PCI MIDWEST
A Chapter of Precast/Prestressed Concrete Institute

PRECAST FOCUS

ACOUSTICAL CONTROL WITH PRECAST CONCRETE STRUCTURES

The basic objective of architectural acoustics is to provide a pleasant environment where desired sounds are clearly heard by the intended listener and unwanted sounds or noise are isolated or absorbed. Good acoustical design uses absorptive and reflective surfaces, sound barriers, and vibration isolators. Some surfaces must reflect sound so that the loudness will be adequate for listeners in all areas. Other surfaces absorb sound to avoid echoes and sound distortion. Sound can be isolated from rooms where it is not desired by utilizing precast concrete walls, floors and ceiling construction. The inherent mass of precast concrete makes it an excellent sound barrier.

Large reductions of sound levels from room to room can be accomplished only by continuous, impervious barriers. The ability of a barrier to reduce the intensity of airborne sound is designated by its sound transmission class (STC). As the unit weight of a precast concrete wall or floor increases, the STC also increases. Precast concrete walls, floors, and roofs typically do not require additional treatments to provide adequate sound insulation. If greater sound insulation is required, it can be obtained by using a resiliently attached layer of gypsum board or other absorptive building material. Precast concrete floors in combination with resilient materials can control impact sounds as well. One common solution consists of good quality carpeting mounted on resilient padding.

Most walls are acoustically composite and consist of different elements. Doors and windows are often the weak link in an otherwise effective continuous sound barrier. A relatively small hole can significantly reduce the STC of the acoustical barrier. All noise that reaches a space by paths other than through the primary barrier is called flanking. Flanking can be reduced with good attention to joints, gaps, and openings with proper safing and sealants. Suspended ceilings in rooms where walls do not extend from the ceiling to the roof or floor above allow sounds to travel to adjacent rooms. Use of full-height walls will prevent this source of flanking. The probability of flanking paths in a precast concrete structure is much less than in a conventional steel or wood structure. Additional information on the Acoustical Properties of Precast Concrete can be found in Chapter 11 of the "PCI Design Handbook" (MNL-120) available for purchase on the PCI Online Bookstore.

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