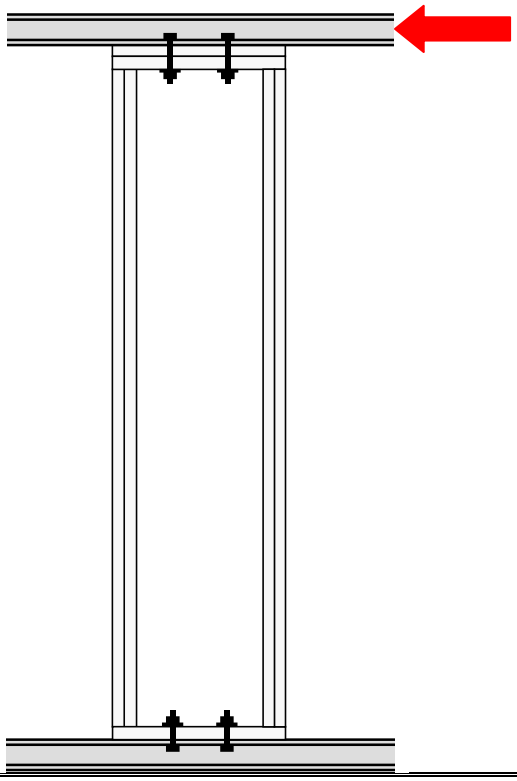
Walls 02IAm



Walls:	02IAm1	02IAm1re	02IAm2[3]
Manufactured:	**June 18, 1998**[1]	**June 18, 1998**	
MOE data files:	2iam1s.prn	2iam1s.prn	
MOE_{plates} (10^6 psi)			
MOE_{studs} (10^6 psi)	1.79	1.79	
$Density_{plates}$ (kg/m^3)			
$Density_{studs}$ (kg/m^3)	500	500	
Date tested:	**July 9, 1998**	**July 16, 1998**[2]	**September 10, 1998**
Time tested:	15:36	13:13.	16:30
LTC files:	utp_alex	utp_alex	
Data files:	02IAm1.dat	02IAm1re.dat	02IAm2.dat
Excel files:	02IAm1_data	02IAm1re_data	02IAm2_data
Photo files:	367-376	452-466	no pictures

[1] Sheathing attached to the bottom plate with ½ to ¾ -in. edge distance.

[2] A week after the test of 02IAm1 wall, seven additional nails were driven to attach the sheathing to the bottom plate at approximately 3 in. o. c. with ¾-in. edge distance.

[3] No record of the date of manufacture and framing properties.

Wall 02IAm1

Observations: In the beginning of the test, the wall exhibited unexpectedly stiff behavior. The shear modulus was 6.8 Kip/in. However, a major event occurred at 0.27-in. deflection as can be seen in Figure 02IAm1-a. The peak load 220 lbf. (0.11 Kip/ft.) was recorded at 1.1 in. Another major event occurred at approximately 1.9-in. deflection when the load resistance decreased 20%.

Failure mode: The bottom plate split at the right end under the first sheathing nail and the framing nails (Photo 371). Sheathing unzipped at the bottom plate and three nails tore through the edge while the rest of the wall remained intact. The relative displacement between the sheathing and framing members was less than 0.01 in. Wall rotated around the left end stud (Photo 374).

Wall 02IAm1re

Rationale: After 02IAm1 test, the specimen looked undamaged except for the split end of the bottom plate and three nails torn through the edge. The idea was to test the performance of a retrofitted wall after the seismic event. A week after the first test, the wall was retrofitted (see video-record): seven additional nails were driven to attach the sheathing to the bottom plate at approximately 3 in. o. c. with ¾-in. edge distance. The bottom plate was not replaced and the old nails were not removed.

Observations: The load-deflection curve in Figure 02FAm1re-a shows that the retrofitted wall was significantly less stiff but the plastic region increased. The peak load was the same as in the first test. Apparently, the performance of the first nails in the bottom plate was critical for the wall strength and stiffness. As usual for IAm walls, the sheathing displacement relative to the top plate and studs was insignificant (0.016 in.). The wall failed after 4.9-in. deflection.

Failure mode: The bottom plate split under the sheathing nails (Photo 460). Sheathing nails did not tear though the edge (Photo 457).

Wall 02IAm2

Observations: The performance of this wall was significantly different from 02IAm1 wall. Although the elastic stiffness was only half of 02IAm1 wall, the peak load was 60% higher. As can be seen in Figure 02IAm2-a, the peak load occurred at 1.1-in. deflection, at which point a sudden 15% load drop occurred and then the yielding continued at a lower level. The 20% resistance decrease was observed at 2.9-in. deflection.

