

DRAWING BY PAUL SANOW ASTC

How tall should my stage be?

BY WILLIAM CONNER, ASTC

Considerations in the planning of a school or community theatre in determining a suitable high trim

IN THE PLANNING OF A THEATRE, inevitably the height of the stage is a critical design issue and usually a significant topic for discussion. The users want it to do everything, the people responsible for money want it short, the architects are not too crazy for this big box on end otherwise spoiling their building design, and the theatre consultant wants it high enough to meet the needs of the user. Once the high trim is set, the highest point above the stage to which a batten with scenery or curtains can be hoisted, determining the final height of the stage is rather simple and a straightforward technical exercise. Deciding what high trim to plan for is not so simple. The target of this article is to assist users and owners in the planning process of a high school stage, which is probably not a lot different from many college or community theatres, in determining a suitable high trim.

Easy changeover [between events] results in better utilization of a building that frequently serves many purposes.

First, the purpose and function for a tall stage house and rigging should be considered. The obvious use is for hanging scenic drops and being able to fly one out and another in, to change a scene or back drop. In reality, we find that the more important use in a school or community setting is not changing the scenes within a show, but the changeover between one event and another. Easy changeover results in better utilization of a building that frequently serves many purposes. There are

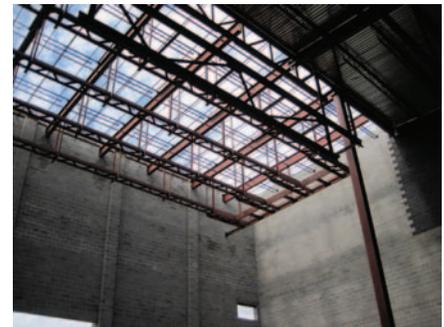
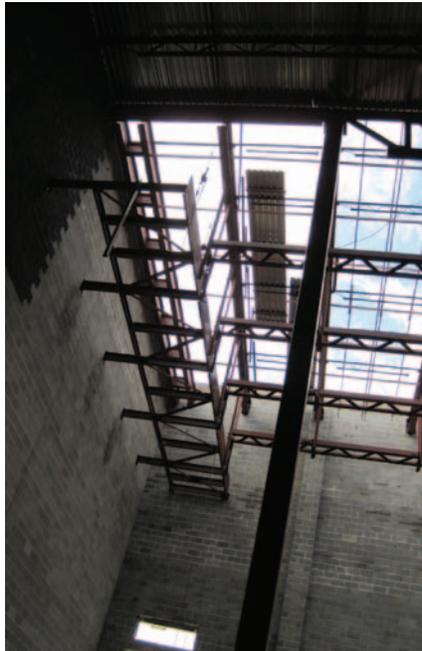
only so many Friday and Saturday nights and other prime dates, and the goal should be to amortize the facility over all of them. This requires quick and efficient changes from the Friday night band concert to the Saturday morning children's theatre play, to a Saturday night event, to a Sunday morning rental by a church group. The changes may be from the band shell to a masking setting with curtains, to a drop and furniture, perhaps with some lighting changes along the way, that are much more safely and

quickly accomplished if it all lowers to the floor, to make the changeover possible. If you can do those changeovers, more than likely there is enough stage height to permit lyric theatre with multiple back drops. In our view, the number-one criterion is that the curtains can be flown out and the orchestra shell set up, which has nearly the same height requirements as multiple drops suitable for high school and community use.

A Broadway, and thus national tour, standard (if such a thing exists) is that drops and curtains are nominally 30' tall. Yes, there are plenty shorter and some taller, but based on looms, (no longer a real limitation today), the widest seamless material available at 30' set the standard. Considering an 18' to 20' trim at the proscenium, this was close to an uninterrupted view from the tenth row, with the sight line passing under the most downstage masking border to the top of the drop. Thirty foot drops then necessitate a minimum high trim in the 65' to 70' range, to allow one to fly out as the other is flown in and some room for the lighting that is at or just above the top of the drop. This is great, and it's a height very few high schools would find limiting. If you can build and equip a stage with a 70' high trim, which will put the roof deck up around 80' or so, do it. The schools that have this make good use of the space and don't regret it.

Unfortunately, the budget usually is a part of this decision. Primarily as a result of building and fire code changes in the mid-1990s, many high school stages today are constructed with a clear maximum height to the underside of the roof of 50'. Over that threshold, a proscenium wall with proscenium opening protection, like a fire safety curtain or deluge system, and two-hour fire rating is required. The result is that the first inch over 50' costs a whole lot. So we look at 50', which if properly planned, permits a high trim of 45' to 46'. Is that sufficient for curtains to clear orchestra shell towers, and can it be lower?

