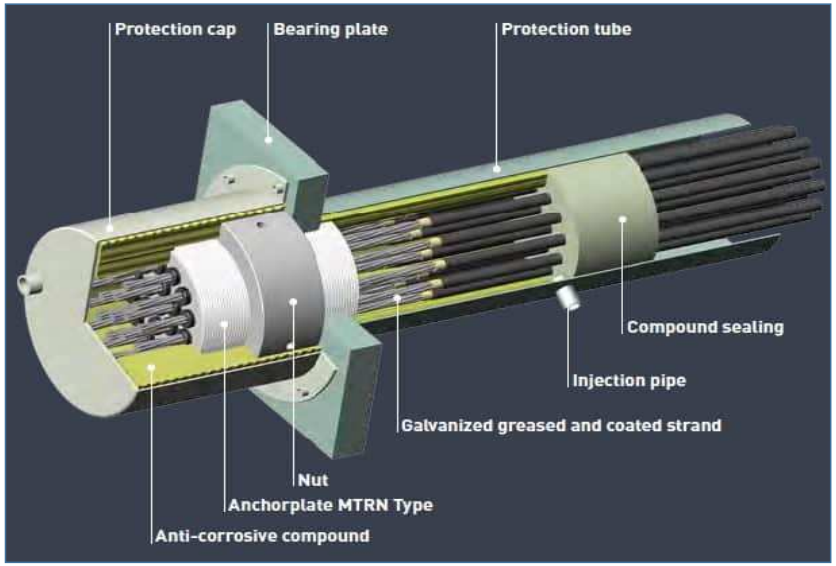
MINnD S2 GT1.1 IFC Bridge Prestressing / Cable stayed bridge / Suspension bridge
MINnDs2_GT1.1_ ifc-bridge_taxonomy_prestressing_suspension_systems_005_2022

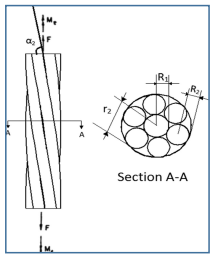
Name (English)	Definition	Nom (Français)	Définition
Anchorage	Mechanical device, usually comprising several components, designed to retain the force in the stressed tendon, and to transmit the force to the structure.	Ancrage	Dispositif mécanique, généralement composé de plusieurs éléments, conçu pour maintenir les efforts dans les câbles tendus, et pour transmettre les efforts à la structure
Anchor head	Part that holds one or several tensile elements by wedges/button heads/ nuts and transfers the prestressing load to the bearing plate, or for small tendon sizes directly into the structure. The anchor head is sometimes called a wedge plate.	Bloc d'ancrage / Tête d'ancrage	Pièce maintenant une ou plusieurs armatures de précontrainte par des clavettes, manchons, écrous et transférant la force de précontrainte à la plaque d'appui ou directement à la trompette.
Anchorage cap	Cap made of steel or plastic to encapsulate the end of the tensile elements at the anchorage	Capot d'ancrage	Capot en acier ou en plastique, placé à l'extrémité des armatures de précontrainte pour rendre l'ancrage étanche, soit provisoirement pour permettre l'injection, il est alors démonté lorsque le coulis a durci, soit définitivement, le capot étant laissé en place après l'injection pour renforcer la protection.
Bearing plate	Part that supports the anchor head and transfers the prestressing load onto or into the structure. The bearing plate is sometimes called a "force transfert unit".	Plaque d'appui	Partie qui supporte la tête d'ancrage et transmet les efforts de précontrainte à la structure.
Bursting reinforcement	Reinforcement in the local anchorage zone, just adjacent to the anchorage, to confine the concrete, and to resist transverse tensile loads due to the introduction of the prestressing load.	Frettage d'éclatement	Renforcement localisé au niveau de la zone d'ancrage pour confiner le béton et empêcher l'éclatement du béton à la mise en tension de la précontrainte.
Button head	Part that holds an individual tensile element, typically a wire, and transfers the prestressing force to the anchor head, or for an individual tensile element directly to the bearing plate.	Manchon	Partie qui maintient une armature de précontrainte individuel, généralement un câble, et transmet les efforts de précontrainte à la tête d'ancrage ou à la plaque d'appui
Coil	Delivery unit of strands, monostrand or wires, generally made of a cylindrical shape.	Bobine Ligature ?	
Compression fitting	A cylindrical steel component that is extruded/cold over the tensile element such as to provide a tight fit with the tensile element allowing to anchor the tensile element force.		
Connector	Special element to join individual duct lengths/sections between each other or to join a duct segment to the anchorage or trumpet.		
Coupling / coupler	A device to join adjacent sections of tendons	Coupleur	Dispositif utilisé pour raccorder les sections adjacentes des armatures de précontrainte
Deviator	A structural element where external tendons are deflected, and tendon forces are transmitted to the structure.	Déviateur	Élément structurel assurant la déviation des câbles externes et la transmission des efforts à la structure.

