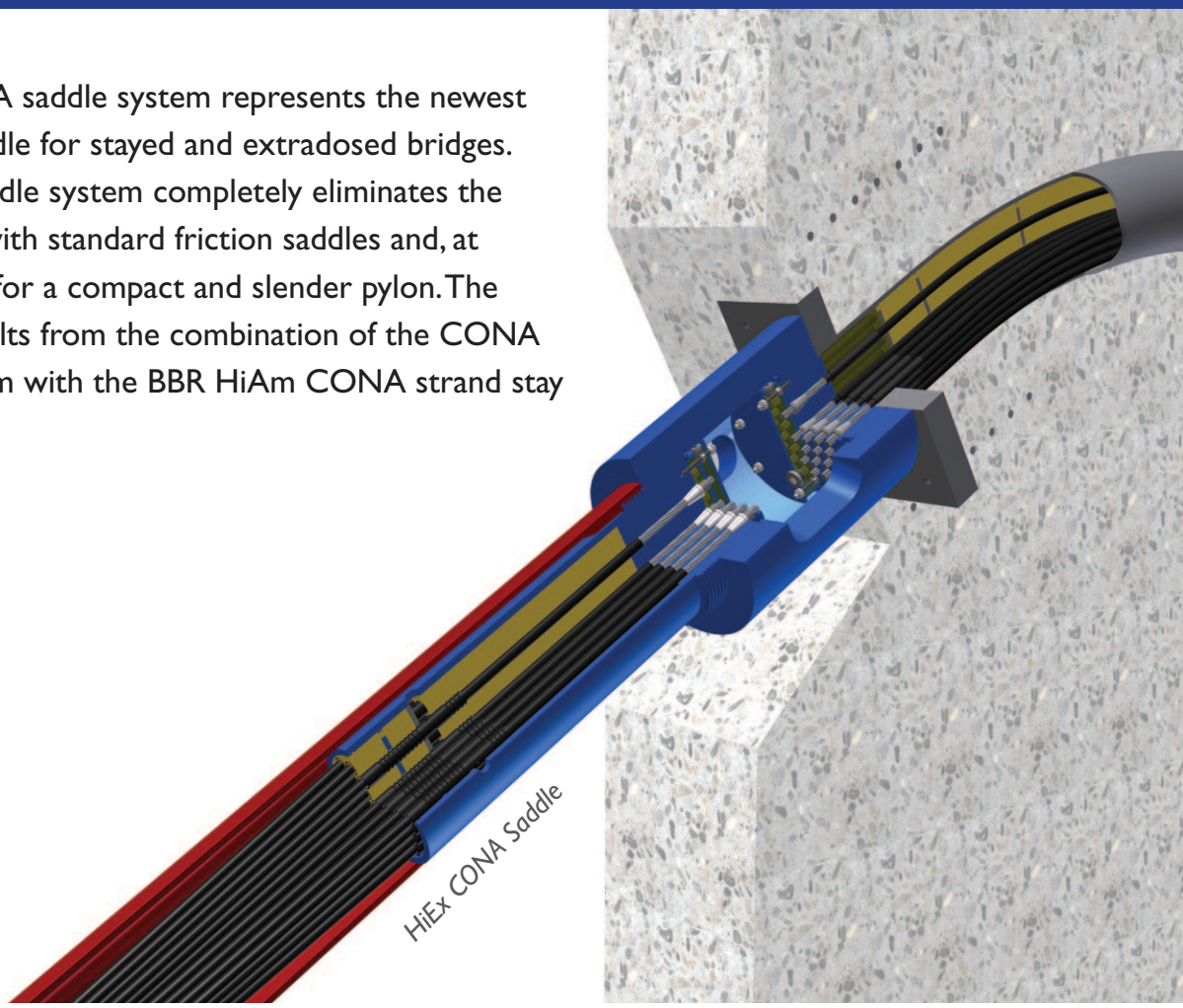
BBR HiEx CONA Saddle

Strand Stay Cable Saddle System

The BBR® HiEx CONA saddle system represents the newest and most modern saddle for stayed and extradosed bridges. The HiEx CONA® saddle system completely eliminates the problems associated with standard friction saddles and, at the same time, allows for a compact and slender pylon. The technical solution results from the combination of the CONA CMI internal PT system with the BBR HiAm CONA strand stay cable system.



