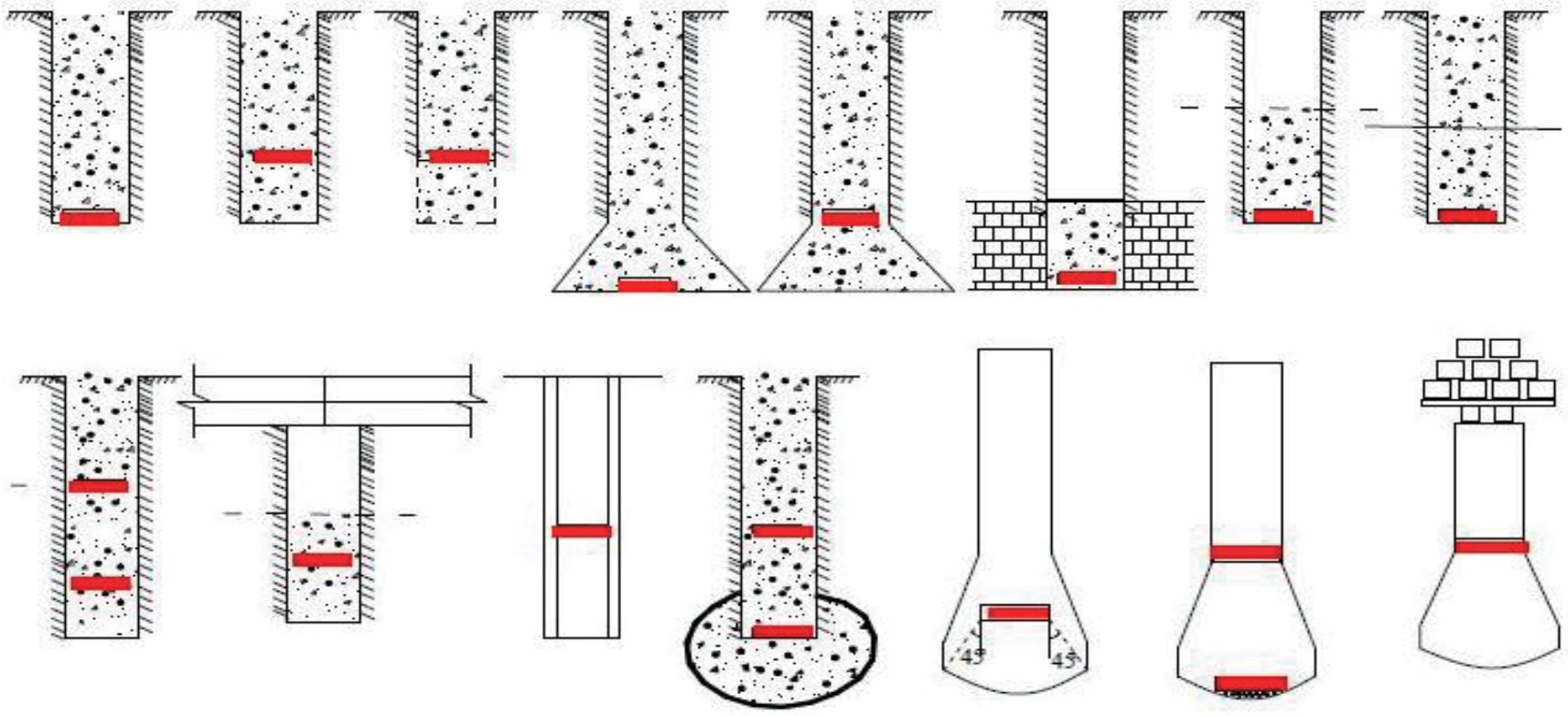
Different positions (various types of piles)



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Test procedures in drilled shafts

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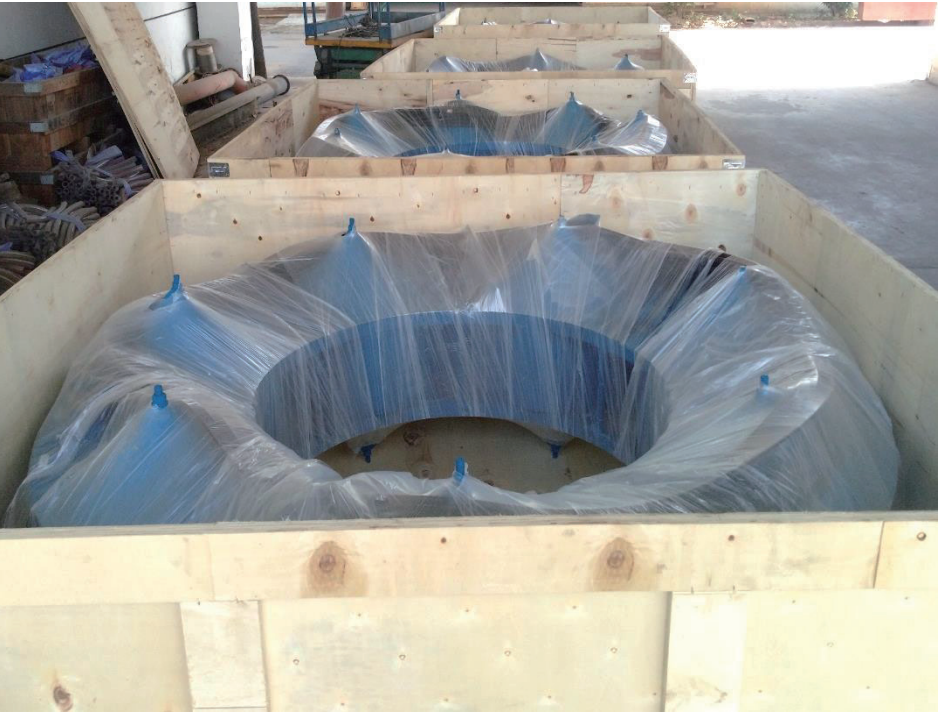
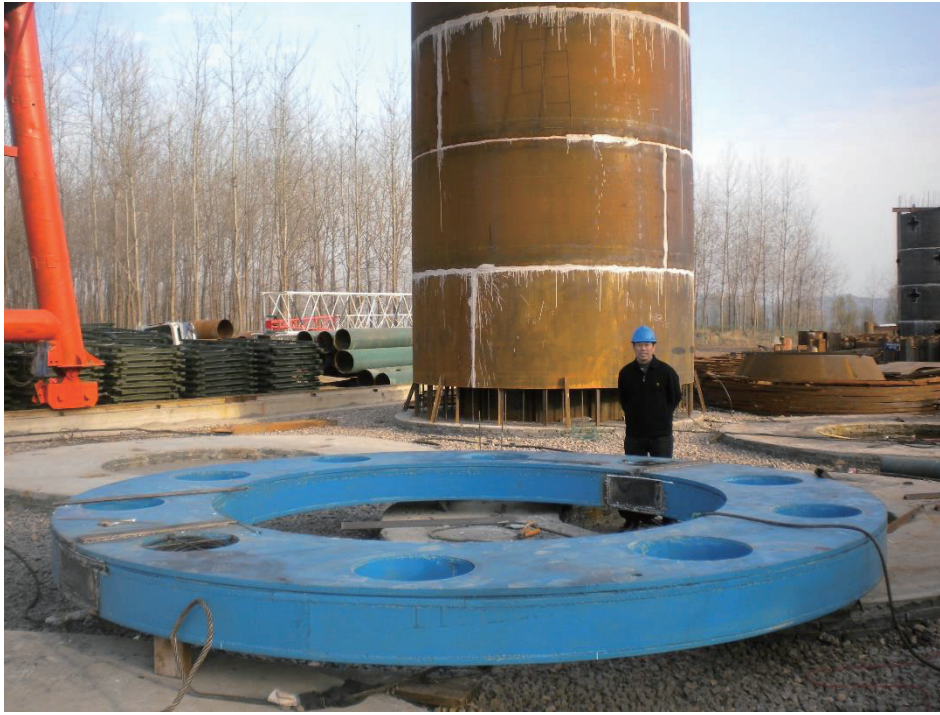
Production and shipping



