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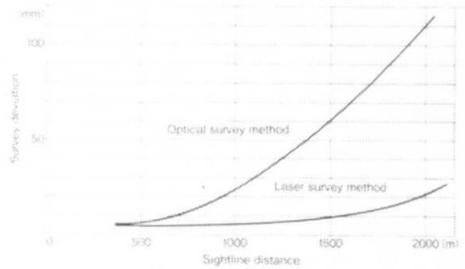
# Construction Technology of Cables for Suspension Bridges

Nippon Steel Corporation

## Cable Construction of Ohnaruto Bridge Quality-Oriented Results

### (1) Sag and Tower Displacement Survey Deviation

Laser measurement equipment was used to survey sag and tower displacement on Ohnaruto Bridge. Compared to tansits and other conventional optical measuring equipment, this approach provided longer sightline distance when surveying at night, thereby ensuring sufficient precision.



### (2) Cable Sag Measurement Results

Entries without unit markings are mm

Cable	1A~2P Backstay Span		3P~3P (Side Span)		3P~4P (Center Span)		4P~5A (Side Span)	
	N	S	N	S	N	S	N	S
Targeted Sag Value	0.842 (m)		10.820 (m)		74.732 (m)		10.820 (m)	
At Erection of Guide Strand (Sag Allowance)	8mm / 80		4mm / 80		26mm / 80		14mm / 80	
When Squeezing is Complete (at Cable Center)	96	128	107	86	39	81	57	75
Imoshima Bridge Results (When Pre-squeezing is Complete)			59	27	53	90	116	75

### Impact of Relative Sag Deviation on Cable Stress

Span	Cable	Relative Sag Deviation among Strands (%)		Cable Stress Deviation (MPa)	Average of $\sigma_{88}$ (kg/mm <sup>2</sup> )	
		$\Delta F/\Delta L$	$\Delta F/\Delta L$		Ohnaruto Bridge	Kanamin Bridge
Side Span	2P	7.8mm		0.06kg/mm <sup>2</sup>		
	3P	9.9	5.765	0.10	0.10	0.13
	4P	12.6		0.13		
	5A	7.8		0.08		
Center Span	S	8.2		0.08	0.08	0.12
	N	8.9	2.232	0.06		

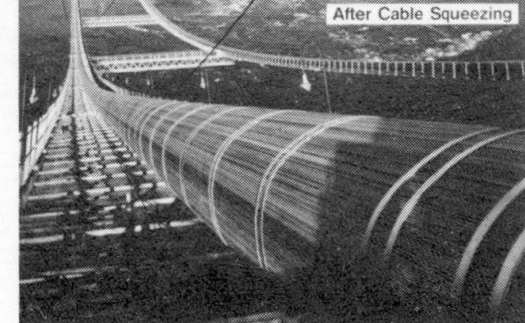
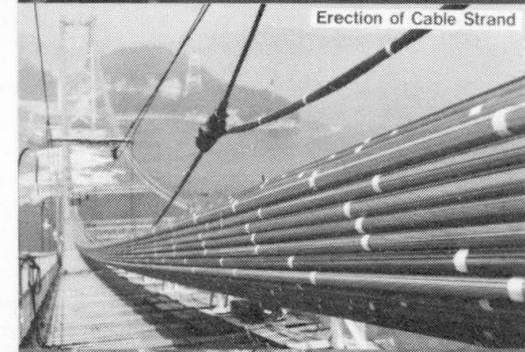
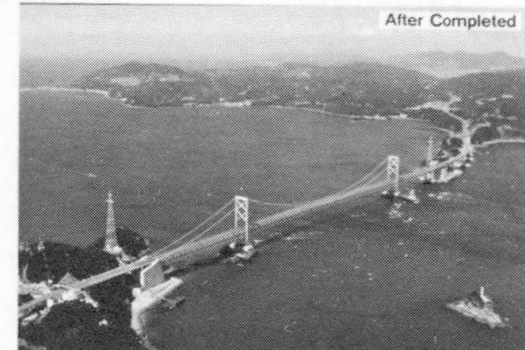
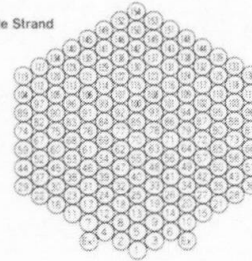
### (3) Cable Percentage of Void After Cable Band Bolt Tightening

Bridge	Cable Diameter (mm)	Erection Method	Void Ratio of Cable	
			Plan (%)	Result (%)
George Washington	911	AS	20.9	21.2
Golden Gate	919	-	19.0	17.4
Tacoma Narrows	514	-	-	17.2
Forth Road	603	-	20.8	18.9
Salazar	596	-	16.8	20.8
New Port	387	PS	18.5	19.7
Kanamin Bridge	654	-	19.0	16.8
Hirado Bridge	366	AS	20.0	21.2
Imoshima Bridge	610	PS	17.0	17.2
Ohnaruto Bridge	829	PS	18.0	17.6

### Specification of the Ohnaruto Bridge Cable

Galvanized Wire	Diameter	5.37mm
	Tensile Strength	180~186kg/mm <sup>2</sup>
	Amount of Wires Consisting Strand	PWS 127
Strand	Unit Weight	22.525kg/m
	Length	1722m
	Weight of Strand	39.0t
	Amount of Strands Consisting Cable	154
Cable	Diameter	840mm
	Amount of Wires Consisting Cable	19,558
	Total weight	11,963t

### Arrangement of Cable Strand



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