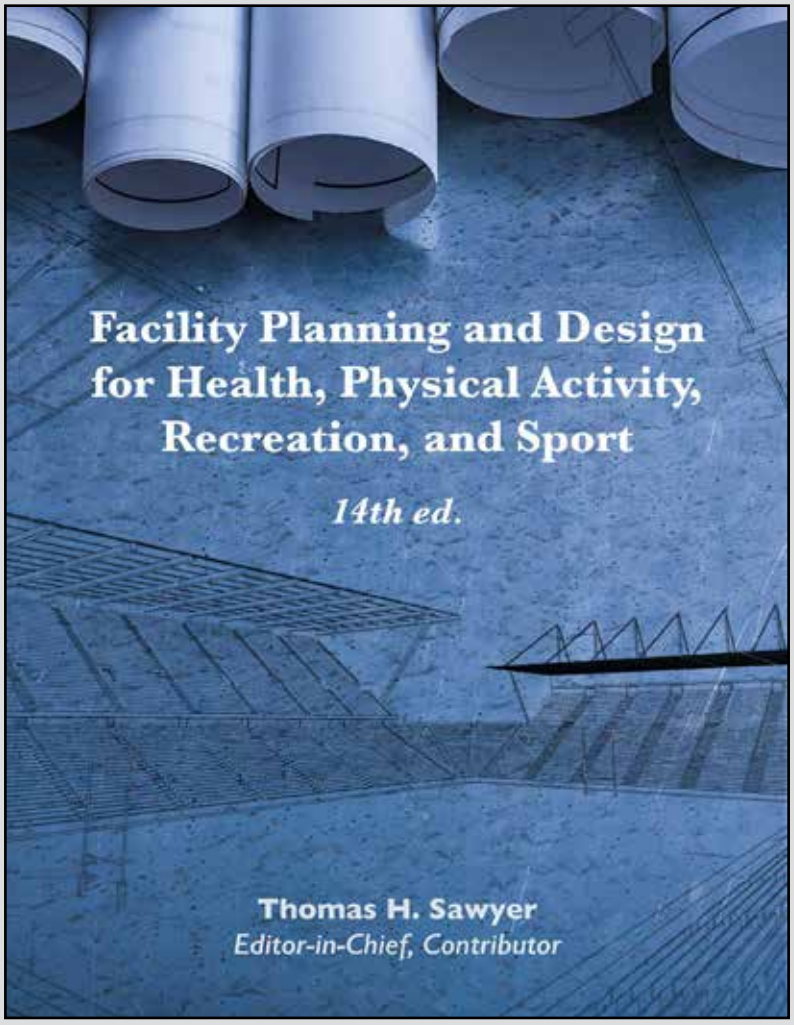
INSTRUCTOR'S GUIDE



SAGAMORE VENTURE

CONTENTS

Sample Course Syllabus

FACILITY PLANNING AND DESIGN

Either Undergraduate or Graduate Level

Course Description:

This course has been developed to introduce students to the theories, principles, and applications of community-based comprehensive planning of park and recreation areas, and sports venues. It includes current practices in planning, design, and development. There may be field trips to various types of facilities.

Textbook:

Sawyer, T. H. (Ed.). (2019). *Facility planning and design for health, fitness, physical activity, recreation, and sports* (14th ed.). Urbana, IL: Sagamore-Venture.

Competencies: NRPA and/or COSMA

National Recreation and Parks Association (NRPA)

8.22 Describe the process of planning for community recreation needs through the use of a recreation needs survey.

8.23 Explain the important components of planning such as slope, placement, alignment, soil types, and so forth as they relate to the development of recreation and sports facilities.

Commission on Sport Management Accreditation (COSMA)

Common professional components (CPC) included in this course and supporting required textbook are:

- Management concepts—including planning, organizing, leading, evaluating, controlling, strategic planning, and decision-making.
- Construction budget—including bidding process, types of construction budgets, and contingency budgets.
- Legal aspects—including construction contracts, negligence, risk identification, and risk management.

Course Goals:

Upon completion of this course, the student should be able to demonstrate the following:

1. Fundamental understanding of the planning process for facilities (venue) development in parks, recreation, and sports
2. Knowledge of the construction terminology and the roles of the various professionals involved in designing and constructing a facility or venue
3. Knowledge of facilities or venue construction standards
4. An understanding and application of the various construction standards established by various governing bodies
5. An understanding of contemporary facility financing strategies

6. Fundamental understanding of the concepts and issues of risk management as applied to the design and operation of park, recreation, and sports facilities or venues
7. Knowledge of principles and practices of safety, emergency action, and risk management in park, recreation, and sports agencies
8. An ability to complete a conceptual site plan for a recreation or sports facility
9. An ability to interpret and evaluate a site plan
10. An understanding of the value of user and/or public input into the planning process
11. An ability to identify and describe the elements of park planning

What to expect from this course:

This course has been designed to assist the student in gaining an understanding of facility or venue planning and design for park, recreation, and sports areas. The student should expect to learn about the planning process, specific design features for various park, recreation, and sports areas. Finally, the student will learn about risk management and safety concerns when developing park, recreation, and sports areas.

Course Content:

1. Planning
   a. Predesign feasibility study
   b. Needs assessment and community surveys
   c. Demographic data
   d. Survey and evaluation of existing sites and facilities
   e. Traffic patterns—pedestrian and vehicular
   f. Major space usage patterns and programming
   g. Aesthetic considerations
   h. Functional considerations
   i. Master planning
2. PERT Master Plan Schedule
3. Program statement for facility development
4. Program and building committee—purpose and functions
5. User charts
6. Bubble charts
7. Space dimensions (specifications)
8. Projected site location
9. Regulations (i.e., municipal [codes], county [codes], state [codes], and federal [OSHA, ADA])
10. Desirable professional standards (i.e., AAHPERD, ACSM, ASTM, CPSC)
11. Strategic planning
12. Design Phase
    a. Architect selection
    b. Facility consultant selection
    c. Schematic design
    d. Design development
    e. Construction documents and blue prints
13. Bid Process
14. Facility Considerations
    a. Indoor facilities
    b. Outdoor facilities
    c. Aquatic facilities
    d. Parks
    e. Wall, ceiling, and floor treatments

   f. Electrical, mechanical, and energy management
   g. Accessibility and ADA concerns
15. Risk Assessment
   a. Risk reduction
   b. Facility safety
   c. Crowd management and medical emergency
   d. Security and evacuation plan
   e. Alcohol management
16. Financing Facilities (Graduate Course Only)
   a. Sources of revenue (taxes, bonds, sponsorships, specialized seating, naming rights, project finance, etc.)
   b. Concession and merchandising management
   c. Design and construction budgets
   d. Box office management
17. Crowd Control and Security
18. Economic Theory Applied to Stadiums and Arenas (Graduate Course Only)
19. Economic Impact of Venues and Events (Graduate Course Only)

Tentative Course Outline:

Week Topic(s) Readings
(Undergraduate Course Only)

1. Master planning
2. Standards and guidelines
3. Planning for safety and risk management
4. ADA and inclusion
5. Common facility components
6. Field specifications
7. Court specifications
8. Ancillary spaces
9. Recreational spaces (e.g., aquatics, skateparks, camps, etc.)
10. Adventure spaces
11. Public school areas
12. Athletic training spaces
13. Track and cross-country facilities
14. Trends in facilities
15. Trends in equipment

(Graduate Course Only)

1. Master planning
2. Standards and guidelines
3. Planning for safety and risk management
4. ADA and inclusion
5. Common facility components
6. Field specifications
7. Court specifications
8. Ancillary spaces
9. Track and Cross Country facilities
10. Adventure spaces

11. Public school areas
12. Athletic training spaces
13. Financial planning and financing facility development
14. Public vs. private sources of revenue/Economic Impact of Venues and Events
15. Economic Theory Applied to Stadiums and Arenas

Assignments:

1. **Master Plan: (See sample document at the end of the syllabus)**
   (Undergraduate and Graduate Course Requirement)

   Each student (or group) will complete a fictitious master plan (i.e., recreation management students will select a park and/or recreation project; sports management students will select a sport-oriented project, amateur or professional; and recreation therapy students will pick a project focusing on the provision of services to clients). The typical contents of a master plan include the following:

   a. Cover Page
   b. Executive Summary
   c. Goals and objectives
   d. Supply analysis
   e. Population analysis
   f. Demand analysis
   g. Standards analysis
   h. Agency action plan
   i. Expenditure analysis
   j. Priority criterion ranking

2. **Finance Plan: (See sample document at the end of the syllabus)**
   (Graduate Course Requirement Only)

   Each student (or group) will develop a financial plan to support the Master Plan he/she (they) has prepared. The financial plan should include funding from public and private sources.

3. **Tour and Photo Survey Reports:**
   (Undergraduate and Graduate Course Requirement)

   Each student (or group) will tour four (4) facilities of his/her choice (i.e., parks, playgrounds, field sports complexes [e.g., baseball, soccer, softball], YMCAs, YWCAs, high school sports complexes, college sports complexes, Boys Clubs, Girls Clubs, community sports centers, etc.).

   In the tour report, the student should

   a. summarize the tour (including name and address of the facility, website, name of director or executive director);
   b. describe the good design points;
   c. describe the poor design points;
   d. list what he/she learned on this tour;
   e. answer the question, if you could change one thing, what would you change and why; and
   f. answer the question, if you could take one idea with you, what would it be and why.

4. **A Recreation or Sports Facility Program (Wish) Book: (See sample document at end of the syllabus)**
   (Undergraduate and Graduate Course Requirement)

   Each student (or group) will prepare a facility design wish book to be used by the architect and the design team to develop the initial design of a facility of his/her choice (i.e., recreation management students will select a park and/or recreation project; sports management students will select a sport-oriented proj-

ect, amateur or professional; and recreation therapy students will pick a project focusing on the provision of services to clients). The facility design wish book should include, but not be limited to, the following:

a. Cover page
b. Executive summary
c. Goals and objectives
d. Programming for the facility
e. Safety and security
f. Specific program spaces needed (i.e., courts, fields, multiple purpose, aquatic, etc.)
g. Details for the specific spaces (i.e., include the specific needs for each space as suggested by standards and best practices)
h. Support/ancillary areas (i.e., restrooms, lobbies, offices, locker rooms, concessions, storage, custodial, etc.)
i. Grounds (i.e., plantings, turf, irrigation, drainage, etc.)
j. Parking

Sample Completed Master Plan Project

Undergraduate and Graduate Course Project Requirements

MARK TWAIN RECREATION AND SPORT PARK MASTER PLAN
HANNIBAL, MISSOURI ON THE MISSISSIPPI RIVER

EXECUTIVE SUMMARY

Our goal with this project is to create a park, recreation, and sports complex that is all encompassing in Hannibal, Missouri. Hannibal is located on the Mississippi River approximately 100 miles north of St. Louis. Former resident Mark Twain left $100 million in a trust account where the principal is not able to be touched. We will develop a public multipurpose complex on 300 acres adjacent to the Mississippi River.

BRIEF HISTORY OF HANNIBAL, MO

Hannibal's first inhabitants, as far as we know, were the Mound Builders, whose mounds can still be seen in and near the city. Centuries later, the Missouri Indians lived here, the Sac and Fox Indians being the last to inhabit the area.

The first explorers on record, who saw the river shore at the future site of Hannibal, were Father Marquette and Louis Joliet in 1673. The first explorer who landed at the site was the French monk Louis Hennepin in 1680. He named the body of water north of Hannibal the Bay de Charles.

In the 1790s, salt was discovered in the vicinity. It was of great value to St. Louis and other large settlements. Mathurin Bouvet was able to secure Spanish land grants that allowed him to take title of two parcels here in 1795.

One, located in Ralls County, at what came to be known as Spalding, contained a salt lick. The salt was extracted from the land and transported to the warehouse at Bay de Charles where his workers and their families had formed the first white settlement in Marion County.

Hannibal was finally founded in 1819 by Moses Bates, who platted the town for the Hannibal Company that sold the lots at low prices. He and Jonathan Fleming built the first building in town, a log cabin, near the corner of North Main and Bird Streets. Bates also owned the first steamboat in town, the General Putnam. In 1830, the population was only 30. However, when Hannibal became chartered as a city in 1845, James Brady became the town's first mayor, and the city soon grew to 2,020 by 1850.

Hannibal has always been known for its rich railroad history. The first railroad to cross the state of Missouri, the Hannibal and St. Joseph Railroad, was completed in 1859. The first run in 1860 to carry the Pony Express mail across the state to St. Joseph was made by a skillful engineer, Addison Clark, who made the 206-mile run from Palmyra to St. Joseph in 4 hours 20 minutes—a record not broken for years. The first railway mail car for sorting mail en route was made in the railroad shops at Hannibal in 1862. A model of this car is on display in St. Joseph. At an earlier date, the first locomotive manufactured west of the Mississippi was made at the Hannibal–St. Joseph Shops in Hannibal. It was a 34-ton engine called the General Grant.

Statues of important people, real and fictional, are scattered about the town. The statue of Congressman William Henry Hatch in Central Park was sculptured by Frederick Hibbard and dedicated in 1914. Hatch (1833–1896) was a Hannibal attorney who was instrumental in securing the passage of agricultural legislation that established the position of Secretary of Agriculture in the Cabinet of the President of the United States. Hibbard also sculpted the Tom and Huck Statue placed at the foot of Cardiff Hill and the Mark Twain Statue located in Riverview Park overlooking the Mississippi River.

MISSION, GOALS, AND OBJECTIVES

Mission

Our mission is to provide an all-inclusive park, recreation, and sports facility using only the annual interest for instruction and operations.

Goals and Objectives

The purpose of goals and objectives are to (a) to provide direction for future planning, (b) answer critical community questions, and (c) provide structure to the master plan process. The first set of goals and objectives is to foster continued development of recreation and park planning.

Goal one. To involve a larger cross section of the community.

Create more cohesiveness between the youth sports organizations by creating activity fields for the top played youth sports in the area.

Create more programs and more opportunities for involvement for the elderly by collaborating with the retirement and nursing homes.

Goal two. To coordinate recreation services for residents.

Provide a kiosk where community organizations can post events, programs, and other opportunities for participation.

Maintain and promote the use of this master plan as a decision-making tool starting immediately.

Goal three. To provide spaces for the residents of Hannibal (indoors and outdoors).

Develop and plan for park area by year 2007.

Develop and plan for sport area by year 2009.

Develop and plan for recreation area by year 2011

SUPPLY ANALYSIS

Purposes of the Supply Analysis

A supply analysis is the process of identifying the existing and potential parks and recreation resources, facilities, and programs that are available to community residents.

