

AP1000 Seismic and Structural Review April 2 - 4, 2003

Effect of Basemat Lift-off on Floor Response Spectra

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Lift-off Analysis of Basemat

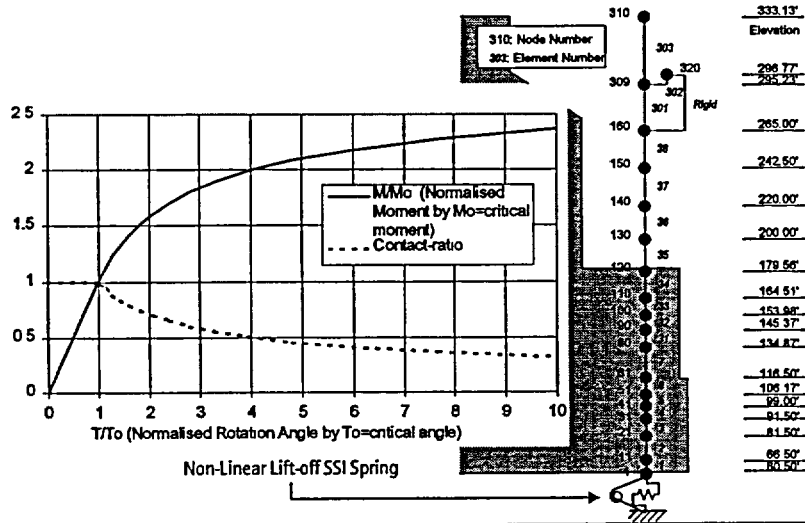
- Seismic analyses of AP1000 show potential Lift-off of basemat
- Safe Shutdown Earthquake (SSE) level and larger level (1.5 SSE) in Horizontal EW direction
- AP1000 non-linear analyses on simplified stick model considering SSI spring with basemat effect of lift-off using "Technical Guidelines for Aseismic Design of Nuclear Power Plants (Translation of JEAG 4601-1991)"
- Lift-off initiates at critical moment M_o , and critical angle θ_o



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Simplified NI Stick Model



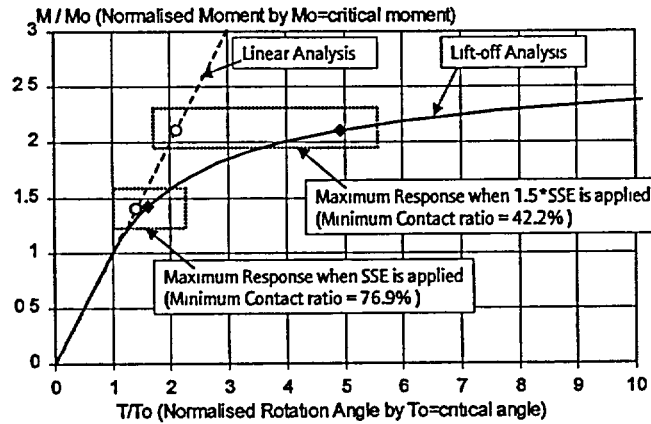
Analysis Result

ZPA (G) at Top of SB (Node 310)		
	1.0*SSE	1.5*SSE
Linear	1.7011	2.5517
Lift-off	1.7016	2.5434
Rate (Lift-off / Linear)	1.0003	0.9967

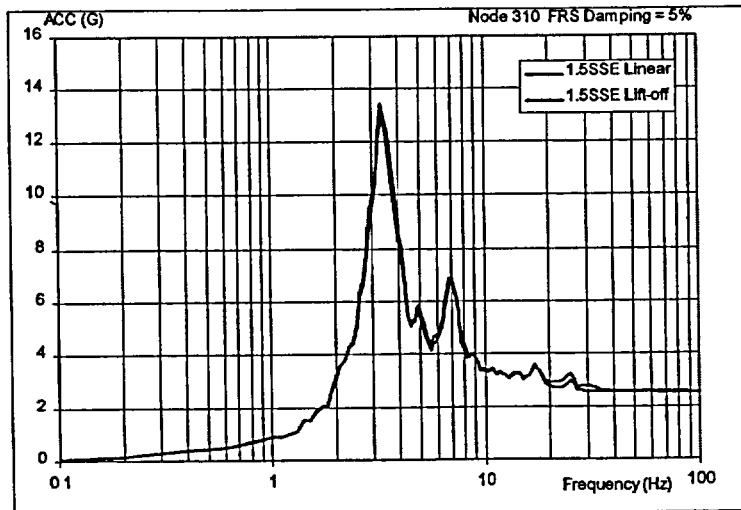
Rotational Angle at Basemat		
	1.0*SSE	1.5*SSE
Linear	9.872E-06	1.481E-05
Lift-off	1.158E-05	3.838E-05
Rate (Lift-off / Linear)	1.173	2.592