Failure mode: There was no record or picture taken. It can be assumed that the bottom plate split at 1.1-in. deflection under the first nail or two. Figures 02IAm2-c and d indicate that the sheathing unzipped at the bottom plate similar to the previous walls.

General

Data acquisition: The load range at the UTP controller was set at 5500 lbf. However, with the account to the initial load on the specimens during the setup and the low load capacity, the errors in the load readings were relatively high.

Table 02IAm1. Data summary.

Specimen	**02IAm1**	**Per unit length**	
Shear Bolts		**monotonic test**	
Wall length		**2.00ft.**	**0.609m**
Date:	7-09-1998.	**Time:**	15:36
		units	**02IAm1**
Peak unit load, v_{peak}		Kip/ft. KN/m	0.110 1.605
Drift at peak load, Δ_{peak}		in. mm	1.075 27.31
Yield unit load, v_{yield}		Kip/ft. KN/m	0.098 1.433
Drift at yield load, Δ_{yield}		in. mm	0.115 2.93
Proportional limit, $0.4v_{peak}$		Kip/ft. KN/m	0.044 0.642
Drift at prop. limit, $\Delta@0.4v_{peak}$		in. mm	0.052 1.31
Unit load at failure or $0.8v_{peak}$		Kip/ft. KN/m	0.087 1.277
Drift at failure, $\Delta_{failure}$		in. mm	1.951 49.56
Shear modulus, G $@0.4v_{peak}$		Kip/in. KN/mm	6.804 1.192
Work until failure per unit length		Kip·ft./ft. KN·m/m	0.015 0.069
Unit load, $v_{1/300}$ @ 0.32 in. (8.13 mm)		Kips/ft. KN/m	0.018 0.256
Unit load, $v_{1/200}$ @ 0.48 in.(12.19 mm)		Kips/ft. KN/m	0.016 0.234
Unit load, $v_{1/100}$ @ 0.96 in. (24.38 mm)		Kips/ft. KN/m	0.020 0.292
Unit load, $v_{1/60}$ @ 1.6 in. (40.64 mm)		Kips/ft. KN/m	**0.026** **0.372**

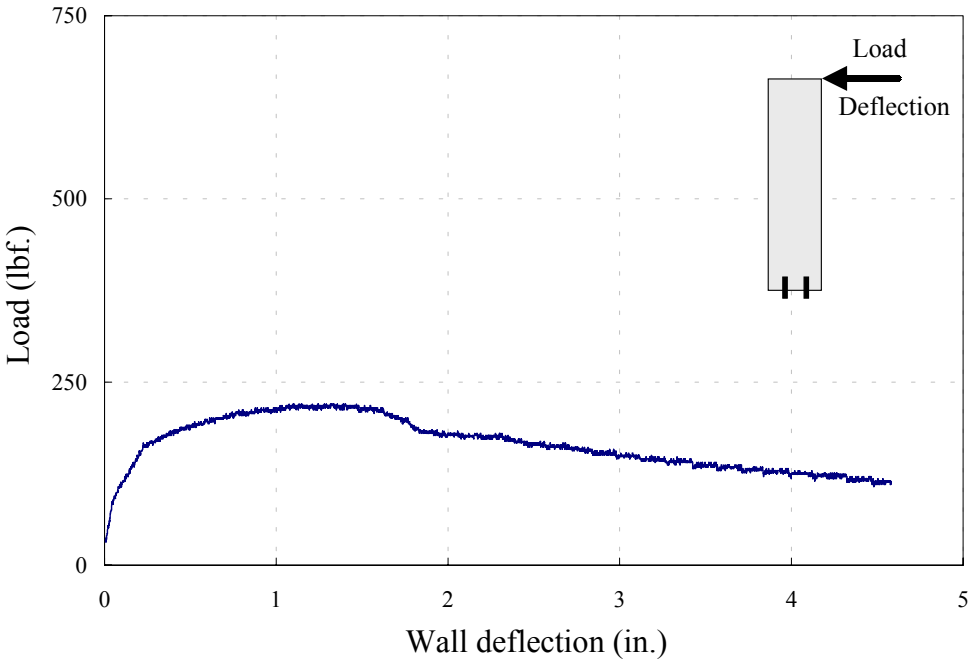


Figure 02IAm1- a. Observed load-deflection curve[1].

