ENGINEERED
BAR SYSTEMS

Marine Tie Bars • Architectural Bar Systems • Post Tensioning Bars

Dextra

www.dextragroup.com

Vision

To be a global leader in engineered solutions for the construction industry, providing high added value on quality, safety, and service.

Mission

To exceed customer satisfaction, stakeholder expectations, and contribute safely to a sustainable future by committing to the highest standards of performance and results with creativity, integrity, reliability, environmental and social responsibility.

Values

- Stakeholders' satisfaction
- Agile creativity
- Transparent integrity
- Environmental & social responsibility
- Passion and commitment

About us

Established 40 years ago in 1983, Dextra is a leading manufacturer and distributor of engineered construction products for the building and civil industries.

For over fifteen years, Dextra has been selling a comprehensive range of steel bar systems suitable for a variety of concrete, ground engineering and structural steelwork applications.

The combination of our in-house engineering expertise and design capability with modern manufacturing facilities has allowed us to supply to major construction projects such as Boubyan Seaport in Kuwait (6,000 tons of tie bars and accessories), Suvarnabhumi Airport in Thailand (2,000 tons of tension rods), and Sheikh Jaber Causeway-Doha Link in Kuwait (1,750 tons of post tensioning bars).

Thanks to our ISO-certified production facilities, quality systems, and in-house laboratories, Dextra teams are able to control and maintain a high level of quality in all system components, ensuring full compliance with project specifications and customer satisfaction.

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Tension rods for the suspension of the roof structure
Bangkok International Trade & Exhibition Centre, Thailand

Our expertise

DETERMINATION OF THE RIGHT SOLUTION

Dextra can guide you step-by-step in selecting the most appropriate and cost effective solution for your project. Our guidance is based on 40 years of handling large-scale, complex projects.

SYSTEM OPTIMIZATION & CUSTOMIZATION

Dextra has developed a comprehensive standard component range over the years, allowing for rapid adjustment and customization of our products for a genuinely optimum project solution. Our team will support in the selection and drawing of your systems.

For designers, Dextra offers full technical documentation as well as design/ drafting software components. These can be found in the download section of www.dextragroup.com.

TOTAL CONTROL OVER MANUFACTURING

Dextra has many years of expertise developing and producing its own products. In addition to our own facilities and ISO-certified quality assurance processes, all of our suppliers are audited on a regular basis by our team of engineers to ensure quality compliance and ongoing improvement. Inspections are performed in our own factory or, if necessary, in partner laboratories.

PACKING & SHIPPING

Dextra prides itself to only provide the best packing solution for all exported goods to ensure safe shipping and flawless deliveries. Each bar system component is individually marked to allow easy and quick identification and save time upon installation.

When speed is of the essence, we can also provide acceleration methods to expedite our solutions and avoid site delays.

ON-SITE SERVICE & SUPPORT

We believe that the product delivery is merely the beginning of our customers' journey. Dextra worldwide professionals are also able to accompany you through each step of the onsite installation process until you are completely satistifed with our solutions.

Wheatstone LNG Terminal, Australia

MARINE
TIE BARS

Port Autonome de Pointe Noire, Republic of Congo

About our range

Tie Bars are used in port and harbour construction to anchor waterfront structures. Dextra's unique range covers various steel grades from 355 to 700 N/mm² in yield strength, and thread diameter up to 160 mm.

Different standard designs of fixed and articulated joint are available such as swivel nuts, captive nuts and ball cages, to ensure the project requirements are fully accommodated. Anchorages can be made compatible with all sheet pile profiles, combi walls and concrete diaphragm walls.

For projects using sheet piles, Dextra can also design and prefabricate waling beam systems with waling bolts to provide a complete anchoring system which will ensure full compatibility and consistency with our tie bar systems.

Typical applications

- Harbors
- Wharves
- Jetties
- River embankments
- Container terminals
- Oil & Gas terminals

Product benefits

Various articulation solutions with captive nut, swivel nut, ball cage, T-plate, angle seating, and/or pad-eye ends.

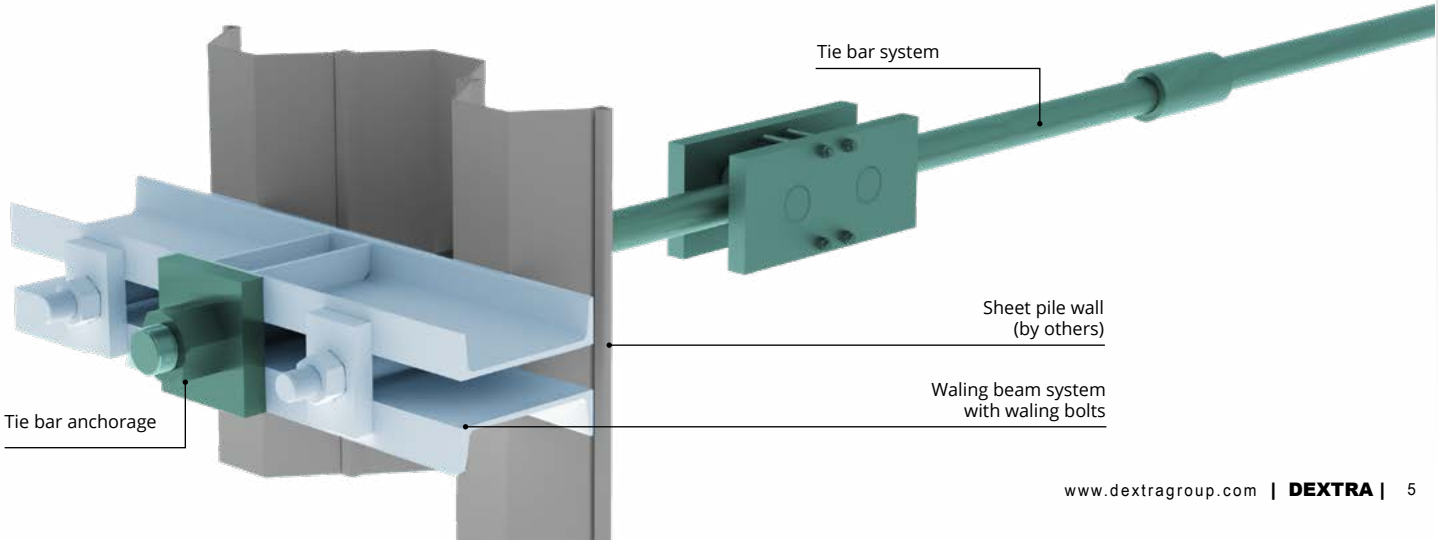
- Ductile design.
- Quick installation.
- Full range of accessories and corrosion protection options available to suit all project requirements.
- Post-tensioning applicable.

