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Diagonal Shear Of Partially Grouted Concrete Masonry Panels

Oan, Ahmed

Appendix C

Appendix C presents the tables describing the properties of the walls used in the study, where the first sixty six wall are the walls tested in the experimental program of this thesis and the rest are walls used in previous investigations in literature.

Notations for the tables:

f'm : Average compressive strength of masonry (MPa).

L : Length of the wall (mm).

H: Height of the wall (mm).

t: thickness of the wall (mm).

d_v: effective depth of the wall (mm), in this case taken as 0.8 L.

A_{sh} : Area of horizontal reinforcement per spacing S (mm) .

f_{yh} : Yield strength of the horizontal reinforcement (MPa).

A_{sv} : Area of vertical reinforcement (mm).

f_{yv} : Yield strength of the vertical reinforcement (MPa).

P : Axial load (kN).

S : Vertical spacing between horizontal reinforcement.

γ_g **:** Factor to account for partially grouted or ungrouted walls.

γ_g = 1 for fully grouted walls, and equals A_n/A_g for ungrouted and partially grouted walls , Where A_n/ A_g less than or equals 0.5.

A_n : net area of the wall.

A_g : gross area of the wall.

Vexp : Experimental ultimate shear load (kN).

Table C-1 Properties of walls.

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
1	Oan & Shrive	12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	416.0	297.0
2		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	416.0	278.1
3		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	416.0	275.9
4		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	416.0	270.1
5		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	416.0	261.1
6		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	416.0	272.2
7		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	416.0	257.4
8		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	416.0	265.9
9		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	416.0	259.4
10		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	416.0	275.1
11		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	416.0	281.5
12		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	416.0	278.4
13		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	416.0	278.7
14		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	416.0	287.6
15		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	416.0	278.9
16		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	236.0	149.5
17		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	236.0	146.9
18		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	236.0	157.2
19		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	628.0	384.4
20		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	628.0	346.6

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
21	Oan & Shrive	12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	628.0	419.6
22		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	628.0	347.9
23		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	628.0	337.1
24		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	628.0	390.1
25		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	628.0	384.2
26		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	628.0	362.3
27		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	628.0	325.0
28		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	628.0	338.4
29		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	628.0	356.0
30		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	628.0	373.9
31		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	628.0	360.4
32		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	628.0	349.7
33		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	628.0	377.8
34		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	353.0	186.4
35		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	353.0	199.8
36		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	353.0	215.5
37		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	839.0	459.5
38		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	839.0	403.5
39		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	839.0	433.6
40		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	839.0	414.6

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
41	Oan & Shrive	12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	839.0	393.8
42		12.4	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	839.0	402.0
43		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	839.0	437.0
44		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	839.0	393.3
45		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	839.0	425.7
46		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	839.0	423.6
47		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	839.0	400.9
48		12.4	1590	1200	0.75	190	1272	0	0	0	0	0	0.50	839.0	405.9
49		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	839.0	410.3
50		12.4	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	839.0	436.8
51		16.2	1590	1200	0.75	190	1272	0	0	37.7	560	200	0.50	839.0	443.4
52		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	471.0	231.1
53		16.2	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	471.0	250.8
54		19.5	1590	1200	0.75	190	1272	0	0	0	0	0	0.37	471.0	237.2
55		19.5	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.37	315.0	186.4
56		19.5	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.37	315.0	217.3
57		19.5	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.37	315.0	208.0
58		19.5	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.37	315.0	210.1
59		19.5	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.37	315.0	206.7
60		12.4	1590	1200	0.75	190	1280	0	0	21.5	530	200	0.37	315.0	212.0

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
61	Oan & Shrive	14.2	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	608.0	350.7
62		14.2	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	608.0	323.1
63		14.2	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	608.0	339.2
64		14.2	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	608.0	320.4
65		14.2	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	608.0	334.6
66		14.2	1590	1200	0.75	190	1272	0	0	21.5	530	200	0.50	608.0	333.2
67	Voon & Ingham 2006	17.6	1800	1800	1.00	140	1440	1570	318	28.3	325	400	1.0	0	215.0
68		17.6	1800	1800	1.00	140	1440	1570	318	28.3	325	1800	1.0	0	195.0
69		17	1800	1800	1.00	140	1440	1570	318	78.5	320	400	1.0	0	215.0
70		17	1800	1800	1.00	140	1440	1570	318	78.5	320	900	1.0	0	223.0
71		18.5	1800	1800	1.00	140	1440	1570	318	0	0	0.00	0.5	0	143.0
72		18.5	1800	1800	1.00	140	1440	942	318	0	0	0.00	0.5	0	93.0
73		18.8	1800	1800	1.00	140	1440	1570	318	28.3	325	400	1.0	126.0	263.0
74		18.8	1800	1800	1.00	140	1440	1570	318	28.3	325	400	1.0	63.0	244.0
75		24.3	1800	3600	2.00	140	1440	2454	318	28.3	325	400	1.0	63.0	207.0
76		24.3	3000	1800	0.60	140	2400	2513	318	28.3	325	400	1.0	63.0	598.0
77	Schultz 1998	15.5	2845	1422	0.50	195	2276	1135	414	22.2	483	200	0.4	265.0	261.3
78		15.5	2032	1422	0.70	195	1626	1135	414	22.2	483	200	0.4	185.4	253.5
79		15.5	1422	1422	1.00	195	1138	1135	414	22.2	483	200	0.4	130.2	175.9
80		15.5	2845	1422	0.50	195	2276	1135	414	43.5	483	200	0.4	265.5	243.4

