

**Homework #3**

Assigned Monday, November 3, 2008

Due at the start of class on Monday, November 10, 2008

(1) An industrial worker sustains the following noise exposure:

1 hour at 95 dBA

1 hour at 100 dBA

How many hours can this worker now spend in a 90 dBA noise field without exceeding the OSHA industrial noise guidelines (Table 13.11.2)? Explain.

(2) A large, rectangular meeting room has floor dimensions 20m wide x 60m long, and a floor-to-ceiling height of 15m. A balcony attached to the middle of the back wall extends 15m into the room. The balcony is 3m thick. The entire main floor area and top of the balcony is assumed to be Occupied audience, orchestra, chorus. The two side walls and the front and underside of the balcony, are constructed of Wooden walls, 2 in. material. The ceiling is Acoustical tile on rigid surface. The back wall above and below the balcony is Glass, heavy plate, while the front of the hall is Concrete block, painted.

a) Using the absorptivity data from Table 12.5.1 in the K&F text and the Sabine equation (12.3.4 and 12.3.6), determine an estimate for the reverberation time ( $T_{60}$ ) for the room at 125 Hz, 500 Hz, and 4kHz.

b) Determine  $r_d$ , the critical distance for this room (see 12.7.2), using the total absorption at 500 Hz.

c) The effect of sound absorption in the hall due to atmospheric (air) losses can be estimated using the modified Sabine equation (12.3.10 and 12.3.11). Assuming the air in the hall has a relative humidity of 35%, recalculate the reverberation times at frequencies 125 Hz, 500 Hz, and 4 kHz. Comment on the results.