Product features

- Available in steel grades 355/510, 500/660, 700/900 N/mm².
- Thread diameter range from M48 to M162.
- Rolled threads.

Corrosion protection / surface finish

Various corrosion protection options are available such as bituminous tape, epoxy coating, sacrificial thickness depending on the project design and requirements.



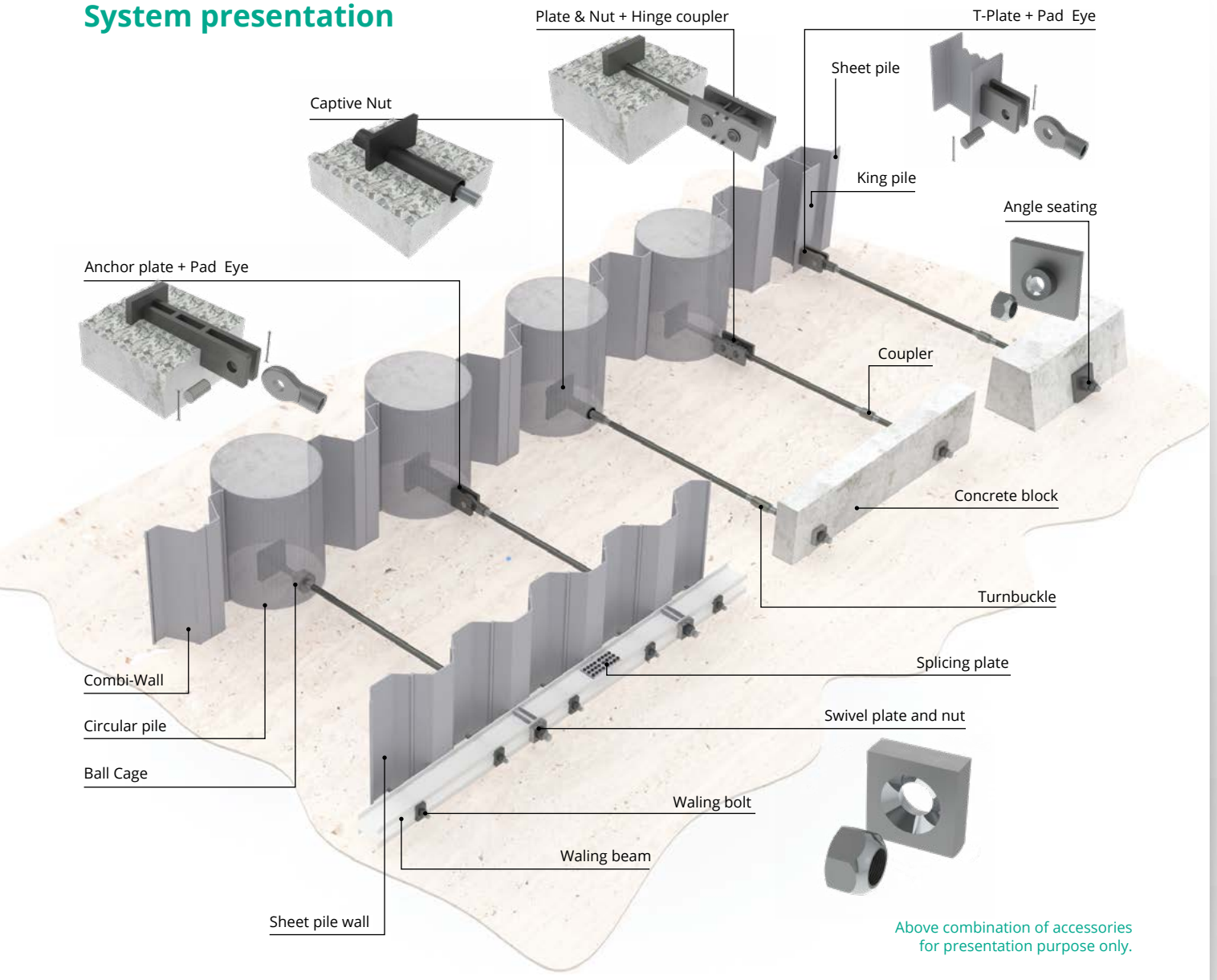
SLNG Terminal, Singapore

Marine tie bar load table

Thread size	Grade 355/510			Grade 500/660			Grade 700/900		
	Un-factored Yield Load	Un-factored Ultimate Load	Tension capacity as per EC3*	Un-factored Yield Load	Un-factored Ultimate Load	Tension capacity as per EC3*	Un-factored Yield Load	Un-factored Ultimate Load	Tension capacity as per EC3*
mm	kN	kN	kN	kN	kN	kN	kN	kN	kN
M48	523	751	541	737	972	700	1,031	1,326	955
M52	624	896	645	879	1,160	835	1,230	1,582	1,139
M56	721	1,035	745	1,015	1,340	965	1,421	1,827	1,315
M60	839	1,205	867	1,181	1,559	1,122	1,653	2,126	1,531
M64	950	1,365	983	1,338	1,766	1,272	1,873	2,408	1,734
M68	1,085	1,558	1,122	1,528	2016	1,452	2,139	2,750	1,980
M72	1,228	1,764	1,270	1,730	2,283	1,644	2,422	3,114	2,242
M78	1,460	2,098	1,510	2,057	2,715	1,955	2879	3,702	2,666
M83	1,669	2,398	1,726	2,351	3,103	2,234	3,291	4,231	3,047
M88	1,892	2,718	1,957	2,664	3,517	2,532	3,730	4,796	3,453
M93	2,128	3,058	2,202	2,998	3,957	2,849	4,197	5,396	3,885
M98	2,379	3,418	2,461	3,351	4,423	3,184	4,691	6,031	4,342
M103	2,643	3,798	2,734	3,723	4,915	3,539	5212	6,702	4,825
M108	2,922	4,198	3,022	4,115	5,432	3,911	5,762	7,408	5,334
M113	3,214	4,618	3,325	4,527	5,976	4,303	6,338	8,149	5,867
M118	3,521	5,058	3,642	4,959	6545	4,713	6,942	8,926	6,426
M123	3,841	5,518	3,973	5,410	7,141	5,141	7,574	9,738	7,011
M128	4,175	5,998	4,319	5,881	7,762	5,589	8,233	10,585	7,621
M133	4,523	6,498	4,679	6,371	8,410	6,055	8,919	11,468	8,257
M143	5,261	7,559	5,442	7,411	9,782	7,043	10,375	13,339	9,604
M153	6,055	8,699	6,263	8,529	11,258	8,106	11,940	15,352	11,053
M162	6,818	9,794	7,052	9,602	12,675	9,126	13,443	17,284	12,444

* Loads as per EN 1993-5 (Eurocode 3) considering kt=0.9 as permitted when rotation is possible at anchorages.