a)Production in the factory



b)Shipping to the field

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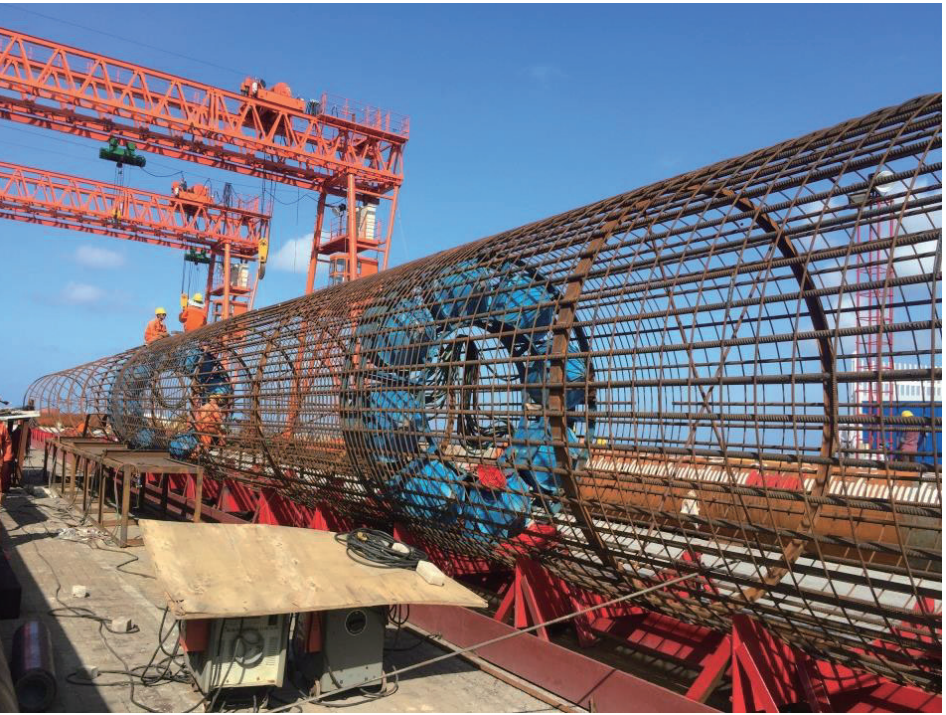
Installation of load cell

a) Axial positioning

b) Welding with steel cage

Fabrication of reinforcement cage



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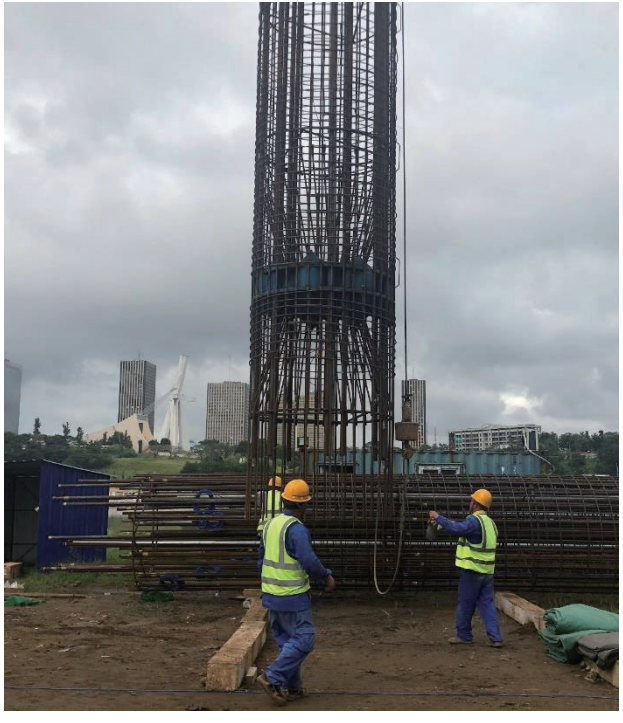
Lifting the cage into the drill hole



Pouring concrete

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Test preparation

a) Erection of reference beams

b)Erection of test shed

Test preparation

c) Marking at the pile head

d) Check the test system

On-site test

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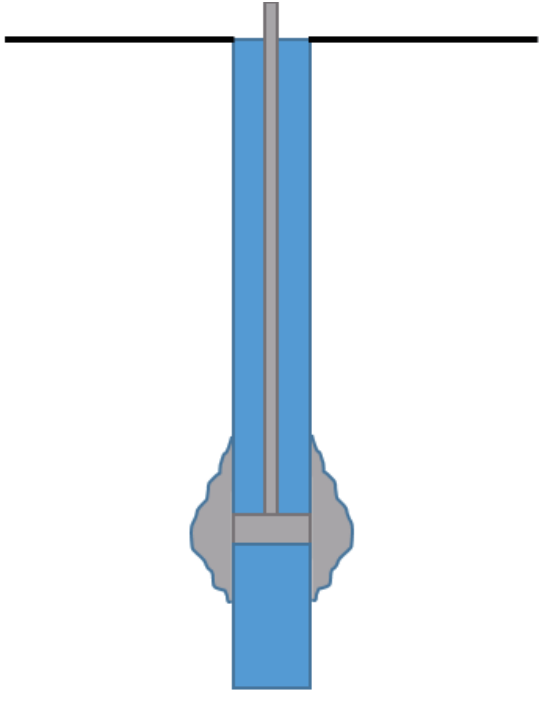
Post-test grouting of in-situ piles