The following are the purposes of the supply analysis:

- To identify all parks and recreation services that are provided to community residents
- To identify what different agencies or groups provide parks and recreation services to community residents
- To identify what percentage of parks and recreation services are provided by the respective agencies or organizations
- To answer a number of specific and important questions that an effective parks and recreation administrator should know
- To provide information regarding the condition of parks and recreation resources, facilities, and programs

Recreation. The following is a list of lakes and marinas in the Hannibal, Missouri area.

- Blackjack Marina on Mark Twain Lake, 573-565-2233, yearly, daily slips for rent, regular and mixed gas, full-time mechanic, fishing and pontoon boat rentals, convenience store, self-service snack bar, and grilled barbeque sandwiches available on weekends.
- City Of Hannibal Marina On Mississippi River at the Foot of Broadway, 573-406-1272. On the Hannibal waterfront with overnight slips available May through October.
- Indian Creek Marina Route HH off Highway 24, 573-735-4075, yearly, daily slip rentals, jon boat, pontoon, ski boat, and wave runner rentals. Supply store and restaurant on premises. Mechanics on duty daily.
- Mark Twain Lake, 573-735-4097, Lake is approximately 27 miles in length and is surrounded by 38,400 acres managed by the U.S. Corps of Engineers. This lake is ideal for both sailboating and motorboating and provides fishermen a variety of fish species.

Golf. The following is a list of golf courses in the Hannibal, Missouri area.

- Norwoods Golf Club, 52651 Norwoods Place, Hannibal, MO 63401, 573-248-1998, Championship public 18-hole golf course that offers a challenge for players of all skill levels, plus features a driving range, putting green, and pro shop.
- Hannibal Country Club, 1200 Country Club Dr., Hannibal, MO 63401, 573-221-0629, private, 9 holes, 5844 yards, par 70, CR-68.0, S-110.
- American Legion Golf Course, 3681 Route MM, Hannibal, MO 63401, 573-221-5831, public, 9 hole, 5794 yards, Par 70, CR-33.6, S-N/A.

Camping. The following is a list of campsites in the Hannibal, Missouri area.

- Mark Twain Cave & Campground Hwy 79 South, Hannibal, MO 63401

Nearby colleges. The following is a list of nearby colleges in the Hannibal, Missouri area.

- Blessing – Rieman College of Nursing, Adams County, IL
- Culver-Stockton College, Lewis County, MO
- Hannibal-LaGrange College, Marion County, MO
- John Wood Community College, Adams County, IL
- Quincy University, Adams County, IL

Parks. The following is a list of parks in the Hannibal, Missouri area.

- 19 park areas located consistently throughout the town

Other Organizations. The following is a list of other organizations in the Hannibal, Missouri area.

- YMCA

Items the city already has. The city of Hannibal already has the following facilities.

Ramp park. The Hannibal Ramp Park is located in Huckleberry Park, off Highway 61. The 8,800-square-foot ramp park features below grade concrete bowls with 6-foot drop-ins. It also includes banks, spines, rollers, a hubba ledge, grind block, extensions, and a handrail. The park was designed to allow use by BMX's skateboarders and roller bladers of all skill levels.

Aquatic center. The Aquatic Center is located off Highway 36 at 1700 Pleasant Drive. It contains two twisting water slides, one drop slide, two diving boards, several water playground features, zero-depth entry, shaded areas, and a newly renovated pool house and concessions area. The concessions area sells Pepsi products, Papa John's pizza, candy, hot dogs, snow cones, and much more.

Baseball fields. Complex includes three ball diamonds of varying sizes: Clemens, Conley, and Harding; all of the fields are lighted and fenced.

Youth programs include soccer, basketball, baseball/softball, football, and gymnastics.

POPULATION ANALYSIS

Purposes of the Population Analysis

There are several purposes for performing a population analysis. Identified below are those purposes.

- The planning process does not occur in a vacuum, and the population served is most critical. Therefore, one of the primary purposes of the population analysis is to be sure the master plan meets the needs of the population for which it is designed.
- The population analysis provides the planner with information that can dramatically alter the recommendations of the master plan.
- The population analysis provides not only current information (current planning needs) but also future information (future planning needs).
- The population analysis can identify specific planning information or specific communities.
- The parks and recreation master plan for that community (also based on future trends) will be largely affected (number of playgrounds, tot lots, playground equipment) by that specific population.

Census 2000 Demographic Profile Highlights

Hannibal, Missouri

Total population: 17,757

Male: 8,247
Female: 9,510
Median age: 36.1
Under 5 years: 1,248
18 years and over: 13,170
65 years and over: 2,985
White: 16,090
Black or African American: 1,167
American Indian and Alaska Native: 63
Asian: 63
Native Hawaiian and Other Pacific Islander: 13
Some other race: 44

Hispanic or Latino (of any race): 200
Average household size: 2.40
Average family size: 2.98
Population 25 years and over: 11,325
High school graduate or higher: 8,722
Bachelor's degree or higher: 1,766
Civilian veterans (civilian population 18 years and over): 1,997
Disability status (population 5 years and over): 3,199
Foreign born: 194
Median household income in 1999: $29,892
Median family income in 1999: $37,264
Per capita income in 1999: $16,902
Families below poverty level: 516
Individuals below poverty level: 2,407

DEMAND ANALYSIS

Purpose of a Demand Analysis

The demand analysis provides an accurate assessment of what the community residents desire in the area of parks and recreation. Some of the purposes of the demand analysis are to:

- determine precisely what current activities and resources are popular as measured by actual participation;
- determine precisely what current activities and resources are not popular as measured by lack of participation;
- provide an opportunity to participate in the planning process;
- provide a series of public hearings open to residents of the service area to assess on a nonrandom basis the residents' desires, interests, participations, priorities, and awareness factors;
- establish a database that goes beyond the master plan writer's own perspective of what is important to a community; and
- determine trends or changes in the desires of community residents relative to parks and recreation.

By using community surveys, it was determined that Hannibal currently participates in the following activities:

Cooking: 32%
Crafts: 33%
Dance: 16%
Swimming: 57%
Gymnastics: 11%
Running: 18%
Group Exercise: 18%
Skating: 23%
Sewing: 11%
Tennis: 10%
Walking: 79%
Team Sports: 44%
Woodworking: 9%
Roller Hockey: 6%
Church: 43%
Other: 20%

The residents also stated that while they were satisfied with the facilities in Hannibal, they would like to see the following areas included in the master plan for the future:

Sport Information Kiosk: 52%
Multi-Sport Facility: 48%
New Park Area: 45%
Multifield: 40%
Fitness Center: 39%

Public input plays an important role in the decisions regarding community parks and recreation. It is important for all pertinent information to be available to the public in order to make well-informed decisions regarding park and recreation development for Hannibal. In addition, the input of the public should be made available in organized meetings in which topics can be discussed and shared for the purpose of making the best decisions for the community. Therefore, it is our opinion that a citizen committee should be formed so that the issues of the community can be voiced.

STANDARDS ANALYSIS

Purposes of the Standards Analysis

A standards analysis is a process of identifying and comparing existing parks and recreation facilities and resources to nationally accepted standards for those facilities and resources. A standards analysis accomplishes many critical planning decisions. Some of the purposes of a standards analysis are to

- allow a community to determine whether the overall community is in line with the nationally accepted parks and recreation standards,
- allow the community to determine what facilities and resources are needed and which ones provide an overabundance (from a standards viewpoint),
- make obvious shortages or overages and prevent "personal bias" regarding the appropriate supply of parks and recreation resources, and
- allow the community to determine whether specific areas within the community do not have adequate resources despite that the overall community meets the standards.

Example

Neighborhood Playground

Description: Designed to provide both active and passive short-term activities. Usually located adjacent to public schools.

Contents: Distinct play areas for preschool and school-aged children, shelter structures, open space, multiple-use paved for court games, areas for field games, some off-street parking, and lighting.

Population served: General focus is for ages 5 to 14, with informal recreation for all ages. One per 1,000 to 5,000 population: possibly one for every elementary school.

Service area and accessibility: Neighborhood - Walking distance within a half-mile radius.

Acres/1,000 persons: 2.0 for cities of 10,000 to 25,000
1.5 for cities of 25,000 to 100,000

Size range acres: 5–10 for cities of 1,000 to 25,000
4–8 for cities of 25,000 to 100,000

Neighborhood Park

Description: Landscaped natural park of limited size primarily for passive recreational needs of all ages but with designated active areas. The park provides some scenic and aesthetic value. It should be located in the center of a multiple-family dwelling neighborhood or nearby site.

Content: Open lawn space, shrubbery, small picnic areas, drinking fountain, miniature scenic paths or nature walks, area for court games if not provided at a nearby recreation facility, off-street parking, and lighting. Has some program potential.

Population served: For all ages. From 1,000 to 10,000 maximum.

Service area and accessibility: Entire neighborhood. If park is unique, it may attract others from another neighborhood.

Acres/1,000 persons: 2.0 for cities of 1,000 to 25,000
1.5 for cities of 25,000 to 100,000

Size range acres: 6–8 for cities of 1,000 to 25,000
5–8 for cities of 25,000 to 100,000

Community Playfield

Description: Primarily an athletic complex that serves the recreational needs of the community. Usually one per community, however, if the community is cut by barriers, or if sufficient acreage cannot be obtained, then two are recommended.

Content: Athletic complex – lighted court and field games area, community center, swimming pool, lawn areas, adequate parking, may have picnic and play area for children. It may be a portion of major community park. Has high potential for recreation programming.

Population served: All ages. Entire population of community, 10,000 minimum to 30,000 maximum.

Service area and accessibility: Within biking distance.

Acres/1,000 persons: Minimum 1 acre per 1,000 persons.
Cities up to 50,000, 2 acres per 1,000 persons is recommended

Size range acres: 15–25 for cities of 1,000 to 250,000

Major Community Park

Description: A large natural area and/or landscaped area to provide urban dwellers escape for city congestion without traveling a large distance. It should be designed to accommodate a large number of people and a wide variety of activities. It provides for both intensive use and passive use.

Content: Provides for combination of intensive and non-intensive development ranging from play apparatus to bicycle trails. Typical facilities include swimming facilities, picnic tables, paths, game courts, gardens and natural areas, pavilion, ample parking, and sanitary facilities. May include multipurpose trails internally or as part of a system.

Population served: All ages, toddler to retiree. Serves between 40,000 to 100,000 people.

Service area and accessibility: Entire population for cities with population up to 25,000; 1–4 miles for cities of 1,000 to 25,000 persons; within 30 minutes for cities of 25,000 to 250,000.

Acres/1,000 persons: From minimum of 1 acre to maximum of 5 acres.
Recommended: 5.0 acres for cities of 1,000 to 100,000

Size range acres: 20– 35 for cities of 1,000 to 25,000
50–100 for cities of 25,000 to 100,000

In Hannibal's case, although it is not a huge town, it is growing and could have a larger park. With fund-raising, the capital is there to build a larger one. This is the case with a lot of the facilities we are planning. The start-up money is already available to begin on these projects and continue to make this facility grow.

EXPENDITURE ANALYSIS

Purposes of Expenditure Analysis

The purpose of the expenditure analysis is to provide the master plan reader with accurate information relative to the cost of a specific agency-recommended action. The expenditure analysis has other purposes as well. The expenditure analysis:

- offers a comparison to similar agencies. The expenditure analysis, if prepared properly, will show how much money is spent per resident for parks and recreation, and the information can be compared to other communities similar to the size and makeup to the master plan.
- highlights a method of funding for the proposed cost so that the community decision makers have an idea of where the needed money will come from.
- highlights the relative importance of the parks and recreation service. Communities may not realize how little or how much they spend for the quality aspects that the parks and recreation departments provides.

History of Spending for Leisure Services

The annual income for Hannibal is $11,500,000. The expenses are divided into beautification, parks, building, and service fees. The total for beatification is $60,000; for parks is $20,000, for building is $50,000, and for service/ expenses is $20,000, which currently runs the park department $150,000. This gives the city a surplus of money that can be used in more development structures, increasing the ability to go ahead and create other projects and get those in the master plan done.

Method of Funding

The main method of funding will come from the trust that can use the interest. This gives more money that can be used. Other methods of funding are bonds and bank loans.

HANNIBAL'S ACTION PLANS

Purpose of the Agency Action Plan

Hannibal's action plan identifies their actions and responsibilities and suggests a timeline. This action plan will also map out specific actions, while it identifies specific agency responsibilities and interprets data. The priority of these projects will be discussed in detail in "Priority Section." The following five projects are our suggestions for Hannibal's Park and Recreation development based on prior research provided in the previous sections.

Table 1.1
Proposed Community Park and Recreation Development Projects (Agency Actions)

Agency	Action	Time Frame	Why
Hannibal PR	Multipurpose Complex	2 years	Needing an area that is offered to support the community with their recreation activities that is available for them indoors.
Hannibal PR	Build a kiosk	Within a year	Gives residents and tourist an idea what is going on within the town.

Hannibal PR	New Park	5 years	Gives an opportunity to build a playground area suitable for all needs.
Hannibal PR	Multi-field Area	5 years	With different sports being held, a multi-field area will give the opportunity to have more than one field to be used. Have more than one field that can be used for football, soccer, and other interests.
Hannibal PR	Fitness Center	7 years	A fitness center is something that could be used by all people. Whether or not they are athletic, everyone is looking to get into shape. The reason why this project has not been developed sooner is because there is already a local YMCA that offers this service, although the development of one will be needed as the population grows.

PRIORITY CRITERION RANKING

Purposes of the Criterion Ranking System

One purpose of the criterion ranking system is to rank the priority of projects so the master plan writer can recommend a specific order the actions should take. Another purpose of the system is to eliminate bias as to what order the recommendation should take. A master plan may recommend the construction of an outdoor swimming pool and an 18-hole golf course. As soon as that information is public, special interest groups generally use that information for their own best interests. However, an order of importance based on criteria should put the recommendations in line with what is best for the community. Equality of needed facilities, programs, and resources usually emerges because of a properly designed ranking system.

Priorities

Develop an overall plan for a 200-acre park and recreation complex on the northeast side of Hannibal running along the Mississippi River, designating the locations for multipurpose complex and aquatic center (indoor and outdoor); multiple-field complex for baseball, softball, football, and soccer; fitness complex (indoor and outdoor); boating and fishing area; golf course; practice range and practice greens; tennis complex (indoor and outdoor); picnic areas; playground for children with disabilities; disc golf area; and a multiple trail layout.

- Design and build a multipurpose complex and aquatic center (indoor and outdoor).
- Design and build a multiple-field complex for baseball, softball, football, and soccer.
- Design and build a fitness complex (indoor and outdoor).
- Design and build a boating and fishing area.
- Design and build a golf course, practice range, and practice greens.
- Design and build a tennis complex (indoor and outdoor).
- Design and build a park area.