System presentation



Above combination of accessories for presentation purpose only.

Type of walls and compatibility

	Wall element	Captive Nut	Ball Cage	Hinge Coupler	Anchor Plate	T-Plate	Swivel plate	Swivel Angle Seating
	Additional accessory on bar end	-	**Plate & Nut**	**Plate & Nut**	**+ Pad Eye**	**+ Pad Eye**	**+ Swivel Nut**	**+ Swivel Nut**
	Rotation capability	5°	± 10°	45°	± 90°	± 90°	± 7°	± 7°
	Directions	all	all	vertical	vertical	vertical	all	all
Steel wall	**Sheet Pile + Waling beam**						X	X
Steel wall	**HZ Pile (King Pile)**					X		
Concrete wall	**Circular Pile / Combi-Wall**	X	X	X	X			
Concrete wall	**Concrete Capping Beam**	X	X	X	X			
Concrete wall	**Diaphragm Wall**	X	X					
Concrete wall	**Concrete Block**			X			X	X

ARCHITECTURAL **BAR SYSTEMS**

Valenciennes Bowstring, France

About our range

Tension rod systems provides engineers and architects with an aesthetic and high-performance solution for tensile members in structures such as roofs, facades, canopies, and architectural bracing. The ETA-evaluated system is intended for static and quasi static loading conditions.

For applications requiring fatigue verification, such as bridges or other dynamically loaded structures, project specific engineering assessment and validation are required.

Fast installation can be achieved thanks to the simplicity of the system design.

Compression struts complement the range of architectural bar systems and are used when structural members are required to take compression loads as well as having the benefits of installation and aesthetic appeal associated with the Dextra tension rod system.

Featuring a wide range of sizes and accessories in various steel grades and in both carbon and stainless steel with various finishes, Dextra tension rods and compression struts meet the engineering and design requirements of consultants and architects alike.

Typical applications

- Roof support systems
- Canopies roof support systems
- Truss bracing systems
- Hanging floors
- Road and pedestrian bridges
- Temporary stays and braces

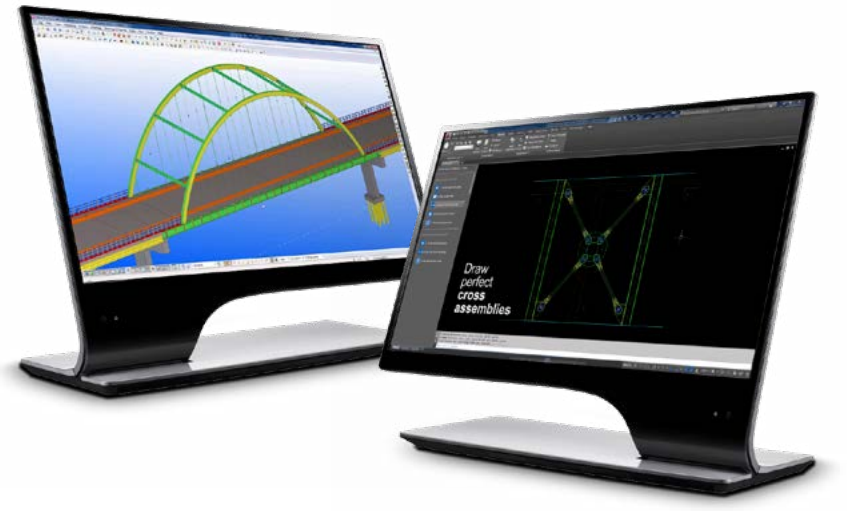
CAD & BIM

Structures incorporating architectural tension rod systems are often complex.

To aid in the design, detailing, and installation, Dextra offers automated drawing components in AutoCAD, Revit, and Tekla, available for download on our website.

www.dextragroup.com

AUTODESK AUTOCAD AUTODESK REVIT Tekla



Carbon steel tension rods

Cylingas Gas Tanks, UAE

About our carbon steel range

- Available in high strength grades, allowing the use of smaller diameters to achieve the same tension capacity as larger diameter mild steel tension bars.
- In situ length adjustment can be achieved by rotation of the bar into the forks and/or at each turnbuckle along the tendon.
- Turnbuckles also allow for the application of a preload, making for example self-weight sagging corrections easier.

Design references

EN 1993 (Eurocode 3)

Product features

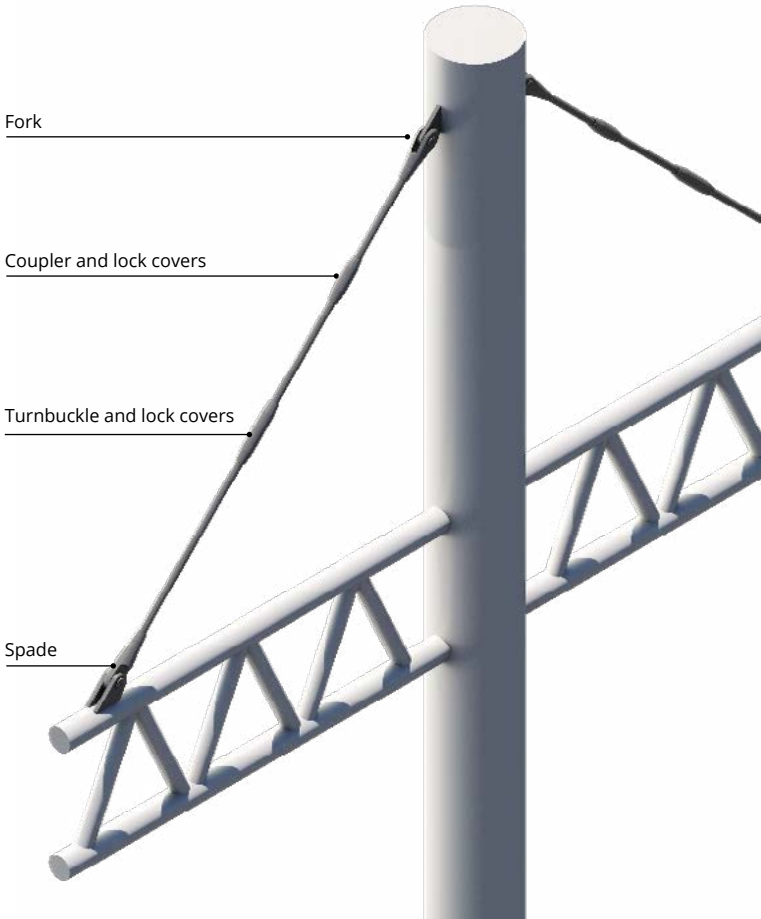
- Available in steel grades 460, 520, and 700 N/mm².
- Thread diameter range from M16 to M133.
- Rolled threads.