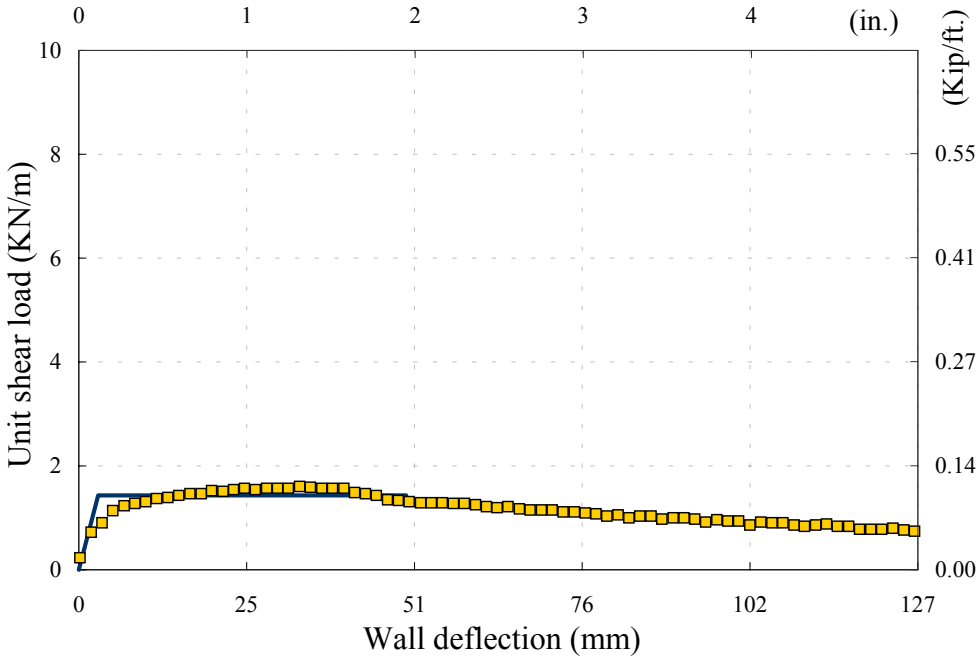


Figure 02IAm1- b. Unit load-deflection and EEEP curves[2].

[1] The scale of the graph varies between test series.
[2] The scale of the graph is uniform between test series for comparison purposes.

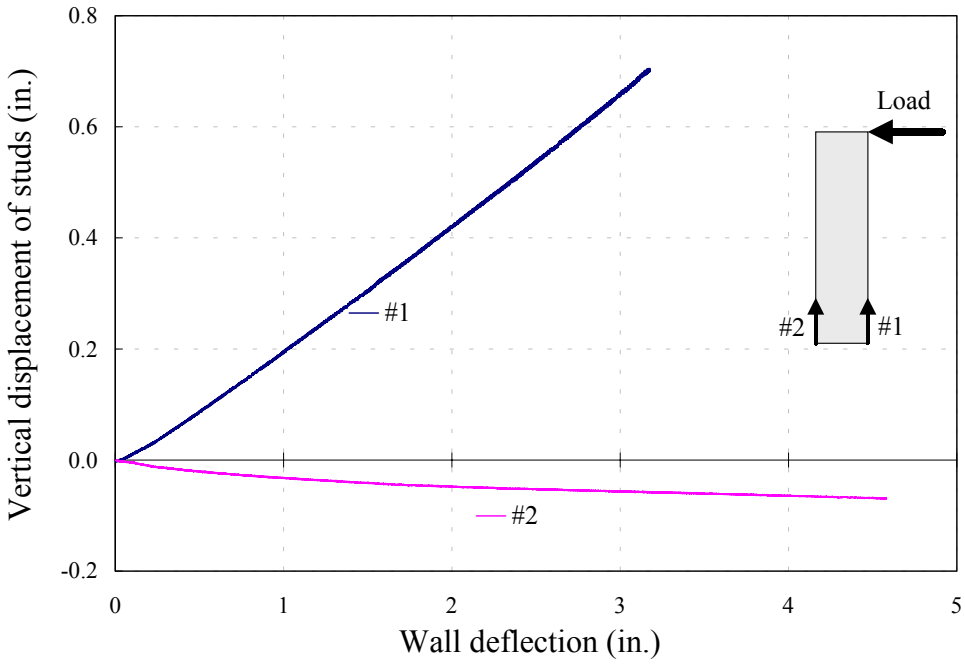


Figure 02IAm1- c. Vertical displacement of studs.

