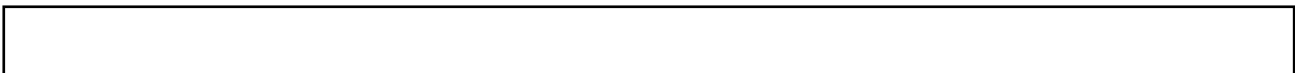




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Collapse Load and Absorbed Energy Estimation of

Steel Tube Members Subjected to Local Impact

要旨

鋼管構造物の部材管壁に物体が衝突した場合の部材崩壊荷重と吸

Table 1 Dimension of test specimens and estimated values of  $k$  in Eq. (10)

Specimen No.	Length (mm)	Width (mm)	Thickness (mm)	Estimated $k$
1	100	10	1.5	0.15
2	150	10	1.5	0.22
3	200	10	1.5	0.30
4	250	10	1.5	0.37
5	300	10	1.5	0.45
6	350	10	1.5	0.52
7	400	10	1.5	0.60
8	450	10	1.5	0.67
9	500	10	1.5	0.75
10	550	10	1.5	0.82
11	600	10	1.5	0.90
12	650	10	1.5	0.97
13	700	10	1.5	1.05
14	750	10	1.5	1.12
15	800	10	1.5	1.20
16	850	10	1.5	1.27
17	900	10	1.5	1.35
18	950	10	1.5	1.42
19	1000	10	1.5	1.50

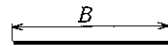


Fig. 4 Geometries

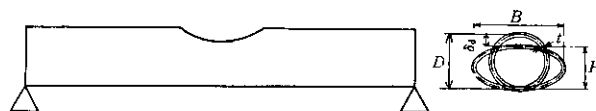


Fig. 5 Steel tube with local dent depth  $\delta_d$

仮定し、鋼管材料は完全塑性体と仮定すると、荷重  $P$  とへこみ変位  $\delta_d$  の関係は次式によって与えられる<sup>6)</sup>。

$$P = \frac{1}{4} \times K \sigma_y t^2 (\delta_d / D)^{1/2} \dots \dots \dots (1)$$

ここに、 $K$  は定数、 $\sigma_y$  は鋼管材料の降伏応力、 $t$  は鋼管の板厚、 $D$  は鋼管の平均径である。

なお、へこみ変形はトイ型曲線と見做すことができる。

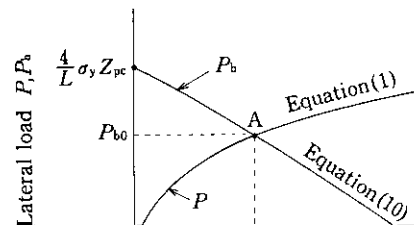




Table 5 Measured and estimated absorbed energy and etc.

Table 6 Comparison of the results

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Specimen	Measured Energy (kJ)	Estimated Energy (kJ)	Ratio (Estimated/Measured)
1	12.5	11.8	0.94
2	15.2	14.5	0.95
3	18.7	17.9	0.96
4	21.3	20.5	0.96
5	24.8	23.8	0.96
6	28.5	27.2	0.95
7	32.1	30.8	0.96
8	35.6	34.2	0.96
9	39.2	37.5	0.96
10	42.8	40.8	0.95
11	46.3	44.1	0.95
12	50.1	47.5	0.95
13	53.8	50.8	0.94
14	57.5	54.2	0.94
15	61.2	57.5	0.94
16	65.0	60.8	0.93
17	68.8	64.2	0.93
18	72.5	67.5	0.93
19	76.3	70.8	0.93
20	80.1	74.2	0.93
21	84.0	77.5	0.92
22	87.8	80.8	0.92
23	91.7	84.2	0.92
24	95.6	87.5	0.91
25	99.5	90.8	0.91
26	103.4	94.2	0.91
27	107.3	97.5	0.91
28	111.2	100.8	0.90
29	115.1	104.2	0.90
30	119.0	107.5	0.90