KAWASAKI STEEL TECHNICAL REPORT
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Strength of Steel-Concrete Composite Pipe Reinforced with Spiral Rib

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Synopsis :
This study deals with the applicability of a newly developed pipe, which has spiral ribs on its inner surface, thereby making it a composite structure. Mechanical properties of the composite pipe were investigated through push-out, compression and bending tests. Main conclusions obtained are as follows: (1) Bond stress can satisfy the ordinarily required value for the composite pipe having ribs more than 8 mm high. (2) Nominal bond stress increases steadily with increasing the number of ribs. (3) Structural member made of spiral ribbed pipes and concrete can be designed and used as a fully integrated body.

The body can be viewed from the next page.

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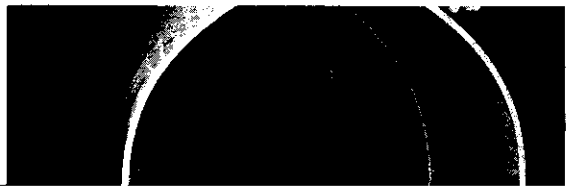
2 Model Specimen



STK 41 steel pipe of 600 mmϕ × 9 mm$t$ and SS41 steel ribs of 9 mmϕ round bar and 9 mm × 9 mm square bar were used as model specimen. **Tables 1** and **2** show the mechanical properties and the chemical com-

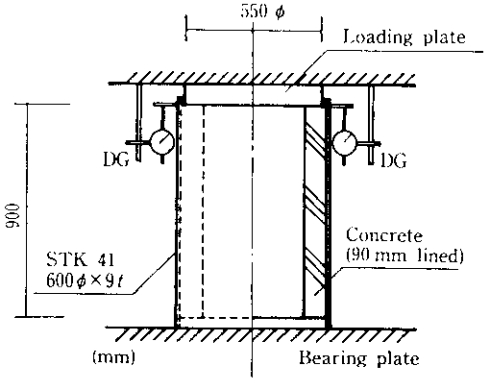
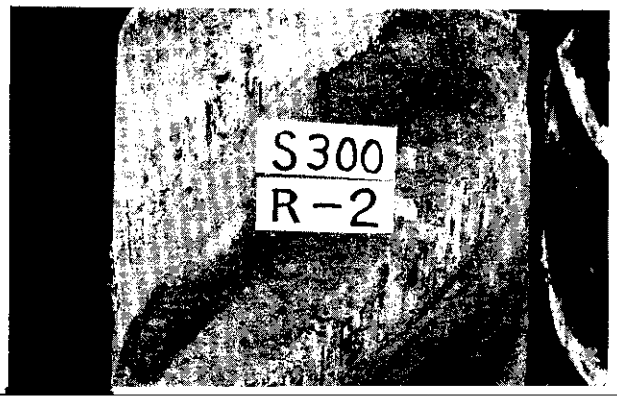


Table 3 Bond stresses obtained from the push-out tests

Specimen	Collapse load (kN)		Nominal bond stress (MPa)	Ratio to 800 LN	Ratio to allowable stress*
	Average	Standard deviation			
S300FN	1 689	263.7	1.03	0.62	4.67
S300FS-1	4 200	20.4	2.55	1.53	11.5
S300FR-2	5 132	83.5	3.12	1.87	14.1
S800LN	2 788	274.3	1.67	1.00	7.56
S500LS-1	5 401	128.0	3.29	1.97	14.9
S500LS-2	6 407	233.0	3.89	2.34	17.6
S500LR-1	5 374	68.6	3.27	1.96	14.8


S300
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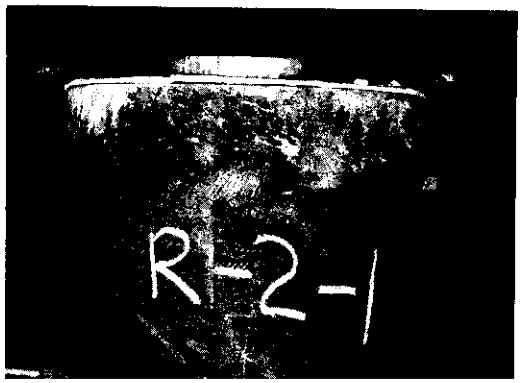
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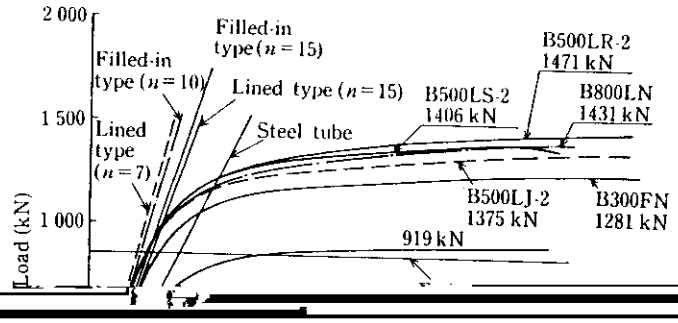
Table 4 Strength of composite column

	Collapse load	Stiffness		
			P_{*3}	D_{*5}



Displacement of specimen at mid-length (mm)

Table 6 Conditions of rib welding

Welding	Consumables	Current (A)	Voltage (V)	Velocity (cm/min)

strength detected from Tables 3 and 7. It is clear from this figure that the nominal bond strength increases as an increase of the bearing area. Conversely, bearing area which satisfies the required bond strength of the rib can

7 Conclusions