APPENDIX E

RESULTS OF SEISMIC TESTS
TEST RC-4

EQUIPMENT COMBINATION 2, UNCOUPLED
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration

Equipment A Absolute Acceleration

Equipment B Absolute Acceleration

Equipment A Relative Displacement

Equipment B Relative Displacement

Equipment A-B Relative Displacement
TEST RC-4
EQUIPMENT COMBINATION 2, UNCOUPLED
NEWHALL GROUND MOTION, 30% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Load Cell Inertia Force

Max = 10.90 lbs
Min = -19.80 lbs

Equipment B Load Cell Inertia Force

Max = 12.82 lbs
Min = -10.98 lbs

Equipment A Load Cell Inertia Force

Equipment B Load Cell Inertia Force
TEST RC-6
EQUIPMENT COMBINATION 2, UNCOUPLED
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration
Max = 0.39 g
Min = -0.28 g

Equipment A Absolute Acceleration
Max = 1.26 g
Min = -1.24 g

Equipment B Absolute Acceleration
Max = 1.79 g
Min = -1.52 g

Equipment A Relative Displacement
Max = 2.95 in
Min = -3.01 in

Equipment B Relative Displacement
Max = 0.48 in
Min = -0.38 in

Equipment A-B Relative Displacement
Max = 3.09 in
Min = -3.24 in
TEST RC-6
EQUIPMENT COMBINATION 2, UNCOUPLED
TABAS GROUND MOTION, 25% SPAN
CONNECTOR LONGITUDINAL FORCES

![Graphs showing load cell inertia force for Equipment A and Equipment B.]

- Equipment A Load Cell Inertia Force:
  - Max = 16.60 lbs
  - Min = -17.70 lbs

- Equipment B Load Cell Inertia Force:
  - Max = 27.40 lbs
  - Min = -22.50 lbs
TEST RC-7
EQUIPMENT COMBINATION 2, UNCOUPLED
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 4.51 in
Min = -4.60 in

Equipment B Relative Displacement
Max = 0.71 in
Min = -0.61 in

Equipment A-B Relative Displacement
Max = 4.67 in
Min = -5.09 in
TEST RC-7
EQUIPMENT COMBINATION 2, UNCOUPLED
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment B Load Cell Inertia Force

Max = 41.92 lbs
Min = -41.18 lbs

Equipment A Load Cell Inertia Force

Max = 25.40 lbs
Min = -32.40 lbs

Equipment B Load Cell Inertia Force

Max = 41.92 lbs
Min = -41.18 lbs

Equipment A Load Cell Inertia Force

Max = 25.40 lbs
Min = -32.40 lbs
TEST RC-11
EQUIPMENT COMBINATION 2,
FLEXIBLE STRAP CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Absolute Acceleration

-1.4
-0.7
0
0.7
1.4
0 5 10 15 20 25
Time (s)
Acceleration (g)
Max = 0.78 g
Min = -0.82 g

Shake Table Absolute Acceleration

-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0 5 10 15 20 25
Time (s)
Acceleration (g)
Max = 0.26 g
Min = -0.25 g

Equipment A Relative Displacement

-2.20
-1.10
0.00
1.10
2.20
0 5 10 15 20 25
Time (s)
Displacement (in)
Max = 1.65 in
Min = -1.65 in

Equipment B Relative Displacement

-0.28
-0.14
0.00
0.14
0.28
0 5 10 15 20 25
Time (s)
Displacement (in)
Max = 0.24 in
Min = -0.22 in

Equipment A-B Relative Displacement

-2.40
-1.20
0.00
1.20
2.40
0 5 10 15 20 25
Time (s)
Displacement (in)
Max = 1.66 in
Min = -1.63 in
TEST RC-11
EQUIPMENT COMBINATION 2,
FLEXIBLE STRAP CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
CONNECTOR LONGITUDINIAL FORCES AND STRAINS

Equipment A Connector Force
Max = 75.38 lbs
Min = -78.89 lbs

Equipment B Connector Force
Max = 82.92 lbs
Min = -89.01 lbs

Equipment A Connector Force

Equipment B Connector Force

Upper Topside Connector Strain Gauge
Max = 637.80 µE
Min = -617.64 µE

Upper Bottomside Connector Strain Gauge
Max = 831.25 µE
Min = -867.33 µE

Lower Topside Connector Strain Gauge
Max = 791.15 µE
Min = -774.19 µE

Lower Topside Connector Strain Gauge
Max = 609.27 µE
Min = -604.73 µE
TEST RC-13
EQUIPMENT COMBINATION 2, FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 2.38 in
Min = -2.25 in

