Subject: Building Services – III

Topic: Educational Buildings

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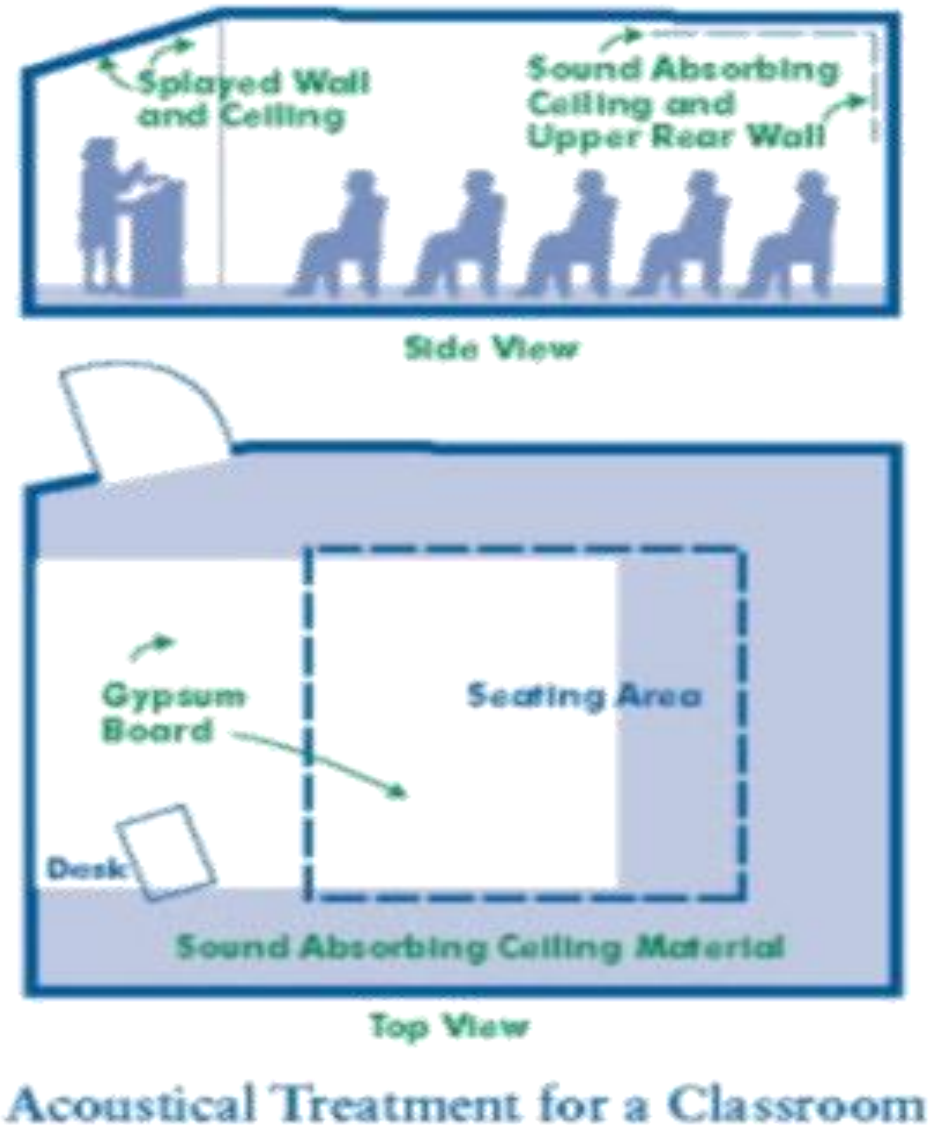
ENHANCEMENT OF WANTED SOUND

- **CONTROL EXCESSIVE REVERBERATION BY SOUND ABSORPTION**
- **MINIMISE ECHOS FROM DISTANT SURFACES**
- **USE HARD MATERIALS FOR USEFULL SOUND REFLECTION**



Acoustical Treatment for a Classroom

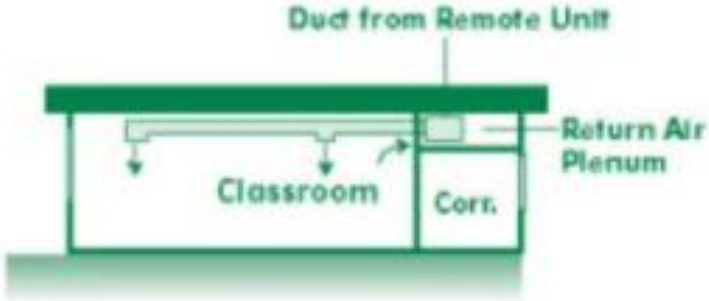
CONTOL OF UNWANTED SOUNDS

Wall-Mounted A/C Unit

Roof-Mounted A/C Unit

Design quiet ventilation system

Control of Intruding Noise



Preferred Layout for Noise Control

Architectural Design

- Design walls and partitions to meet STC ratings criteria.
- Specify ceiling tile and, if required, wall acoustic treatment to meet the reverberation control requirements of the Standard. Annex C of the Standard is especially useful in this regard.
- Limit or omit open space classrooms in the school.
- Specify sound insulating windows to block street noise or other environmental noises.
- For general classrooms with no fixed lecture position and ceiling less than about 3 m. (10 ft.), place most if not all sound absorbing material on ceiling. Over 3 m., an increasing amount will have to be on walls.
- For lecture type classrooms, it is best to ring upper wall and ceiling with sound absorbing

material. In lecture halls, use sound reflecting material over the lectern, sound absorbing upholstered chairs, back wall sound absorbing or tilted orientation. In this case, consulting support by professionals is recommended.

- For classrooms with fixed or predominant teacher position, don't place sound absorbing material just above and in front of teacher's position.

- Corridors should generally have total surface area of sound absorbing material on the ceiling or walls not less than 50% of the floor area and up to 75% overall. 75% treatment area is recommended for corridors with high traffic or noisy lockers.

- For cafeterias and large CLS with ceiling height up to 3.7 m. (12 ft.), suspended ceiling with NRC of 0.70 or higher should be used for full ceiling area less lights and ventilation grilles. Test results published by manufacturers typically assume an air space of sixteen inches above suspended ceilings. Less height is acceptable for frequencies 500 Hz and higher. For heights at 12 ft. or above, see Annex C of the Standard for guidance or consult an expert and plan on including some treatment on walls.

- Carpeting can be helpful for muffling chair and foot sounds from students; however, it is not effective alone at providing sound absorption and is a poor sound absorber for low frequencies. MSDE does not recommend the general use of carpet in classrooms due to potential indoor air quality concerns unless a high level of maintenance is available.

- Stagger room entrances along corridors to reduce direct sound transmission through open doors.

- Use wall mounted indirect light fixtures or pendent mounted fixtures rather than ceiling transfer fixtures to maximize the ceiling area available for acoustic treatment.

- Avoid fluorescent lighting systems with ballasts that emit a constant hum.