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APPENDIX C

COMPILATION OF DATA ON SELECTED DEMOLITION PROJECTS

Data from 45 demolition projects were collected with the assistance of several demolition contractors who furnished the data from their files on existing projects. These data, as a function of 13 major project-related parameters, have been compiled and tabulated here. In addition, five estimated parameters introduced for the purpose of data analyses have been calculated for each demolition project. These are presented in Table C-1 under items 14 through 18.

Although the available data are not complete for each parameter listed in Table C-1, they were found adequate for performing the required analyses. The compiled data are presented in Table C-1.

Commercial brick and concrete buildings		Waste to Structure bulk factor	Truck Capacity (yd ³)
Columbus	615	0.96*	20
	587	0.19	20
	670	0.02*	20
	620	0.09*	—
	478	0.27	20
	551	0.16	20
Chicago	5	0.29	55
New York	1	0.25	35
	2	0.35	35
	3	0.17	35
OK City	1	0.25	35
Donna AFB	1	0.05	35
			30 mean
* Considered as outliers		Mean	0.21 w/o outliers (10)
			0.25 incl outliers (12) ← use

TABLE C-1. DETAILED SUMMARY OF DATA FOR VARIOUS DEMOLITION PROJECTS

Parameters	Columbus #648	Columbus #645	Columbus #639	Columbus #615
(1) Type of structure	Residential Wood	Residential Brick	Residential Brick	Commercial Brick
(2) Total floor area, 1000 sq ft	1.20	0.60	320.00	9.00
(3) Volume of structure, 1000 cu ft	12.00	6.00	3200.00	90.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr				
(6) Average floor height, feet	10.00	10.00	10.00	10.00
(7) Days to wreck	3.00	8.00	34.00	16.00
(8) Total cost of demolition, 1000\$	1.75	2.50		11.75
(9) Distance of disposal site, miles	9.00	5.00	10.00	12.00
(10) Cost of disposal, \$/cu yd ^(c)	1.98	1.68	1.98	2.38
(11) Volume of the truck, cu yd	20.00	20.00	20.00	20.00
(12) Volume of waste, 1000 cu ft	5.40	4.90	560.00	66.50
(13) Composition (by volume)				
Concrete, percent				
Bricks, percent	10.00	80.00	50.00	85.00
Wood, percent	85.00	15.00	45.00	10.00
Paper board, percent	3.00	3.00	3.00	1.00
Steel, percent	2.00	2.00	2.00	4.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	4.50	8.17	1.75	9.61
(15) Volume of waste per cu ft of structure	0.45	0.82	0.18	0.96
(16) Adjusted cost of demolition per sq ft of floor area ^(c)	1.45	4.13		1.39
(17) Adjusted cost of demolition per cu ft of structure ^(c)	0.15	0.42		.13
(18) Adjusted cost of disposal, \$/ cu/yd/10 mile ^(c)	2.20	3.37	1.98	1.98

TABLE C-1. (Continued).

Parameters	Columbus #587	Columbus #670	Columbus #675	Columbus #603
(1) Type of structure	Commercial Brick	Commercial Brick	Residential Brick	Residential Wood
(2) Total floor area, 1000 sq ft	9.10	245.00	46.10	1.20
(3) Volume of structure, 1000 cu ft	91.00	2450.00	461.00	12.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr				
(6) Average floor height, feet	10.00	10.00	10.00	10.00
(7) Days to wreck	6.00	8.00	14.00	1.00
(8) Total cost of demolition, 1000\$	4.25	87.50		1.25
(9) Distance of disposal site, miles	8.00	8.00	4.00	10.00
(10) Cost of disposal, \$/cu yd	2.68	1.98	1.68	1.98
(11) Volume of the truck, cu yd	20.00	20.00	20.00	20.00
(12) Volume of waste, 1000 cu ft	17.00	38.00	59.5	10.80
(13) Composition (by volume)				
Concrete, percent				18.00
Bricks, percent	85.00	85.00	80.00	80.00
Wood, percent	10.00	10.00	15.00	—
Paper board, percent	1.00	1.00	3.00	—
Steel, percent	4.00	4.00	2.00	2.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	1.87	3.16	1.29	9.0
(15) Volume of waste per cu ft of structure	.19	0.02	0.13	0.9
(16) Adjusted cost of demolition per sq ft of floor area (c)	0.47	0.40		1.04
(17) Adjusted cost of demolition per cu ft of structure (c)	0.05	0.04		0.11
(18) Adjusted cost of disposal, \$/ cu/yd/10 mile (c)	3.35	2.48	4.28	1.98