Sample Completed Financial Plan Project

Graduate Course Project Only

THE CITY OF HANNIBAL AND THE MARK TWAIN ENTERTAINMENT AND SPORT GROUP PROUDLY PRESENT: MCSHOWMAN SQUARE

The financing plan is for a new facility to be located in Hannibal, Ohio, that will not only be the home to the Hannibal Mud Hens minor league baseball team but also include two Marriot hotels, retail shopping, condominiums, a 12-screen movie theater, and a city park.

HISTORY

The Hannibal Mud Hens are a Class A minor league baseball team, affiliated with the Cincinnati Reds, from Hannibal, Ohio. The team plays in the Midwest League. The team's inaugural year in Hannibal was 1983, as the Hannibal Suns, a Pittsburgh Pirates farm team that replaced the Pirates' previous Midwest League farm team, the Danville Suns. The following year, the team was given the more traditional name "Mud Hens." The Mud Hens first home park built in 1965 was Lucas Field near the University of Cincinnati campus. The team moved to a new park in downtown Hannibal, Fixerhosen Field, on May 13, 1988. The facility that is currently being constructed in Hannibal will include the Mud Hens new field, as well as other facilities that the City of Hannibal will use. The new facility is McShowman Square, which is the name of the new field. The mascot that represents the Mud Hens is Nasty McShowman, who has a baseball head, carries a baseball bat, and rides a Harley.

DEVELOPMENT OF MCSHOWMAN SQUARE

Mayor Jones announced that the City of Hannibal has reached a definitive agreement with the Mark Twain Entertainment and Sport Company and is in final negotiations for the development of McShowman Square. Definitive agreements are documented for construction to begin. They represent a significant milestone toward realizing the project. Agreements will be presented to the Hannibal Redevelopment Commission for consideration. The Redevelopment Commission is the sole entity responsible for approving the agreements. McShowman Square will assist in retaining and gaining jobs and bringing new business opportunities to the area. McShowman Square demonstrates sound fiscal management and the commitment of respected private investors that want to be key partners in revitalizing downtown. An investment in downtown is a positive investment for the community's future.

Summary highlights of the definitive agreement are as follows:

Ballpark/Condominiums/Retail

- City of Hannibal retains Mark Twain Sport to manage the ballpark in a manner consistent with modern Class A professional baseball stadium management standards and practices.
- City will construct the ballpark for an amount not to exceed $30 million with Hardball contributing $10 million toward the infrastructure of the facility.
- City will participate in naming rights and ticket revenues with the proceeds going into a capital maintenance fund.
- Smith Estate will construct at a cost of not less than $60 million for a condominium complex.
- Smith Real Estate is a dynamic and multifaceted commercial real estate firm specializing in project development, marketing, and management. Smith has an award-winning track record with an affinity for mixed-use projects in urban areas. Mark Twain Entertainment and Sport is a company that invests in and operates baseball-related businesses. It is the owner of the Hannibal Mud Hens.
- The retail store spaces will not exceed $25 million. High-end retailers will lease out the space.

Hotels/Movie Theater/City Park

- The City of Hannibal has contracted with Marriot Hotels to bring a Courtyard and a Springhill Suites hotel to McShowman Square. The construction of each hotel will not exceed $30 million.
- The movie theater complex that includes 12 screens will be a Kerasotes theater. The cost of this project will be $10 million.
- The city park will not exceed a budget of $2 million. This park will have a grand fountain, as well as seating, flowers, trees, and paths. It will be a space that can be enjoyed on game days, as well as throughout the year by the entire community.

Additional McShowman Square updates:

- Hannibal City Plan Commission: A public hearing on zoning map amendments. Certain properties within the McShowman Square development are being requested to be rezoned to commercial status.
- City Council: An ordinance outlining the bond financing for the McShowman Square development will be discussed. City Council is being asked to approve a lease for certain land and public improvements between the Hannibal Redevelopment Authority and the Hannibal Redevelopment Commission. The lease provisions are the same as those that have already gained approvals from the Redevelopment Authority and Redevelopment Commission. Final approval on the bond financing could come at the same City Council meeting.

CONSTRUCTION

Mark Twain Entertainment and Sport has been hired to design a new $30 million minor league baseball park in the city of Hannibal, Ohio. The Hannibal Redevelopment Commission has reportedly approved a $2 million

contract with the company for the new stadium. The new ballpark will be the home of the minor league Hannibal Mud Hens from 2009 and will serve as a centerpiece to Hannibal's downtown McShowman Square development.

On January 2, 2007, the first of the concrete was poured for the ballpark at McShowman Square in downtown Hannibal. The future home of the Hannibal Mud Hens is scheduled to be completed in time for Opening Day of the 2009 season. The initial concrete will make up the outfield wall.

FINANCING

This project will be financed by public and private sources. The funding for the entire project will be accomplished as follows:

1. City of Hannibal will issue a general obligation bond (supported by parking revenue, 2% restaurant tax, and 4% bed tax in Dawson and surrounding counties) for $54,000,000 to cover a majority of its expenses and use $10,000,000 of the redevelopment funds to purchase the 10 businesses and 17 houses that will need to be cleared from the property to complete the necessary infrastructure development for the complex. The funds for this project are included in the $54,000,000 general obligation bond.
2. The City of Hannibal will establish a TIF zone around the McShowman Square area to generate additional tax revenue for the area.
3. The remaining $136,000,000 of the $200,000,000 will come from private sources. Prestige Worldwide, a Chicago-based company, is contributing to the City of Hannibal $10,000,000 toward the $30,000,000 city-owned stadium and will operate for the city. Smith Real Estate, a commercial real estate firm, will construct at a cost no less than $20 million a condominium and real estate plaza and 24,000 square feet of first floor retail space. Finally, Cincy Lodging Services will construct two 250-room hotels ($60,000,000, two hotels by Marriott). The remaining funds have come from donations and trusts from the citizens of Hannibal who would like to improve their city and bring more visitors to their city.
4. The naming rights for the baseball complex will be $500,000 for a 20-year period (total $10,000,000). The revenue from the 16 suites will be used to repay the debt. Furthermore, the increased marketing inventory highlighted by the 40-foot video board will significantly increase the sponsorship revenues, which will also be used to reduce the debt on the private side.

THE FACILITIES

Retail Shops and Condominiums

McShowman Field

Retail Shops and Condominiums

The City Park located in McShowman Square

One of the two hotels in McShowman Square

The Movie Theater Complex

Sample Completed Program Book

PROGRAM BOOK
MARK TWAIN BASEBALL PARK COMPLEX

Introduction

The City of Hannibal, Missouri, is developing a baseball park complex. The complex will consist of three lighted T-Ball/Little League fields, one lighted regulation adult baseball field, a control building including concessions area, restrooms, storage space, a second-floor press box area facing each field, a meeting room in the center, practice batting cages, warm-up area for pitchers, picnic area including a playground for younger children, landscaping, and a parking area.

The following details are provided to assist the architect/builder in the development and design of this baseball park.

SAFETY CONCERNS

Safety and Fields

Sawyer, T. H. (2002). *Facilities planning for health, fitness, physical activity, recreation, and sport: Concepts and applications* (pp. 187–188). Champaign, IL: Sagamore-Venture. .

The owner of a potential ball field property must apply the sound and proven guidelines for planning a facility that are outlined in this text to reduce athletes' exposure to risks. The planning process should include an analysis of the causation of injuries. The following are common causes for injuries on field spaces.

Location. The size of the field area is critical. Neither athletes nor spectators should be exposed to any of the following hazards, and planners need to consider each concern when selecting a location for a field.

Streets should not be located any closer than 100 yards to a facility.

Railroad tracks, like streets, should not be any closer than 100 yards to a facility.

Watercourses, man-made culverts, or natural streamways can contain deep, fast-moving water that can trap or entangle people who slip, walk, or slide into them. They should not be any closer than 100 yards to a facility.

Trenches or gulleys can be a hazard holding deep muck, hidden snakes, reptiles, or rodents or containing wires, quicksand, or reinforcing rods that can pierce or entrap a person. They should not be any closer than 100 yards to a facility.

Settlement ponds or basins can contain toxic liquids, silt, or flammable materials and should not be any closer than 100 yards to a facility.

Storage yards with old concrete or other culvert pipes that can roll and crush, junk cars and machinery that can cut or pierce, old wood and metal junk piles, and hazardous drums of liquids (i.e., lead paint, paints, sealants) or acids that can explode or burn should not be any closer than 100 yards to a facility.

Climatic noises, odors, smoke, and dust should be avoided.

The protective perimeter of the area should consist of fencing, landscaping, or walls to keep spectators away from the playing field and to keep players within the playing field.

The area must not consist of soils that are toxic, poor draining, decaying, or of poor structure.

They should be free of debris and glass.

In order to protect the athletes and spectators, the field space should be located in an area that has no other activity spaces in close proximity.

The visibility of the entire area should accommodate foot and vehicle security.

The area should be illuminated at critical times to facilitate supervision and security.

Multipurpose fields that are used for baseball or softball, as well as soccer, field hockey, or football, can have ruts that create dangerous high-speed bounces on the baseball or softball playing surface.

The games of baseball and softball have three major concerns for spectators and parking areas: foul balls, home runs, and overthrows.

Users. The participants' age, gender, skill levels, and/or experience must be considered in creating facilities for all participants.

The area must be accessible to participants and spectators with disabilities.

Site conditions. Concealment areas caused by shrubbery or tree canopy or adjacent structures should be eliminated to deter improper activity.

The public comfort for players and spectators must include restroom facilities close to supervised areas, properly designed and positioned litter containers, benches, and drinking fountains.

Space. The safety or buffer zone around the field and its appurtenance and equipment must be large enough to keep players from hitting stationary objects along its perimeter.

The padding or other accepted proven standards, such as releaseable or yieldable devices for outfield fences, stanchions, fences, or walls, and all other perimeter stationary obstructions, must be used and/or have sufficient buffered perimeter areas.

The safety glazing of nearby windows, observation panels, and doors is a necessity.

The relationship of fields and appurtenance among facilities should be harmonious and complementary in encouraging and facilitating play.

Circulation. The traffic flow of users from one field or appurtenance to another should be designed to be safe.

Materials. The durability and maintainability of the types of appurtenances within and adjacent to the field must be considered.

Access. The pedestrian, player, and spectator traffic around the activity field is important. The field must be located so that there is no interference with the traffic of people, buses, automobiles, service vehicles, vendors, and bicycles. Pedestrian traffic should be routed to have easy access to comfort stations, security, refreshments, lockers, and other related facilities.

The automotive and service (i.e., lawn mowers, maintenance vehicles) driveways should not bisect or parallel open play or human access areas.

Immovable barriers should be installed to separate any automotive traffic routes from all activity areas.

Maintenance vehicle access to fields should have the correct subbase and surface materials installed so as to limit wear and irregular surfaces.

Utility lines. The utility lines, above, on, or below ground, should be positioned so as not interfere with players, the game, or spectators.

Storm drains are frequent hazards, often within the field limits or directly adjacent to them.

Players can have their feet entrapped by such street-sized drains.

Irrigation heads for pop-up or quick-couple sprinklers can cause tripping if not designed properly.

Relocatable aluminum irrigation pipes and sports equipment left on the field are also hazardous.

Power lines, poles, transformers, and control panels must not be in proximity to playing and/or spectator areas. They should be in remote and inaccessible, secure locations.

Fire hydrants and even drinking fountains must not be placed in the vicinity of the area of play.

Buffer/safety zone. The buffer/safety zone for outdoor fields should be 10 yards. When there are multiple fields in a field complex, the distance between parallel fields should not be less than 10 yards on each side of the field. Bleachers should not be any closer than 10 yards from the sideline or end zone.

MINIMUM FIELD DIMENSIONS

The minimum dimensions of the fields can be found on page 452 in Thomas H. Sawyer's (2002) *Facilities Planning for Health, Fitness, Physical Activity, Recreation, and Sport: Concepts and Applications* (Sagamore Publishing).

Seating

The planners need to consider the following safety suggestions when developing seating for spectators for outdoor events: (1) conforming to ADA guidelines; (2) providing railings for each side and the top row to prevent falls; (3) closing areas under each row of seats to prevent children from falling through or climbing; (4) enclosing structure to gain space for storage, concessions, or restrooms and, at the same time, preventing children from playing under the bleachers; and (5) providing aisles with railings for ease of accessing seating (Sawyer, 2002, pp. 188–189).

Bleachers

The seating desired should accommodate 1,000 spectators on the adult field and 500 for each youth field. The bleachers on the youth fields should be portable, and the bleachers on the adult field should be permanent.

A bleacher system has some common elements. These common elements include

- footboards,
- seat boards,
- risers, and
- guardrails.

Rails are used as a safety feature. They provide security while spectators enter or exit the bleachers. There are a variety of styles that will lower the exposure to injury. Folding rails are ideal for recessed areas and other obstacles. Rails should be lightweight for easy setup and takedown yet strong enough to provide adequate support. Guardrails should extend 42 inches above the lowest surface of the leading edge of the bleacher component (i.e., footboard, seat board, aisle).

Risers and footboards are typically aluminum and should be weather resistant for outdoor use. Seat boards can be aluminum or vinyl-covered metal. Indoor bleachers may have risers, footboards, and seat boards made of wood.

When planning bleachers, it is important to consider any gaps or openings that will be in the final product. Any opening between the components in the seating, such as between the footboard, seat board, and riser, should prevent passage of a 4-inch sphere where the footboard is 30 inches or more above the ground and where the opening would permit a fall of 30 inches or more. Bleachers usually come in four- to 52-row systems. Local and state building codes should be consulted when planning bleachers (Sawyer, 2002, pp. 135–136).

LIGHTING

The illumination level for a baseball field is 20 foot-candles for the outfield and 30 foot-candles for the infield (Sawyer, 2002, p. 189). There should be no shadows on the field that create unsafe catching and no glare or irregular bright patch. Furthermore, there should be appropriate lighting for the parking area and walkways into and around the complex. Finally, there should be safety lights installed to protect the facility at night when the facility is not in use.

Orientation of the Fields

Not all fields can meet these criteria in a four-field complex, and there should be at least one field that avoids the batter/catcher and pitcher from facing directly into the early morning or late afternoon sun. Because most of the games are scheduled in the evening, the sun should not be a factor. It becomes a scheduling factor for daylight games.

FENCING

(Sawyer, 2002, pp. 189–190)

Generally speaking, fields should be fenced to protect the field, athletes, and spectators. The height of the fence ranges from 4 feet for youth fields to 8 feet for interscholastic, intercollegiate, and professional. A number of fields have 6-foot fences, which is acceptable but not ideal. All fences less than 8 feet high should be covered with a brightly colored vinyl protector with or without padding. The fence should be sturdy enough to withstand an athlete's weight, as well as serve as a windscreen.