Surface finish

Carbon steel tension rods can either be delivered plain, painted or galvanized. If required, they can also be delivered unpainted (plain black steel surface).

Accessories

Forks and Spades		Forks and spades are designed to be connected to grade S355 gusset plates.
Couplers		Couplers are used to connect individual lengths of bar, usually to achieve a greater tendon length than is possible with a single bar.
Turnbuckles		Turnbuckles are used to connect bars and adjust the overall tendon length.
Cross Turnbuckles		Cross-turnbuckles allow two tendons to cross each other in the same plan.
Lock covers		Lock covers are used to cover the exposed thread of the bar and prevent the relative rotation of components.



Carbon steel system load table

Rod Thread size	Nominal Rod Ø*	Rod Critical Section	Rod Linear weight	Grade 460			Grade 520			Grade 700		
				Yield Load**	Ultimate Load**	Tension capacity as per EC3***	Yield Load**	Ultimate Load**	Tension capacity as per EC3***	Yield Load**	Ultimate Load**	Tension capacity as per EC3***
mm	mm	mm²	kg/m	kN	kN	kN	kN	kN	kN	kN	kN	kN
M16	15	157	1.4	72	98	71	81	105	76	110	141	102
M20	19	245	2.2	113	153	110	127	164	118	171	220	159
M24	23	353	3.3	162	220	159	183	236	170	247	317	228
M30	28	561	4.8	258	350	252	292	376	270	392	505	363
M36	34	817	7.1	376	510	368	425	547	394	572	735	529
M42	40	1,121	9.9	516	701	504	583	751	541	785	1,009	726
M48	45	1,473	12.5	678	921	663	766	987	711	1,031	1,326	955
M52	49	1,758	14.8	809	1,099	791	914	1,178	848	1,230	1,582	1,139
M56	53	2,030	17.3	934	1,269	914	1,056	1,360	979	1,421	1,827	1,315
M64	61	2,676	22.9	1,231	1,672	1,204	1,392	1,793	1,291	1,873	2,408	1,734
M68	65	3,055	26.0	1,405	1,910	1,375	1,589	2,047	1,474	2,139	2,750	1,980
M78	75	4,114	34.7	1,892	2,571	1,851	2,139	2,756	1,984	2,879	3,702	2,666
M83	80	4,702	39.5	2,163	2,938	2,116	2,445	3,150	2,268	3,291	4,231	3,047
M88	85	5,329	44.5	2,451	3,331	2,398	2,771	3,570	2,571	3,730	4,796	3,453
M93	90	5,995	49.9	2,758	3,747	2,698	3,118	4,017	2,892	4,197	5,396	3,885
M98	95	6,701	55.6	3,083	4,188	3,016	3,485	4,490	3,233	4,691	6,031	4,342
M103	100	7,446	61.7	3,425	4,654	3,351	3,872	4,989	3,592	5,212	6,702	4,825
M113	110	9,054	74.6	4,165	5,659	4,075	4,708	6,066	4,368	6,338	8,149	5,867
M123	120	10,820	88.8	4,977	6,762	4,869	5,626	7,249	5,219	7,574	9,738	7,011
M133	130	12,742	104.2	5,861	7,964	5,734	6,626	8,537	6,147	8,919	11,468	8,257

*Nominal bar diameter may vary for small order quantities ** Yield and ultimate loads are unfactored *** As per EN 1993-1-1 γ_{m0} 1.0; γ_{m2} 1.25

Stainless steel tension rods

Stainless steel system load table

Rod Thread size	Nominal Rod Ø*	Rod Critical Section	Rod Linear weight	Grade S460			Grade S520		
				Yield Load**	Ultimate Load**	Tension capacity as per EC3***	Yield Load**	Ultimate Load**	Tension capacity as per EC3***
mm	mm	mm²	kg/m	kN	kN	kN	kN	kN	kN
M16	15	157	1.4	72	102	73	81	105	76
M20	19	245	2.3	113	159	115	127	164	118
M24	23	353	3.3	162	229	165	183	236	170
M30	28	561	4.9	258	364	257	292	376	270
M36	34	817	7.2	376	531	380	425	547	394
M42	40	1,121	10.0	516	729	525	583	751	541
M48	45	1,473	12.7	678	958	665	766	987	711
M56	53	2,030	17.6	934	1,320	923	1,056	1,360	979
M64	61	2,676	23.3	1,231	1,739	1,222	1,392	1,793	1,291
M78	75	4,114	35.2	1,892	2,674	1,847	2,139	2,756	1,984
M83	80	4,702	40.1	2,163	3,056	2,102	2,445	3,150	2,268
M88	85	5,329	45.2	2,451	3,464	2,373	2,771	3,570	2,571
M93	90	5,995	50.7	2,758	3,897	2,660	3,118	4,017	2,892
M98	95	6,701	56.5	3,083	4,356	2,964	3,485	4,490	3,233

* Nominal bar diameter may vary for small order quantities
** Yield and ultimate loads are unfactored
*** As per EN 1993-1-4 γ_{m0} 1.1; γ_{m2} 1.25

Design references

EN 1993 (Eurocode 3)

About our stainless steel range

When the requirements for pleasing aesthetics or corrosion protection are particularly high, stainless steel tension rods are the perfect solution.

Product features

- Available in stainless steel grade S460 and S520.
- Thread diameter range M16 to M98.
- Rolled threads.

Compression struts

Midfield Terminal at Abu Dhabi International Airport, UAE

Typical applications

- Roof support systems.
- Truss bracing systems.
- Face bracing systems.

Design references

EN 1993 (Eurocode 3)

Product features

- Struts are available in two alternative designs:
  - Architectural (with long cone and smoother lines).
  - Non-architectural.
- Carbon steel tube (Circular Hollow Section) range from 42mm to 324mm.
- Thread diameter range from M16 to M103.
- Length adjustment of the assembly possible at each fork end.

Non-architectural strut

Architectural strut

Surface finish

Compression struts can either be delivered plain, painted or galvanized. If required, they can also be delivered unpainted (plain black steel surface).