Danube Bridge (Bulgaria/Romania)

Photo courtesy of FCC

BBR HiEx CONA Saddle

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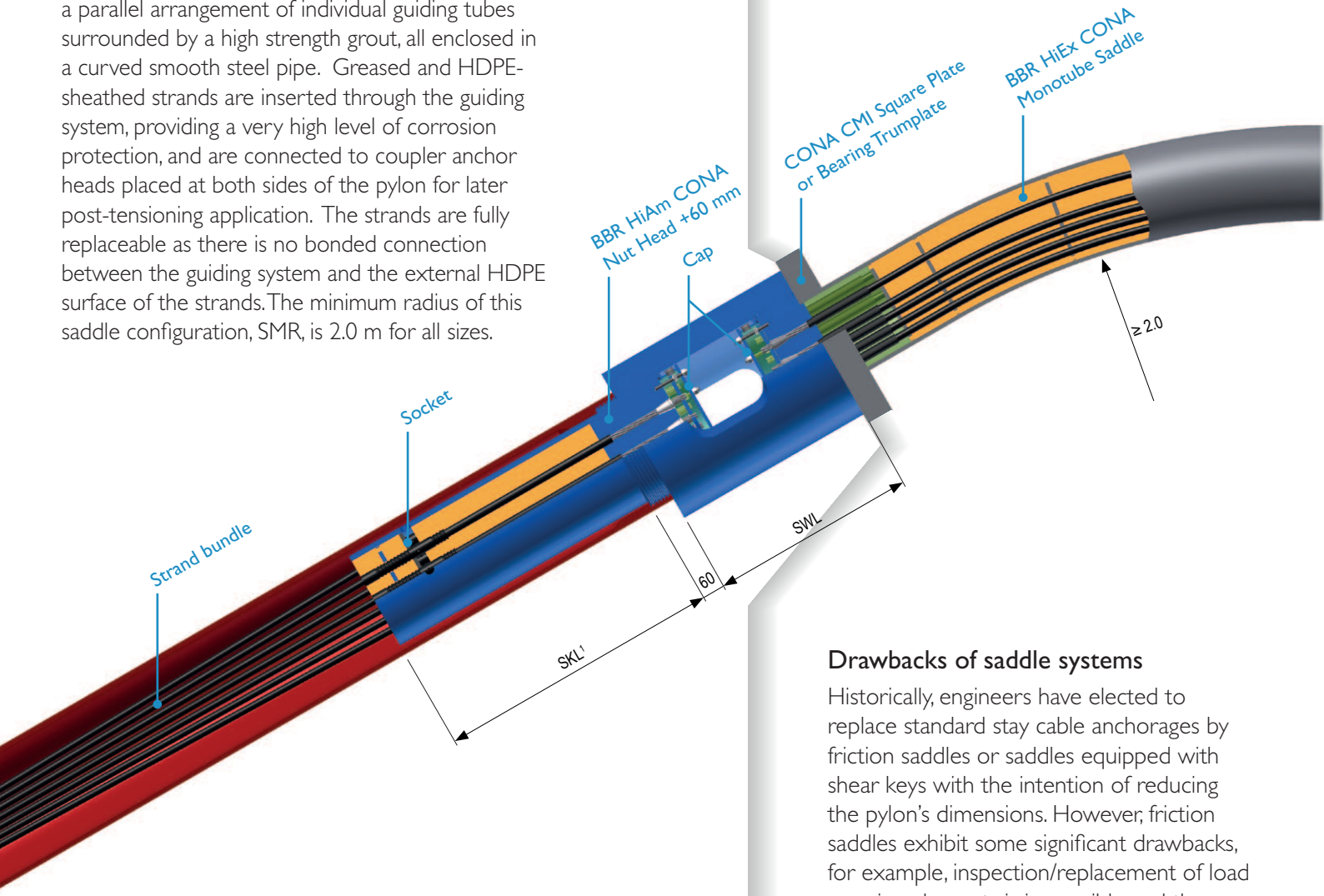
BBR HiEx CONA Monotube Saddle

The Monotube Saddle configuration consists of a parallel arrangement of individual guiding tubes surrounded by a high strength grout, all enclosed in a curved smooth steel pipe. Greased and HDPE-sheathed strands are inserted through the guiding system, providing a very high level of corrosion protection, and are connected to coupler anchor heads placed at both sides of the pylon for later post-tensioning application. The strands are fully replaceable as there is no bonded connection between the guiding system and the external HDPE surface of the strands. The minimum radius of this saddle configuration, SMR, is 2.0 m for all sizes.