The fence height should start at 8 feet as it leaves the backstop around the circumference of the field, including in front of the dugouts. The fencing should be attached on the field side of the poles with all attachments and prongs on the outside of the fence. The fence should be stretched down from the top to the tension rail on the bottom. The fence is meant to protect players and spectators. It should be no closer than 30 feet to the sidelines or foul line but preferably 50 to 75 feet.

DRAINAGE AND IRRIGATION

(Sawyer, 2002, p. 190)

The subsoil of the field should be composed of sand (80% to 90% sand base) to improve the speed of drainage. The playing field should be crowned to allow the heavy rainwater that cannot be absorbed to drain to the sidelines. The slope on either side of the crown should not exceed one quarter of an inch per foot toward the sideline drainage area. The sideline drainage area should be at least 5 yards from the playing field, contoured, and sloped to catch the runoff to direct it to large drains that are approximately 20 yards apart along the sidelines. These drains should be approximately 15 to 20 feet deep with a 3- to 5-foot diameter filled with gravel and covered with a metal grate. Marketers always say the key to sales is "location, location, location." The key to a great field is "drainage, drainage, drainage."

The irrigation system desired is underground with sprinkler heads throughout the field space The planners of the irrigation system need to consider the following: (1) the safety of the participants (i.e., perimeter or within-field sprinkler layout), (2) type of sprinkler heads, (3) the watering pattern layout (i.e., the number of overlapping zones needed, based on the available water pressure, to reach all areas of the field evenly), (4) the source of water (i.e., wells with a pumping system or government or private water company), (5) a timing system, (6) a plan for winterizing in climates that have temperatures below freezing, (7) tie-ins for drinking fountains and hose bibs, and (8) the possibility of a liquid fertilization option.

SPORTS FIELD SERVICE AREAS

(Sawyer, 2002, pp. 190–192)

Sports field service areas include concessions areas, press box, restrooms, scoreboards, and storage. These areas are important to spectators and support staff. If the service areas are well designed and maintained, they will increase fan loyalty.

Concessions Area

The concessions area should be centralized ideally behind home plate, especially in multifield complexes as shown in Diagram 21.1. The area can be constructed from wood or concrete block. It should have plenty of counter space for preparation of products and to service the patrons. The floor should be concrete with numerous drains. There should be at least one double sink and ample cabinet space for storage. The area should have numerous electrical outlets and GFI outlets near water sources. The lighting should be fluorescent. The equipment in the area should include refrigerator, freezer, stove top with at least four cooking elements, microwave, popcorn popper, hot dog cooker/warmer, coffeemaker, soda fountain dispenser, ceiling fans, shelving for merchandise, sign board for advertising, and cash register.

Press Box

The press box is important for the press, scouts, scoreboard operator, and those filming games. The press box should be located higher than the highest part of the bleachers. The size will be dependent upon the number of users. It should have an unobstructed view of the playing field. The following should be available for the press: (1) table to write on or broadcast from; (2) comfortable chairs; (3) phone hookups; (4) computer hookups; (5) electrical outlets; (6) refrigerator; (7) coffeemaker; (8) separate areas for press, radio announcers, scorekeeper, PA announcer, coaches, and scouts; and (9) an area above the press area exclusively for filming games. These facilities are generally constructed of wood with fluorescent lighting.

Restrooms

There need to be numerous restrooms provided, preferably not portable. The number of facilities for women should be twice as many as that provided for men. Each restroom should provide changing areas for babies with adjacent waste disposal units. Each restroom area should be accessible to persons with disabilities or at least an appropriate number of restrooms need to be accessible and so labeled. These facilities are generally constructed of concrete block with concrete floors with drains for cleaning. The lighting should be fluorescent. The rooms should be adequately ventilated.

Scoreboards

There are a number of reliable scoreboard companies. The planners need to consider first what the function of the scoreboard will be—to depict score and time remaining only or to provide entertainment and information as well. Scoreboards can be simple or complex in nature. The planners need to consider what they want the scoreboard to depict before determining the type of scoreboard to be purchased. The choices include (1) score; (2) periods or innings; (3) injury time or penalty time remaining; (4) times and places by lanes; (5) diving score by judge, degree of difficulty, total points scored, ranking after "x" number of dives; (6) balls, strikes, outs; (7) roster; (8) players vital statistics; (9) advertising; (10) PA system; (11) multiple functions for various sports using the field complex; (12) close-ups of players and spectators; (13) time of day; (14) scores from other games; and much more depending on the planner's imagination.

Storage

As is true with indoor facilities, there is never enough storage. The planners need to consider what items need to be stored. These include, but are not limited to, (1) various types of riding lawn mowers; (2) push mowers; (3) tillers; (4) Weed eaters; (5) shovels, rakes, and hoes; (6) utility vehicles; (7) irrigation pipes; (8) hoses and sprinkler heads; (9) field liners; (10) goals; (11) field flags; (12) benches; (13) waste containers; (14) protection screens; (15) pitching machines; (16) tarps; (17) fertilizers, insecticides, and talc; (18) paint; (19) chains, yard markers, and padding for goal post for football; and much more.

Storage areas generally are constructed out of concrete blocks with concrete floors and an appropriate number of drains for cleaning. The space should have fluorescent lighting with an adequate number of electrical outlets. There should be a separate work area with a workbench and an adequate amount of storage with shelving. The entrance should be an automatic roll-up door at least 8 feet high. The ceiling height should be at least 10 feet. The voids under bleachers should be enclosed. (These spaces make inexpensive storage areas.) The space for chemical storage must meet OSHA guidelines.

BASEBALL FIELD SPECIFICATIONS

(Sawyer, 2002, pp. 192–196)

Baseball facilities are important aspects of sport in public schools (Grades 5–12), colleges and universities (varsity competition, as well as recreation), community recreation programs, Babe Ruth Leagues, Little Leagues, corporate recreation programs, and military recreation programs. Due to the alarming number of injuries reported to the Consumer Product Safety Commission (CPSC), safety is a principle concern. This concern places pressure on field operators, turf managers, maintenance managers, and others to have a safe playing field. A "field of dreams" is created from a consistent set of proven guidelines and safety standards to ensure consistency around the country. It is important for the planners to be aware of the field specifications described in the various rules books that govern these two sports (i.e., National Federation of High School Activities Association, National Collegiate Athletic Association, National Intercollegiate Athletic Association, National Junior College Athletic Association, Little League Association, etc.). These rule books are the "gospel" in regard to the specific dimensions for the fields, and most rule books are revised annually.

Bases

The base areas must be level with all irregularities eliminated. The type of base used in either baseball or softball varies, and the rule books stipulate what types are permissible. The planner should contact the American Society of Testing and Materials (ASTM) for detailed information regarding the appropriate standards for bases. Presently, the ASTM F-8 Committee on Sports Equipment and Facilities is establishing standards and classifications for bases.

Bases are intended to be a reference point on a baseball field. They are an integral part of the game. The adult field should be equipped with permanent or stationary bases and the youth fields with release-type bases.

Stationary base. This base uses a ground anchor permanently installed in the playing field. The anchor measures either 1 inch or 1 ½ inches installed a minimum of 1 inch below the playing surface. The base is designed with a stem that fits into or over the ground anchor and holds the base securely in place.

The base should be constructed of permanently white material, which can be rubber, polyvinyl, polyurethane, or other synthetic material to increase service life. The base top should have a molded tread pattern to increase player traction and reduce slippage. Base size and color should conform to individual governing organizations. Permanent or stationary bases can be used on fields by players with more advanced or higher skill levels only after (1) the players have been thoroughly warned that they can be seriously injured for life if they make a mistake in judgment or miscalculation and (2) they have been made thoroughly aware of other options (i.e., the tapered side base or low silhouette that tapers to the ground eliminating impact of a sliding player against a vertical surface and

uses that momentum to slide over the base). Bases are the number one cause of injuries to ankles and other body parts, especially stationary, modified-stationary, and poorly designed release-type bases.

Release-type base. The release-type base is designed to reduce the chance of injury to a sliding player by releasing from its anchor system on the impact of a hard lateral slide. The release base must use a permanent ground anchor securely positioned below ground for installation. There are two-piece and three-piece designs. The release-type must not expose hidden secondary hazards after the primary aboveground base portion releases.

Home plate. The home plate, batter's box, and catcher's box and their correct dimensional size and positioning must conform to the game and the rules of the appropriate governing body. The area should be well compacted, properly tapered, and level, with no irregularities. The plate must be firmly anchored and any undermining or ruts corrected before play begins.

The home plate is a reference point on the playing field. It establishes the horizontal limits of the strike zone used by the umpire in calling balls and strikes. It is imperative that all home plates have a white surface that measures 17 x 8 ½ x 8 ½ x 12 x 12 inches flush with the surrounding playing surface. Furthermore, all home plates must have a periphery black bevel that does not exceed 35°. The outermost edge of the bevel must be sufficiently below the playing surface. It does not matter how the plates are field mounted as long as they remain flat and flush with surrounding playing surfaces with no sharp corners or sharp nails exposed.

Buried. A rubber or synthetic plate 2 inches or more thick is buried and the uppermost white surface is installed flush with the playing surface. It can be mounted in a concrete subbase to provide greater leveling stability.

Turf Infield and Outfield

It needs to be noted here that natural turf in the infield and outfield should be Tifway™ Bermuda grass. It should be over seeded (see base paths) with Topflight™ perennial ryegrass.

Pitcher's Mound

The pitcher's mound and its plate must meet the requirements of the games governing body. The height of the plate, the pitch of the slope within the circle toward home plate, the radius of the circle, and the level plate length and width size are all critical to safety in any type of designated and designed fields and must be checked and maintained before any game.

Base Paths

A regular maintenance concern is the rutting of the base path. Like the infield, the base path should be free of ruts and irregularities in the surface. Periodically, hand rake the base paths between first and second and second and third to identify any low spots. The base paths between home and first and first and third can be composed of clay and sand like the infield or of natural turf or synthetic material. If the base path is composed of natural turf, it should be over seeded with Topflight™ perennial ryegrass prior to the season, periodically during the season, and at the conclusion of the season, as well as in early fall. Prior to over seeding in the early spring and early fall, the area should be aerated then de-thatched to provide good seed-to-soil contact. The seeded area should be fertilized first with 10-10-10 fertilizer, and one month later with a slow-release 30-16-10.

Warning Track

A 10-foot wide warning track should encircle the entire playing field and provide noticeable surface variations in feel and sound to provide ample warning to players chasing fly balls who are unaware of the perimeter and any obstacles. The track can be made of clay or crushed (M-10) granite or brick. The crushed brick will add color for enhanced TV coverage. The warning track and/or buffer zone should be equal in width to 5% of the distance from

home plate to the deepest part of the playing field and completely encircle the field. Care should be taken for any edge between the track and the turf to be smooth and even.

Backstop

The backstop is a key element of a field for safeguarding the players and spectators. The basic purposes of backstop include (1) keeping the ball within the playing area, (2) protecting the spectator, (3) safeguarding others involved in the game (i.e., batters in the on-deck circle, bat persons), and (4) protecting nearby activities from conflict with pop-ups (i.e., adjacent ball fields, concessions areas, restrooms, parking areas).

When designing the backstop, the planners should consider the following: (1) using small mesh to discourage people from climbing the structure; (2) ensuring the parking and traffic areas are not close; (3) installing a double mesh to prevent fingers, faces, and other body parts of spectators from being crushed by errant balls or thrown bats; (4) keeping the mesh free from any barbs or penetrating parts to ensure safety for players and spectators; (5) ensuring the distance between home plate and the backstop is not less than 25 feet but preferably 60 feet to ensure player safety; (6) using ground materials of either turf with an appropriate warning track composed of clay or crushed granite (M-10) or crushed brick or no turf with either clay or crushed granite (M-10) or crushed brick; and (7) ensuring the height of the backstop is at least 18 feet, preferably 20 feet, with a 4- to 6-foot overhang at the top with a 45° angle.

The most frequently used backstop consists of three 12-foot wide panels that are 18 to 20 feet high covered with a 1 ½-inch galvanized wire mesh material. These panels can be made of steel, aluminum, or wood. One panel is placed directly behind home plate and the other two on each side flaring at 30° with the center panel. The fencing on either side of the side panels should gradually taper down to 8 feet behind the players' bench area to provide greater protection for the spectators in bleachers on the other side of the fence. The top of the backstop will have three panels, 4 to 6 feet x 12 feet, attached to the upright panels and positioned at a 45° angle to contain errant balls. This overhang will be covered with the same material as the uprights.

Players' Bench Area

There are two types of player bench areas commonly constructed for baseball and softball. These areas are the dugouts and field-level shelters. The safer of the two is the dugout, but it is also the most expensive to construct. The dugout is usually 4 feet deep and constructed of poured concrete and concrete blocks with drains to remove water quickly. It has an elevated players' bench area, entrance to locker rooms (if in a stadium complex), drinking fountain, communication, bat rack, other storage space, lights, and electrical outlets. Recently, to better safeguard the players, either shatterproof plastic or wire mesh has been installed to repel errant balls and bats. The roof is constructed so as to discourage people from sitting or climbing on it.

The field-level shelter is at field level with a poured concrete floor and concrete block walls. It has a wire mesh fence at least 6 feet high to repel errant balls or bats. The space should have a bat rack, communications, a drinking fountain, additional storage, lights, and electrical outlets. The roof should be constructed to discourage sitting and climbing.

Batting Cage

The batting cage should be located outside the fenced playing field. It should be constructed of steel, aluminum, or wood. The minimum size for one batter should be 10 feet wide, 100 feet long, and 10 feet high. If more than one batter is going to be hitting, then the cage needs to be wider (i.e., 10 feet wider for each batter) with a separating mesh curtain. The space must be completely covered by mesh netting to protect other players and spectators. There needs to be a source of electricity and numerous GFI electrical outlets. The floor surface should be similar to home plate for the batters and natural mounds for the pitchers.

Bull Pen

The bull pen should be located either down first and third into the outfield area or in right and left center fields. These areas should be protected from errant balls and the spectators. The area behind the catcher should have a protective fence to protect the spectators. The pitching mound should be an exact replica of the actual playing field mound. There should also be a home plate area. Finally, there should be benches available for the players.

Size

The size of the youth fields and adult fields can be found on page 452. However, the size should be doubled checked in the appropriate rule book.

PARKING LOT DESIGN

The parking lot should be located at least 20 yards from the outfield fence. It should be paved with enough space for 500 vehicles; this should include handicapped spaces. The parking lot needs to be lighted.