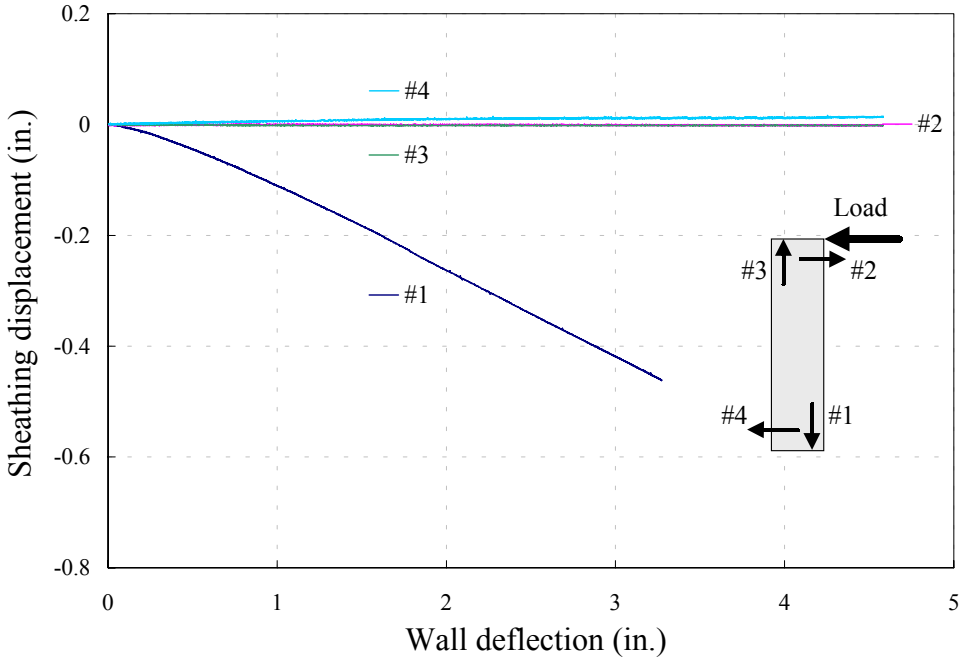


Figure 02IAm1- d. Sheathing displacement.

Table 02IAm1re. Data summary.

Specimen **02IAm1re**	**Per unit length**	
Shear Bolts	**monotonic test**	
Wall length	**2.00ft.**	**0.609m**
Date: 7-16-1998.	**Time:**	13:13
	units	**02IAm1re**
Peak unit load, v_{peak}	Kip/ft. KN/m	0.110 1.605
Drift at peak load, Δ_{peak}	in. mm	3.085 78.36
Yield unit load, v_{yield}	Kip/ft. KN/m	0.100 1.454
Drift at yield load, Δ_{yield}	in. mm	0.887 22.53
Proportional limit, $0.4v_{peak}$	Kip/ft. KN/m	0.044 0.642
Drift at prop. limit, $\Delta@0.4v_{peak}$	in. mm	0.392 9.95
Unit load at failure or $0.8v_{peak}$	Kip/ft. KN/m	0.087 1.277
Drift at failure, $\Delta_{failure}$	in. mm	4.948 125.68
Shear modulus, G $@0.4v_{peak}$	Kip/in. KN/mm	0.899 0.157
Work until failure per unit length	Kip·ft./ft. KN·m/m	0.037 0.166
Unit load, $v_{1/300}$ @ 0.32 in. (8.13 mm)	Kips/ft. KN/m	0.002 0.022
Unit load, $v_{1/200}$ @ 0.48 in.(12.19 mm)	Kips/ft. KN/m	0.003 0.037
Unit load, $v_{1/100}$ @ 0.96 in. (24.38 mm)	Kips/ft. KN/m	0.004 0.058
Unit load, $v_{1/60}$ @ 1.6 in. (40.64 mm)	Kips/ft. KN/m	0.006 0.080

