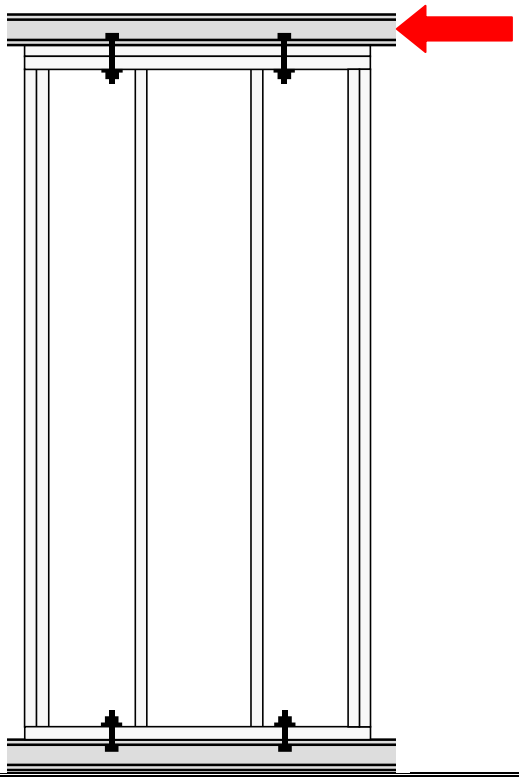
Walls 04IAm



Walls:	**04IAm1**	**04IAm2**
Manufactured:	**June 18, 1998**[1]	**June 18, 1998**[1]
MOE data files:	4iam1p.prn 4iam1s.prn	4iam2p.prn 4iam2s.prn
MOE_{plates} (10^6 psi)		
MOE_{studs} (10^6 psi)	1.81	1.63
$Density_{plates}$ (kg/m^3)		
$Density_{studs}$ (kg/m^3)	477	492
Date tested:	**July 7, 1998**	**July 9, 1998**
Time tested:	18:26	10:25
LTC files:	utp_alex*	utp_alex
Data files:	04IAm1.dat	04IAm2.dat
Excel files:	04IAm1_data	04IAm2_data
Photo files:	338-356	357-364

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

Wall 04IAm1

Observations: The wall exhibited a very 'soft' performance. Shear modulus was less than a half of that of 08IAm3 and 08IAm4 walls. The peak load 645 lbf. (0.16 Kips/ft.) was observed at 1.55-in. deflection. Then, the resistance decreased gradually. The 20% load reduction was observed at 2.2-in. deflection. Rotation of the sheathing around the left corner can be seen on Photo 439. Figure 04IAm1-d reveals that the sheathing displacement from the framing did not exceed 0.03 in. except for the right bottom corner, which separated from the bottom plate at the peak load.

Failure mode: Sheathing unzipped at bottom plate and the rest of the wall seemed undamaged after the test. The wall rocked as a rigid body (Photo 356). Wall resistance was governed by the row of sheathing nails at the bottom plate. After failure, the nails tore through the sheathing edge at the bottom plate like in walls 8IAm. Photo 355 shows that sheathing rotated around the nail furthest away from load at the bottom plate.

Wall 04IAm2

Observations: This wall was twice stiffer and 9% stronger than 04IAm1 wall. It reached the peak load earlier (at 1.1-in deflection) and yielded gradually. The 20% load reduction occurred at 2.7-in deflection. Uplift of studs and sheathing displacements were similar to those of 04IAm1 wall.

Failure mode: Failure mechanism was similar to the first wall: sheathing unzipped at the bottom plate because of wall rocking (Photo 362). The nails tore through the sheathing edge.

General

Overall, the performance of IAm walls is strongly dependent of the sheathing attachment at the bottom plate. The capacity of these walls approximately equals the capacity of the row of nails et the bottom.

Load readings: The load cell capacity is 55 Kips. For the tests of weak walls, the load range on the UTP controller should be reduced in order to obtain accurate readings. Unfortunately, during these tests, the adjustment was not done and the resolution of load readings was not satisfactory.

Instrumentation: For sheathing movement measurements, LVDT's 500 were used. Photos 338-341 show the location of the transducers. Tips of the probes were sanded with 1/1000 sandpaper. Polished steel pads were attached to the framing against the LVDT probes to allow sliding with minimum friction. This system appeared to be reliable and was used further.