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
81	Schultz 1998	15.5	2032	1422	0.70	195	1626	1135	414	43.5	483	200	0.4	187.6	270.3
82		15.5	1422	1422	1.00	195	1138	1135	414	43.5	483	200	0.4	133.2	211.3
83	Matsumura 1987	21.8	1590	1800	1.13	150	1272	2030	385	70.8	385	400	1.0	116.9	381.6
84		21.8	1190	1800	1.51	150	952	1548	385	70.8	385	400	1.0	87.5	219.6
85		21.8	1190	1800	1.51	150	952	1548	385	70.8	385	400	1.0	87.5	246.3
86		22.3	1190	1800	1.51	190	952	1148	385	0	0	0	1.0	443.2	266.8
87		22.3	1190	1800	1.51	190	952	1148	385	126.9	385	400	1.0	443.2	427.3
88		22.3	1190	1800	1.51	190	952	1148	385	253.8	385	400	1.0	443.2	490.6
89		22.3	1190	1800	1.51	190	952	2026	385	253.8	385	400	1.0	443.2	492.9
90		22.3	1190	1800	1.51	190	952	2026	385	507.7	385	400	1.0	443.2	612.7
91		29	1190	1800	1.51	190	952	2026	385	253.8	385	400	1.0	443.2	511.0
92		26.1	1190	1800	1.51	190	952	2026	385	253.8	385	400	1.0	443.2	465.8
93		27.4	1190	1800	1.51	190	952	2026	385	304.0	385	400	1.0	443.2	592.4
94		26.1	1190	1800	1.51	190	952	1148	385	253.8	385	400	1.0	443.2	470.3
95		26.4	1190	1800	1.51	180	952	2026	385	254.2	385	400	1.0	419.8	490.5
96		31.4	1190	1800	1.51	190	952	2026	385	253.8	385	400	1.0	443.2	585.6
97		16.4	1720	1800	1.05	150	1376	1549	385	42.6	385	400	0.5	0	108.4
98		27	1720	1800	1.05	150	1376	1912	385	42.6	385	400	0.5	0	157.4
99		16.4	1320	1800	1.36	150	1056	1547	385	42.6	385	400	0.5	0	87.1
100		27	1320	1800	1.36	150	1056	1412	385	42.6	385	400	0.5	0	93.1

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
101		16.4	920	1800	1.96	150	736	1549	385	42.6	385	400	0.5	0	73.1
102		27	920	1800	1.96	150	736	1013	385	42.6	385	400	0.5	0	73.1
103		16.4	1320	1800	1.36	150	1056	1547	385	0	0	0	0.5	0	57.4
104		16.4	1320	1800	1.36	150	1056	1547	385	0	0	0	0.5	0	65.3
105		16.4	1320	1800	1.36	150	1056	1547	385	42.6	385	400	0.5	0	63.4
106		16.4	1320	1800	1.36	150	1056	1547	385	88.8	385	400	0.5	0	73.3
107		16.4	1320	1800	1.36	150	1056	1547	385	133.2	385	400	0.5	0	89.1
108		27	1320	1800	1.36	150	1056	1547	385	42.6	385	400	0.5	97.0	101.0
109		27	1320	1800	1.36	150	1056	1547	385	42.6	385	400	0.5	194.0	136.6
110	Matsumura	27	1320	1800	1.36	150	1056	1547	385	42.6	385	400	0.5	291.1	166.3
111	1987	14	1370	1800	1.31	150	1096	1548	385	0	0	0	0.5	100.7	84.3
112		14	1370	1800	1.31	150	1096	1548	385	88.8	385	400	0.5	100.7	150.0
113		14	1370	1800	1.31	150	1096	1548	385	133.2	385	400	0.5	100.7	160.3
114		14	1370	1800	1.31	150	1096	1548	385	201.0	385	400	0.5	100.7	141.8
115		14	1370	1800	1.31	150	1096	574	385	42.6	385	400	0.5	100.7	129.5
116		27	1320	1800	1.36	150	1056	1547	385	0	0	0.00	0.5	194.0	136.6
117		14	1320	1800	1.36	150	1056	1547	385	0	0	0.00	0.5	194.0	79.2
118		27	1320	1800	1.36	150	1056	1547	385	88.8	385	400	0.5	194.0	138.6
119		27	1320	1800	1.36	150	1056	1547	385	133.2	385	400	0.5	194.0	152.5
120		15.2	1970	1800	0.91	150	1576	1545	385	88.8	385	400	0.5	144.8	224.6