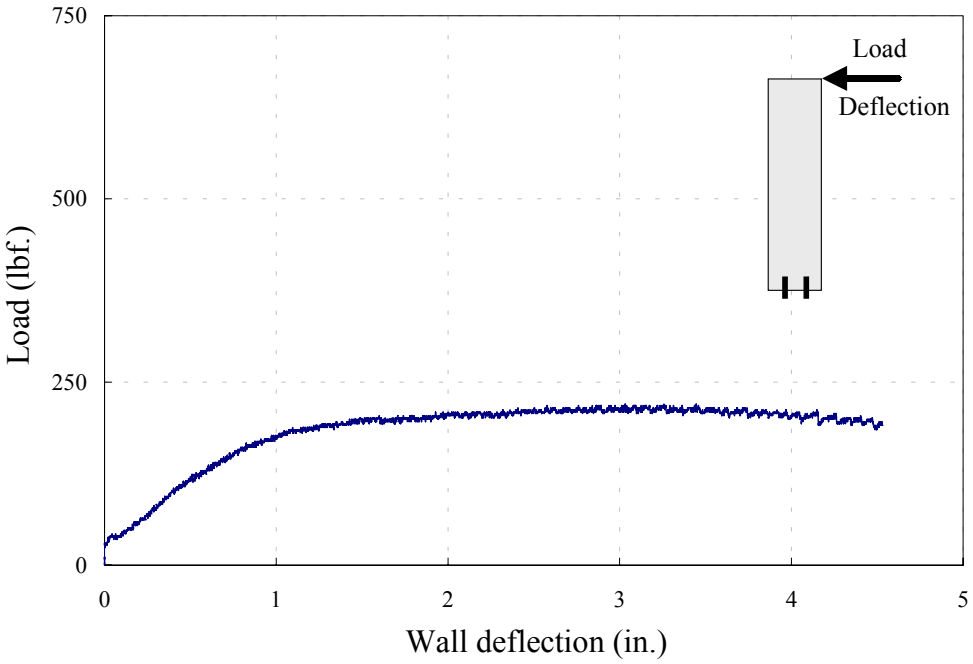


Figure 02IAm1re- a. Observed load-deflection curve.

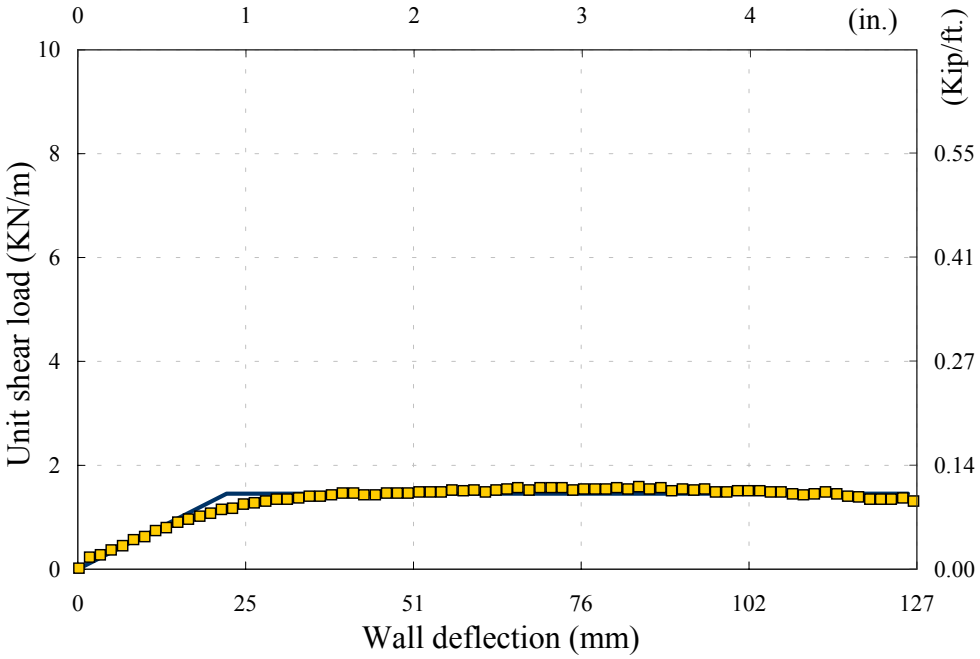


Figure 02IAm1re- b. Unit load-deflection and EEEP curves.