Model selection

CHS (circular hollow section) compression struts range from M16 to M103 and are available in grade 355.

The total compression capacity is limited by the resitance to buckling (which depends on the size of the CHS and pin-to-pin length).

Please refer to the technical datasheet available on www.dextragroup.com for more information about strut selection.

Hyderabad Metro, India

POST TENSIONING **BAR SYSTEMS**

Jahra Road, Kuwait

About our range

Post tensioning bars are used for **permanent works** such as connecting various segments of bridge structures, shear keys for seismic resistance, connection of segments or girders and the reinforcement of piers.

They are also used for **temporary works** such as the anchoring of temporary steel frame supports, lifting bars for segment launching trusses, and stitching bridge segments.

The bars systems need to have defined properties and characteristics in order for the structure to be designed correctly and the bars appropriately tensioned.

The Dextra post-tensioning range features **smooth bars**, **fully threaded bars**, and **CR Bar 1080**, with a full range of accessories.

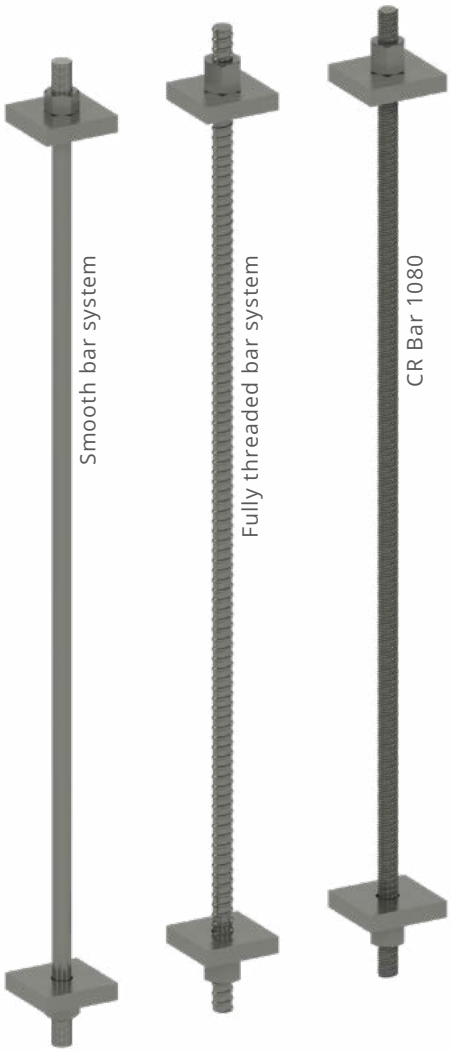
The services of a fully dedicated design team are available to provide engineering support.

Design references

- AASHTO
- Eurocode 2

Typical applications

- Post-tensioning of concrete structures.
- Temporary bracing / Temporary post-tensioning.
- Heavy lifting.
- Seismic restrainer system.
- Hold down for steel structure, wind turbine.
- Structural steel frame ties.
- Bridge segment connections.
- Bridge segment continuity tendons.
- Pre-stressed concrete.
- Pile-testing.



Corrosion protection

Various corrosion protection measures are available depending on whether the tendon is temporary, permanent, bonded, un-bonded and with or without free un-bonded length.

Protection can be achieved by the application of a heat shrink sleeve, grease, paint, grout, or a combination of these.

The smooth bars for shear key applications are normally supplied in a HDPE tube injected with grease and complete with specially designed accessories.

Smooth bar systems

Product features

- Diameters range from 31 mm to 100 mm.
- Three steel grades available.
  - › Grade 1030
  - › Grade 1080
  - › Grade 1200
- Rolled threads (obtained with cold plastic deformation of the metal between two dies) optimized for fatigue performance..

Special application: Shear key & hold down bar systems

- Shear key and hold down bars are a special application of PT smooth bar systems where an assembly acts as a permanent seismic restrainer for the connection of precast elements for elevated metro road for instance.

- Shear key and hold down bar systems are available with a full range of accessories for Grade 1200 and in 4 diameters: 37/M39, 43/M45, 45/M48 and 49/M52.

Product benefits

- High impact resistance.
- Smaller pitch allows finer adjustment and brings less draw-in loss.
- Full range of accessories for specific applications.
- High fatigue performance.

