Basic Guidelines for Room Layout For Presentations

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Introduction

While the proper layout of a presentation room or multimedia theatre can involve some complex geometry, there are some simplified guide-lines that can be used. These are not intended to replace a rigorous layout design, but will allow you to ballpark your room and identify any major layout problems.

General Guide-Lines

For optimum viewing, the audience should be seated within the shaded area indicated in this diagram. They should be within ±30º of a line perpendicular to the screen's centre. They should be seated no closer then twice the image height. If a room is too wide to allow all viewers to fall within these guidelines, consider multiple displays.
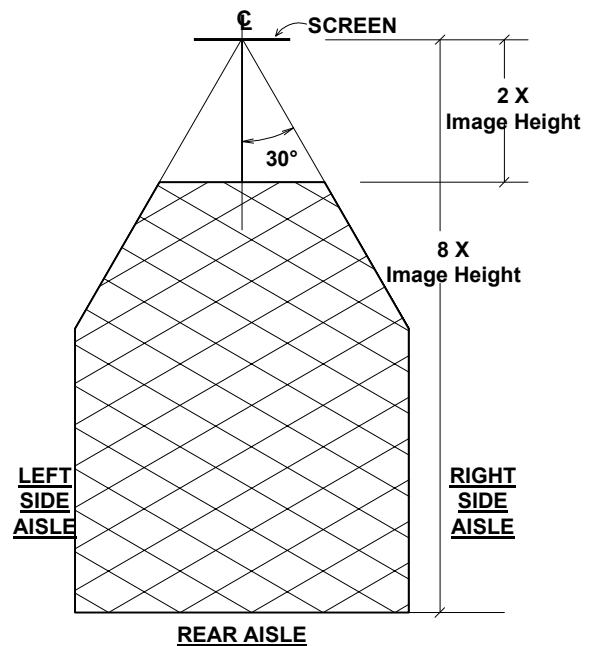
The distance to the furthest viewer depends on the content of the presentation. For general-purpose (e.g.: entertainment) the last row should be no further than eight times the image height. This should be adjusted to six times the image height for corporate or data presentations (e.g. spreadsheets), or four times the image height for critical applications (e.g.: control rooms, CAD drawings, very fine detail, etc.). See below for screen width criteria.

To prevent obstruction of the screen by the heads in front, the bottom of the screen should be four feet (1200mm) above the floor – this can be adjusted somewhat if the seating is staggered, or if the floor is raked. Allow a minimum of six inches (150mm) between the top of the screen and the ceiling. In both cases, don't forget about the frame thickness.

A rough rule-of-thumb for establishing the minimum ceiling height in feet is to divide the depth of the room by eight, six, or four (see above) and add 4.75. Thus, a 35' room should have a minimum ceiling height of 9'-1.5" (i.e.: [35 / 8] + 4.75). The rule-of-thumb for metric is to divide the depth of the room by eight, six, or four and add 1.5m. The screen should never be positioned too high – bear in mind ergonomic figures regarding comfortable head tilt and vertical eye movement range: no viewer should have to rotate their head more than ±30° from straight ahead, or tilt their head no more than 25° from horizontal.

Seating

Design the optimum viewing area first (see above), then place the seating within it.

As a rule-of-thumb, allow six square feet per person for the seating area. While local codes may vary, the general requirements for fixed seats (as opposed to bench seats or "*bum-rails*") are:

> They must have arms and a back, and they must be attached to the floor. They must be in rows, with a minimum unobstructed horizontal clearance between plumb lines from the front of an unoccupied seat to the back of the seat in front. This clearance may vary, but is typically 16 inches (400mm).

> Aisles must be provided so that there are no more than seven seats between any one seat and an aisle. There is usually an exception to this when: doors are provided to serve both ends of a row; the row contains no more than 100 seats; and each doorway serves no more than three rows. Aisles must terminate in a cross-aisle. Aisle widths and the length of an EXIT aisle are usually dictated by local fire codes.

Front or Rear Projection?

Front Projection	Can generally provide a wider viewing-angle than rear projection.
	Requires controlled lighting, and ambient light must be kept off the screen to eliminate a reduction in contrast ratio.
	Requires either a projection room at the rear of the theatre, or a platform or mount for the projector(s) out in the theatre. **Note that this latter is a potential noise source**. The projection geometry must be carefully worked out to get the best compromise between image keystoning and blockage of the light path by the audience. Must be accessible for maintenance. A projection booth must be dust free (positive pressure preferred), and have adequate ventilation.
Rear Projection	Generally has a narrower viewing-angle than front projection – better for long, narrow rooms.
	Can be viewed with higher levels of room illumination, and is less immune to "wash out" by ambient lighting.
	Available in flexible & rigid materials. A rigid screen is more expensive than a front projection screen, and has size restrictions.
	Requires space behind the screen. Mirrors may be used to reduce the required depth. Must be accessible for maintenance. Rear projection room must be dust free, and have adequate ventilation.

Determine the purpose of the presentation. If this is a "*canned*" presentation, you can consider either front or rear projection. If a live talker is interacting with the presentation, rear projection is best so that the speaker can interact with the images without being in the projector's light path. In addition, the higher allowable room illumination allows for note-taking, etc.

Screen Width

Determine your *minimum* screen height based on the distance to your farthest viewer and your ceiling height. This figure may be adjusted based on the application (e.g.: an entertainment application will require a larger than minimum size screen for impact). More information about image size and projection distance can be found here: http://www.conceptron.com/articles/image_size.html To determine the screen width, multiply the height by the multiplier found in the following table:

Medium	Multiplier
Standard video projectors	1.33
HDTV video projectors	1.78
Overhead projector	1.00
16mm film	1.33
35mm film	1.37
Cinemascope and large-format film	see notes
35mm slides	about 1.50 (depends on slide mount)
2¼ X 2¼ slides	1.00

Table 1. Screen Height Multipliers To Determine Screen Width

NOTES: **If you are mixing media, select the largest multiplier.**

If you are designing for a general-purpose use, and 35mm slides will be used, use 1.00 as a multiplier.

Cinemascope and large-format films can vary considerably. Check with the film's producers for exact aspect ratios.

ADA Requirements

In the U.S., the *Americans with Disabilities Act* has significant impact on presentation theatres. Here are some points worth noting:

A minimum number of wheelchair positions will be required based upon seating capacity. The accessibility and size of these spaces is defined. A minimum number of aisle seats will be required to have either no aisle-side armrest or an aisle-side armrest that folds up.

Certain additional signage may be required.

Your sound system will require the addition of a hearing-assisted system. The number of stations will depend upon seating capacity.

Your emergency systems may require the addition of strobe signals or visual messaging systems. The number of stations will depend upon coverage.

Your video and other visual presentation systems (such as film or 35mm slides) may require captioning.

Further information on ADA requirements can be found here: http://www.conceptron.com/articles/ada_req.html

Misc. Considerations

Don't forget that you need an equipment location. This is usually, but not always, located at the projector(s). This equipment may include projection controllers, a show controller, video equipment, and audio equipment. Don't forget to provide adequate electrical power for this equipment and the projector(s). Don't forget to allow conduit for speaker cables, control signals, etc. For boardrooms and meeting rooms you will also want to provide accessible sources (such as VCR's and DVD players).

Do the aesthetics or theme demand that loudspeakers and other equipment be concealed?

How is the presentation started? Common methods are: automatically, audience-demand, host-demand, and live presenter (may require random-access control or other interactivity).

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