

Theater Engineering Conference

Physical Construction

General Theater Construction*

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Summary—This paper will discuss the uses of alternate materials and to some extent the varied requirements to be considered in the construction of a modest or low-cost type of theater as compared to the construction of the more elaborate or so-called de luxe motion picture house. It will neglect the considerations of the special features such as layout of a full-act stage, stage lifts, gridiron, dressing rooms, paint bridges, orchestra lifts, and other requirements of a full presentation or legitimate theater, as probably there will be few theaters of this description constructed in the immediate future.

INTRODUCTION

WHEN CONSIDERING the construction of a theater of any type, it might be in order to mention that the estimates received at the present time, for the building of a proposed low-cost or modest house, take on the proportions of a de luxe theater; surely the prospective owners sincerely believe that the architect has included a fully equipped stage, solid-gold hardware, and mink-lined cosmetic rooms. However the prospects of a substantial reduction in the cost of theater building and theater equipment in the near future, are, in the author's opinion, not at all promising.

The matter of location of the theater, the accessibility to transportation, parking facilities, orientation of entrance features and marquees, vertical signs and similar questions will be discussed in detail by others, and therefore these topics, which of course are of primary importance, will be left for future consideration.

The more important functional and esthetic elements necessary in a good motion picture theater of both the modest and de luxe house, will be discussed in more or less the sequence of importance in which they affect and influence the average theater patron. Many will no doubt disagree with the order of presentation, but the theater patron will not be concerned with the sequence so long as all elements in one form or another are present. All are vitally important and necessary

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in the construction of a new theater; the functional elements to a far greater degree than the esthetic, which however, cannot entirely be neglected, in any theater.

Disregarding in this consideration such important requisites as cleanliness and courteous service, the following elements seem most vital and necessary:

1. Comfort while watching the show.
2. Good vision of the picture and proper projection.
3. Good sound.
4. Adequate and inviting toilet and rest-room facilities.
5. Ample and properly arranged lounge and circulating spaces.
6. Pleasing and attractive interior architectural treatment.
7. Attractive entrance and exterior treatment.
8. The physical structure of building.

SEATING, VENTILATION, LIGHTING

Under the first heading several factors will be considered, which will cause the patron to feel comfortable. Starting with the seats there is, of course, a wide range in both comfort and cost; however even the modest theater should have spring seats with upholstered backs of 20-inch minimum width, and spaced not less than 2 feet and 10 inches back to back of seats. The covering may be of leatherette, corduroy, mohair, or other serviceable material. In the de luxe theaters the covering materials would be of better quality, the seats and back upholstery would be deeper and more luxurious even to the extent of providing foam-rubber and upholstered arm rests, the seats should be 21 to 23 inches in width and back-to-back spacing from 3 feet to 3 feet 3 inches. Loge seats should be at least 22 inches wide and spaced not less than 3 feet 4 inches back to back. Orchestra rows 3 feet back to back with 21-inch-wide seats would be a good average for acceptable comfort.

The next consideration is "ventilation." Here again even the less-expensive theater must have adequate ventilation, without annoying or noticeable drafts. All theaters, where the hot summer season is of considerable duration, should be air-conditioned, at least provisions should be made in the ventilating system and layout of the fan room, so that cooling coils and refrigerating equipment, either for well water or compressor, could be installed in the future. If ventilation alone is installed the author recommends 35 to 50 cubic feet per minute of air per person; if well water is used, 30 cubic feet per minute.

would be sufficient; and if cooling is obtained by means of compressors 20 to 25 cubic feet per minute per person should be provided. In the smaller inexpensive theater, where air conditioning cannot be provided, the ventilation may consist simply of large quantities of air with no return or recirculating ducts or trenches under the floor. In the better theaters return air ducts or trenches would be built under the orchestra floor, located in relation to sources of air supply, to provide even ventilation in all parts of the house.

A separate smoke-exhaust system should be installed wherever the budget permits; this should be a definite requirement for a de luxe theater.

In connection with recirculating ventilation systems there has recently been considerable discussion concerning automatic electric shutoff equipment on main fans by New York State Authorities; however, the author believes that a manually operated shutoff switch controlling the main supply fan could be provided in a readily accessible location in the auditorium, outside the fan room, and this would prove more practical in preventing the spread of smoke through the theater in case of fire.

