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Cable Stays for Bridges

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DYWIDAG POSTTENSIONING SYSTEMS

Type of steel	Steel grade	(mm)	Nominal ultimate load kN (100 200 400 1000 2000 5000)	Bell anchorage	QR plate anchorage	Square ribbed plate anchorage	Rectangular rib-bed pl. anchorage	Square solid plate anchorage	Rectangular solid plate anchorage	LQ-plate anchorage	Ring plate anchorage	Multi area anchorage	Bond head anchorage	Loop anchorage	Coupler (movable)	Coupler (fixed)	Unbonded tendon
Smooth bar	1420/1570	10		●											●	●	
		12,2		●											●	●	●
	835/1230	26		●			●		●						●	●	●
		32		●		●	●	●	●						●	●	●
		36		●		●	●	●	●						●	●	●
	1080/1230	26		●	●		●		●						●	●	●
		32		●	●	●	●	●	●						●	●	●
		36		●	●	●	●		●						●	●	●
Thread bar	885/1080	15		●											●	●	●
	1325/1470	16		●			●								●	●	
	835/1030	26,5		●			●		●						●	●	●
		32		●		●	●	●	●						●	●	●
		36		●		●	●	●	●						●	●	●
	1080/1230	26,5		●	●		●		●						●	●	●
		32		●	●	●	●	●	●						●	●	●
		36		●	●	●	●		●						●	●	●
Strand	1570/1770	½0,6"		●						●			●			●	●
		3		●						●			●	●		●	
		4		●						●			●	●		●	
		5		●						●			●	●	●	●	
		7		●							●		●	●	●	●	
		9		●							●		●	●	●	●	
		11		●						●	●		●	●	●	●	
		12		●						●	●	●	●	●	●	●	
		15		●							●	●	●	●	●	●	
		19		●							●	●	●	●	●	●	

DYWIDAG CABLES

Performance \ Cable type	STRAND CABLE	BAR CABLE	
LOAD BEARING			
1 CABLE (Static+Dynamic)	STRAND (7-wire stress-relieved) Grade St 1570/1770 Diameter 0,6" (Low relaxation)	THREADED BARS Grade St 835/1030 Dia. 32, 36 mm	STEEL TUBES Grade St 37 (DIN 17 100)
2 ANCHORAGE			
Static	WEDGE ANCHORAGE	NUT ANCHORAGE	
Dynamic	Combined WEDGE+BOND ANCHOR	BOND ANCHORAGE	
Bending	STEEL TUBES	STEEL TUBES	
CORROSION PROTECTION	Multiple anti-corrosion barriers to meet different requirements eg SHEATHING, GROUT, COATING OF STRANDS etc	eg STEEL TUBES, GROUT etc	
PRESTRESSING	SINGLE and MULTIPLE STRAND-JACKS	SINGLE BAR-JACKS	
CABLE ERECTION	Different procedures to fit into various construction demands eg Erection on site, Prefabrication		
ADDITIONAL FEATURES	FULLY REPLACABLE ADJUSTABLE before and after grouting	REPLACABLE ADJUSTABLE before grouting	

CABLE STAYS FOR BRIDGES

CABLE STAYS

PRESTRESSED CONCRETE

TYPICAL CROSS SECTION

CONCRETE GRADE B 45 – 160 / 135 CM

56 STRANDS TENDONS – 19 ø 0,6"

STIRRUP –

PROTECTIVE CONCR. LAYER WITH ADDIT. REINFORCEMENT IN VEHICLE IMPACT ZONE OF THE CONCRETE STAY –

CONSTRUCTION ON SCAFFOLDING WITH POST-TENSIONED PRESTRESSING

STRUCTURAL CRITERIA

THE CONCR. STAY IS DESIGNED AS BEAM WITH FIXED ENDS STRESSED BY AXIAL TENSION FORCE AND STRESSED BY BENDING MOMENTS DUE TO DEAD WEIGHT OF STAY AND DUE TO WIND LOAD

CHECK OF STRESSES FOR PRESTR. CONCRETE MEMBERS ACC. TO GERMAN CODE DIN 4227

CHARACTERISTICS

- ALLOW. TENS. FORCE/SQM OF CONC. STAY – 55 MN
- UNIFORM PRESTR. CONCR. DESIGN FOR TOTAL STRUCTURE INCL. STAY AND ANCHOR BLOCK
- STRUCTURE WITH SMALL DEFLECTIONS
- PERFECT PROTECTION AGAINST CORROSION
- RELIABLE RESISTANCE AGAINST VEHICLE IMPACT AND SIMILAR DAMAGES
- NO MAINTENANCE
- POSSIBILITIES FOR INDIVID. ARCHITECT. DESIGN
- LIMIT OF GIRDER SPAN AT 250 M APPROX. DUE TO DEAD WEIGHT OF CONCRETE STAY

PRESTRESSING STEEL

*COMPOSITE CROSS SECTION: WIRES ST. 1325/1470, DIA. 16 MM (W) + STEEL TUBE (ST)

*FIXED END: STEEL TUBE WITH INCREASED WALL THICKNESS

*LOAD TRANSFER AT ANCHORAGE: DEAD LOAD VIA THREADS OF WIRE (I) FATIGUE LOADS VIA BOND ANCHORAGE ZONE II

*COMPOSITE CROSS SECTION: BARS ST. 932/1079, DIA. 32 & 36 MM (B) + STEEL TUBE (ST)

*FIXED END: STEEL TUBE

*LOAD TRANSFER AT ANCHORAGE: DEAD LOAD VIA THREADS OF BARS (I) FATIGUE LOADS VIA BOND ANCHORAGE ZONE II

*COMPOSITE CROSS SECTION: STRANDS ST. 1580/1860, DIA. 0,6" (S)

*FIXED END: ANCHOR STEEL TUBE

*LOAD TRANSFER AT ANCHORAGE: DEAD LOAD VIA WEDGES OF STRANDS (I) FATIGUE LOADS VIA BOND ANCHORAGE ZONE II

EXAMPLES (STRUCTURE AND CONSTRUCTION METHOD)

DANUBE RIVER BRIDGE, METTEN, F.R.G.

ELEVATION 145,0 A–A B–B 30,0 DETAIL „C" E–E DETAIL „D"

CONSTRUCTION STAGES: INCREMENTAL LAUNCHING; CASTING OF STAY ON SCAFFOLDING

FLÖSSER BRIDGE, FRANKFURT/M. F.R.G.

ELEVATION 106,5 A–A B–B C–C 20,4

FREE CANTILEVER WITH TEMPORARY STEEL CABLES; CASTING OF STAY ON SCAFFOLDING; ARRANGEM. OF FREE CANTILEVER SEGMENTS

DESIGN WITH CABLE STAYS ARRANGED BELOW GIRDER

ELEVATION 98,8 DETAIL „A" B–B C–C

MAIN RIVER BRIDGE, HOECHST AG, F.R.G.

ELEVATION 148,2 A–A B–B 30,9 C–C D–D

ANCHORAGE; IN TOWER; IN GIRDER; TOP VIEW; SIMULTANEOUS SEGMENTAL CONSTRUCTION

PENANG BRIDGE, MALAYSIA

ELEVATION 107,5 225,0 107,5 A–A 25,3

ANCHORAGE; IN TOWER; IN GIRDER; TOP VIEW; SEGMENTAL CONSTRUCTION

FA ROUTE 63 OVER MISSISSIPPI RIVER QUINCY, ILLINOIS, U.S.A.

ELEVATION 134,1 274,3 134,1 A–A

ANCHORAGE; IN TOWER; IN GIRDER; CONSTR. STAGES