Drawbacks of saddle systems

Historically, engineers have elected to replace standard stay cable anchorages by friction saddles or saddles equipped with shear keys with the intention of reducing the pylon's dimensions. However, friction saddles exhibit some significant drawbacks, for example, inspection/replacement of load carrying elements is impossible and they can suffer from fretting fatigue, as well as slippage when faced with moderate differential forces.

Technical specifications

BBR HiEx CONA	Type			012 06	013 06	019 06	022 06	024 06	027 06	031 06	037 06	042 06
	Number of strands	n		12	13	19	22	24	27	31	37	42
	Breaking Strength		[kN]	3,348	3,627	5,301	6,138	6,696	7,533	8,649	10,323	11,718
Sleeve	Sleeve-W Length	SWL	[mm]	440	440	470	480	485	495	510	530	540
Bundle BBR Saddle	Minimum Radius Bundle, f = 0.25	SBR	[m]	2.3	2.4	2.9	3.2	3.3	3.5	3.8	4.1	4.4
	Minimum Radius Bundle, f = 0.35	SBR	[m]	2.8	2.9	3.5	3.8	3.9	4.2	4.4	4.9	5.2

[1] Socket length can be found by referring to the relevant BBR HiAm CONA technical literature.

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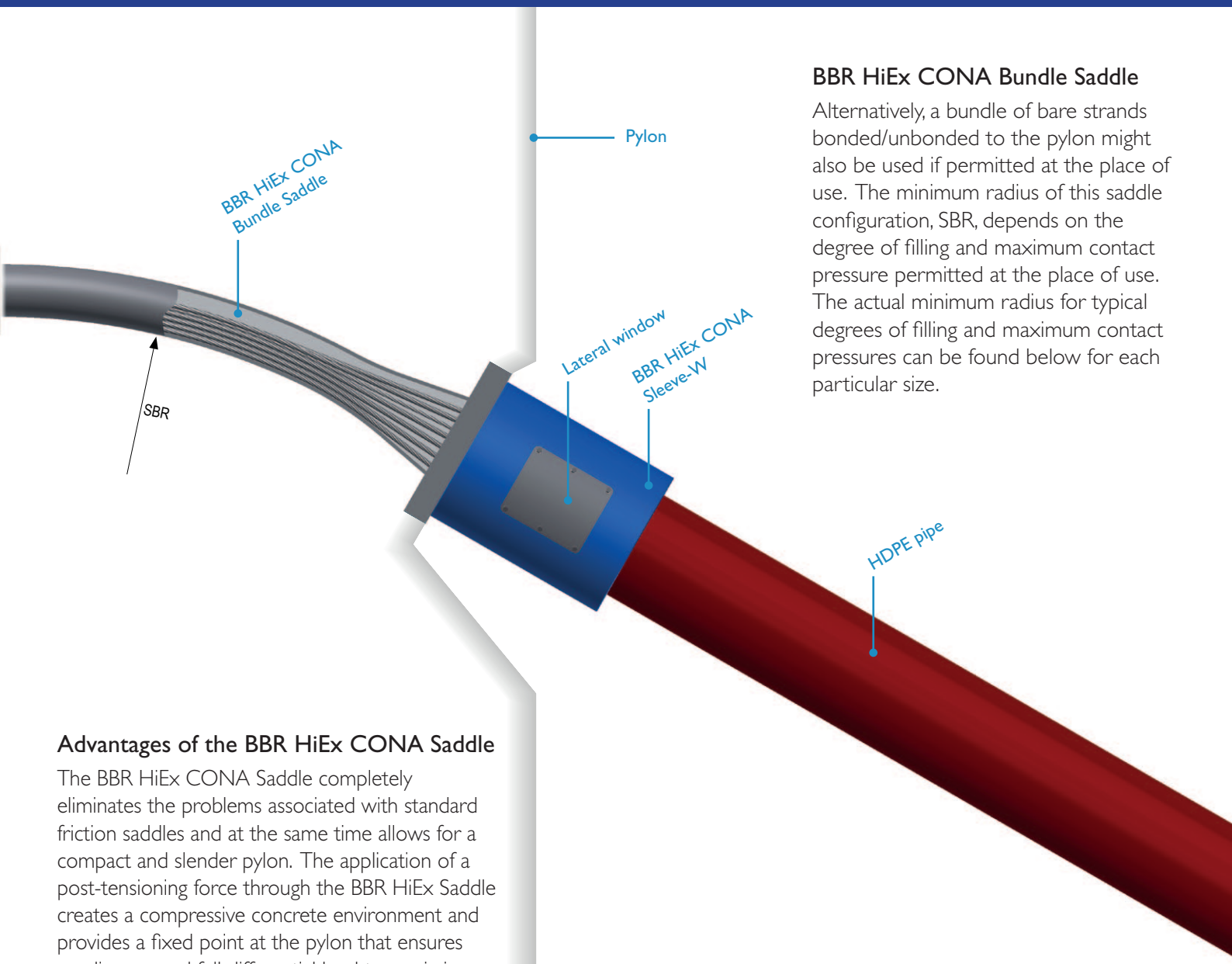