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Major Domestic Projects

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Yangtze River Bridges

Yellow River Bridges

Cross-sea Bridges

Tested by DDSB

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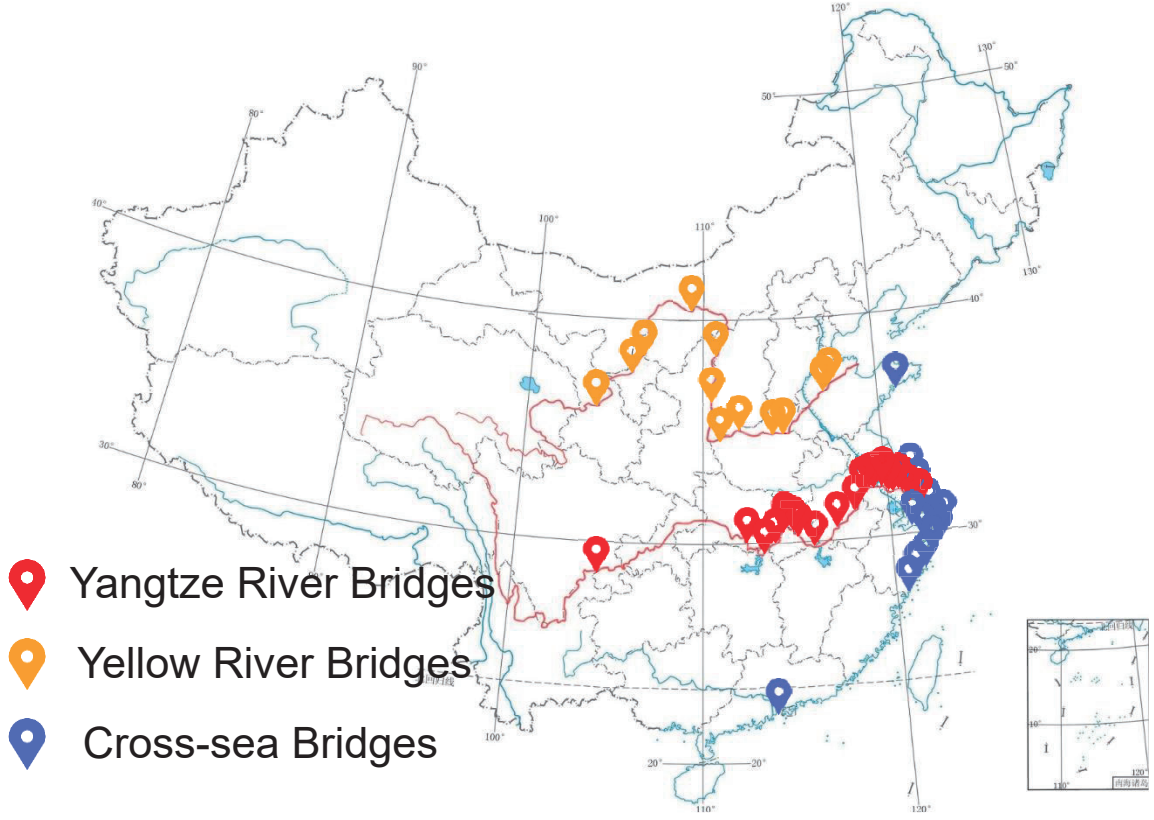

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Yangtze River Bridges ★ Tested by DDSB

No.	Project	Year	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
1	Runyang Yangtze River Bridge	2000	Drilled shaft	12000	2.8	60	Rock
2	Sutong Yangtze River Bridge	2002-2003	Drilled shaft	10054	2.5	125	Sand
3	Nanjing 3rd Yangtze River Bridge	2003	Drilled shaft	9000	2	78	Rock
4	Shanghai Yangtze River Bridge	2006	Drilled shaft	10994	2.5-3.0	108	Clay
5	Jingyue Yangtze River Highway Bridge	2007	Drilled shaft	4530	2.2	80	Rock
6	Taizhou Yangtze River Bridge	2008	Drilled shaft	5300	2.3	108	Sand
7	Maʻanshan Yangtze River Bridge	2008	Rooted caisson	18000	6	48	Pebble
		2010	Drilled shaft	3000	1.5	43	Rock
8	Wuhan Erqi Yangtze River Bridge	2009	Drilled shaft	5981	1.2	100	Rock
9	Chongqi Yangtze River Bridge	2009	Drilled shaft	4498	2	100	Sand
10	Jiujiang Yangtze River Highway Bridge	2010	Drilled shaft	15350	2.8	80	Rock
11	Wandong Yangtze River Bridge	2014	Rooted caisson	12000	5	47	Clay
12	Hutong Yangtze River Railway Bridge	2014	Drilled shaft	5155	2	118	Sand
13	Chizhou Yangtze River Bridge	2015	Drilled shaft+ Rooted caisson	5220	2.5	56	Rock
14	Wuhan Qqingshan Yangtze River Bridge	2015	Drilled shaft	6259	1.8	70	Rock
15	Wufengshan Yangtze River Bridge	2015-2016	Drilled shaft	6758	2	80	Rock
16	Shishou Yangtze River Bridge	2016	Drilled shaft	11794	2.2	120	Sand
17	Qipanzhou Yangtze River Bridge	2016	Drilled shaft	10656	2.5	66	Rock

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Yangtze River Bridges ★ Tested by DDSB

No.	Project	Year	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
18	Nanjing 5th Yangtze River Bridge	2017	Drilled shaft	14461	2.8	90	Rock
19	Wuxue Yangtze River Bridge	2017	Drilled shaft	5593	2	63	Rock
20	Chibi Yangtze River Bridge	2017-2018	Drilled shaft	4589	2.5	58	Rock
21	Xianxinlu Yangtze River Crossing	2019	Drilled shaft	11992	2.2	123	Rock
22	Yanji Yangtze River Bridge	2020	Drilled shaft	12382	2.5	80	Rock
23	Longtan Yangtze River Bridge	2020	Drilled shaft	13458	2.2	92	Rock
24	Changtai Yangtze River Bridge	2020	Drilled shaft	6927	2.5	104	Sand
25	Kahaluo Jinsha River Bridge	2021	Drilled shaft	7183	2.5	72	Gravel
26	Zhangjinggao Yangtze River Bridge (North foundation)	2021	Drilled shaft	Before grouting 7813 After grouting 13260	2.5	116	Sand
27	Maʻanshan Yangtze River Railway & Highway Bridge	2021	Drilled shaft	2924	1.5	65	Sand
28	Shuangliu Yangtze River Bridge	2022	Drilled shaft	10614	2.5	117	Rock
29	Guanyinsi Yangtze River Bridge	2022	Drilled shaft	6200	2.2	35	Pebble
30	Zhangjinggao Yangtze River Bridge (South foundation)	2022	Drilled shaft	Before grouting 7000 After grouting 11500	2.8	107	Sand
31	Libu Yangtze River Railway & Highway Bridge	2023	Drilled shaft	Before grouting 7915 After grouting 12823	2.5	66	Pebble
32	Bailizhou Yangtze River Bridge	2023	Drilled shaft	10351	2.5	118	Sand

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Yellow River Bridges ★ Tested by DDSB