38,000 ft³
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TABLE C-1. (Continued)

Parameters	Columbus #619	Columbus #620	Columbus #630	Columbus #653
(1) Type of structure	Commercial Wood	Commercial Concrete	Residential Brick	Commercial Brick
(2) Total floor area, 1000 sq ft	30.0	120.00	1.40	2.40
(3) Volume of structure, 1000 cu ft	288.00	1200.00	14.00	24.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr				
(6) Average floor height, feet	10.00	10.00	10.00	10.00
(7) Days to wreck	55.00	25.00	10.00	11.00
(8) Total cost of demolition, 1000\$	12.00	57.50	5.00	7.00
(9) Distance of disposal site, miles	10.00	12.00	14.00	11.00
(10) Cost of disposal, \$/cu yd ^(c)	1.98	2.48	2.08	2.03
(11) Volume of the truck, cu yd	20.00		20.00	20.00
(12) Volume of waste, 1000 cu ft	59.00	99.40		
(13) Composition (by volume)				
Concrete, percent		40.00		
Bricks, percent	17.0	35.00	80.00	80.00
Wood, percent	80.0	20.00	15.00	15.00
Paper board, percent		2.00	3.00	3.00
Steel, percent	3.00	3.00	2.00	2.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	2.05	0.83	16.98	14.63
(15) Volume of waste per cu ft of structure	0.21	0.09		
(16) Adjusted cost of demolition ^(c) per sq ft of floor area	0.40	0.48	3.54	2.90
(17) Adjusted cost of demolition ^(c) per cu ft of structure	0.04	0.05	0.36	0.30
(18) Adjusted cost ^(c) of disposal, \$/ cu yd/acre	1.98	2.06	1.77	1.90

TABLE C-1. (Continued)

Parameters	Columbus #628	Columbus #624	Columbus #600	Columbus #478
(1) Type of structure	Residential Wood	Residential Wood	Residential Wood	Commercial Brick
(2) Total floor area, 1000 sq ft	2.88	3.20	0.80	5.00
(3) Volume of structure, 1000 cu ft	28.80	32.00	8.00	50.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr				
(6) Average floor height, feet	10.00	10.00	10.00	10.00
(7) Days to wreck	6.00	4.00	2.00	8.00
(8) Total cost of demolition, 1000\$	3.00	2.50	1.50	9.50
(9) Distance of disposal site, miles	15.00	22.00	10.00	11.00
(10) Cost of disposal, \$/cu yd ^(c)	2.97	3.21	1.98	2.08
(11) Volume of the truck, cu yd	20.00	20.00	20.00	20.00
(12) Volume of waste, 1000 cu ft	28.62	27.00	4.86	13.50
(13) Composition (by volume)				
Concrete, percent	7.00	7.00		12.00
Bricks, percent			17.00	53.00
Wood, percent	90.00	90.00	80.00	32.00
Paper board, percent				
Steel, percent	3.00	3.00	3.00	3.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	5.00	8.44	6.08	2.7
(15) Volume of waste per cu ft of structure	0.50	0.85	0.61	0.27
(16) Adjusted cost of demolition, per sq ft of floor area ^(c)	1.04	0.78	1.86	1.88
(17) Adjusted cost of demolition, per cu ft of structure ^(c)	0.19	0.08	0.19	0.19
(18) Adjusted cost of disposal, \$/ cu yd/acre ^(c)	1.98	1.47	1.98	1.89

TABLE C-1. (Continued)

