Those who manage physical education, athletic, and recreation programs have a number of legal duties that they are expected to carry out. Among these is an obligation to take reasonable precautions to ensure safe programs and facilities. According to Hronek and Spengler (2002, p. 273), “The law recognizes a duty owed by coaches, recreation managers, and their staff to provide safe facilities for both participants and spectators.” Physical education and sports facilities that are poorly planned, designed, or constructed may lead to many problems for program leaders in those facilities. A poorly designed facility may limit the programs that can be offered; make the facility harder to operate, maintain, and supervise; and significantly increase the participants’ exposure to hazardous conditions. These factors can lead to a greater likelihood of injury and can increase the organization’s exposure to claims of negligence.

A poorly designed facility can usually be traced to a lack of expertise or effort on the part of the planning and design team. It is not uncommon for a sport, physical education, or recreation facility to be designed by an architect who has little or no experience working with that type of building. For persons without the proper background and understanding of the unique aspects of sport and recreation facilities, many opportunities for mistakes exist that may lead to increased problems related to safety, operations, and staffing.

Design problems commonly found in activity facilities include inadequate safety zones around courts and fields, poorly planned pedestrian traffic flow through activity areas, poor access control and security, lack of proper storage space, and the use of improper building materials. Safety problems related to design are often difficult, expensive, or impossible to fix once the facility has been built, and especially once the facility is in use. These facilities must be planned and designed by professionals with activity-related knowledge and experience and with the input of appropriate faculty, coaches, and staff who will work in the facility.

One essential aspect of planning multipurpose facilities is to consider all foreseeable activities that may take place within its walls. A gymnasium designed specifically for recreation will be very different than one meant for large groups of spectators. By identifying as many potential uses as possible and planning for each, many problems can be reduced or eliminated before construction even starts. This article will provide a brief look at a few of the areas where errors in the planning and design process often create hazardous conditions within physical activity facilities; it does not cover the safe
design of playgrounds, which has been discussed in a previous JOPERD feature (Hudson & Thompson, 2000).

Security and Access Control

Controlling access to sport, physical education, and recreation facilities is an important function of facility managers. When planning a facility, access to the facility and access within the facility both need to be addressed.

Legal liability, fee collection, deterrence of vandalism and theft, crowd control, patron safety and satisfaction, and maintaining exclusivity and value are a few of the reasons it is necessary to deny access to persons who are not authorized to use the facility. Multipurpose facilities can present unique challenges for controlling access. When an entire facility is open for recreation, an open access plan may be utilized. However, if a varsity basketball game is scheduled, certain doors, gates, and fences can be opened or closed in order to restrict spectator access to the arena, while still allowing the rest of the facility to remain open for recreational users, and affording emergency egress as required. A properly designed and equipped facility, along with a well-trained staff, will minimize access control issues.

Trying to correct access control problems in a poorly designed facility can be very challenging. Many buildings, especially older spectator facilities, can be a nightmare to control. Fire regulations may require many doors leading outside for quick evacuation. If limited access is desired through these doors, a plan must be developed to address how they can be secured, monitored, and controlled without violating fire regulations.

A very common method of trying to control access in a facility is by chaining or padlocking doors that should remain open. Even though this method may have the desired effect in controlling the building, it can create significant hazards and is likely to be a violation of fire codes. By identifying access needs and communicating those needs to the architect early in the planning process, many appropriate methods can be used to avoid future problems.

Ensuring fast and easy emergency egress from all spaces within the facility is essential. One good method to do this utilizes corridors that run parallel to the program spaces and provide emergency exits on either end. Exit doors may be controlled by providing staff to monitor who comes and leaves, using doors equipped with alarms and panic bars for emergencies, installing closed circuit television cameras that are monitored by staff, or by utilizing magnetic locks that can either be released by a supervisor or that will automatically release when a fire alarm is triggered.

Buffer/Safety Zones

Many sport and recreation activities require a certain amount of space between the activity area and any obstructions such as walls, columns, or equipment in order to enhance the safety of the participants. This space is commonly referred to as a buffer zone or safety zone.

