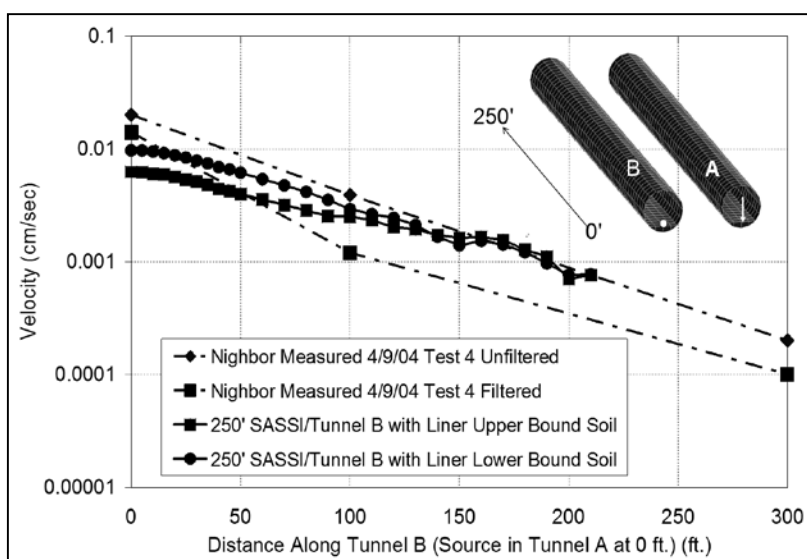
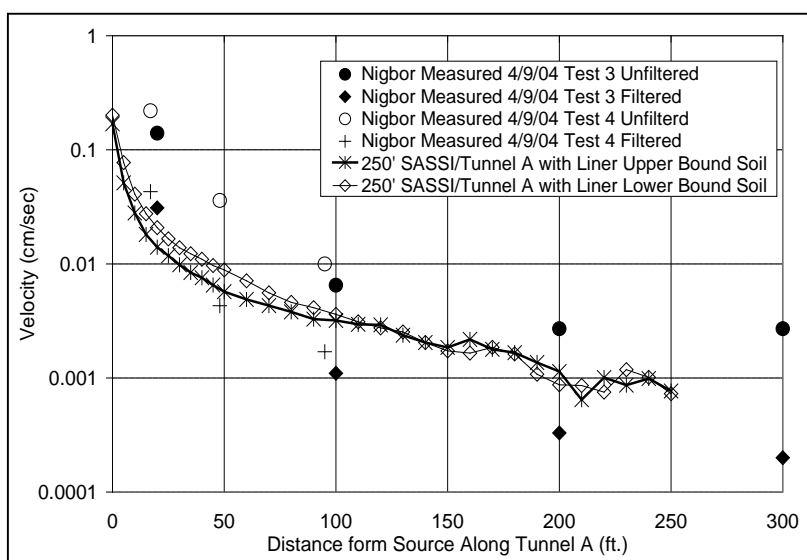
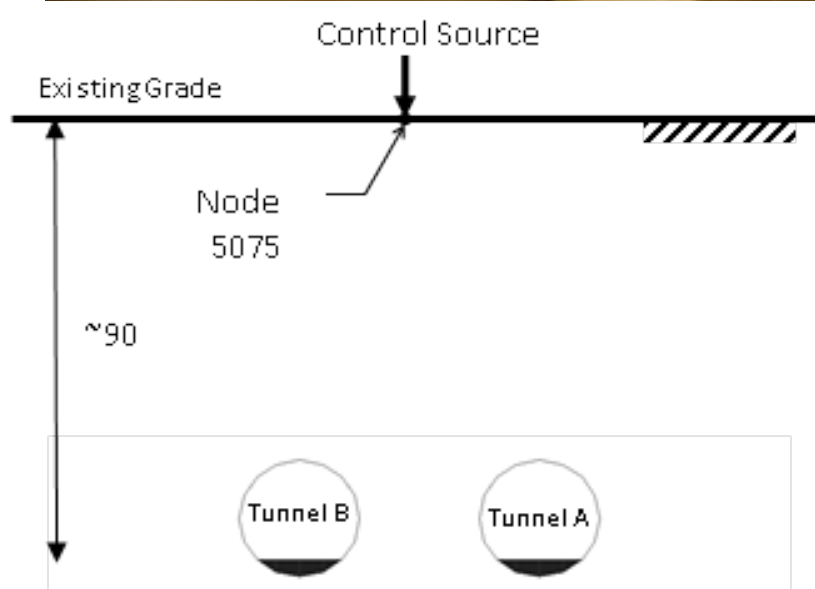
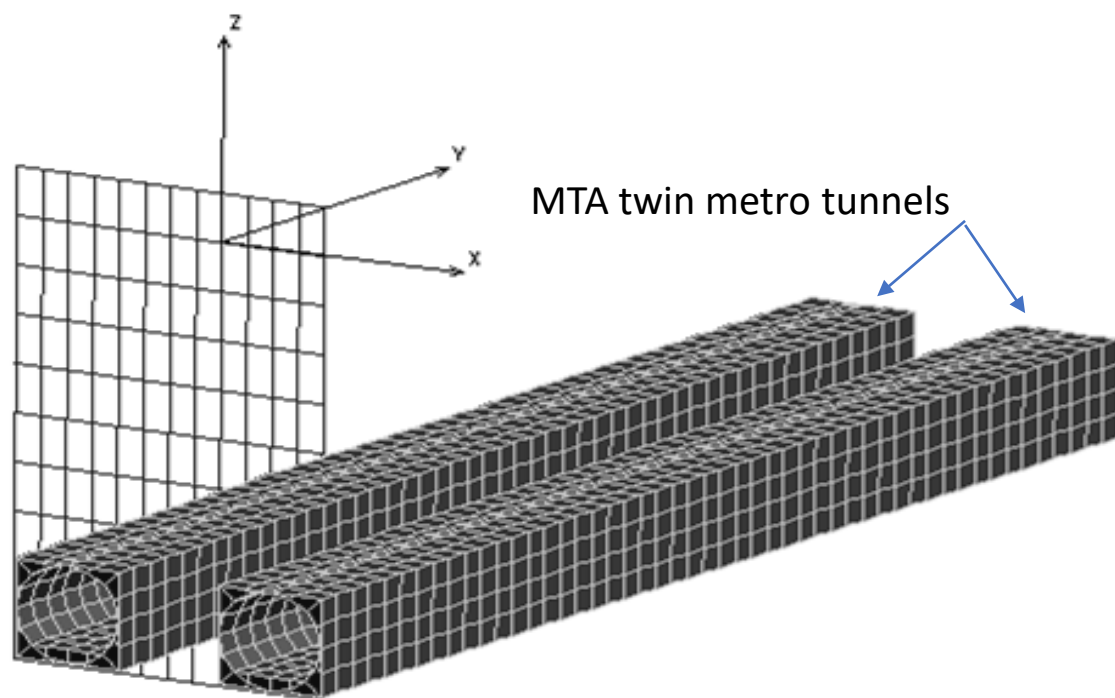
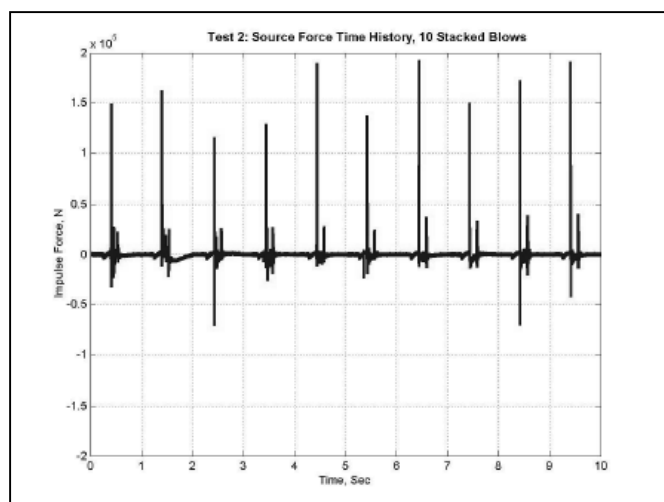


