

Ground Motion Record from M 7 Anchorage, Alaska Earthquake of November 30, 2018

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Acceleration Histories at NSMP Station 8047 – 18 km from Epicenter





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Resultant Horizontal Accelerations



Velocity Histories at Station 8047





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Resultant Horizontal Velocities



Displacement Histories at Station 8047





Resultant Horizontal Displacements



Central Period & Normalized Velocity

• Central period,

 $T_c = 2\pi (PGD/PGA)^{0.5} = 0.83 s$

Hence medium-frequency ground motion

• Normalized velocity,

 $PGV_n = PGV/(PGD \cdot PGA)^{0.5} = 0.42$ Hence, **broad-banded** ground motion



Response Spectrum of Horizontal Ground Motion (5% Damping)





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Acceleration-Deformation Response Spectrum of Horizontal Ground Motion





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Strength and Deformation Demands for Various Values of Damping





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Toppling Response Spectrum





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Observations

- Medium-frequency and broad-banded ground motion
- Very high strength demands on brittle structures
- High deformation demands on weak structures
- Only small and slender objects are toppled by this ground motion
- Both strength and deformation demands should be explicitly considered in seismic design



Acknowledgments

- Data may be downloaded from the Center for Engineering Strong Motion Data:
 - https://www.strongmotioncenter.org/
- Data analysis and observations are preliminary
- No responsibility of any kind is assumed

