Table 3.8.5-9: CRB Stability Input Evaluation Parameters

Data Description	Value
CRB Weight (kips)	45,774
Buoyancy Load (kips)	40,500
CRB East-West Length (ft) (between exterior faces of walls)	81′-0″
CRB North-South Length (ft) (between exterior faces of walls)	119′-8″
CRB Height (ft)	95′-0″
CRB Embedment Depth (ft)	55′-0″
CRB Foundation East-West Length (ft)	91′-0″
CRB Foundation North-South Length (ft)	129′-8″
Foundation Area (ft^2)	11,800
Soil Density, ysoil (pcf)	130
Soil Coefficient of Pressure at Rest, K_o	0.5
Ground water level	Less than plant elevation 98′-0″
Flood level	Less than plant elevation 99′-0″
Surcharge (psf)	250
Coefficient of Friction between Wall and Soil	0.5
Coefficient of Friction between Basemat and Soil (static analysis)	0.58
Coefficient of Friction between Basemat and Soil (nonlinear analysis)	0.55

† Buoyancy load based on the water level at Elevation 100'-0" for conservatism.

Table 3.8.5-10: CRB Total Static Lateral Soil Pressure

Elevation	Lateral Static Soil Pressure (psi)
100′-0″ to 76′-6″	12
76′-6″ to 50′-0″	31
50′-0″ to 45′-0″	38

Note:
The highlighted region at EL 50'-0" & 45'-0" represents the pressure on the 5 ft thick foundation.

Table 3.8.5-11: CRB SAP2000, SASSI2010, and ANSYS Model Summary

Items	SAP2000	SASSI	ANSYS
Number of Joints	8872	17055	12142
Number of Joint with Restraints	864	0	2029
Number of Frame Elements	1393	1393	2098
Number of Shell Elements	4069	4069	3974
Number of Solid Elements	3966	3966	3967

Table 3.8.5-12: Reactor Building Sliding Displacements for Soil Type 7, 8 and 11 (Dead Weight + Buoyancy)

Direction of Input Motion	Description of Results	Maximum Sliding - inch		
		Soil Type 7	Soil Type 11	Soil Type 8
E-W (X)	E-W Sliding (X)	0.11	0.03	0.10
N-S (Y)	N-S Sliding (Y)	0.06	0.04	0.06

Table 3.8.5-13: Control Building Sliding and Uplift Displacements for Soil Type 7 and 11

Description of Results	Maximum Sliding and Uplift Displacement - inch	
	Soil Type 7 (Location/Excitation)	Soil Type 11 (Location/Excitation)
DW+Buoyancy+Static Pressure Vertical (Z) Displacement - Static	0.0353	0.0353
DW+Buoyancy+Static Pressure + Seismic E-W (X)	0.044 (A /E-W)	0.017 (C/E-W)
DW+Buoyancy+Static Pressure + Seismic N-S (Y)	0.08 (D/N-S)	0.029 (D/N-S)
DW+Buoyancy+Static Pressure + Seismic Vertical (Z) Uplift	0.01 (C/E-W)[1]	0.015 (D/Vertical)

[1] Excitation in the E-W direction produces uplift displacement,

Table 3.8.5-14: Average Soil Bearing Pressures (Toe Pressures) along Edges of RXB Basemat

Basemat Edges	WEST	EAST	NORTH	SOUTH
Total Reaction (kips)	61,580	73,004	133,073	133,321
Total Tributary Area (ft^2)	1,869	1,950	4,296	4,296
Average Toe Pressure in ksf	33.0	37.4	31.0	31.0
Average Toe Pressure in psi	229	260	215	216

Table 3.8.5-15: Seismic Vertical CRB Base Reactions and Dead Weight

Concrete Case	Soil Type	Seismic Load Case	Cracked Seismic Vertical Reaction (kips)	Uncracked Seismic Vertical Reaction (kips)	Dead Weight (kips)
Cracked 7% Damping	S7† CSDRS	Capitola	22,228	23,455	45,680
		Chi Chi	26,415	26,333	45,680
		El Centro	27,118	26,885	45,680
		Izmit	24,628	25,146	45,680
		Yermo	26,253	26,015	45,680
	S8 CSDRS	Capitola	22,129	22,284	45,680
		Chi Chi	26,196	26,074	45,680
		El Centro	26,565	26,562	45,680
		Izmit	24,857	25,868	45,680
		Yermo	26,284	26,267	45,680
	S11 CSDRS	Capitola	20,173	20,103	45,680
		Chi Chi	24,121	23,885	45,680
		El Centro	24,400	24,413	45,680
		Izmit	21,793	21,150	45,680
		Yermo	24,260	24,132	45,680
	S7 CSDRS-HF	Lucerne	18,371	19,126	45,680
	S9 CSDRS-HF	Lucerne	21,209	20,637	45,680

†S7, S8, S9, S11 designate Soil Types 7, 8, 9, and 11, respectively.

Table 3.8.5-16: Average Soil Bearing Pressures (Toe Pressures) along Edges of CRB Basemat

Basemat Edges	WEST	EAST	NORTH	SOUTH
Total Reaction (kips)	18,620	21,078	16,974	15,338
Total Tributary Area (ft2)	1,190.4	1,199.4	853.1	853.1
Average Toe Pressure (ksf)	15.64	17.57	19.90	17.98
Average Toe Pressure (Psi)	108.6	122.0	138.2	124.9

Table 3.8.5-17: Reactor Building SAP2000 Basemat Model Summary

Item	RXB Basemat SAP2000
Number of joints	2,360
Number of joints with restraints	559
Number of frame elements	40
Number of shell elements	2,366
Number of solid element	0

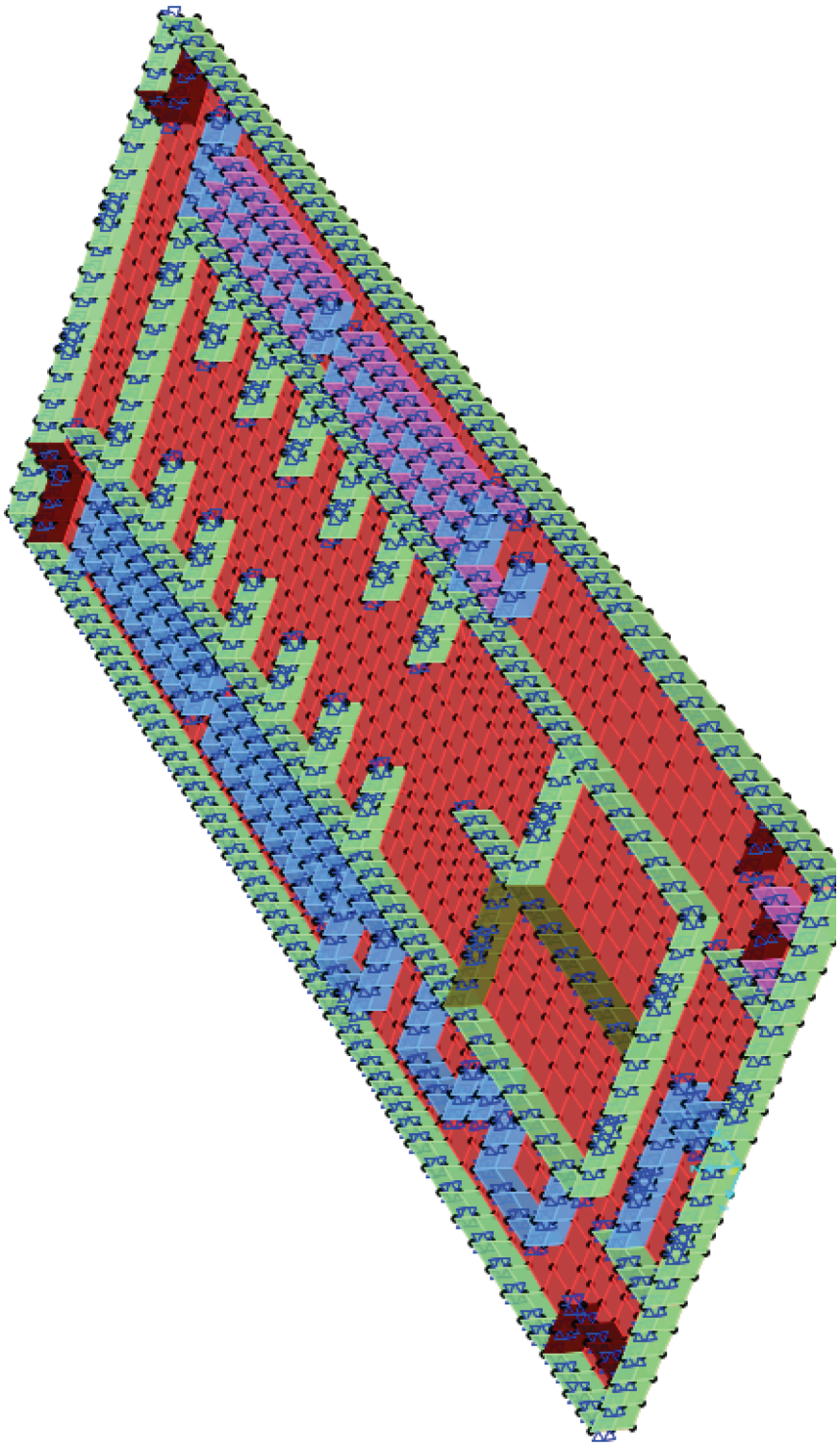


Figure 3.8.5-1: SAP2000 Model for Evaluation of Design Forces in the Reactor Building Basemat Model

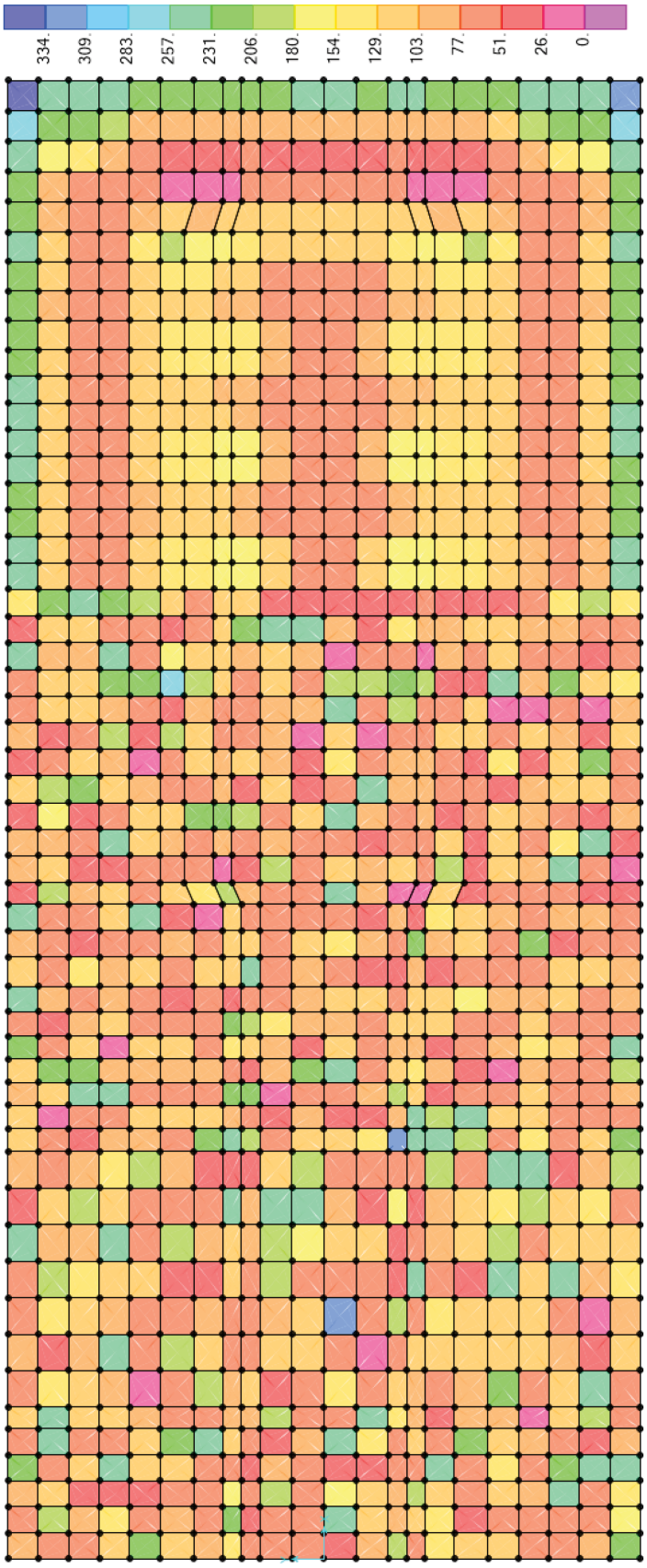


Figure 3.8.5-2: Static Base Pressure Contours for Governing Load Combination in the Reactor Building Basemat Model (Lb, in Units)

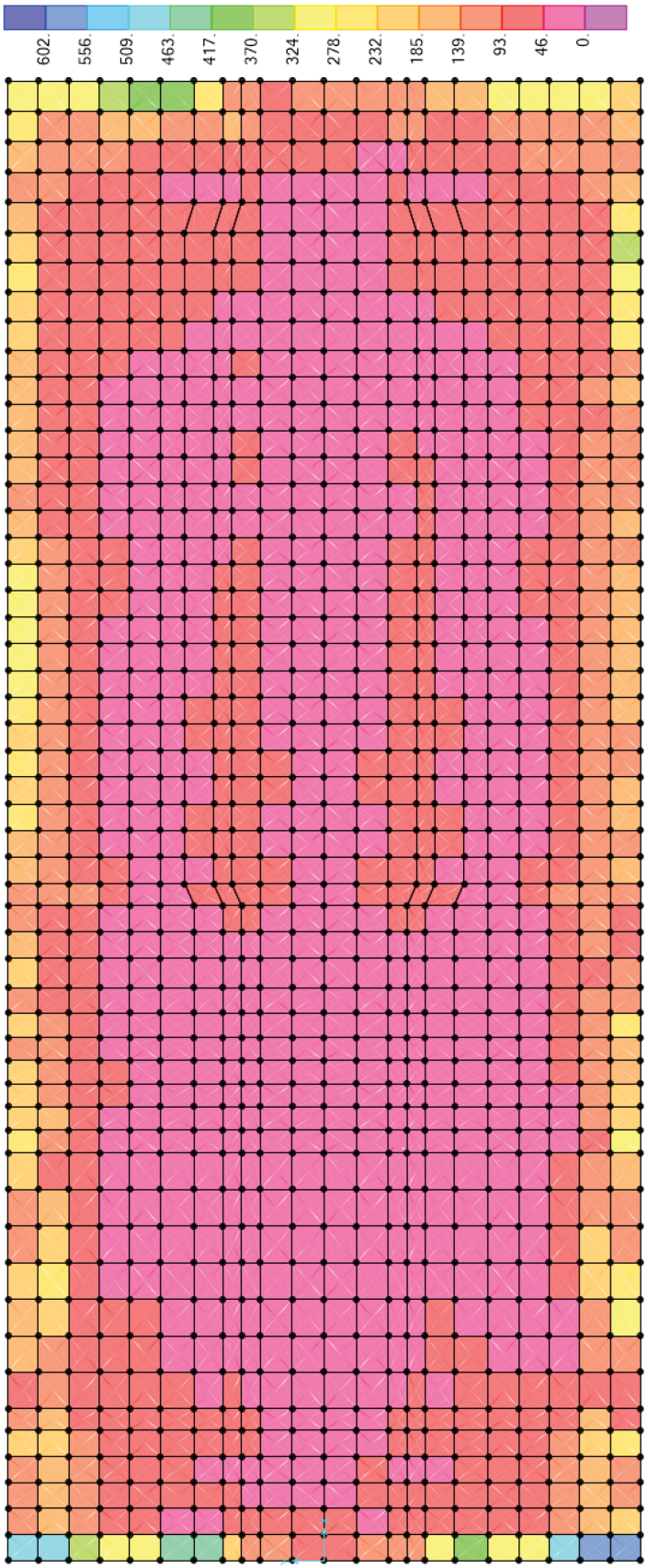
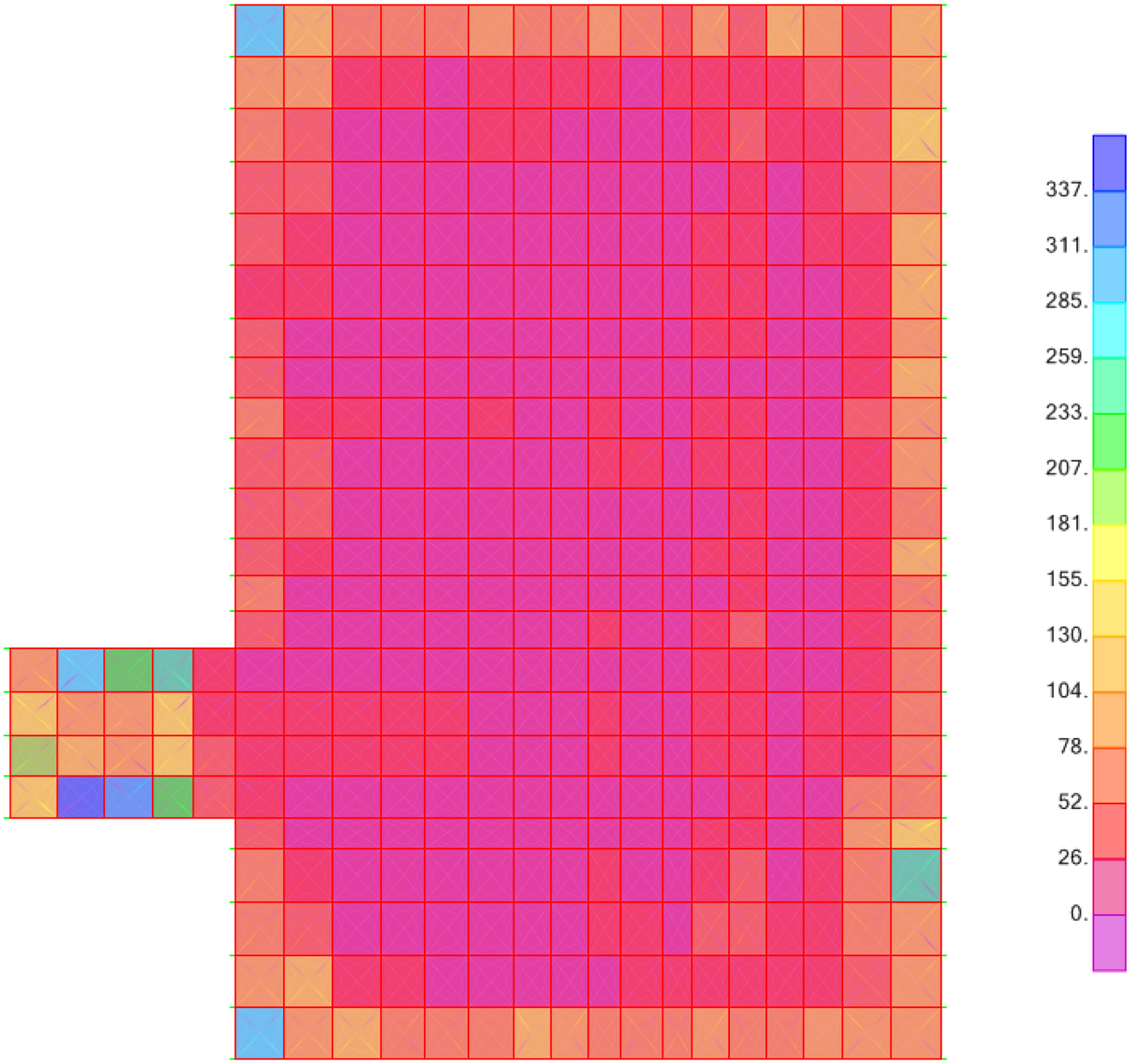


Figure 3.8.5-3: Seismic Base Pressure Contours from SASSI2010 Analysis in the Reactor Building Basemat Model (Lb, inch Units)

Figure 3.8.5-3a: Dynamic Pressure Contours on Control Building Basemat (psi)



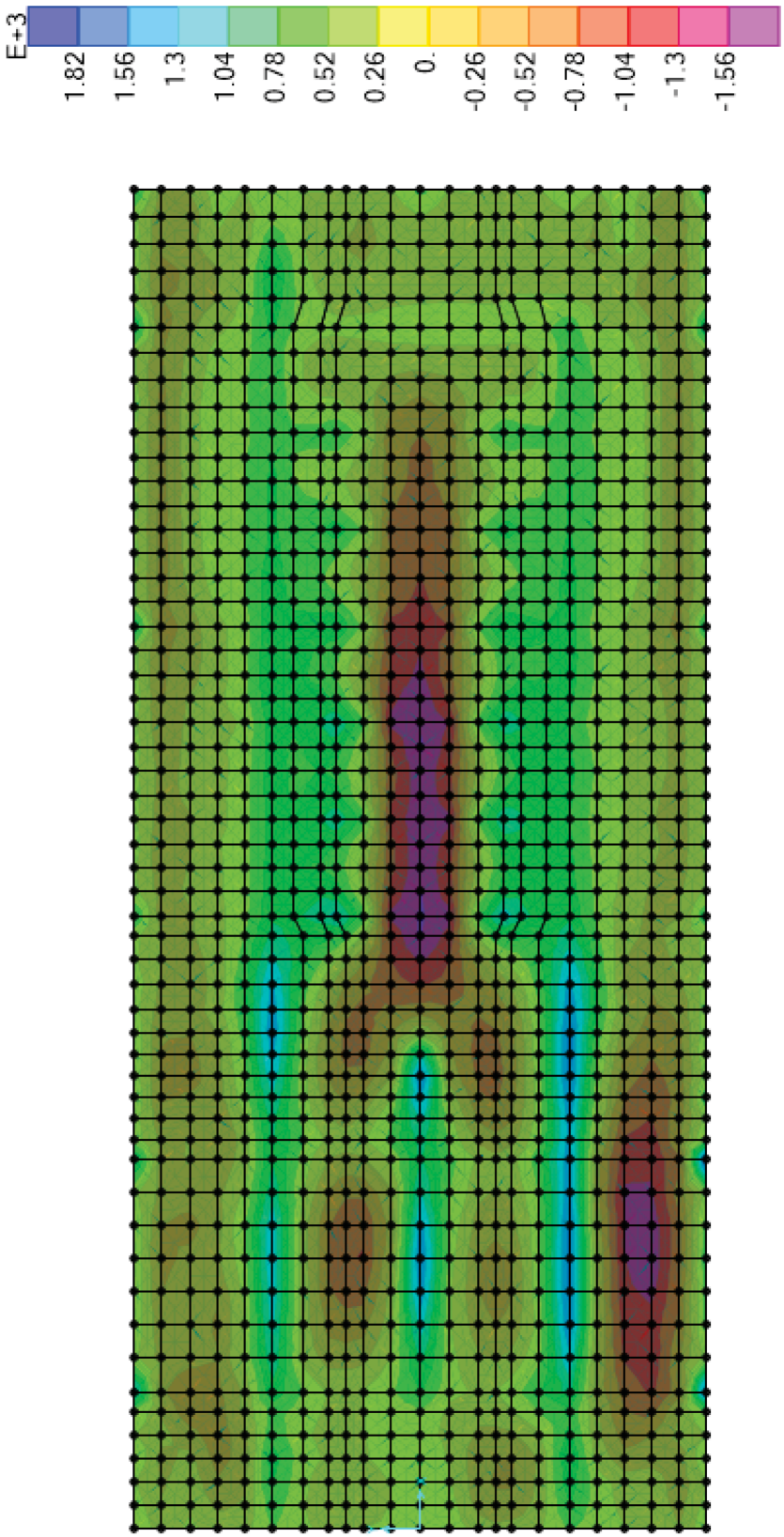


Figure 3.8.5-4: M22 due to Static Base Pressure in the Reactor Building Basemat Model

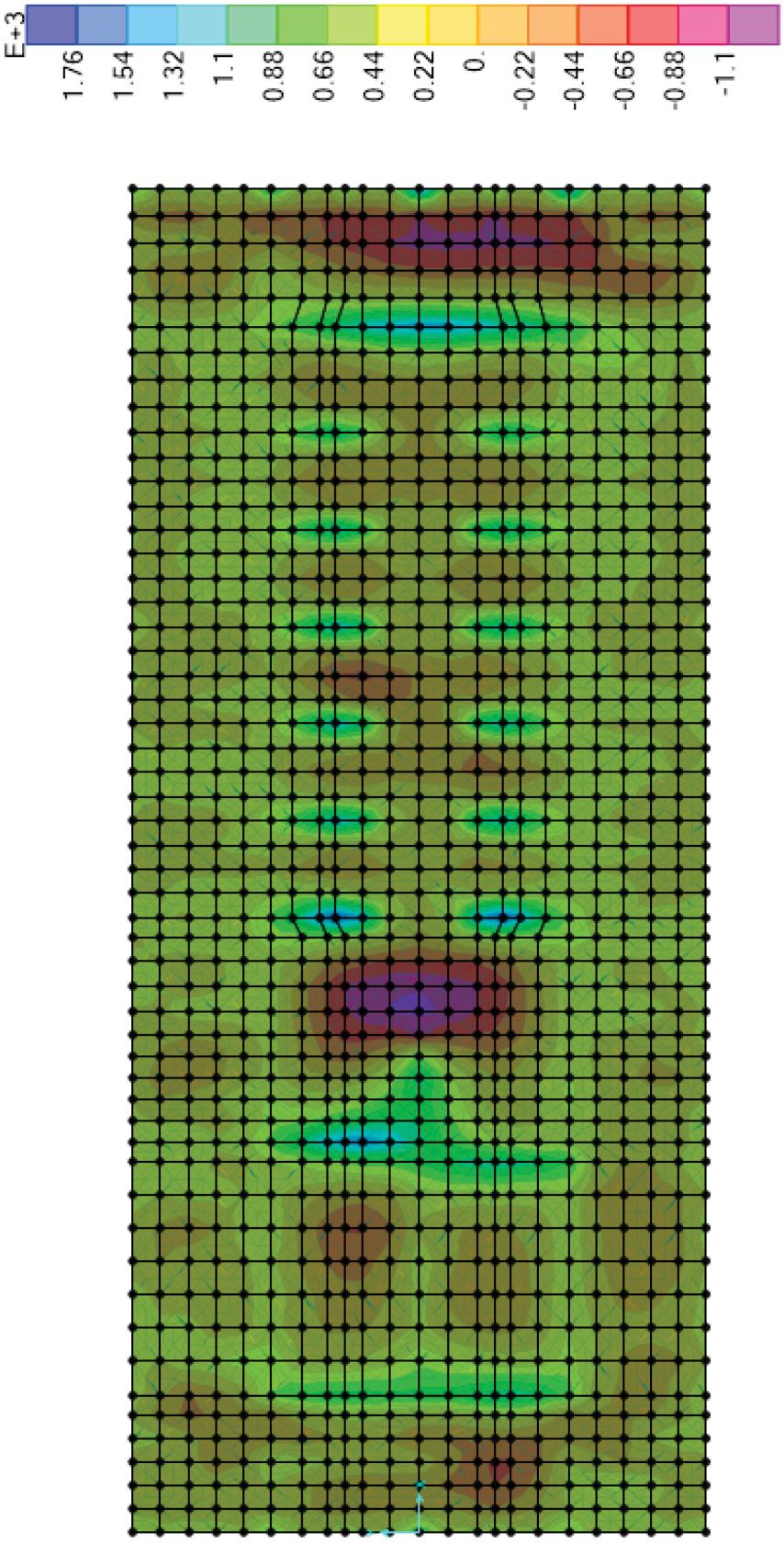


Figure 3.8.5-5: M11 due to Static Base Pressure in the Reactor Building Basemat Model

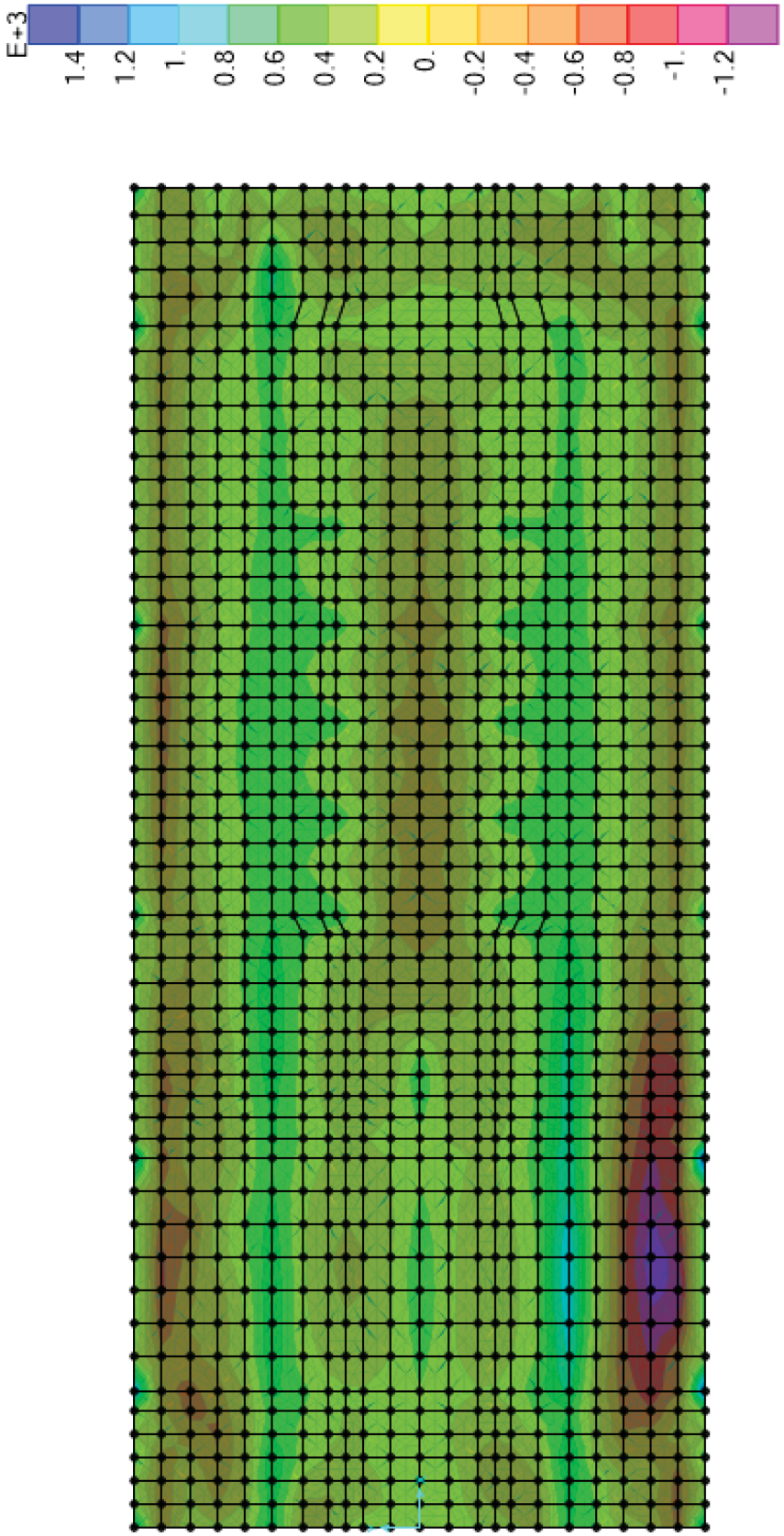


Figure 3.8.5-6: M22 due to Seismic Base Pressure in the Reactor Building Basemat Model

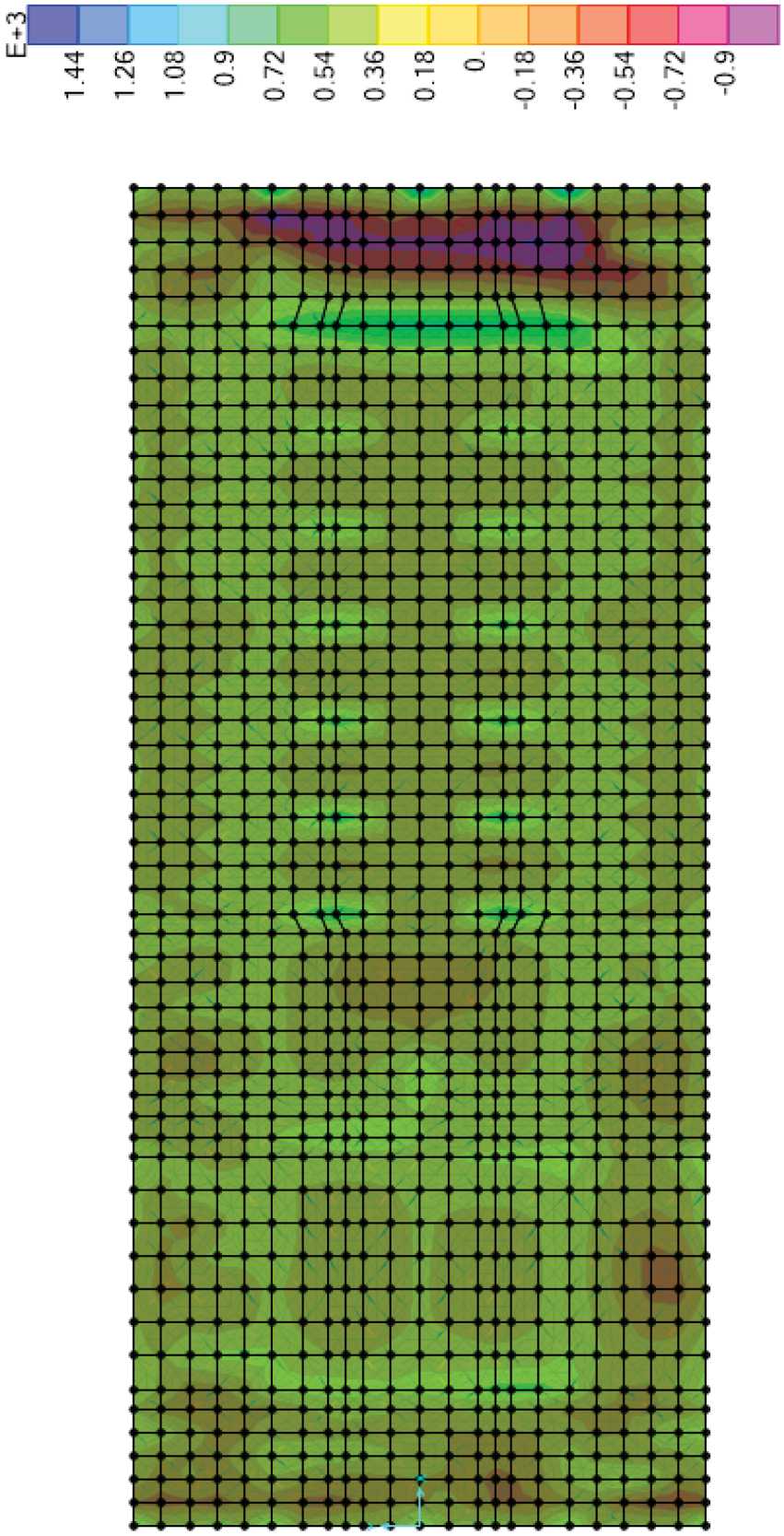


Figure 3.8.5-7: M11 due to Seismic Base Pressure in the Reactor Building Basemat Model