Equipment B Relative Displacement
Max = 0.43 in
Min = -0.33 in

Equipment A-B Relative Displacement
Max = 2.38 in
Min = -2.12 in
TEST RC-13
EQUIPMENT COMBINATION 2,
FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 25% SPAN
CONNECTOR LONGITUDINAL FORCES AND STRAINS

Equipment A Connector Force

Max = 104.62 lbs
Min = -108.42 lbs

Equipment B Connector Force

Max = 129.31 lbs
Min = -113.00 lbs

Upper Topside Connector Strain Gauge

Max = 786.03 µε
Min = -791.34 µε

Lower Topside Connector Strain Gauge

Max = 1070.03 µε
Min = -1004.34 µε

Lower Bottomside Connector Strain Gauge

Max = 869.42 µε
Min = -935.83 µε
TEST RC-14
EQUIPMENT COMBINATION 2,
FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 4.56 in
Min = -4.38 in

Equipment B Relative Displacement
Max = 0.73 in
Min = -0.65 in

Equipment A-B Relative Displacement
Max = 4.38 in
Min = -4.21 in
TEST RC-14
EQUIPMENT COMBINATION 2,
FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES AND STRAINS

Equipment B Connector Force

Max = 203.66 lbs
Min = -176.32 lbs

Upper Bottomside Connector Strain Gauge
Max = 2793.24 µ!
Min = -2698.43 µ!

Lower Bottomside Connector Strain Gauge
Max = 2455.83 µ!
Min = -2393.33 µ!
TEST RC-18
EQUIPMENT COMBINATION 2, BUS SLIDER CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS
TEST RC-18
EQUIPMENT COMBINATION 2, BUS SLIDER CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment B Connector Force
Max = 79.65 lbs
Min = -97.37 lbs

Equipment B Connector Force
-2 -1 0 1 2
Displacement (in)
TEST RC-20
EQUIPMENT COMBINATION 2, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 1.73 in
Min = -1.60 in

Equipment B Relative Displacement
Max = 0.34 in
Min = -0.33 in

Equipment A-B Relative Displacement
Max = 1.80 in
Min = -1.45 in
TEST RC-20
EQUIPMENT COMBINATION 2, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 25% SPAN
CONNECTOR LONGITUDINAL FORCES
TEST RC-21
EQUIPMENT COMBINATION 2, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration
Max = 0.65 g
Min = -0.51 g

Equipment A Absolute Acceleration
Max = 2.05 g
Min = -1.67 g

Equipment B Absolute Acceleration
Max = 2.23 g
Min = -2.12 g

Equipment A Relative Displacement
Max = 3.60 in
Min = -3.39 in

Equipment B Relative Displacement
Max = 0.70 in
Min = -0.68 in

Equipment A-B Relative Displacement
Max = 3.75 in
Min = -2.96 in

F18
TEST RC-21
EQUIPMENT COMBINATION 2, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Connector Force
Max = 133.31 lbs
Min = -179.43 lbs

Equipment B Connector Force
Max = 283.27 lbs
Min = -239.90 lbs

Equipment A Connector Force

Equipment B Connector Force

Equipment A Connector Force

Equipment B Connector Force
TEST RC-24
EQUIPMENT COMBINATION 5, UNCOUPLED
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration
Max = 0.27 g
Min = -0.25 g

Equipment A Absolute Acceleration
Max = 0.96 g
Min = -0.95 g

Equipment B Absolute Acceleration
Max = 0.73 g
Min = -0.71 g

Equipment A-B Relative Displacement
Max = 2.22 in
Min = -2.25 in

Equipment A Relative Displacement
Max = 2.22 in
Min = -2.25 in

Equipment B Relative Displacement
Max = 0.07 in
Min = -0.05 in
TEST RC-24
EQUIPMENT COMBINATION 5, UNCOUPLED
NEWHALL GROUND MOTION, 30% SPAN
CONNECTOR LONGITUDINAL FORCES

![Equipment A Load Cell Inertia Force](image1)
Max = 15.28 lbs
Min = -14.62 lbs

![Equipment B Load Cell Inertia Force](image2)
Max = 11.12 lbs
Min = -10.87 lbs

![Equipment A Load Cell Inertia Force](image3)

![Equipment B Load Cell Inertia Force](image4)
TEST RC-26
EQUIPMENT COMBINATION 5, UNCOUPLED
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 2.89 in
Min = -2.97 in