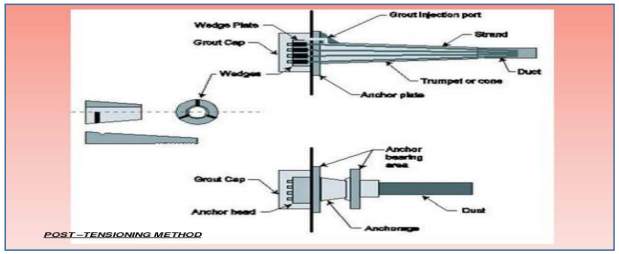
Illustration



Duct	An enclosure in which tensile elements are placed and that temporarily or permanently allows relative movement between the tensile elements and the surrounding concrete. The remaining void within the duct can be subsequently be filled with filling material.	Gaine	Élément d'encapsulation dans lequel les câbles de précontraintes sont placés, et qui permettent, temporairement ou de manière permanente, un déplacement relatif des éléments tendus par rapport au béton environnant. Le vide de la gaine peut éventuellement être comblé par du matériau de remplissage
Duct coupler			
Duct support	Device that supports and firmly holds a duct in position.		
Filling Material	A material used to completely fill the space around the tensile elements inside a duct to provide corrosion protection and/or bond. A cementitious filling material is also called "grout".	Coulis de remplissage	Matériau utilisé pour combler le vide dans la gaine et ainsi protéger de la corrosion et assurer un lien.
Fixed anchorage	Anchorage that does not allow stressing, or anchorage formed by bond between tensile elements and concrete.	Ancrage fixe	
Fixed coupling	Coupling that allows joining of adjacent tendon sections stressed not at the same time	Coupleur fixe	
Grout	Cementitious filling material		
Grout inlet			
Grout vent			
Injection			
Intermediate anchorage	Can be used when structures are built in steps. The intermediate anchorage anchors temporarily one strand in a first section before the second section is built and the whole strand is stressed from the other end of the second section. After stressing the whole strand from the second section, the anchorage remains in the structure without taking any forces. The anchorage can be used for internal bonded or internal unbonded tendons.	Ancrage intermédiaire	
Jack			
Monostrand	A single strand	Monotoron	
Multistrand		Multitoron	
Movable coupling	Coupling that allows joining of adjacent tendon sections stressed at the same time		
Nut	Piece that holds an individual tensile element, typically a bar, and transfers the prestressing force to the anchor had, or for an individual tensile element directly to the bearing plate. Nuts can alos be components of anchorages or couplers.	Écrou	Bombés ou plats, utilisés dans les procédés de mise en tension par barres de précontrainte, permettent le maintien en tension en s’appuyant obligatoirement sur la rondelle correspondante (bombée ou plate) et la plaque d’ancrage avec trou lisse.
Pipe	A thick walled smooth duct made of plastic or steel.		
Protection cap			
Pulling rope			

Sheathing	An enclosure encapsulating a single tensile element, usually separated by a thin layer of grease or wax from the tensile element. Typically monostrands are equipped with polymer sheathing.	Sous-gaine	
Shuttle			
Sleeve			
Spacer bar			
Strand	Twisted steel cable composed of 2, 3, 7 or 19 high strength steel wires	Toron	
Stressing anchorage	Anchorage allowing stressing of the tendon, usually a mechanical anchorage.		
Tendon	A single tensile element or a bundle of tensile elements used for the prestressing of a strcuture, including the required protection and anchorages.	Câble	
Tensile element	Individual element such as strand, wire or bar to impart prestressing.	Armature de précontrainte	
Trumpet	Device used to join bearing plate to duct providing the necessary leak tightness and allowing a reduction of the bundle diameter in the case of multi tensile elements anchorage.	Trompette	Pièce située derrière la plaque d'ancrage qui a pour fonction le raccordement des conduits à l'ancrage et permet l'épanouissement des torons entre le conduit et la tête d'ancrage.
Trumplate	Steel part combining the functions of a trumpet and an anchor plate for prestressing reinforcement.	Tromplaque	Pièce en acier réunissant les fonctions d'une trompette et d'une plaque d'ancrage pour armature de précontrainte.
Vent	Tube or hose that permits air and water to escape the duct at high points and ends of the tendon profile.	Évent	Tuyau ou trou permettant l'évacuation de l'eau et de l'air aux points hauts ou aux extrêmités
Wedge	Part that holds and individual tensile element, typically a strand, and transfers the prestressing force to the anchor head, or, typically for a single tensile element but also feasible for several tensile elements, directly to the bearing plate.	Clavette	Mors métalliques (brins) constitués de deux ou trois éléments servant à bloquer les torons dans la tête d'ancrage percée de "n" trous tronconiques.