BBR HiEx CONA Bundle Saddle

Alternatively, a bundle of bare strands bonded/unbonded to the pylon might also be used if permitted at the place of use. The minimum radius of this saddle configuration, SBR, depends on the degree of filling and maximum contact pressure permitted at the place of use. The actual minimum radius for typical degrees of filling and maximum contact pressures can be found below for each particular size.

Advantages of the BBR HiEx CONA Saddle

The BBR HiEx CONA Saddle completely eliminates the problems associated with standard friction saddles and at the same time allows for a compact and slender pylon. The application of a post-tensioning force through the BBR HiEx Saddle creates a compressive concrete environment and provides a fixed point at the pylon that ensures no-slippage and full differential load transmission between the stay cables and the saddle. The BBR HiEx Saddle is proven by testing to transfer more than 95% GUTS.

043 06	048 06	055 06	061 06	069 06	073 06	075 06	085 06	091 06	097 06	109 06	121 06	127 06	151 06	169 06	185 06	217 06
43	48	55	61	69	73	75	85	91	97	109	121	127	151	169	185	217
11,997	13,392	15,345	17,019	19,251	20,367	20,925	23,715	25,389	27,063	30,411	33,759	35,433	42,129	47,151	51,615	60,543
540	555	575	585	605	615	625	645	665	675	695	725	755	795	825	855	895
4.4	4.7	5.0	5.3	5.6	5.7	5.8	6.1	6.3	6.5	6.9	7.2	7.4	8.0	8.5	8.9	9.5
5.2	5.5	5.9	6.2	6.6	6.8	6.8	7.2	7.5	7.7	8.1	8.6	8.7	9.5	10.0	10.5	11.3

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BBR HiEx CONA Saddle

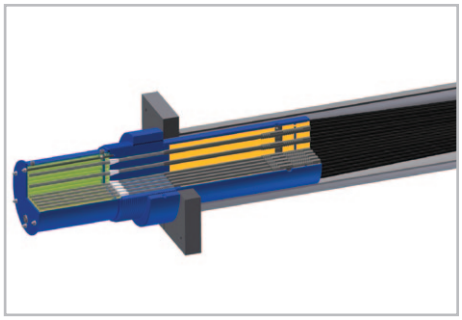
Strand Stay Cable Saddle System

Features

- Highest capacity and widest range of saddles available on the international marketplace
- Saddle sizes up to 217 strands with a breaking strength of over 60,000kN
- Optimised for 15.7mm diameter, 1,860 MPa strand
- No slippage and 100% differential load transfer across the saddle
- No fatigue or fretting fatigue at any point of the saddle
- Superior fatigue resistance with BBR Benchmark testing above and beyond international standards and recommendations
- System approved and in compliance with the latest recommendations from *fib*, CIP (Setra) and ETAG 013.
- Highest possible corrosion protection with an advanced fully independent and redundant water tightness system
- Easy inspection and replacement of all load-carrying elements. Independent installation/replacement of left/right cables and single strand installation/replacement.

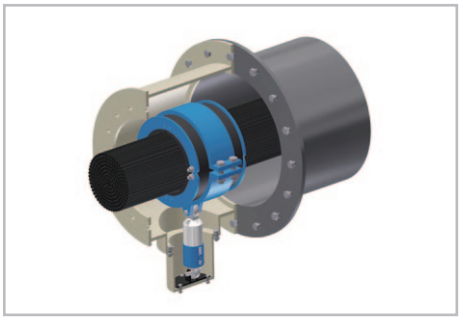
For further information download these brochures from our website.

Compatible technologies



HiAm CONA Stay Cable

Square Damper



Viscous Damper

Project application

Rio Corgo Viaduct (Portugal)

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