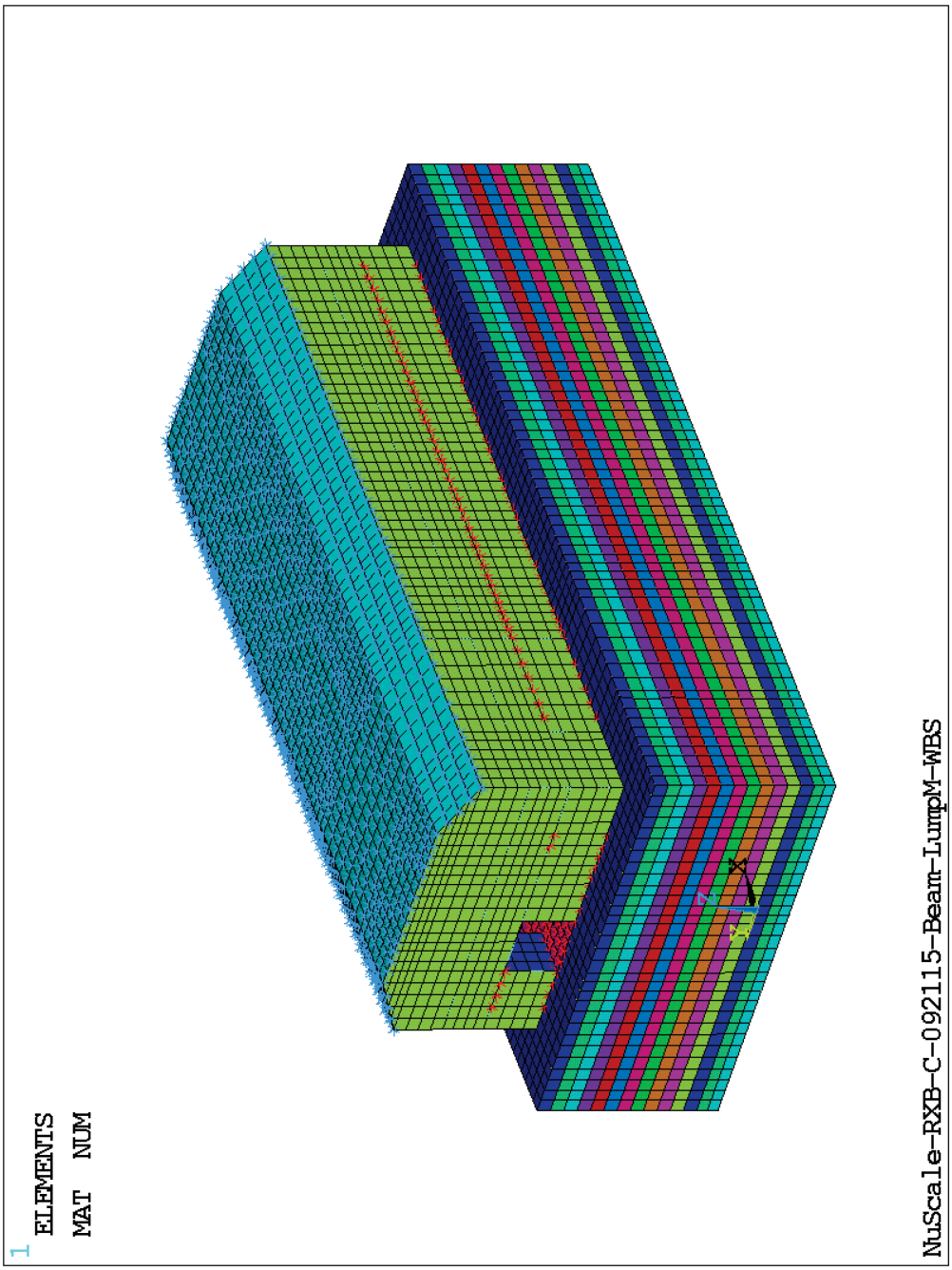


Figure 3.8.5-8: RXB ANSYS Model with Backfill Soil

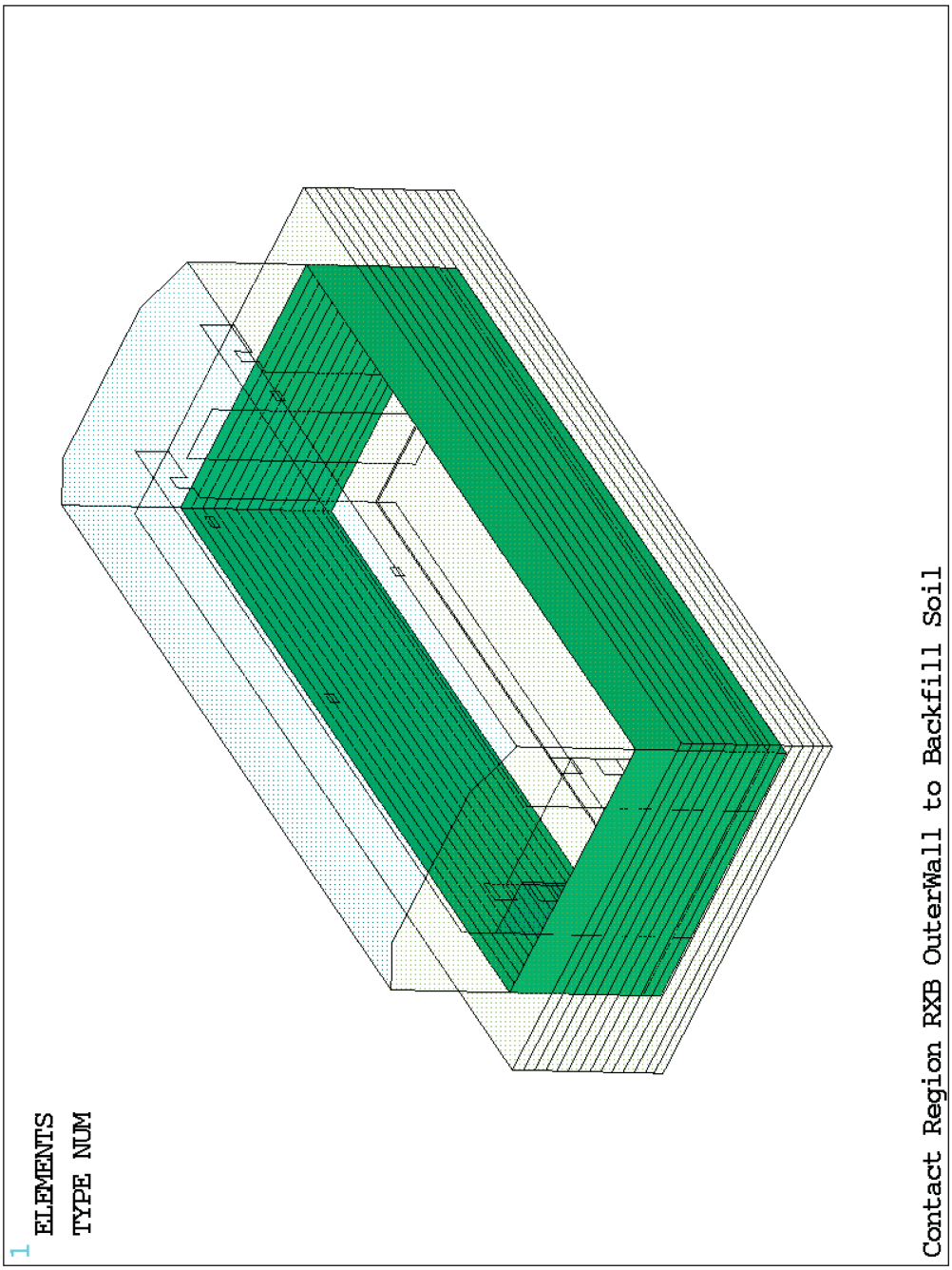


Figure 3.8.5-9: Nonlinear Contact Region between Building and Soil

Figure 3.8.5-10: Nodes Selected for Settlement Values

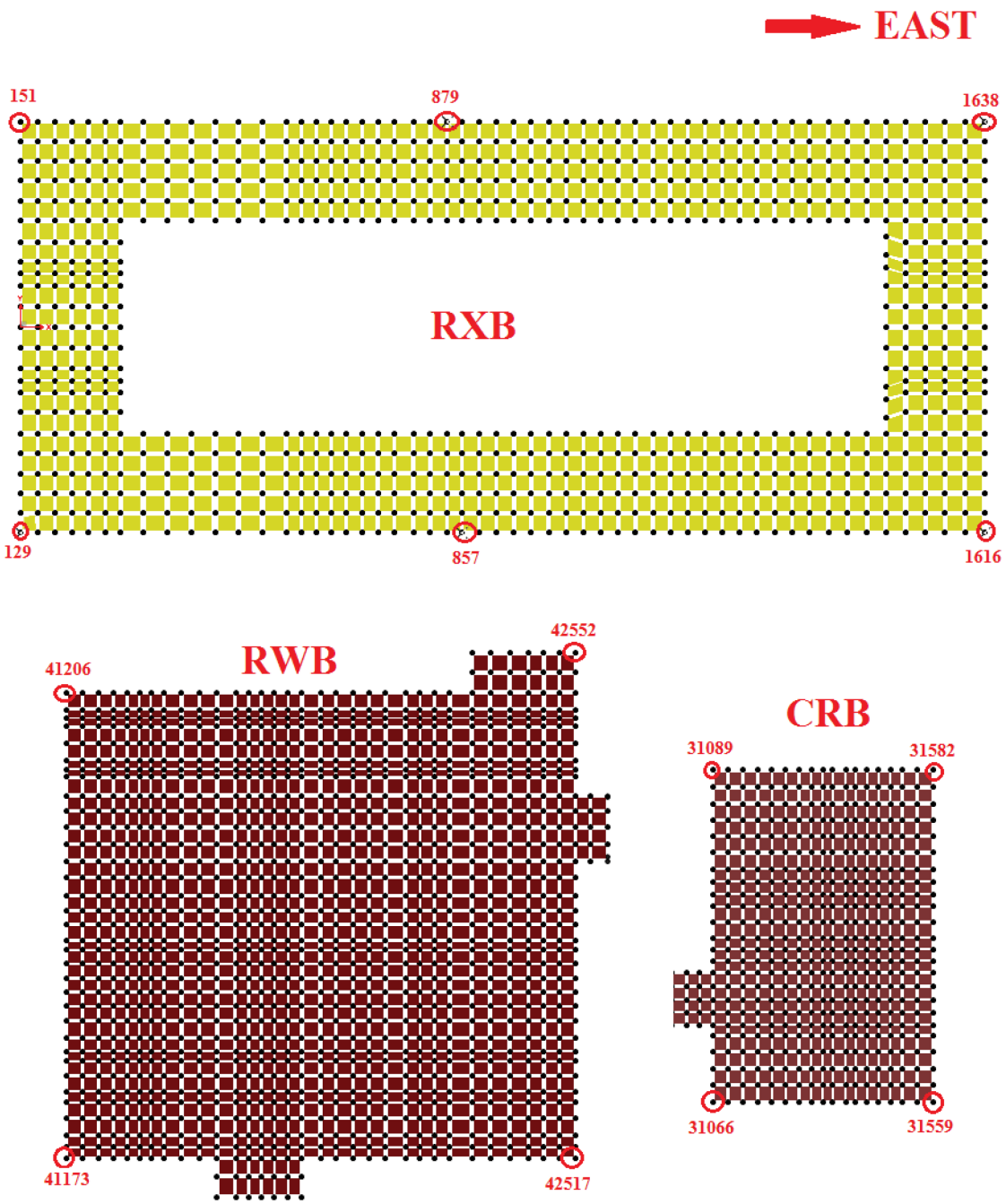


Figure 3.8.5-11: RXB Skin Nodes on Backfill Soil Vertical Boundaries for Applying SASSI Acceleration Time Histories

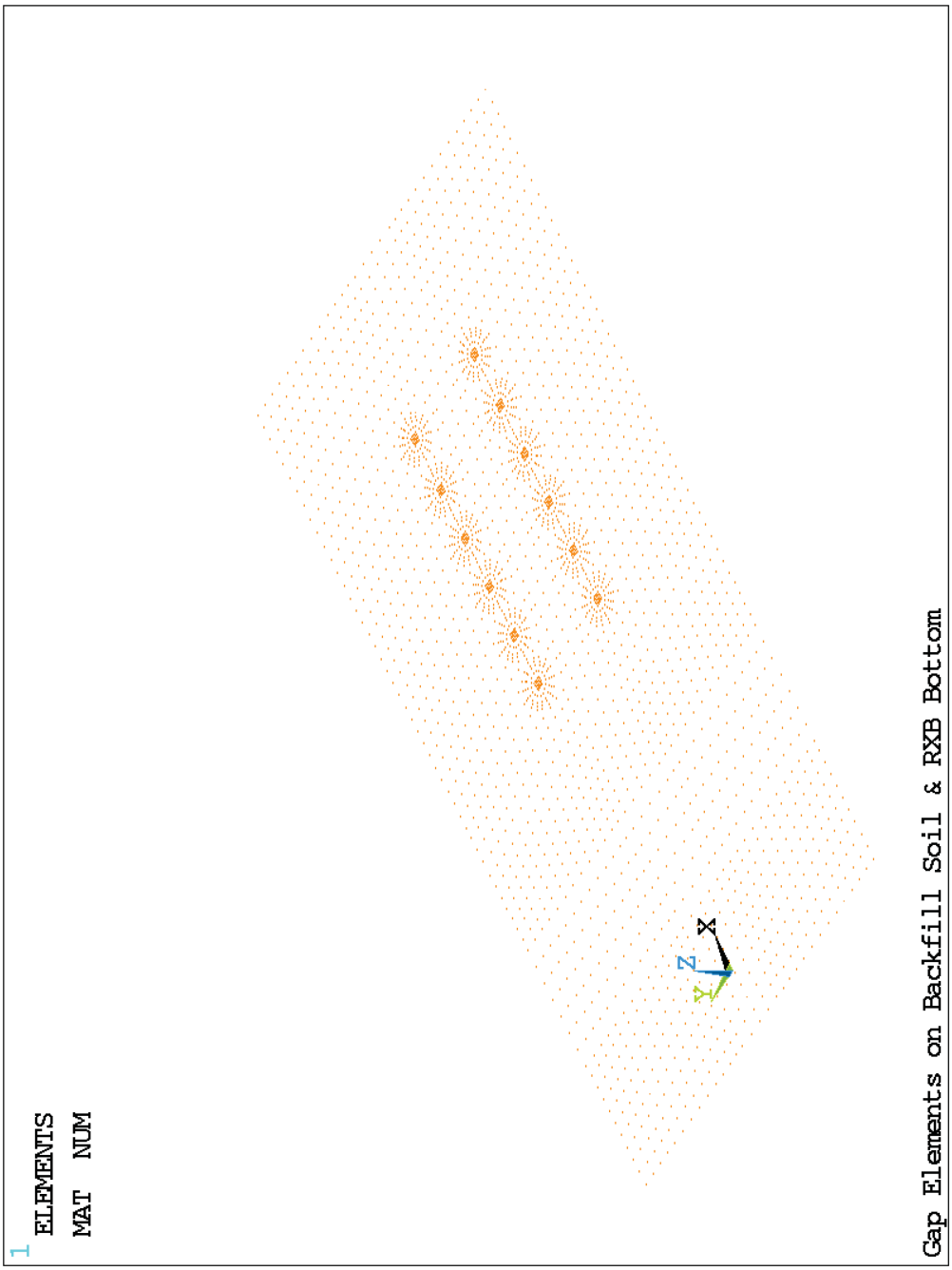


Figure 3.8.5-12: RXB Foundation Bottom Skin Nodes for Applying SASSI Acceleration Time Histories