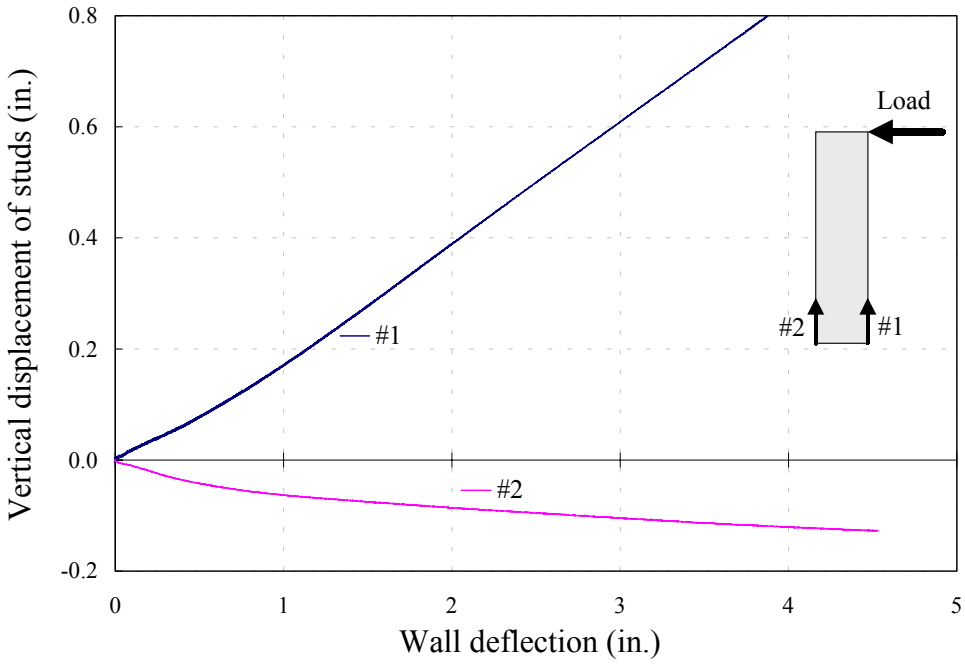


Figure 02IAm1re- c. Vertical displacement of studs (initial envelope).

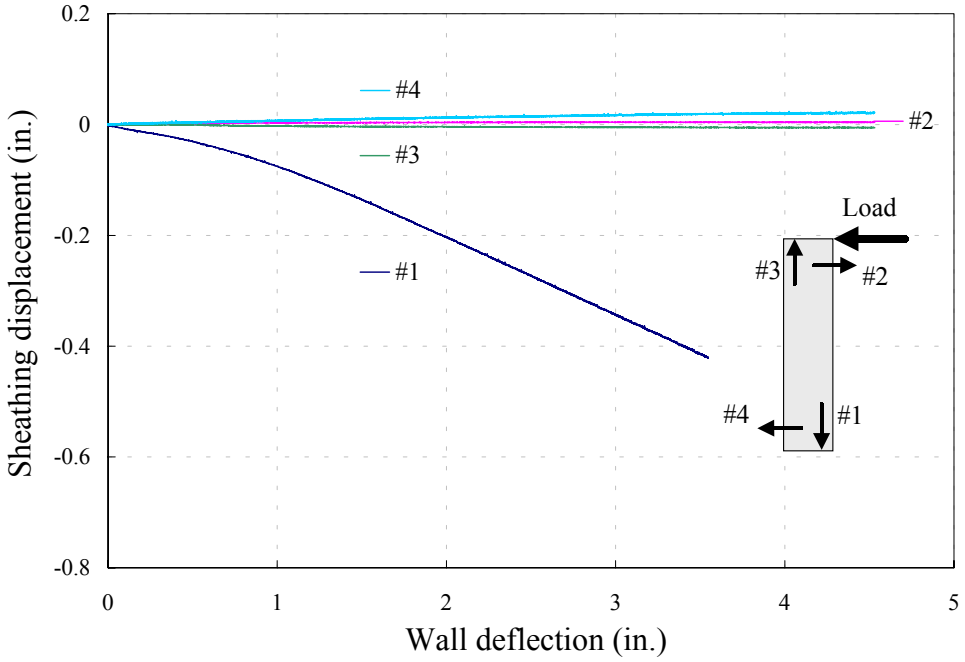


Figure 02IAm1re- d. Sheathing displacement.

Table 02IAm2. Data summary.

Specimen	**02IAm2**	**Per unit length**	
Shear Bolts		**monotonic test**	
Wall length		**2.00ft.**	**0.609m**
Date:	9-10-1998.	**Time:**	16:30
		units	**02IAm2**
Peak unit load, v_{peak}		Kip/ft. KN/m	0.176 2.568
Drift at peak load, Δ_{peak}		in. mm	1.078 27.38
Yield unit load, v_{yield}		Kip/ft. KN/m	0.150 2.189
Drift at yield load, Δ_{yield}		in. mm	0.356 9.04
Proportional limit, $0.4v_{peak}$		Kip/ft. KN/m	0.070 1.027
Drift at prop. limit, $\Delta@0.4v_{peak}$		in. mm	0.167 4.24
Unit load at failure or $0.8v_{peak}$		Kip/ft. KN/m	0.140 2.036
Drift at failure, $\Delta_{failure}$		in. mm	2.900 73.67
Shear modulus, G $@0.4v_{peak}$		Kip/in. KN/mm	3.372 0.591
Work until failure per unit length		Kip·ft./ft. KN·m/m	0.034 0.151
Unit load, $v_{1/300}$ @ 0.32 in. (8.13 mm)		Kips/ft. KN/m	0.018 0.256
Unit load, $v_{1/200}$ @ 0.48 in.(12.19 mm)		Kips/ft. KN/m	0.018 0.256
Unit load, $v_{1/100}$ @ 0.96 in. (24.38 mm)		Kips/ft. KN/m	0.020 0.292
Unit load, $v_{1/60}$ @ 1.6 in. (40.64 mm)		Kips/ft. KN/m	**0.024** **0.351**