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
121	Matsumura 1987	15.2	1970	1800	0.91	150	1576	1545	385	88.8	385	400	0.5	144.8	218.7
122		15.2	1770	1800	1.02	150	1416	1285	385	88.8	385	400	0.5	130.1	180.5
123		15.2	1370	1800	1.31	150	1096	1014	385	88.8	385	400	0.5	100.7	143.9
124		15.2	970	1800	1.86	150	776	774	385	88.8	385	400	0.5	71.3	69.8
125		15.2	970	1800	1.86	150	776	774	385	88.8	385	400	0.5	71.3	68.4
126	Nolph et al. 2012	13.24	2631	2337	0.89	194	2105	2323	439	200.0	493	1118	0.5	49.3	221.8
127		13.24	2631	2337	0.89	194	2105	2323	439	284.0	493	1118	0.5	49.3	227.7
128		13.24	2631	2337	0.89	194	2105	2323	439	400.0	493	1118	0.5	49.3	202.9
129		13.88	2631	2337	0.89	194	2105	2323	439	200.0	493	1118	0.5	49.3	260.0
130		14.53	2631	2337	0.89	194	2105	2323	439	200.0	493	1118	0.5	49.3	295.0
131	Baenziger & Porter 2011	18.7	2850	2640	0.93	203	2280	1394	436	43.0	445	200	0.5	0	208.2
132		18.7	2850	2640	0.93	203	2280	1394	436	35.0	606	200	0.5	0	201.1
133		18.7	4270	2640	0.62	203	3416	1652	436	43.0	445	200	0.5	0	348.3
134		19.7	4270	2640	0.62	203	3416	1910	436	35.0	606	200	0.5	0	431.0
135		19.6	2850	2640	0.93	203	2280	1084	436	35.0	606	200	0.5	0	266.0
136		19.6	2850	2640	0.93	203	2280	1084	436	71.0	606	200	0.5	0	325.6
137		24.3	2850	2640	0.93	203	2280	1084	436	43.0	445	200	0.5	0	249.1
138		23	4270	2640	0.62	203	3416	1910	436	71.0	606	200	0.5	0	405.7
139		21.4	2850	2640	0.93	203	2280	1600	436	43.0	445	200	0.5	0	425.2
140		20	2850	2640	0.93	203	2280	1600	436	71.0	606	200	0.5	0	424.4

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
141	Scrivener 1969	8.1	2400	2600	1.08	140	1920	0	0	0.0	0	0	0.3	138.3	124.5
142		10.7	2400	2600	1.08	14	1920	400	287	0.0	0	0	0.4	336.1	302.5
143		8.1	2400	2600	1.08	140	1920	0	0	219.3	297	800	0.3	237.2	213.5
144		8.1	2400	2600	1.08	140	1920	400	282	86.0	297	800	0.4	296.6	266.9
145		8.1	2400	2600	1.08	140	1920	529	282	129.0	297	2400	0.5	276.8	249.1
146		8.1	2400	2600	1.08	140	1920	658	282	0	0	0	0.5	296.6	266.9
147		10.7	2400	2600	1.08	140	1920	658	287	0	0	0	0.5	321.2	289.1
148		8.1	2400	2600	1.08	140	1920	787	282	0	0	0	0.5	346.0	311.4
149		10.7	2400	2600	1.08	140	1920	787	287	86.0	297	800	0.5	514.0	462.6
150		10.7	2400	2600	1.08	140	1920	787	287	172.0	297	800	0.5	553.6	498.2
151		10.7	2400	2600	1.08	140	1920	1000	287	300.0	287	800	0.3	474.4	427.0
152		10.7	2400	2600	1.08	140	1920	1000	287	266.7	287	800	0.4	553.6	498.2
153	Shing et al. 1990	20.67	1829	1829	1.00	143	1727	1935	496	71	386	406	1.0	491.7	455.1
154		17.91	1829	1829	1.00	143	1727	1935	496	71	386	406	1.0	0.0	353.1
155		17.91	1829	1829	1.00	143	1727	1935	496	71	386	406	1.0	180.5	384.5
156		20.67	1829	1829	1.00	143	1727	1935	496	71	386	406	1.0	180.5	431.6
157		20.67	1829	1829	1.00	143	1727	1000	441	71	386	406	1.0	486.5	426.3
158		22.74	1829	1829	1.00	143	1727	1420	448	71	462	406	1.0	486.5	499.6
159		22.74	1829	1829	1.00	143	1727	1420	448	71	386	406	1.0	486.5	468.2
160		17.23	1829	1829	1.00	143	1727	1935	496	71	462	406	1.0	486.5	536.2