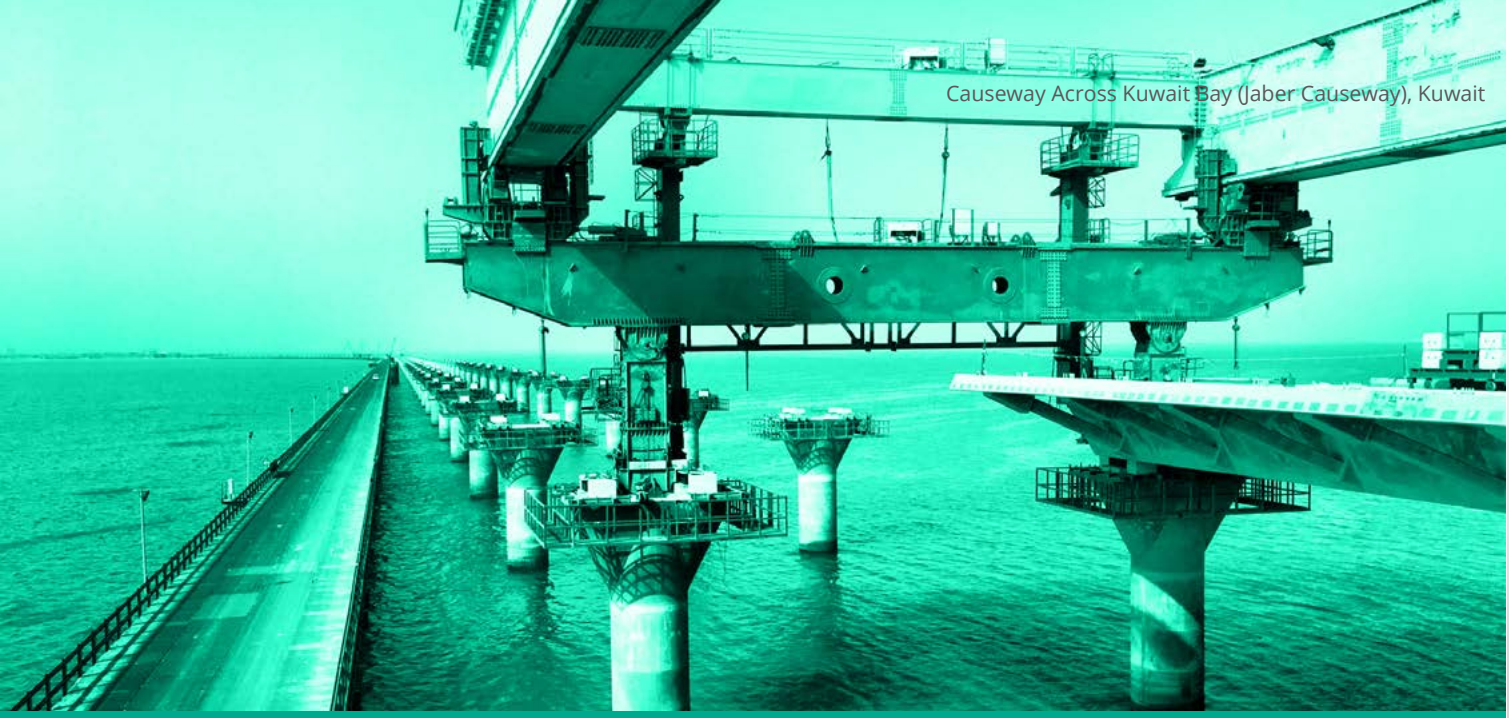
Shear key bar

Hold down bar

Smooth bar system load table

Bar thread size	Critical cross section area	Nominal diameter	Shaft diameter	Linear weight	Grade 1030		Grade 1080		Grade 1200	
	(mm^2)	(mm)	(mm)	(kg/m)	Yield load (kN)	Ultimate load (kN)	Yield load (kN)	Ultimate load (kN)	Yield load (kN)	Ultimate load (kN)
M33	694	30	31	5.9	579	714	645	749	728	832
M39	976	35	37	8.4	815	1,005	907	1,054	1,025	1,171
M42	1,121	38	40	9.9	936	1,155	1,042	1,211	1,177	1,345
M45	1,306	41	43	11.4	1,091	1,345	1,215	1,410	1,371	1,567
M48	1,473	43	45	12.5	1,230	1,517	1,370	1,591	1,547	1,768
M52	1,758	47	49	14.8	1,468	1,811	1,635	1,898	1,846	2,109
M60	2,362	55	57	20.0	1,972	2,433	2,197	2,551	2,480	2,834
M68	3,055	62	65	26.0	2,551	3,147	2,841	3,300	3,208	3,666
M78	4,114	72	75	34.7	3,435	4,237	3,826	4,443	4,319	4,936
M88	5,329	82	85	44.5	4,450	5,489	4,956	5,755	5,595	6,395
M98	6,701	92	95	55.6	5,596	6,902	6,232	7,237	7,036	8,042
M103	7,446	97	100	61.7	6,218	7,670	6,925	8,042	7,819	8,936

Note:
- Yield loads and ultimate loads are unfactored.
- Percentage elongation after fracture: ≥ 12% for Grade 1030, ≥ 10% for Grade 1080 & Grade 1200.



Causeway Across Kuwait Bay (Jaber Causeway), Kuwait

Smooth PT bar systems in action

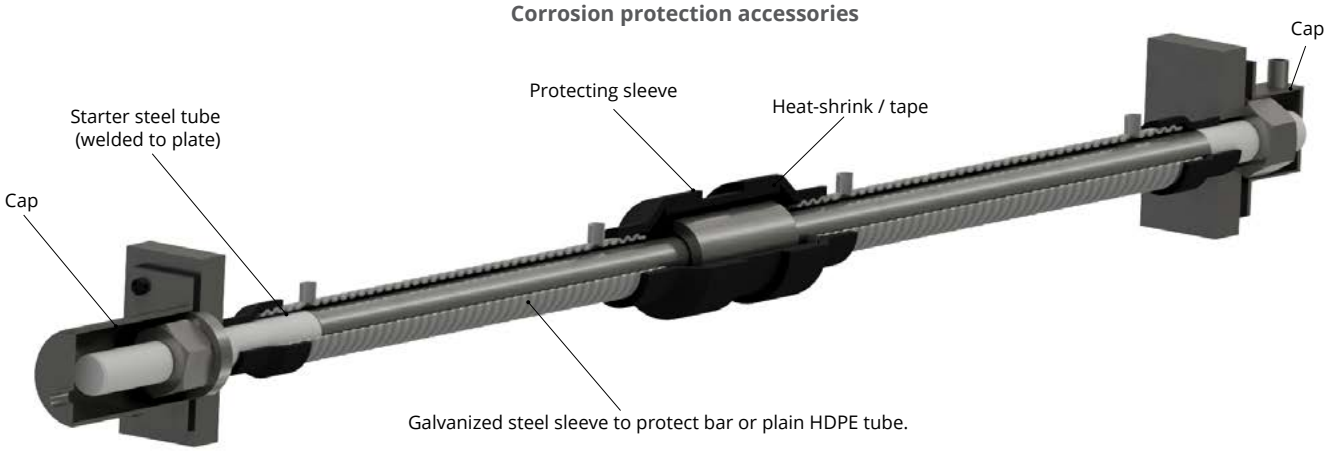
High-performance post tensioning solution for Jaber Causeway, the world's longest sea link

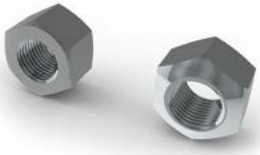
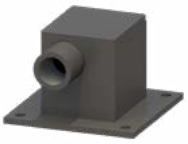
Dextra smooth PT bar Grade 1030 were used all along the sea link for the connection of the precast girders.

In addition, high performance PT bars in Grade 1200 were used to anchor the main steel pylons. These were delivered complete with full corrosion protection accessories.

System accessories

Corrosion protection accessories



Coupler system	Nuts	Bearing plates	Washers	Caps
				

Fully threaded bar systems

Product features

- Diameters range from 25 mm to 50 mm.
- 2 steel grades available:
  - Grade 1030
  - Grade 1080
- Continuous hot rolled thread.

Product benefits

- Re-usable.
- Cuttable at site.
- Continuous thread makes connection possible at any point.
- Large pitch especially suitable for fast installation and temporary applications.
- Re-tensioning possible without any damage.
- Full range of accessories, including corrosion protection accessories, also supplied by Dextra.

Fully threaded bar system load table

Bar nominal diameter	Shaft diameter dA	Pitch c	Cross-sectional area	Linear weight	Grade 1030		Grade 1080	
					Yield load	Ultimate load	Yield load	Ultimate load
(mm)	(mm)	(mm)	(mm²)	(kg/m)	(kN)	(kN)	(kN)	(kN)
25	28	12	491	3.9	407	506	457	530
32	36	16	804	6.3	668	828	748	869
36	41	18	1,018	8.0	845	1,048	947	1,099
40	45	20	1,257	9.9	1,043	1,294	1,169	1,357
50	56	24	1,963	15.4	1,630	2,022	1,826	2,121

Note:
- Yield loads and ultimate loads are unfactored.
- Percentage elongation after fracture: ≥ 7% for Grade 1030 and Grade 1080.

