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JIS

JAPANESE INDUSTRIAL STANDARD

Prestressed concrete beams for slab bridges

JIS A 5313—1991

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by

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Prestressed concrete beams for slab bridges

A 5313-1991

1. Scope

This Japanese Industrial Standard specifies the prestressed concrete bridge beams (hereafter referred to as the "bridge beams") manufactured by pretensioning and to be used for slab type road bridges.

Remarks 1. The following Standards are cited in this Standard:

JIS A 1108	Method of Test for Compressive Strength of Concrete
JIS A 1132	Method of Making and Curing Concrete Specimens
JIS A 5011	Air-Cooled Iron-Blast-Furnace Slag Aggregate for Concrete
JIS A 5012	Granulated Blast Furnace Slag Fine Aggregate for Concrete
JIS A 5308	Ready-Mixed Concrete
JIS A 6204	Chemical Admixtures for Concrete
JIS G 3112	Steel Bars for Concrete Reinforcement
JIS G 3536	Uncoated Stress-Relieved Steel Wires and Strands for Prestressed Concrete
JIS R 5210	Portland Cement

2. The units and numerical values given in { } in this Standard are in accordance with the International System of Units (SI) and are appended for informative reference.

The units and values in this Standard will be converted to SI units and values on April 1, 1995.

2. Definition of Terms

The definitions of the main terms used in this Standard are as follows:

(1) bondless section The section near the end of a bridge beam where the adherence of the concrete to the PC steel is cut.

(2) bondless steel PC steel in the bondless section.

(3) bond control beam A beam which partly contains bondless steel.

(4) ordinary beam A beam in which the PC steel is adhered to the concrete throughout and is arranged in a straight line.

3. Types

The bridge beams shall be classified into the types given in Table 1 and Table 2.

Table 1

Type designation	Grade of bridge	Type of bridge beam	Standard span m	Beam height mm	7-wire strand PC steel wire SWPR 7B, 12.7 mm and 15.2 mm		Remarks
					Number of wires required	Standard diameter	
1S05	Grade 1 bridge	Ordinary beam	5	325	9	12.7	1. The interval of the beam centers shall not exceed 0.77 m.
1S06			6	325	12		
1S07			7	350	13		2. When used for bridges, this table is applicable to oblique angles of not less than 60°.
1S08			8	375	16		
1S09			9	400	17		
1S10		Bond control beam	10	425	10	15.2	3. The span may be longer than the standard span by a maximum of 0.2 m, and may be shorter by a maximum of 1 m.
1S11			11	450	11		
1S12			12	475	11		
1S13			13	500	13		
1S14			14	525	15		4. A snow load of 100 kgf/m^2 {981 N/m^2} is taken into account for these beams.
1S15			15	550	15		
1S16			16	575	17		
1S17			17	600	17		
1S18			18	650	17		
1S19			19	700	19		
1S20			20	750	19		
1S21			21	800	19		

Table 2

Type designation	Grade of bridge	Type of bridge beam	Standard span m	Beam height mm	7-wire strand PC steel wire SWPR 7B, 12.7 mm and 15.2 mm		Remarks
					Number of wires required	Standard diameter	
2S05	Grade 2 bridge	Ordinary beam	5	275	9	12.7	1. The interval of the beam centers shall not exceed 0.77 m.
2S06			6	300	9		
2S07			7	325	10		2. When used for bridges, this table is applicable to oblique angles of not less than 60°.
2S08			8	350	11		
2S09			9	375	15		
2S10			10	400	16		3. The span may be longer than the standard span by a maximum of 0.2 m, and may be shorter by a maximum of 1 m.
2S11		Bond control beam	11	425	10	15.2	
2S12			12	450	10		4. A snow load of 100 kgf/m^2 {981 N/m^2} is taken into account for these beams.
2S13			13	475	11		
2S14			14	475	13		
2S15			15	500	15		
2S16			16	525	15		
2S17			17	575	15		
2S18			18	600	17		
2S19			19	650	17		
2S20			20	700	17		
2S21			21	750	17		

4. Quality

4.1 Appearance The bridge beams shall have a fine external appearance, and shall be free from harmful defects such as flaws, cracks and twists.

4.2 Bending Strength The bending strength of the bridge beam shall be such that the bridge beam will not produce crackings when it is subjected to the bending strength test specified in 8. with a cracking test moment as shown in Table 3 or Table 4, and in Table 5 or Table 6.