Building a facility without an adequate buffer or safety zone presents a foreseeable risk of injury. A number of lawsuits have been based on claims that an injury occurred as a result of an inadequate buffer or safety zone. Whether it is to provide space between the court and a wall or another object or to separate two adjacent courts, buffer zones must be considered. Additionally, a concept that is often overlooked when planning physical activity facilities is that all of the action for a given activity will not necessarily be limited to the boundaries of the court or field. Much of the action in certain sports occurs out of bounds. In volleyball, for example, the area beyond the end lines and sidelines is playable and frequently in use. With tennis, a significant part of the game occurs well behind the end lines, and in
A stairwell (above) dangerously intrudes into the buffer zone of a playing court, while an inadequate buffer zone and lack of wall padding make the basketball court at right hazardous.

softball and baseball, foul balls are pursued on a regular basis. Facility planners must understand that play outside of the boundaries in these and other activities is a part of the game and that generous buffer zones must be designed into these facilities to accommodate this.

**Indoor Activity Areas**

There are currently no widely accepted standards regarding buffer zones for basketball courts. The National Collegiate Athletic Association (NCAA) and the National Federation of State High School Associations specify that the minimum recommended distance around the court is three feet, while ten feet is preferred. Other organizations recommend minimum distances ranging from six feet to six and a half feet, although they too prefer 10 feet. The problem comes when facility planners consult the organizations that specify three feet as the minimum and design a new facility with a three- or four-foot buffer zone. Where safety is concerned, there is a huge difference between three feet and 10 feet. It is the author's opinion that providing only three feet from the end line to the wall creates a dangerous facility, especially when the wall is not padded. The greater the distance from the activity area to the wall, the lower the chances of injuries occurring from collisions. For basketball courts, the author recommends a distance from the end line to the wall or other obstruction of at least 10 feet. As for the sidelines, a minimum of six feet of clear space that is free from walls, obstructions, or other courts is needed (Seidler, 2005). Anything less than 10 feet on the end lines and six feet on the sidelines presents a foreseeable risk of collision and should be avoided if possible.

Padding walls and other obstructions can reduce the chances and seriousness of collision injuries to participants. It is recommended that any court that has less than a full 10 feet of clear space between the end line and the wall have padding where players are likely to hit if they lose control while going out of bounds. Padding walls and other obstructions is an important safety measure even when there is at least a 10-foot buffer zone beyond the end line.

It is recommended that wall padding extend from no more than four inches off of the floor and be at least six and a half feet tall. For increased safety, the padding should extend the entire width of the court. Wall pads in many facilities provide inadequate coverage, because they begin eight to 12 inches above the floor, rise to a height of only five or six feet or extend only the width of the actual court. In these facilities, players over six feet tall or others who may come into contact with the wall beyond the padding receive no protection. Specifying wall padding all around will affect the budget of a new gymnasium very little and will provide a much safer environment, easily justifying the added expense.

When planning a facility, it is necessary to use pads that meet or exceed the standards set by the American Society for Testing and Materials (ASTM). The ASTM (2005) recently established standard specification F2440-04 in order to identify a minimum level of protection for impact and shock absorption properties for wall padding. Padding that does not meet the ASTM standard should not be used. There are indications that some sport governing bodies are beginning to recognize the need for a higher quantity of padding of better quality. The 2006 NCAA men’s and women’s basketball rules state, “It is recommended that padding that meets current ASTM standards be used on walls and other facility features in or around the playing area that a student-athlete might contact during play” (NCAA, 2005, p. 23).

A common mistake made when planning a gymnasium is to design it only with basketball in mind. Multipurpose gymnasia, such as those found in a typical middle school or high school, are commonly used for activities other than basketball. Using the gym for indoor soccer, ultimate Frisbee, whiffle ball, relay games, and other activities, or bringing the softball team indoors to practice during inclement weather, are common occurrences that may put participants in an environment that was not designed for the
activity taking place. Installing padding on the walls around the entire perimeter of a gymnasium that may be used for such activities is recommended. If the walls are padded only under the baskets, it will provide little protection during these other activities.