Starting with the minimum 24' opening, we'd like shell towers to be in the 22' to 24' range. Allowing for a drama trim of 20',



The under-construction view provides a well illuminated view of the relationship of loading bridge, cross stage catwalks, and roof framing doubling as loft block beams, and the exterior of the same stage and auditorium.

Today's multi-functioning facilities

The books and other classic texts provide a rule that the stage height should be a factor between two and a half and three times the proscenium opening, without quite so much guidance on what the proscenium opening height should be nor to what was measured. I theorize that, since prosceniums used to be so much taller, often with an arch or opening that was never fully opened to the audience view, this rule did not simply always result in a stage that was tall enough. Perhaps the rule was actually derived from looking at existing theatres and measuring the proscenium and stage height, not by determining what made the masking work in a design process but simply empirically from considering examples.

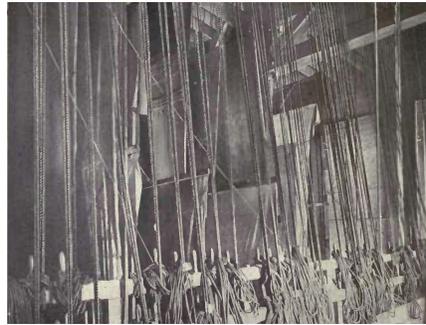


I take some exception to this rule of thumb because it seems to come from a time when drama and lyric theatre was presented in theatres and music was presented in concert halls. Most of today's theaters must function for both drama and concerts, and frequently the music program is the major player. For band and orchestra, an opening of at least 24' is very desirable, and taller is good. For drama or lyric theatre, an adequate proscenium opening may be as low as 18' to 20', easily achieved with adjustable masking of some sort within the taller opening designed for music. It would be ideal if every high school theatre had a 24' opening and the stage was 60' to 72' tall. All too often today, and very regrettably, the rule of thumb is misused and a stage is drawn of a certain height and then the proscenium is determined by dividing the height by the factor. The unfortunate result is a proscenium height that is in the 10' to 15' range, entirely unresponsive of the music program and just plain unattractive. Couple this with the misguided notion that the width should be sized for the annual concert band festival with several hundred instrumentalists spread out, that short height yields a proportion more like that of a letter box slot or a link sausage than an arch or picture frame.

Is it any wonder that when an historic theatre is restored and reopened, that a common response is "Too bad we can't build them like that anymore?" There is no doubt the 40' wide by 35' high proscenium arch compared to the new school's 60' wide by 16' tall punched opening in a thin wall plays an important role in this sad trend.



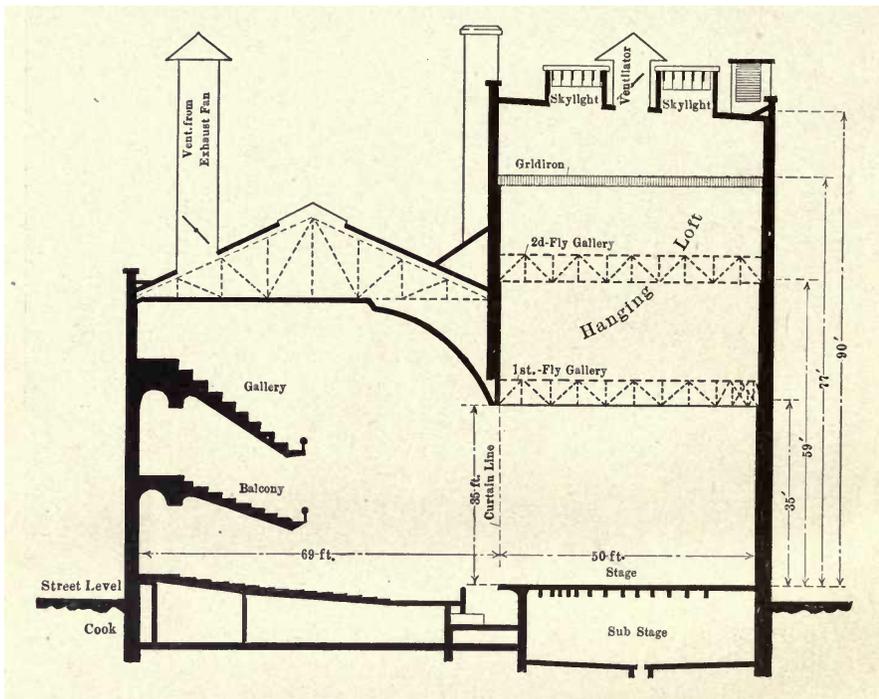
The stage catwalks at John Cooper School's PAC provide access for inspecting and servicing the rigging, which is not possible when it is simply underhung, yet does not restrict the travel and high trim below useful minimums, as a full stage gridiron would in a 50' high stage.