Parameters	Columbus #539	Columbus #551	Columbus #555	Columbus #564
(1) Type of structure	Commercial Wood	Commercial Brick	Commercial Wood	Residential Wood
(2) Total floor area, 1000 sq ft	17.60	12.00		4.32
(3) Volume of structure, 1000 cu ft	211.00	120.00		43.20
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr				
(6) Average floor height, feet	12.00	10.00		10.00
(7) Days to wreck	64.00	21.00	95.00	6.00
(8) Total cost of demolition, 1000\$	42.50	12.00	140.90	5.00
(9) Distance of disposal site, miles	7.00	12.00	25.00	3.00
(10) Cost of disposal, \$/cu yd ^(c)	2.97	2.48	3.48	1.78
(11) Volume of the truck, cu yd	20.00	20.00	20.00	20.00
(12) Volume of waste, 1000 cu ft		18.90	1437.00	
(13) Composition (by volume)				
Concrete, percent				8.00
Bricks, percent	20.00	85.00	20.00	
Wood, percent	78.00	10.00	77.00	90.00
Paper board, percent		1.00		
Steel, percent	2.00	4.00	3.00	2.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	4.00	1.58		13.38
(15) Volume of waste per cu ft of structure	0.40	0.16		
(16) Adjusted cost of demolition, per sq ft of floor area ^(c)	2.40	1.00		1.15
(17) Adjusted cost of demolition, per cu ft of structure ^(c)	0.21	0.10		0.12
(18) Adjusted cost of disposal, \$/ cu/yd/acre ^(c)	4.28	2.06	1.39	5.94

TABLE C-1. (Continued)

Parameters	Columbus #597	Boston #1	Boston #2	Boston #3
(1) Type of structure	Residential Wood	Residential Brick	Commercial Wood	Residential Brick
(2) Total floor area, 1000 sq ft	0.77	39.00	153.50	105.30
(3) Volume of structure, 1000 cu ft	7.70	390.00	1535.00	1053.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr				
(6) Average floor height, feet	10.00			
(7) Days to wreck	4.00			
(8) Total cost of demolition, 1000\$	1.85	37.80	42.00	54.54
(9) Distance of disposal site, miles	25.00			
(10) Cost of disposal, \$/cu yd	3.96			
(11) Volume of the truck, cu yd	20.00			
(12) Volume of waste, 1000 cu ft	6.50			
(13) Composition (by volume)				
Concrete, percent	8.00			
Bricks, percent				
Wood, percent	90.00			
Paper board, percent				
Steel, percent	2.00			
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	8.45			
(15) Volume of waste per cu ft of structure	0.85			
(16) Adjusted cost of demolition, per sq ft of floor area ^(c)	2.39	0.94	0.28	0.51
(17) Adjusted cost of demolition, per cu ft of structure ^(c)	0.24	0.10	0.03	0.06
(18) Adjusted of disposal, \$/ cu yd/acre ^(c)	1.58			

TABLE C-1. (Continued)

Parameters	Chicago #1	Chicago #2	Chicago #3	Chicago #4
(1) Type of structure	Residential Wood	Residential Wood	Residential Wood	Commercial Wood
(2) Total floor area, 1000 sq ft	13.20	2.20	13.74	22.00
(3) Volume of structure, 1000 cu ft	132.00	33.00	200.00	440.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr		50.00		65.00
(6) Average floor height, feet	10.00	15.00	15.00	20.00
(7) Days to wreck	15.00	4.00	12.00	17.00
(8) Total cost of demolition, 1000\$	6.94	2.45	7.00	26.00
(9) Distance of disposal site, miles	10.00	15.00	20.00	15.00
(10) Cost of disposal, \$/cu yd ^(c)	1.30	1.66	2.53	2.24
(11) Volume of the truck, cu yd	55.00	55.00	55.00	55.00
(12) Volume of waste, 1000 cu ft	75.60	11.00	35.00	128.00
(13) Composition (by volume)				
Concrete, percent	8.00			20.00
Bricks, percent	28.00	8.00	25.00	17.00
Wood, percent	62.00	90.00	73.00	60.00
Paper board, percent				
Steel, percent	2.00 ^(a)	2.00	2.00	3.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	5.73	5.00	2.55	5.82
(15) Volume of waste per cu ft of structure	0.58	0.34	0.18	0.30
(16) Adjusted cost of demolition, per sq ft of floor area ^(c)	0.51	1.07	0.49	1.14
(17) Adjusted cost of demolition, per cu ft of structure ^(c)	0.06	0.08	0.04	0.06
(18) Adjusted cost of disposal, \$/ cu yd/acre ^(c)	1.30	1.11	1.27	1.50

TABLE C-1. (Continued)