PLAYGROUND AREA

The playground area should be centrally located to the spectator spaces. The design should follow guidelines established by (a) U.S. Consumer Product and Safety Commission Guidelines for public playground safety, Publication #325 (1994, rev. 1997); (b) ASTM F 1487-93, 95, 97, 01 Voluntary Standards for Public Playground Equipment; (c) ASTM F 1292-91, 93, 95, 96, 04 Surfacing; and (d) ADA guidelines.

PICNIC AREA

There should be a number of picnic areas within and outside the park for spectators and families to relax either in a shaded grassy area or inside a shelter. The shelters should be large enough to comfortably hold two normal-sized picnic tables. The other areas should have at least one picnic table.

LANDSCAPING

Safety

It is critical that the planning process for safety results in a landscape design that manages the risk of all adjacent outdoor spaces so that all foreseeable user accidents or injuries can be avoided. This planning for safety and security should include

- signage in large lettering that clearly identifies pedestrian and vehicular paths, facilities, right-of-way, accessible parking, no parking and fire zones, and any other user-friendly restrictions or expectations;
- perimeter fencing or appropriate use of natural barriers;
- programmable and/or light-sensitive night lighting;
- pedestrian and vehicular circulation that is easy to maintain and has reasonable and unobstructed views of cross traffic at every intersection;
- smooth (yet skid resistant) pavements and other path or road surfaces;
- bollards (permanent and removable barriers) restricting vehicular travel on pedestrian paths; and
- surveillance.

Characteristics of Turfgrasses Commonly Used for Sports Turfs (Sawyer, 2002, p. 145)

Puhalla, Krans, and Goatley (1999) suggested that there are 11 grasses commonly used as turfgrasses. However, of these species, only five are widely used in sports turf situations: Bermuda grass, Kentucky bluegrass, tall

fescue, perennial ryegrass, and creeping bent grass. There are two other grasses that are sometimes used: buffalo grass and zoysia grass.

Furthermore, Puhalla et al. (1999) indicated that Bermuda grass (monostand) is planted and maintained alone except when over seeded with perennial and annual ryegrass for winter play. Tall fescue, perennial ryegrass, and Kentucky bluegrass are planted and maintained as either monostands or in combination with other cultivars (polystands). Creeping bent grass is usually planted as a monostand.

Turfgrass selection is usually based upon weather zones (e.g., warm, transition, or cool). In warm weather zones (Southern states across the United States), sports turf is generally dominated by Bermuda grass because it flourishes in the hot summers and mild winters and can withstand occasional summer dryness without damage. In the transitional zone, fields are dominated by tall fescues and specifically developed Bermuda grass. Finally, in cold zones (Northern states across the United States), Kentucky bluegrass and perennial ryegrass predominate, and a mixture of those species is probably the most popular sports turf. "Both types tolerate the cold northern winters adequately, and the mixture allows for the aggressive spreading and recovery characteristic of Kentucky bluegrass, along with the stability and wear resistance of perennial ryegrass" (Puhalla et al., 1999, p. 8).

The national Turfgrass Evaluation Program (NTEP) tests hundreds of commercially available cultivars and experimental entries of turfgrass annually. Researchers conduct these tests at universities in 40 states and a few Canadian provinces. Data from each year are summarized and published on a website (www.ntep.org) and also in CD format. Go to the website and read the disclaimer at the bottom of that page, then click enter. This will take you to the main page (www.ntep.org/contents2.shtml). To find a grass species, simply click on the link in the yellow box "All NTEP Reports – Select a Turfgrass Species."

Additional Components to a syllabus that you might include …
How the Course Works:
Calendar of Events – Semester Year
Late Assignments:
Evaluation:
Course Grade Determination:
Grading Policy:
Other Important Course Information:
Email Etiquette:
Technology Policy and Minimum Technology Requirements:
Academic Integrity and Dishonesty:
FERPA:
ADA Statement:
Providing Access and Opportunity for Students with Disabilities:
Acc
ommodation Letters & Testing Accommodations:
Online Examinations:
Making Technology Accessible for Students with Disabilities:
Field Trips:
Emergency Preparedness:
Right to Revision:
Course Withdrawal:
The Learning Center:
International Students:
Writing Center Information:
Special Needs:
Title IX:

Chapter 1:
Planning Facilities: Master Plan, Site Selection, and Development

Important Dates:

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Successful building projects have most likely undergone thorough predevelopment reviews and well-designed site selections and development processes. Projects without these elements are doomed to failure from the outset.

Anyone who has been involved in facility planning and development understands that errors are common during the planning and development process. The challenge is to complete a facility project with the fewest number of errors. Before becoming too deeply involved in the planning and development process, it is important to review some of the common errors that have been made in the past (Conklin, 1999). Conklin (1999), Farmer, Mulrooney, and Ammon (1996), Frost, Lockhart, and Marshall (1988), and Horine and Stotlar (2002) suggested these errors include, but are not limited to, (1) failure to provide adequate and appropriate accommodations for persons with disabilities throughout the facility; (2) failure to provide adequate storage spaces; (3) failure to provide adequate janitorial spaces; (4) failure to observe desirable current professional standards; (5) failure to build the facility large enough to accommodate future uses; (6) failure to provide adequate locker and dressing areas for both male and female users; (7) failure to construct shower, toilet, and dressing rooms with sufficient floor slope and properly located drains; (8) failure to provide doorways, hallways, or ramps so that equipment may be moved easily; (9) failure to provide for multiple uses of facilities; (10) failure to plan for adequate parking for the facility; (11) failure to plan for adequate space for concessions and merchandising; (12) failure to provide for adequate lobby space for spectators; (13) failure to provide for an adequate space for the media to observe activities as well as to interview performers; (14) failure to provide for adequate ticket sales areas; (15) failure to provide adequate space for a loading dock and parking for tractor trailers and buses; (16) failure to provide adequate numbers of restroom facilities for female spectators; (17) failure to provide adequate security and access control into the facility and within the facility; (18) failure to provide adequate separation between activities (buffer or safety zones) in a multipurpose space; (19) failure to provide padding on walls close to activity area, as well as padding and/or covers for short fences, on goal posts, and around trees; (20) failure to plan for the next 50 years; (21) failure to plan for maintenance of the facility; (22) failure to plan for adequate supervision of the various activity spaces within the facility; and (23) failure to plan to plan.

LEARNING OBJECTIVES

After studying this chapter, the student will be able to

- appreciate the process used for designing a facility,
- understand the composition of a master plan,
- prepare a program statement,
- understand the roles of selected professionals in the planning process,
- discuss the function of the predevelopment guide,
- describe the process involved in site selection,
- understand the various facility development stages,
- describe what construction documents consist of,
- outline the bidding process, and
- describe the construction phase.

KEY TERMS

This chapter contains the following key terms: master plan, regional analysis, site analysis, RFP, RFQ, predevelopment review, functional analysis, construction documents, schematic design phase, design development phase, lump sum contract, construction manager, design-and-build, drawings, specifications, bidding, change orders, and as-built drawings.

CASE STUDY

Bannon, J. J. (1987). *Problem solving in recreation and park*s (2nd ed.). Champaign, IL: Management Learning Laboratories.

Special Parks for Sidewalk "Surfers"

Situation: Those kids in cutoffs have a lot of courage. They coast down the sidewalks on their skateboards without a trace of worry. Arms spread for balance, lower body leaning to maneuver, they talk as they skate. Skateboarding is dangerous. Enough kids are bowling over shopping carts and dogs, falling on the pavement, or sliding in front of cars to worry parents and pedestrians. Sidewalks and streets are not made for skateboarding, but there may be a solution to that, too.

At least three municipalities are considering the construction of special parks for skateboarding. It has been reported that in other areas of the country, such as California and Florida, kids are paying about $1 dollar an hour to skate on the smooth concrete waves, banks, and hills. The parks have proved so successful in these states that more than 100 are being constructed and many more are being planned.

Those who favor such special parks have contended that if the parks are supervised properly, they will provide wholesome recreation for the entire family. They have stated also that if skateboarders are required to wear helmets, gloves, and elbow and kneepads, accidents can be kept at a minimum. "We have to accept that children are going to skateboard regardless of what adults say, so let's put some safeguards on it," said one California recreation director. Most proponents have said that skateboarding is no more dangerous than most contact sports and injuries occur because it is so new.

Opponents of the new parks have argued that skateboarding is very dangerous, particularly for the young children. Accidents happen every day. The most common injury is a broken wrist because skateboarders break their fall with their hands. Others have contended that it is a fad and that the interest will wane in a couple of years. "For that reason, it does not seem logical to set aside precious parkland for this type of activity," asserted one public official.

As the director of parks and recreation in Bennetville, Nebraska, you are faced with a dilemma. Many citizens in the community are pressuring the park board to construct a skateboard park. This pressure is coming from parents whose children are now skateboarding in the streets and on the sidewalks. To date, one youngster has been seriously injured and three have broken their arms in skateboard accidents. One city council member has asked for the passage of an ordinance prohibiting all skateboarding in the community. This controversy has been going on for the last 6 months. As a result, the mayor and council have requested you to write a report that would include a series of recommendations on these issues.

Problems: Should special parks be developed for skateboarding? Is skateboarding a dangerous sport? What has been the experience of other communities regarding this activity? Should this activity be permanently banned from the community? Should parkland be used for this activity? In what conditions would you allow skateboarding in public parks? What recommendations would you make to the mayor and council?

SELF-ASSESSMENT EXERCISES

1. What are the common errors made in developing facility projects?
2. What is the composition of a master plan?
3. What is the function of the predevelopment guide?
4. Who should be members of a facility planning advisory committee?
5. Describe the components of a regional analysis.
6. What are the components of a site analysis?
7. What professionals are on the design team?
8. What is an RFQ?
9. Draft a sample RFP.
10. Describe the predevelopment review.
11. Outline the schematic design phase.
12. Describe the design development phase.
13. Describe the three common construction approaches.
14. What are the construction documents?
15. What are specifications?
16. Describe the bidding process.
17. Describe the construction phase.

INTERNET EXERCISES

You are the executive director of the Clay County YMCA. The board of directors has requested that you contact design–build firms with experience working with not-for-profit organizations. Search the Internet for design–build firms and make a list of possible firms to be interviewed for the project.

Go to http://www.aia.org/ and gather information regarding predevelopment review, schematic design, design development phase of a building project, and description of construction documents.

Search the Internet for information regarding the bidding process.

Chapter 2:
Planning Facilities for Safety and Risk Management

Todd L. Seidler, University of New Mexico

CHAPTER OVERVIEW

Sports and recreation facilities that are poorly planned, designed, or constructed often increase participants' exposure to hazardous conditions and not only render the facility harder to maintain, operate, and staff, but also significantly increase the organization's exposure to liability. A poorly designed facility can usually be traced to a lack of effort or expertise of the planning and design team. It is not uncommon for a sports, physical education, or recreation facility to be designed by an architect who has little or no experience designing that type of building. For those without the proper background and understanding of the unique properties of sports and recreation facilities, many opportunities for mistakes exist that may lead to increased problems related to safety, operations, and staffing.

Design problems commonly seen in activity facilities include inadequate safety zones around courts and fields, poorly planned pedestrian traffic flow through activity areas, poor security and access control, lack of proper storage space, and the use of improper building materials. Often, safety problems related to design are difficult, expensive, or impossible to fix once the facility has been built. It is essential that professionals with activity-related knowledge and experience plan and design these facilities.

To protect themselves from claims of negligence, managers of sports and recreation programs and facilities have a number of legal responsibilities they are expected to perform. In this case, negligence is the failure to act as a reasonably prudent and careful sport or facility manager would act in the same or similar circumstances. In general, facility managers are required to run their programs so as not to create an unreasonable risk of harm to participants, staff, and spectators. One of their specific legal duties is to ensure that the environment provided is free from foreseeable risks or hazards. Unsafe facilities are one of the leading claims made in negligence lawsuits related to sports and physical activity. When discussing facility liability, Page (1988) called it "one of the largest subcategories within the broad spectrum of tort law" (p. 138). More specifically, managers of sports facilities are expected to provide a reasonably safe environment and at least to carry out the following five duties:

- keep the premises in safe repair,
- inspect the premises to discover obvious and hidden hazards,
- remove the hazards or warn of their presence,
- anticipate foreseeable uses and activities by invitees and take reasonable precautions to protect the invitee from foreseeable dangers, and
- conduct operations on the premises with reasonable care for the safety of the invitee.

According to van der Smissen (1990), "The design, layout, and construction of areas and facilities can provide either safe or hazardous conditions, enhancing or detracting from the activity in which one is engaged" (p. 235). A properly planned, designed, and constructed facility will greatly enhance the facility manager's ability to effectively carry out these legal duties. Common safety problems in sports facilities can usually be traced to two primary causes: (1) poor facility planning and design and (2) poor management.

When discussing safe facilities, Maloy (2001) stated, "Most liability problems dealing with safe environment, however, stem from maintenance and operation of the premises, not their design and construction" (p. 105). Even though this may be true, it is important to understand that sports managers can take many actions during the planning process that will enhance the their ability to safely and properly maintain and operate the premises. A well-designed facility makes the management process more effective and efficient. It follows that the easier it is to maintain a facility, the more likely it is that it will be done well. Jewell (1992), in his book *Public Assembly Facilities*, stated, "Public safety begins with good architectural design..." (p. 111). Therefore, the majority of this chapter will focus on the planning and design of safe facilities.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- understand negligence and become familiar with the basic legal duties expected of facility managers;
- understand the role that good facility planning has in the design and construction of safe facilities;
- identify at least five methods of controlling access to facilities;
- describe the importance of and identify the minimal guidelines for safety or buffer zones;
- discuss the problem of traffic patterns within facilities and identify alternatives; and
- understand the need for selecting the proper materials for floors, walls, and ceilings.

KEY TERMS

The following are the terms found in this chapter: pedestrian traffic flow, safety zones, security and access control, and supervision.

CASE STUDY

Situation: The University of Hannibal has gained state support for the construction of a student recreational sports facility. You have been selected to chair a subcommittee charged with developing a set of guidelines to be used by the architect and the planning committee regarding safety and risk management for the facility.

Problems: How will you proceed? What will be the guidelines?

SELF-ASSESSMENT EXERCISES

1. Why is it important for sports, physical education, and recreation professionals to be involved in the planning and design process of new facilities?
2. Define negligence.
3. What are the five legal duties managers of sports facilities are expected to carry out?
4. What are the two primary causes of safety problems in sports facilities?
5. Why is it important to control access to sports and recreation facilities?
6. What are safety zones and why is it important to understand their purpose?
7. Why is it important to provide adequate space for storing equipment and supplies?
8. How can a well-planned facility help in the supervision of a sports facility?
9. How can selecting the wrong materials increase potential hazards in a sports facility?

INTERNET EXERCISES

Search the Internet for examples of facility safety plans.

Search the Internet for examples of risk management plans.