Many contemporary productions call for the function, namely high trim, travel, and speed, that this fly system, from the Iroquois Theatre, provided over 100 years ago.



Rendering of John Cooper School's Performing Arts Center.



A classic early 20th century theatre section, the ill-fated Iroquois Theatre, provided a high trim of 75' and roof over 90' above the stage floor, not unlike a well-designed contemporary stage for opera, ballet, and road shows, but beyond the means of most high school and many colleges.

21' high curtains with an allowance of two feet for tracks and batten or 23' on top of a 22' shell is just 45', so a 45.5' high trim, possible in a 50' high stage, works. Taking this to the minimums, with an 18' drama trim (barely enough for a two-story set) and a 20' high shell (which is really less than desired) a high trim around 41.5' just works. This also supports the use of 18' to 20' high backdrops, a size range that is reasonable to own or rent and still be effective.

What about even lower? Below these heights we recommend other solutions that don't require curtains flying to clear shells and which also don't permit multiple backdrops to fly. These are frequently referred to as dead-hung stages but might more accurately be referred to as single-setting stages. These stages may have rigging to facilitate hanging a drop or even allow flying out of sight smaller pieces, like a sign or banner or small framed piece of scenery suggestive of a scene, but it definitely changes the style and range of production options. Within this style and height, a plan to clear the stage of curtains, perhaps by tracks to the walls, should be considered.

How an orchestra shell might be moved in, set, and stuck requires a plan and acceptance of a lower quality of the acoustical support it provides. If having the stage overhead exposed to audiences is acceptable, a series of cross stage lighting catwalks may be the most efficient means for over stage lighting. This affords safe, easy, and economical access to the lights for hanging and focusing and servicing without ladders or lifts and without concern for obstructions on the stage under the lights. It also provides an easy platform and basis for no- or low-cost hanging of lightweight props and scenery, and it permits the suggestion of a place or time by simple effects such as dropping leaves or hand sprinkling of fake snow. If masking the overhead is a must, then stage lighting on battens that raise and lower with an electric motor is the practical but not inexpensive alternative. Whether the curtains can be raised to above heads for cleaning the stage at the floor level and

moving things on and off the stage but not out of sight of the audience, is only a question of cost. This is much appreciated by the technicians; however, the equipment to raise the curtains to 45' and out of sight costs very little more than the equipment to raise them seven or eight feet. This is a very small return on the investment compared to the same investment in a taller stage. One plus to this sort of stage design is that a permanent orchestra shell ceiling can be built over the catwalks for much less than a ceiling that must be rigged and stored over the stage.

So, how tall? A 70'-high trim and an 80' (or more) -high stage house with full walk on gridiron functions very well with few limitations and clearly qualifies as a fully rigged stage or full working stage. When on a tighter budget, significant savings can be realized while retaining most of the functions of a fully rigged stage in a

high school setting with a high trim in the mid-40' range and a roof deck right at or inches under 50'. Instead of a gridiron, we have developed a design with high cross stage catwalks for accessing the rigging or another system for routine inspection and adjustments. If the budget or other design considerations prevent that, a roof that is 35' to 40' above the stage, allowing space for economical bar joist framing, catwalks at 20' and ducts above those can work. Then including provisions for hanging lightweight scenery in addition to the curtains and tracks is recommended either on rigging that raises and lowers on tracks or is dead hung.

Finally, all of this works and returns the functionality promised when tightly coordinated with the architecture, structural framing, ducts, fire sprinklers, wiring, roof drains, stage roof fire vents, and everything that has to be on a stage. The best-laid plans for stages of any heights can easily be

foiled without vigilant oversight and review at every step of design and construction by someone that is familiar with and experienced in the design and construction of stages and auditoriums. ■



Bill Conner, ASTC has been a theatre consultant for more than 30 years and has represented the ASTC in the areas of codes and standards since 1987. Among his work on codes and standards, he is now the senior member of NFPA's Assembly Occupancy committee; was awarded the NFPA Lifetime Achievement award in 2008; is a member of the ANSI A117.1 committee and several UL technical standards panels; testified at hearings of the ATBCB; and served more than ten years as ASTC's first representative to the PLASA TSC as well as the Rigging Working Group. Bill can be reached at bill@bcaworld.com. Visit www.theatreconsultants.org to learn more about ASTC and www.bcaworld.com to learn more about Bill's work.