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THE SOUND OF ARCHITECTURE

1. **What is the difference between sound absorption and sound insulation in architectural acoustics?**

   Sound absorption addresses how sound behaves within a space by reducing reverberation and echo. Sound insulation, by contrast, involves blocking or reducing the transmission of sound between spaces, typically through construction elements like walls, floors, and ceilings.

2. **What is the significance of the weighted sound reduction index (Rw) and how does Rw+Ctr differ?**

   Rw measures airborne sound insulation. Rw+Ctr adjusts for low-frequency noise, better reflecting real-world conditions.

3. **How is reverberation time (RT or T60) calculated and why is it important in acoustic design?**

   Reverberation time (T60) is calculated using the formula $T60 = 0.161 \times V / A_t$, where V is the room volume and A_t is the total equivalent absorption area. It indicates how long it takes for sound to decay by 60 dB in a space and is critical for determining speech clarity, comfort and functionality of rooms.

4. **What acoustic rating systems are used to evaluate ceiling systems in terms of both airborne and impact noise?**

   Rw (airborne), Ln,w (impact) and CAC (speech privacy across ceilings).

5. **How do perforation percentage and cavity depth affect acoustic panels?**

   Higher perforation percentages generally enhance mid-to high-frequency sound absorption by increasing surface resonance and airflow resistance. Increased cavity depth behind the perforated panel supports low-frequency absorption by boosting membrane and resonant effects.

6. **What key factors should architects consider when placing absorbers, diffusers and reflectors in a room?**

   Room size, shape, ceiling height and function. Place absorbers on ceilings, walls or both to control reverberation

Competency Codes: PC24, PC28, PC33, PC39.