Data acquisition: For wall 04IAm1, LabTech file utp_alex.ltc did not include calibrations of POTs. The data was converted in Excel file. For wall 04IAm2, the calibration data was included in the setup file utp_alex.ltc and saved with the same name.

Table 04IAm1. Data summary.

Specimen	**04IAm1**	**Per unit length**	
Shear Bolts		**monotonic test**	
Wall length		**4.00ft.**	**1.219m**
Date:	7-07-1998.	**Time:**	18:26
		units	**04IAm1**
Peak unit load, v_{peak}		Kip/ft. KN/m	0.161 2.353
Drift at peak load, Δ_{peak}		in. mm	1.547 39.29
Yield unit load, v_{yield}		Kip/ft. KN/m	0.136 1.985
Drift at yield load, Δ_{yield}		in. mm	0.485 12.33
Proportional limit, $0.4v_{peak}$		Kip/ft. KN/m	0.064 0.941
Drift at prop. limit, $\Delta@0.4v_{peak}$		in. mm	0.230 5.85
Unit load at failure or $0.8v_{peak}$		Kip/ft. KN/m	0.127 1.861
Drift at failure, $\Delta_{failure}$		in. mm	2.188 55.59
Shear modulus, G $@0.4v_{peak}$		Kip/in. KN/mm	2.241 0.393
Work until failure per unit length		Kip·ft./ft. KN·m/m	0.022 0.098
Unit load, $v_{1/300}$ @ 0.32 in. (8.13 mm)		Kips/ft. KN/m	0.074 1.084
Unit load, $v_{1/200}$ @ 0.48 in.(12.19 mm)		Kips/ft. KN/m	0.094 1.382
Unit load, $v_{1/100}$ @ 0.96 in. (24.38 mm)		Kips/ft. KN/m	0.128 1.875
Unit load, $v_{1/60}$ @ 1.6 in. (40.64 mm)		Kips/ft. KN/m	**0.155** **2.272**

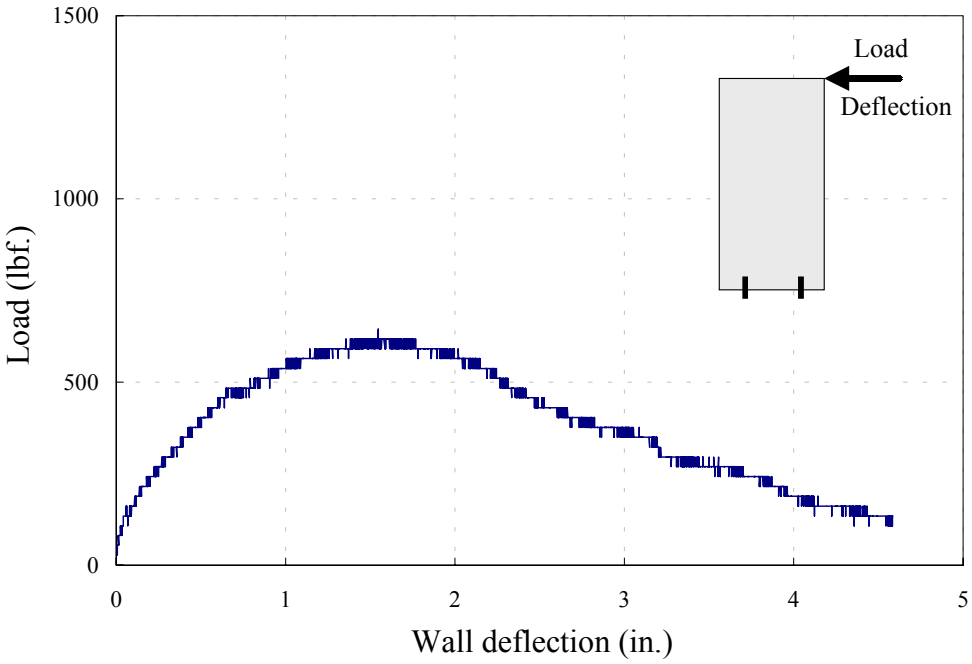


Figure 04IAm1- a. Observed load-deflection curve[1].