No.	Project	Year	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
1	Zhengzhou to Xinxiang Yellow River Bridge	2001	Drilled shaft	5000	2.2	63	Sand
2	Jili Yellow River Bridge	2003	Drilled shaft	3500	1.5	64	Sand
3	Heʻnan Sunkou Yellow River Bridge	2003	Drilled shaft	4000	1.5	70	Sand
4	Shanxi Yumenkou Yellow River Bridge	2004	Drilled shaft	3300	2.0	90	Sand
5	Kaifeng Yellow River Bridge	2004	Drilled shaft	3000	1.5	80	Sand
6	Jiyang Yellow River Bridge	2004	Drilled shaft	3000	1.5	80	Sand
7	Baotou to Shulinshao Highway Yellow River Grand Bridge	2007	Drilled shaft	1572	1.5	60	Sand
8	Jiʻnan Jianbing Yellow River Bridge	2008	Drilled shaft	2200	1.2	89	Rock
9	Lanzhou Hekou Yellow River Bridge	2013	Drilled shaft	7571	2.5	30	Rock
10	Ningxia Yongning Yellow River Highway Bridge	2014	Drilled shaft	2000	1.8	73	Sand
11	Yinchuan Yellow River Bridge	2014	Drilled shaft	6345	1.2	28	Sand
12	Yuncheng to Lingbao Yellow River Bridge	2015	Drilled shaft	5455	2.0	73	Clay
13	Anyang to Luoshan Highway Yellow River Bridge	2021	Drilled shaft	Before grouting 6072 After grouting 13395	2.2	110	Silt
14	Jiaozuo to Pingdingshan Highway Yellow River Bridge	2023	Drilled shaft	Before grouting 7080 After grouting 12234	2.2	106	Sand

Cross-sea Bridges ★ Tested by DDSB

No.	Project	Year	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
1	Hangzhou Bay Cross-sea Bridge	2002-2004	Drilled shaft	6000	2.8	120	Clay
2	East China Sea Bridge	2002	Drilled shaft	5700	2.5	110	Sand
3	Xihoumen Bridge	2004	Drilled shaft	13009	2.8	40	Rock
4	Qingdao Bay Bridge	2005	Drilled shaft	7775	1.8	47	Rock
5	SINOPEC LNG Cross-sea Bridge	2006-2007	Drilled shaft	2706	1.8	65	Sand
6	Damne Bridge	2008	Drilled shaft	5000	2.2	122	Clay
7	Zhujiajian Cross-sea Bridge	2009	Drilled shaft	6656	2.5	106	Rock
8	Hong Kong-Zhuhai-Macao Bridge	2010	National Science and Technology Support Program: Research on Foundation Settlement Control Technology for Ultra-long Immersed Tube Tunnel with Thick Soft Base and Large Dredging in Offshore Area				
9	Ningbo Xiangshan Port Bridge	2010	Drilled shaft	15000	3.0	120	Rock
10	Ningbo Daxie 2nd Cross-sea Bridge	2011	Drilled shaft	1346	1.5	63	Sand
11	Taizhou Bay Cross-sea Bridge	2013-2016	Drilled shaft	3471	1.8	77	Clay
12	Yueqing Bay Cross-sea Bridge	2014-2015	Drilled shaft	3606	2.0	78	Gravel
13	Sanmen Bay Cross-sea Bridge	2015	Drilled shaft	3408	1.8	91	Gravel
14	Fuchimen Cross-sea Bridge	2016	Drilled shaft	7040	2.8	68	Rock
15	Gaoming Bridge	2016	Drilled shaft	9311	2.8	130	Peddle
16	Ningbo Zhoushan Port Main Channel	2017	steel pipe pile	4390	2.0	111.5	Silty clay

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Zhangjinggao Yangtze River Bridge, Span: 2300 meters.

The World's First Span.

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Sutong Yangtze River Bridge, the world's first cable-stayed bridge with a span of over 1,000 meters.

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Changtai Yangtze River Bridge

The world's first span cable-stayed bridge.

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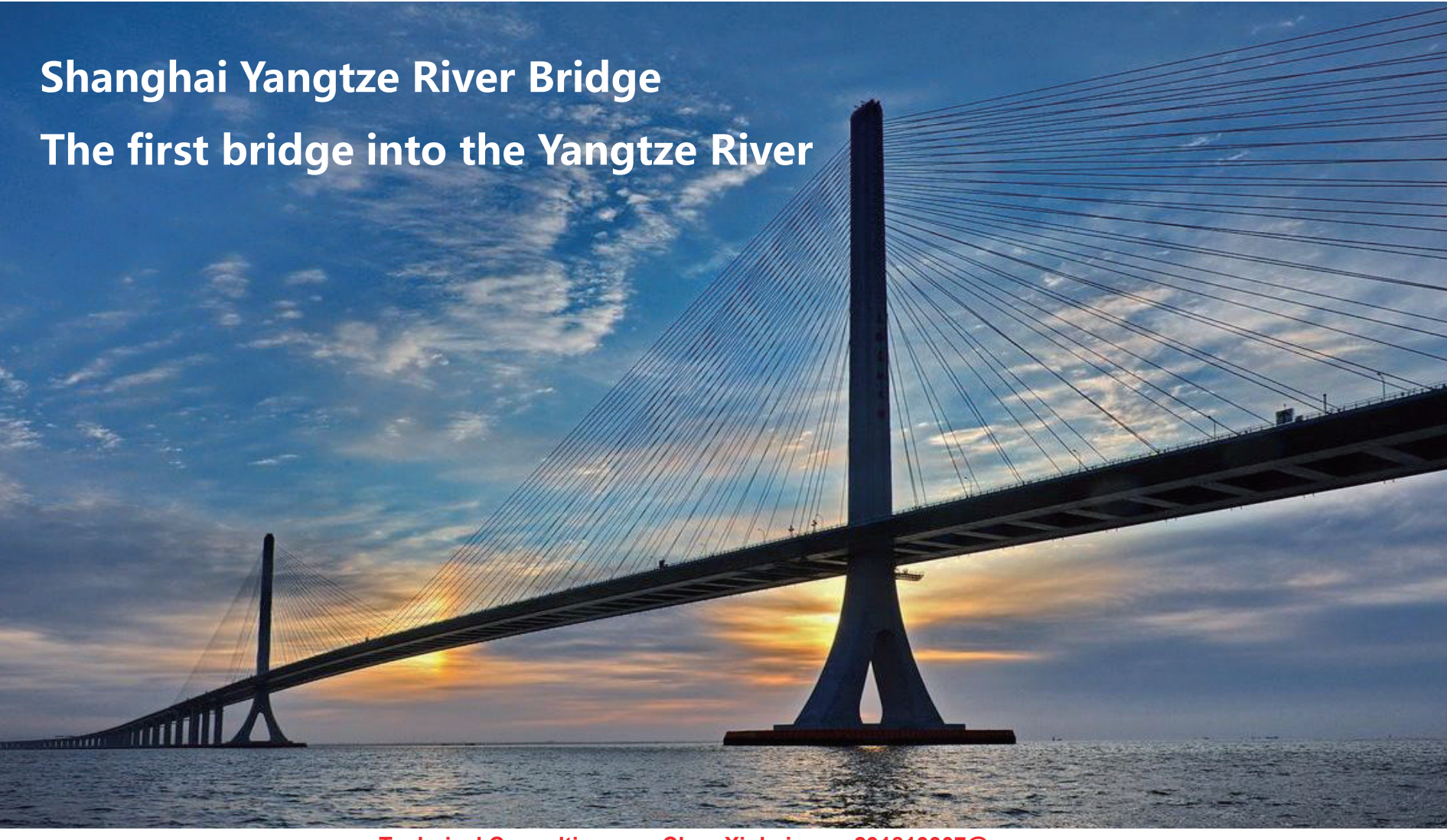