Post-tensioning system

Main system	Main System Properties	System	System Properties	Sub-system	Sub-System properties	Component / Object	Object Properties
Implemented components	*Bonded tendon* *Unbonded tendon* *Longitudonal tendon* *Transversal tendon* *Vertical tendon* *Internal tendon* *External tendon* *Hybrid tendon* *Exchangeable tendon (Y/N)* ***Protection level:*** *Protection level 1 (PL1)* *Protection level 2 (PL2)* *Protection level 3 (PL3)*	**Linear Zone (Tensile element)**		Prestressing steel		Strand Coil	*Diameter* *Coiling sense (left/right)*
						Stress bar	
						Wire	*Ultimate strenght*
						Strand	*Number of wires*
						Tendon tail	*Length*
						Tendon	*Monostrand* *Multistrand (Number of strands)* *Date of birth (implementation date)*
				Tendon Encapsulation		Sheathing	*PEHD*
						Wax	
						Grease	
				Continuity anchorage		Bar coupler	
						Compression fittings	
						Movable Coupler block	
						Sleeve (=coupler casing)	
						Trumpet	
						Wedges	
				Tendon support system		Chairs	
						Others	
				Local zone reinforcement (only with continuity anchorages)		Back-up bars	
						Bursting steel	
						Confinement reinforcement	
		Linear Zone (Duct)		Ducting system		Corrugated Duct	*Metal Protection level PL1* *PEHD ou PP: Protection Level PL2 PL3*
						Duct coupler (duct connector or joiner)	*Venting point (Yes / No)*
						Duct support	*coordinates x, y, z* *height*
						Duct Inlet	*coordinate z*
						Duct Outlet (= vent)	*coordinate z*
						Segmental coupler	
						Smooth pipe	
						Electrofusion socket	
						Sensor	*Acoustic sensor* *Accelerometer* *Void sensor*
				Duct Filling material		Grout	
						Wax	
						Grease	
						Gel	
Main system	**Main System Properties**	**System**	**System Properties**	**Sub-system**	**Sub-System properties**	**Component / Object**	**Object Properties**
Implemented components		**Anchorage zone**		**Anchorage (assembly)**	*Fixed anchorage* *Dead end anchorage*	Anchor	
						Anchor nut	
						Anchor, barrel	

			Anchorage zone volume *dimension x* *dimension y* *dimension z*			Bearing plate	*Basic or Special* *Number of strands* *Bolts for cap (Yes/No)* *Inspection port (Yes/No)* *Concrete strength*
						Bond length (in a passive anchorage)	
						Bulb (in a passive anchorage)	
						Button head	
						Strand deviation soft interface	*Bushing* *Deviation plate*
						Deviation plate (DSI)	
						Electrical connection	
						Fixed Coupler block	
						Insulation plate	
						Lock nut	
						Pocket former (=recess former, stressing pan)	*x,y,z*
						Protection cap	*Temporary/ Permanent* *Material*
						Retaining plate	
						Sensor	
						Shims	
						Tension ring	
						Troubleshooting anchor	
						Trumpet	*Yes/No* *Material*
						Trumplate	
						Wedge	*Type of strand 13/15,2/15,7mm* *Number of segments (2/3)* *Clip/ No clip*
						Wedge plate (Anchor head)	*Number of holes* *Type of strand (0,5, 0,6, other)*
				Local zone reinforcement (end block)		Back-up bars	
						Bursting steel	*Bar diameter* *Grade of steel 400/500/670*
						Confinement reinforcement	*Bar diameter* *Grade of steel 400/500/670* *Helix/Stirrups* *Pitch/Spacing*
		Deviation zone		Deviator		Deviator tube	
						Diabolo	
						Matrix deviator	
				Nailing reinforcement		Reinforcement	

Main system	Main System Properties	System	System Properties	Sub-system	Sub-System properties	Component / Object	Object Properties
Implementation components - Equipment		**Threading system**		Strand pusher			*Hydraulic* *Electric*
				Uncoiler			*Horizontal* *Vertical*
				Dispenser / Strand drum			
				Hydraulic pump			

