Sports Venue Renovations

How to Make the Building Code Work for You

By Paul Villotti

Courtesy of the University of Notre Dame

NCAA member schools use approximately 2,500 stadiums and arenas to support their athletic programs. These facilities range from stadiums seating over 100,000 fans, to fieldhouses filled with hundreds of supporters. Between the largest and smallest venues one thing is common: all schools renovate these facilities to improve fan amenities and increase revenue. New clubs, suites, additional concessions, restrooms, and "seating bowl" enhancements top the list of improvements. How does the building code impact these renovation projects? If I upgrade my building, do I have to upgrade all non-complying conditions? How do I integrate new construction into a non-conforming building? These common questions have a surprising answer.

Ten years ago, there were three building codes in the United States. Because of pressure within the design community, these three model building codes merged to become the International Building Code (IBC), which is now enforced across the United States. It requires new work to comply with current requirements, but specifically allows existing construction (not affected by the new work) to remain as is, as long as the overall safety of the building is not reduced.

Let's look at some common renovations, and discuss potential code issues.

Suite, Club, and Press Box Additions increase height and floor area. The building code currently allows stadiums and arenas to be up to 55 feet in height without fire resistive construction. Since many of these towers exceed 100 feet in height, reclassification of the building is required. The building code does not permit new additions to cause an existing building to fall into non-compliance. Demonstration that no additional hazards are created is required. These new towers are of fire resistive construction, and are provided with a full array of fire protection features including sprinklers, standpipes, and fire alarms in order to demonstrate that any fire hazard in the new tower will not spread into the seating bowl.

Restroom Additions are a common improvement. There is a misunderstanding that the building code requires any increase in toilets to fully comply with the required number based upon the current code. This is not true. The building code allows fixtures to be added in any quantity or amount as long as the overall amount is increased beyond the original count. Another variation occurs when a 2,000-seat addition is added to a 10,000-seat facility. The building code requires new toilet fixtures for the new population only; it does not require the building be retroactively upgraded for the original 10,000 people.

Seating Bowl Enhancements are among the trickiest types of renovations. A simple reseating, which leaves the aisle configuration alone, can be accomplished without requiring upgrades to the rest of the bowl. If new aisles are provided, or existing aisles are relocated, then the building code will require compliance with the new aisle requirements. This

includes proper exit capacity, center handrails, and elimination of dead-end aisles. Another common design is to add additional seats to a bowl. Since additional people are using an existing exit system, the building code considers this as an increased hazard and requires the exit system to be evaluated and upgraded.

There certainly is not only one approach to renovations. The building code has three options that can affect the final solution. Option one, the most common, is prescriptive compliance with the building code. To do this one must understand the rules as they apply to assembly occupancies. Application of these rules is tricky, and the design team should include someone experienced in arena design.

The second approach is the **development of equivalencies**. Approximately 50 percent of stadium and arena renovations require some form of equivalency. The building code specifically allows technical justification to prove that an alternate design provides equal or better safety. Examples include heat transfer calculations revealing that fireproofing is not needed for structural steel, heat and smoke modeling to justify omitting sprinklers in open air concourses and high bay arena roof areas, and reliability and audibility analysis of the public address (PA) system to enhance or replace a fire alarm.

The third way to address non-complying conditions is via a **code modification**. The building code allows non-compliance due to practical difficulties associated with existing conditions. This approach does not require demonstration that the design is safe. It only requires that it is not dangerous. The most common use of the modification request is in a seating bowl which has non-conforming treads and risers. It is impractical to modify existing aisle treads and risers without replacing the entire seating bowl. The building code recognizes that while these conditions are non-compliant, they cannot be changed so their continued use is allowed.

Successful renovation projects have several common traits. The first is that a survey of existing conditions to identify non-compliant conditions is done prior to the start of design work. A building code approach can then be developed to address the non-compliant conditions early in the design. This best occurs during the master plan or concept phase.

At this point, a **meeting with all stake holders** including the school, design team, building and fire officials is essential. If done early, these discussions are constructive, fruitful, and beneficial to the final design, as all interested parties can contribute. The building code approach is refined after these discussions.

A **code report** is generated that allows the information to be conveyed to all who may not have been included in the original discussions. This allows consistency in understanding the requirements. This report may include an exit analysis, fire and smoke modeling, diagrams of sprinkler systems, and fire resistive wall assemblies. The report is updated as the design progresses and is submitted as part of the final construction documents. It becomes a great first step when the renovated facility is again renovated.

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