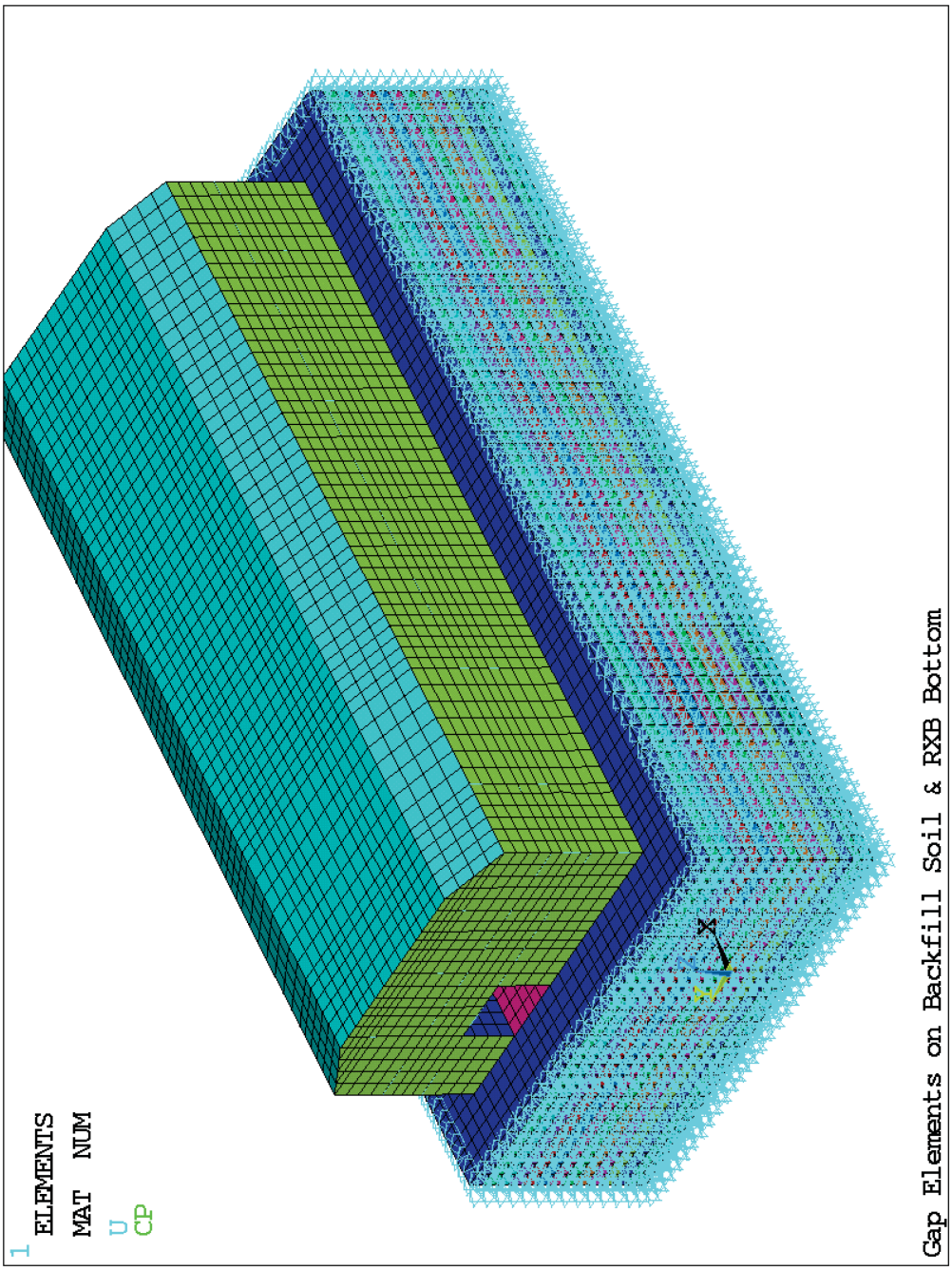


Figure 3.8.5-13: Displacements from SASSI Applied to ANSYS Model Boundary

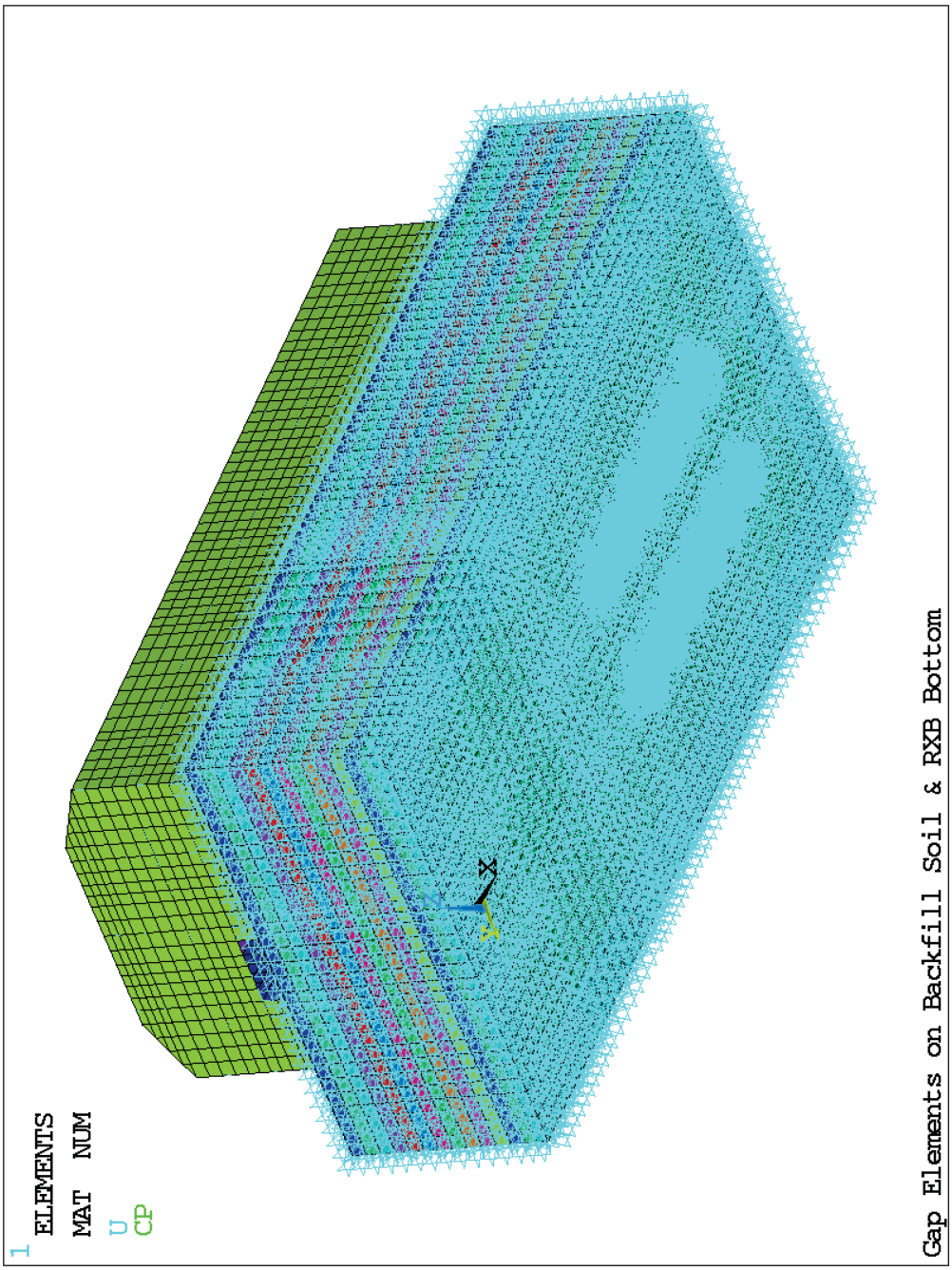


Figure 3.8.5-14: Displacements from SASSI Applied to ANSYS Model Boundary

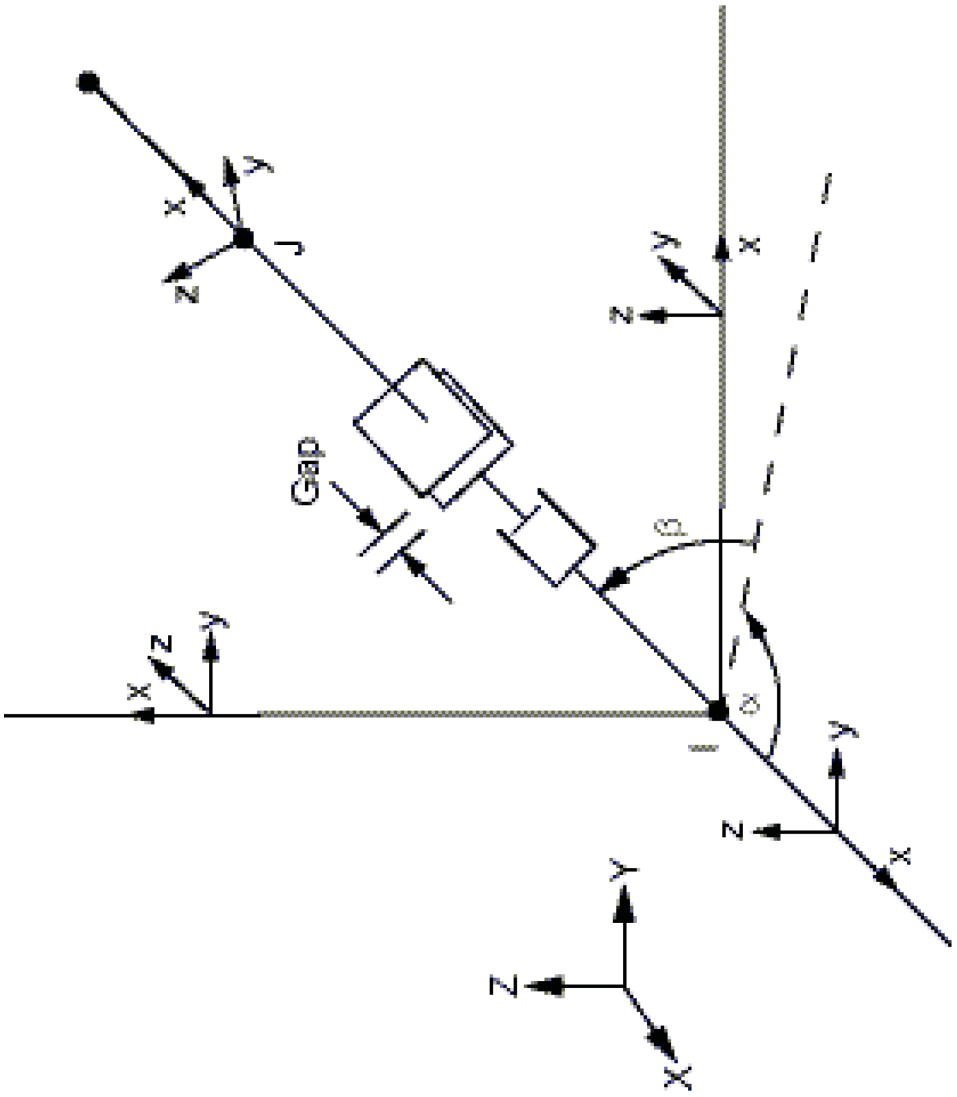


Figure 3.8.5-15: Nonlinear Contact Element between Backfill and Surrounding Soil

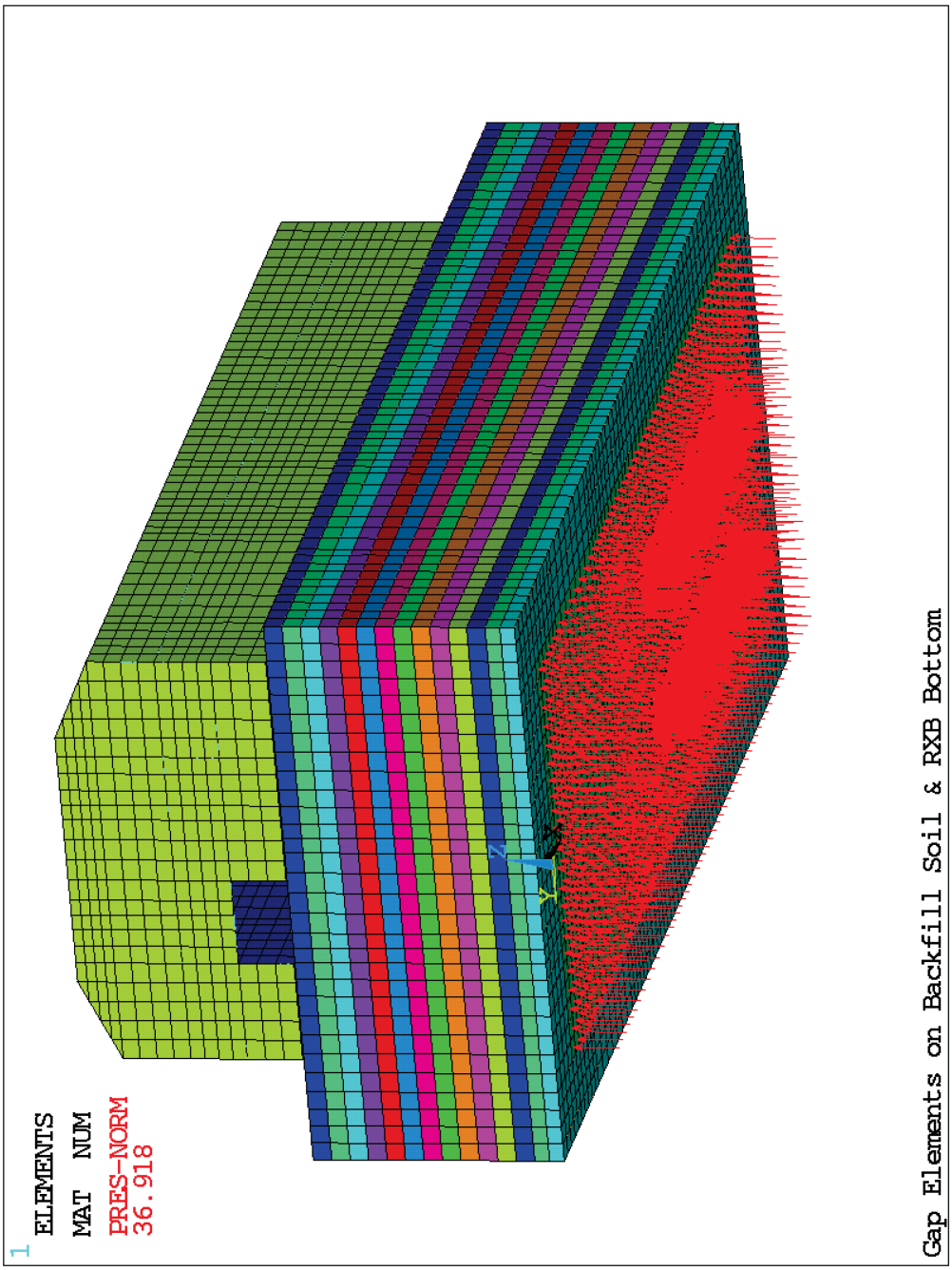


Figure 3.8.5-16: Buoyancy Load on Basemat

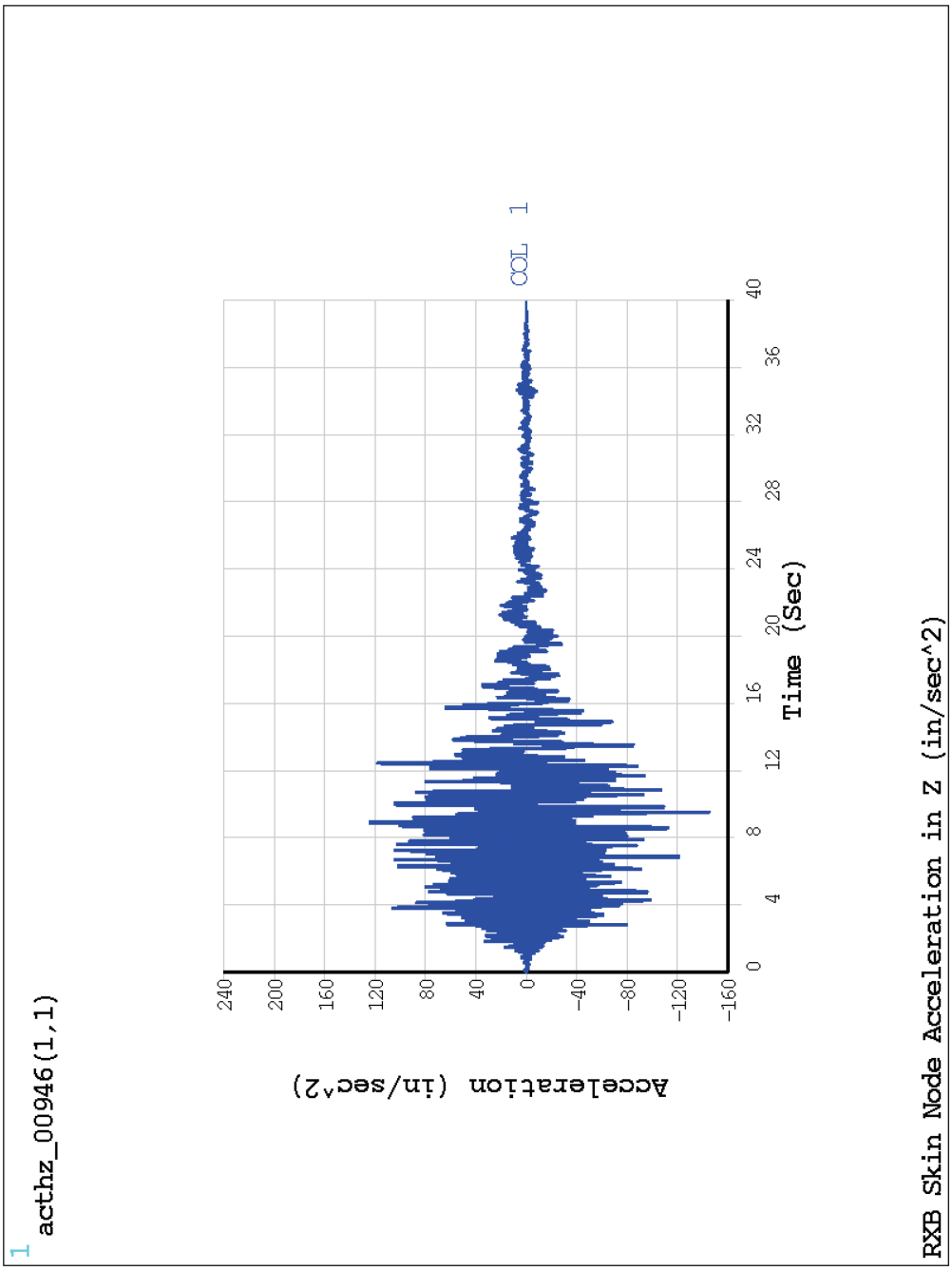


Figure 3.8.5-17: Soil Type 7 - Acceleration Time History - Vertical

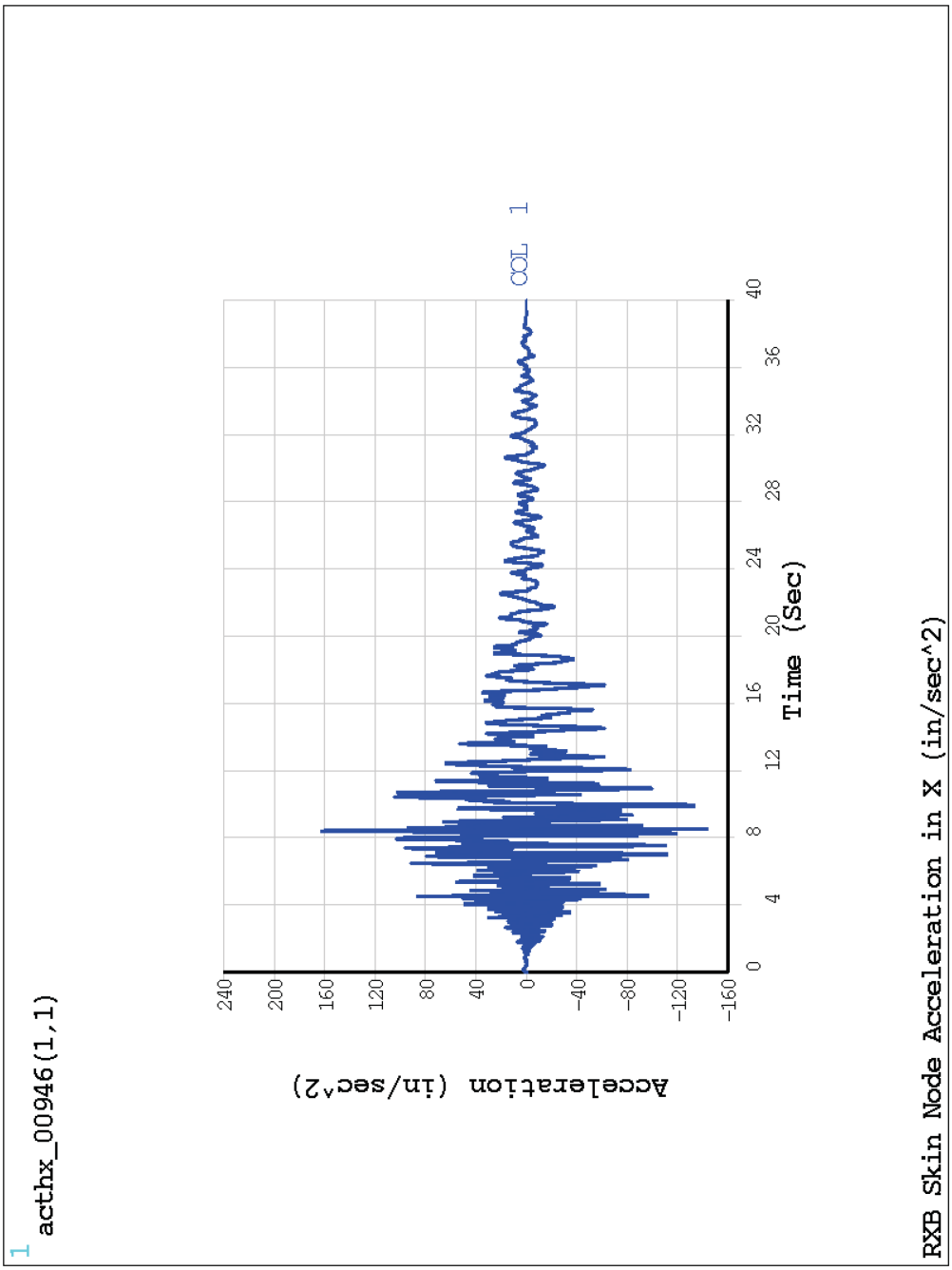


Figure 3.8.5-18: Soil Type 7 - Acceleration Time History - E-W

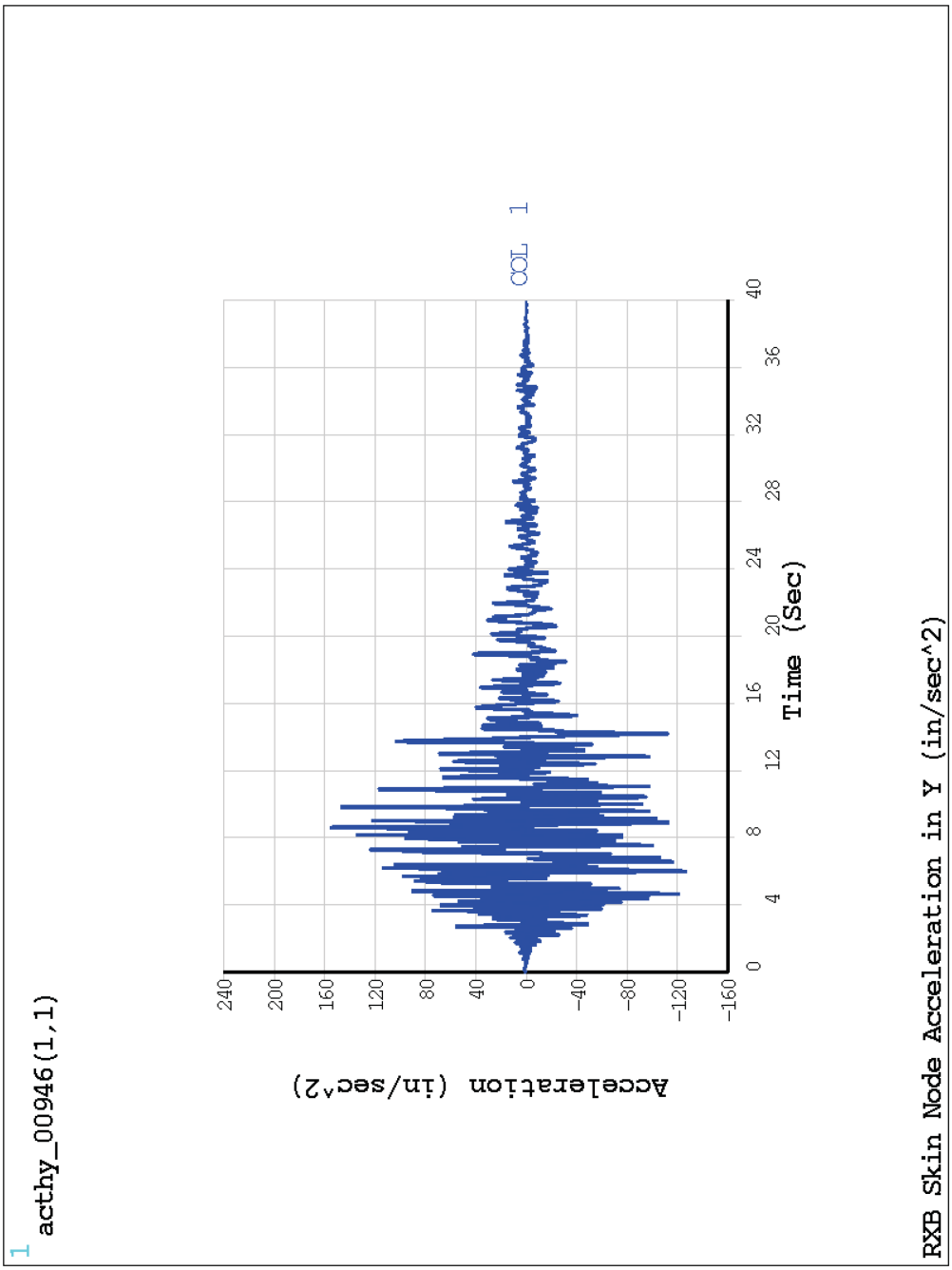


Figure 3.8.5-19: Soil Type 7 - Acceleration Time History - N-S

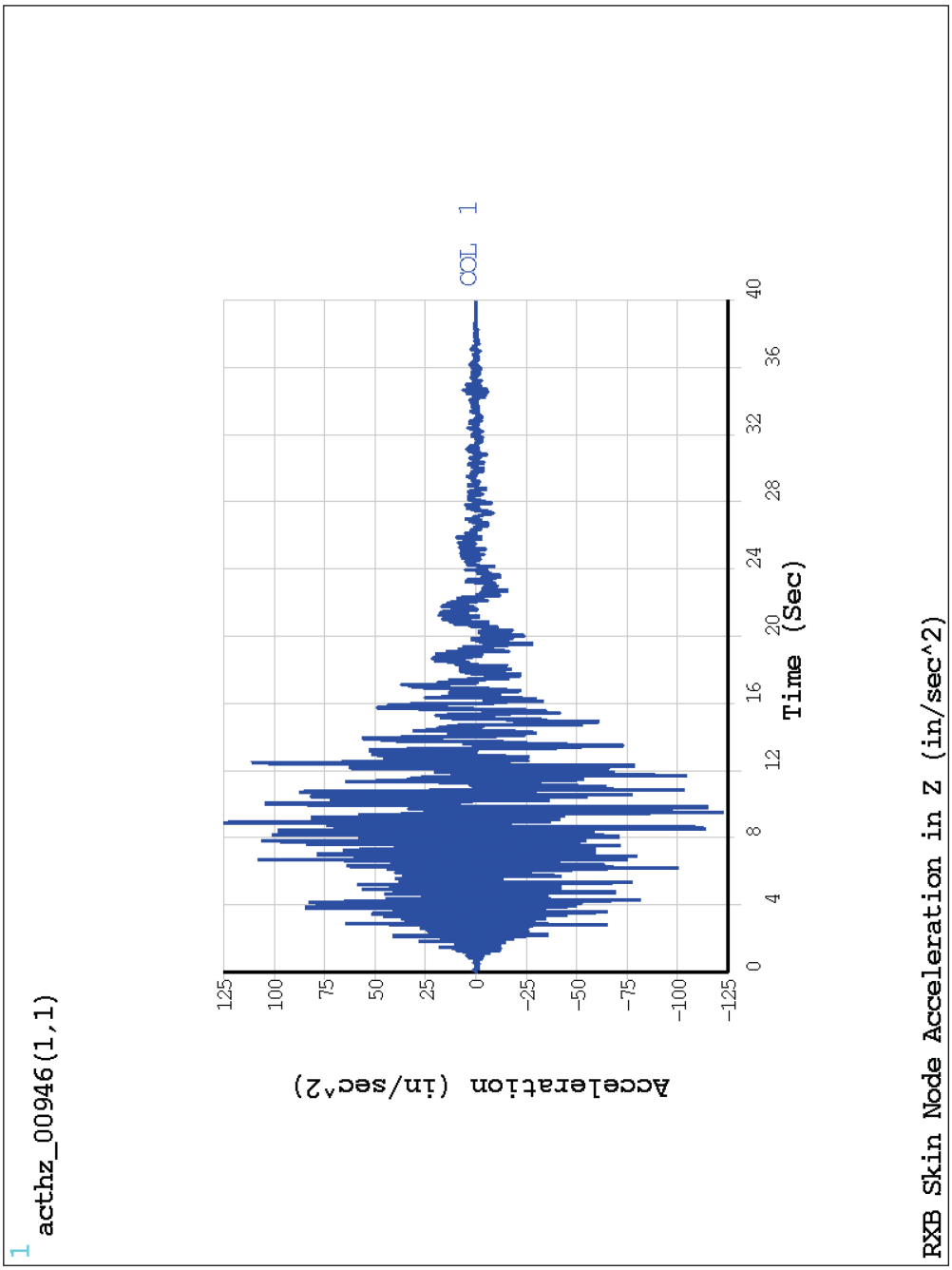


Figure 3.8.5-20: Soil Type 8 - Acceleration Time History - Vertical

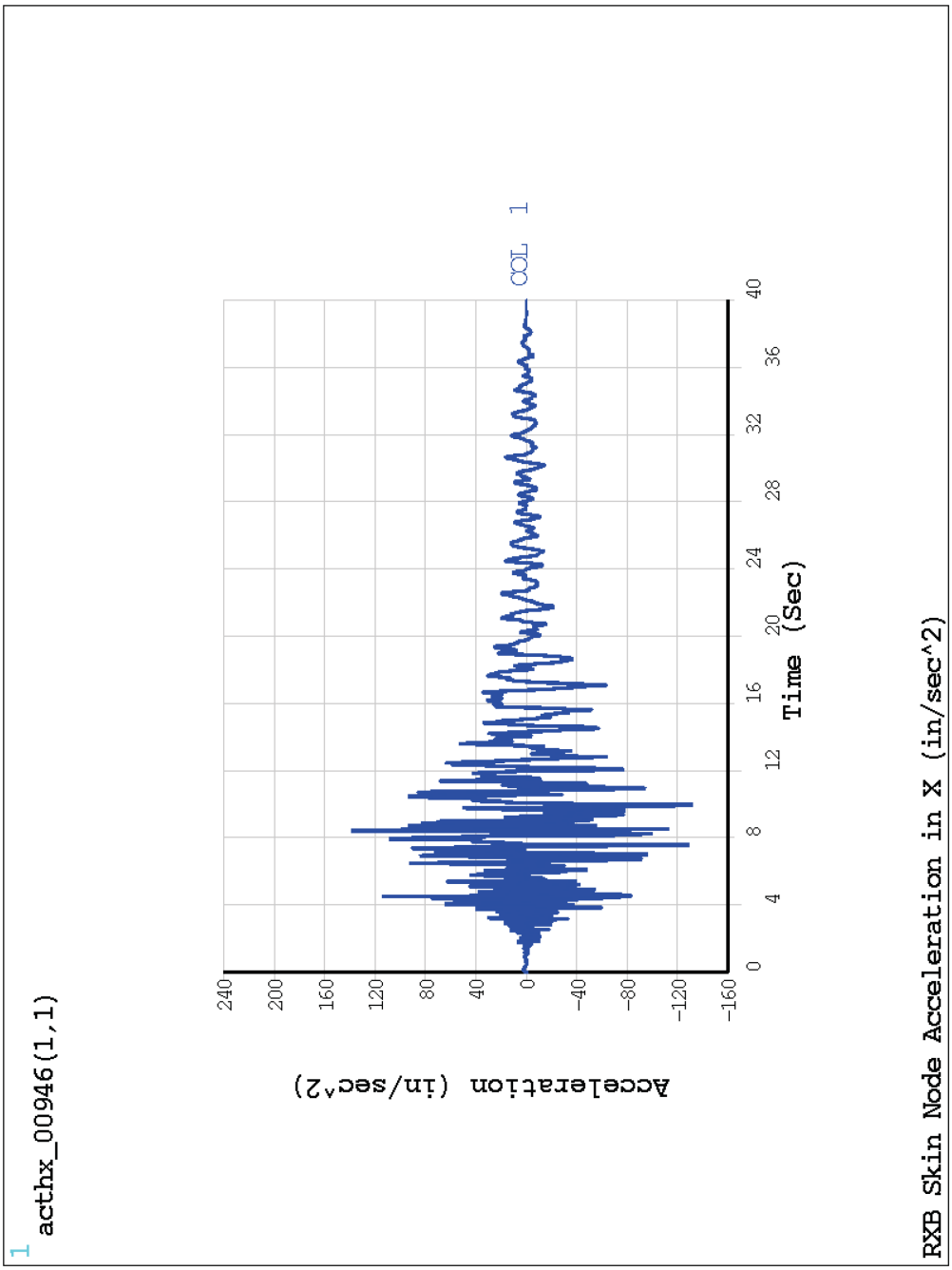


Figure 3.8.5-21: Soil Type 8 - Acceleration Time History - E-W

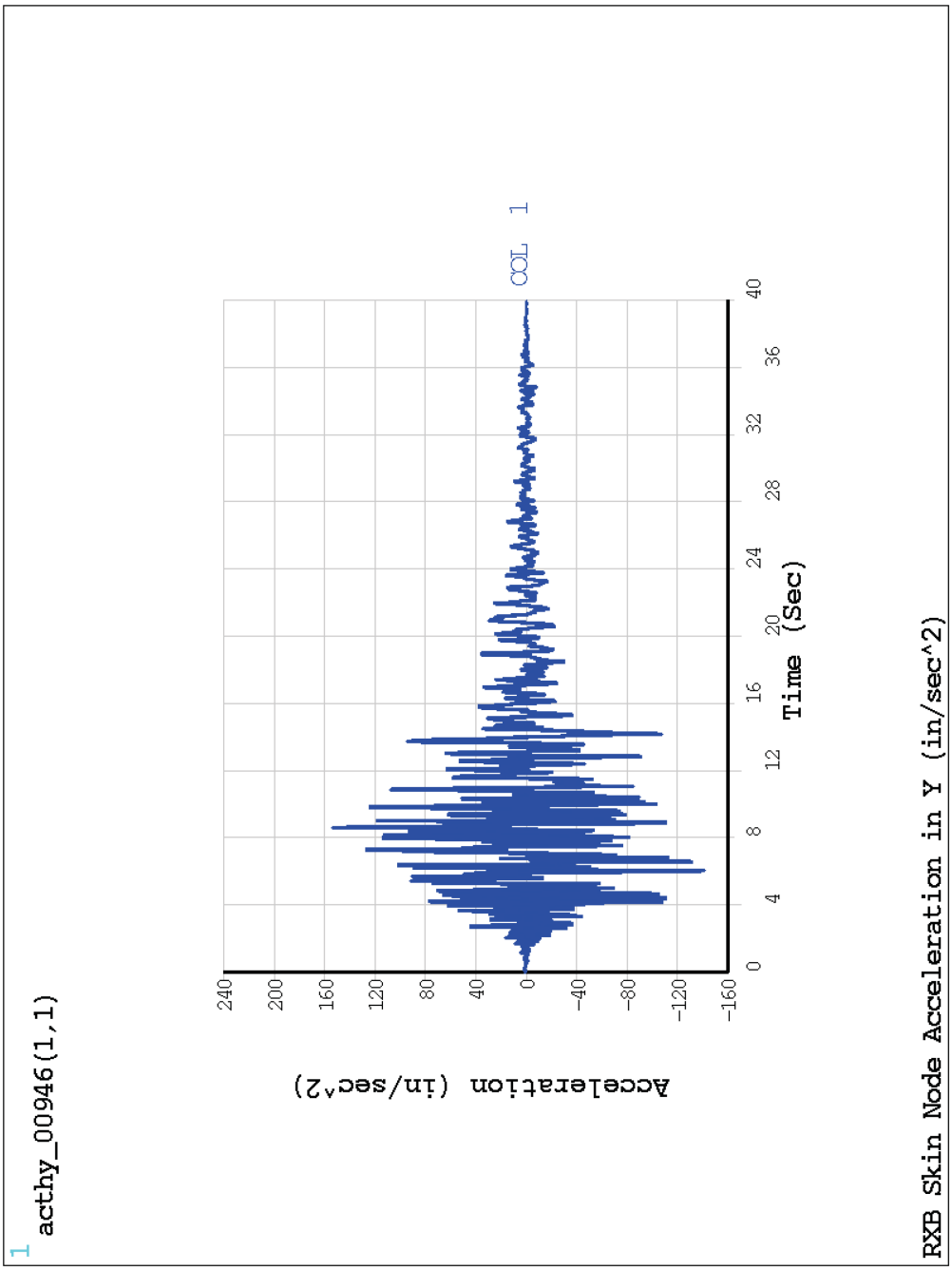


Figure 3.8.5-22: Soil Type 8 - Acceleration Time History - N-S

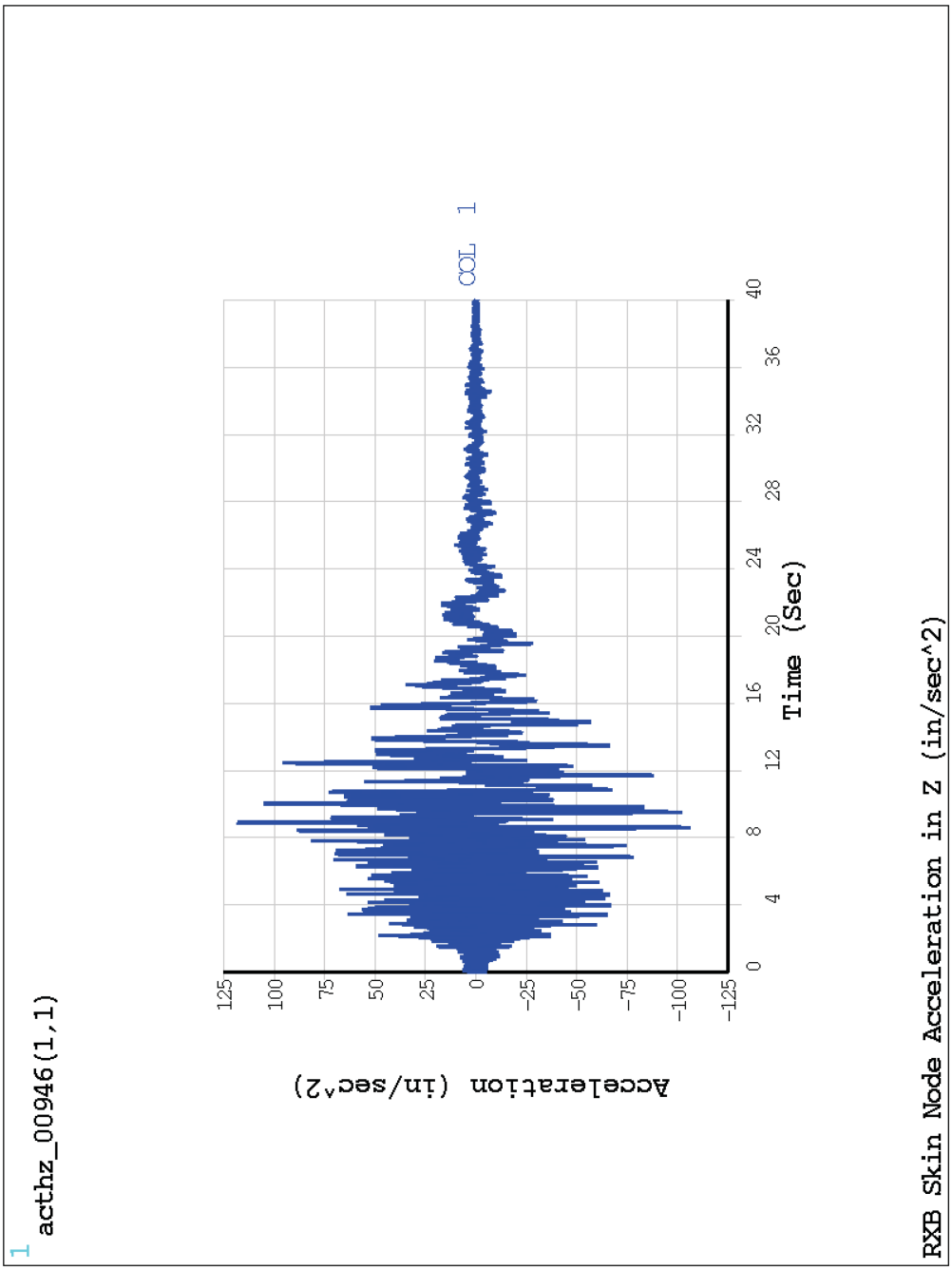


Figure 3.8.5-23: Soil Type 11 - Acceleration Time History - Vertical

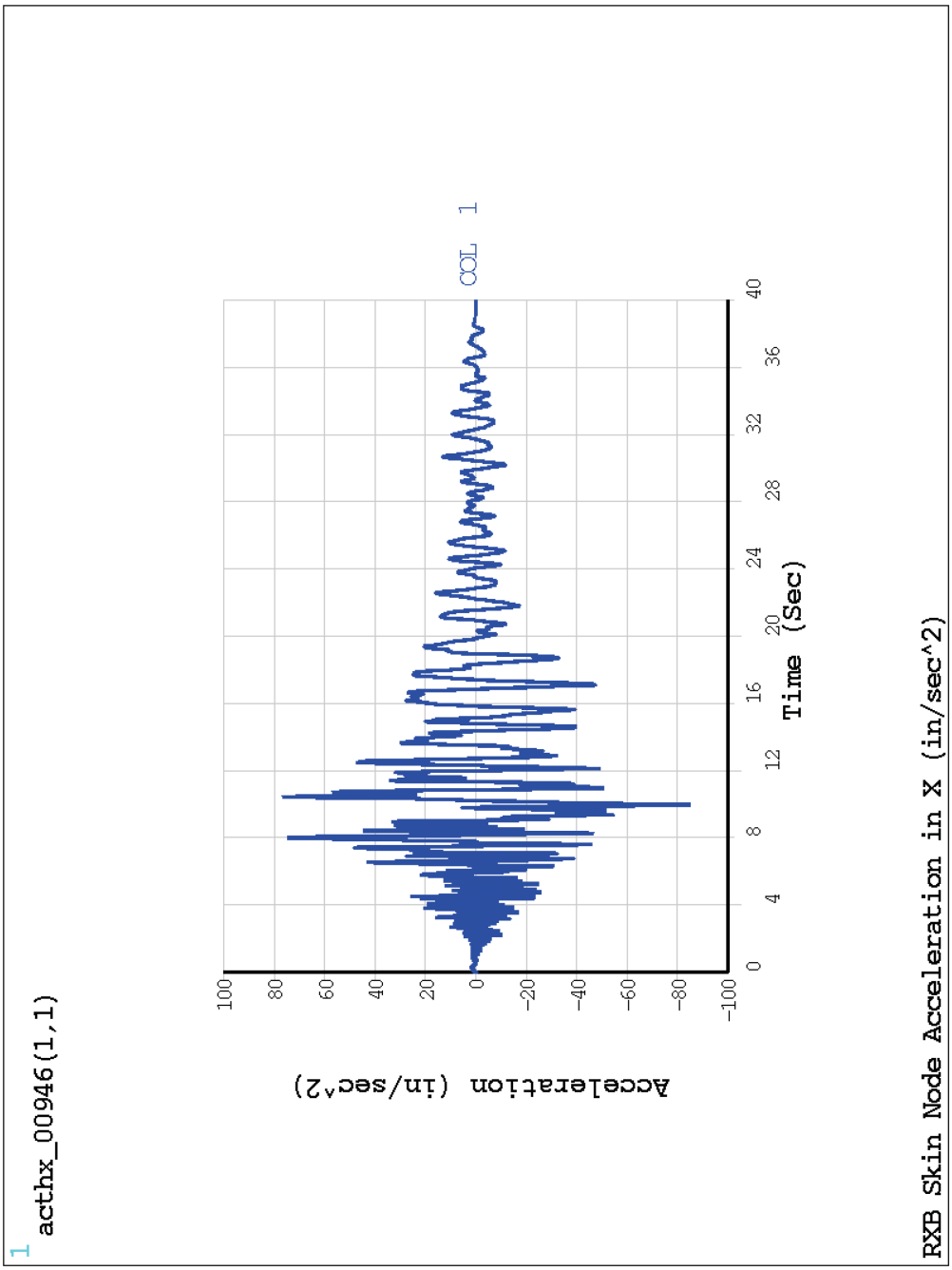


Figure 3.8.5-24: Soil Type 11 - Acceleration Time History - E-W

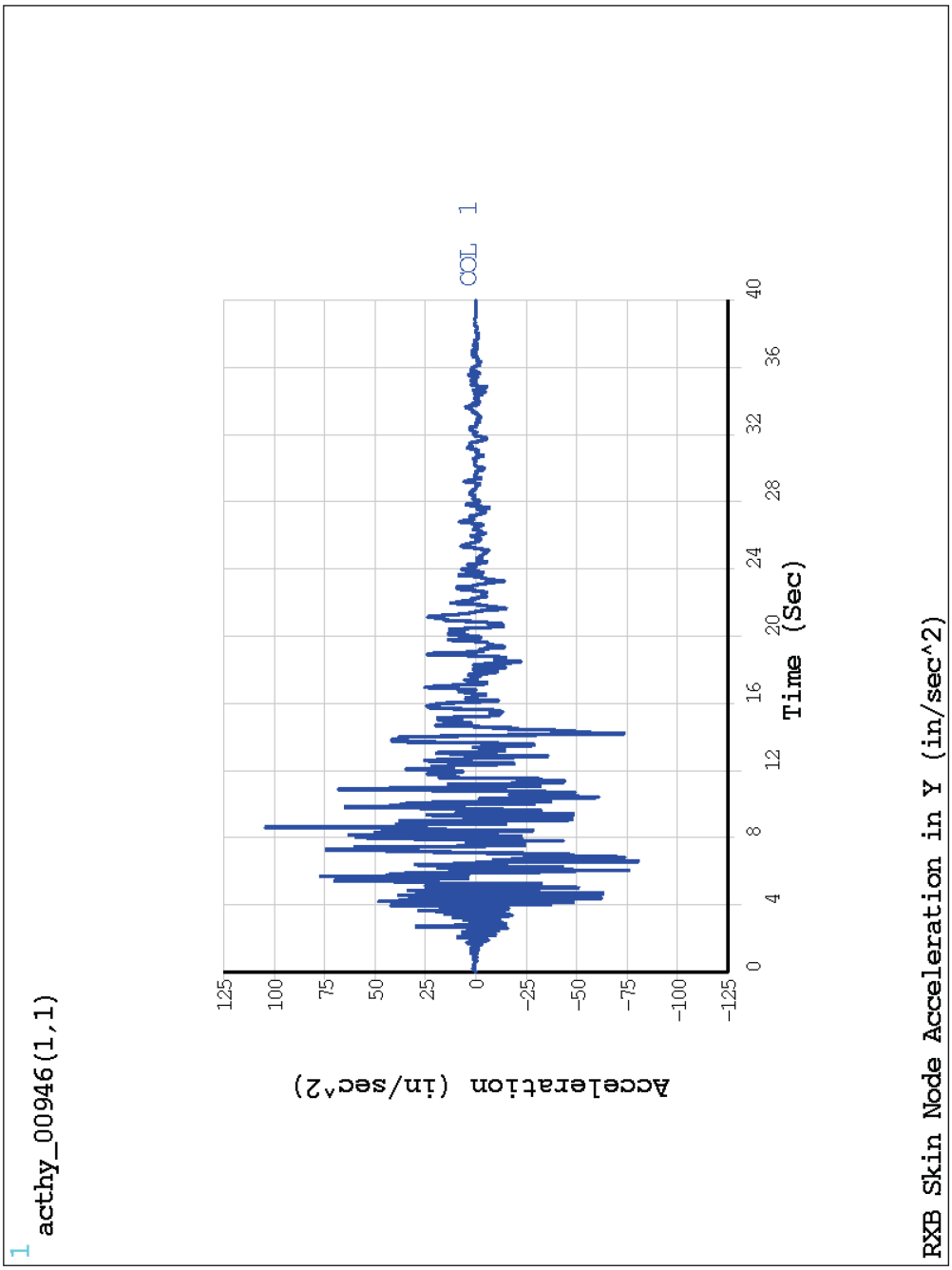


Figure 3.8.5-25: Soil Type 11 - Acceleration Time History - N-S

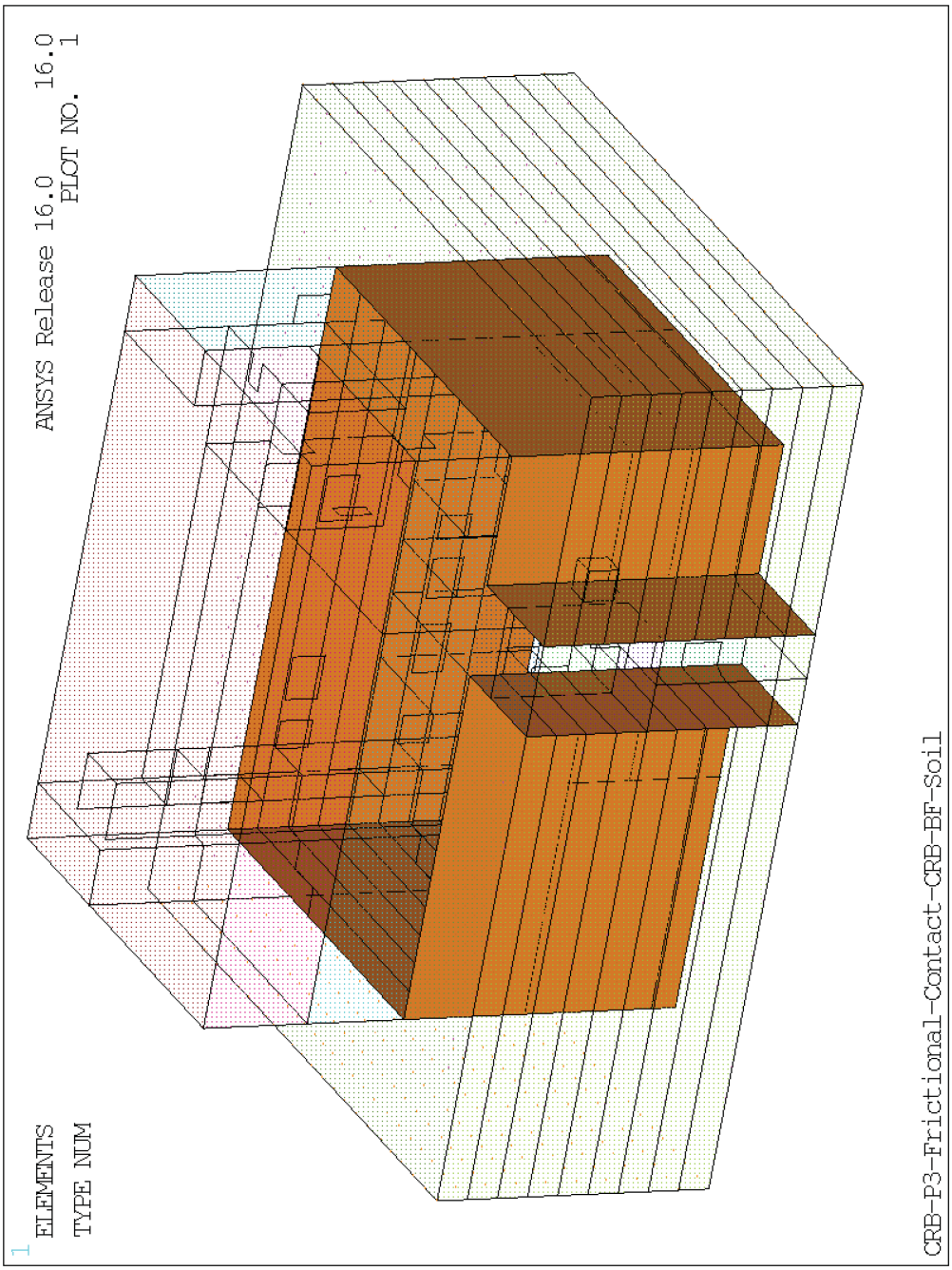


Figure 3.8.5-26: Nonlinear Contact Region between CRB and Soil

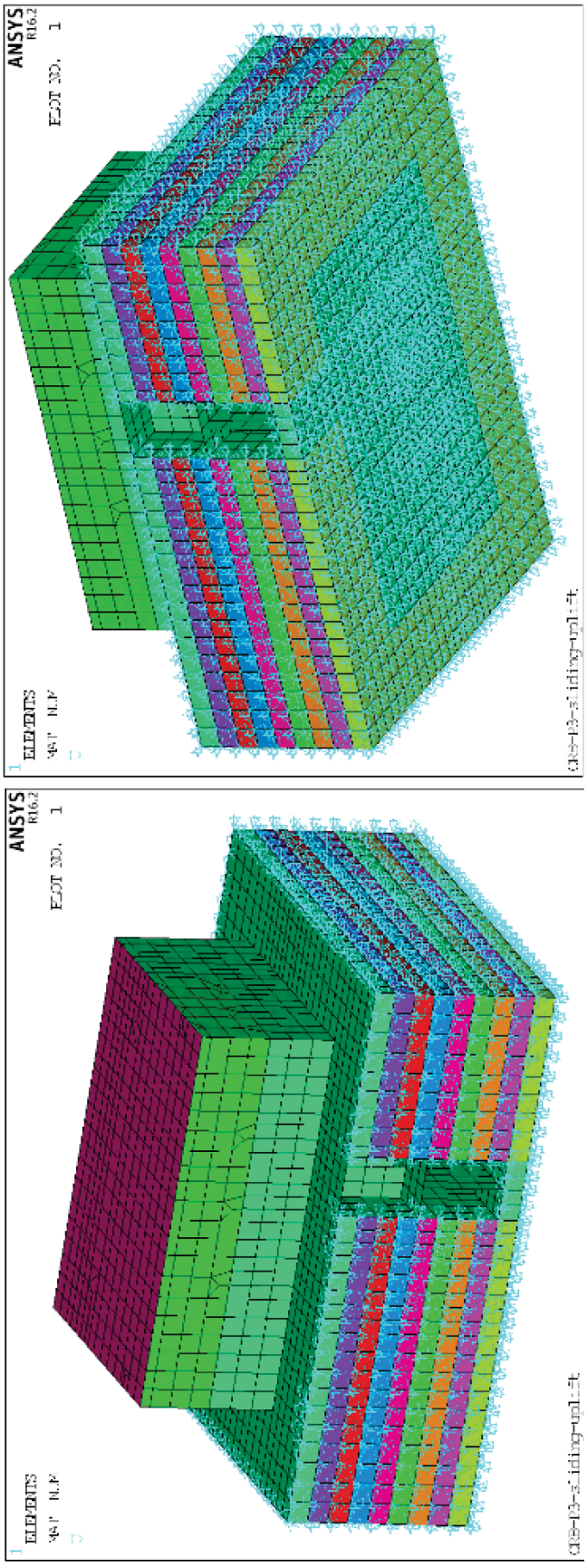


Figure 3.8.5-27: CRB Time Histories from SASSI Applied to ANSYS Model Boundary

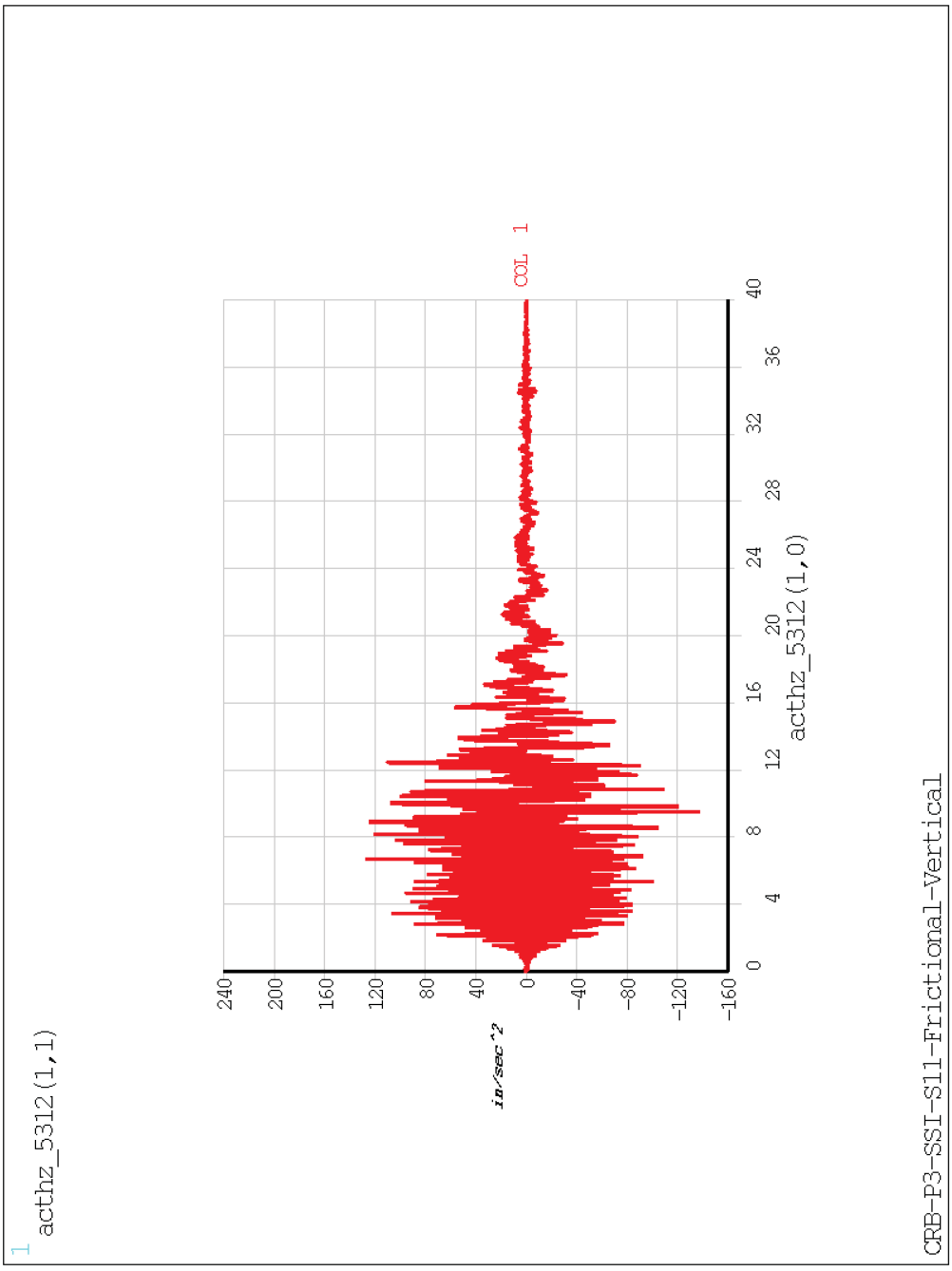


Figure 3.8.5-28: Soil Type 11, Capitola Input - Acceleration Time History - Vertical