Chapter 3
Sustainable Design, Construction, and Building Operations

J. Patrick Marsh, Samford University
Jeffrey C. Petersen, Baylor University

CHAPTER OVERVIEW

The practice of sustainability is predicated on the simple fact that everything that humans need to survive comes from the natural environment. As issues such as global warming, water and soil contamination, material shortages, and rising energy prices have come to the forefront of society, the need for sustainable development practices has been made clear. The goal of a sustainable building is to function or operate in a way that has the smallest impact on the environment. To achieve the goal of maximizing the sustainability of building operations, the building needs to be designed, constructed, and maintained with sustainability in mind. This chapter will describe sustainable facility operations and maintenance and then describe how the design and construction of the building can enhance the sustainability of building functionality.

LEARNING OBJECTIVES

Through the study of this chapter the student will:

- define sustainability and recognize the importance of sustainable construction and facility operations practices,
- identify and describe key concepts for sustainable facility operations,
- identify and describe key concepts for sustainable facility construction,
- identify prominent building certification programs around the world and describe the process through which certifications are obtained,
- identify and describe the benefits and drawbacks of sustainable construction and facility operations practices, and
- define greenwashing and the negative impact it has on sustainability efforts.

KEY TERMS

The following terms can be found in this chapter: adaptive reuse, BEES, black water, BLCC, brownfield, building commissioning, building-related illnesses, carbon reduction, FEMP, gray water, greenfield, greenhouse gases, hard costs LEED, LCA, life cycle, NIST, NREL, recycled, renewable, renewable energy, retro-commissioning, scope creep, sick building syndrome, soft costs, sustainability, and volatile organic compounds.

CASE STUDY

Your community has recently decided to build a new indoor arena. First, determine the best site for the new arena within your community by using the site selection criteria outlined in the chapter. Next, describe how sustainable design and construction practices will be used in the construction of the arena. Then develop a site management plan outlining the arena's operations and maintenance plan, incorporating sustainability measures. Finally, identify a building certification to seek and outline the new arena meets the requirements for certification.

SELF-ASSESSMENT EXERCISES

1. What elements should be included in a site management plan?
2. What are some of the drawbacks to sustainable construction and facility operations practices?
3. Describe the differences between rating systems and life cycle assessments.

4. Why is greenwashing harmful to the sustainability movement?
5. What elements should be considered when selecting a site for a new facility?
6. What are the three primary areas (triple bottom line) of benefits of sustainable facilities? Give an example of each.

INTERNET RESOURCES

Websites: Go to these sites to gather more information regarding sustainable building design.

Sustainable Design
http://en.wikipedia.org/wiki/Sustainable_design

Guiding Principles of Sustainable Design
http://www.nps.gov/dsc/dsgncnstrl/gpsd/

Sustainable Design
http://www.greensource.construction.com/

DOE Complex-Wide Sustainable Design Program
http://www.pnl.gov/doesustainabledesign/

Sustainable Design
http://www.nrdc.org/buildinggreen/

Sustainable Design Update
http://www.sustainabledesignupdate.com/

Chapter 4
Universal and Accessible Design: Creating Facilities That Work for All People

Donald Rogers, Indiana State University

CHAPTER OVERVIEW

The Americans with Disabilities Act (ADA) is federal legislation that has been completely enforceable since July 1992. The small business owner and the large corporation have all had ample time to minimally meet compliance through planning. More than this, employers and public accommodations should be following the law because failure to comply is clearly discrimination. For the cost of a postage stamp, an administrative complaint filed against an organization or community may cost thousands of dollars. And complying with the ADA is more than beneficial, to all people. If unsure of where to start, consider the resources identified below or consult your state attorney general's office on disability and ask for help. There are countless organizations committed to assisting willing public and private entities with implementation strategies. The burden is clearly ours to make this act more than just a few words on paper. Designing for accessibility is a concept that understands life's realities: that essentially, we are all temporarily able-bodied.

The legal aspects of designing for inclusion such as architectural barriers, undue hardship, readily achievable, and reasonable accommodation are defined and refined only through trial and the establishment of precedent, within each legislative jurisdiction; however

- the ADA prohibits discrimination with respect to employment (under Title I), state and local government services (under Title II), public accommodations (under Title III), and telecommunications (under Title IV);
- the ADA provides for private and federal enforcement of the law (under Title V);
- prior to passage of ADA, the ABA (1968) and the Rehabilitation Act of 1973 established standards that were specific to the access required in facilities designed, constructed, altered, or leased with federal money;
- the act of compliance is both a legal and ethical obligation, with real incentives (financial and practical); and
- the ADA, the ABA, and the Rehabilitation Act of 1973 all serve as federal legislation providing standards related to compliance issues. Subsequent actions taken under these legislative acts have provided the framework for a barrier free, accessible environment, (i.e., the UFAS and the ADAAG).

LEARNING OBJECTIVES

After reading this chapter the student should be able to

- understand the historical development of constitutional protection and the civil rights of people with disabilities including the ADAAG, ADA of 1990, UFAS of 1984, Sections 502 and 504 of the Rehabilitation Act of 1973, and the Architectural Barriers Act of 1968;
- understand the concepts of accessible and universal design and further appreciate the benefits of creating accessible and usable facilities for all people;
- understand the meaning and/or intentions of ADA terminology, including architectural barriers, undue hardship, readily achievable, and reasonable accommodation;
- understand the difference between standards and guidelines related to the ADA and other federal accessibility legislation; and
- understand the legal advantages related to compliance including tax incentives and the administrative responsibilities related to regulatory enforcement.

KEY TERMS

The following terms can be found in this chapter: Americans With Disabilities Act,

Americans With Disabilities Accessibility Guidelines, Architectural Barriers Act, Architectural and Transportation Barriers Compliance Board.

CASE STUDY

A: The Architectural Barrier

Debbie, a 13-year-old girl, had been in a wheelchair a little over 3 years when she first considered attending a resident sports camp for target sports. Injured in a bicycle accident,

Debbie has a "low-level" spinal cord injury. However, she is physically active in school and very bright, and she wants to develop her competitive skills as both an archer and shooter. Whereas her school and home have been easy environments to get around, how accessible would she find the camp?

Debbie's mother was the first to suggest that Debbie attend the sports camp. The challenge was to determine whether the sports camp she wanted to attend was accessible to someone in a wheelchair.

Consider that you are the director of this sports camp. What kinds of architectural barriers may exist, and how might you modify or make reasonable accommodations for Debbie or anyone else who relies on a wheelchair for mobility? Are you prepared to make all the necessary accommodations so that Debbie and other disabled individuals can attend your camp? What are some of the significant costs that might impact full ADAAG compliance? If you are unable to afford some of the accommodations necessary (undue hardship), how will you defend your decision to deny participation to applicants with disabilities such as Debbie? And in the event that undue hardship is a legitimate claim, what will you do to adequately comply with ADA in the future?

B: The Communication Barrier

Jim has been hearing impaired from birth. Now, almost 9 years old, Jim can sign, read lips, and verbalize well. However, he has no hearing at all and must completely rely upon visual or physical communication. Jim has registered for your swimming program and is looking forward to his first class in your facility.

When Jim arrives to your facility, will you be able to accommodate him? What kind of challenges will he face? What kinds of facility changes should you consider to ensure Jim the same experiential quality as other children enrolled in the program? Are there safety issues that must be addressed with regard to the pool environment? What legal obligation does your facility have to provide Jim with accommodating services for the hearing impaired? How do you intend to address Jim's challenges and your concerns?

C: The Employment Barrier

Darryl is a 45-year-old "low-level" quadriplegic who has applied to work at your facility's front desk. He has a bachelor's degree in psychology and a good record of prior employment. Darryl recently contacted you for a copy of the job description for a front desk employee. He has set up a meeting to discuss the position description requirements and those reasonable accommodations that would allow him to perform the front desk duties as prescribed. Though minor architectural barriers exist, the cost of reasonable accommodation would not be prohibitive. However, the fiscal budget has insufficient capital reserves available to fund architectural changes to the facility. Without these modifications, Darryl cannot perform the duties of a front desk employee.

SELF-ASSESSMENT EXERCISES

1. What obligation does your facility have to remove the architectural barriers?
2. If funds do not currently exist in the budget, can you delay architectural changes until they are available?
3. What are Darryl's rights to employment?

4. What incentives exist that might support the financial costs of barrier removal?
5. What incentives exist that might support the legal need to act on barrier removal?
6. Develop a presentation for the facility's decision makers detailing your recommended response to this case.

INTERNET EXERCISES

In the 10 years since the enactment of the Americans with Disabilities Act, Web technologies and access have continued to evolve. The number of websites that now offer information, services, and so forth with regard to accessibility for persons with disabilities are staggering. Before this information can be of value, the user must establish its overall quality. Using the Internet and World Wide Web, locate and identify at least five different sites (URLs) that are directly related to accessibility for the disabled and complete the following steps:

1. Identify and classify by content, each type of information (i.e., legislated standards or guidelines, technical assistance or support information, commercial or consulting services, etc.; if more than one type of information is available, select only one type of information from each site to evaluate).
2. Analyze the accuracy of the information, rating its correctness on a scale of 1 to 5 (1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent).
3. Determine the value of the information, rating its usefulness on a scale of 1 to 5 (1 = poor, 2 = fair, 3 = average, 4 = good, 5 = excellent).
4. Follow two to three links (if available) from each site and summarize whether they were generally accurate and valuable.
5. Evaluate the quality of each site after considering the specific characteristics identified above. Finally, based upon overall quality, rank order the sites from best to worst. These results can be shared with fellow students, faculty, and others.

Chapter 5
Electrical, Mechanical, and Energy Management

Richard L. LaRue, Retired, University of New England

CHAPTER OVERVIEW

The technologies of mechanical and electrical engineering are constantly changing. However, facility planners should become familiar with concepts related to the function of HVAC, sound, lighting, and so forth.

During the design and operation of a sports and recreational facility, one of the most important factors for the management to understand and address is the energy use of the facility. Faced with a future of ever-increasing utility costs, managers must take a fresh look at old operating procedures and install new technologies designed to reduce the amount of energy needed to operate. Building components such as the envelope and the infiltration and exfiltration of air through the envelope; the amount and quality of air; and the type of heating, ventilation, and air-conditioning systems greatly impact energy use. Heating and use of hot water and the type and amount of lighting to accommodate sports and recreational activities further compound energy consumption. Although the computer and its use has automated some of these systems and enabled the operator to study and control energy use, establishing operating procedures that consider energy consumption along with user comfort will be the final ingredient in a total management program.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

1. understand lighting and sound in terms of functionality;
2. understand the challenges of implementing electronic technologies;
3. understand climate control concepts in terms of efficiency;
4. recognize the administrative responsibilities related to electronic technology and climate control;
5. understand the challenges of sick building syndrome,
6. understand both the trends and the new technologies in electrical and mechanical engineering;
7. understand terminology related to energy management;
8. understand the design, construction, and operating considerations related to energy management;
9. identify the various energy savings considerations when planning, operating, and maintaining a sports and recreational facility; and
10. learn sources of energy management information and reference materials.

KEY TERMS

The following terms will be found in this chapter: acoustics, brightness, direct lighting, emergency lighting, environmental climate control, exit lighting, fluorescent, foot-candle, foot-lambert, glare, high-pressure sodium, Holophane lighting system, HVAC, incandescent, indirect lighting, lamp lumens, lighting, lighting controls, mercury-vapor, metal halide, natural lighting, night lighting, quartz, reflective factor, thermal environment, translucent materials, air-conditioning, air quality, building automation, building envelope, chemical contaminants, domestic hot water, energy accounting, energy analysis, energy audit, energy management, heat pumps, physical contaminants, thermal factors, ventilation systems.

CASE STUDY

Situation: The architect for a sports facility at a small college is looking for your recommendation concerning the lighting requirements for the facility's swimming pool area. The area (diagramed below) has both a spectator

balcony area, program space on the pool deck (under the balcony), and the main pool (25 yards by six competitive lanes). Current U.S. Swimming and collegiate championships require 100 foot-candles at the water's surface; therefore, the architect was planning to meet this level of lighting.

Problems:

1. What should be the foot-candles at the water's surface? Should the facility rely on the U.S. Swimming and collegiate standards?
2. What other sources of light must be considered when determining the facility's needs?
3. Are there different levels of lighting required for competition pools and leisure pools?
4. Would you choose direct or indirect lighting and why?
5. If you choose direct lighting, what types are appropriate and what other considerations are important?
6. If you choose indirect lighting, what types are appropriate and what other considerations are important?
7. Detail a maintenance program for your recommended lighting system in this facility.

The district cooling system at Yale University in New Haven, Connecticut was wasting energy to overcome bottlenecks in its piping system. Undersized pipes and an inefficient chilled water distribution system increased the pumping pressure in the system and introduced greater friction losses. The chillers were modified from tow-pass to single-pass units and the piping changed throughout the system to reduce friction losses. The university spent $980,000 to redesign its hydronic loop. The new design increased the chiller plant's output capacity by 2,500 tons and cut fuel bills by $309,000 during a 5-month period, resulting in an estimated 1.5-year payback period. In addition, the increase in the efficiency of the system avoided the expenditure of $2.5 million for a new chiller.

SELF-ASSESSMENT EXERCISES

1. What is lighting?
2. What is the difference between foot-lambert and foot-candle?
3. Describe the reflective factor.
4. Describe each of the following types of lighting and indicate the advantages and disadvantages of each: incandescent, fluorescent, mercury-vapor, high-pressure sodium, and metal halide.
5. What is meant by lighting levels?
6. When and where should natural lighting be used?
7. What is a translucent material?
8. Describe the need for maintenance of a lighting system.
9. Describe the issues surrounding outdoor lighting.
10. What are the common types of special or supplemental lighting requirements?
11. What is a lighting control?
12. What are the planning issues related to sound and acoustics?
13. Besides lighting what other electronic issues need to be planned for in the building design?
14. What is the planning issues related to environmental climate control?
15. Which organization publishes technical standards about heating, refrigeration, and air-conditioning for facilities?
16. What are the two highest costs for operating sports and recreational facilities?
17. Why are the reasons that energy issues are mishandled in the design process for facilities?
18. What are the three steps involved in energy management?
19. How is energy management programs typically financed?
20. Identify the main parts of the building envelope?
21. How is heat lost or gained in sports and recreational facilities?
22. What is included in the typical domestic hot water system in facilities?
23. Why is air quality important in sports and recreational facilities?
24. What are some factors to consider when maintaining indoor air quality?

25. What is the purpose of lighting in sports facilities?
26. What ways is lighting made more efficient?
27. Why would sports and recreational facility managers want to incorporate automated control systems into their facilities?
28. What are some of the components that building automation systems control?