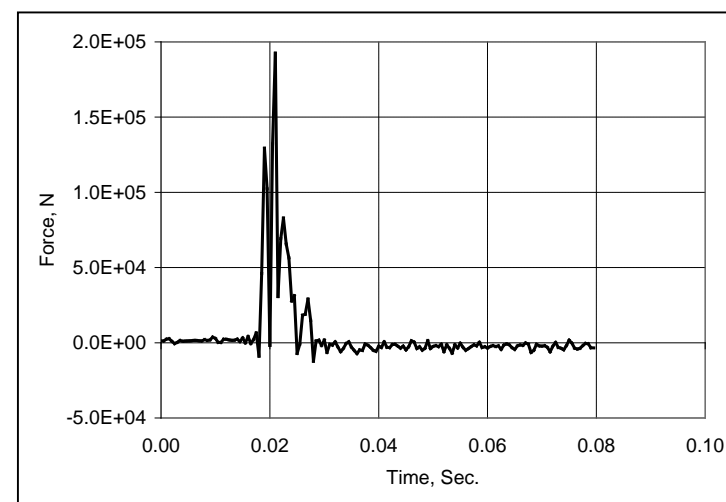
# Vibration Transmissibility Analysis in Underground Structures



Recorded Source Force TH



Input Force TH



The successful operation of facilities that incorporate long electron-positron beams necessitates a very low vibration environment at the beam supports. Mitigation of the ground motion and imported vibration from numerous vibrations sources is the main engineering challenge for these projects. MTR/SASSI was selected as analysis tool for calculating the vibrations in underground tunnels resulting from near field sources due to equipment operation as well as far-field sources for a new generation of linear colliders. The program capabilities were validated by comparing calculated vibration results with field obtained measurements performed at the Los Angeles County Metropolitan Authority (MTA) Metro Red Line tunnels. A 3D SSI model of a representative segment of the tunnels was developed. Analyses for three loading cases were performed simulating three tests that were done to characterize transmission of vibrations from grade to a tunnel, 90 feet deep, transmission of vibrations inside one of the tunnels, and transmission of vibrations from one tunnel to the other tunnel. The maximum velocities, mobility functions, and displacement functions were calculated for each test case. The results were compared with available recorded data. Excellent agreement between MTR/SASSI results and recorded data for all three tests was obtained.