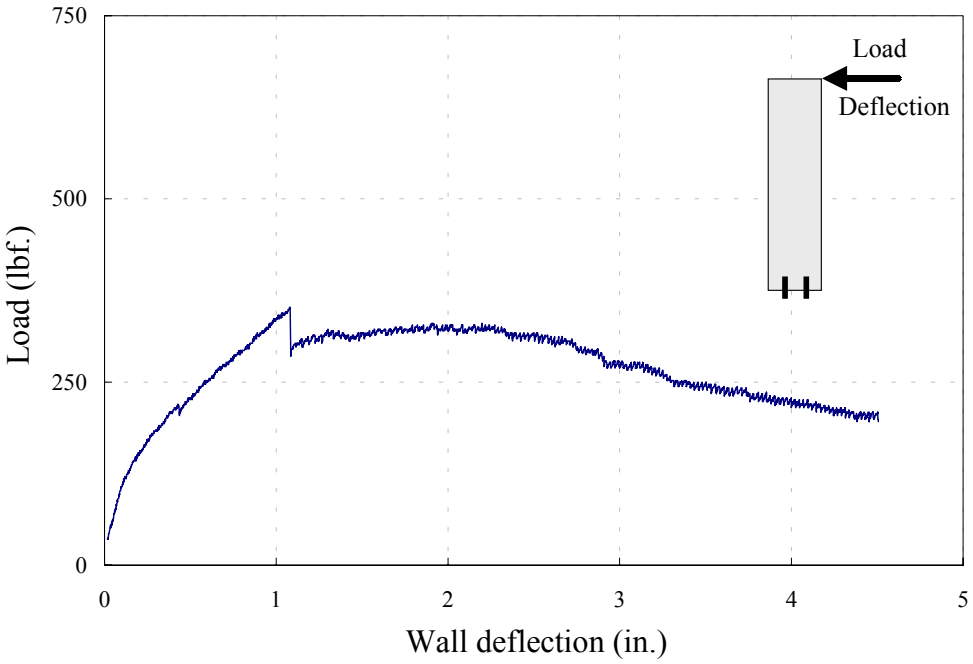


Figure 02IAm2- a. Observed load-deflection curve.

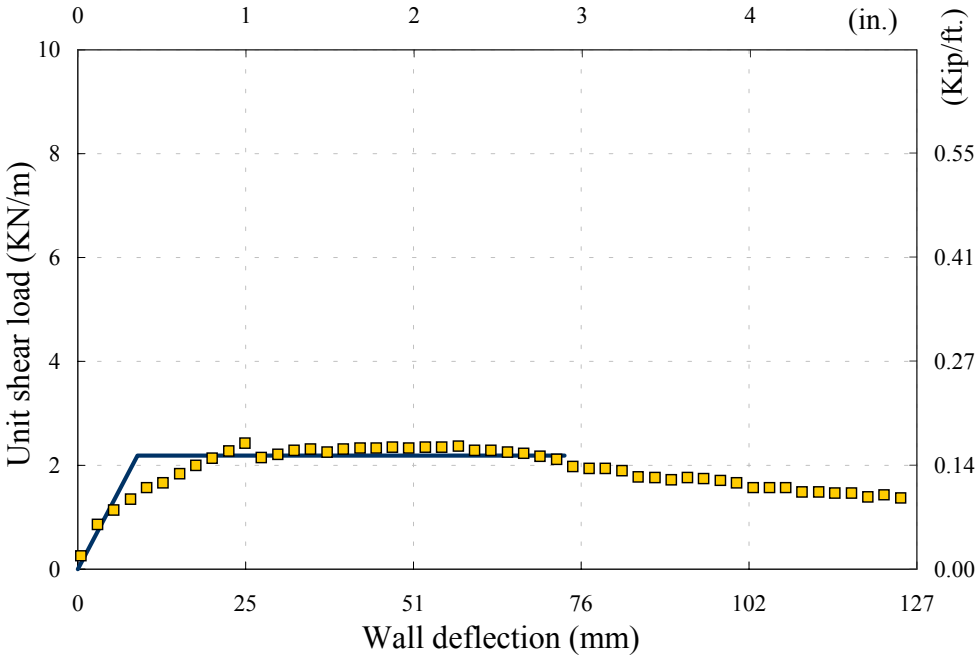


Figure 02IAm2- b. Unit load-deflection and EEEP curves.