A third element which vitally affects the comfort of patrons is the lighting of the auditorium, while the picture is on. In *all* theaters the amount of exposed lights, lighted wall, or ceiling surfaces above the patrons eye line should be reduced to a minimum. A major portion of light required in the auditorium can be obtained by providing a relatively brightly lighted aisle by means of closely spaced aisle lights. There should be no exposed bulb lighting on either walls or ceiling that might be a distraction.

VISION AND PROJECTION

The second fundamental features are good vision and projection. These are essential in all theaters in very much the same degree.

Good projection depends primarily on good projection equipment located in the projection booth as close to the center line of the screen as practical, and with as flat a projection angle as possible, together with a good screen of the correct size for the length of the theater.

Good vision will depend on a good sight line with sufficient slope or proper grading of the orchestra floor, and proper stepping arrangement in the balcony. The sweep and staggering of seats, the arrangement of aisles and crossovers and vision angles at front rows will also greatly affect the *proper vision* of the picture. This might be the best

time to discuss briefly the projection-booth layout. In the theaters with a very low budget the booth should be arranged for two active machines straddling the axis line, and also *space* for one additional machine as well as room adjacent to one side wall, on which the control panel for all house lights should be located. A rewind room even though it be small, should be arranged adjacent to the booth with vision ports permitting a view of both the screen and projection machines, while the film is being rewound. A generator or rectifier room is essential as well as a toilet room for the operator located as close to the booth as possible.

In the booth for the better theaters, there should be three projection machines, one spot machine, and space for a future machine or piece of equipment which may be required for television or other new projection equipment. This type of theater should have house lighting on dimmers and wall space should be provided for light panels and dimmer banks in the booth. A vision port should be provided through the front wall adjacent to the light panel. The upper walls and ceiling of the booth in a de luxe theater should be acoustically treated with fireproof acoustical tile or perforated transite board. There should also be a film lift provided from the street-level floor to the booth. This feature might be eliminated in a very inexpensive house.

SOUND

Good sound first requires good sound equipment in the booth and at the screen. This is also a fundamental requirement in *all* sizes and grades of theaters. Good sound also will depend a *great deal* on the acoustics of the auditorium. In all theaters the acoustics can be controlled by the use of various acoustical materials on the walls and ceilings; by the shape of the auditorium; by the arrangements of forms and movement of the wall and ceiling surfaces; by the volume or cubical content of the auditorium; by the size and shape of the balcony; and also by the upholstery on the seats and the floor covering.

In the low-budget theater a great deal can be accomplished by the use of highly absorbent materials on the few acoustically vital wall surfaces, and by shaping or sloping other walls in relatively inexpensive materials.

In the more-expensive type of theaters architectural embellishments can be used in forms and designs that will be decorative and also add to the acoustic properties of the auditorium. (Theater acoustics will be covered by other papers.)

FACILITIES

The next consideration will be *ample and inviting toilet and rest-room facilities*. The location of the toilet rooms is most important. They should be readily accessible to all patrons with a minimum of travel and cross traffic. The necessity of having patrons use stairways to lounge and toilet rooms should be avoided whenever possible. There should be sufficient fixtures provided in all types of theaters; in smaller and less elaborate theaters, the proportion should be not less than one fixture for each 100 patrons, and in the better theaters the ratio should be not less than one fixture for each 75 patrons. In all toilet rooms the floors and wall wainscot to a minimum height of 5 feet should be of an impervious, easily washed material.

In the less-expensive theater the floors and base could be of tile or terrazzo, the toilet stalls of flush baked-enamel steel. The walls may be covered with tile, terrazzo, asphalt tile, linoleum, or composition tile. In the de luxe house the floors and base may be of tile or terrazzo or marble. The walls of structural glass, glass mosaic, tile, terrazzo, marble, or formica should have a minimum height of 6 feet and preferably extend to the ceiling. Remaining plaster surfaces should have a flat enamelled finish or they could be covered with washable wall paper. Toilet stalls for better theaters should be of structural glass, marble, tile, or porcelain-finished steel partitions, hung from ceiling supports. Wherever the budget will permit, all plumbing fixtures should be hung from the wall to facilitate frequent washing of the floors.