				Winch			*Electric* *Other*
				Hand tools and accesories		Shuttle (Push-through caps)	*Steel* *Plastic*
						Olive	
						Push tubes	
						Guiding hoses	
						Hydraulic cutter	
						Cable sock	
						Welded stirrup	
		Tensioning system		Hydraulic jack			*Single strand jack* *Multistrand jack* *Hollow jack (for bars)* *Jacking force*
				Hydraulic pump			
				Accessories		Guide forks / Strand Combs	
						Guide caps	
						Wedge seating tool	
						Fork / Spacer fork	
						Hydraulic cutter	
				Chairs		Stressing chair	
						Destressing chair	
						Jack chair	
						Curved chair	
		Grouting system	*For cement grout* *For wax/soft fillers*	Grouting station		Grout mixer	*Drum* *Colloidal*
						Agitation tank	
						Grout pump	
				Peristaltic pump			
				Wax pump			
				Vaccum pump			
				Heating tank			
		Installation monitoring system		Filling sensor			
				Force transducer / Load cell			
				Pressure gauge			
				Elongation			
				Displacement			
				Density			
				Insulation / Electrical resistance			
				Vibration / Accelerometer			
		Accessories		Gauges			
				Hoses			
				Coilers			
				Winches			
				Strand Coupler			
				Power Cables			
		Tools		Mirror Welding Machine			
				Internal debeader			
				Bundling Tool			
				Collars			
				Strand Preparation Bench			

Post-tensioning system

Main system	Main System Properties	System	System Properties	Sub-system	Sub-System properties	Component / Object	Object Properties
Tendon	***Internal tendon***	**Anchorage zone**		Anchorage (assembly)	*Fixed anchorage*		*Basic or Special*
					Dead end anchorage	Bearing plate	*Number of strands*
							Bolts for cap (Yes/No)
							Inspection port (Yes/No)
							Concrete strength
	Longitudinal tendon					Strand deviation soft interface	*Bushing*
							Deviation plate
	Protection level PL2					Pocket former (=recess former, stressing pan)	*x,y,z*
						Protection cap	*Temporary/ Permanent*
							Material
	Profile of the tendon (Table with x,y coordinates along the z axis of the structure)		*dimension x*			Trumpet	*Yes/No*
							Material
	Number of strands		*dimension y*			Wedge	*Type of strand 13/15,2/15,7mm*
							Number of segments (2/3)
							Clip/ No clip
	Stressing force		*dimension z*			Wedge plate (Anchor head)	*Number of holes*
	Force profile (Table with the force value along the z axis of the structure)			Local zone reinforcement (end block)			*Type of strand (0,5, 0,6, other)*
						Bursting steel	*Bar diameter*
							Grade of steel 400/500/670
						Confinement reinforcement	*Bar diameter*
							Grade of steel 400/500/670
							Helix/Stirrups
							Pitch/Spacing
		Linear zone		Ducting system		Corrugated Duct	*Material (Steel for PL1/ Polymer for PL2 PL3)*
							Diameter
						Duct coupler (duct connector or joiner)	*With venting point*
							Without venting point
						Duct support	*coordinates x, y, z*
							height
						Duct Inlet	*coordinate z*
						Duct Outlet (= vent)	*coordinate z*
						Segmental coupler (only for precast segmental construction)	
				Duct Filling material		Grout	
						Wax	
						Grease	
						Gel	
				Prestressing steel		Strand Coil	*Diameter*
							Coiling sense (left/right)
						Strand	Number of wires
						Tendon tail	
						Tendon	Monostrand
							Multistrand (Number of strands)
							Date of birth (implementation date)