Parameters	Chicago #5	Detroit #1	Detroit #2	Detroit #3
(1) Type of structure	Commercial Concrete	Residential Wood	Residential Wood	Residential Wood
(2) Total floor area, 1000 sq ft	33.00	1.50	1.50	2.00
(3) Volume of structure, 1000 cu ft	660.00	22.50	22.50	24.00
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr	70.00	55.00	55.00	60.00
(6) Average floor height, feet	20.00	15.00	15.00	12.00
(7) Days to wreck	25.00			
(8) Total cost of demolition, 1000\$	39.60	1.20	1.08	1.60
(9) Distance of disposal site, miles	10.00	35.00	15.00	35.00
(10) Cost of disposal, \$/cu yd	2.24	4.82	3.51	4.82
(11) Volume of the truck, cu yd	55.00	55.00	35.00	55.00
(12) Volume of waste, 1000 cu ft	188.00	2.84	2.84	5.4
(13) Composition (by volume)				
Concrete, percent	59.00			
Bricks, percent	30.00	17.00	17.00	5.00
Wood, percent	7.00	80.00	80.00	94.00
Paper board, percent				
Steel, percent	3.00	4.00	3.00	3.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	5.70	1.90	1.90	2.70
(15) Volume of waste per cu ft of structure	0.29	0.12	0.13	0.23
(16) Adjusted cost of demolition per sq ft of floor area	1.15	0.70	0.63	0.70
(17) Adjusted cost of demolition per cu ft of structure	0.06	0.05	0.04	0.06
(18) Adjusted cost of disposal, \$/ cu yd/acre	2.24	1.40	2.34	1.40

TABLE C-1. (Continued)

Parameters	Detroit #4	Detroit #5	Detroit #6	Detroit #7
(1) Type of structure	Residential Wood	Residential Wood	Residential Wood	Residential Wood
(2) Total floor area, 1000 sq ft	3.60	5.04	33.60	16.80
(3) Volume of structure, 1000 cu ft	43.20	60.50	403.20	201.60
(4) Type of demolition	Mechanical	Mechanical	Mechanical	Mechanical
(5) Age of structure, yr	65.00	70.00	65.00	65.00
(6) Average floor height, feet	12.00	12.00	12.00	12.00
(7) Days to wreck				
(8) Total cost of demolition, 1000\$	2.00	6.66	46.00	26.20
(9) Distance of disposal site, miles	20.00	30.00	5.00	7.00
(10) Cost of disposal, \$/cu yd	1.88	1.75	0.88	1.07
(11) Volume of the truck, cu yd	55.00	55.00	55.00	55.00
(12) Volume of waste, 1000 cu ft	9.70	13.50	282.00	195.30
(13) Composition (by volume)				
Concrete, percent	2.00	2.00	10.00	10.00
Bricks, percent	15.00	15.00	20.00	10.00
Wood, percent	75.00	75.00	67.00	77.00
Paper board, percent				
Steel, percent	3.00	3.00	3.00	3.00
Aluminum, percent	5.00	5.00		
Plastics, percent				
(14) Volume of waste per sq ft of floor area	2.70	2.68	8.40	11.63
(15) Volume of waste per cu ft of structure	0.23	0.23	0.01	0.97
(16) Adjusted cost of demolition, per sq ft of floor area	0.50	1.09	1.21	1.37
(17) Adjusted cost of demolition, per cu ft of structure	0.04	0.19	0.19	0.12
(18) Adjusted cost of disposal, \$/cu yd/acre	0.95	0.60	1.76	1.52

TABLE C-1. (Continued)

Parameters	Detroit #8	New York #1	New York #2	New York #3
(1) Type of structure	Residential Wood	Commercial Multi-story Brick	Commercial Multi-story Brick	Commercial Multi-story Brick
(2) Total floor area, 1000 sq ft	57.60	105.80	21.22	644.00
(3) Volume of structure, 1000 cu ft	691.20	1370.10	290.00	9960.00
(4) Type of demolition	Mechanical	Manual/ Mechanical	Manual/ Mechanical	Manual/ Mechanical
(5) Age of structure, yr	60.00	85.00	85.00	
(6) Average floor height, feet	12.00	12.95	13.60	10.90
(7) Days to wreck		45.00	30.00	120.0
(8) Total cost of demolition, 1000\$	89.83	405.00	84.00	1686.00
(9) Distance of disposal site, miles	10.00	12.00 (offshore)	12.00 (offshore)	10.00
(10) Cost of disposal, \$/cu yd	1.53	3.88	3.88	3.87
(11) Volume of the truck, cu yd	55.00	35.00	35.00	35.00
(12) Volume of waste, 1000 cu ft	393.87	334.84	99.43	1642.00
(13) Composition (by volume)				
Concrete, percent	10.00	38.00	37.00	35.00
Bricks, percent	20.00	57.00	56.00	52.00
Wood, percent	67.00	3.00	6.00	10.00
Paper board, percent				
Steel, percent	3.00	2.00	1.00	3.00
Aluminum, percent				
Plastics, percent				
(14) Volume of waste per sq ft of floor area	6.80	3.17	4.69	2.55
(15) Volume of waste per cu ft of structure	0.58	0.25	0.35	0.17
(16) Adjusted cost of demolition, per sq ft of floor area ^(c)	1.37	3.14	3.24	2.15
(17) Adjusted cost of demolition per cu ft of structure ^(c)				
(18) Adjusted cost of disposal, \$/ cu yd/acre ^(c)	1.53	3.24	3.24	3.87