In all new theaters there should be cosmetic or anterooms of varying sizes leading to the ladies' toilet room. A men's smoking room need be provided only in de luxe theaters, in all others an entry space only, sufficient to provide privacy, is required.

LOUNGES

Lounge space will vary in location, size, and shape in practically all theaters. In the smaller inexpensive house the orchestra promenade should be of ample size but the lounging space can be reduced to a minimum. In the larger and better theaters there should be large lounging and circulating areas provided, preferably near the rest rooms, arranged, however, so that the noises from the lounge will not be audible to people watching the show. In the de luxe theaters there will be a check room, a room for lost and found articles, also a so-called

crying room for infants, preferably with a window at which the parent may watch the picture while sitting with the child.

The manager's office should be located near the orchestra promenade, and, where finances permit, a toilet room, clothes closet, ticket closet, and built-in safe should be provided in the manager's office.

INTERIOR TREATMENT

Pleasing and attractive interior treatment applies to the promenade, foyer, and lounge areas, toilet room, as well as the auditorium. The interior architecture will be influenced by the money available for such treatment and also the ingenuity, designing skill, and taste of the architect, from whom, as is well known almost anything or everything can be expected.

In the inexpensive theaters pleasing effects can be obtained by grouping a few very simple attractive shapes and by changing the planes and directions of walls and ceiling, concentrating the interest at the stage or some special motif of design.

In the de luxe theater there will be greater latitude possible by using marble, real wood, mirrors, indirect lighting, run-plaster molds, and occasional cast-plaster features; most of which must be omitted to a great extent in the inexpensive theater.

More neon and cold-cathode lighting will be used in new theaters of the better type, but the cost will restrict to some extent the use of this type of lighting in the cheaper houses.

ENTRANCE AND EXTERIOR

An *attractive entrance and exterior treatment* are most important in all types and sizes of theaters, and particularly so in locations in which competition and transient patronage are essential considerations.

Even in the theater in which every dollar invested must be made apparent, it is good showmanship and good business to spend just a little more on an attractive and inviting exterior entrance treatment.

Instead of the scarce theater materials such as brick, tile, structural glass, terrazzo, and formica, stucco and aluminated aluminum can be used in interesting forms and colors. Here very high light intensity is a primary requisite.

In the better theaters, the use of materials such as marble, limestone, glass, mosaic, tile, granite, and terrazzo in conjunction with stainless steel or bronze will provide the opportunity for a more elaborate and diversified entrance treatment.

The box office should be outside of the first set of doors even in locations in which inclement weather is a serious consideration. It should be located to provide the best shelter for patrons under the marquee or canopy and also should be visible at the first sight of the theater entrance.

Structural glass doors probably should be used in the more-expensive theater, whereas, aluminum, formica, or natural wood doors could be used in the less-expensive house.

THE PHYSICAL STRUCTURE

We are all searching for some new and less-expensive materials or methods of erecting the known materials, so that more theaters can be built at lower costs. The details of the light-steel frame and exterior theater, as well as the wood frame and wood-exterior theater, will be presented in other papers. This article will cover briefly other types of construction.

For the inexpensive theater, it probably will be found that a building constructed with brick side-wall piers to support roof trusses, which may be of either wood or steel, and walls of cement or cinder block, would cost the least at the present time. The blocks may be painted with water-resisting paint, or stucco may be applied which will stand up very well in the more moderate climates. The entrance features may be embellished by the use of aluminum, porcelain, enameled steel, or brick. The better construction for most locations in this country but more costly, of course, is skeleton steel frame for walls and roof, walls faced with brick and backed up with masonry block, and the roof of lightweight masonry plank, such as gypsum or porete support on steel.

In some locations in this country and in a great many foreign and South American countries reinforced concrete construction is used almost exclusively with excellent results. Very often steel is used for the roof trusses only. With lumber at its present high cost, the tendency, even in small theaters, is to use more fire-resistant materials throughout the theater, particularly in roof construction.

CONCLUSION

This subject is, as will no doubt be realized, limitless in its scope and there are so many special types of theaters, such as the first-run, high-admission house, the very small village and neighborhood theater, and on the other hand, the very large and showcase theater, that it has been impossible to discuss it all in the space allowed.