Note: 1.0E-05 corresponds to 0.018" in 150' width of Basemat

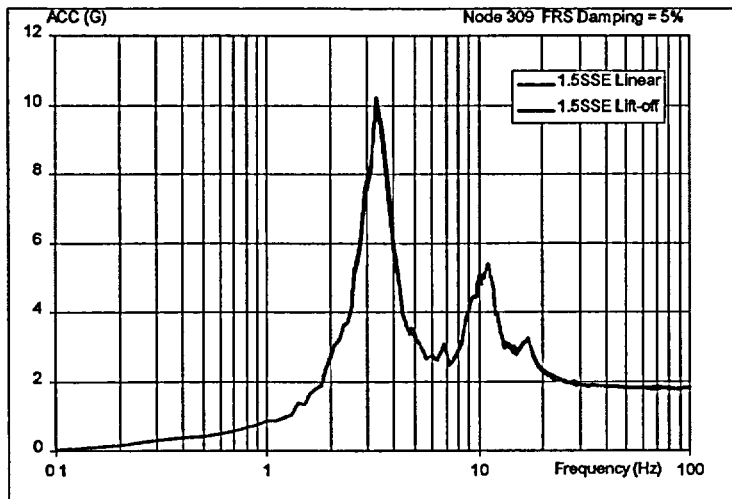
Analysis Result : Soil Spring Response



Comparison of Response Spectra (Node 310)



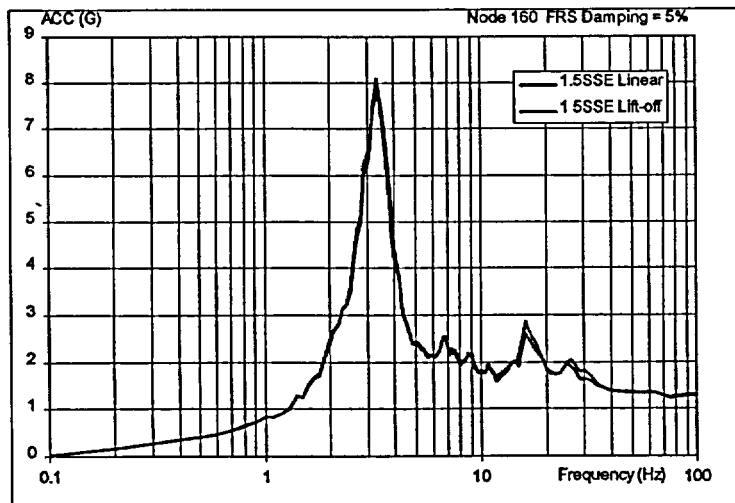
Comparison of Response Spectra (Node 309)



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Comparison of Response Spectra (Node 160)