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	dv	Asv	fyv	Ash	fyh	S	γg	P	Vexp
161	Okamoto et al. 1987*	22.81	1200	1800	1.50	190	1105	1537	387	126.9	354	400	1.0	893.8	547.2
162		22.81	2000	1800	0.90	190	1105	2561	387	126.9	354	400	1.0	2230.6	991.8
163		26.73	1200	1800	1.50	190	1905	1161	387	126.9	354	400	1.0	0.0	711.4
164		25.16	1200	1800	1.50	190	1105	1537	387	126.9	354	400	1.0	0.0	529.0
165	Sveinsson et al. 1985*	23.14	1219	1422	1.17	194	1143	464	465	154.8	407	284	1.0	444.6	461.1
166		23.14	1219	1422	1.17	194	1143	400	465	154.8	407	284	1.0	711.8	562.8
167		15.83	1219	1422	1.17	143	1143	774	391	160.0	438	284	1.0	484.6	428.8
168		15.83	1219	1422	1.17	143	1143	774	410	160.0	438	284	1.0	484.6	428.8
169		15.13	1219	1422	1.17	143	1143	774	391	133.5	438	474	1.0	484.6	411.4
170		15.13	1219	1422	1.17	143	1143	774	410	133.5	438	474	1.0	484.6	388.7
171		15.13	1219	1422	1.17	143	1143	774	391	21.8	438	203	1.0	484.6	334.7
172		15.13	1219	1422	1.17	143	1143	774	391	155.2	438	399	1.0	484.6	423.6
173		15.13	1219	1422	1.17	143	1143	774	391	133.5	438	474	1.0	303.3	341.7
174		15.13	1219	1422	1.17	143	1143	774	391	133.5	438	474	1.0	481.1	418.4
175		20.11	1219	1422	1.17	143	1143	774	391	133.5	438	474	1.0	481.1	320.7
176		20.11	1219	1422	1.17	143	1143	774	391	166.7	438	237	1.0	481.1	334.7
177		20.11	1219	1422	1.17	143	1143	1175	391	133.5	438	474	1.0	481.1	409.6
178		20.11	1219	1422	1.17	143	1143	800	438	166.7	438	237	1.0	481.1	418.4
179		20.11	1219	1422	1.17	143	1143	774	410	133.5	438	474	1.0	143	353.9
180		20.11	1219	1422	1.17	143	1143	774	410	166.7	438	237	1.0	143	383.5

Table C-1 Properties of walls (continued).

No.	Source	f'm	L	H	H/L	t	d_v	A_{sv}	f_{yv}	A_{sh}	f_{yh}	S	γg	P	V_{exp}
181	Sveinsson et al. 1985*	20.11	1219	1422	1.17	143	1143	258	391	133.5	438	474	1.0	143	380.0
182		20.11	1219	1422	1.17	143	1143	774	391	166.7	438	237	1.0	143	373.0
183		20.11	1219	1422	1.17	143	1143	774	391	103.2	410	284	1.0	143	392.2
184		20.11	1219	1422	1.17	143	1143	774	410	117.1	417	129	1.0	143	395.7
185		27.62	1219	1422	1.17	143	1143	774	391	29.0	438	203	1.0	143	468.9
186	Chen et al. 1978	9.2	1200	1400	1.17	190	960	0	0	0.0	0	0	1.00	89.0	220.0
187		9.2	1200	1400	1.17	190	960	0	0	0.0	0	0	0.50	89.0	117.0
188		12.6	1200	1400	1.17	190	960	400	488	0.0	0	0	1.00	89.0	218.0
189		12.6	1200	1400	1.17	190	960	400	488	200.0	330	1400	1.00	89.0	279.0
190		9.2	1200	1400	1.17	190	960	400	488	200.0	330	1400	0.50	89.0	220.0
191		12.6	1200	1400	1.17	190	960	400	488	200.0	330	280	1.00	89.0	368.0
192		13.1	1200	1400	1.17	190	960	1018	477	0.0	0	0	1.00	89.0	293.0
193		13.1	1200	1400	1.17	190	960	1018	477	0.0	0	0	0.50	89.0	169.0
194		13.1	1200	1400	1.17	190	960	1018	477	200.0	330	700	1.00	89.0	253.0
195		9.2	1200	1400	1.17	190	960	1018	477	200.0	330	700	0.50	89.0	223.0
196		9.2	1200	1400	1.17	190	960	1018	477	284.0	509	280	1.00	89.0	390.0

* Reported by Fattal and Todd (1991)