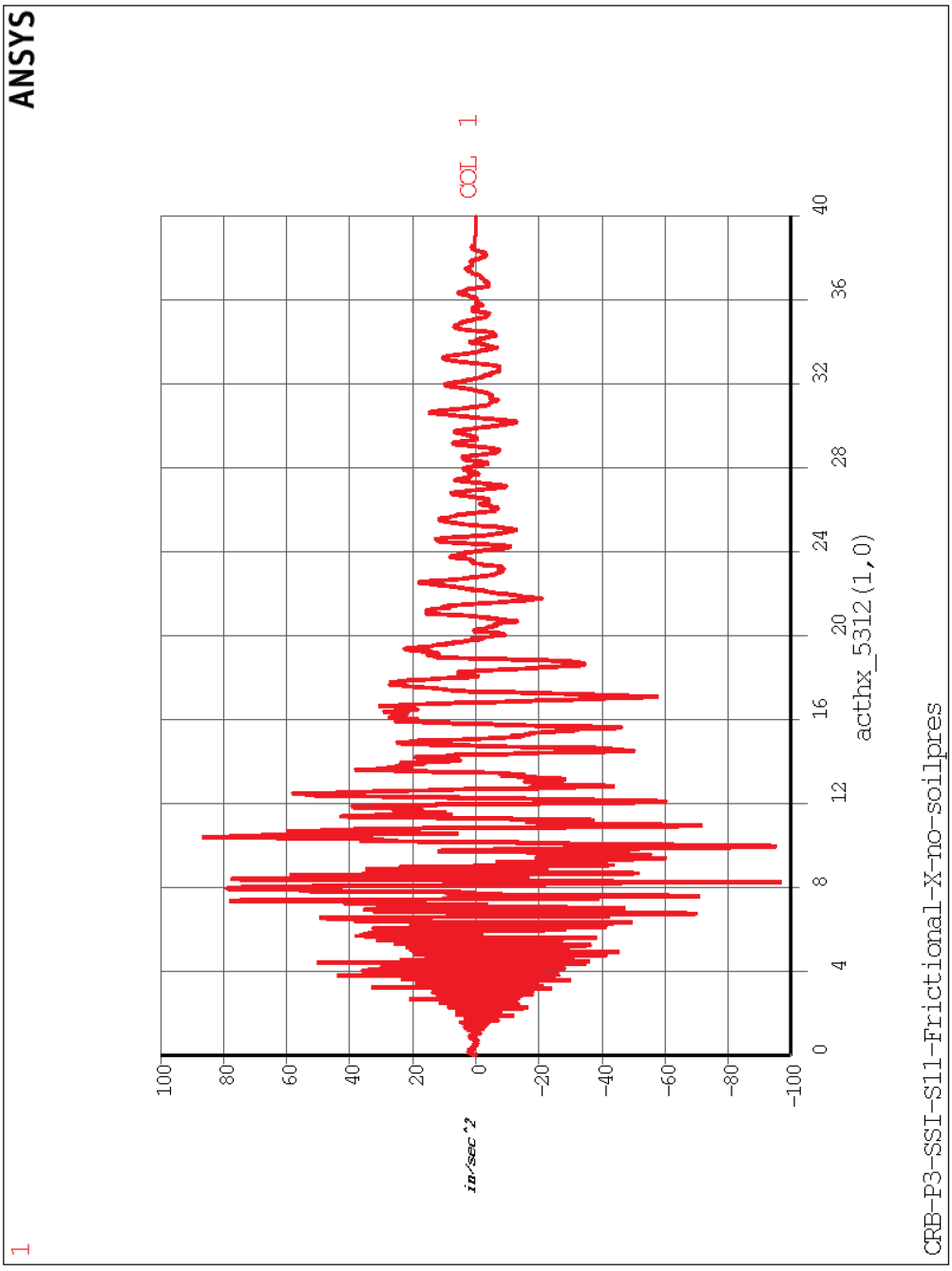


Figure 3.8.5-29: Soil Type 11, Capitola Input - Acceleration Time History - E-W

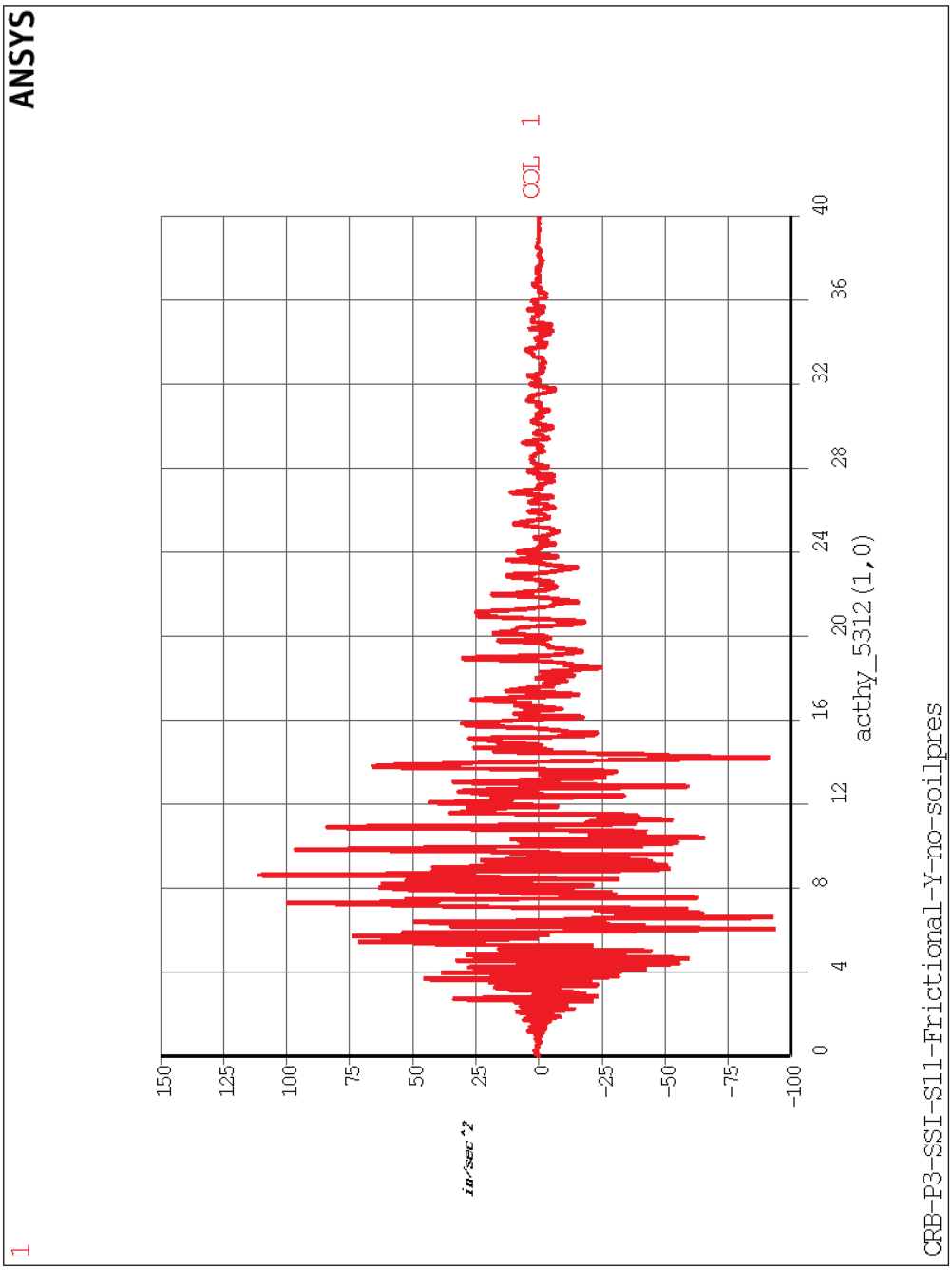


Figure 3.8.5-30: Soil Type 11, Capitola Input - Acceleration Time History - N-S

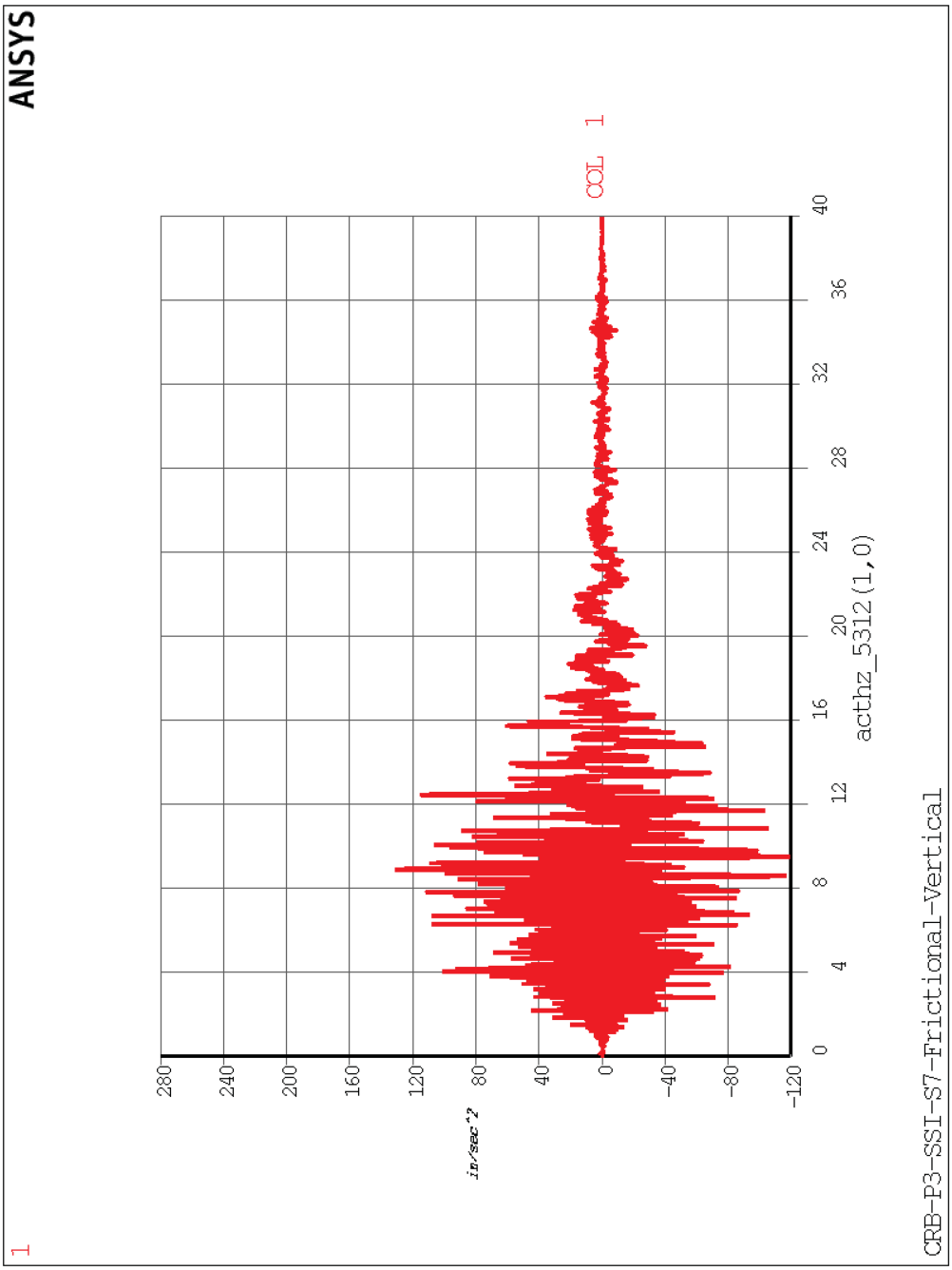


Figure 3.8.5-31: Soil Type 7, Capitola Input - Acceleration Time History - Vertical

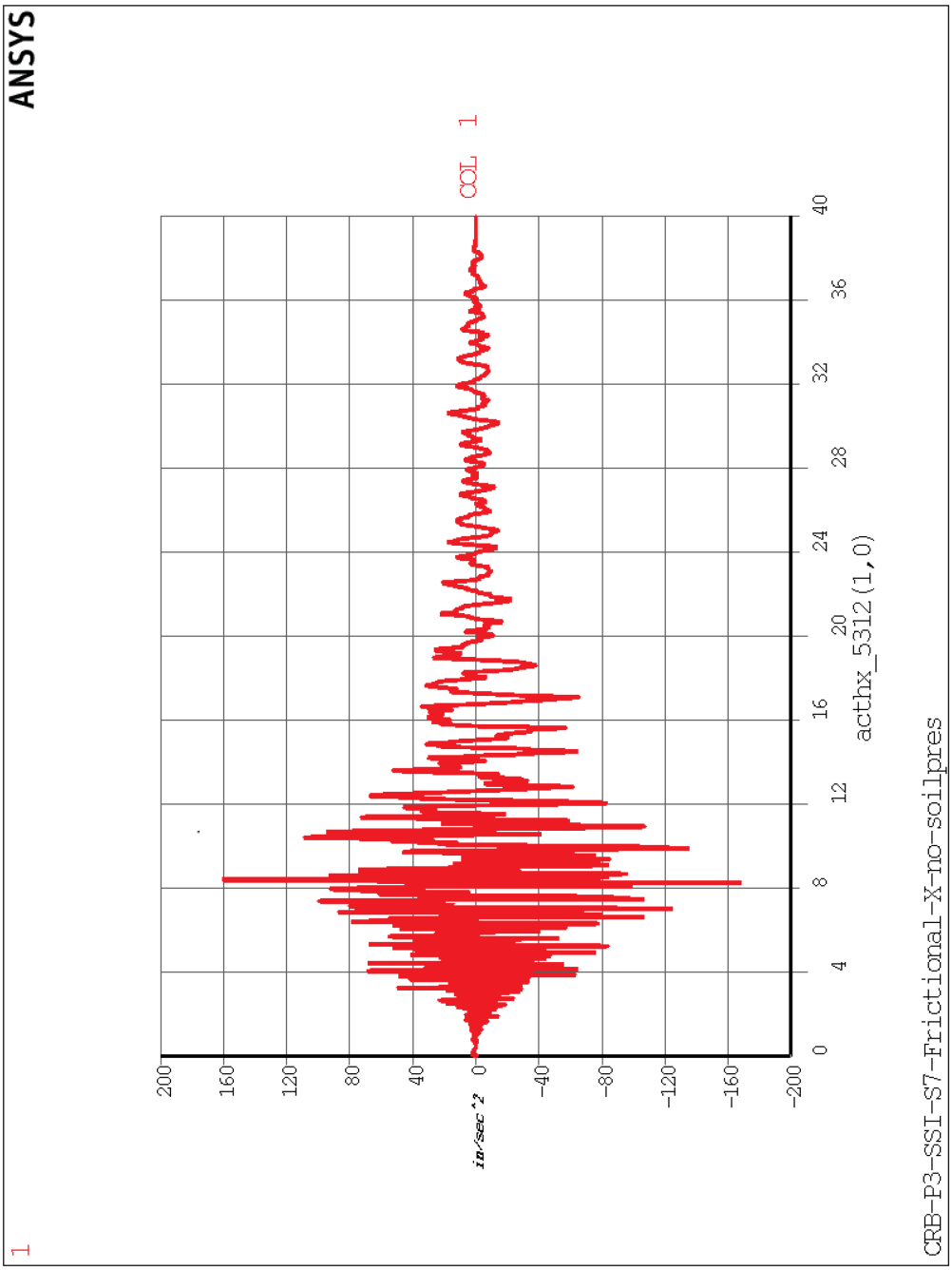


Figure 3.8.5-32: Soil Type 7, Capitola Input - Acceleration Time History - E-W

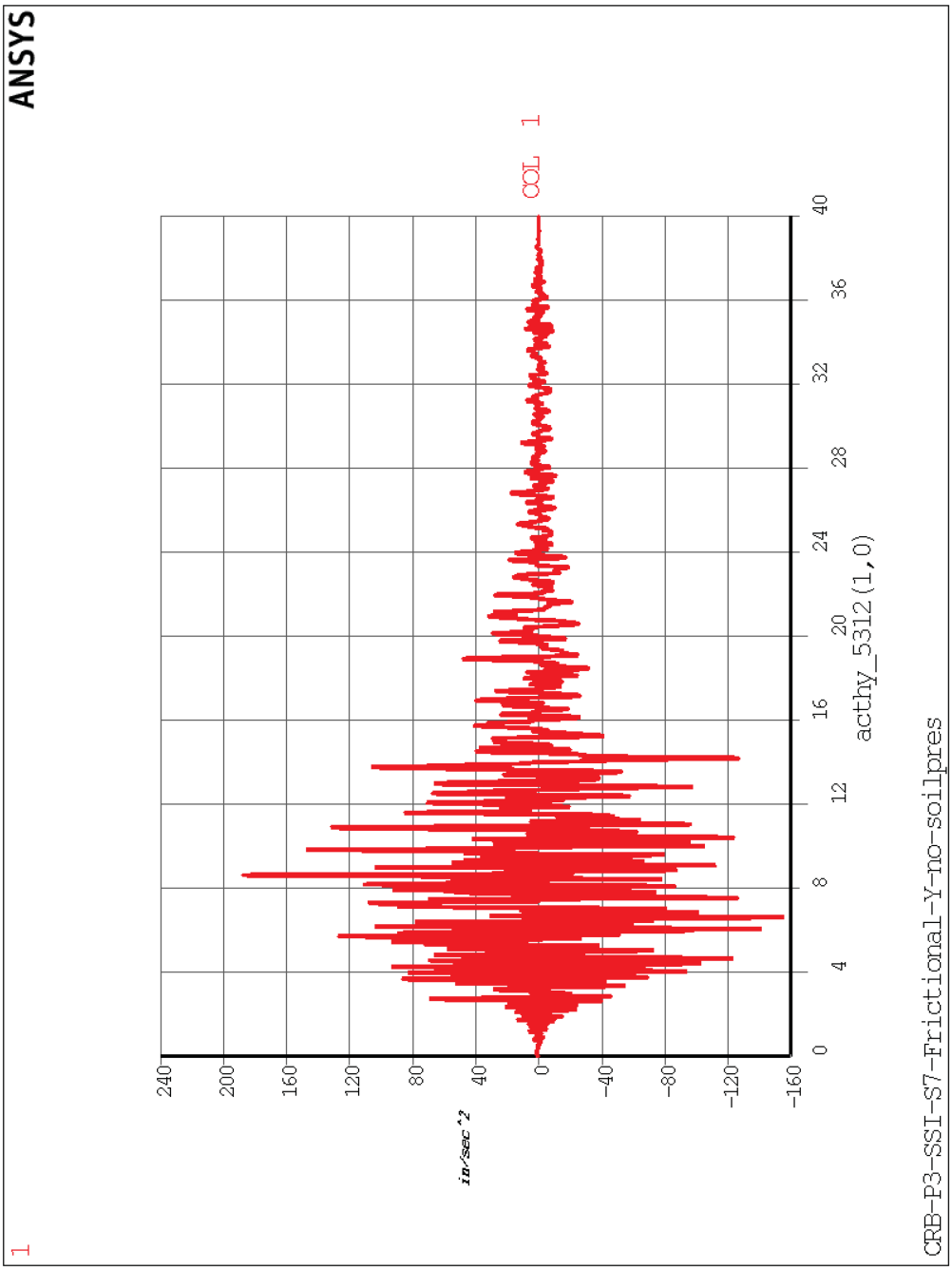


Figure 3.8.5-33: Soil Type 7, Capitola Input - Acceleration Time History - N-S

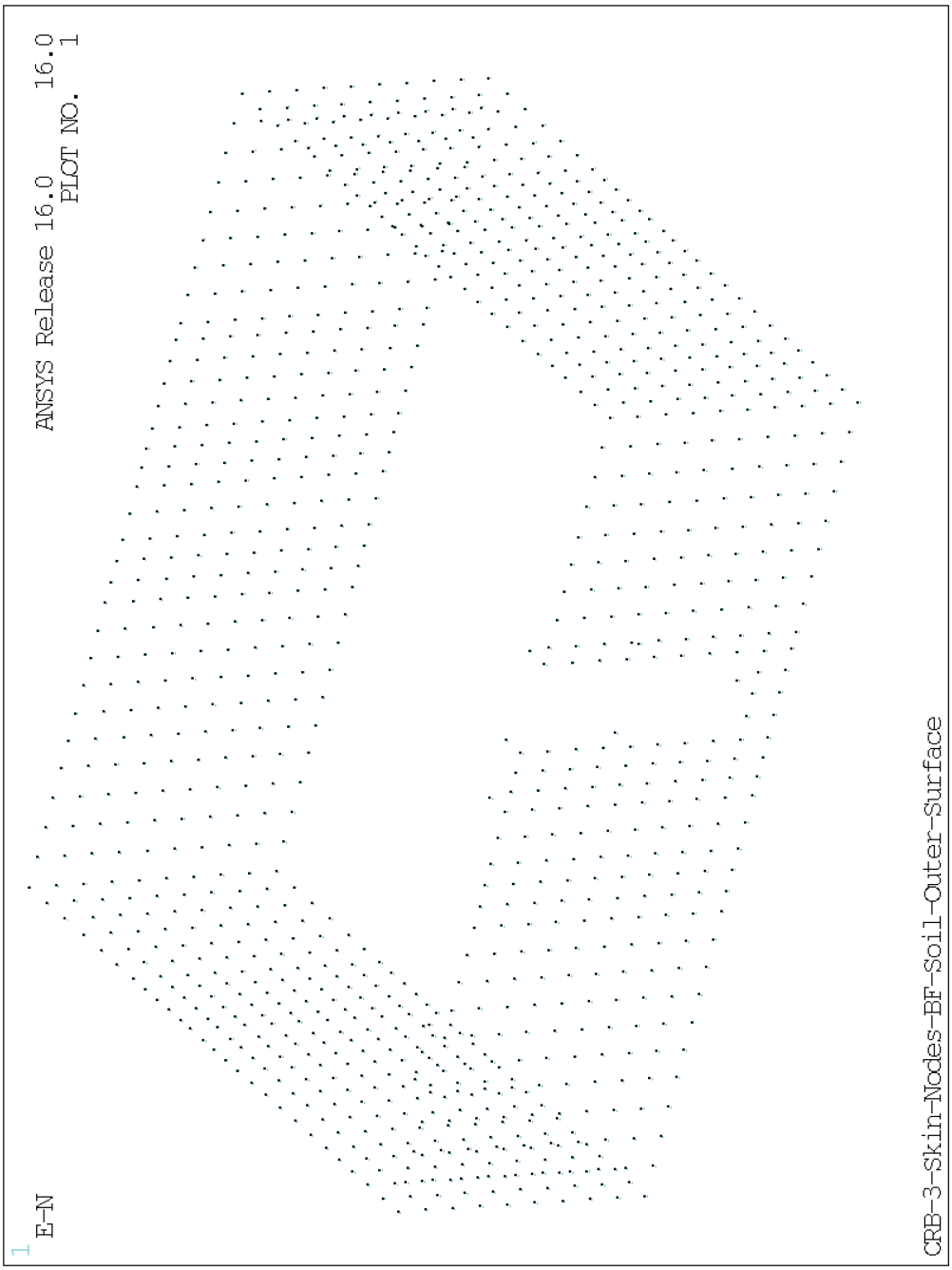


Figure 3.8.5-34: CRB Skin Nodes on Backfill Outer Boundaries for Applying SASSI Time Histories

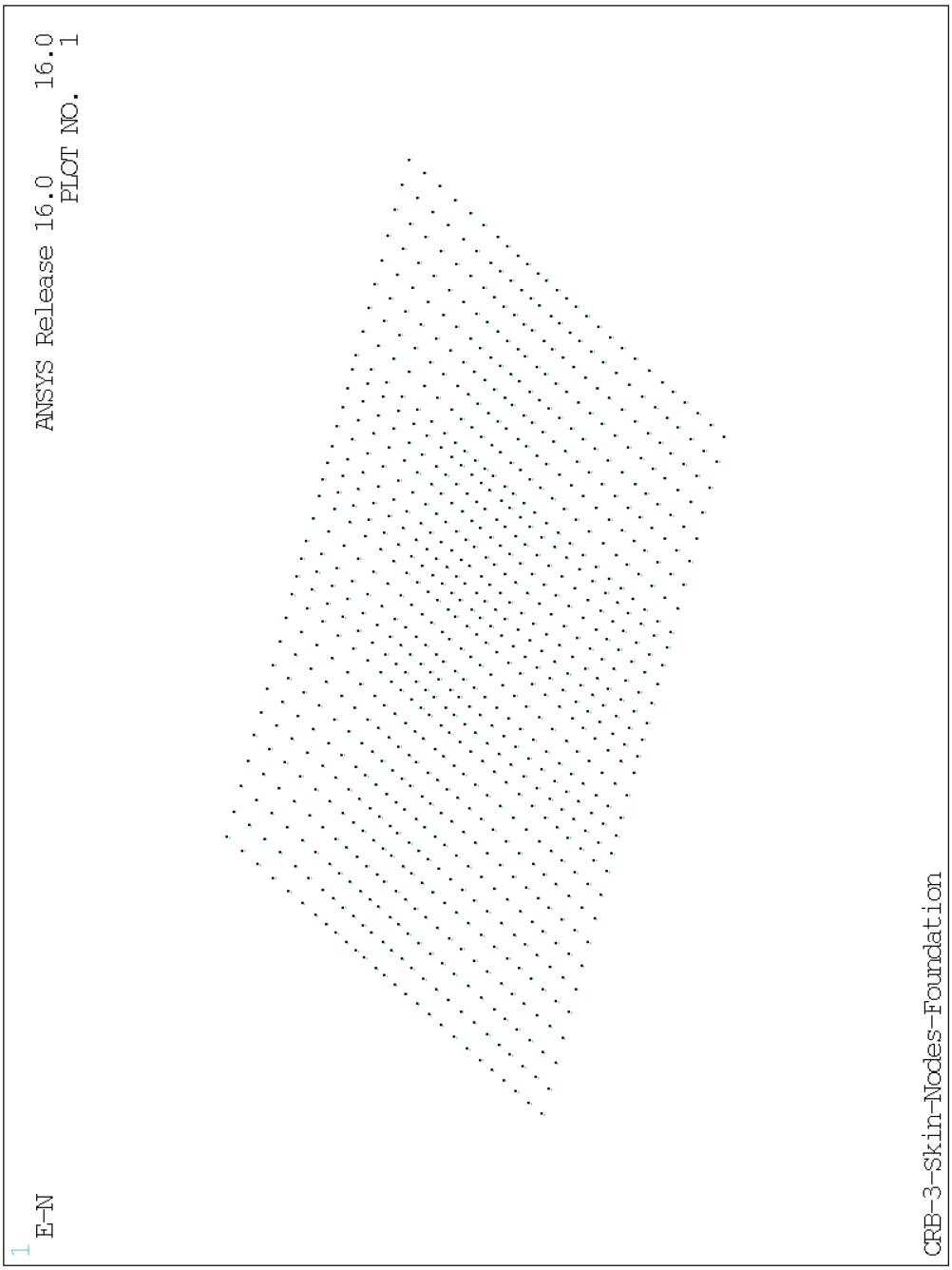


Figure 3.8.5-35: CRB Foundation Bottom Skin Nodes for Applying SASSI Time Histories

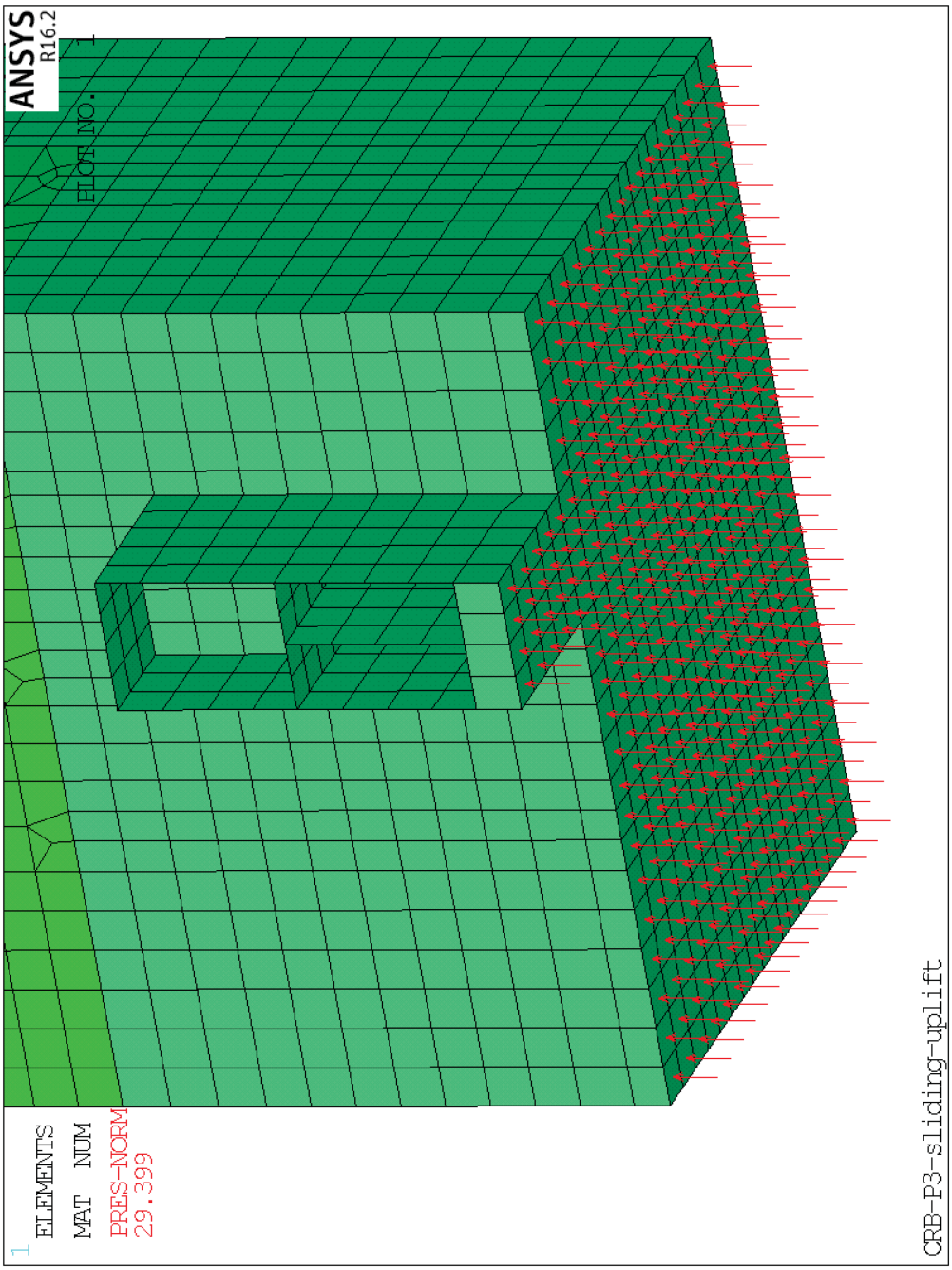


Figure 3.8.5-36: Buoyancy Load on Basemat

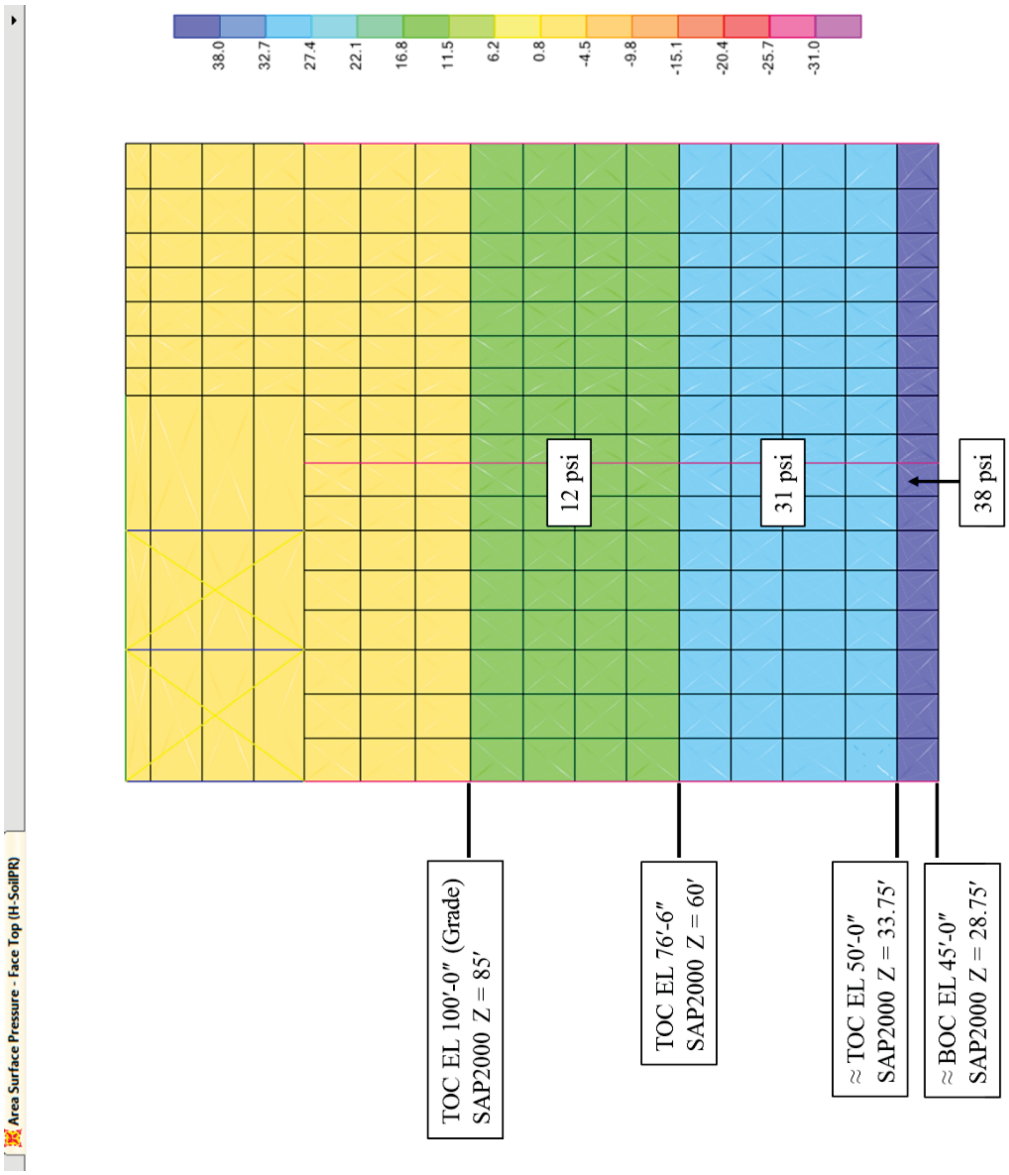


Figure 3.8.5-37: Static Soil Pressure on CRB Outer Walls

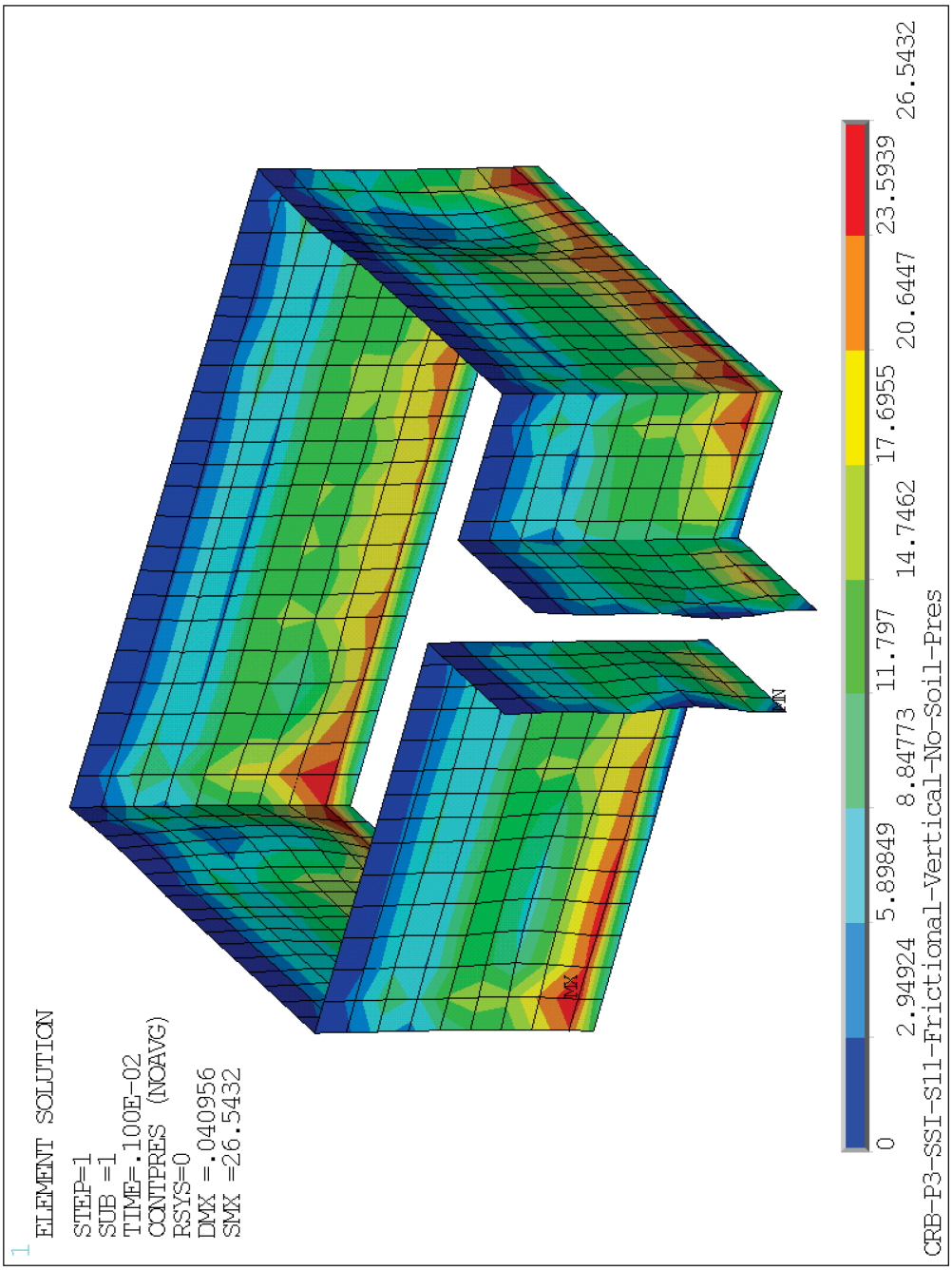


Figure 3.8.5-38: CRB Static Soil Pressure from Poisson's Ratio Effect - Soil Type 11

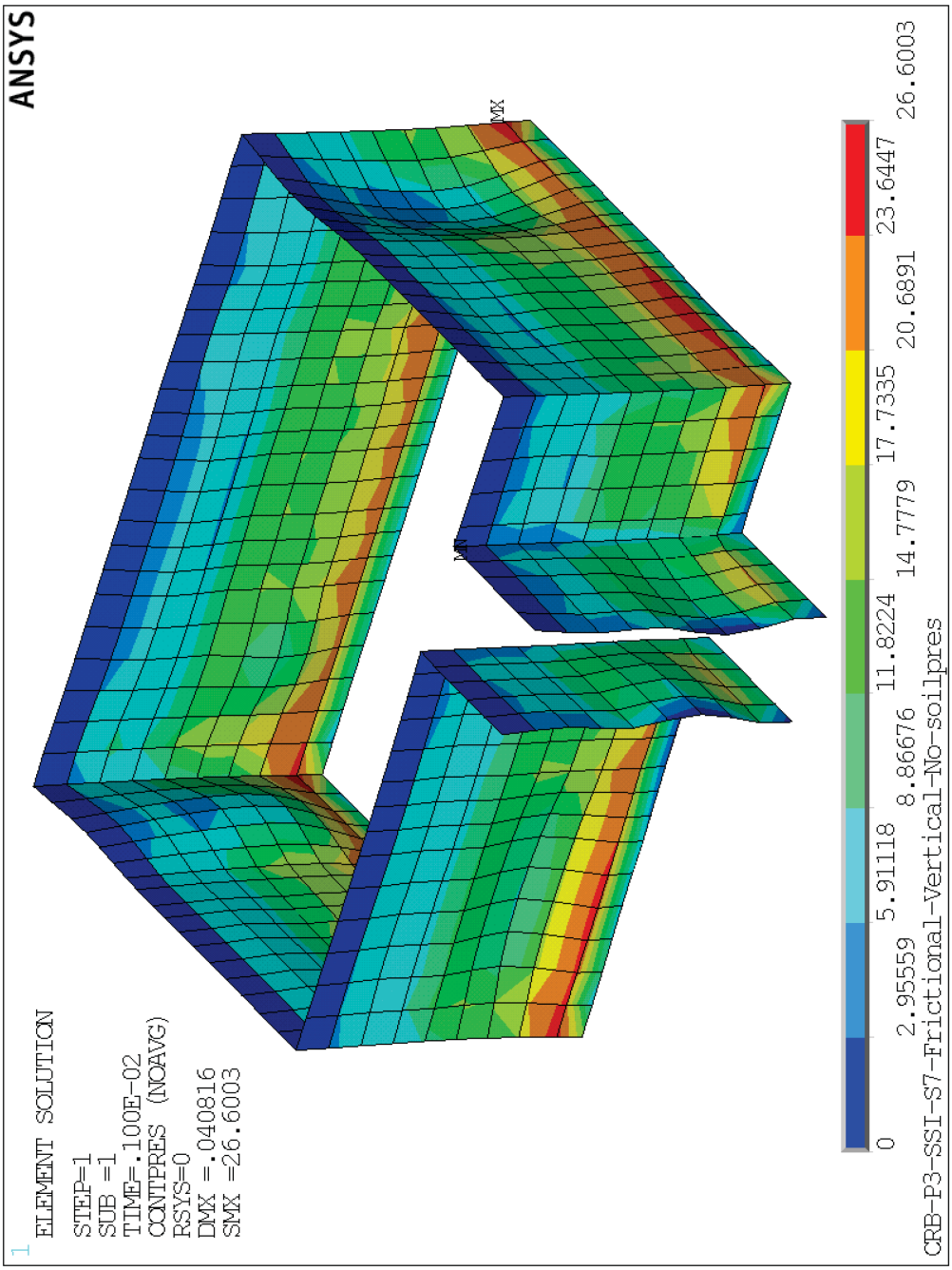


Figure 3.8.5-39: CRB Static Soil Pressure from Poisson's Ratio Effect - Soil Type 7