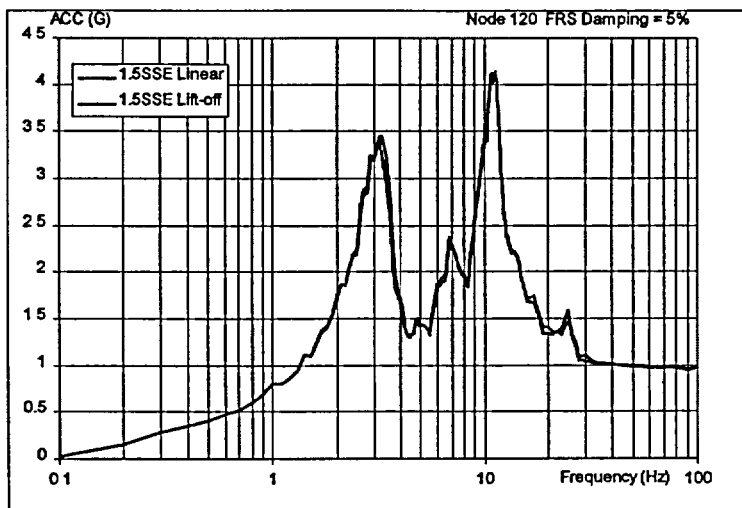


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Handwritten notes at the top of the page, including "1.5SSE" and "1.5SSE Lift-off".

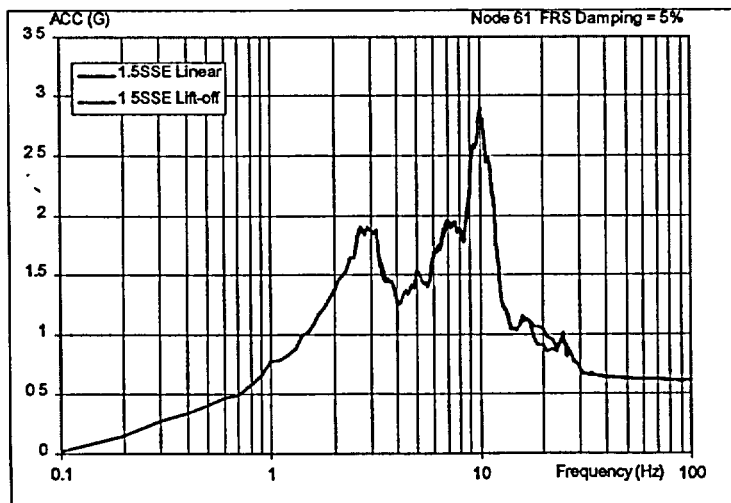
Comparison of Response Spectra (Node 120)



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Comparison of Response Spectra (Node 61)



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Lift-off FEM Analysis of Basemat

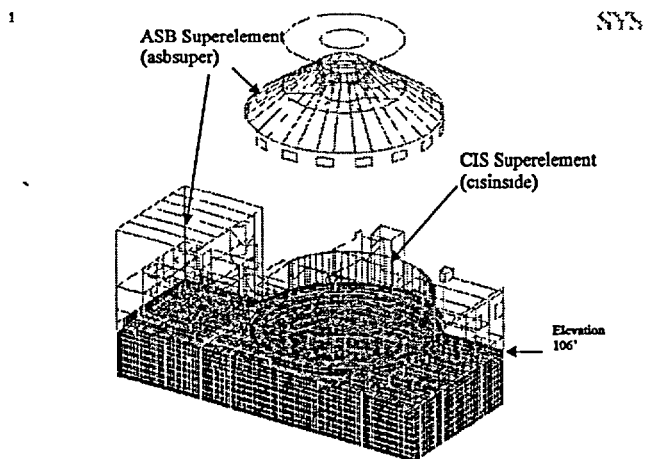
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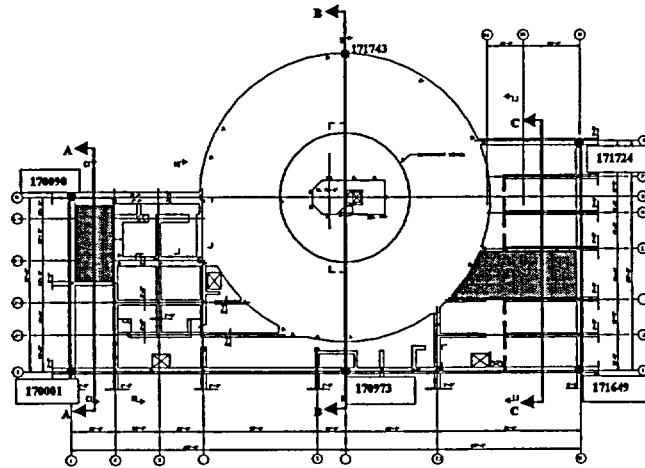
FEM Analysis Model