Equipment B Relative Displacement
Max = 0.16 in
Min = -0.13 in

Equipment A-B Relative Displacement
Max = 2.88 in
Min = -2.99 in
TEST RC-26
EQUIPMENT COMBINATION 5, UNCOUPLED
TABAS GROUND MOTION, 25% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment B Load Cell Inertia Force
Max = 31.22 lbs
Min = -31.68 lbs

Equipment B Load Cell Inertia Force
Max = 18.78 lbs
Min = -18.22 lbs
TEST RC-27
EQUIPMENT COMBINATION 5, UNCOUPLED
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 4.57 in
Min = -4.67 in

Equipment B Relative Displacement
Max = 0.24 in
Min = -0.20 in

Equipment A-B Relative Displacement
Max = 4.68 in
Min = -4.68 in
TEST RC-27
EQUIPMENT COMBINATION 5, UNCOUPLED
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Load Cell Inertia Force
Max = 29.88 lbs
Min = -25.62 lbs

Equipment B Load Cell Inertia Force
Max = 44.72 lbs
Min = -48.68 lbs

Equipment A Load Cell Inertia Force

Equipment B Load Cell Inertia Force

Equipment A Load Cell Inertia Force

Equipment B Load Cell Inertia Force
TEST RC-31
EQUIPMENT COMBINATION 5,
FLEXIBLE STRAP CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS
TEST RC-31
EQUIPMENT COMBINATION 5, FLEXIBLE STRAP CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
CONNECTOR LONGTUDINAL FORCES AND STRAINS

Equipment B Connector Force

Max = 82.14 lbs
Min = -79.46 lbs

Equipment B Connector Force

Max = 82.14 lbs
Min = -79.46 lbs

Upper Bottomside Connector Strain Gauge

Max = 1062.48 \( \mu \text{E} \)
Min = -774.37 \( \mu \text{E} \)

Lower Topside Connector Strain Gauge

Max = 539.97 \( \mu \text{E} \)
Min = -594.10 \( \mu \text{E} \)
TEST RC-33
EQUIPMENT COMBINATION 5, FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 2.28 in
Min = -2.19 in

Equipment B Relative Displacement
Max = 0.19 in
Min = -0.17 in

Equipment A-B Relative Displacement
Max = 2.31 in
Min = -2.21 in
TEST RC-33
EQUIPMENT COMBINATION 5,
FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 25% SPAN
CONNECTOR LONGITUDINAL FORCES AND STRAINS

**Equipment B Connector Force**

Max = 152.29 lbs
Min = -152.57 lbs

**Upper Bottomside Connector Strain Gauge**

Max = 1635.57 \( \mu \varepsilon \)
Min = -1407.65 \( \mu \varepsilon \)

**Lower Bottomside Connector Strain Gauge**

Max = 837.32 \( \mu \varepsilon \)
Min = -994.31 \( \mu \varepsilon \)
TEST RC-34
EQUIPMENT COMBINATION 5,
FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 4.39 in
Min = -4.30 in

Equipment B Relative Displacement
Max = 0.27 in
Min = -0.31 in

Equipment A-B Relative Displacement
Max = 4.40 in
Min = -4.30 in
TEST RC-34
EQUIPMENT COMBINATION 5,
FLEXIBLE STRAP CONNECTOR
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES AND STRAINS
TEST RC-38
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS

**Shake Table Absolute Acceleration**

Max = 0.28 g  
Min = -0.25 g

**Equipment A Absolute Acceleration**

Max = 0.51 g  
Min = -0.53 g

**Equipment B Absolute Acceleration**

Max = 0.58 g  
Min = -0.58 g

**Equipment A-B Relative Displacement**

Max = 3.06 in  
Min = -3.71 in
TEST RC-38  
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR  
NEWHALL GROUND MOTION, 30% SPAN  
CONNECTOR LONGITUDINAL FORCES

![Graph showing equipment connector forces and displacement](image)

- **Equipment A Connector Force**
  - Max = 55.38 lbs
  - Min = -61.28 lbs

- **Equipment B Connector Force**
  - Max = 93.76 lbs
  - Min = -91.57 lbs

**Displacement (in)**

- Force (lbs)
  - Equipment A Connector Force
  - Equipment B Connector Force
TEST RC-39
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
NEWHALL GROUND MOTION, 100% SPAN
ACCELERATIONS AND DISPLACEMENTS
TEST RC-39
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
NEWHALL GROUND MOTION, 100% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Connector Force

Max = 168.04 lbs
Min = -150.95 lbs

Equipment B Connector Force

Max = 273.82 lbs
Min = -285.52 lbs
TEST RC-40
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS
TEST RC-40
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 25% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment B Connector Force
Max = 142.78 lbs
Min = -136.11 lbs