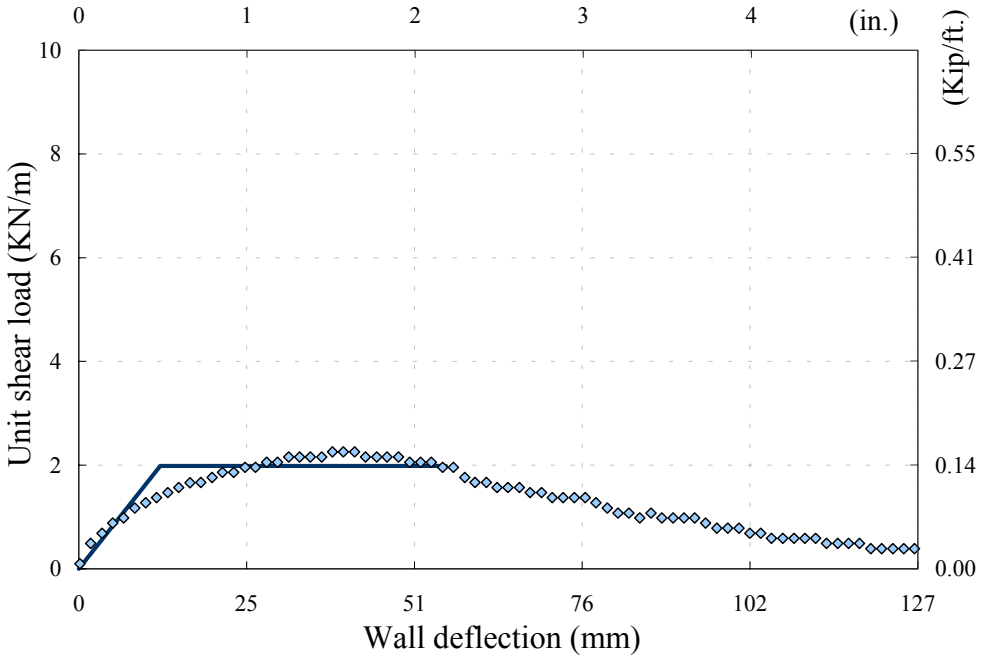


Figure 04IAm1- b. Unit load-deflection and EEEP curves[2].

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

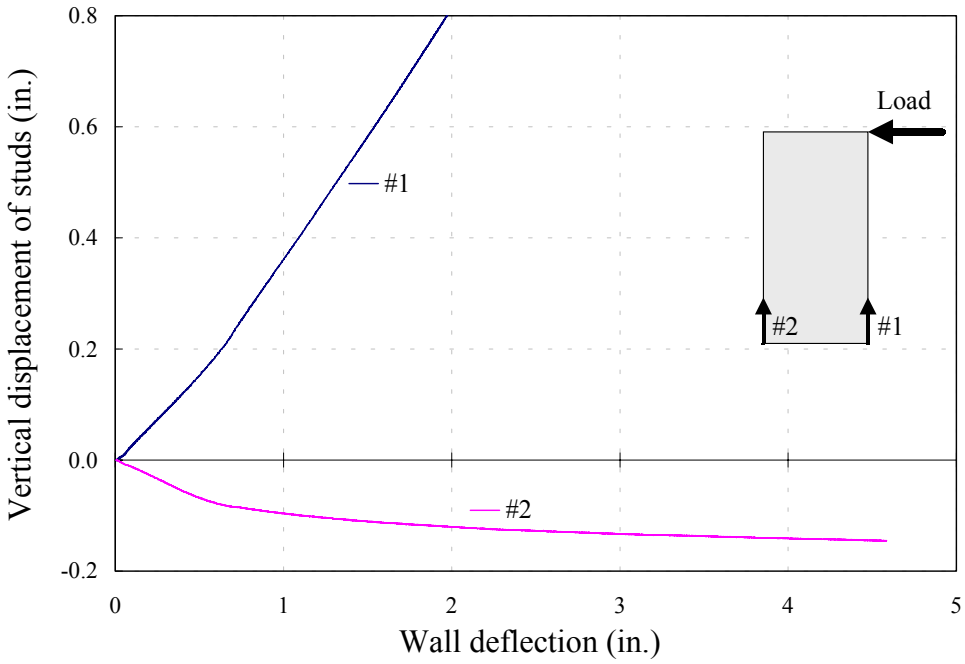


Figure 04IAm1- c. Vertical displacement of studs.