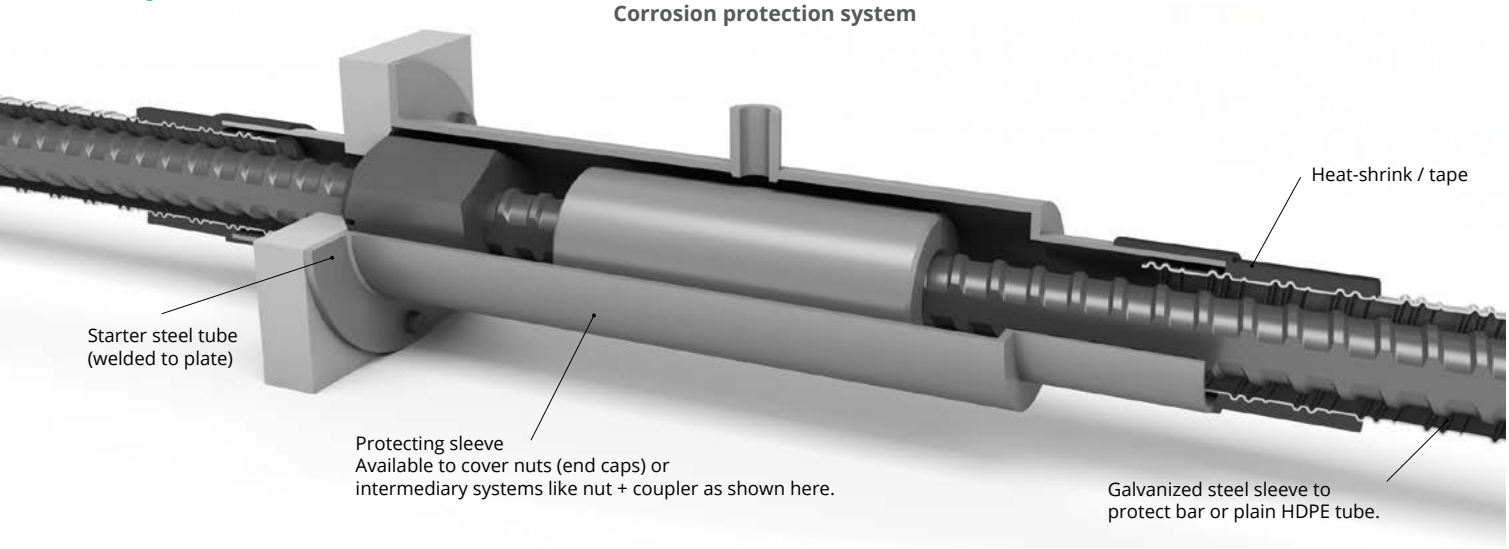
Jahra Road, Kuwait

Fully threaded bar systems in action

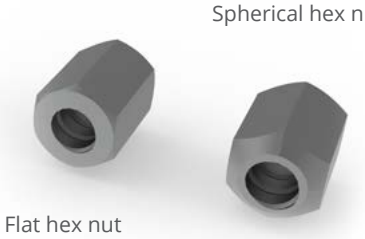
For the Jahra Road project in Kuwait, Dextra supplied reusable fully threaded bar systems in diameters 36 mm and 50 mm, Grade 1080. The high-grade bars were used for the heavy lifting of precast girders, temporary support of the concrete structures, and temporary bracing of supporting structure.

System accessories

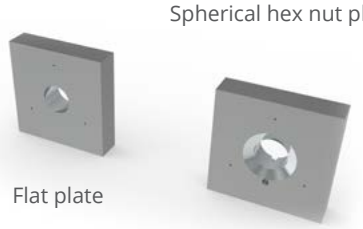
Corrosion protection system



Nuts



Bearing plates



Coupler system

CR Bar 1080 systems

High-tensile CR Bar 1080 is quenched and tempered to obtain their specified properties and provided with cold-rolled thread. Specifically designed to facilitate mainly easier installation, continuous thread for possible connections at any point, and lesser lock-off loss.

Typically used for permanent or temporary application for the connection between steel and concrete elements or concrete to concrete elements or steel to steel elements. It has high impact resistance and high fatigue performance that allows cost-efficient size selection from OD 26.5 mm to OD 75 mm. Accessories for specific applications are made available upon request.

Product features

- Cold-rolled CR Bar 1080 (quenched & tempered)
- Diameter range available from 26.5 mm to 75 mm
- Bar grade: Grade 1080
- 8% Elongation after fracture
- Pitch 6 mm for ≤ OD 40 mm and 8 mm for ≥ OD 47 mm
- Length up to maximum 11.8 m
- Complete accessory range available: Couplers, washers, nuts & plates
- All accessories are designed to exceed the load performance of the bar

Product benefits

- Re-usable* / Re-tensioning
- CR Bars 1080 available in lengths up to 11.8 m. Custom lengths available upon request
- Cuttable at the site
- Continuous thread makes connection possible at any point

* The bars and components can be re-used/re-tensioned providing that the actual condition of each component is in the same condition as its first use and undamaged. Subject to engineer's validation and approval at site.

CR Bar 1080 system load table

Nominal Diameter	Shaft Diameter	Nominal Thread Size	Pitch	Cross-section Area	Linear Weight	Grade 1080	
(mm)	(mm)	(mm)	(mm)	(mm²)	(kg/m)	Yield Load (kN)	Ultimate Load (kN)
26.5	26	31.76	6	540	4.52	513	583
32	33	38.87		872	6.55	829	942
36	36	41.88		1,037	8.27	985	1,120
40	40	45.89		1,278	10.18	1,214	1,380
47	48	55.03	8	1,787	14.00	1,697	1,929
50	50	57.23		1,955	15.82	1,858	2,112
57	58	65.25		2,634	20.51	2,502	2,844
65	63	70.25		3,109	26.62	2,953	3,357
75	73	80.26		4,177	35.37	3,968	4,511