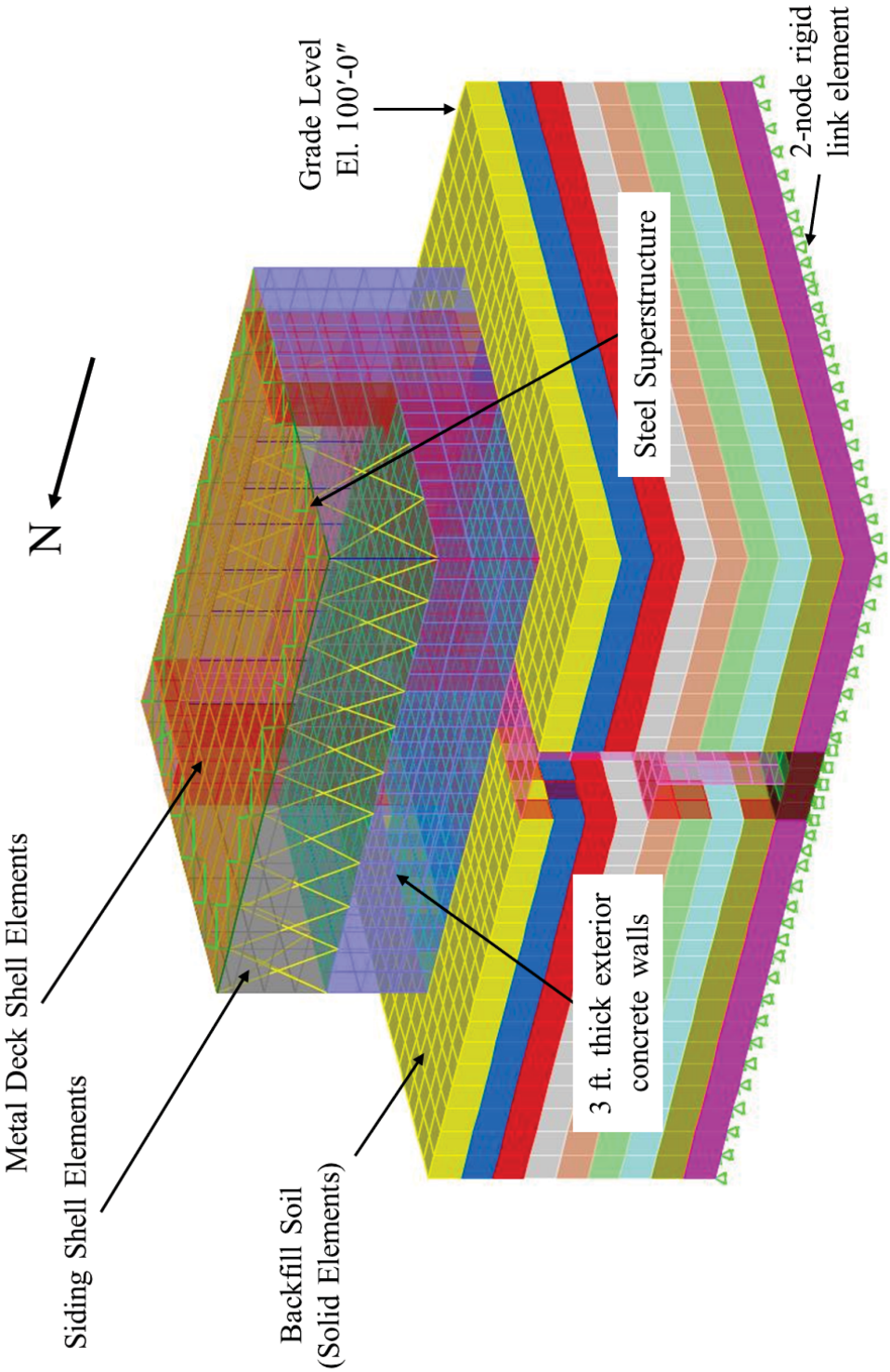


Figure 3.8.5-40: CRB SAP2000 Model with Backfill Soil

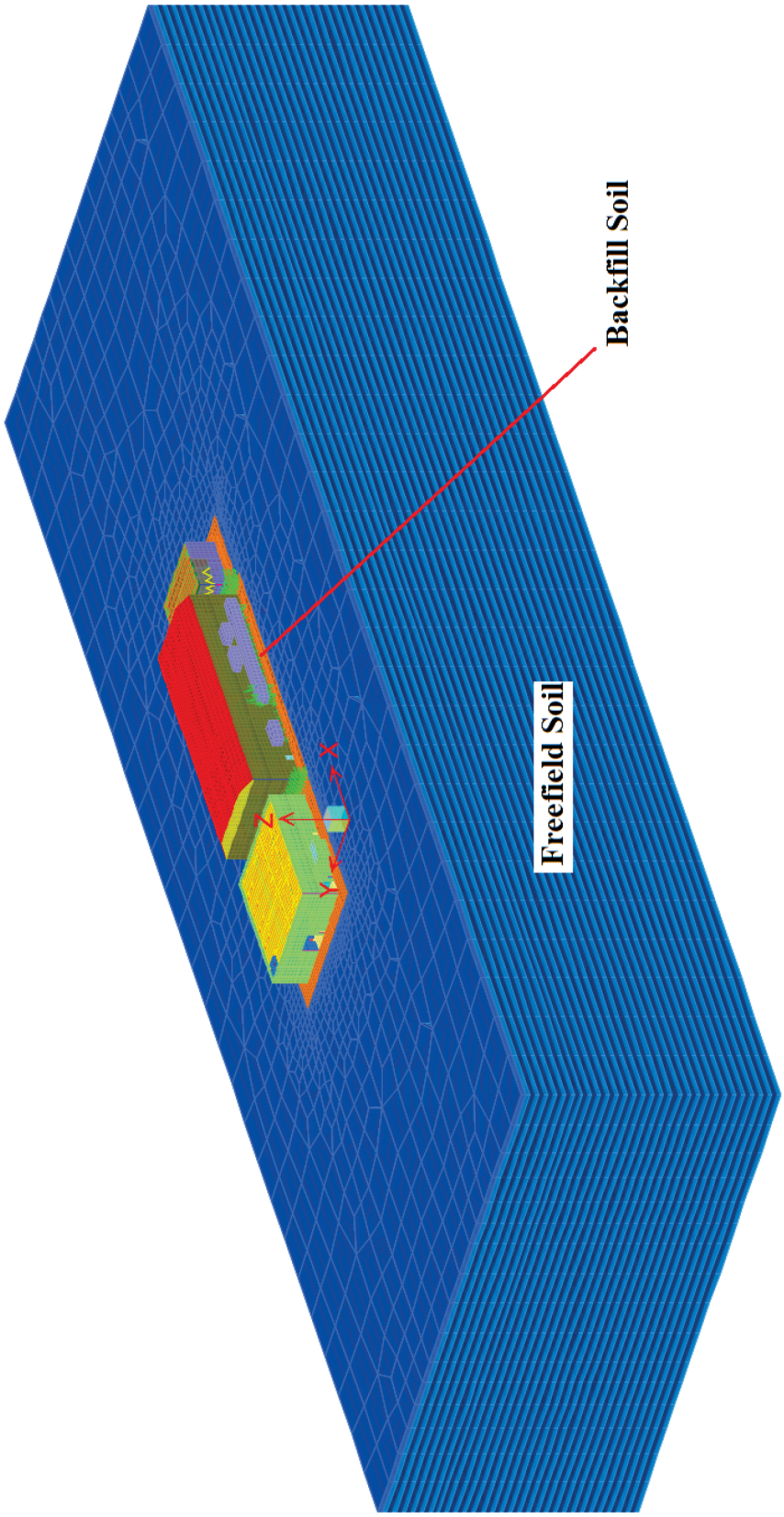


Figure 3.8.5-41: SAP2000 Model for Settlement

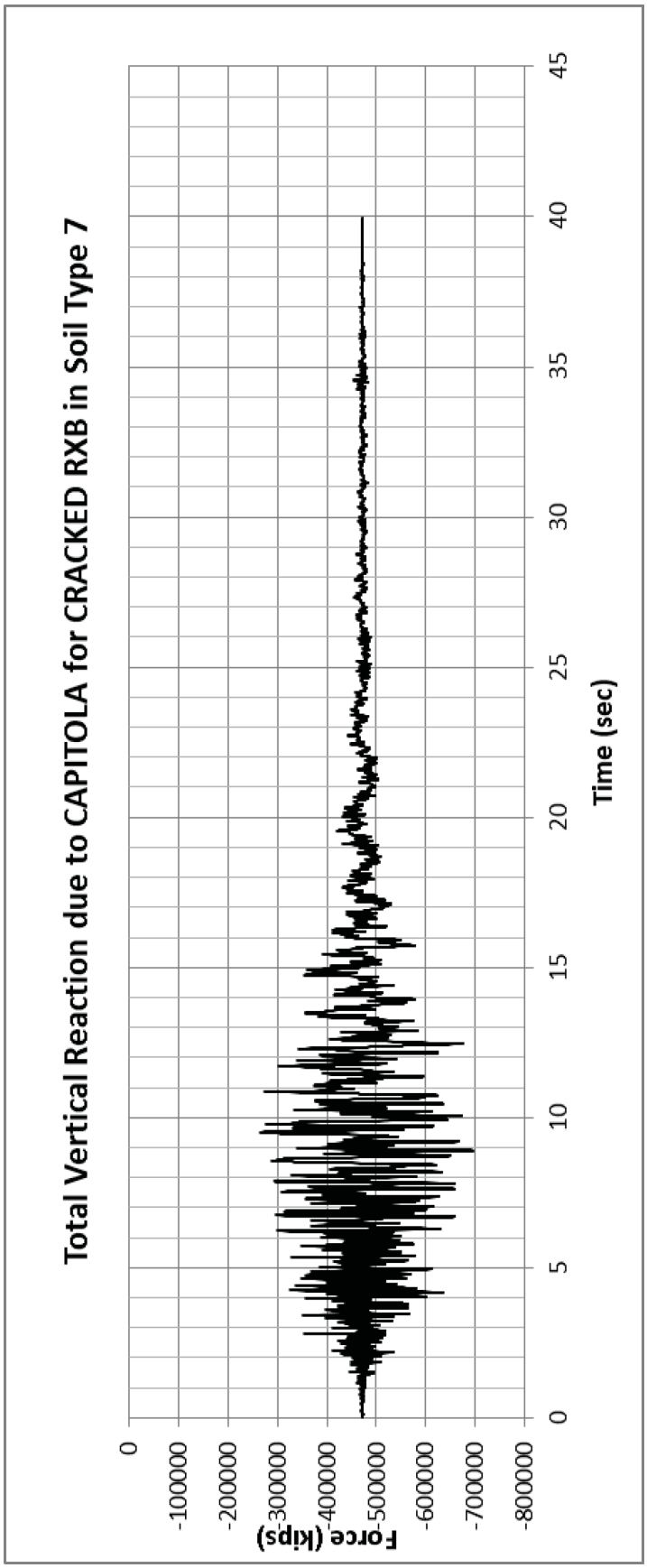
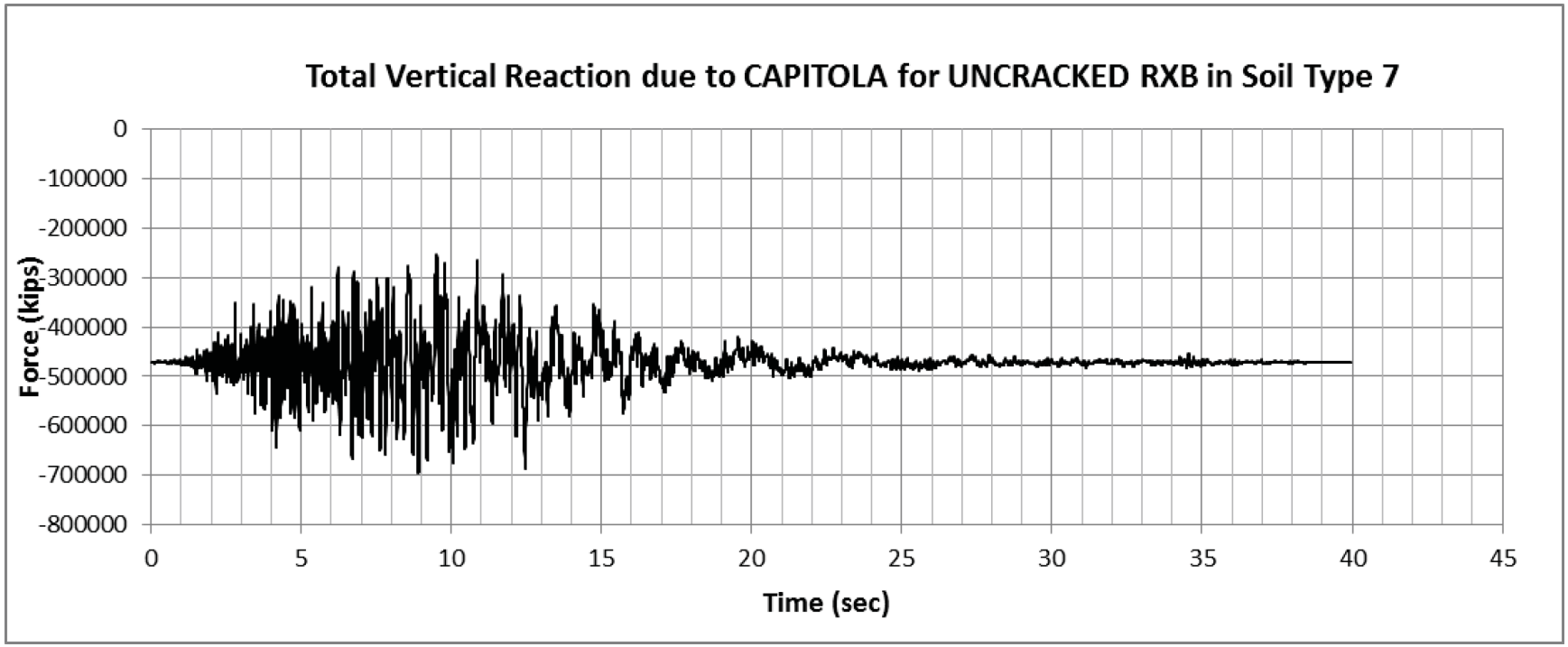


Figure 3.8.5-42: Total Cracked Base Vertical Reaction Time History due to Capitola for Soil Type 7

Figure 3.8.5-43: Total Uncracked Base Vertical Reaction Time History due to Capitola for Soil Type 7



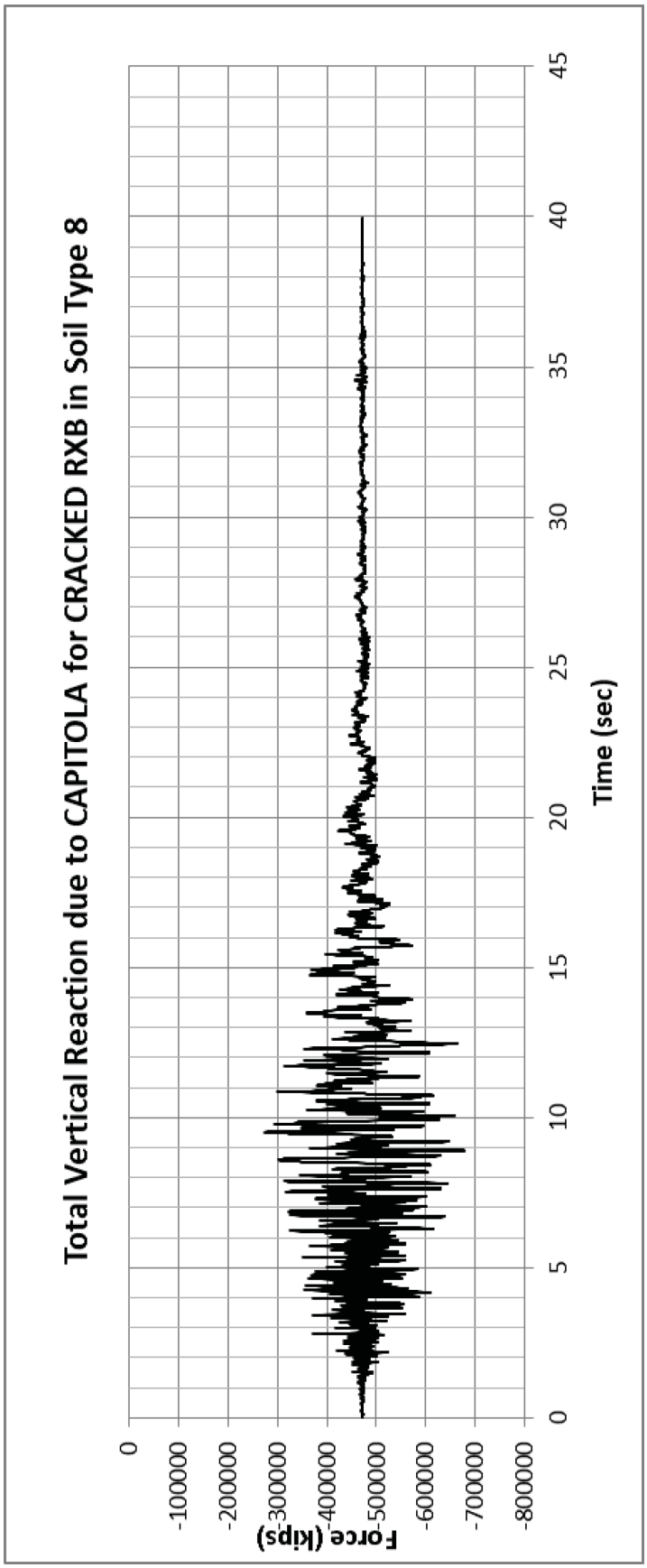


Figure 3.8.5-44: Total Cracked Base Vertical Reaction Time History due to Capitola for Soil Type 8

Figure 3.8.5-45: Total Cracked Base Vertical Reaction Time History due to Capitola for Soil Type 11

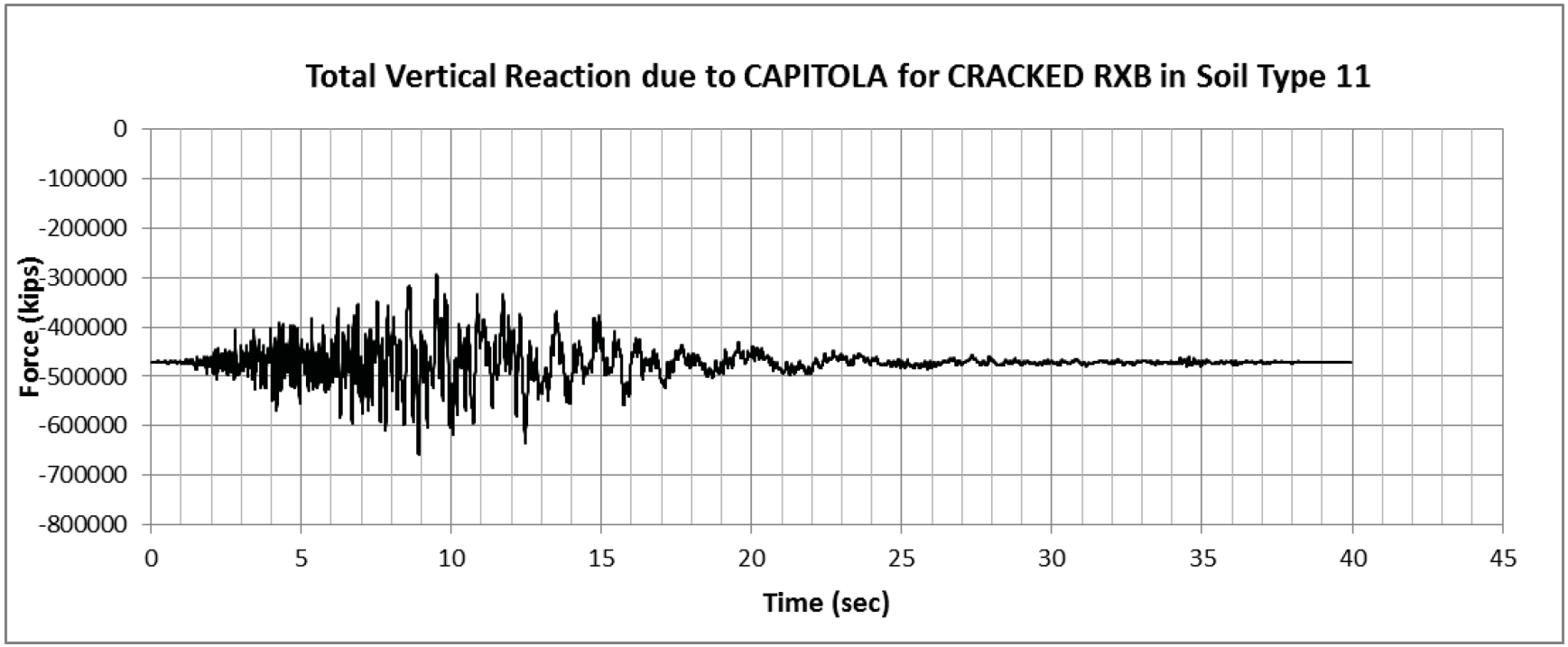


Figure 3.8.5-46: Total Cracked Base Vertical Reaction Time History due to Lucerne for Soil Type 7

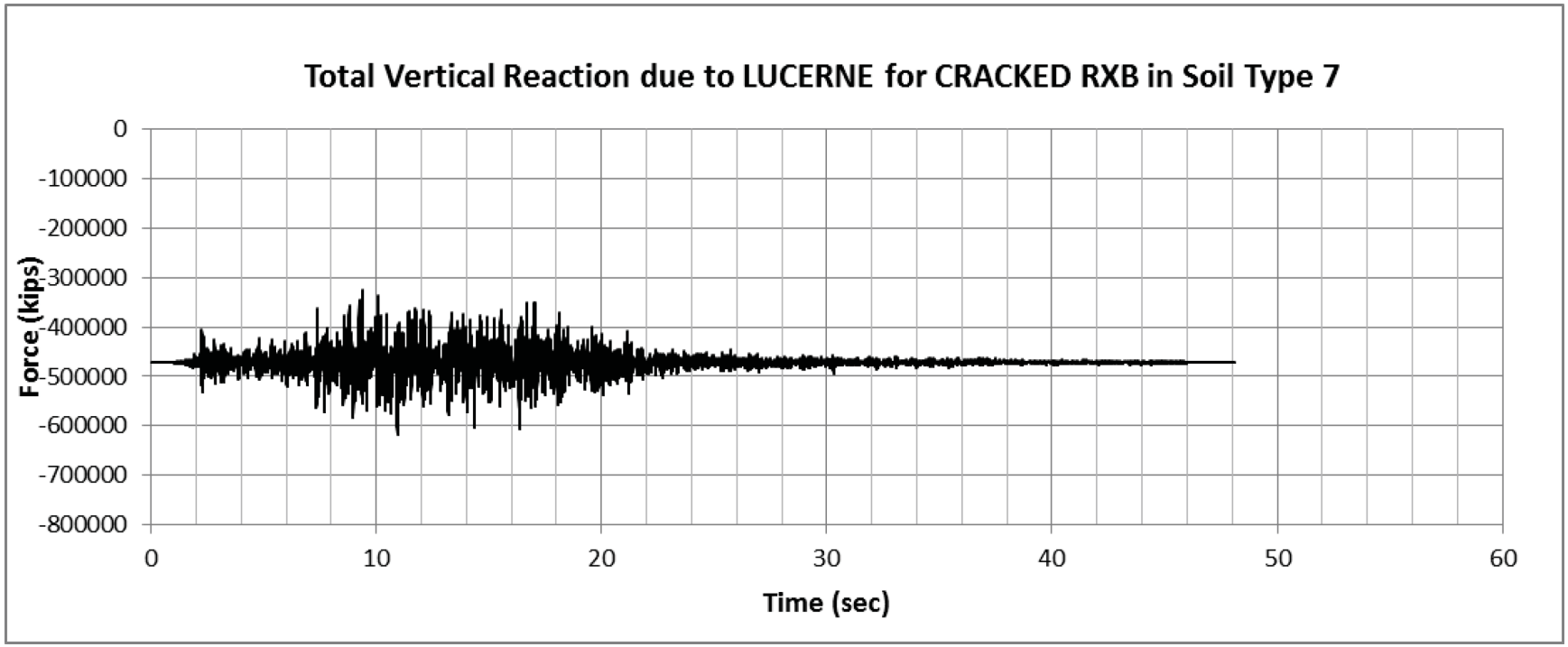
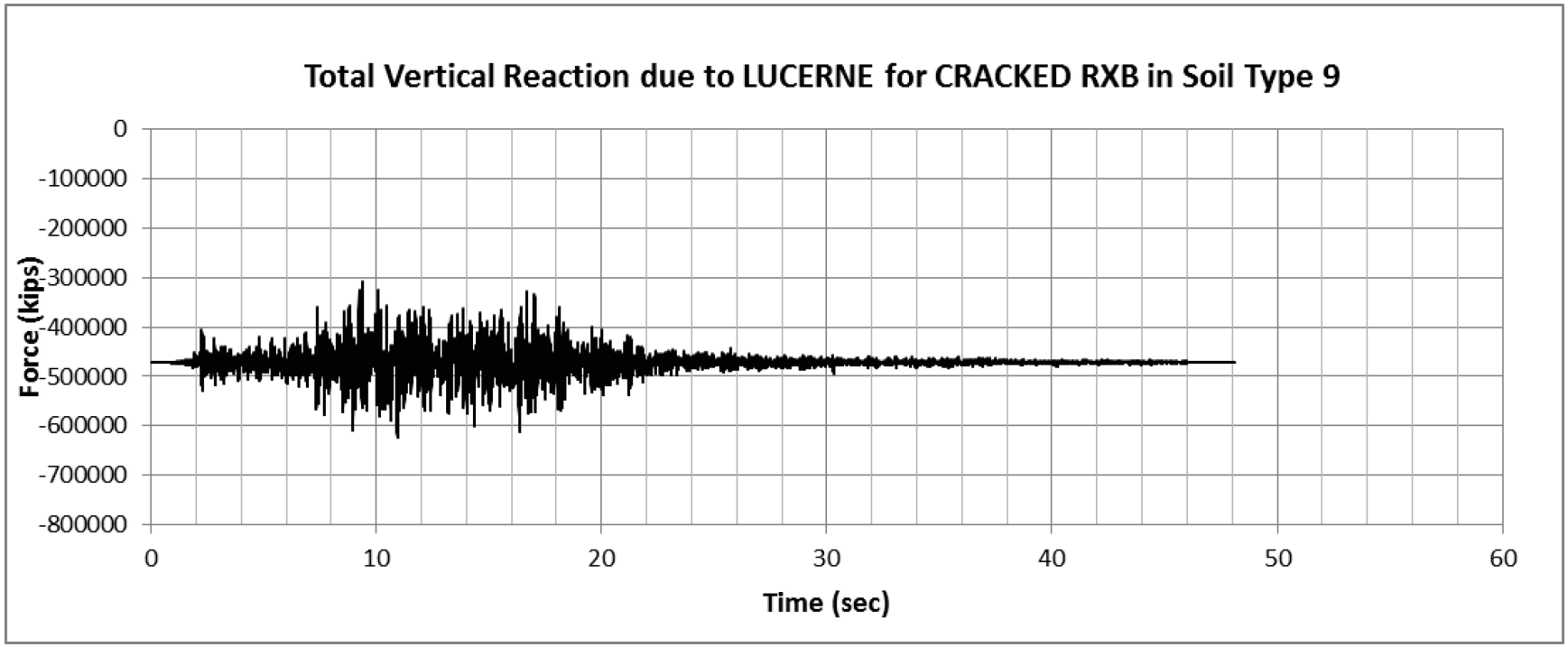


Figure 3.8.5-47: Total Cracked Base Vertical Reaction Time History due to Lucerne for Soil Type 9



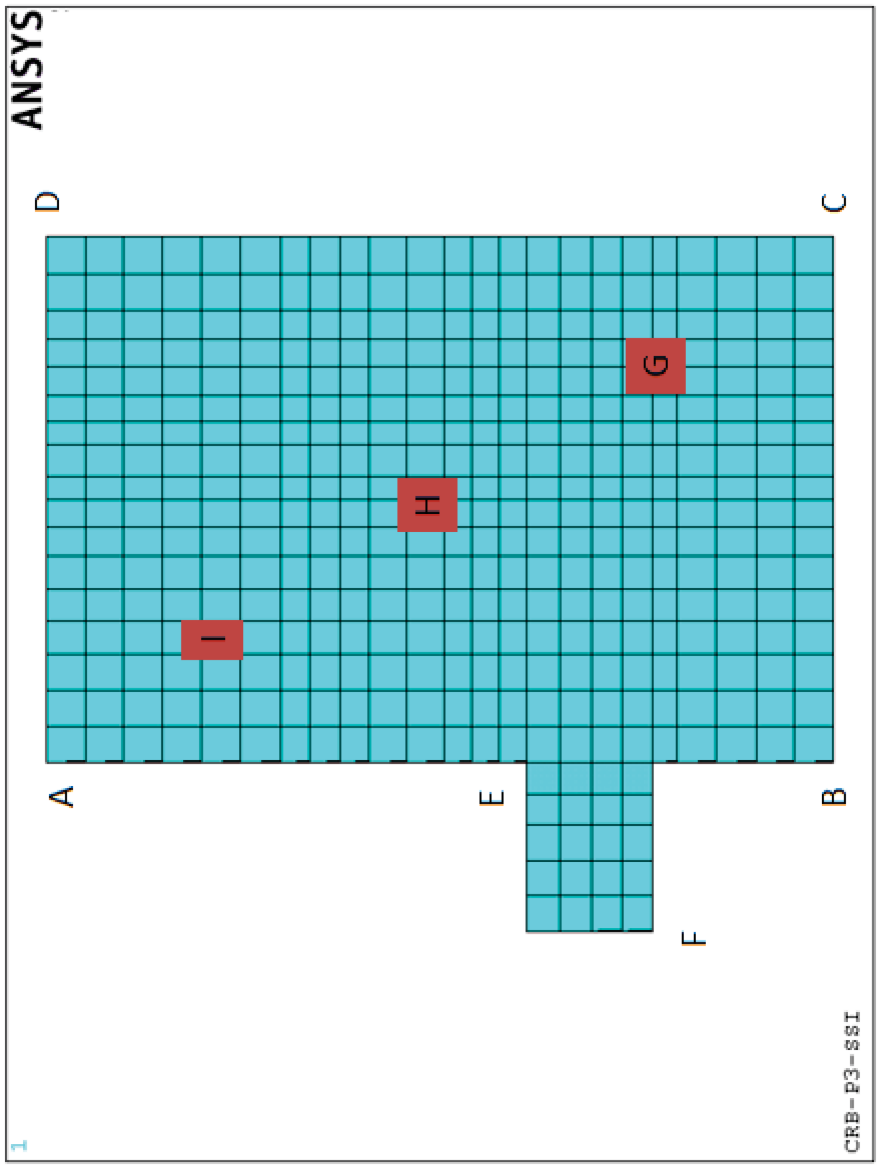


Figure 3.8.5-48: CRB Foundation Time History Location Designations

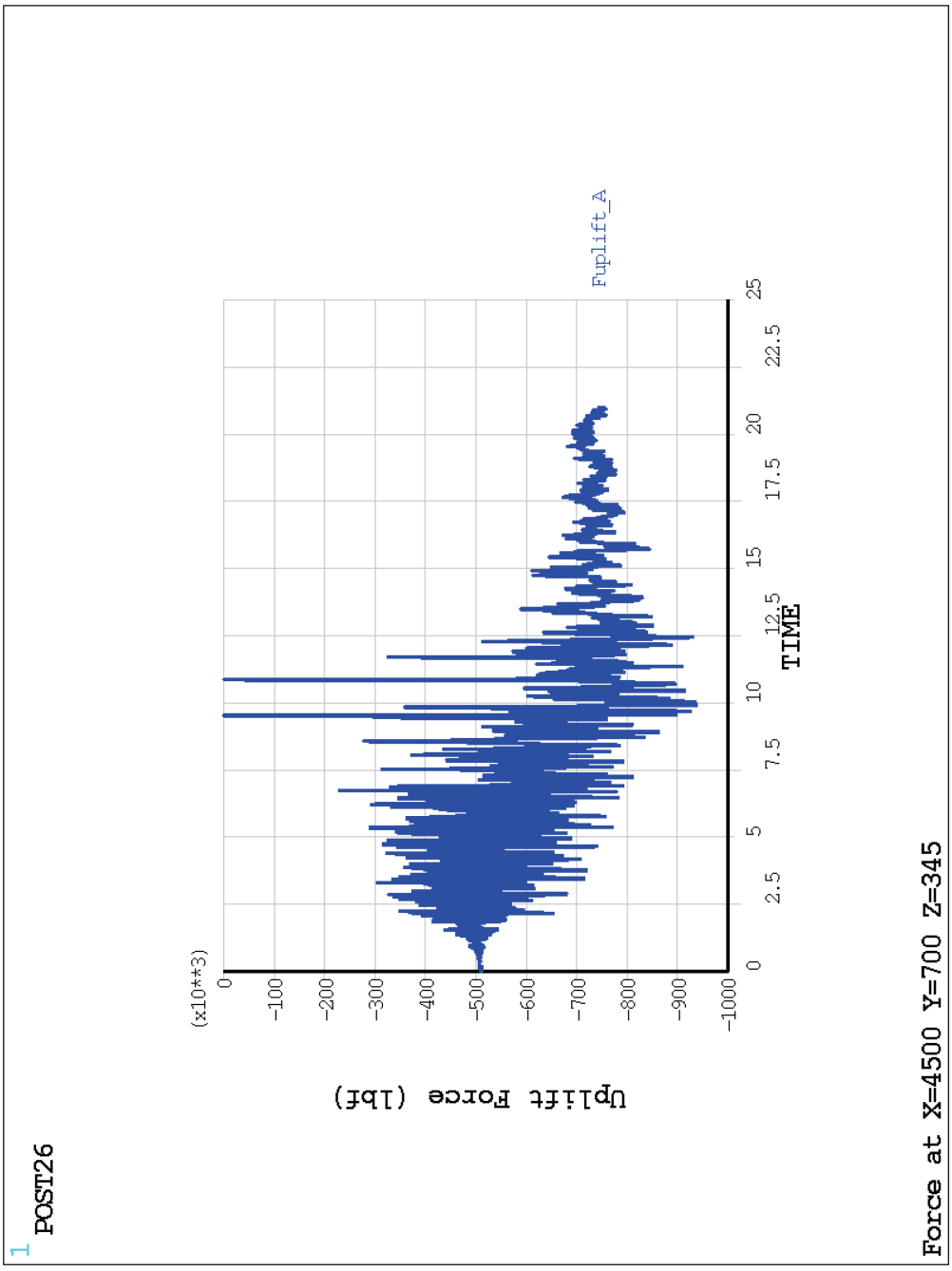


Figure 3.8.5-49: Reaction Force at Location A (S11 - Vertical Excitation)

Figure 3.8.5-50: Relative Displacement (Uplift) at Location A (S11 - Vertical Excitation)

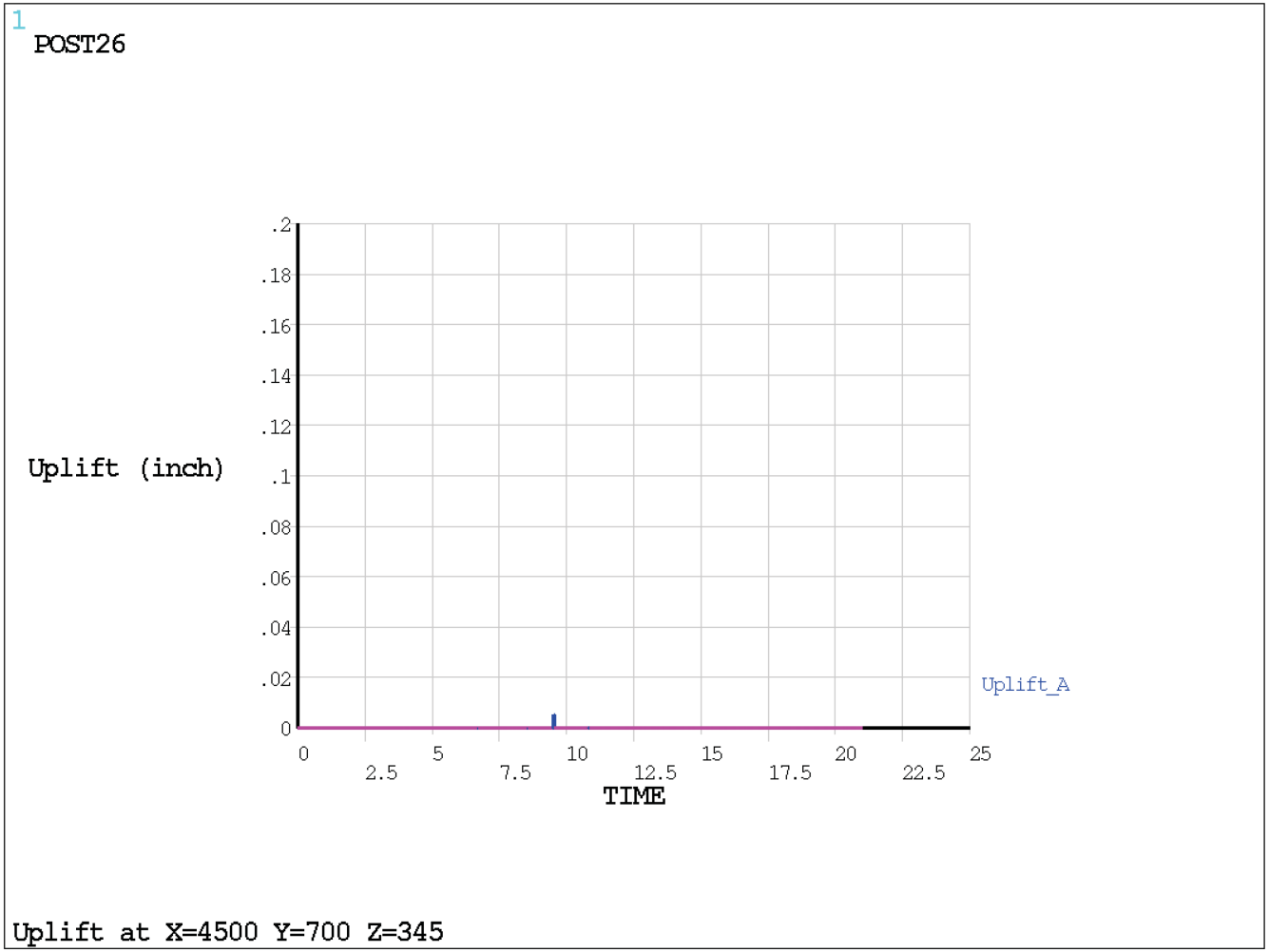


Figure 3.8.5-51: Lateral Relative Displacements (Sliding) at Location A (S11 - Vertical Excitation)