Activity spaces and surrounding areas should also be designed to be free of obstructions such as inward-opening doors, poles, columns, and supports. If any such obstruction cannot be moved or eliminated from the activity area or buffer zone, it must be padded. All other protrusions that may cause a safety hazard in the gymnasium should also be avoided if possible. Common examples include drinking fountains and fire extinguishers, which if considered during the planning process, can be recessed easily into a wall. Standard door knobs located in an activity area such as a wrestling room or gymnasium can also pose a hazard. Alternative types of door knobs that are recessed in the door are available and should be used.

Another area where safety or buffer zones are important and often overlooked is in the weight room. Placing weight equipment too close together can present a serious safety hazard. Most weight equipment should be spaced a minimum of three feet apart. This measurement should be made with the movement of the machine or exercise in mind. Some exercises require a horizontal movement, and the safety or buffer zone should be measured from the extremes of this movement. An example is the space often required for leg extension machines. As the movement is executed, the legs straighten and extend another two feet or so out from the machine. The safety zone should be measured from the point of full extension. Some exercises require more than a three-foot safety zone. Certain free-weight exercises such as squats and power cleans require more room because of the amount of weight and relative lack of control typically encountered during such exercises. Spotters must have room to effectively supervise the lift.

Allowing more than one activity to take place in one area can also be dangerous. Playing basketball games on two or more courts that overlap (using a side basket for one game and an end basket for another) produces a situation in which an injury is foreseeable.

**Outdoor Activity Areas**

Outdoor fields and courts have safety problems similar to those of indoor activity areas. As discussed earlier, many courts and fields are built without considering that much of the activity takes place outside of the boundary lines. Overlapping fields are a common occurrence and can cause a significant safety hazard if activities are allowed to take place simultaneously. A common example of this is when there are two adjacent softball fields that share a part of the outfields. If games are being played at the same time on each field, the outfielders are at risk of a collision. Overlapping courts and fields should be avoided if at all possible. An alternative to the softball field example might be to turn the fields around and have the home plates close together.

![Obstacles such as this shed should not intrude on the activity area.](image)

Placing two activity areas adjacent to each other can be just as dangerous as those that overlap. It is not uncommon to see a baseball field located right next to a track. Sometimes this can lead to joggers on the track having to dodge flying baseballs. The planning for all adjacent activity areas must take into consideration that activities may occur simultaneously, so that foreseeable dangerous situations can be avoided.

Another common design problem that may produce hazardous conditions is the typical football field that is surrounded by a track. Very often, field event facilities are constructed inside the track and may include asphalt runways, pit areas, and raised concrete curbs. In this situation, there is often little distance between the football sidelines and the inner perimeter of the track, much less the runways, pits, and the commonly used concrete pole vault box.

Ideally, two activity areas such as a football field and a track should not be combined into one space. Realistically, however, there often is insufficient space or funding to construct the two separately. If this type of mixed-use field is necessary, a minimum of 15 feet of clear space between the sidelines or end zone of the football field and the track is recommended. The jumping and vaulting runways should be placed outside the track if possible.

Water valves, telephone and electrical boxes, and other above-ground fixtures are often placed adjacent to the inner perimeter of the track. These are often located in metal boxes mounted several inches above the ground. A person can fall and strike the sharp metal receptacle and be severely injured. If such boxes are essential, they should be placed underground with the top flush with the field surface. Any obstructions that are within 15 feet of the field should be padded for safety. The primary problem with padding obstructions is that, even if padded, they still may be a hazard. The padding deteriorates over time, disappears, or is not properly installed. It is better to plan and construct the area without such hazards in the first place, rather than counting on pads to make them safe.

Many fields have been built with steel manhole covers or storm drain grates in, or adjacent to, the playing area. Also, fences are often constructed or trees planted just outside of
The boundary lines, typically with no thought for the safety of the people using the field. As stated before, it is very important to understand that not all activities take place within the playing field. Whether chasing a fly ball into foul territory or getting tackled on the sideline, obstructions that are just out-of-bounds can be significant hazards. With proper planning, these can usually be avoided.