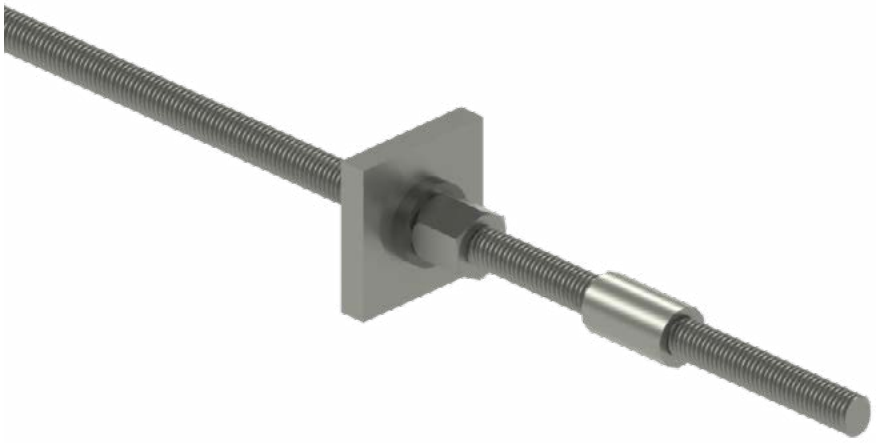
Note:
- Yield loads and ultimate loads are unfactored.
- Yield stress is 0.2% proof stress.
- The modulus of elasticity may be taken as E = 205,000 N/mm^2
- Percentage elongation after fracture ≥ 8%

CR Bar 1080 systems in action

Typical applications for temporary or permanent applications:

- Pre-tensioning or post-tensioning of concrete structures
- Temporary bracing / temporary post-tensioning
- Heavy lifting or hangers (i.e. precast segments / beams).
- Launching gantries assembly
- Structural steel frame ties
- Segment or girder connections (temporary or permanent stitching).
- Bridge segment continuity tendons.
- Seismic restrainer system
- Reinforced concrete pier foundations
- Concrete or Steel pylons
- Cofferdams
- Temporary or partial stressing
- Prestressed block and brick construction
- Pile testing

System accessories



Coupler system	Nuts	Bearing plates	Washers

WORLDWIDE **REFERENCES**

Marine tie bars

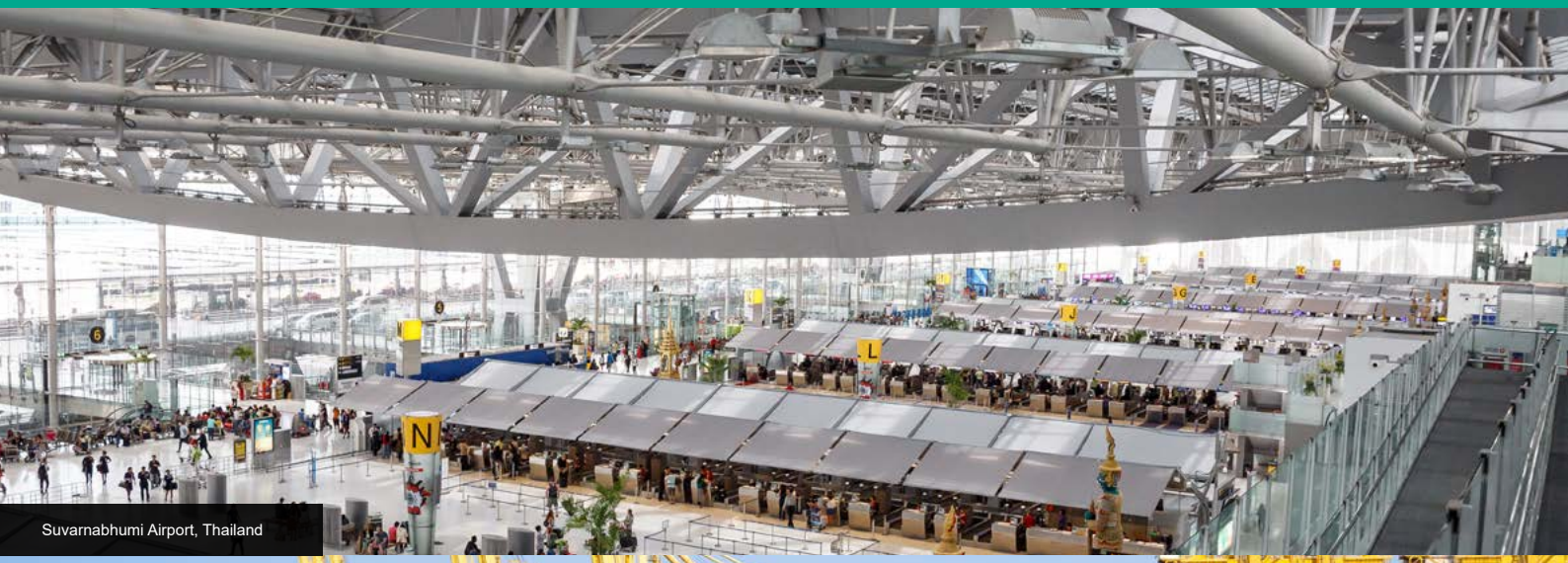
Queensland Curtis LNG (QCLNG), Australia
Wheatstone LNG, Australia
Maitree Super Thermal Power Project, Bangladesh
Porto Multi Rio, Brazil
Port Autonome de Pointe Noire, Republic of Congo
Noumea Port Berth 8, France
Sète Quay, France
Paradip International Cargo Terminal, India
Aqaba Container Terminal, Jordan
Mubarak Al-Kabeer, Kuwait
Tanger Med 2 Caisson Port, Morocco
MICT Berth 7 and Berth 8, Philippines
Jizan Refinery Terminal, Saudi Arabia
Shuqaiq Steam Power Plant, Saudi Arabia
SLNG Berth No.2, Singapore
Laem Chabang, Thailand
Fujairah Port, UAE
Port Khalid, UAE
Stevin Rock Berths New Quay, UAE
Cochin Shipyard - New Dry Dock, India

Architectural bars

Bezons Bridge, France
Pune Cricket Stadium, India
Stadium 974, Qatar
Khaosiung National Stadium, Taiwan
Bangkok Arena, Thailand
Bangkok BITEC Exhibition Center, Thailand
Suvarnabhumi International Airport, Thailand
Abu Dhabi International Airport, UAE
Cylingas Gas Tank, UAE

Post tensioning bars

China Central Television Headquarters, China
Nouvelle Route du Littoral, France
Arrah Chhapra Bridge, India
Mandovi Cable Stayed Bridge, India
Chennai Metro, India
Causeway Project, Kuwait
Doha Link, Kuwait
Jahra Road, Kuwait
Nhat Than Bridge, Vietnam
Tan Vu - Lach Huyen Bridge, Vietnam



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