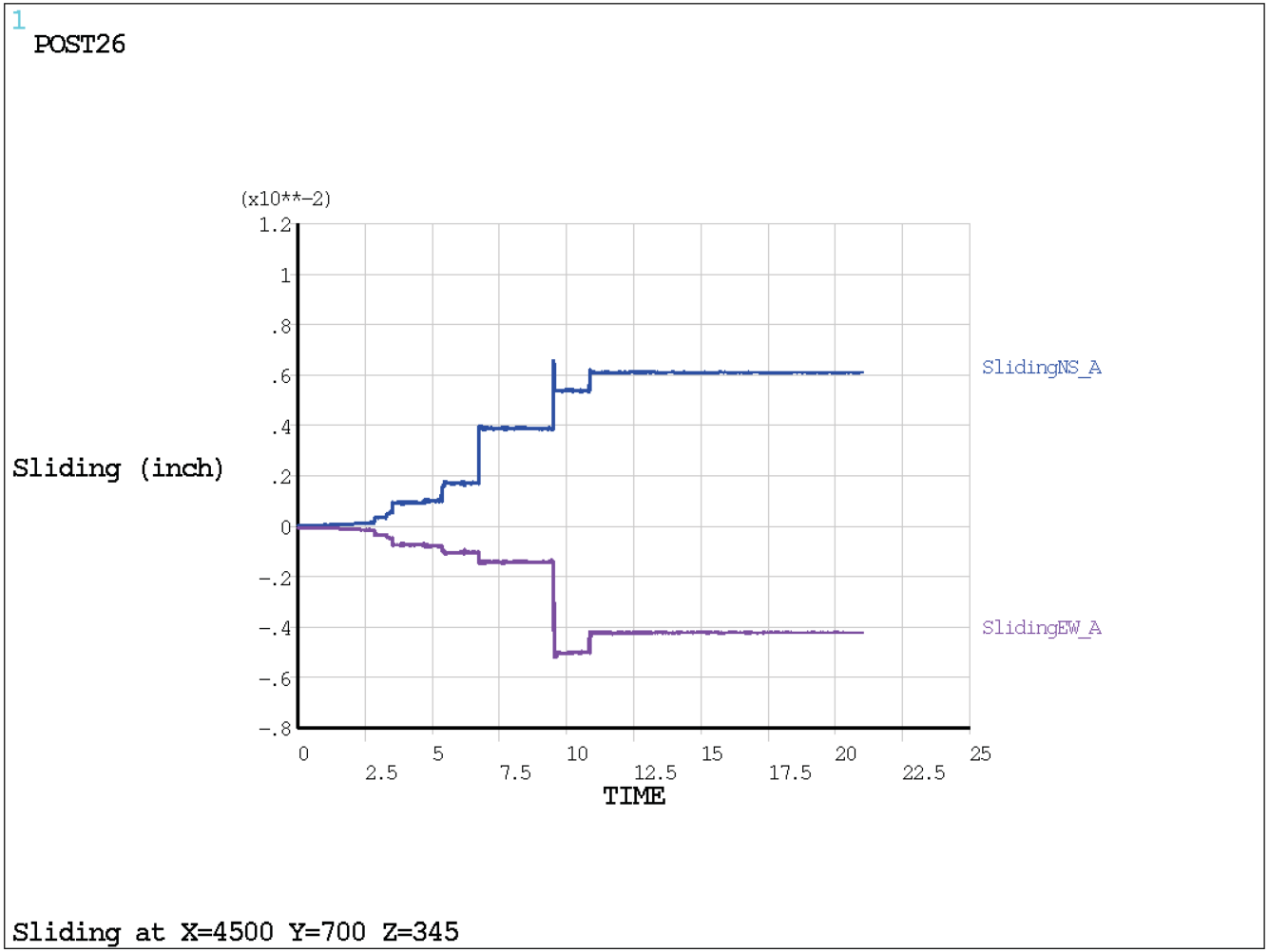


Figure 3.8.5-52: RXB Foundation Time History Location Designations

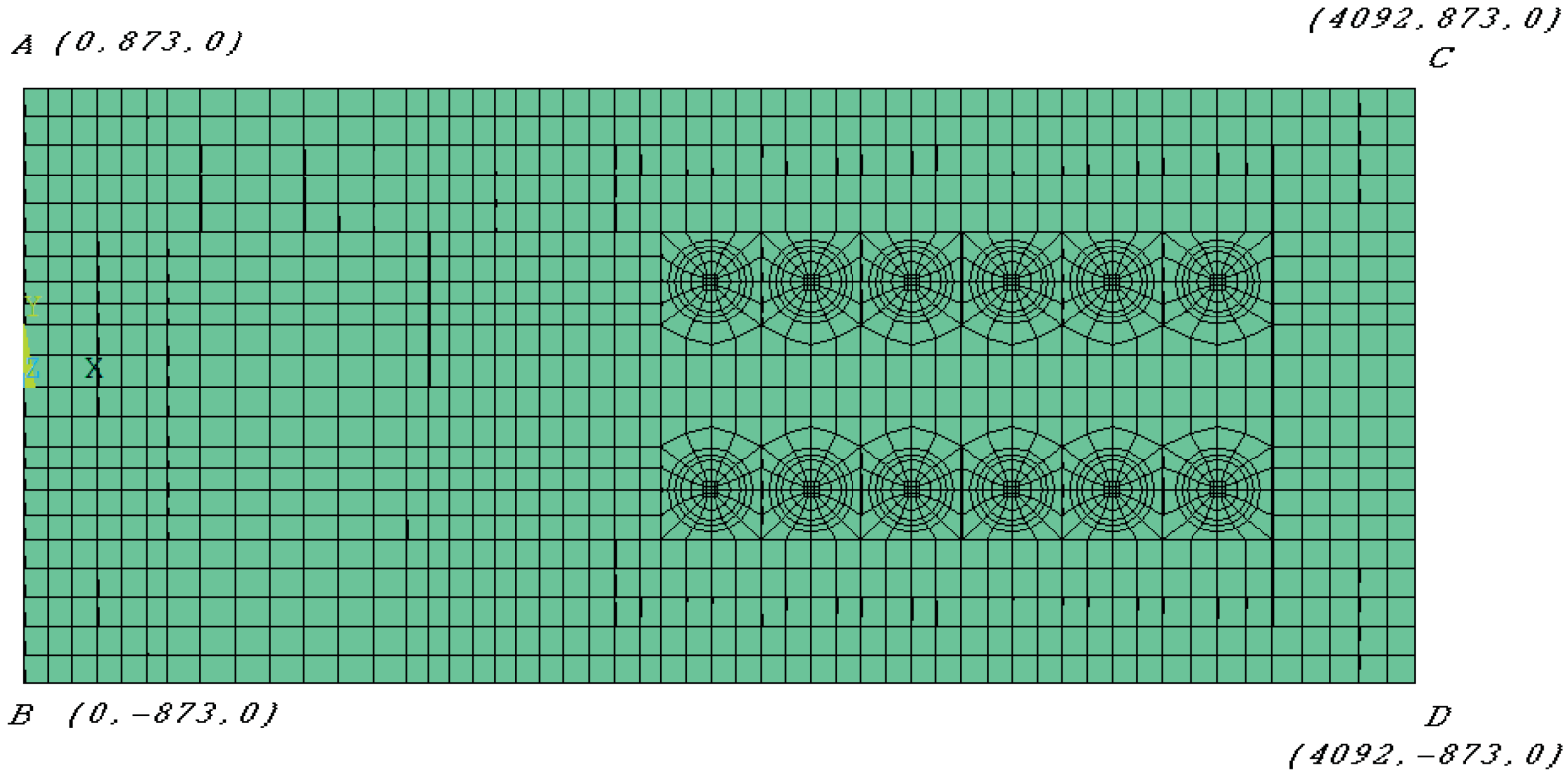
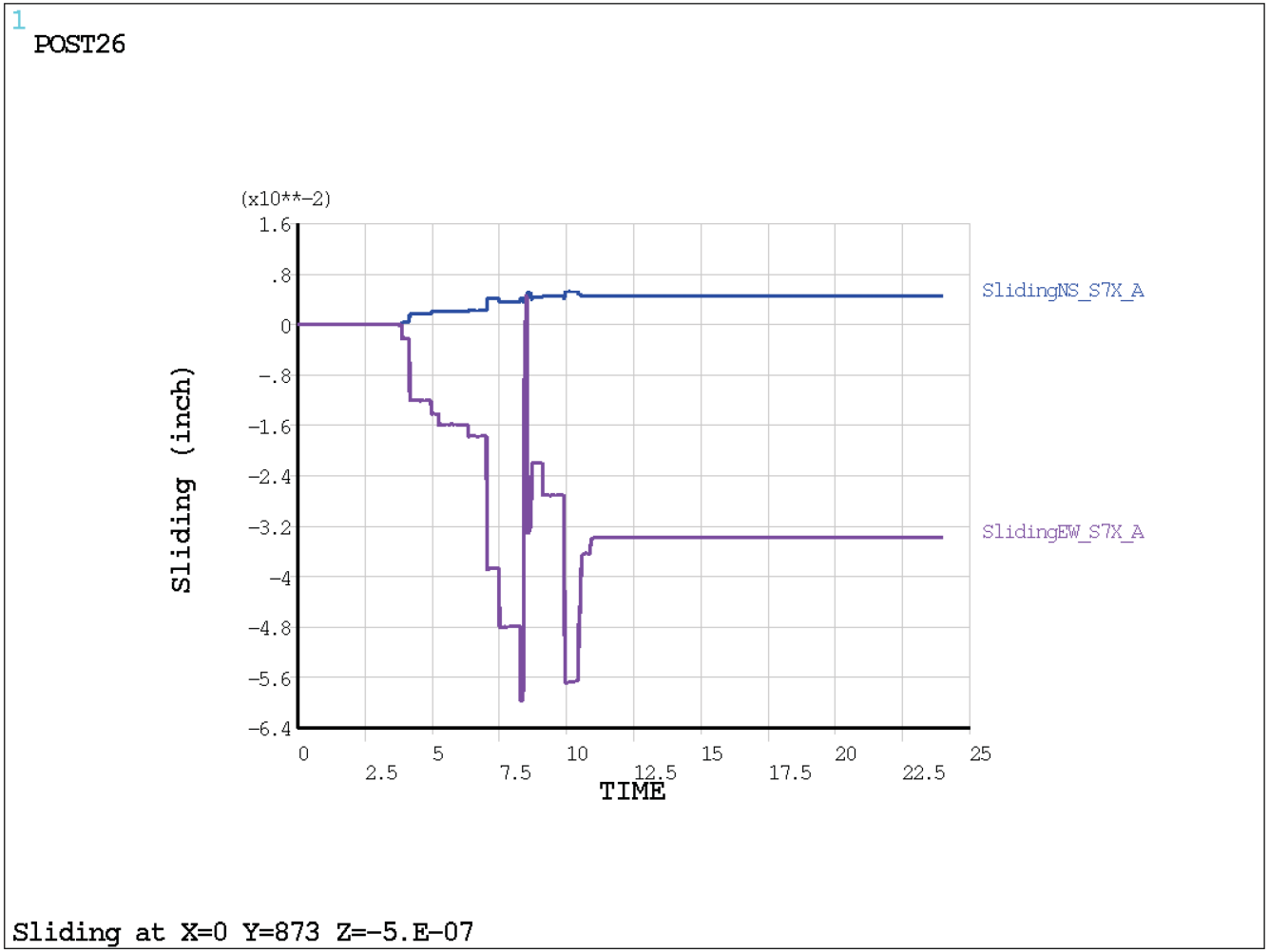


Figure 3.8.5-53: Lateral Relative Displacements (Sliding) at Location A (S7 - E-W Excitation)



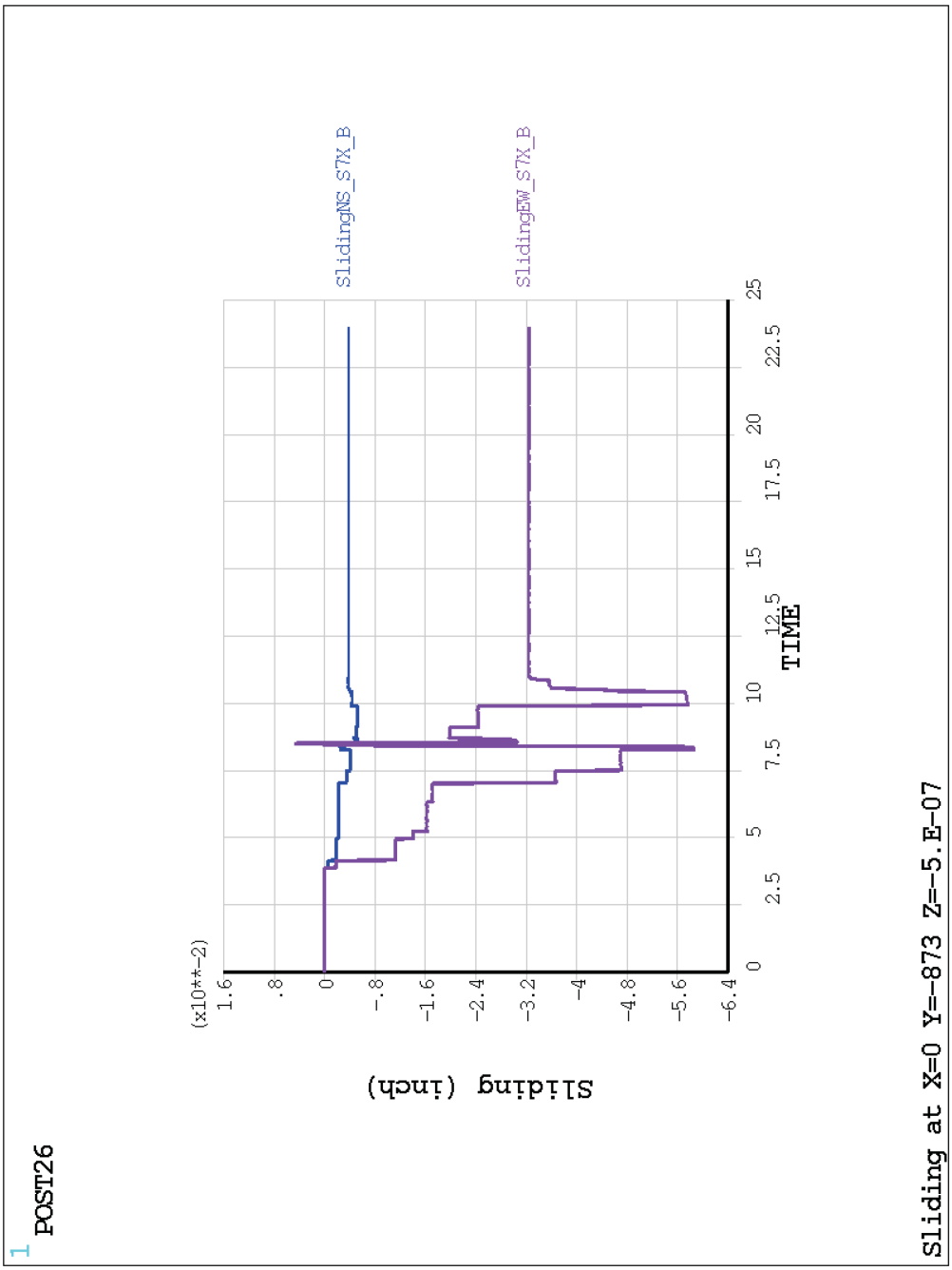


Figure 3.8.5-54: Lateral Relative Displacements (Sliding) at Location B (S7 – E-W Excitation)

Figure 3.8.5-55: Lateral Relative Displacements (Sliding) at Location C (S7 - E-W Excitation)

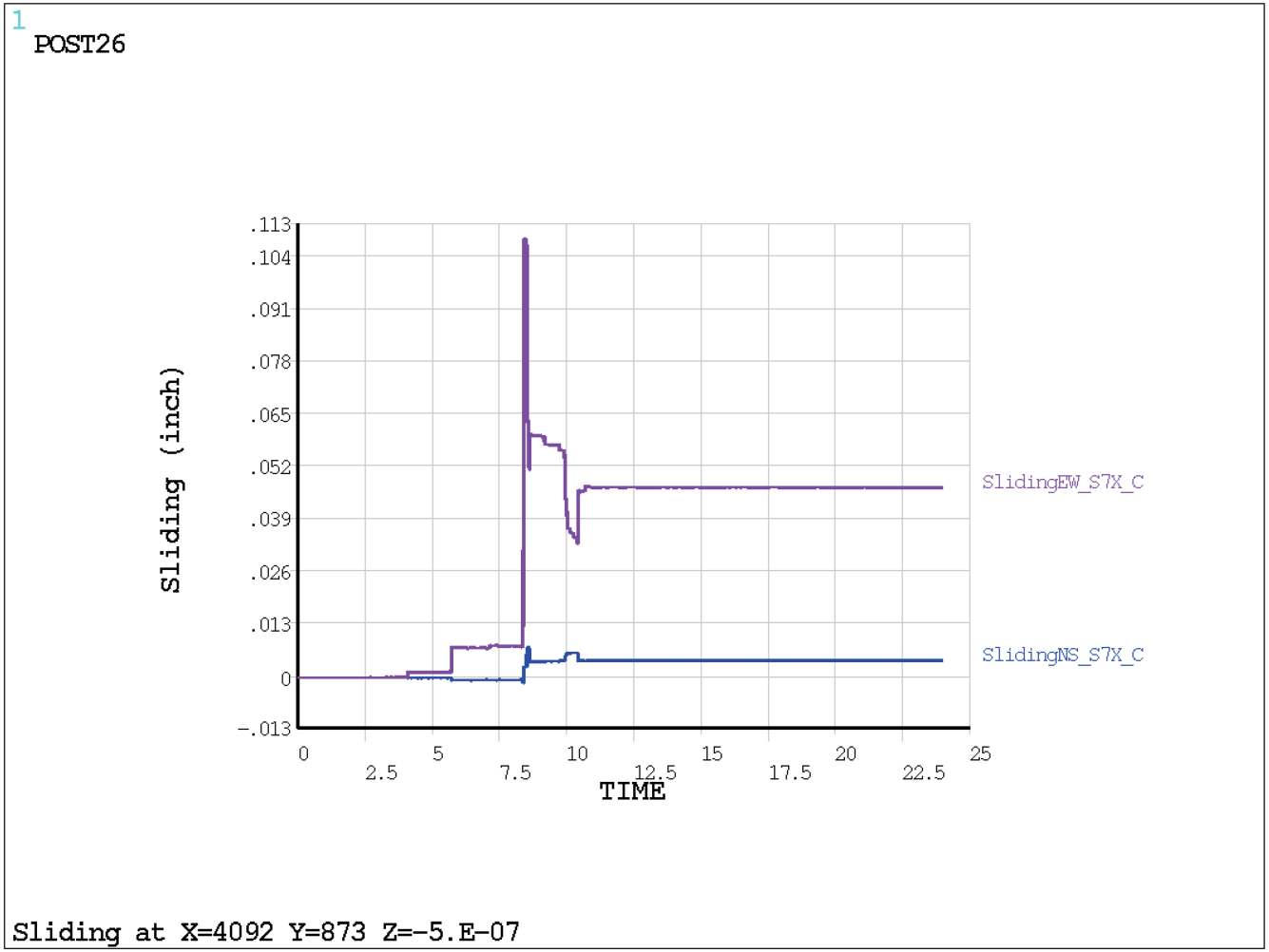
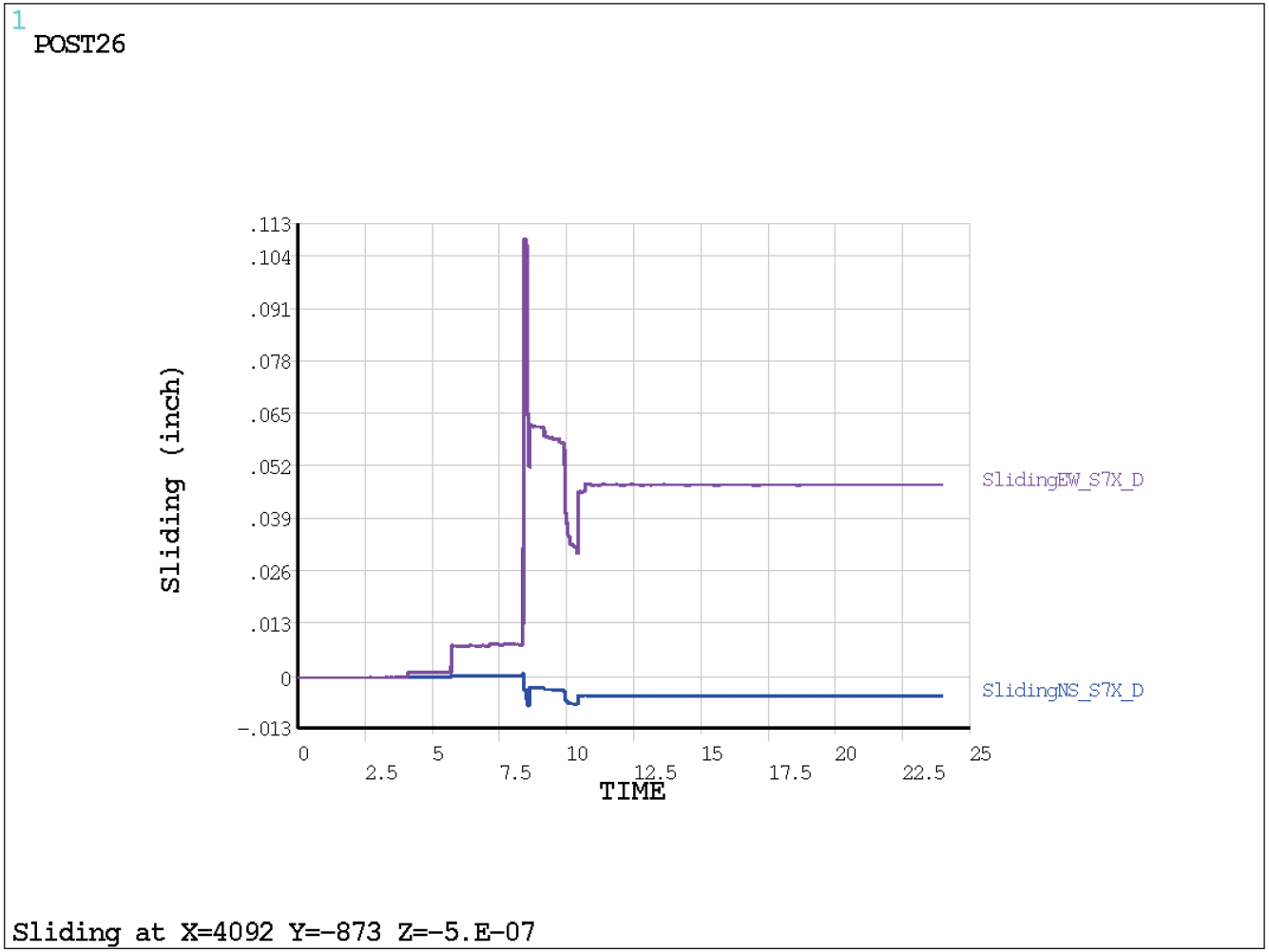


Figure 3.8.5-56: Lateral Relative Displacements (Sliding) at Location D (S7 - E-W Excitation)



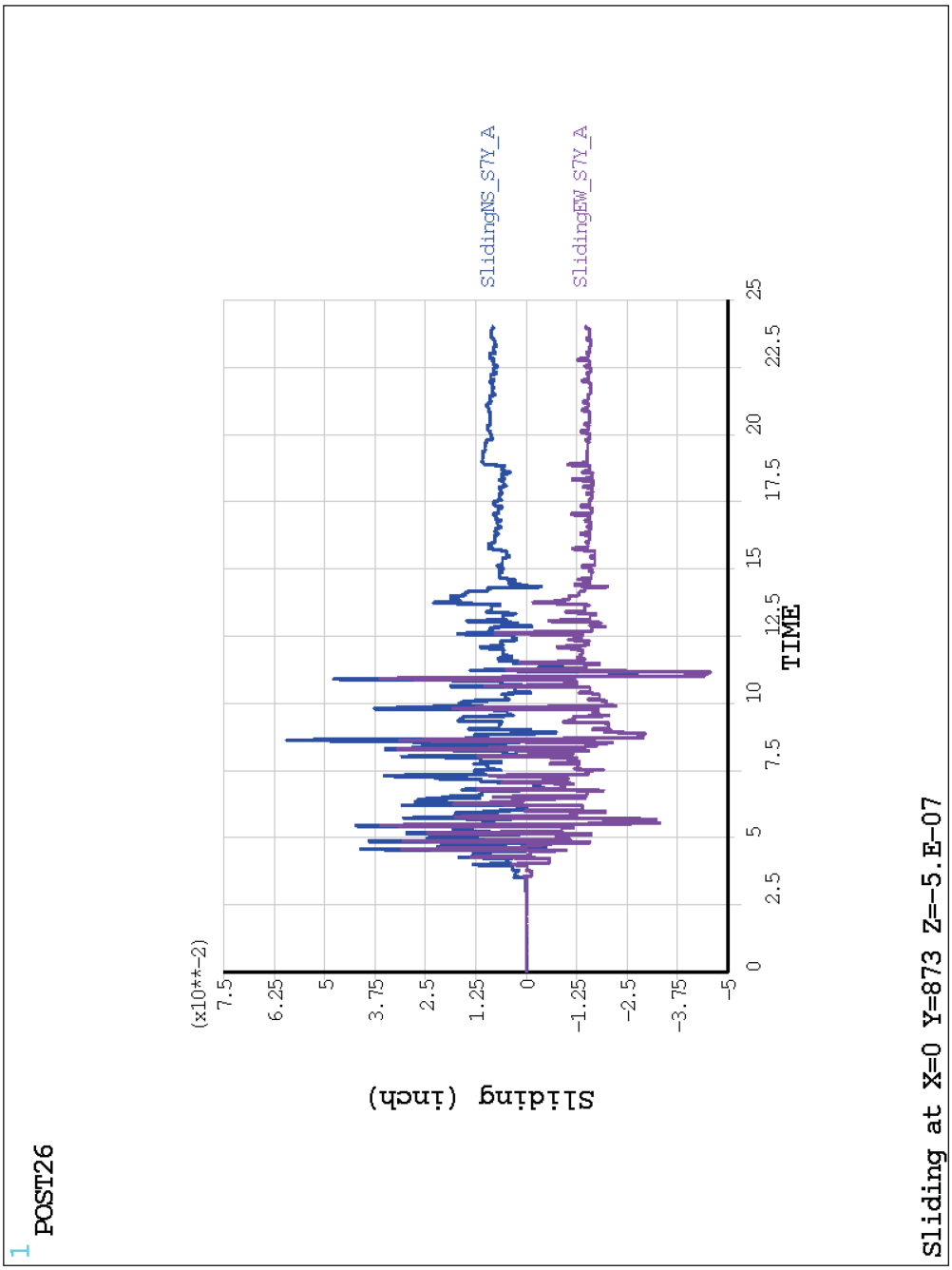


Figure 3.8.5-57: Lateral Relative Displacements (Sliding) at Location A (S7 - N-S Excitation)

Figure 3.8.5-58: Lateral Relative Displacements (Sliding) at Location B (S7 - N-S Excitation)

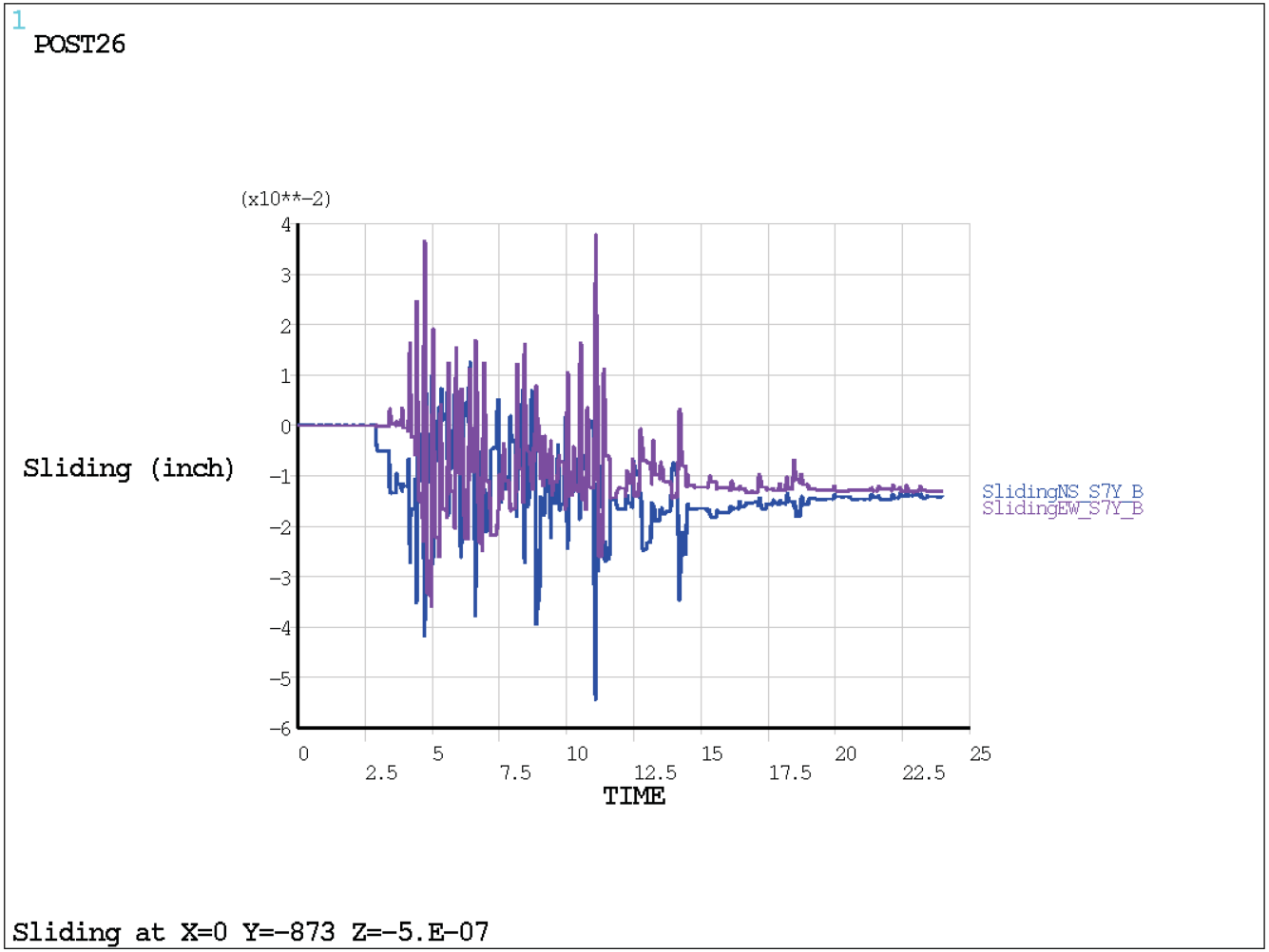


Figure 3.8.5-59: Lateral Relative Displacements (Sliding) at Location C (S7 - N-S Excitation)

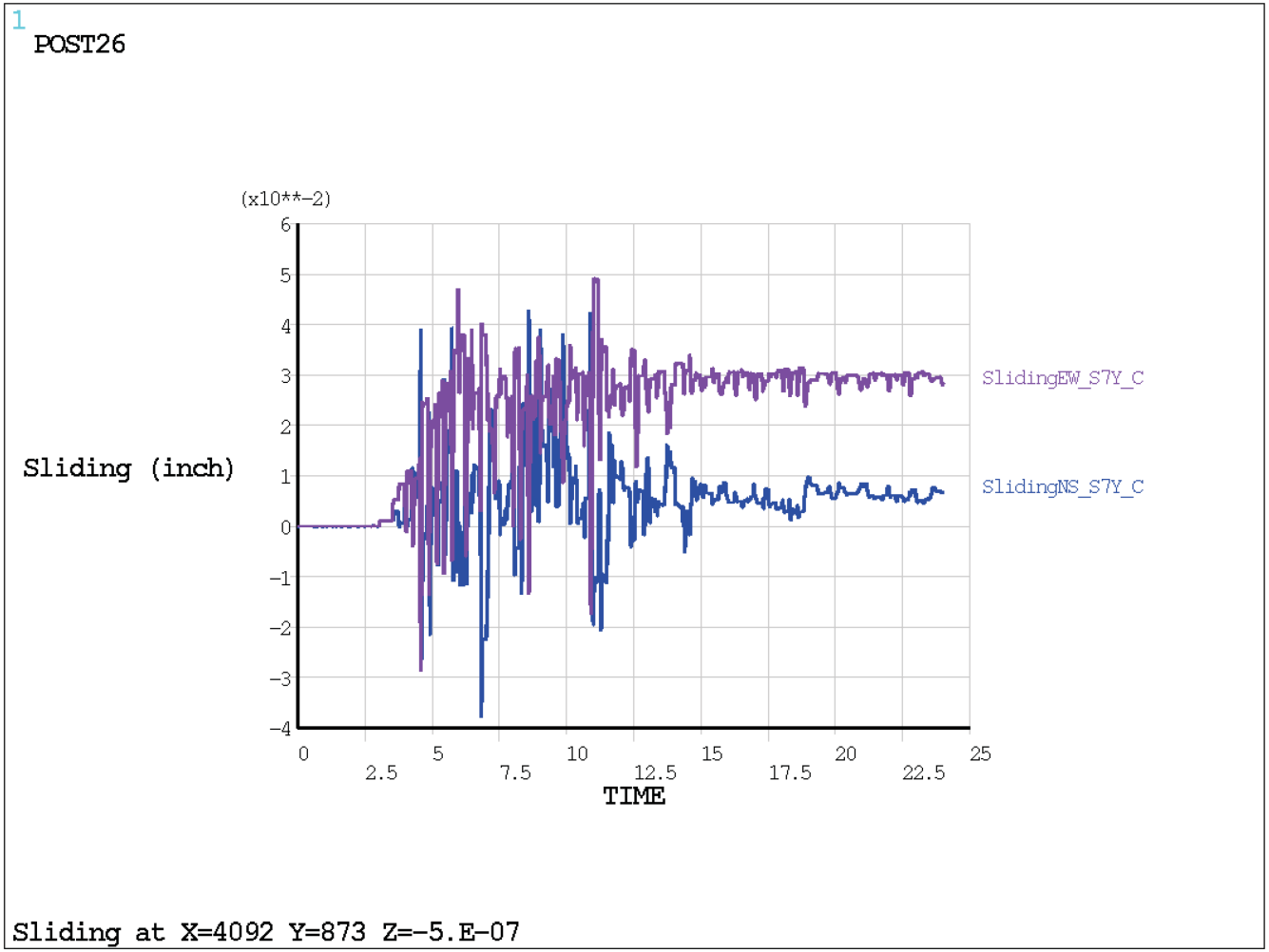
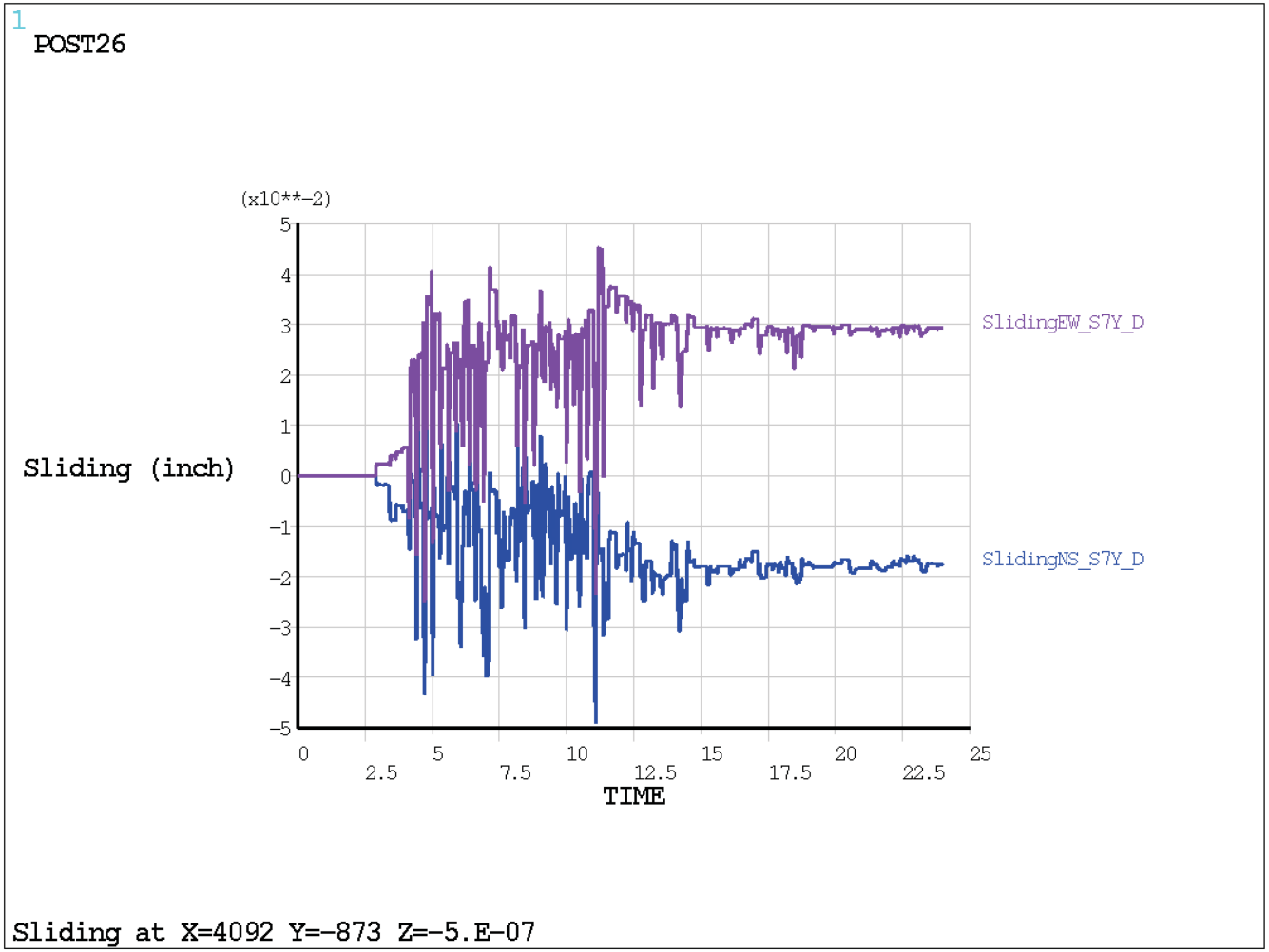


Figure 3.8.5-60: Lateral Relative Displacements (Sliding) at Location D (S7 - N-S Excitation)