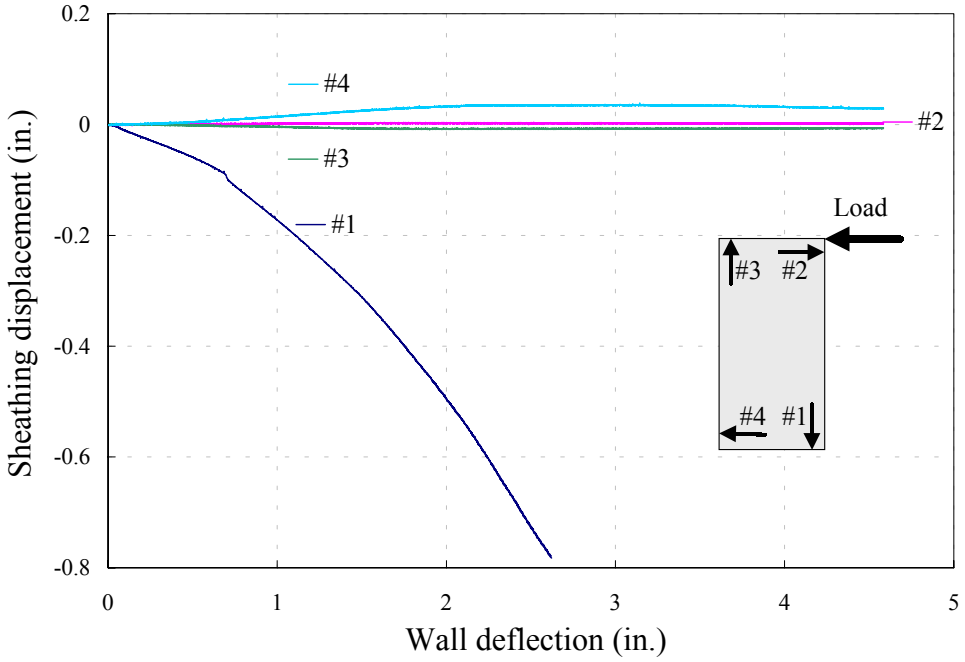


Figure 04IAm1- d. Sheathing displacement.

Table 04IAm2. Data summary.

Specimen	**04IAm2**	**Per unit length**	
Shear Bolts		**monotonic test**	
Wall length		**4.00ft.**	**1.219m**
Date:	7-09-1998.	**Time:**	10:25
		units	**04IAm2**
Peak unit load, v_{peak}		Kip/ft. KN/m	0.175 2.547
Drift at peak load, Δ_{peak}		in. mm	1.096 27.83
Yield unit load, v_{yield}		Kip/ft. KN/m	0.155 2.259
Drift at yield load, Δ_{yield}		in. mm	0.266 6.77
Proportional limit, $0.4v_{peak}$		Kip/ft. KN/m	0.070 1.019
Drift at prop. limit, $\Delta@0.4v_{peak}$		in. mm	0.120 3.05
Unit load at failure or $0.8v_{peak}$		Kip/ft. KN/m	0.134 1.959
Drift at failure, $\Delta_{failure}$		in. mm	2.669 67.79
Shear modulus, G $@0.4v_{peak}$		Kip/in. KN/mm	4.649 0.814
Work until failure per unit length		Kip·ft./ft. KN·m/m	0.033 0.146
Unit load, $v_{1/300}$ @ 0.32 in. (8.13 mm)		Kips/ft. KN/m	0.114 1.680
Unit load, $v_{1/200}$ @ 0.48 in.(12.19 mm)		Kips/ft. KN/m	0.134 1.974
Unit load, $v_{1/100}$ @ 0.96 in. (24.38 mm)		Kips/ft. KN/m	0.168 2.467
Unit load, $v_{1/60}$ @ 1.6 in. (40.64 mm)		Kips/ft. KN/m	**0.168** **2.467**