INTERNET EXERCISES

Go to the Internet and review the following websites and determine their value for a building planner:

American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE)
http://www.ashrae.org

American National Standards Institute (ANSI)
http://www.ansi.org

Electrical Engineering: WWW Virtual Library Index
http://arioch.gsfc.nasa.gov/wwwvl/ee.htm

Electric Technology Resource Center (ETRC) at the University of South Florida, Tampa
http://www.teco.net/etrc.htm

Illuminating Engineering Society of North America (IESNA)
http://www.iesna.org

Go to the following websites to determine what additional information is available regarding energy management:

Advanced Technologies for Commercial Buildings
www.advancedbuildings.org

A building professional's guide to more than 60 environmentally appropriate technologies

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
www.ashrae.org

It was organized for the sole purpose of advancing the arts and sciences of heating, ventilation, air-conditioning, and refrigeration for the public's benefit through research, standards writing, continuing education, and publications.

Lighting Research Center
www.lrc.rpi.edu/

The Lighting Research Center (LRC), based at Rensselaer Polytechnic Institute in Troy, NY, is the world's largest university-based research and educational institution dedicated to lighting.

U.S. Department of Energy, Energy Efficiency and Renewable Energy Network
www.eren.doe.gov

Provides technical assistance and resource information relating to energy efficiency and renewable energy.

www.eren.doe.gov/financing/

Provides useful links to energy efficiency and renewable energy financing resources for businesses and industry, including funding through utilities, state and federal programs, and international sources.

Green Light Program
www.epa.gov.greenlights

Energy Star Program
www.epa.gov/energystar

Energy Star Building Upgrade Manual
www.epa.gov.appstar/buildings/manual

Energy User News
www.energyusernews.com

National Lighting Bureau
www.nlb.org

Chapter 6
Ancillary Areas

Jeffrey C. Petersen, Baylor University

CHAPTER OVERVIEW

Ancillary areas are defined as secondary-use space components of a physical activity or sport facility in relation to the primary activity spaces. However, the successful operation of these facilities is directly tied to the proper design and operation of these ancillary spaces. This chapter will carefully consider six ancillary areas (locker rooms, offices, meeting/team rooms, laundry areas, janitorial areas and storage room) and the design details of these areas critical for optimal facility operation.

LEARNING OBJECTIVES

Through the study of this chapter the student will:

- define ancillary spaces and identify the primary ancillary spaces within facilities for physical activity and sport;
- identify and describe key components of locker rooms including:
  - lockers
  - showers
  - toilets
  - wet/dry Areas
  - size
  - traffic flow
  - amenities;
- describe the function and types of specialty locker rooms;
- identify key planning considerations for offices;
- identify similarities and differences in meeting rooms and team rooms;
- quantify the amount of storage space desirable in a facility and describe storage area features that enhance effectiveness;
- describe key features in laundry room and janitorial area design; and
- provide examples of specialization of ancillary spaces in the following settings: athletics (by sport or level), physical education, fitness clubs, recreation centers, or multipurpose facilities.

KEY TERMS

The following terms will be found in this chapter: amenities, ancillary, construction provider, cost authority, development team, design variables, dry grooming station, locker rooms, owner's project manager, sauna, shower, steam room, toilet, wet grooming station.

CASE STUDIES

1. Assume that you are appointed at the planning team chairperson for a total locker room renovation at a university campus recreation center. What ideas will you bring to the design team regarding each of the following areas: locker type selection and number, shower type and number, traffic patterns and flow, sight lines, wet and dry area planning, amenity inclusion? Be prepared to share your rationale regarding your suggestions in the above areas.

2. Create an outline of storage rooms needed including sizes, locations and features for the following four settings:
    1. A YMCA or Community Center with two 3-court gyms, one indoor pool, four outdoor tennis courts, three racquetball courts, a three outdoor multipurpose fields (soccer & football).
    2. A high school physical education complex with two separate gyms, four locker rooms, one swimming pool, one baseball/softball field, and two multipurpose fields (soccer & football).
    3. An outdoor Youth Sportsplex with eight softball fields, four t-ball fields, four baseball fields and six soccer/football fields along with two locker room/restroom/concession stand buildings.
    4. A private fitness center with two weight rooms, one yoga studio, one spin cycle studio, men's and women's locker rooms with whirlpool, sauna and massage room amenities.

3. Create a master plan of offices and meeting rooms needed for one of the two settings described below:
    1. An NFL franchise practice facility for coaches' offices and team/position meeting needs.
    2. An NCAA Division I basketball program for both men and women.

SELF-ASSESSMENT EXERCISES

1. What factors impact the determination of locker room size?
2. Describe the basic locker configurations and the different materials available for locker construction.
3. Explain the differences between saunas, whirlpools and steam rooms as locker room amenities.
4. What are the main purposes of an express locker room?
5. What are the main purposes of a family locker room?
6. Describe the special facility needs related to the installation of commercial-grade washer/extractors and dryers within an athletic facility setting.
7. What are some of the common components of an effective janitorial area?
8. How have space allocations for ancillary space and storage space been determined or researched?

INTERNET LINKS

Amenities - https://www.athleticbusiness.com/locker-room-products-and-amenities.html
https://classpass.com/blog/2016/04/26/the-classpass-shower-awards-whats-the-best-locker-room-in-your-city/

Laundry – https://www.athleticbusiness.com/locker-room/keeping-college-athletic-laundry-operations-running-smoothly.html
https://www.athleticbusiness.com/locker-room/designing-attractive-functional-laundry-spaces.html

Locker Rooms - https://www.athleticbusiness.com/locker-room/designing-public-locker-rooms-with-an-eye-on-privacy.html
https://www.clubindustry.com/step-step/six-fundamentals-good-locker-room-design
https://www.ihrsa.org/improve-your-club/everything-you-need-to-know-about-health-club-locker-room-size/
https://www.bostonmagazine.com/health/2019/02/14/most-luxurious-locker-rooms-boston/

Showers - https://www.bdcnetwork.com/getting-out-1960s-new-thinking-needed-locker-room-showers

Specialty Locker Rooms - http://recmanagement.com/feature_print.php?fid=200805fe01
https://www.parksandrecbusiness.com/articles/2015/07/27/not-your-daddys-locker-room
https://campusrecmag.com/come-one-come-locker-rooms/

Storage-https://www.wengercorp.com/Construct/docs/Athletic%20Planning%20Guide%20by%20Wenger%20GearBoss.pdf

https://datumstorage.com/news/storage-solutions-every-sport/

https://bradfordsystems.com/athletic/

http://www.spacesaver.com/athletic-apparel-storage/

Team Rooms - https://www.athleticbusiness.com/stadium-arena/inside-the-modern-team-locker-room.html

Chapter 7
Graphics and Signage

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Signs and signage have been a part of facilities for years. Until recently, signage, or environmental graphics, has been relegated to a back seat in terms of facility planning. Today's large and complex facilities, great number of sports facility users, guidelines developed through the ADA and OSHA, and a litigation-oriented society are all moving signage to the forefront of planning a new facility.

Effective signage in a sports complex must be well planned. Signage should be an integral part of facility design. There are various types of signs that will be used in any given sports complex, such as electronic signs and architectural signage. Well-planned, easily maintained, well-designed, cost-effective signs can help prevent injury and related problems.

LEARNING OBJECTIVES

After reading this chapter, the student should

- be able to understand the importance of signage,
- know how to design effective signage,
- know the type of sign needed for a given situation,
- be able to understand the cost and maintenance factors of signage, and
- be able to understand the place of graphics in facility architecture.

SELF-ASSESSMENT EXERCISES

1. What are environmental graphics?
2. What are the five categories of signs that are identified for use in facilities?
3. Compare and contrast comprehensibility and readability.
4. OSHA has developed three standards regarding the communication of hazardous conditions. What are they? Explain each.
5. What is the importance of placement of your signage?
6. What three groups of people does signage serve?
7. What are some ways to save money when buying signs for your facility?
8. What specific guidelines have been identified by ADAAG regarding ADA signage?

CASE STUDY

Divide students into groups of three and have each group visit one portion of your sports complex (foyer/lobby area, weight area, arena area, etc.).

Group members should discuss all aspects of signage in that area and record the information. They should

- include signage design, placement, construction, shape, use of color and/or graphics, and size;
- determine the group(s) of facility personnel/users for whom the signs were designed; and
- discuss the effectiveness of the signage. How can the signage in this area be improved?

Have students return to the classroom and present the findings from their area to the rest of the class. If time permits, allow each group to present its findings to the class in the area the students visited.

INTERNET RESOURCES

Occupational Safety and Health Administration
www.osha.gov

Office of Facilities Management
Environmental Graphics Design Program Guide
www.va.gov/facmgt/standard/signage_pg.asp

ADA Accessibility Guidelines
www.access-board.gov/adaag/html/adaag.htm

Chapter 8
Indoor and Outdoor Surfaces

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Although discussions about indoor surface materials seldom elicit excitement, interest, or enthusiasm, these choices are integral to the appearance, utility, and overall success of any facility. The cost, type, installation, and maintenance of these materials are directly linked to facility usage, appearance, longevity, safety, and overall facility success. The three categories of indoor surfacing include floors, walls, and ceilings.

LEARNING OBJECTIVES

After reading this chapter, the students should be able to

- demonstrate knowledge of the primary surface design areas of a facility;
- describe the types of materials available for these surfaces and their characteristics;
- understand the nature of various surface materials, use characteristics, safety issues, aesthetics, and acoustics;
- identify various advantages and disadvantages of surface materials that should be considered for flooring, wall, and ceiling materials;
- understand the impact of equipment and pedestrian traffic and the impact this has on facility surface life;
- explain recommended maintenance and upkeep practices for various surface materials;
- describe the concept of hardness and how it is measured;
- demonstrate an understanding of an appropriate selection process for facility flooring options; and
- understand the role of a facility manager in the selection of appropriate surface materials for sports facilities.

KEY TERMS

The following key terms will be found in this chapter: absorption, acoustics, aesthetics, area-elastic surfaces, area of deflection, cushioned systems, dead spots, fenestration, flooring, grades, hardness, life expectancy, moisture resistant, padded floor, polyvinyl chloride (PVC), point-elastic surfaces, porous, polyurethane, resilience, rolling load, shock absorption, spring systems, subflooring, suspension floor, synthetic flooring, tare space, tribometer, underlay,vinyl, walk-off.

CASE STUDY

Situation: Mark Twain Community College is planning a new athletic and recreational sports complex. You are responsible for developing the specifics for the floor, walls, and ceiling in the multipurpose field house.

Problem: What specifics will you recommend for these indoor surfaces that will accommodate the following activities: basketball, tennis, badminton, volleyball, and track and field?

SELF-ASSESSMENT EXERCISES

1. What are the three important surface area considerations when planning facility construction or renovation? (floors, walls, and ceilings)
2. Name three distinct areas or divisions within facilities currently being built. (service/ancillary areas, main arena or activity area, and office/administration area)
3. Name the two most popular synthetic flooring materials. (polyvinyl chlorides [PVC] and polyurethane)

4. What are the three main types of surfaces currently employed for primary gym floors? (hardwood, vinyl, and synthetic flooring)
5. What are three types of recommended subfloor constructions? (suspension floor, spring floor, padded floor)
6. Name five considerations in the selection of a flooring material. (economic feasibility, ease of maintenance, current and planned use of the facility, appearance compatibility/aesthetics, and safety and risk management factors)
7. Name the considerations in making an appropriate surface choice. (solicitation, comparison, visitation, selection, quality, manufacturers, maintenance and operations, initial cost, life cycle cost, bidding, and installation)
8. What impact does wood grade have on the appearance of flooring, and what grade options are available? (Wood grade influences the color, tone, and grainy appearance of the floor and the number of defects observed during the inspection process and is classified into first-, second-, and third-grade categories.)
9. What functions do walls serve? Name two highly sought after properties in wall materials. (Walls act as dividers and barriers to sound, heat, and light. The two properties sought in wall materials are moisture-resistant characteristics and sound acoustical properties.)
10. Name three important considerations that should be used to determine a ceiling's construction. (roof design, local building codes, and the nature of the planned activities)
11. What factors influence the characteristics of any facility surface? (subflooring materials, hardness, area-elastic qualities, point-elastic qualities, absorption, and resilience)
12. According to Piper (1998), what are some factors that should be included in the selection process for windows? (lighting, ability to keep elements out, heat loss, aesthetics, security, and view)
13. Locker room materials should possess what important qualities? (Materials should be durable and able to withstand moisture and dirt.)
14. What is the key to controlling microbiological gardens? (The key is prevention.)
15. Apart from the characteristics of the surface itself, what other methods can be used to improve the aesthetic appearance of all facilities? (patterns of paint, use of colors, designs, flooring grade choice, and lighting)
16. What are two of the more popular surfaces for aerobic exercise facilities, and what are important considerations when choosing flooring materials? (Spring-loaded hardwood floors and heavily padded carpet surfaces. Important considerations are shock absorption, foot stability, surface traction, and resiliency.)
17. What are some popular forms of wall systems for racquetball courts? (reinforced fiberglass concrete, plaster, panels, poured-in-place cement slab, and shatterproof glass)
18. Apart from the obvious importance of any surface material, what is the importance of the subflooring material? (It impacts the characteristics of the surface material, it can be as important as the surface material choice, it can influence the life expectancy of the surface material [i.e., moisture retention capacity]).

INTERNET EXERCISES

Go to the Athletic Business website and develop a list of indoor surface suppliers and contractors.

Go to the Internet and gather additional indoor surface suppliers and contractors not found at the Athletic Business site.

Chapter 9
Landscape Design, Sports Turf, and Parking Lots

Richard L. LaRue, Retired, University of New England

CHAPTER OVERVIEW

The planning of a sports or recreational facility requires the expertise of a licensed landscape architect or experienced landscape planner. The facility manager should have a significant role in the planning process. Other people who may lend their expertise and/or experience include those responsible for facility maintenance and safety, facility users, and program staff.

Parking areas should be designed to be multipurpose (i.e., unused parking space as additional recreation space). Provided that vehicular controls are in operation, it is entirely possible to use flat, well-maintained parking surfaces as additional outdoor recreation space or sports courts. However, the best recreation or sports spaces are designed specifically as such a space, and regular use of a parking lot as a play space probably indicates a flaw in the outdoor space planning. Yet, planners must be sensitive to planning for multipurpose uses and maintain flexibility in their plans.

LEARNING OBJECTIVES

After reading this chapter, the student should

- be able to understand landscape concepts in terms of aesthetics, function, and safety;
- be able to recognize the planning responsibilities related to groundskeeping management, maintenance, and equipment;
- be able to understand the design and operation of surface and subsurface irrigation and drainage;
- be able to understand the concepts related to parking design for aesthetics, function, and safety;
- be able to understand the difference between standards and guidelines related to chemical handling and storage (i.e., legal aspects and recommendations);
- be able to understand both the trends and new technologies in landscape design; and
- be able to assist in the planning of parking areas for recreation and sports venues.