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Runyang Yangtze River Bridge

Combined suspension and cable-stayed bridges

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Hangzhou Bay Cross-sea Bridge,
World Record for the Longest Cross-Sea

Technical Consulting Chen Xinkui 291813307@qq.com

Xihoumen Bridge

The world's first span steel box girder suspension bridge

Technical Consulting Chen Xinkui 291813307@qq.com

Taizhou Yangtze River Bridge

World's first: two-span suspension bridge with three towers

Technical Consulting Chen Xinkui 291813307@qq.com

East China Sea Bridge

The world's longest offshore sea bridge

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High-rise Buildings Over 100 Meters

Tested by DDSB

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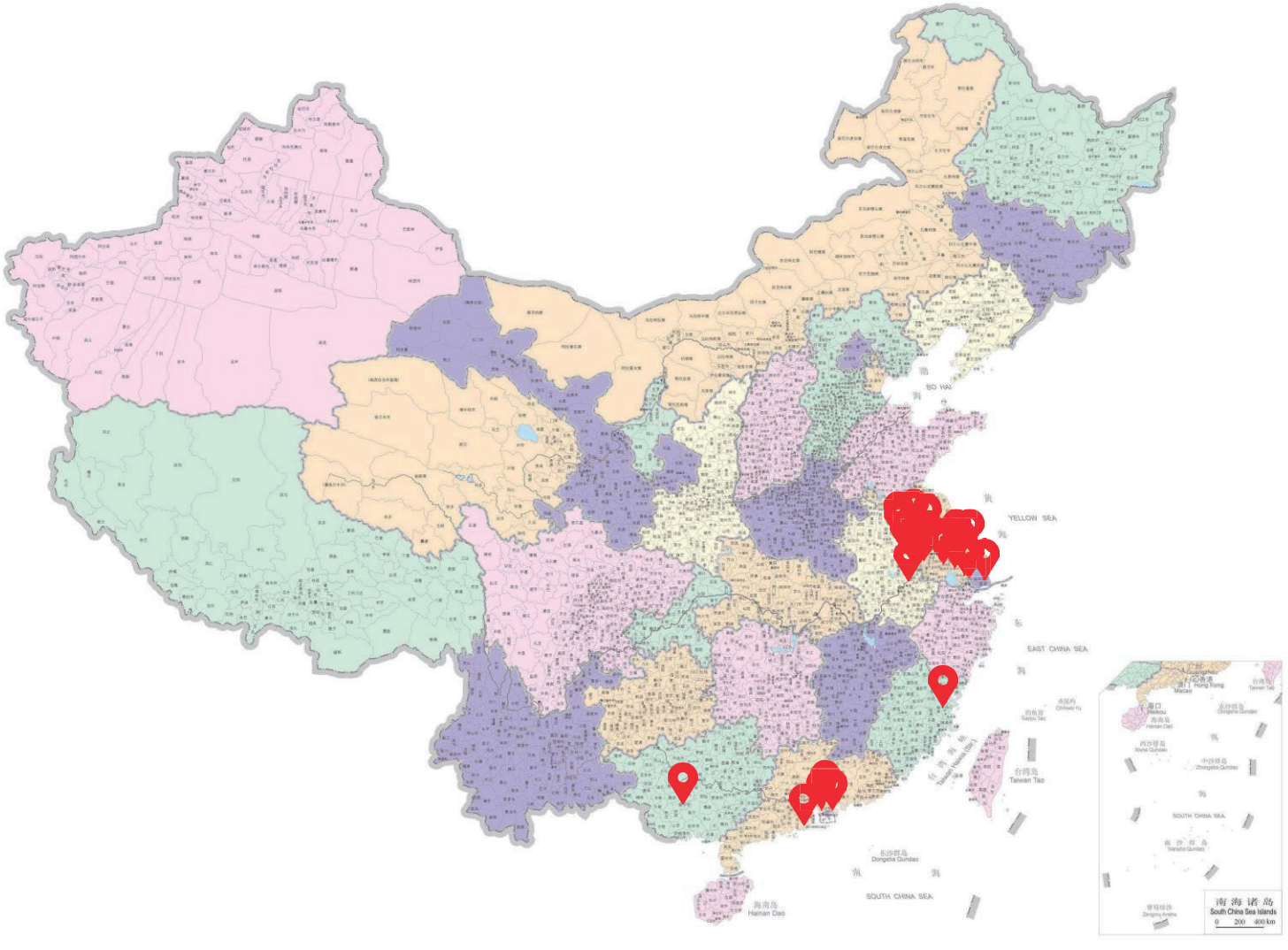

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High-rise Buildings Over 100 Meters ★ Tested by DDSB

No.	Project	Height (m)	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
1	Shenzhen Ping'an Financial Center	600	Digging pile	1740	1.8	24	Rock
2	Nanjing Greenland square Zifeng tower	450	Digging pile	7600	2.0	28	Rock
3	Shenzhen China Energy Storage Building	333	Drilled shaft	3600	1.2	53	Rock
4	Huaxi Longxi International Hotel	328	Drilled shaft	1800	1.0	21	Caly
5	Wuhu Qiaohong international-Riverside Century City	318	Drilled shaft	5060	1.5	33	Rock
6	Nanjing Youth Olympic Center Tower	315	Drilled shaft	8374	2.0	69	Rock
7	Changzhou Runhua Global Center Building	308	Drilled shaft	2000	1.0	64	Caly
8	Shenzhen Hengyu Financial Center	301	Drilled shaft	9774	1.5	70	Rock
9	Nanjing Hexi Golden Eagle Plaza	300	Drilled shaft	2335	1.0	47	Rock
10	Nanjing Jinmao Square Phase ll	285	diaphragm wall	31400	1.2*6	32	Rock
11	Suzhou Runhua Global Building	278	Drilled shaft	1310	1.0	65	Rock
12	Nanning Diwang Commerce Center	276	Digging pile	5000	1.5	25	Rock

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High-rise Buildings Over 100 Meters ★ Tested by DDSB

No.	Project	Height (m)	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
13	Fuzhou Shimao International Center	263	Drilled shaft	3870	1.5	45	Rock
14	Kunshan Golden Eagle	252	Drilled shaft	2276	1.0	55	Sand
15	Zhuhai Hengqin Port	250	Drilled shaft	6316	1.8	79.5	Rock
16	Nanjing Hexi Shimao Center	245	Drilled shaft	5569	1.5	71.8	Rock
17	Nantong Runhua International Center	238	Drilled shaft	1800	0.9	70	Sand
18	Nanjing Jin'ao Building	232	Drilled shaft	2400	1.5	70	Rock
19	Nanjing City of Finance	200	Drilled shaft	2200	1.0	49	Rock
20	Suzhou Center Garden Building	160	Drilled shaft	2520	1.2	58	Sand
21	Nanjing Deji Building	150	Drilled shaft	4700	1.5	35	Rock
22	Nanjing Yangzi Science and Technology Innovation Center Phase III Building	150	Drilled shaft	4742	1.6	57	Rock
23	Nantong International Trade CenterJiangyin	150	Drilled shaft	752	1.0	69	Sand
24	Changsheng Howard Johnson Hotel	132	Drilled shaft	2600	1.2	88	Caly

