RAIL VEHICLE NOISE AND VIBRATION

NOISE

HOW IS NOISE FROM COMMUTER RAIL MEASURED
- Decibels (db) are the unit by which noise levels are measured. Measured sound levels (in decibels) are usually weighted to correspond to the human range of hearing. A-weighted decibels (dBA) is the time weighted value for noise, it replicates what people can hear. Noise decreases with distance.

HOW MUCH NOISE DOES COMMUTER RAIL OR LIGHT RAIL PRODUCE AS COMPARED TO OTHER VEHICLES?
- At fifty feet away from a person, a city bus would measure 84 dBA and a heavy truck 90 dBA. A light rail vehicle at the same distance would measure 66 dBA and an Electric Multiple Unit 85 dBA. Comparatively, conversational speech is about 60 dBA.

HOW DOES THE FEDERAL TRANSIT AUTHORITY (FTA) DECIDE WHEN A TRAIN IS TOO LOUD NEARBY HOMES AND PEOPLE?
- The FTA groups noise sensitive land uses into three categories. Category 1 is buildings and parks where quiet is an essential element of their purpose, Category 2 is residences and buildings where people normally sleep; where nighttime sensitivity is very important. Category 3 is institutional land uses with primarily daytime and evenings use, such as schools, libraries, churches and active parks. FTA measures noise at a location, then models expected noise levels with the addition of rail and future traffic, then determines the level of noise in the future.

WHAT DO THEY DO TO LOWER THE NOISE?
- Two levels of impact are included in the criteria: Moderate Impact and Severe Impact. Noise mitigation is normally specified for severe impact areas unless there is no practical method to decrease the noise. Mitigation may include earth berms or noise walls.

VIBRATION

HOW DOES VIBRATION FROM RAIL SERVICE AFFECT PEOPLE AND BUILDINGS?
- Typical vibration effects include a perceptible movement of building floors. More severe vibration may include rattling of windows, shaking of items on shelves or a rumbling noise.

HOW IS VIBRATION MEASURED?
- Vibration is measured by velocity decibels (VdB) which indicate the intensity of groundborne movement - how fast and how strong. Vibration velocity is affected by how fast a train or other vehicle is traveling, how close it is to an object, building or person, and the conditions of the ground and/or soil.
- The threshold where people notice vibration is 65 VdB.
- Vibration decreases with distance. The velocity measurement is in fractions of an inch per second (10-6 in/sec).

WHAT ARE THE TYPICAL SOURCES OF VIBRATION?
- Common vibration sources people may feel or hear include construction equipment, airplanes, thunder, trains, automobile traffic and trucks and buses.

HOW MUCH VIBRATION DOES COMMUTER RAIL AND LIGHT RAIL PRODUCE?
- Vibration values for commuter rail ranges from 75 to 85 VdB for a person or building fifty feet away. For light rail, this value is typically 75 VdB, again at fifty feet away.
- Commuter rail is typically located farther from pedestrians or residences, than light rail. And, since commuter rail usually operates along tracks used by freight trains (which create stronger vibration), resulting vibration may not be noticed.