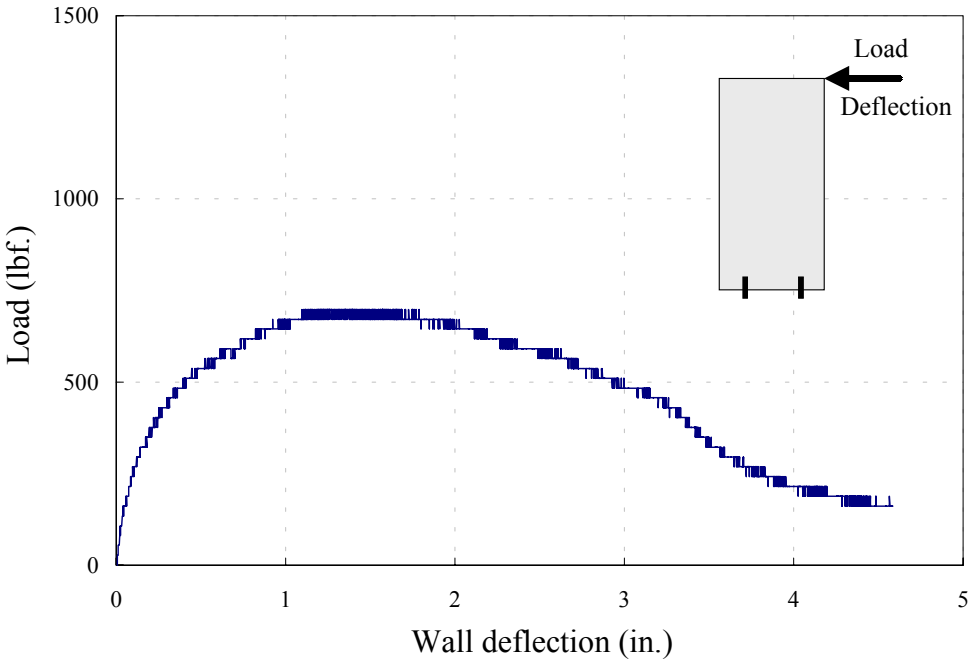


Figure 04IAm2- a. Observed load-deflection curve.

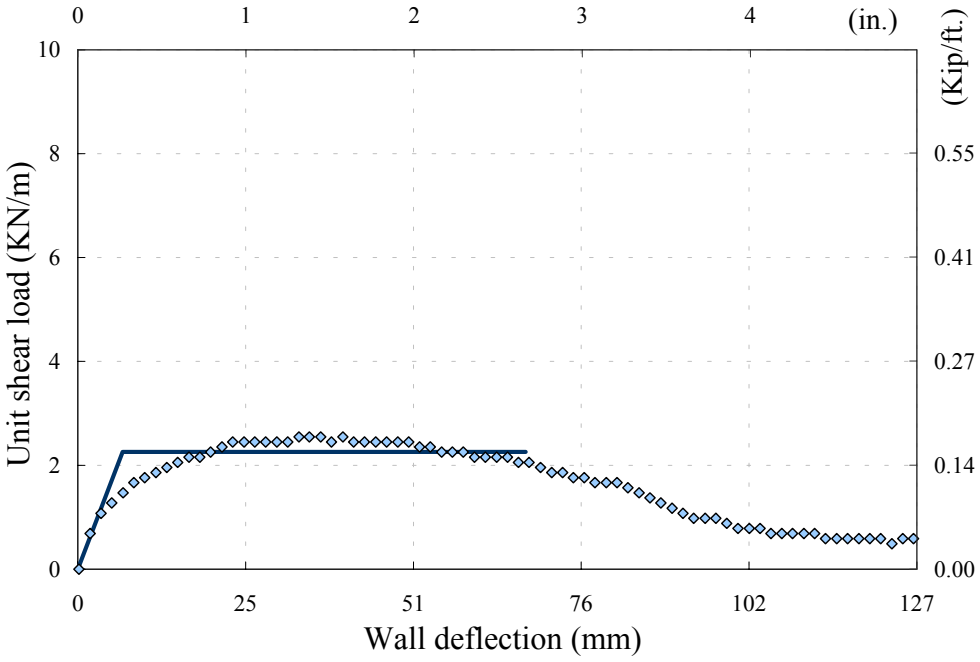


Figure 04IAm2- b. Unit load-deflection and EEEP curves.