**Storage**

Probably the most common complaint that facility managers report when asked about their facility is a lack of adequate storage space. Without a proper storage space, equipment is left stacked in a corner of the gym, in one of the hallways, or on the side of the pool deck. Typically, adequate storage space is planned for in the original facility design. However, as the design is developed and the estimated cost of construction becomes more clear, projects that are determined to be over budget must have design adjustments made to them. Storage areas are frequently the first spaces to go. Another common reason for inadequate storage space is a failure of the planning team to fully consider all of the activities that must be accommodated in the facility.

Beside the fact that improperly stored equipment is much more likely to be vandalized or stolen, it may also constitute an attractive nuisance if others use it, unsupervised and often in a manner for which it was not designed, outside of class or activity time. While no longer a common sight, trampolines were often pushed into a corner of a gymnasium and left unattended. This improper storage and poor supervision led to many catastrophic injuries and deaths and has resulted in the elimination of trampolines from most programs today. It is essential that adequate storage space be planned and constructed and that it be readily accessible and easily secured to prevent unauthorized use of the contents.

Lack of sufficient storage space for outdoor equipment is also a common problem. Providing a fenced, lockable storage area for items that are too large to be moved indoors is recommended. A fully enclosed storage area for pole vault and high-jump pits, hurdles, judge's stands, and other movable equipment can provide protection from the weather, vandals, and unauthorized use.

**Proper Building Materials**

Another common issue in the planning process is the failure to select proper building materials. Many factors must be considered during the selection of construction materials for a physical education or recreation facility. Among these are initial cost, functionality, durability and expected life span, aesthetics, and the ease and cost of maintenance. Another frequently overlooked factor is safety. Without due consideration, improper building materials can adversely affect the inherent safety of the facility. The potential activities that may take place in every space must be studied thoroughly to ensure that the facility will optimally support each activity.

Flooring materials must be chosen with great care. Poor selection of the floor surface can contribute to significant safety hazards. One of the most dangerous examples commonly occurs in wet areas, such as locker rooms, shower areas, training rooms, and pool decks. The material selected for the floors in these areas should provide a long-lasting, easily maintained, nonslip surface. All too often, these wet areas are constructed with a smooth finish, such as polished concrete, linoleum, or terrazzo. These are excellent surfaces in the proper situation and are usually selected for cost, durability, and ease of maintenance. But they all can become extremely slippery when wet. Many excellent nonslip surfaces are available for wet areas. One of the best surfaces is rough-finish ceramic or quarry tile. Additionally, all wet areas should slope toward a floor drain to avoid the creation of standing water.

Poorly chosen wall surface materials may also prove hazardous. Standard drywall should not be placed in activity areas such as gymnasia, where bodies, balls, and other pieces of equipment may hit and put holes in it. Impact resistant drywall that will withstand the abuse likely to occur in a gymnasium should be used instead.

Another major surface hazard is the use of standard glass in or near activity areas. Using glass in doors, windows, or in fire extinguisher covers is a common cause of injury. The use of glass with imbedded wire mesh should be avoided in or near activity areas. In spite of what many people believe, such glass is not safety glass. According to Cohen (2004), "wired glass is much less impact-resistant than standard glass" (p. 11). It can be broken fairly easily and can cause even greater injury than standard glass.

Another relatively common problem has occurred with the use of glass in what most people think of as a nonactivity area. The trophy case in the lobby of most high school gyms is a good example of this. Planners often overlook the fact that lobby space is frequently used for activities, whether it
is the wrestling team running in the halls during inclement weather, cheerleaders practicing, or just the everyday horseplay that occurs with teenagers. Safety or tempered glass of some sort should be used in all such areas.

Mirrors used in weight rooms and dance studios must be selected and hung with care. They should be high-strength, shatter-proof glass designed for activity areas. Weight-room mirrors should be mounted about 18 inches above the floor to avoid contact with weight plates leaned against walls or barbells that may roll against the wall.

It is also important to select proper ceiling materials. Acoustic ceiling panels can be excellent for classrooms and offices, but can become a maintenance headache and a safety hazard when used in activity areas such as gymnasiums or racquetball courts. Standard acoustic panels are not meant to withstand abuse from balls, and they often break or shatter when hit. If an acoustic ceiling is desired, there are tiles designed for gymnasiums that will stay in place if struck by a ball or other object.