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Ports and Offshore Wind Powers

Tested by DDSB

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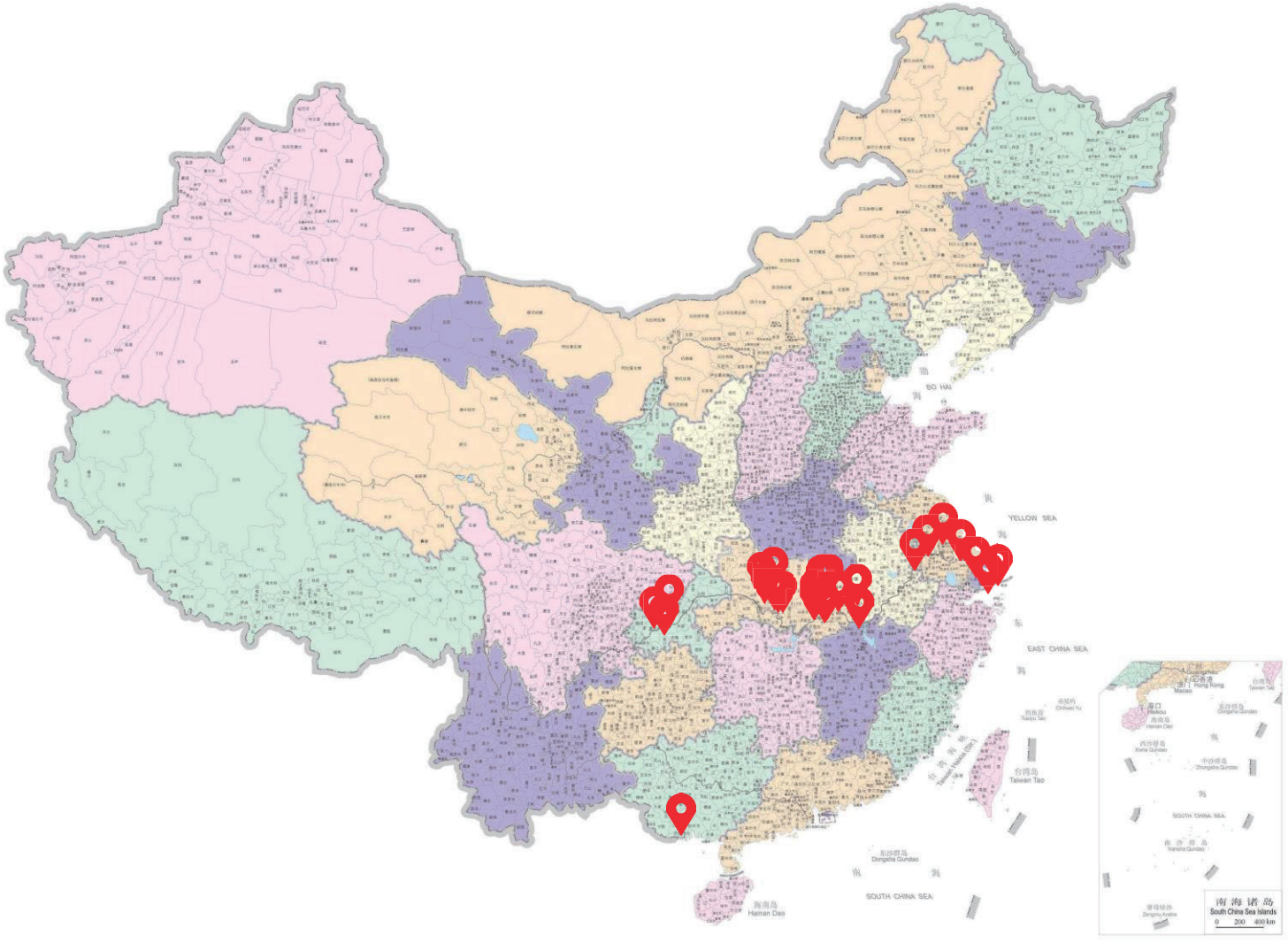

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Ports and offshore wind powers ★ Tested by DDSB

No.	Project	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
1	Shanghai Donghai Bridge Offshore Wind Power Plant	Pipe pile	2200	1.7	72	Sand
2	Chongqing Port Cuntan Working Area Phase lll	Drilled shaft	3000	2.0	26	Rock
3	Hubei Huangshi Port Qipanzhou Wharf 7-10 Berth	Pipe pile	800	0.9	44	Clay
4	Hubei Jingzhou Port Honghu New Embankment Wharf	Drilled shaft + Steel pipe pile	700	1.2	31	Clay
5	Hubei Jingzhou Port Cheyanghe Wharf	Drilled shaft	1600	1.5	37	Clay
6	Chongqing Port Guoyuan Working Area Phase ll	Drilled shaft	2100	2.0	36	Rock
7	Guangxi Fangchenggang Steel Base Wharf	Drilled shaft	3000	2.0	32	Sand
8	Hubei Jingzhou Port Libu Wharf Phasel	Drilled shaft + Steel pipe pile	5860	0.8	32	Pebble
9	Hubei New Wuhan Port Chujiang Wharf	Steel pipe pile	596	0.9	37	Rock
10	Jiangsu Zhangjiagang Inner Port Berth	Pipe pile	700	0.8	45	Sand
11	Jiangxi Coal Reserve Center Jiujiang East Wharf	Drilled shaft	2595	1.3	32	Rock
12	Jiangsu Zhenjiang Port Longmen Logistics Wharf	Steel pipe pile	1910	1.2	35	Sand
13	Hubei Jingzhou Port Xinzhou Wharf	Pipe pile	900	0.9	31	Sand

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Ports and offshore wind powers ★ Tested by DDSB

No.	Project	Foundation type	Max load (metric ton)	Diameter (m)	Length (m)	Bearing stratum
14	Shanghai Donghai Bridge Offshore Wind Power Plant II	Steel pipe pile	3520	1.7	85	Sand
15	Anhui Ma'anshan Port Cihu Wharf	PHC pile + Steel pipe pile	817	1.0	53	Sand
16	Hubei Jingmen City Shayang Port Integrated Wharf	Pipe pile	540	0.8	33	Pebble
17	Hubei Jiayu Port Linjiangshan Logistics Park Wharf	Steel pipe pile + Drilled shaft	1364	1.0	36	Rock
18	Hubei Jingzhou Port Jiangling Yuejin Wharf	PHC pile + Steel pipe pile	800	1.2	39	Pebble
19	Hubei Qichun Port Guanyao Logistics Wharf	Steel pipe pile	736	1.0	45	Rock
20	Shanghai Lingang Offshore Wind Power II	Steel pipe pile	2968	1.7	90	Sand
21	Hubei Wuhan Port Haibo Heavy Industry Wharf	Drilled shaft	1068	1.0	12	Rock
22	Hubei New Wuhan Port Sanjiang Wharf 1-4 Berth	PHC pile	1119	1.0	40	Rock
23	Hubei New Wuhan Port Sanjiang Wharf 1-4 Berth	Steel pipe pile	1100	1.0	44	Rock
24	Hubei New Wuhan Port Sanjiang Wharf 5-8 Berth	Steel pipe pile	1121	1.0	39	Rock
25	Chongqing Port Luohuang Working Area Reconstruction	Drilled shaft	2010	1.8	39	Rock
26	Jiangsu Taizhou Port Qiwei Working Area Wharf	PHC pile	1188	1.0	48	Sand
27	Hubei New Wuhan Port Baihushan Wharf	Steel pipe pile	1181	1.1	39.7	Rock