Table 3 (Applicable unitl March 31, 1995)

Unit: tf · m {N · m}

Type designation	Cracking test moment	Reference (1) Weight per unit length (tf/m {kN/m})
1S05	13.2 { 129×10³}	0.533 {5.23}
1S06	16.5 { 162×10³}	0.533 {5.23}
1S07	19.3 { 189×10³}	0.573 {5.62}
1S08	23.7 { 232×10³}	0.613 {6.01}
1S09	27.2 { 267×10³}	0.653 {6.40}
1S10	30.8 { 302×10³}	0.551 {5.40}
1S11	36.6 { 359×10³}	0.563 {5.52}
1S12	40.0 { 392×10³}	0.576 {5.65}
1S13	48.1 { 472×10³}	0.588 {5.77}
1S14	56.7 { 556×10³}	0.601 {5.89}
1S15	61.2 { 600×10³}	0.613 {6.01}
1S16	71.1 { 697×10³}	0.648 {6.35}
1S17	76.5 { 750×10³}	0.682 {6.69}
1S18	86.5 { 848×10³}	0.707 {6.93}
1S19	102 {1 000×10³}	0.732 {7.18}
1S20	113 {1 110×10³}	0.757 {7.42}
1S21	125 {1 230×10³}	0.782 {7.67}

Note (1) For simplicity, these values assume the mass per unit volume of concrete, including the steel, to be 2.5 t/m³, and the load of a unit length of bridge beam acts as the force, these do not form a part of this Standard.

Table 4 (Applicable from April 1, 1995)

Unit: N・m

Type designation	Cracking test moment	Reference (1) Weight per unit length (kN/m)
1S05	129×10^3	5.23
1S06	162×10^3	5.23
1S07	189×10^3	5.62
1S08	232×10^3	6.01
1S09	267×10^3	6.40
1S10	302×10^3	5.40
1S11	359×10^3	5.52
1S12	392×10^3	5.65
1S13	472×10^3	5.77
1S14	556×10^3	5.89
1S15	600×10^3	6.01
1S16	697×10^3	6.35
1S17	750×10^3	6.69
1S18	848×10^3	6.93
1S19	1000×10^3	7.18
1S20	1110×10^3	7.42
1S21	1230×10^3	7.67

Note (1) For simplicity, these values assume the mass per unit volume of concrete, including the steel, to be 2.5 t/m^3, and the load of a unit length of bridge beam acts as the force, these do not form a part of this Standard.

Table 5 (Applicable until March 31, 1995)

Unit: tf · m {N · m}

Type designation	Cracking test moment	Reference (1) Weight per unit length (tf/m {kN/m})
2S05	9.95 {97.6×10³}	0.453 {4.44}
2S06	11.6 { 114×10³}	0.493 {4.83}
2S07	14.8 { 145×10³}	0.533 {5.23}
2S08	17.3 { 170×10³}	0.573 {5.62}
2S09	22.2 { 218×10³}	0.613 {6.01}
2S10	26.6 { 261×10³}	0.653 {6.40}
2S11	31.1 { 305×10³}	0.551 {5.40}
2S12	34.1 { 334×10³}	0.563 {5.52}
2S13	40.4 { 396×10³}	0.576 {5.65}
2S14	45.0 { 441×10³}	0.576 {5.65}
2S15	53.5 { 525×10³}	0.610 {5.98}
2S16	58.1 { 570×10³}	0.645 {6.33}
2S17	66.9 { 656×10³}	0.670 {6.57}
2S18	77.4 { 759×10³}	0.682 {6.69}
2S19	87.5 { 858×10³}	0.707 {6.93}
2S20	97.8 { 959×10³}	0.732 {7.18}
2S21	108 {1 059×10³}	0.757 {7.42}

Note (1) For simplicity, these values assume the mass per unit volume of concrete, including the steel, to be 2.5 t/m³, and the load of a unit length of bridge beam acts as the force, these do not form a part of this Standard.

Table 6 (Applicable from April 1, 1995)

Unit: N・m

Type designation	Cracking test moment	Reference (1) Weight per unit length (kN/m)
2S05	97.6×10^3	4.44
2S06	114×10^3	4.83
2S07	145×10^3	5.23
2S08	170×10^3	5.62
2S09	218×10^3	6.01
2S10	261×10^3	6.40
2S11	305×10^3	5.40
2S12	334×10^3	5.52
2S13	396×10^3	5.65
2S14	441×10^3	5.65
2S15	525×10^3	5.98
2S16	570×10^3	6.33
2S17	656×10^3	6.57
2S18	759×10^3	6.69
2S19	858×10^3	6.93
2S20	959×10^3	7.18
2S21	$1\,059\times10^3$	7.42

Note (1) For simplicity, these values assume the mass per unit volume of concrete, including the steel, to be 2.5 t/m^3, and the load of a unit length of bridge beam acts as the force, these do not form a part of this Standard.

5. Shapes, Dimensions, and Dimensional Tolerances

The shapes (2) and dimensions of the bridge beams shall be as specified in Attached Figs. 1 to 34, and the dimensional tolerances shall be as specified in Table 7.

Note (2) Bridge beams may be provided with accessories necessary for the beams or may be worked appropriately by agreement of the parties concerned with delivery.

Suspending metal fittings, if attached, shall be located within $\frac{l}{10}$ (l=span) apart from the beam end.