All surface materials selected must be chosen with care in order to withstand the abuse likely to occur in each particular area. Permanent equipment such as lighting fixtures in activity areas must be built to withstand the activities that will take place around them. The proper light fixture typically has a plastic cover and possibly a wire screen to protect the bulb from impacts. If the fixture is struck hard enough to shatter the bulb, the broken glass will be contained by the plastic cover and be prevented from falling to the floor. Fixtures without this feature may shower broken glass onto the floor below when struck.

Miscellaneous Hazards

Another common safety hazard often seen in baseball and softball facilities is open dugouts. All dugouts should be fenced in front to protect those within from line-drive foul balls and errant throws. Providing protected access to and from the dugout is also important. Water fountains and bat racks should be placed inside or behind the dugout so that players are able to gain access to them from the dugout without being directly exposed to the field.

Portable soccer goals that are left out on fields also can create a very hazardous situation. Several children are killed or severely injured each year by climbing on portable goals that are not anchored to the ground. Because these goals are often heavy and poorly balanced, they tend to tip over when someone hangs on them. Injuries typically occur when a child hangs from the crossbar and is then crushed as it tips over. These incidents can be prevented either by permanently anchoring soccer goals or by using a chain or cable to temporarily anchor them in place so that they cannot tip.

Proper signage can have a major impact on both the safety of a facility and an organization’s ability to defend itself in court if someone gets injured and decides to sue. Signs informing clients of the safety rules of the facility and some of the inherent risks of an activity can transfer some of the responsibility for their own safety to the participants and can go a long way in establishing an assumption-of-risk defense. Examples of rules may include “Shallow Water—No Diving” in the pool, “Use of Spotters Required” in the free-weight area, and “No Dunking” for basketball courts. Signs informing of inherent risks include “Playing Racquetball Without Protective Eyewear is Dangerous. Wear Your Goggles.” The signs should be clear, easy to understand, and placed in a prominent position. On individual pieces of equipment such as weight machines, it may be appropriate to place instructional and warning signs directly on the machine.

Conclusion

Many of the factors that go into making a facility safe are easy to implement if they are planned during the design process. Once the concrete has been poured and the facility is open, it is much harder (or may be impossible) to make changes. Planning and designing facilities with safety and risk management in mind can help prevent problems, headaches, injuries, and lawsuits in the future.

In order to plan, design, and build the best and safest facility possible, three things are recommended. First, a professional consultant who specializes in the type of facility being planned should be hired as part of the planning team. A good consultant will provide knowledge that comes from years of studying the unique problems and solutions of physical activity facilities and will also offer an understanding of the planning, design, and construction process.

Aside from providing ideas and solutions, a consultant can often act as a go-between for working out problems between the owner and the architect. Second, it is essential to select architects that have a background and experience in sport, physical education, and recreation facilities. An architect that is great at designing hospitals, hotels, or houses does not necessarily have the background to understand the unique challenges associated with physical activity facilities. Finally, when such a facility is going to be built, physical educators, coaches, and recreation professionals must get involved in the planning process. Even though physical educators do not have the training that an architect may have, their experience and professional understanding of how their facilities are supposed to work can provide invaluable insight to the project. If an opportunity to get involved in planning a new or renovated facility presents itself, physical educators, coaches, and recreation directors should jump at the chance. After all, when the building is complete, the architect cashes his or her check and moves on to the next project. It is the professional faculty and staff who have to work with the facility for the next 50 years.

References


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guidelines, existing facilities need to be analyzed and altered whenever possible in order to increase access and usability for everyone. Not only the building itself need to be accessible, but the selection and placement of equipment must help create and maintain accessibility. If physical educators and health and fitness professionals are striving to provide the best possible facilities and programs for both individuals with disabilities and able-bodied patrons, then it is imperative to remain educated and aware of the structural barriers within facilities for fitness, physical activity, recreation, and sport.

References


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Additional Sources


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