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Metros in big city

Tested by DDSB

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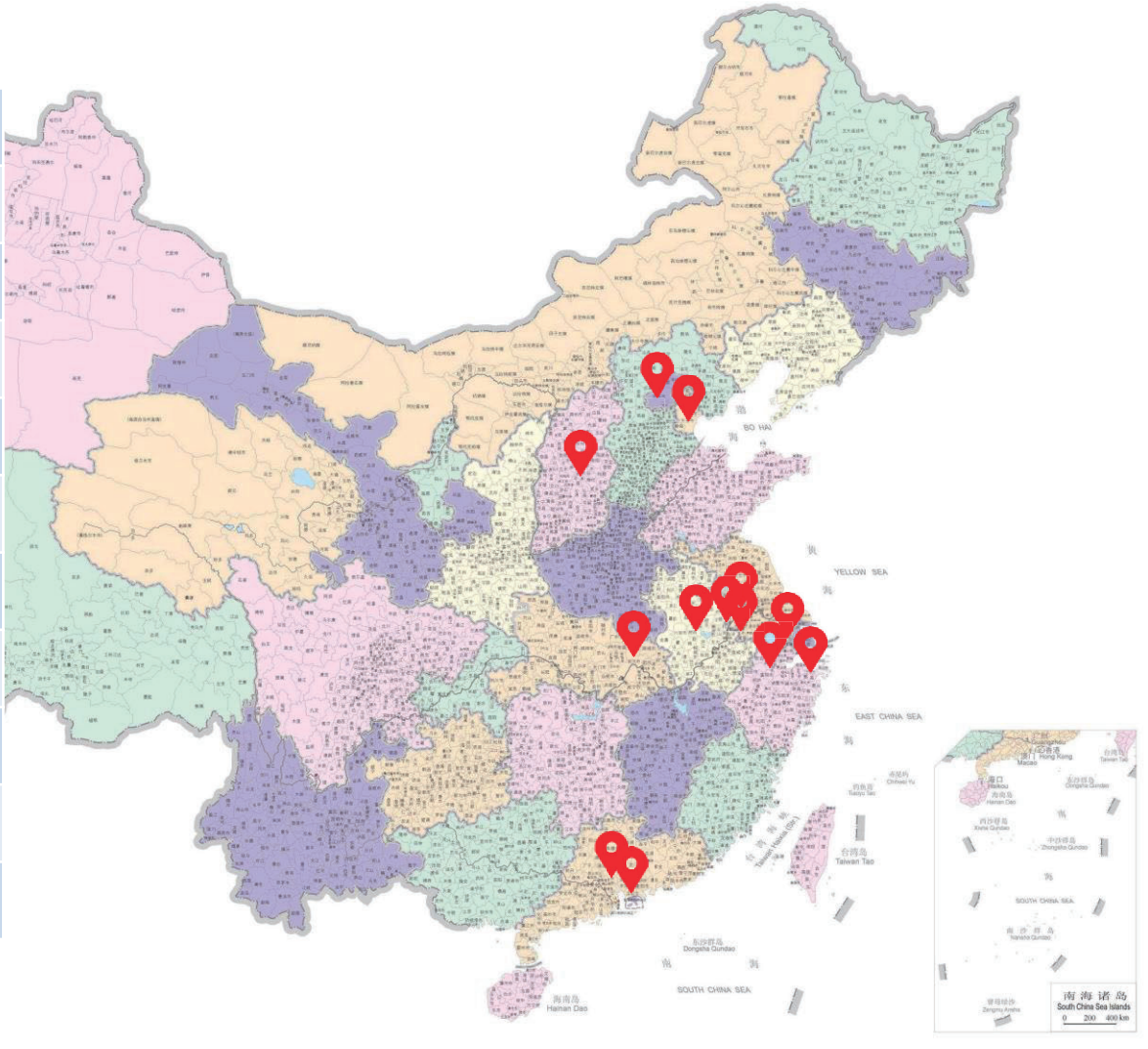
- Nanjing metro
- Beijing metro
- Shenzhen metro
- Guangzhou metro
- Tianjin metro
- Wuhan metro
- Hangzhou metro
- Suzhou metro
- Hefei metro
- Taiyuan metro
- Ningbo metro



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Oversea Projects

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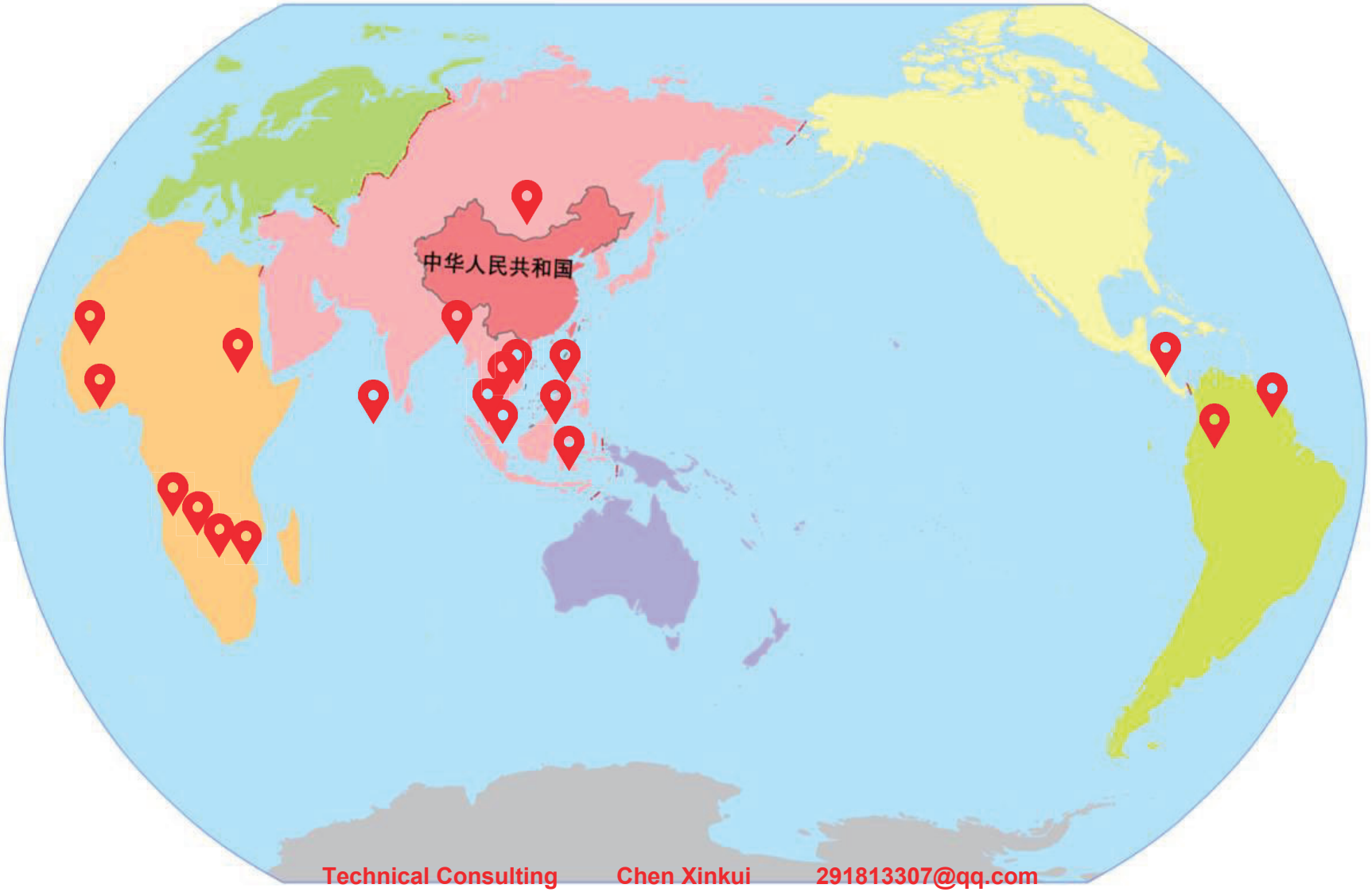