Equipment B Connector Force
Max = 142.78 lbs
Min = -136.11 lbs
TEST RC-41
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration

Equipment A Absolute Acceleration

Equipment B Absolute Acceleration

Equipment A-B Relative Displacement

Equipment B Relative Displacement

Equipment A Relative Displacement

Max = 0.62 g
Min = -0.52 g

Max = 1.97 g
Min = -1.66 g

Max = 2.47 g
Min = -2.26 g

Max = 3.60 in
Min = -1.80 in

Max = 1.80 in
Min = 0.00 in

Max = 3.35 in
Min = -3.32 in

Max = 0.24 in
Min = -0.21 in

Max = 3.36 in
Min = -3.32 in

Max = 0.24 in
Min = -0.21 in

Max = 0.43 in
Min = -0.46 in

Max = 3.35 in
Min = -3.32 in

Max = 0.24 in
Min = -0.21 in
TEST RC-41
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Connector Force
Max = 158.46 lbs
Min = -185.28 lbs

Equipment B Connector Force
Max = 241.24 lbs
Min = -241.76 lbs

Equipment A Connector Force

Equipment B Connector Force

Equipment A Connector Force

Equipment B Connector Force
TEST RC-41B
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 100% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration
Max = 1.07 g
Min = -1.09 g

Equipment A Absolute Acceleration
Max = 4.15 g
Min = -5.14 g

Equipment A Relative Displacement
Max = 5.15 in
Min = -5.80 in

Equipment B Relative Displacement
Max = 1.06 in
Min = -0.71 in

Equipment A-B Relative Displacement
Max = 4.15 in
Min = -5.34 in
TEST RC-41B
EQUIPMENT COMBINATION 5, BUS SLIDER CONNECTOR
TABAS GROUND MOTION, 100% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Connector Force

Max = 2853.22 lbs
Min = -5497.46 lbs

Equipment B Connector Force

Max = 2065.91 lbs
Min = -4333.90 lbs
TEST RC-44
EQUIPMENT COMBINATION 1, UNCOUPLED
NEWHALL GROUND MOTION, 30% SPAN
ACCELERATIONS AND DISPLACEMENTS

Shake Table Absolute Acceleration
Max = 0.32 g
Min = -0.26 g

Equipment A Absolute Acceleration
Max = 1.00 g
Min = -0.97 g

Equipment B Absolute Acceleration
Max = 0.87 g
Min = -0.82 g

Equipment A Relative Displacement
Max = 2.23 in
Min = -2.25 in

Equipment B Relative Displacement
Max = 0.48 in
Min = -0.47 in

Equipment A-B Relative Displacement
Max = 2.36 in
Min = -2.33 in

Equipment A-B Relative Displacement
Max = 2.36 in
Min = -2.33 in
TEST RC-44
EQUIPMENT COMBINATION 1, UNCOUPLED
NEWHALL GROUND MOTION, 30% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Load Cell Inertia Force

Max = 14.60 lbs
Min = -10.70 lbs

Equipment B Load Cell Inertia Force

Max = 11.50 lbs
Min = -15.40 lbs

Equipment A Load Cell Inertia Force

Equipment B Load Cell Inertia Force
TEST RC-46
EQUIPMENT COMBINATION 1, UNCOUPLED
TABAS GROUND MOTION, 25% SPAN
ACCELERATIONS AND DISPLACEMENTS
TEST RC-46
EQUIPMENT COMBINATION 1, UNCOUPLED TABAS GROUND MOTION, 25% SPAN CONNECTOR LONGITUDINAL FORCES
TEST RC-47
EQUIPMENT COMBINATION 1, UNCOUPLED
TABAS GROUND MOTION, 50% SPAN
ACCELERATIONS AND DISPLACEMENTS

Equipment A Relative Displacement
Max = 4.64 in
Min = -4.60 in

Equipment B Relative Displacement
Max = 2.26 in
Min = -2.20 in

Equipment A-B Relative Displacement
Max = 5.25 in
Min = -6.13 in
TEST RC-47
EQUIPMENT COMBINATION 1, UNCOUPLED
TABAS GROUND MOTION, 50% SPAN
CONNECTOR LONGITUDINAL FORCES

Equipment A Load Cell Inertia Force
Max = 76.50 lbs
Min = -20.30 lbs

Equipment B Load Cell Inertia Force
Max = 57.40 lbs
Min = -60.80 lbs

Equipment A Load Cell Inertia Force

Equipment B Load Cell Inertia Force

Equipment A Load Cell Inertia Force

Equipment B Load Cell Inertia Force

Displacement (in)

Displacement (in)