TABLE C-1. (Continued)

Parameters	Oklahoma City #1	Dover AFB #1	Fort Carson #1
(1) Type of structure	Commercial Concrete	Commercial Concrete	Residential Wood
(2) Total floor area, 1000 sq ft	36.00	150.00	50.00
(3) Volume of structure, 1000 cu ft	432.00	1650.00	.
(4) Type of demolition	Explosive	Mechanical	Mechanical
(5) Age of structure, yr	75.00	70.00	
(6) Average floor height, feet	12.00	11.00	
(7) Days to wreck	35.00	100.00	
(8) Total cost of demolition, 1000\$	100.00	125.00	25.00 ^(b)
(9) Distance of disposal site, miles	20.00	20.00	
(10) Cost of disposal, \$/cu yd ^(c)	3.30	5.75	
(11) Volume of the truck, cu yd	35.00	35.00	
(12) Volume of waste, 1000 cu ft	108.00	71.10	
(13) Composition (by volume)			
Concrete, percent	50.00	45.00	
Bricks, percent	20.00	16.00	
Wood, percent	20.00	27.00	
Paper board, percent	7.00	7.00	
Steel, percent	3.00	2.00	
Aluminum, percent		3.00	
Asphalt, percent			
(14) Volume of waste per sq ft of floor area	3.00	0.05	
(15) Volume of waste per cu ft of structure	0.25	0.05	
(16) Adjusted cost of demolition per sq ft of floor area ^(c)	3.68	.98	0.58
(17) Adjusted cost of demolition per cu ft of structure ^(c)	0.32	0.09	
(18) Adjusted cost of disposal, \$/cu yd/acre ^(c)	1.65	2.88	

TABLE C-1. (Continued)

Parameters	Fort Carson #2	Presidio of Monterey
(1) Type of structure	Residential Wood	Residential Wood
(2) Total floor area, 1000 sq ft	252.60	25.35
(3) Volume of structure, 1000 cu ft		
(4) Type of demolition	Mechanical	Mechanical
(5) Age of structure, yr		
(6) Average floor height, feet		
(7) Days to wreck		
(8) Total cost of demolition, 1000\$	117.00 ^(b)	23.00
(9) Distance of disposal site, miles		
(10) Adjusted cost of disposal, \$/cu yd		
(11) Volume of the truck, cu yd		
(12) Volume of waste, 1000 cu ft		
(13) Composition (by volume)		
Concrete, percent		
Bricks, percent		
Wood, percent		
Paper board, percent		
Steel, percent		
Aluminum, percent		
Plastics, percent		
(14) Volume of waste per sq ft of floor area		
(15) Volume of waste per cu ft of structure		
(16) Adjusted cost of demolition per sq ft of floor area	0.59	0.76
(17) Total cost of demolition per cu ft of structure		
(18) Cost of disposal, \$/cu yd/acre		

TABLE C-1. (Continued)

Footnotes to Table C-1.

- (a) Includes 19.5 tons of steel, 7.5 tons of iron, 0.4 ton of brass, 0.11 ton of copper, 0.07 ton of insulated wire.
- (b) At Fort Carson, the demolition cost also includes the cost of foundation removal. Foundation removal cost is about 52 percent for Project #1 and 66 percent for Project #2.
- (c) These costs are adjusted to the December 1974 U.S. average prices, using the ENR Construction Cost Indices.