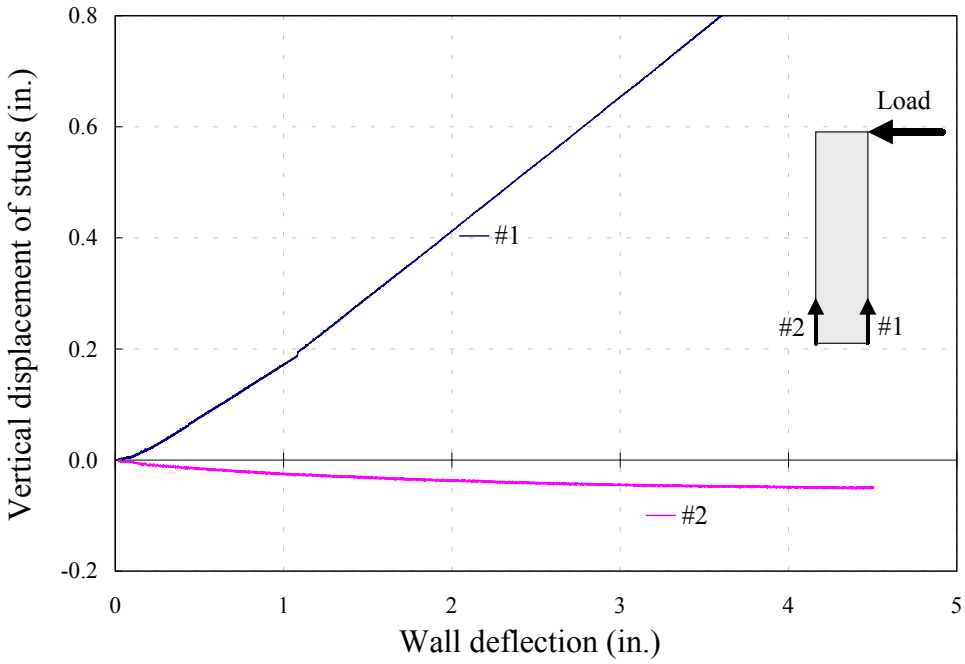


Figure 02IAm2- c. Vertical displacement of studs (initial envelope).

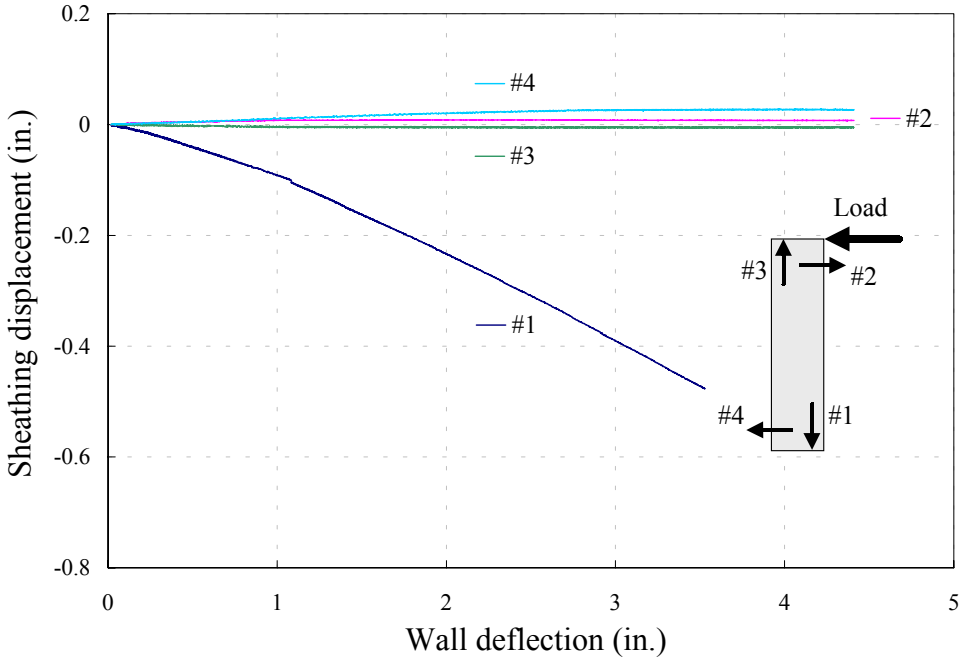


Figure 02IAm2- d. Sheathing displacement.