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Oversea Projects ★ Tested by DDSB

No.	Country/ Region	Project	Year	Foundation Type	Max Load (t)	Diameter (m)	Length (m)	Bearing Stratum
1	Vietnam	Daweng Bridge	2005	Drilled shaft	1426	1.5	48	sand
2	Vietnam	Qinyu Bridge	2005	Drilled shaft	1884	2.0	49	sand
3	Indonesia	Suramadu Bridge	2006	Drilled shaft	4883	2.4	97	clay
4	Cambodia	New Monivong Bridge	2008	Drilled shaft	1400	1.5	51	sand
5	Malaysia	The Second Penang Bridge	2008	Steel pipe pile	1454	1.2	74	sand
6	Vietnam	Phu My Hung Shopping Mall	2009	Drilled shaft	3112	1.5	66	sand
7	Sudan	Sennar Bridge	2010	Drilled shaft	2293	1.5	42	clay
8	Angola	Soyo LNG	2010	Drilled shaft	794	1.2	45	sand
9	Indonesia	Tayan Bridge	2013	Drilled shaft	1711	1.5	38	sand
10	Indonesia	Merah Putih Bridge	2014	Drilled shaft	2090	1.5	46	sand
11	Mozambique	Maputo Bridge & Link Roads	2014	Drilled shaft	5774	2.2	100	rock
12	Combodia	Diamond Twin Tower	2015	Drilled shaft	2388	1.2	43	rock
13	Vietnam	THAY TIEU III Bridge	2016	Drilled shaft	659	1.2	64	sand
14	Brunei	Pulau Muara Besar Bridge	2016	Drilled shaft	6902	1.5	77	rock
15	Maldives	China-Maldives Friendship Bridge	2016	Drilled shaft	28929	3.2	44	rock
16	Singapore	Changi Airport Terminal 5	2017	Drilled shaft	958	1.0	34	sand

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Oversea Projects ★ Tested by DDSB

No.	Country/ Region	Project	Year	Foundation Type	Max Load (t)	Diameter (m)	Length (m)	Bearing Stratum
17	Singapore	Private Building	2017	Drilled shaft	837	0.8	33	sand
18	Indonesia	Pembangunan Jembatan Pendekat Pulau Kalimantan Dan Pulau Laut	2017	Drilled shaft	1769	1.5	32	rock
19	Indonesia	Jembatan Holtekamp Jayapura	2017	Drilled shaft	1359	1.2	49	rock
20	Vietnam	The Sun Project	2018	Drilled shaft	8893	1.8	92	sand
21	Indonesia	Grobogan Cement Plant	2018	Drilled shaft	1866	1.0	55	clay
22	Zimbabwe	Harare International Airport	2019	Drilled shaft	804	0.8	8	rock
23	Bangladesh	The 8th Bangladesh-China Friendship Bridge	2019	Drilled shaft	870	1.2	55	sand
24	Cambodia	New Chroy Changvar Bridge	2019	Drilled shaft	3488	2.0	62	rock
25	Côte d'Ivoire	Cocody Bridge	2019	Drilled shaft	3020	1.6	64	sand
26	Zambia	International Conference Center	2020	Drilled shaft	343	0.6	15	sand
27	Singapore	Hyundai Factory	2020	Bored Pile	4428	1.5	38.3	rock
28	Singapore	Factory	2020	Bored Pile	4484	1.8	40	rock
29	Singapore	Industrial Building	2020	Bored Pile	1440	1	25.4	rock

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Oversea Projects ★ Tested by DDSB

No.	Country/ Region	Project	Year	Foundation Type	Max Load (t)	Diameter (m)	Length (m)	Bearing Stratum
30	Cambodia	Koh pich - Koh norea bridge	2021	Drilled shaft	3300	2	63.5	sandstone
31	Singapore	Short Street Hotel	2021	Bored Pile	3170	1.4	39	silt
32	Singapore	Residential Building	2021	Bored Pile	1150	0.8	34	sand
33	Singapore	MHA Building	2021	Bored Pile	5700	2.2	29	rock
34	Singapore	Gek Poh Station	2022	Bored Pile	3100	1.2	40	silt
35	Singapore	Keppel Tower	2022	Bored Pile	4460	1.8	33	rock
36	Mauritania	Mauritania Overpass project	2023	Drilled shaft	2010	1.6	60	sand
37	Singapore	Shaw Tower	2023	Bored Pile	4820	2	75	sand
38	Singapore	Hai Sing Catholic School	2023	Bored Pile	1260	0.8	39	sand
39	Guyana	New Demerara River Bridge	2023	Drilled shaft	6036	2.2	92	lean clay with sand
40	Panama	Panama 4th bridge	2024	Drilled shaft	16000	2.0	30	rock
41	Columbia	The 1st Line of Metro of Bogota	2024	Drilled shaft	1300	1.5	45	sand
42	Mongolia	Mark tower	2024	Drilled shaft	2400	1.0	38.1	rock
43	Guyana	New Mackenzie-Wismar Bridge Project	2025	Drilled shaft	2600	1.2	63.7	sandy silt
44	Philippines	Samal Island-Davao City Connector Project	2025	Drilled shaft	10750	2.5	132	medium fine sand

Suramadu Bridge Indonesia

The largest cross-sea bridge in Southeast Asia

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The Second Penang Bridge Malaysia

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International Conference Center, Lusaka, Zambia

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The Sun Project, Vietnam

Landmarks of the Saigon River

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New Demerara River Bridge, Guyana

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Panama 4th Bridge, Panama

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