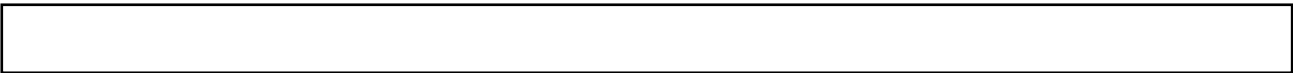




---

---

---



Collapse Load and Absorbed Energy Estimation of

Steel Pipe 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	0.1
2	150	15	1.5	0.15
3	200	20	2	0.2
4	250	25	2.5	0.25
5	300	30	3	0.3
6	350	35	3.5	0.35
7	400	40	4	0.4
8	450	45	4.5	0.45
9	500	50	5	0.5
10	550	55	5.5	0.55
11	600	60	6	0.6
12	650	65	6.5	0.65
13	700	70	7	0.7
14	750	75	7.5	0.75
15	800	80	8	0.8
16	850	85	8.5	0.85
17	900	90	9	0.9
18	950	95	9.5	0.95
19	1000	100	10	1.0

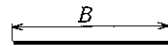


Fig. 4 Geometries

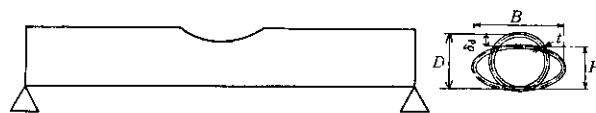


Fig. 5 Steel tube with local dent depth  $\delta_d$

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、へこみ変位はトイ型吸収エネルギーに比例する。

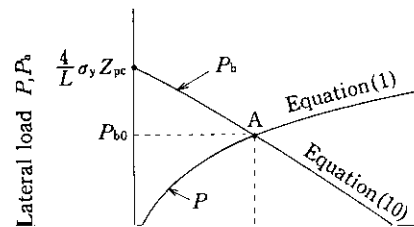




Table 5 Measured and estimated absorbed energy and etc.

Table 6 Comparison of test results

Specimen No.	Applied Load (kN)	Displacement (mm)	Absorbed Energy (kJ)	Failure Mode
1	100	10	1.5	Local buckling
2	150	15	2.5	Local buckling
3	200	20	3.5	Local buckling
4	250	25	4.5	Local buckling
5	300	30	5.5	Local buckling
6	350	35	6.5	Local buckling
7	400	40	7.5	Local buckling
8	450	45	8.5	Local buckling
9	500	50	9.5	Local buckling
10	550	55	10.5	Local buckling
11	600	60	11.5	Local buckling
12	650	65	12.5	Local buckling
13	700	70	13.5	Local buckling
14	750	75	14.5	Local buckling
15	800	80	15.5	Local buckling
16	850	85	16.5	Local buckling
17	900	90	17.5	Local buckling
18	950	95	18.5	Local buckling
19	1000	100	19.5	Local buckling
20	1050	105	20.5	Local buckling
21	1100	110	21.5	Local buckling
22	1150	115	22.5	Local buckling
23	1200	120	23.5	Local buckling
24	1250	125	24.5	Local buckling
25	1300	130	25.5	Local buckling
26	1350	135	26.5	Local buckling
27	1400	140	27.5	Local buckling
28	1450	145	28.5	Local buckling
29	1500	150	29.5	Local buckling
30	1550	155	30.5	Local buckling
31	1600	160	31.5	Local buckling
32	1650	165	32.5	Local buckling
33	1700	170	33.5	Local buckling
34	1750	175	34.5	Local buckling
35	1800	180	35.5	Local buckling
36	1850	185	36.5	Local buckling
37	1900	190	37.5	Local buckling
38	1950	195	38.5	Local buckling
39	2000	200	39.5	Local buckling
40	2050	205	40.5	Local buckling
41	2100	210	41.5	Local buckling
42	2150	215	42.5	Local buckling
43	2200	220	43.5	Local buckling
44	2250	225	44.5	Local buckling
45	2300	230	45.5	Local buckling
46	2350	235	46.5	Local buckling
47	2400	240	47.5	Local buckling
48	2450	245	48.5	Local buckling
49	2500	250	49.5	Local buckling
50	2550	255	50.5	Local buckling
51	2600	260	51.5	Local buckling
52	2650	265	52.5	Local buckling
53	2700	270	53.5	Local buckling
54	2750	275	54.5	Local buckling
55	2800	280	55.5	Local buckling
56	2850	285	56.5	Local buckling
57	2900	290	57.5	Local buckling
58	2950	295	58.5	Local buckling
59	3000	300	59.5	Local buckling
60	3050	305	60.5	Local buckling
61	3100	310	61.5	Local buckling
62	3150	315	62.5	Local buckling
63	3200	320	63.5	Local buckling
64	3250	325	64.5	Local buckling
65	3300	330	65.5	Local buckling
66	3350	335	66.5	Local buckling
67	3400	340	67.5	Local buckling
68	3450	345	68.5	Local buckling
69	3500	350	69.5	Local buckling
70	3550	355	70.5	Local buckling
71	3600	360	71.5	Local buckling
72	3650	365	72.5	Local buckling
73	3700	370	73.5	Local buckling
74	3750	375	74.5	Local buckling
75	3800	380	75.5	Local buckling
76	3850	385	76.5	Local buckling
77	3900	390	77.5	Local buckling
78	3950	395	78.5	Local buckling
79	4000	400	79.5	Local buckling
80	4050	405	80.5	Local buckling
81	4100	410	81.5	Local buckling
82	4150	415	82.5	Local buckling
83	4200	420	83.5	Local buckling
84	4250	425	84.5	Local buckling
85	4300	430	85.5	Local buckling
86	4350	435	86.5	Local buckling
87	4400	440	87.5	Local buckling
88	4450	445	88.5	Local buckling
89	4500	450	89.5	Local buckling
90	4550	455	90.5	Local buckling
91	4600	460	91.5	Local buckling
92	4650	465	92.5	Local buckling
93	4700	470	93.5	Local buckling
94	4750	475	94.5	Local buckling
95	4800	480	95.5	Local buckling
96	4850	485	96.5	Local buckling
97	4900	490	97.5	Local buckling
98	4950	495	98.5	Local buckling
99	5000	500	99.5	Local buckling
100	5050	505	100.5	Local buckling