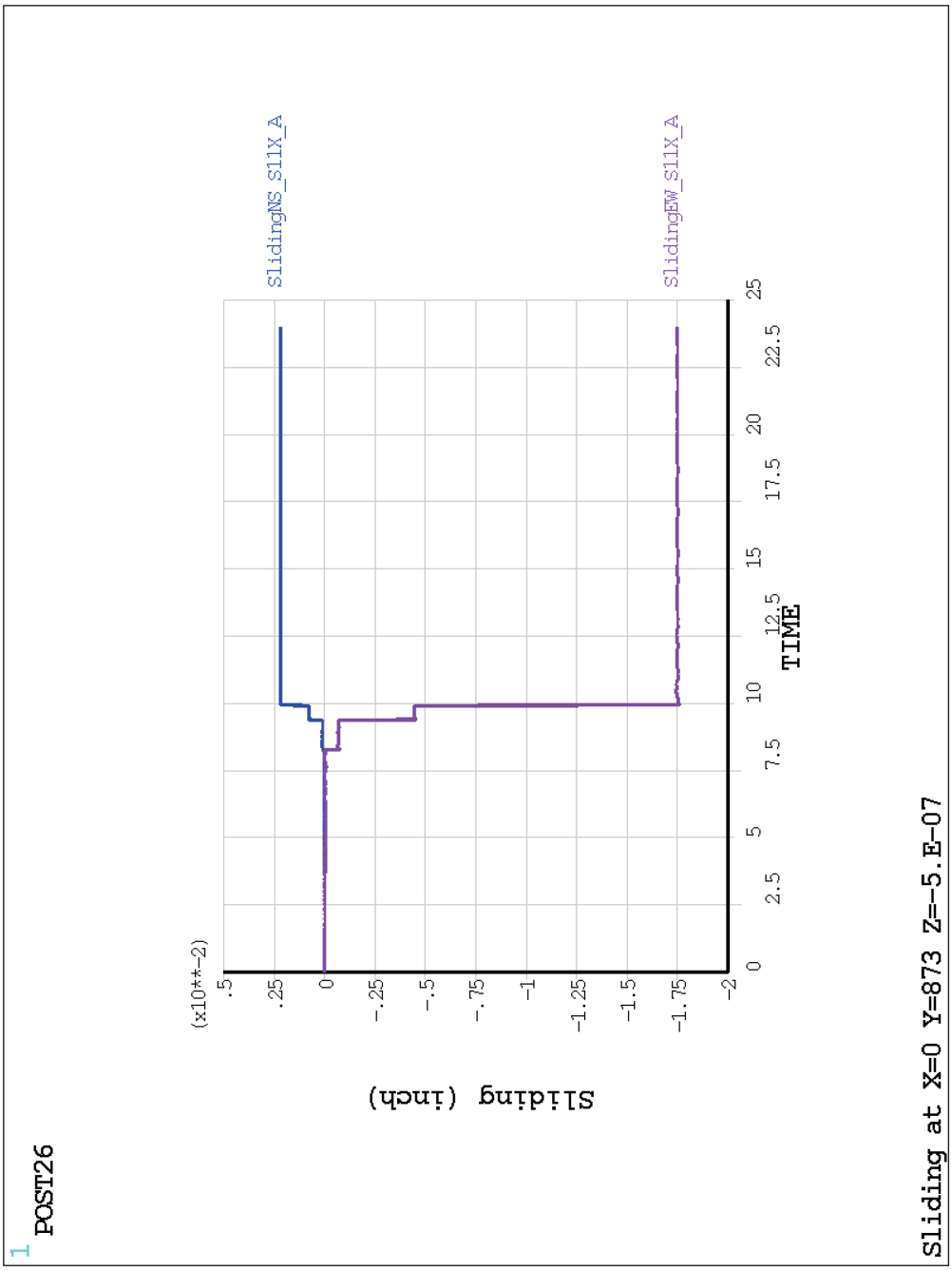


Figure 3.8.5-61: Lateral Relative Displacements (Sliding) at Location A (S11 - E-W Excitation)

Figure 3.8.5-62: Lateral Relative Displacements (Sliding) at Location B (S11 - E-W Excitation)

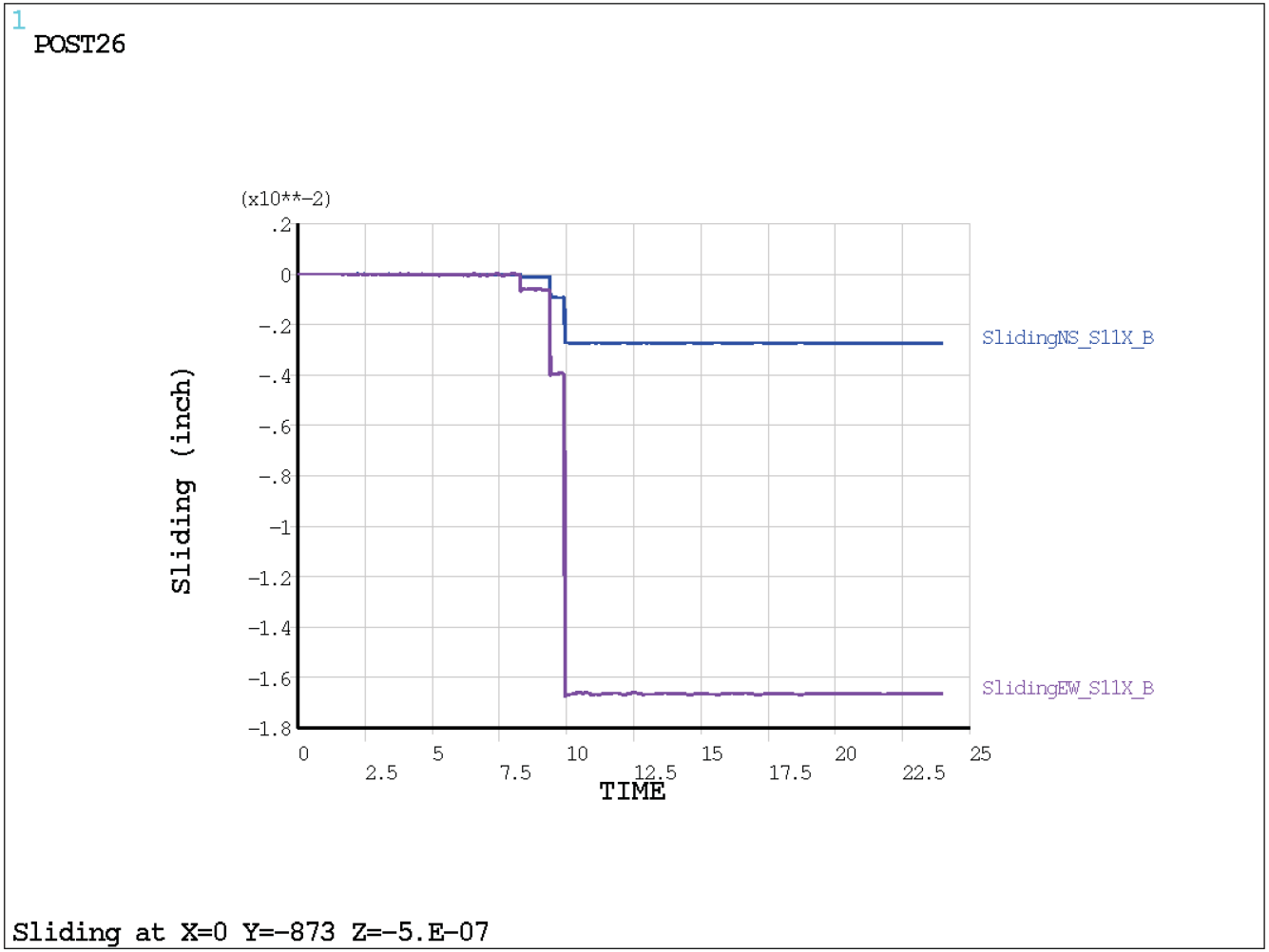


Figure 3.8.5-63: Lateral Relative Displacements (Sliding) at Location C (S11 - E-W Excitation)

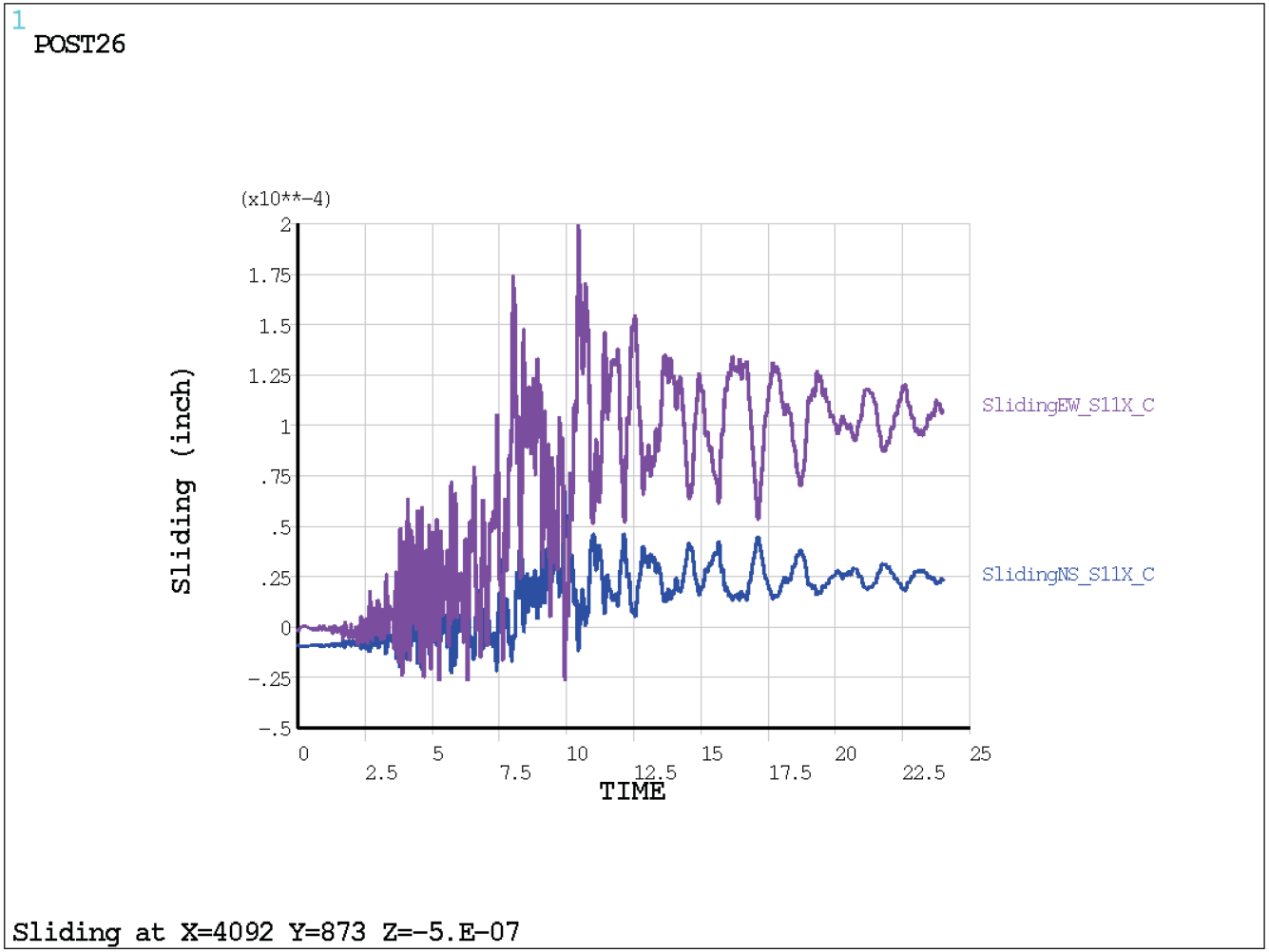
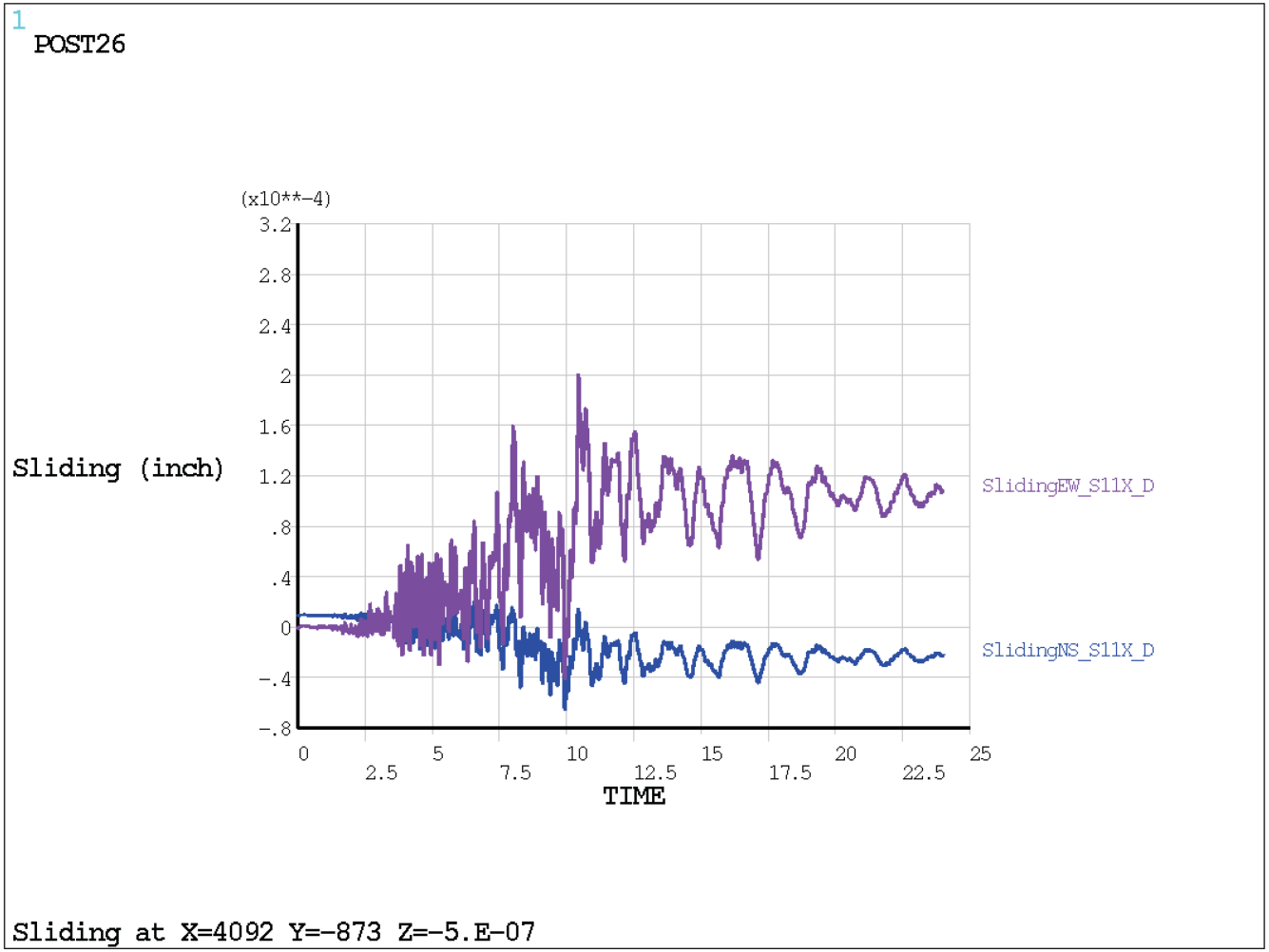


Figure 3.8.5-64: Lateral Relative Displacements (Sliding) at Location D (S11 - E-W Excitation)



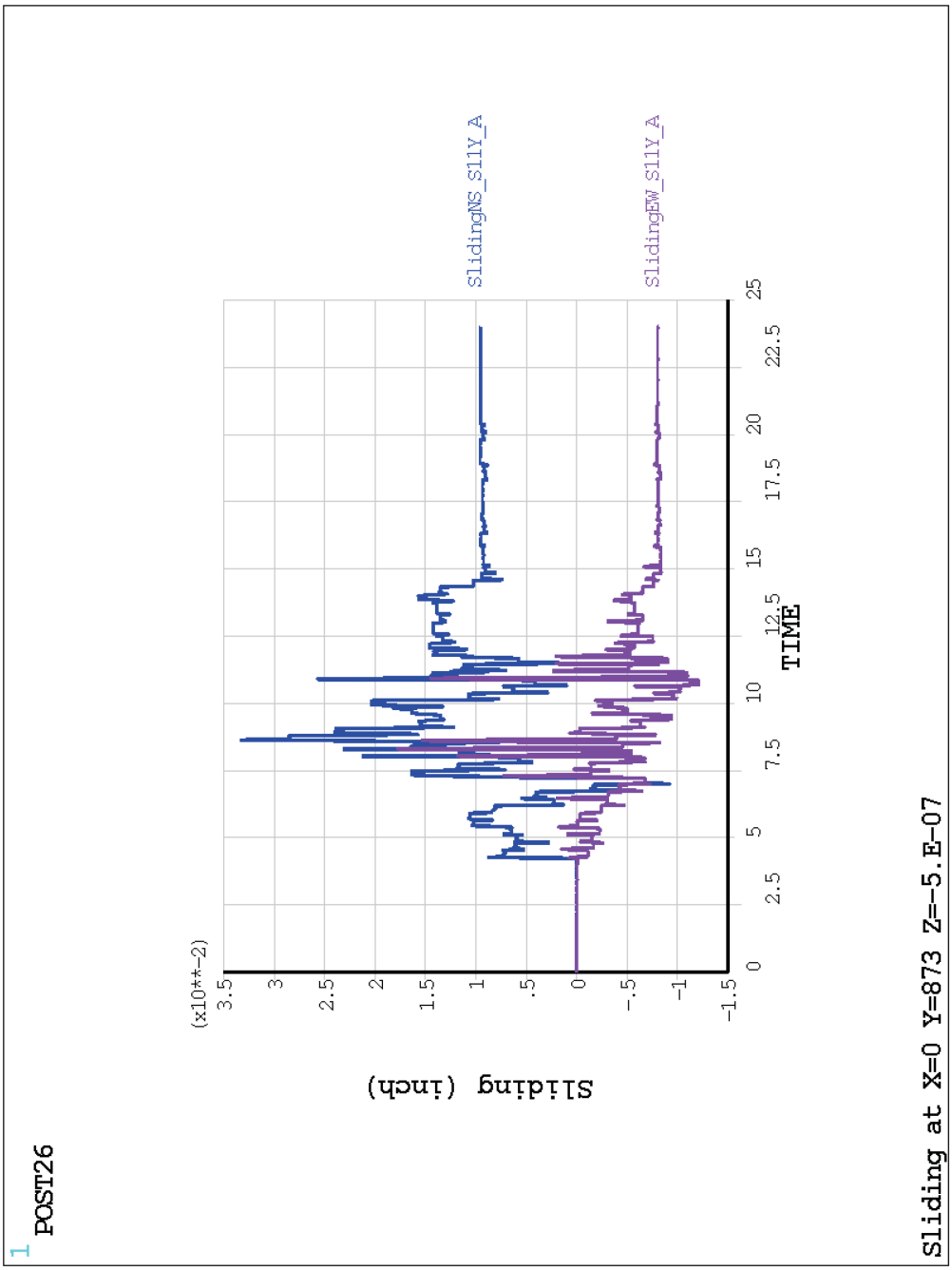


Figure 3.8.5-65: Lateral Relative Displacements (Sliding) at Location A (S11 - N-S Excitation)

Figure 3.8.5-66: Lateral Relative Displacements (Sliding) at Location B (S11 - N-S Excitation)

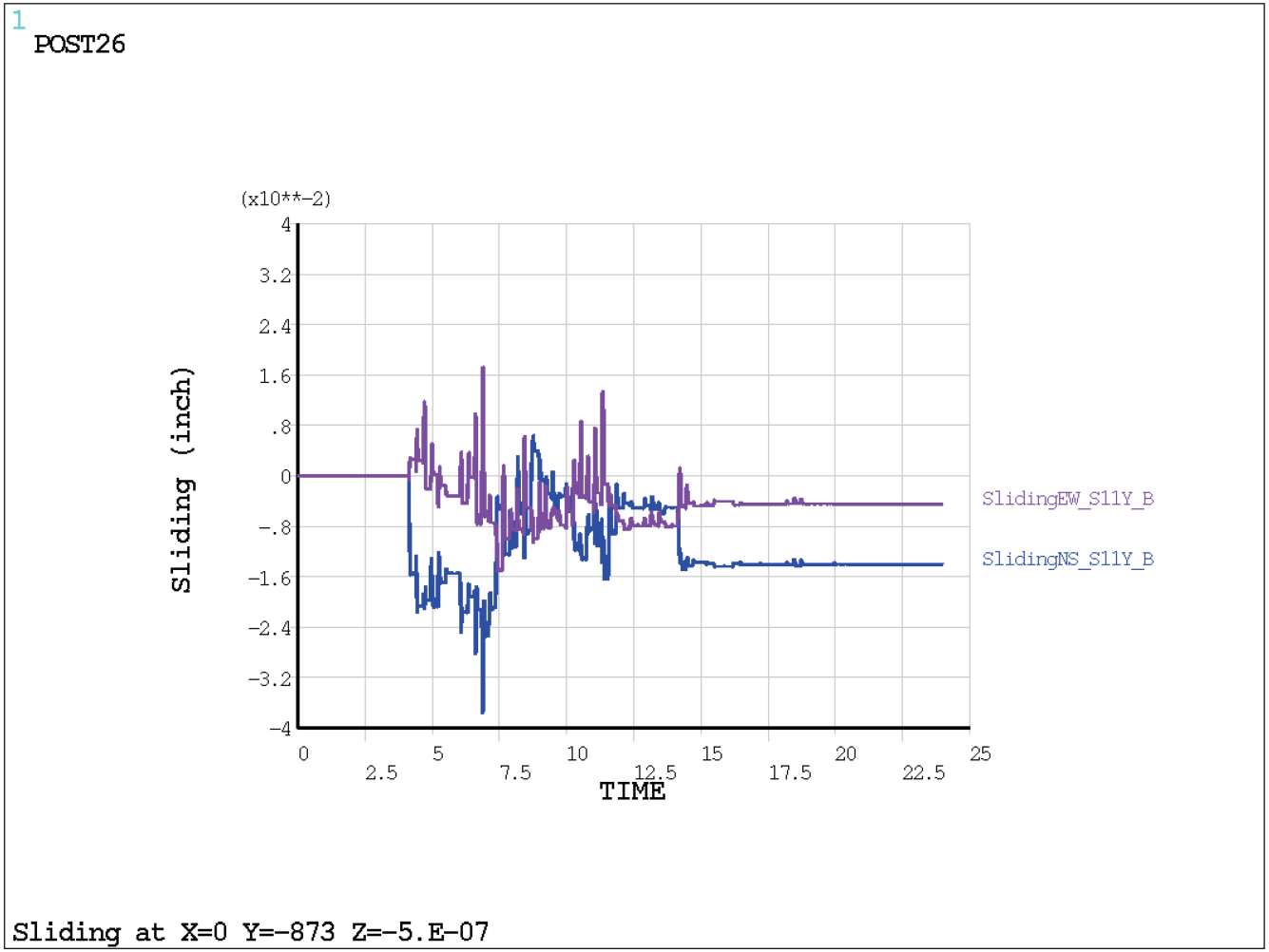


Figure 3.8.5-67: Lateral Relative Displacements (Sliding) at Location C (S11 - N-S Excitation)

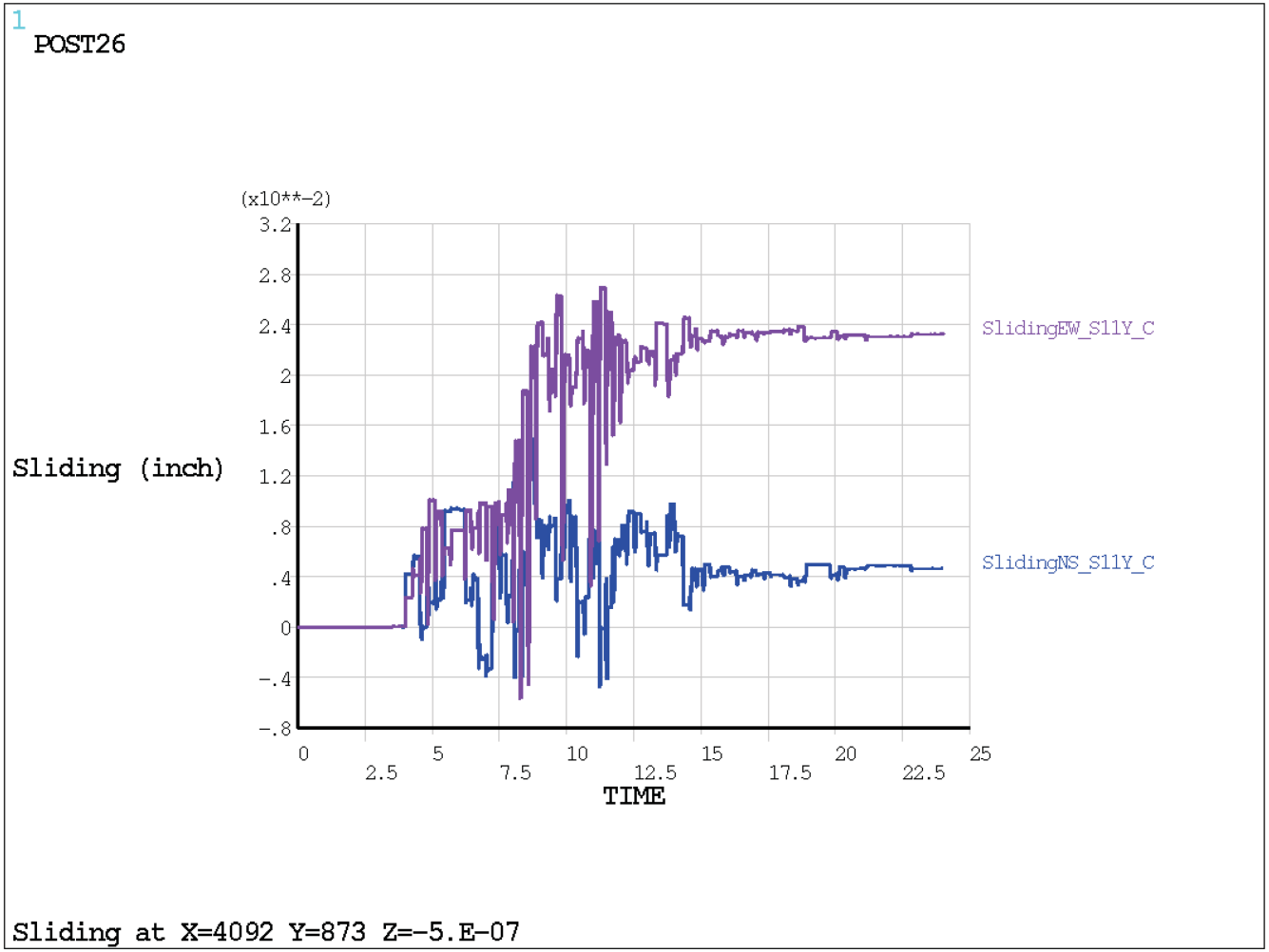


Figure 3.8.5-68: Lateral Relative Displacements (Sliding) at Location D (S11 - N-S Excitation)

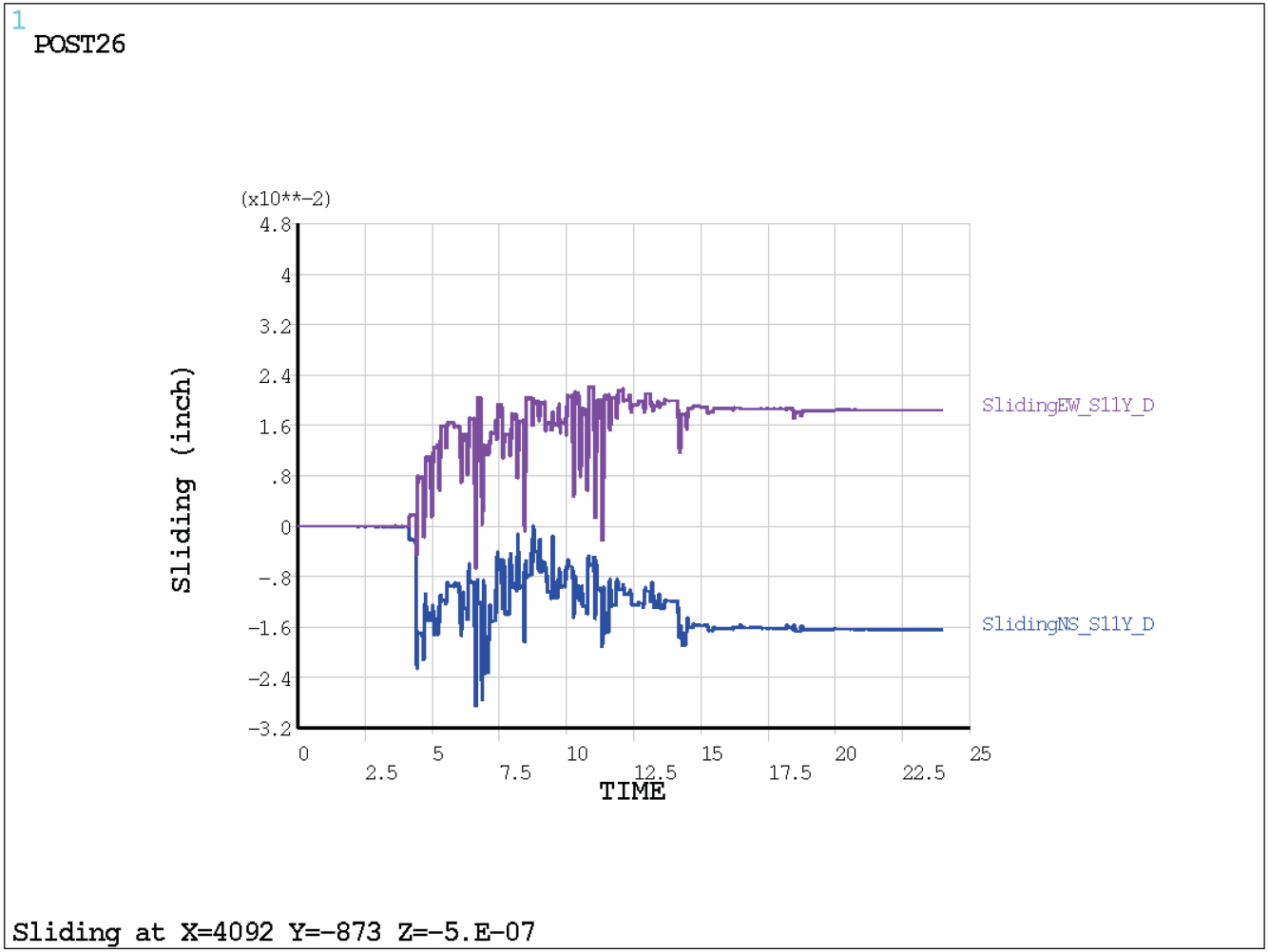


Figure 3.8.5-69: Lateral Relative Displacements (Sliding) at Location A (S8 - E-W Excitation)

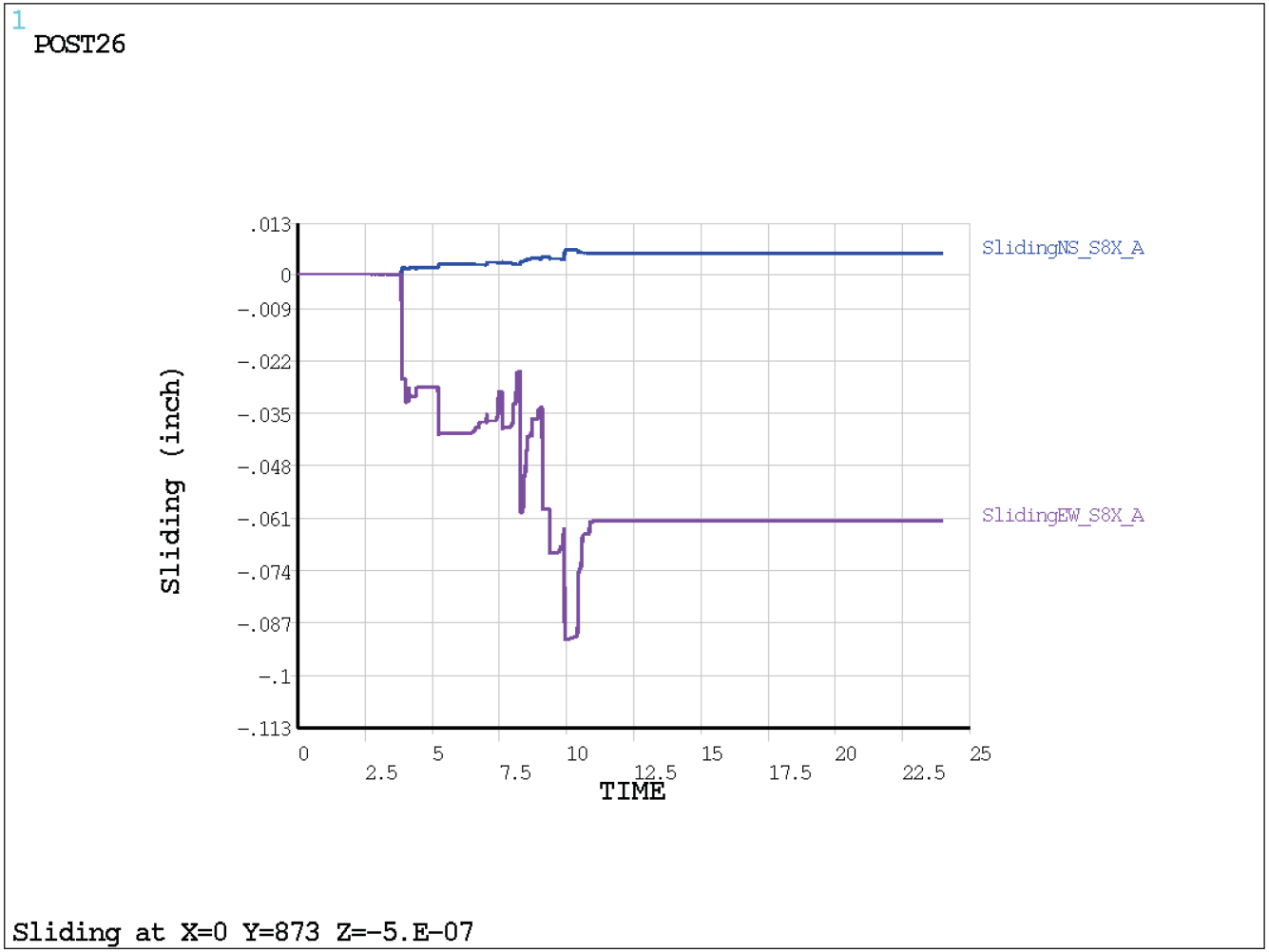


Figure 3.8.5-70: Lateral Relative Displacements (Sliding) at Location B (S8 - E-W Excitation)

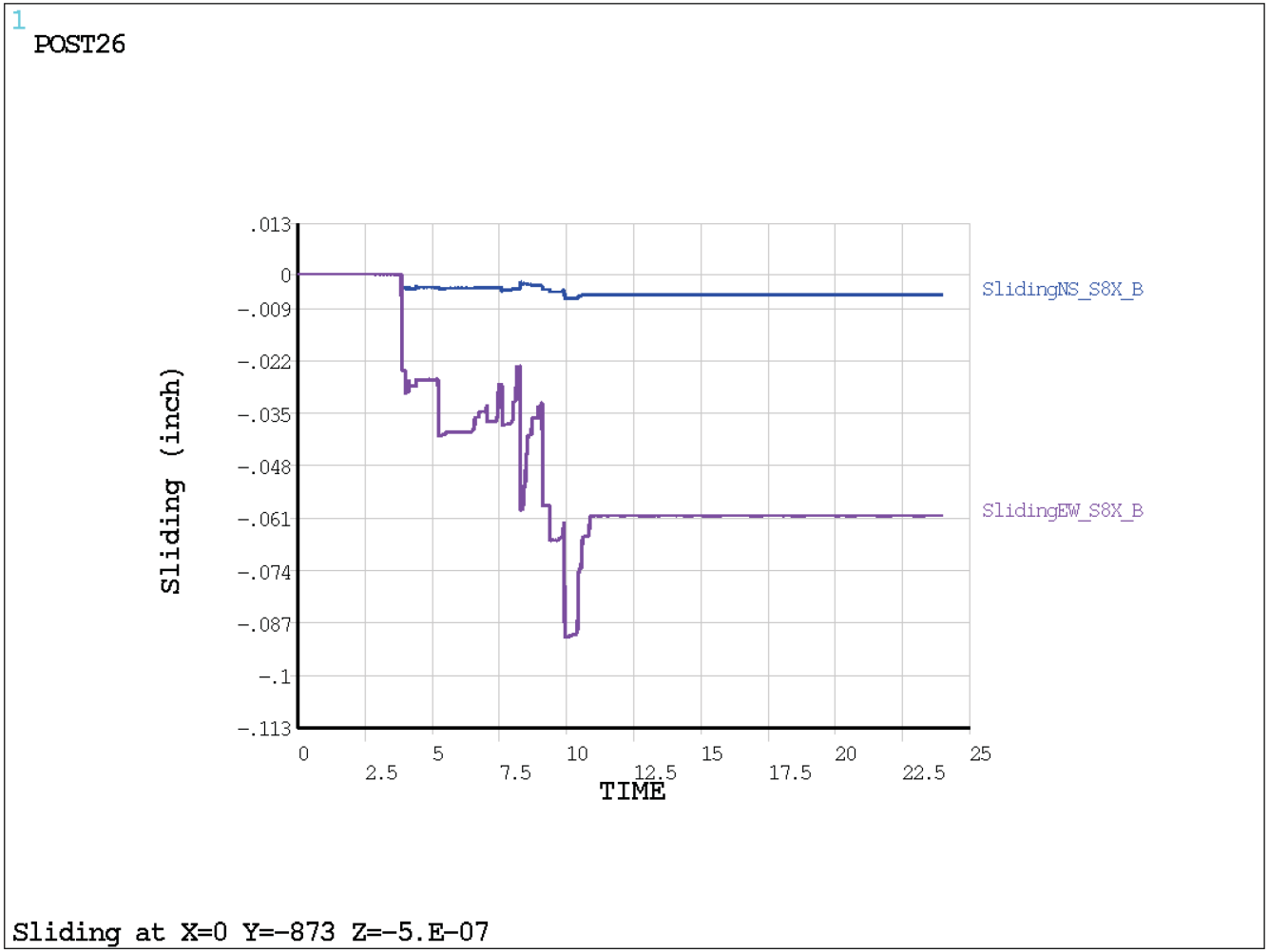


Figure 3.8.5-71: Lateral Relative Displacements (Sliding) at Location C (S8 - E-W Excitation)