Main system	Main System Properties	System	System Properties	Sub-system	Sub-System properties	Component / Object	Object Properties
Implemented components		**Anchorage zone**		Anchorage (assembly)	*Fixed anchorage* *Dead end anchorage*	Bearing plate	*Basic or Special* *Number of strands* *Bolts for cap (Yes/No)* *Inspection port (Yes/No)* *Concrete strength*
						Strand deviation soft interface	*Bushing* *Deviation plate*
			Anchorage zone volume			Pocket former (=recess former, stressing pan)	*x,y,z*
	Protection level:		*dimension x*			Protection cap	*Temporary/ Permanent* *Material*
	Protection level 2 (PL2)		*dimension y*			Tension ring	
	Bonded tendon		*dimension z*			Trumpet	*Yes/No* *Material*
	Longitudonal tendon					Wedge	*Type of strand 13/15,2/15,7mm* *Number of segments (2/3)* *Clip/ No clip*
	External tendon					Wedge plate (Anchor head)	*Number of holes* *Type of strand (0,5, 0,6, other)*
				Local zone reinforcement (end block)		Bursting steel	
						Confinement reinforcement	*Bar diameter* *Grade of steel 400/500/670* *Helix/Stirrups* *Pitch/Spacing*
		Deviation zone		Deviator		Deviator tube	
						Diabolo	
				Nailing reinforcement		Reinforcement	
		Linear zone		Ducting system		Duct support	
						Duct Inlet	
						Duct Outlet (= vent)	
						Smooth pipe	
						Electrofusion socket	
				Duct Filling material		Grout	
						Wax	
				Tendon support system		Chairs	
						Others	
				Prestressing steel		Strand Coil	
						Strand	
						Tendon tail	
						Tendon	
				Tendon Encapsulation		Sheathing	
						Wax	

Suspension bridge

Main system	System	Sub-system	Component / Object	Detail / Properties
Implemented components	Anchorage zone	Fixed anchorage (It can be installed both on the pylon and on the deck)	Bearing plate	It can also be a steel structure with multiple plates and including the Guide pipe
			Guide pipe	
			Steel superstructure	
			Anchor head	
			Wedge	For strand tendons
			Anchorage nut	For bar tendons
			Protection cap	
			Transition pipe	Required to accomodate construction tolerances when cutting the strands. Depending on the system, it may or may not be present
			Sealing system	
			Soft filler	Wax, grease, gel or other polhymers
			Gusset plate	
			Fork/Clevis	
			Pin	
		Adjustable anchorage (It can be installed both on the pylon and on the deck)	Bearing plate	It can also be a steel structure with multiple plates and including the Guide pipe
			Guide pipe	
			Steel superstructure	
			Anchor head	
			Wedge	For strand tendons
			Anchorage nut	For bar tendons
			Protection cap	
			Ring nut	
			Threaded pipe	
			Transition pipe	Required to accomodate construction tolerances when cutting the strands. Depending on the system, it may or may not be present
			Sealing system	
			Soft filler	Wax, grease, gel or other polhymers
			Gusset plate	
			Fork/Clevis	
			Pin	
		Saddle system	Saddle	
			Sealing system	
	Transition zone	Compacting device	Tension ring/ Compaction clamp	Free floating compacting device
			Guide deviator	Compacting device enclosed by the guide pipe
		Damper	Rubber damper	
			Friction damper	
			Viscous damper	
		Connectors	Pylon connection	HDPE pipe, slightly larger in diameter than the main HDPE pipe. It can be released from the pylon, and lowered to create a working window on the pylon.
			Deck connection	
	Free length	Main tensile element	Strand (stay)	radiating stays, fan stays, harp stays
			Wire	
			Bar	
			Bar coupler	
		Pipe	Stay pipe	
		Damper	Cross tie	
		Deck protection	Antivandalistic pipe	
		Fire protection system		

		Blast protection system		

Implementation components - Equipment	Strand implementation	Walkway		
		Winch		
		Gantry		
		Pulley		

Main system	System	Sub-system	Component / Object	Detail / Properties
Implemented components	Anchorage zone	Fixed anchorage (anchorage block)	Bearing plate	It can also be a steel structure with multiple plates and including the Guide pipe
			Guide pipe	
			Steel superstructure	
			Anchor head	
			Wedge	For strand tendons
			Anchorage nut	For bar tendons
			Protection cap	
			Transition pipe	Required to accomodate construction tolerances when cutting the strands. Depending on the system, it may or may not be present
			Sealing system	
			Soft filler	Wax, grease, gel or other polhymers
			Gusset plate	
			Fork/Clevis	
			Pin	
		Saddle system	Saddle	
			Sealing system	
			Roller	
	Transition zone	Connectors	Yoke	
			Socketed end fitting	
			Fastener	
			Grip ring	
			Tensioner	
		Damper	Rubber damper	
			Friction damper	
	Free length	Main tensile element	Load bearing stay (primary cable)	
			Stabilising stay (damping cable)	
			Rear stay	
			Wire	
		Pipe	Stay pipe	
		Hanger	Wrought iron hanger	
			Strand hanger	
			Steel rod hanger	
		Deck protection	Antivandalistic pipe	
		Fire protection system		
		Blast protection system		

Implementation components - Equipment	Strand implementation	Walkway		
		Winch		
		Gantry		
		Pulley		