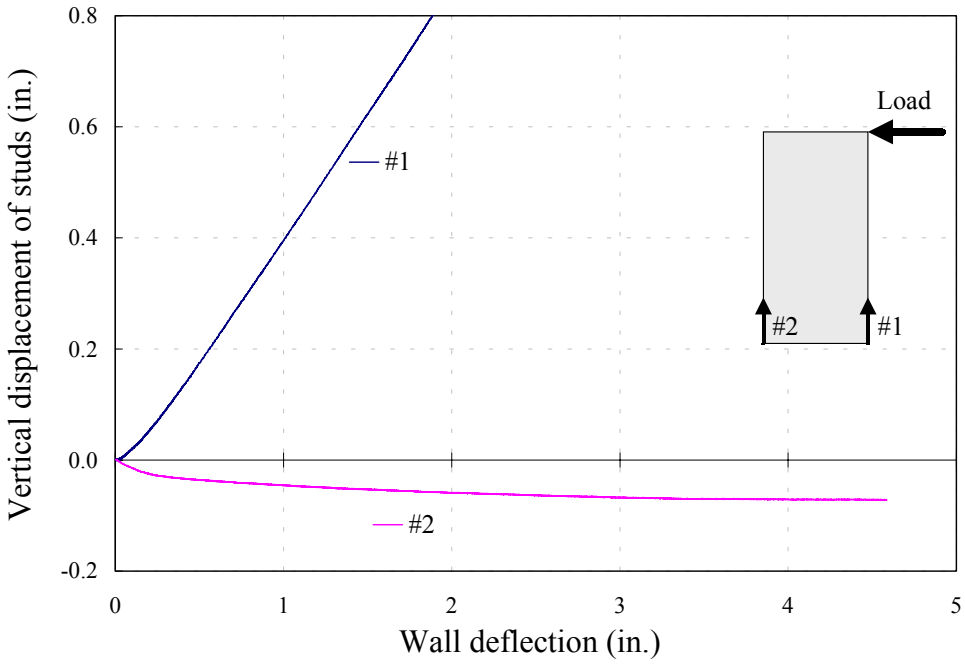


Figure 04IAm2- c. Vertical displacement of studs (initial envelope).

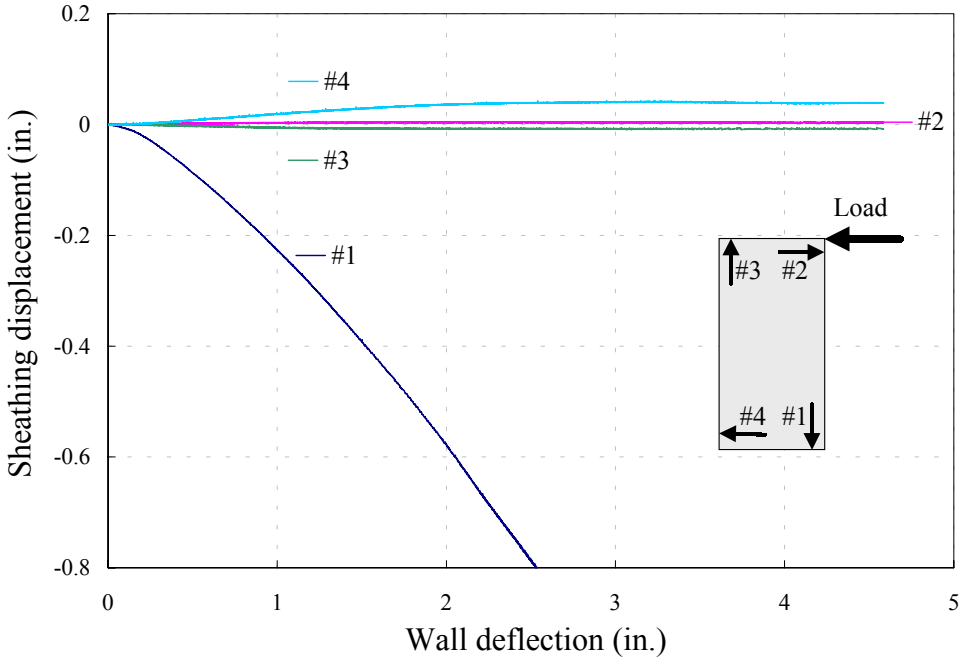


Figure 04IAm2- d. Sheathing displacement.