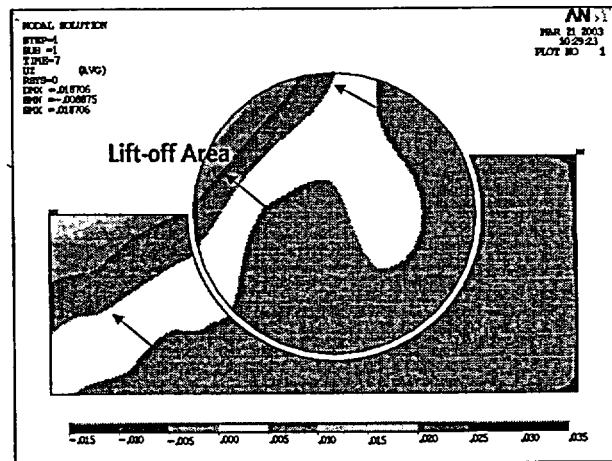
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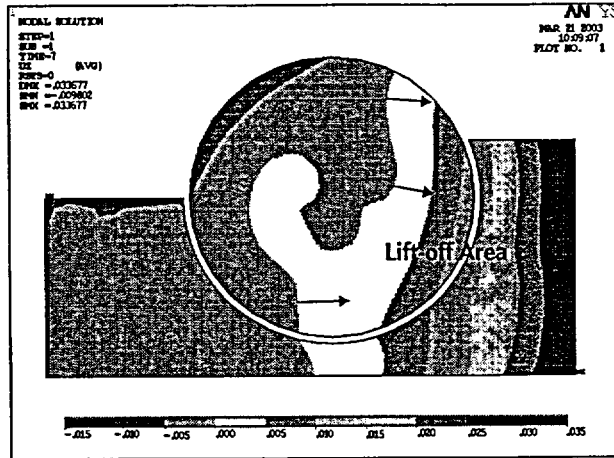
Plan View of Basemat



LC4 Vertical Displacement



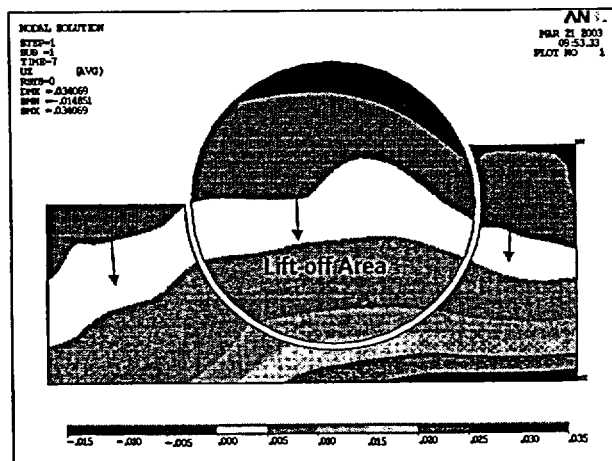
LC6 Vertical Displacement



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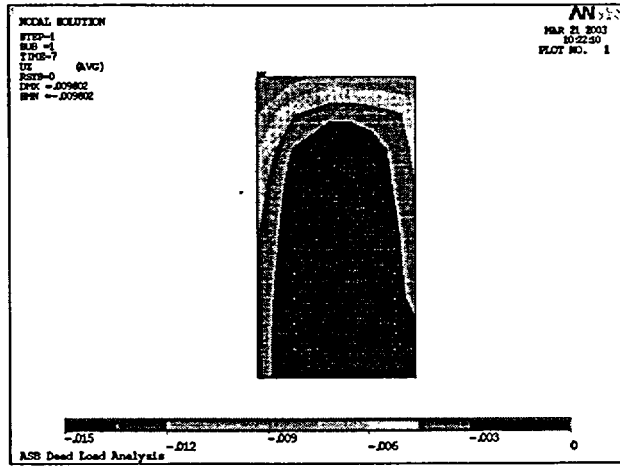
LC10 Vertical Displacement



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LC6 Vertical Displacement in South-East Area of Basemat



LC4 Vertical Displacement in North-Mid Area of Basemat