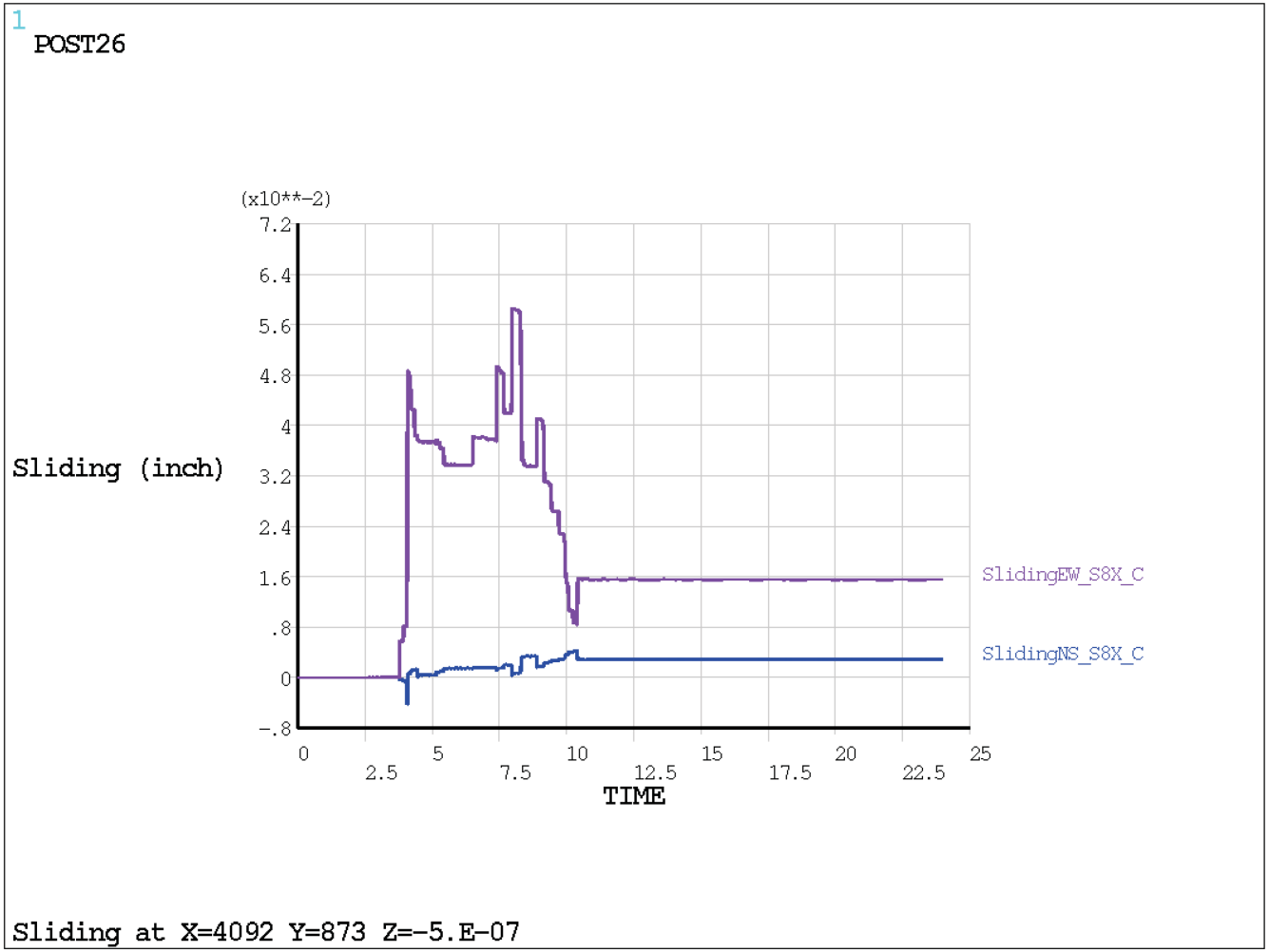


Figure 3.8.5-72: Lateral Relative Displacements (Sliding) at Location D (S8 - E-W Excitation)

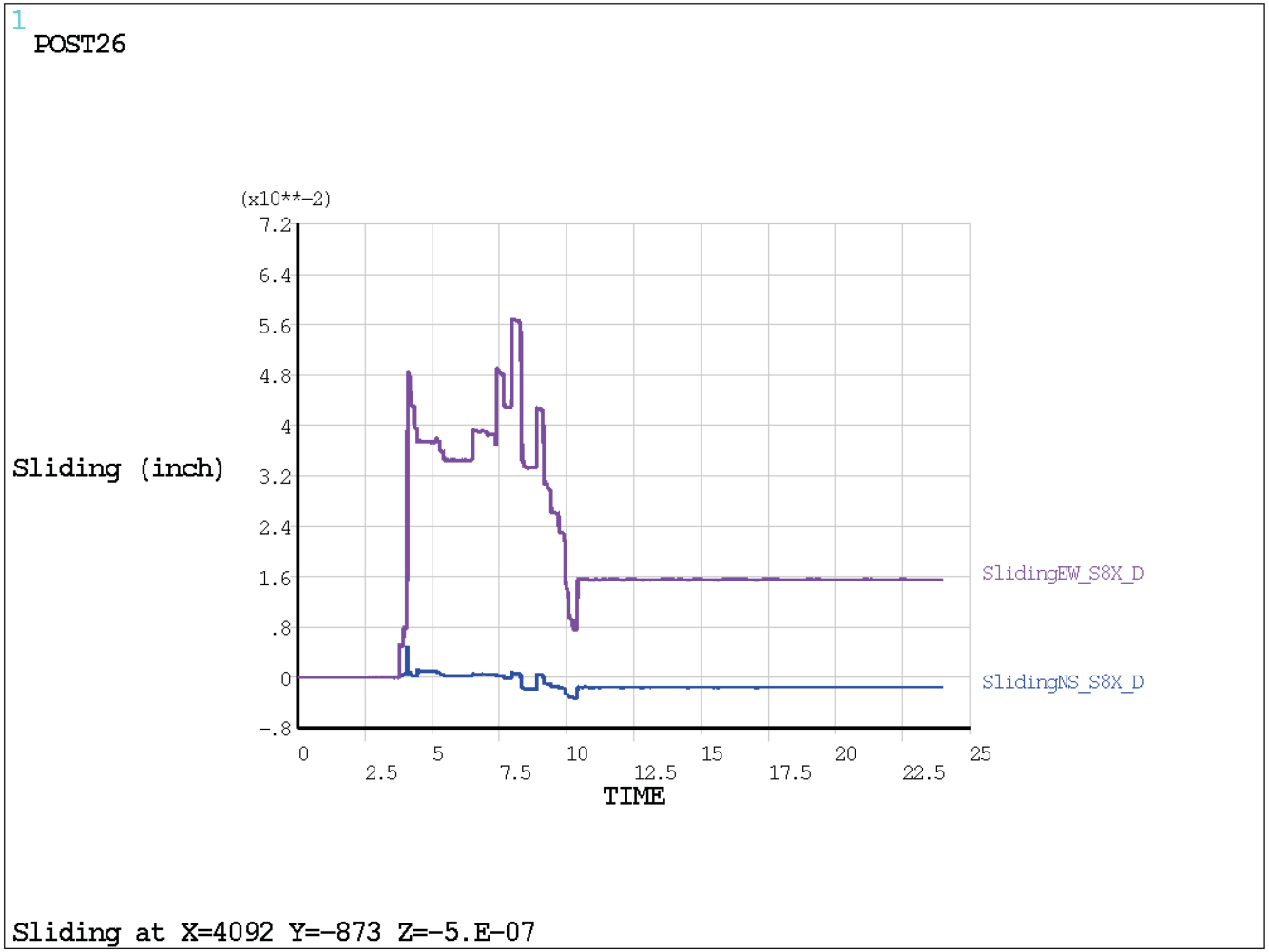


Figure 3.8.5-73: Lateral Relative Displacements (Sliding) at Location A (S8 - N-S Excitation)

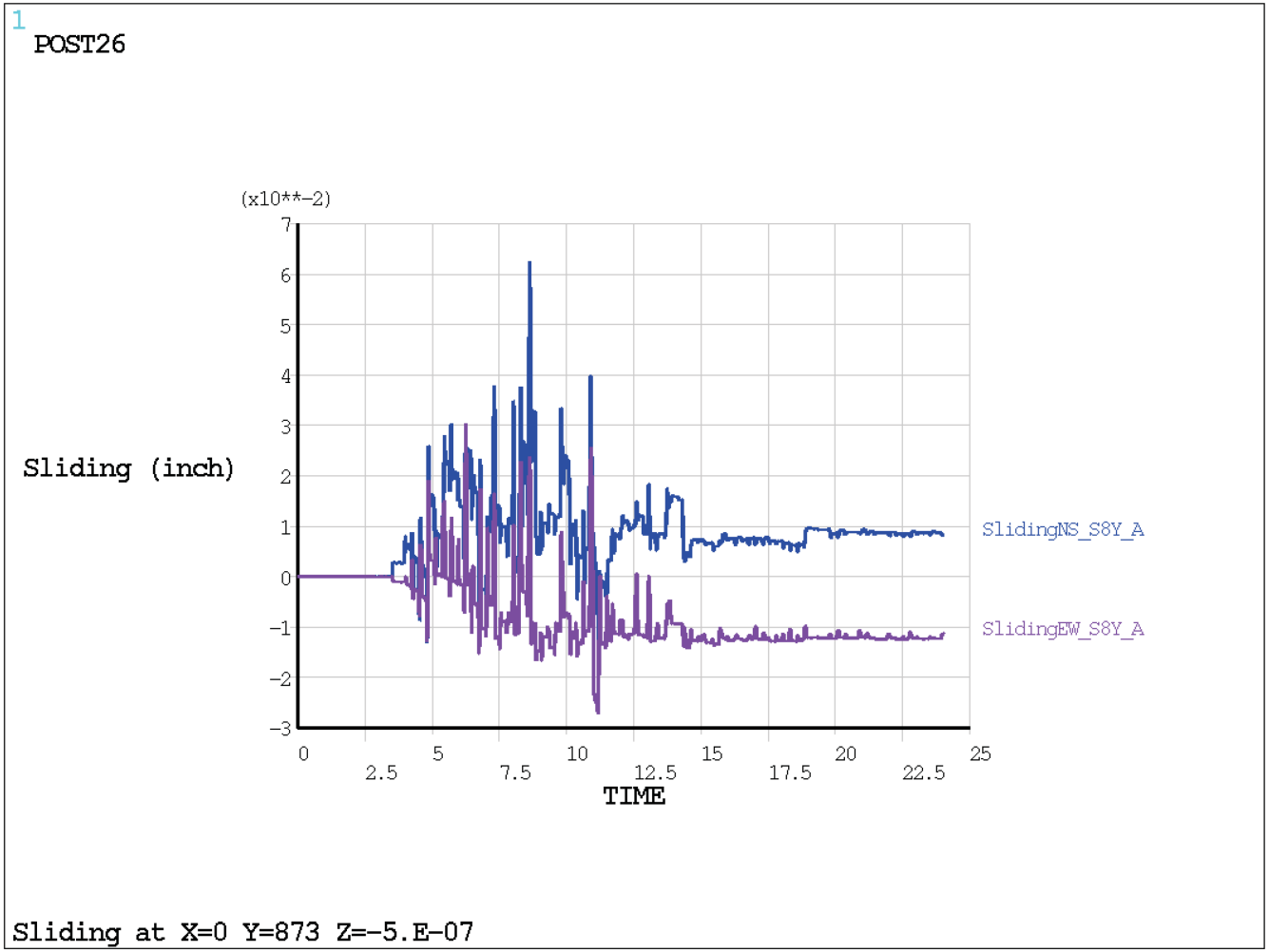


Figure 3.8.5-74: Lateral Relative Displacements (Sliding) at Location B (S8 - N-S Excitation)

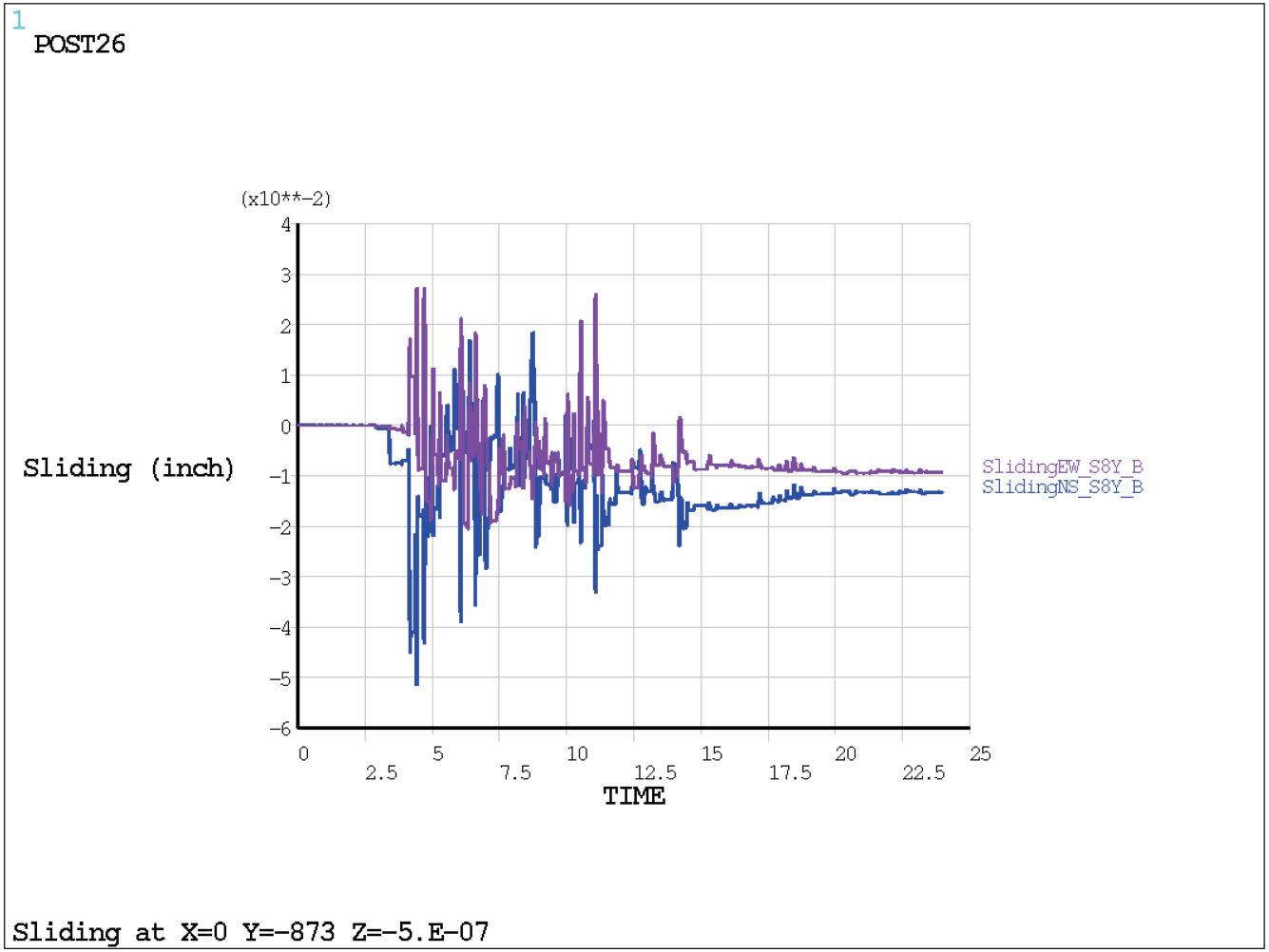
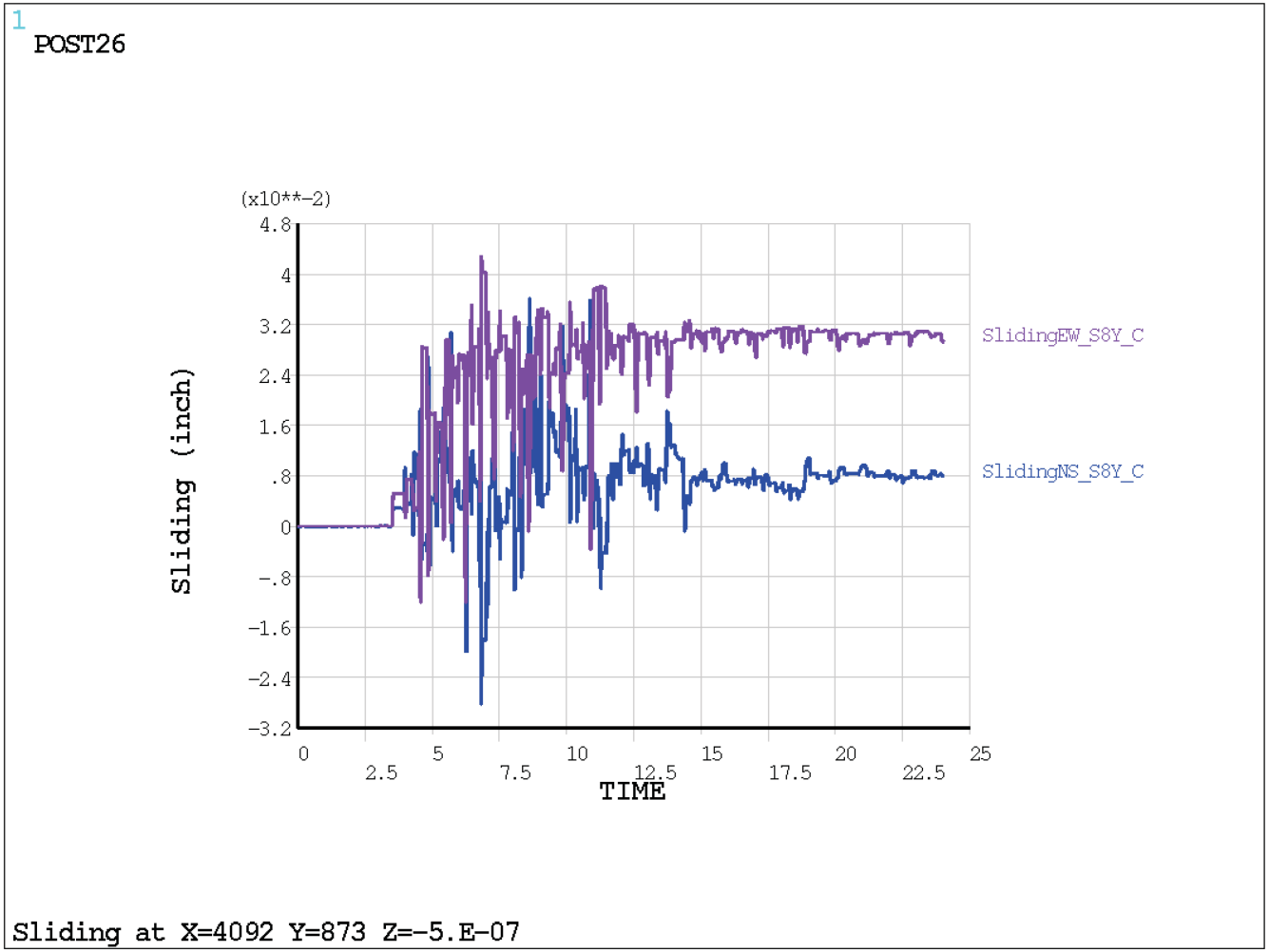


Figure 3.8.5-75: Lateral Relative Displacements (Sliding) at Location C (S8 - N-S Excitation)



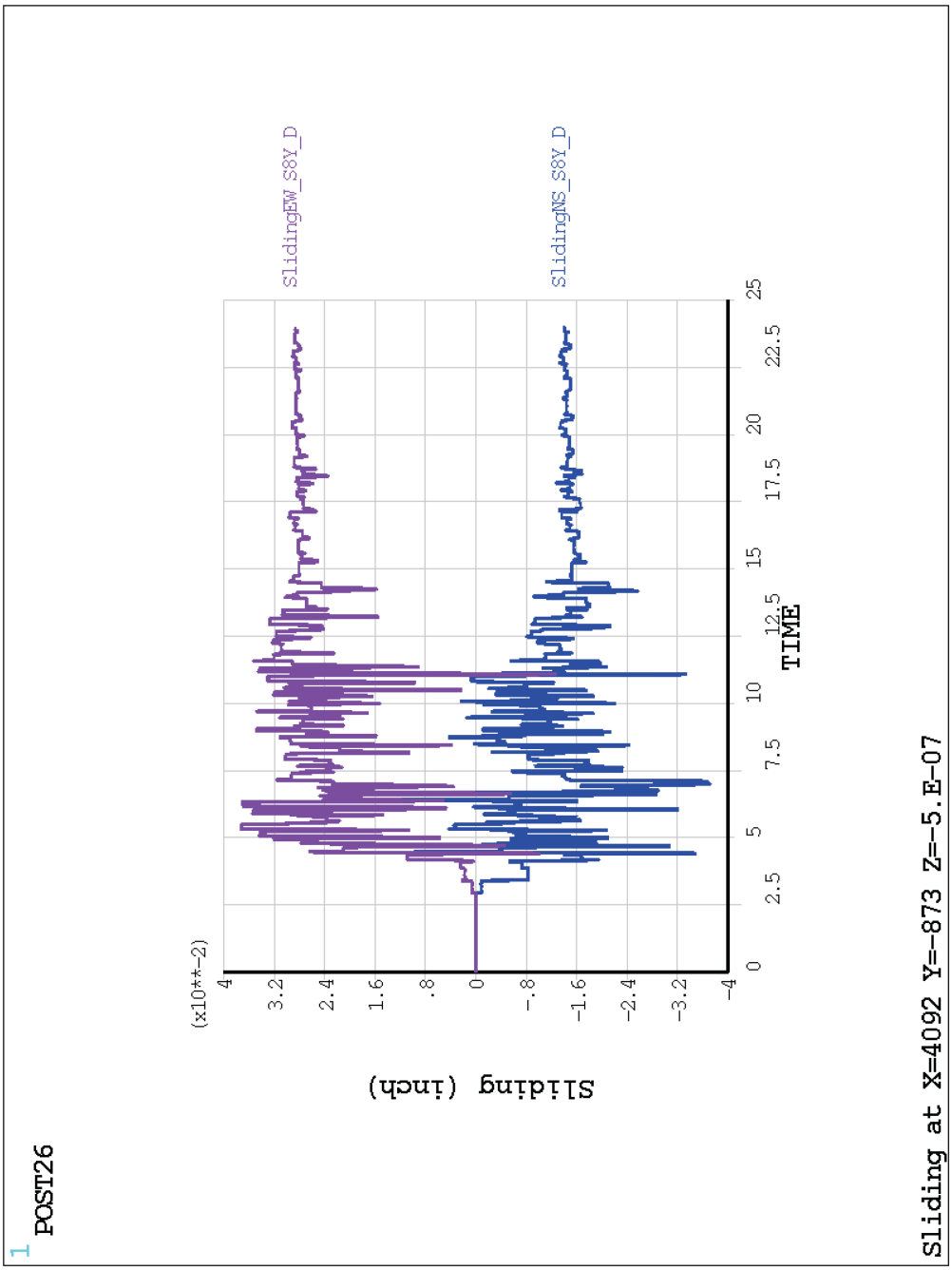


Figure 3.8.5-76: Lateral Relative Displacements (Sliding) at Location D (S8 - N-S Excitation)

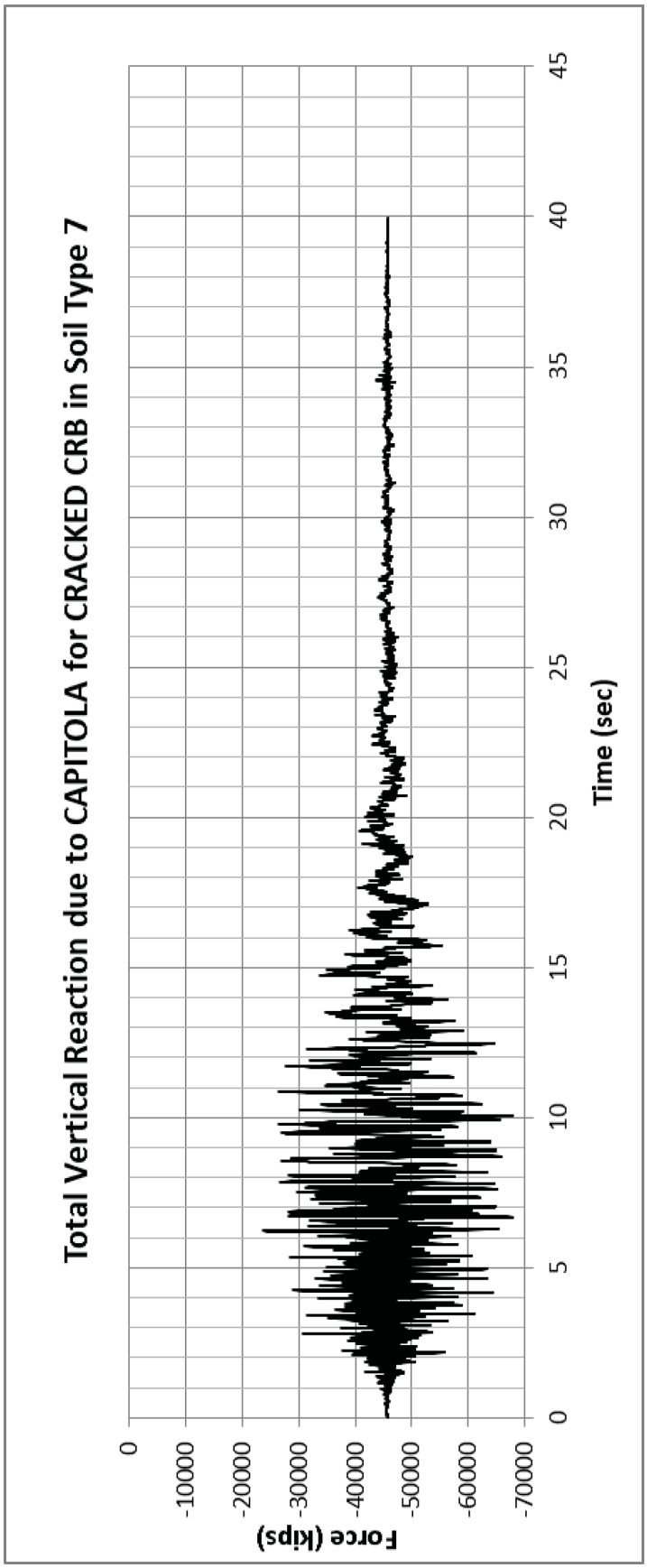


Figure 3.8.5-77: Total CRB Cracked Base Vertical Reaction Time History due to Capitola for Soil Type 7

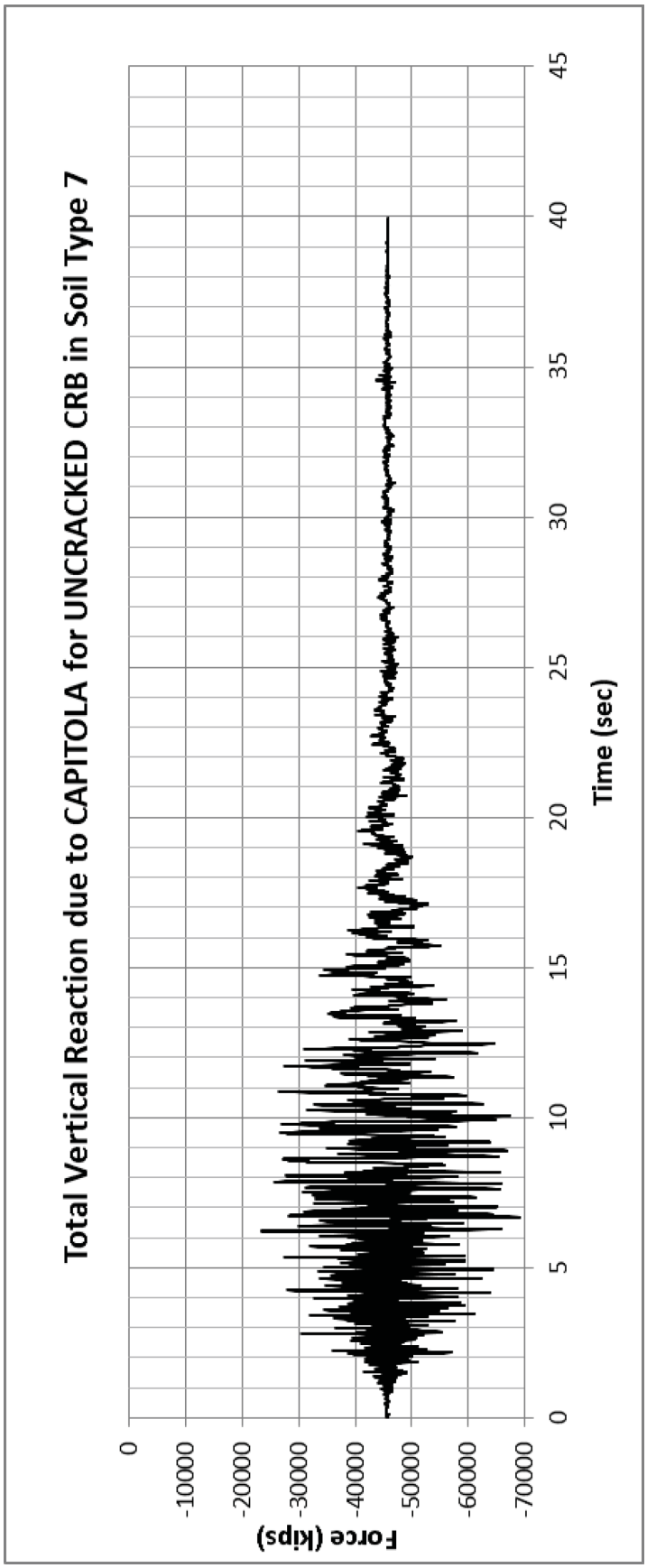


Figure 3.8.5-78: Total CRB Uncracked Base Vertical Reaction Time History due to Capitola for Soil Type 7

Figure 3.8.5-79: Total CRB Cracked Base Vertical Reaction Time History due to Capitola for Soil Type 8

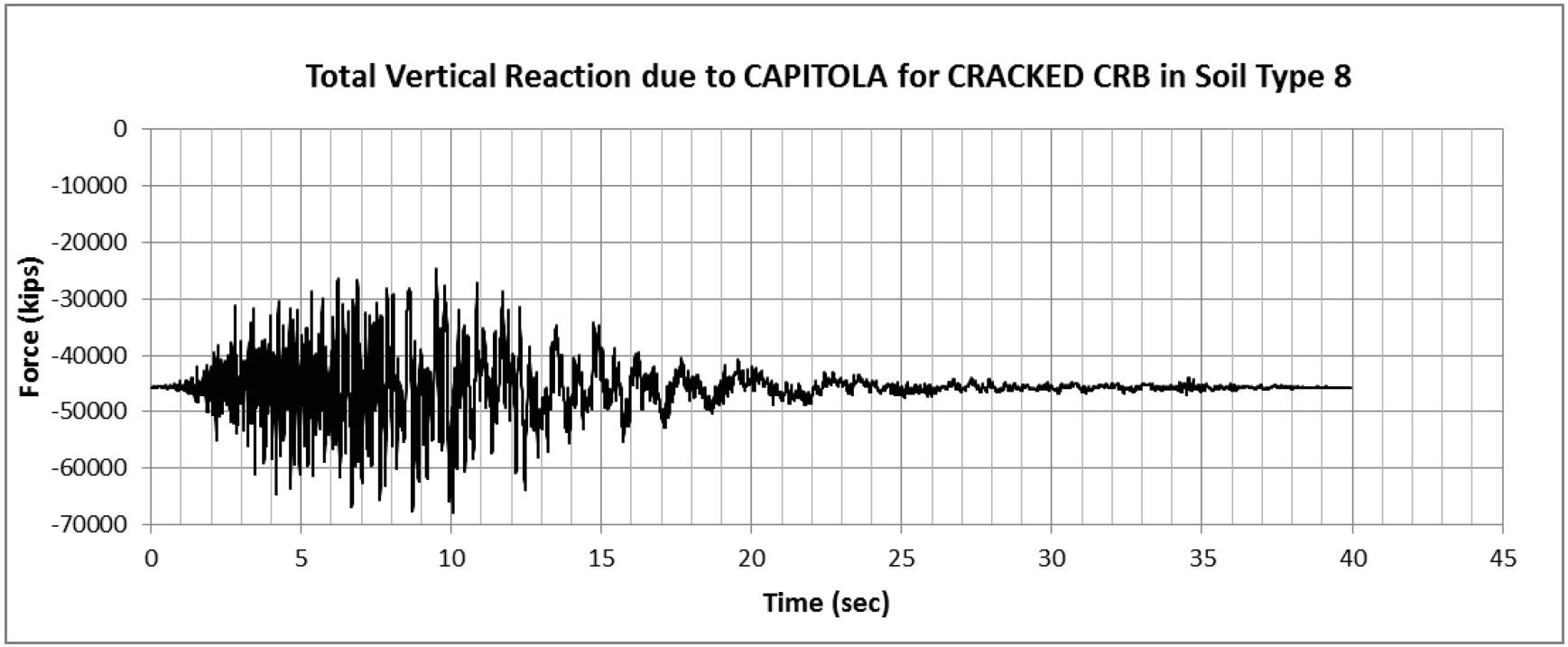
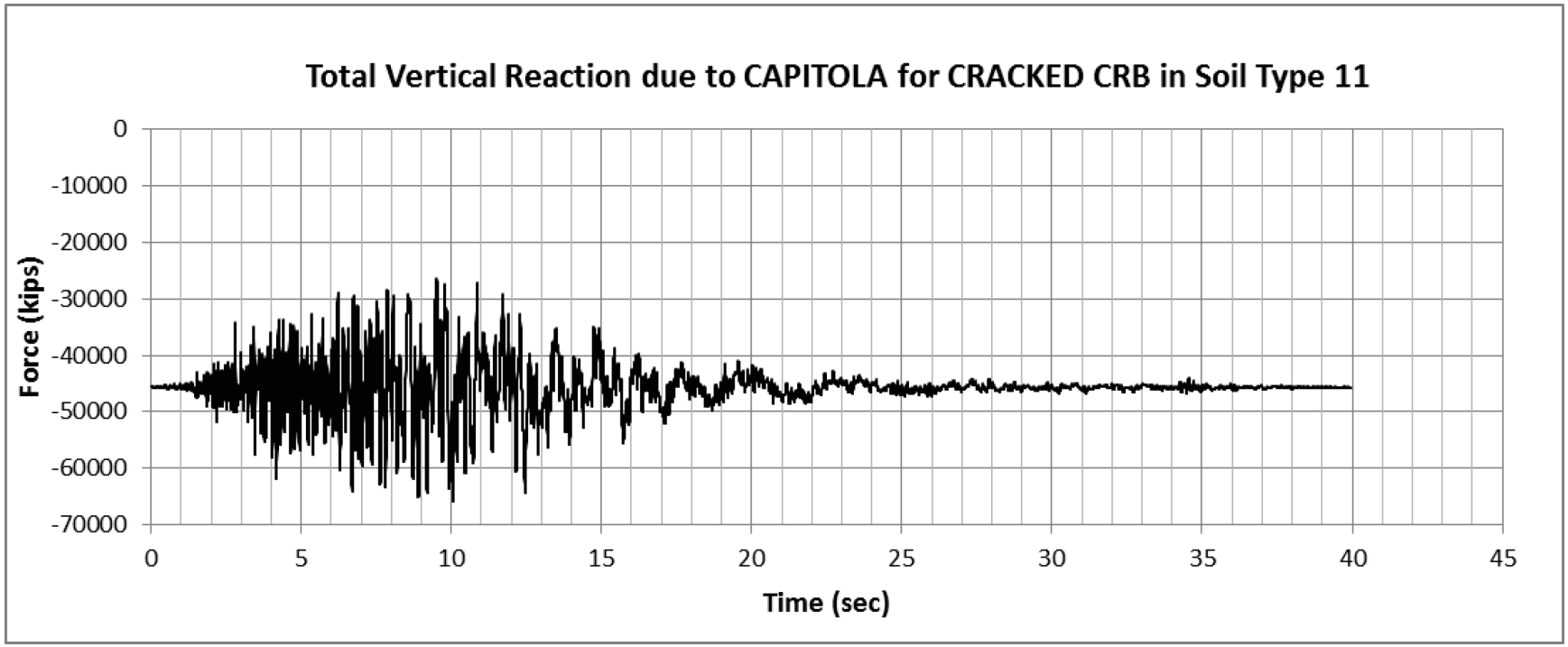


Figure 3.8.5-80: Total CRB Cracked Base Vertical Reaction Time History due to Capitola for Soil Type 11



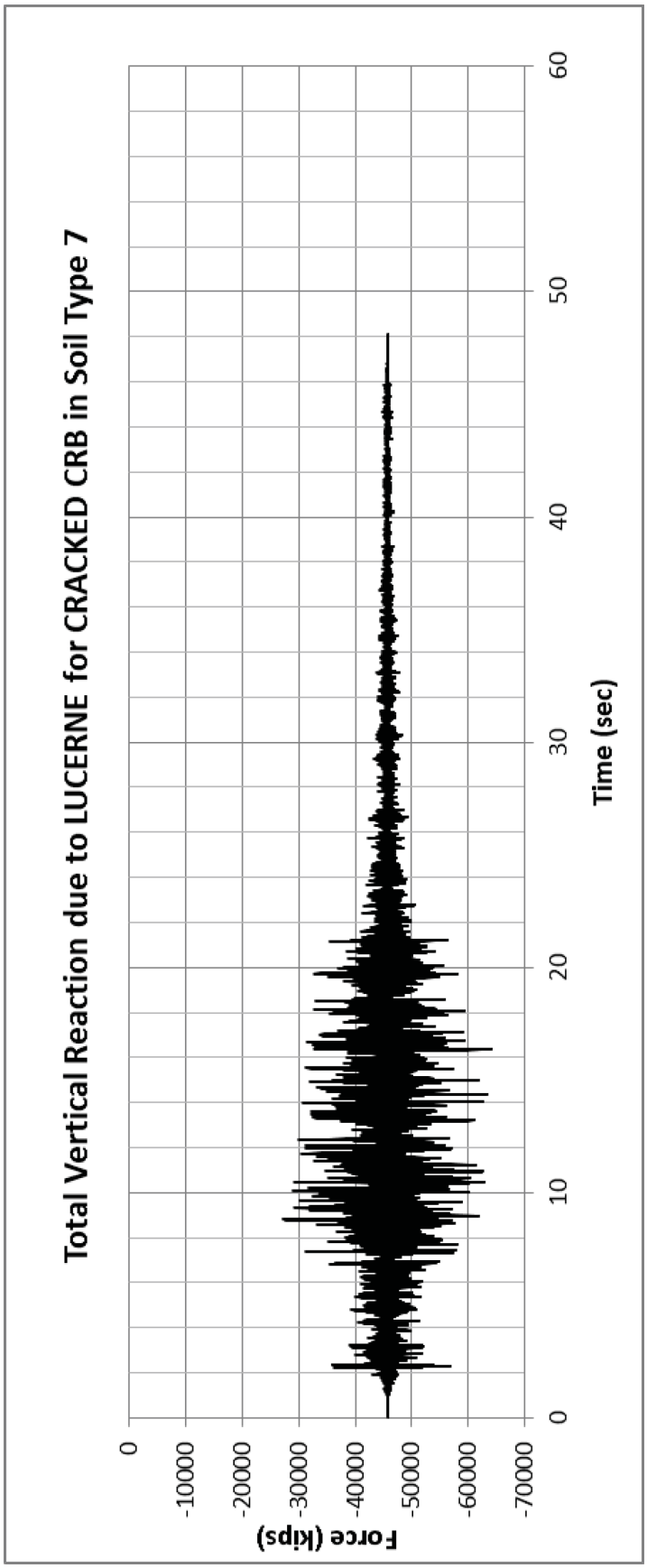


Figure 3.8.5-81: Total CRB Cracked Base Vertical Reaction Time History due to Lucerne for Soil Type 7

Figure 3.8.5-82: Total CRB Cracked Base Vertical Reaction Time History due to Lucerne for Soil Type 9