KEY TERMS

The following key terms will be found in this chapter: drainage, French drain, groundskeeping, irrigation, portable grass, synthetic turf, turfgrass, bicycle parking, car pool/van pool programs, consumer-oriented parking, core area parking, debit card system, open parking system, motorcycle programs, park-and-ride parking, parking garage, parking paradigm, perimeter parking, reserved parking system, reserved space, and zoned parking system.

CASE STUDY

A. Situation: The landscape planner on your facility project has two components that he or she believes will make the front entrance more inviting: an 8-foot berm that will break up the open space in front of the building and a walkway that extends from the parking lot to the front entrance of the building and detours around a bench.

The facility serves a college and community population and is located in New England.

Problem: As the facility's first manager, your input is important to the project:

- Considering the users and geographic location, is there a problem with either or both of the components?
- How does the walkway design lend itself to snow removal in winter?
- Should facility maintenance be contacted for input relative to the walkway design?

- How does the berm component affect the safety of walkway users if campus safety patrols the area by vehicle rather than on foot?
- Should campus safety have input on the design of the berm?
- What are your thoughts and recommendations?
- What steps would you take to justify your opinion?

B. Situation: Your college is planning a sports field for the athletics program. Currently, the athletic department supports women's and men's soccer and women's lacrosse. There are no plans for any other outdoor sports. The college owns one large space that has enough room for one full-sized practice field and one competition field or a smaller practice field and a competition field with a track around the field. The athletic director insists that the college will never support a track program. Therefore, the athletic director is pushing for the full practice field and the competition field without a track.

Problem: A second opinion is that the college should consider the future, placing the competition field so that a track could be added later, even if it means a smaller practice field.

- What is your opinion?
- Should the fields be placed to support the existing program and anticipated plans?
- Should planning anticipate the possibility of future program changes?
- Are there other reasonable options?
- How would you support your opinion?

SELF-ASSESSMENT EXERCISES

1. What should be the components of a total field management program?
2. Describe the aesthetic, function, and safety issues regarding landscape design.
3. What are the characteristics of turfgrasses commonly used for sports turfs?
4. What is a portable grass system?
5. What are the three new kinder, gentler synthetic turfs available?
6. What are the three concepts related to a successful groundskeeping maintenance and management plan?
7. Describe the advantages and disadvantages of surface and subsurface irrigation systems?
8. Describe what must be considered in the planning a drainage system.
9. What does OSHA require regarding chemical handling and storage?
10. Describe how you would incorporate aesthetics, function, and safety in to a parking lot design.
11. What is the traditional parking paradigm?
12. What are the weaknesses of the traditional parking design?
13. Describe the new customer-oriented parking paradigm?
14. What are the components of a maintenance plan for a parking facility?
15. What are the guidelines for a successful signage system for a parking facility?
16. What are the typical funding sources for a parking system?
17. What are the components of an annual budget for the parking system?
18. Describe the three common parking systems.
19. What are the seven parking options?
20. Describe the various new technologies designed for parking systems.

INTERNET EXERCISES

Go to the Internet and determine what additional information is available regarding parking systems and parking garages.

Go to the following websites to gather new and additional information regarding landscaping:

Associations:
- Associated Landscape Contractors of America (ALCA): http://www.alca.org
- American Society of Landscape Architects (ASLA): http://www.asla.org
- Interlocking Concrete Pavement Institute: http://www.icpi.org/ICPI
- National Arborist Association: http://natarb.com
- Outdoor Power Equipment Distributors Association: http://www.aip.com
- Professional Lawn Care Association of America (PLCAA): http://www.plcaa.org
- Responsible Industry for a Sound Environment (RISE): http://acapa.org/rise/intro.html
- Sports Turf Managers Association (STMA): http://www.alp.com/STMA
- Snow and Ice Management Association: http://www.sima.org
- The Irrigation Association: http://www.irrigation.org
- Golf Course Superintendents Association of America (GCSAA): http://www.gcsaa.org

Horticulture:
- American Horticultural Society: http://www.ahs.org
- PLANTnet a commercial horticulture site sponsored by Florist Insurance: http://plantnet.com
- Farmers Almanac Report: http://www.almanac.com

Industry Related-Government:
- Environmental Protection Agency (EPA): http://www.epa.gov
- Occupational Safety and Health Administration (OSHA): http://www.osha.gov
- Plants National Database: http://plants.usda.gov/plants

Arboretums:
- American Association of Botanic Gardens and Arboreta (AABGA): http://www.mobot.org/AABGA/aabga.html

Irrigation:
- Irrigation and Green Industry Network: http://www.igin.com

Journals and Periodicals:
- *Landscape Architecture* (The magazine of the American Society of Landscape Architects): 800-787-5267
- *Recreation Resources* (Serves the information needs of recreation managers throughout the United States, Canada, and the world): 847-427-9512, http://www.rec-neet.com
- *SportsTURF* (The official publication of the Sports Turf Managers Association): http://wwwsportsturfonline.com

Other:
- The Compost Resource Page: http://www.oldgrowth.org
- Metropolitan Detroit Landscape Association (MDLA): http://www.landscape.org
- The Lawn Institute: http://www.lawninstitute.com
- Crop Science Society of America: http://www.crops.org/cssa.html

Chapter 10
Indoor and Outdoor Courts

Bernie Goldfine, Kennesaw State University

CHAPTER OVERVIEW

Indoor and outdoor courts are popular competition and recreation venues. These venues are continually being modernized and improved. Planners need to consider many important changes in materials regarding lighting; floor, wall, and ceiling surfaces; ventilation; and safety.

LEARNING OBJECTIVES

After reading this chapter, the students should be able to

- identify and describe layout, dimensions, and orientations;
- identify and describe various materials used in construction; and
- identify and describe a variety of important specifications and information (e.g., surfacing and lighting) for the courts described in this chapter.

KEY TERMS

The following key terms will be found in this chapter: croquet, DIN flooring standards, layout, orientation, paddle, paddle tennis, platform tennis, shuffleboard.

CASE STUDY

Situation: The Greenwich Recreation Club has recently been incorporated. The Club has sold shares to over 5,000 upper income patrons to raise the initial construction funds for Phase 1 of the club.

You have been charged with the development of the following components for the club: indoor and outdoor tennis courts, platform tennis courts, racquetball courts, a croquet area, and a shuffleboard area.

Problem: What guidelines will you develop regarding the construction of these spaces?

SELF-ASSESSMENT EXERCISES

Divide into groups of three and visit either the handball/racquetball courts in your sports complex or those of a nearby complex. Examine the courts for wall, ceiling, and floor construction. Discuss all aspects of construction within your group. Take notes on the discussion.

Next, study the flushness of all aspects of the court. Discuss this and again take notes. Examine internal and external storage areas of the court and see whether a teaching court is provided. Check the layout of the court battery. Again discuss and take notes. Return to the classroom and discuss your notes as to how improvements could be made to the courts. Each group then shares its comments with the other groups.

Divide into groups of three and design a multipurpose gymnasium that includes basketball, volleyball, and badminton courts. Consider all aspects of design presented in the chapter and draw a floor plan that provides game lines. Also, give an overview of your plan relative to lighting, ceiling clearance, flooring, safety space, and any other factors you deem important.

Divide into groups of three and design a racquetball teaching court for clients 10 to 12 years old. Apply and adapt items discussed in this chapter to this age group. An example might be larger targets and/or the use of cartoon characters in your teaching aids. When you complete this exercise, discuss your design with other class groups.

In groups of three, visit three different tennis complexes. Take copious notes regarding design and construction. If possible, take photographs. Present a report of your findings that evaluates these various courts and complexes.

In groups of five, attempt to gather information on the costs you would incur if you were to build one of the following courts: paddle tennis, platform tennis, or sand volleyball. Write up your cost analysis and present your findings to the class.

INTERNET EXERCISE

Go to the Internet and search for similar club organizations to determine what has been done in other locations.

Chapter 11
Field Spaces

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Sports fields generally require the largest amount of space in an outdoor complex. The activities that can be conducted are varied and require a variety of sizes. Additional acreage is required for spectators, officials, service personnel, and service areas (i.e., concessions, restrooms, equipment storage, scoreboards, and press box).

The usability of the areas, particularly at night and after inclement weather, often requires substantial support utilities such as communication, drainage, irrigation, lighting, security, and sewer systems. Furthermore, the surface material, synthetic or natural, and its substructure systems are also critical.

The various sports field venues that will be highlighted in this chapter include baseball and softball, bocce, cricket, croquet, field hockey, football, lacrosse, lawn badminton, lawn bowling, lawn volleyball, rugby, soccer, and team handball. The beginning of the chapter will highlight common planning challenges for all fields, and the latter portion will cover specific needs for the various fields.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- design a safe outdoor sports field complex,
- identify the different types of field complexes, and
- understand the various playing field standards.

KEY TERMS

The following key terms will be found in this chapter: drainage, field turf, irrigation, lighting, natural turf, orientation, seating, skinned infield, synthetic turf, warning track, accessibility, and codes/regulations.

CASE STUDY

A. Situation: The residents of Riley, Indiana, have decided to develop a donated cornfield into a baseball/softball complex for the children in the area. You and a group of fathers have banned together to build this complex. Your job is to design the multi-field baseball/softball complex with seating and a storage/concessions area.

Problem: What will be your recommendations for this complex?

B. Situation: You are a member of a newly formed community youth baseball association. The organization is nonprofit. You have indicated some knowledge about field design and construction. The group elects you as chairman of the building committee.

Problem: As chairman you are responsible for designing the new four-field youth baseball facility. Prepare a checklist for the design, a diagram of the new facility, and an outline of the details for the facility.

SELF-ASSESSMENT EXERCISES

1. What are the common causes of injuries on outdoor field spaces?
2. Describe the two common types of surfaces.
3. What is important to know and understand about the orientation of sports fields?

4. What should the designer know about fencing for sports fields?
5. Describe how you would ensure a sports field would drain quickly and adequately.
6. What is important to understand about irrigation of sports fields?
7. List the common services areas found at outdoor sports field complexes and describe each.

INTERNET EXERCISES

Go to the Miss USA Softball website and review their plans for a multi-field complex. Then determine how you will use this information to complete Case Study A.

Go to the Little League USA website and review their plans for a multi-field complex. Then determine how you will use this information to complete Case Study B.

Chapter 12
Bleachers

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

The planners need to consider the following safety suggestions when developing seating for spectators for outdoor events: (1) conforming to ADA guidelines; (2) providing railings for each side and the top row to prevent falls; (3) closing areas under each row of seats to prevent children from falling through or climbing; (4) enclosing the structure to gain space for storage, concessions, or restrooms and to prevent children from playing under the bleachers; and (5) providing aisles with railings for ease of accessing seating.

All fields must have adequate seating for spectators. Numerous types of seating are available, from concrete stands, to steel or wood bleachers of various heights, to portable aluminum bleachers. The seating has changed from 18 inches wide to 20 inches to accommodate the spectators' larger backsides. Many of the seats are fiberglass rather than wood, and some are aluminum. The seats are contoured for greater comfort, and some areas have soft theater seating.

The choice comes down to the size of the purchaser's pocketbook.

LEARNING OBJECTIVES

After reading this chapter, the student should be able to

- identify the different types of bleachers,
- understand the basic components of a bleacher system,
- discuss ways to improve safety in bleachers, and
- understand the place of bleachers in facility architecture.

KEY TERMS

The following key terms will be found in this chapter: codes/regulations, guardrails, footboards, permanent/stationary bleachers, portable bleachers, risers, seat boards, telescopic bleachers, temporary bleachers.

CASE STUDY

Visit a local high school or recreation facility. Determine which types of bleacher systems are present on-site. Do the bleachers meet minimum codes in regard to openings in the components? Are guardrails present? Do the guardrails meet existing codes? How wide are the aisles? How many seats per row counted from the nearest aisle?

In addition to the above, conduct an overall risk assessment of the bleachers. Are the bleachers in need of repair or replacement? Can modifications be made to make the bleachers safer for spectators?

SELF-ASSESSMENT EXERCISES

1. What should the designer know about spectator seating?
2. Identify and describe the different types of bleachers.
3. What are the basic components of a bleacher system?
4. Identify some of the agencies/organizations that develop codes regarding bleacher construction.
5. What are some areas that state and local codes address that are of major importance in the building of bleacher systems.

INTERNET EXERCISES

Based upon your findings in the case study, Access the World Wide Web and develop a list of vendors who construct and/or retrofit bleachers. Which vendors provide online quotes? What types of systems are available? What would be the most economical and practical process of improving the bleachers at your site?

Chapter 13
Aquatic Facilities

Leland Yarger, Ball State University
Steven Dalcher, Taylor University

CHAPTER OVERVIEW

The major growth in aquatic facilities took place in the United States shortly after World War II. With a stronger economy and a new interest in aquatics generated by successful swimming training programs in the military, a significant increase in swimming pools occurred in schools, universities, and agencies throughout the United States. Most pools designed and constructed during the 1950s through the 1970s were built to competitive swimming and diving standards. Those wishing to take lessons or engage in aquatics recreation simply did their thing in these rectangular, somewhat deep pools. However, with the advent of the waterslide and water parks in the 1980s, a whole new thought process evolved for those designing and building pools. The leisure pool concept or family aquatic centers that originated in Europe and then migrated to Canada and other countries before coming to the United States called for a great amount of shallow water, much of it moving with currents, waves, and slides. This continues to be a positive and popular trend because although the traditional, competitive rectangular pool may recover 20% to 40% of its operating expenses, leisure pool designs usually can recover more than 50% of their operating costs with many recovering up to 85%.

This chapter will cover both competitive and recreational aquatic facilities; however, the emphasis will specifically be on aquatic design planning rather than some of the ancillary topics (i.e., locker rooms, spectator areas, mechanicals, etc.) already discussed in this text. The chapter will progress from the older, more traditional public pools to the newer aquatic facilities including the family aquatic centers. Also, special attention will be given to particularly troublesome areas like nonslip flooring and ventilation.

Furthermore, a successful project rests upon how well an architect and operator initially reach an understanding of the most important issues, including the building program, a definition of multipurpose use, the operational design for the facility, space utilization, and a design that will accommodate new trends in aquatics. The operator must decide which activities can be combined and which activities must be separated. The operator must foresee who will use, how many different uses will be included, and how many users are anticipated. The program is based on these projections. The architect can help provide a reality check for what the operator envisions. The best possible result of the program phase is producing a program where budget, quality, and size are not compromised.

Furthermore, as with any financial analysis, a total understanding of the operational costs is needed. This is sometimes not factored into a project and will affect the end result. Raising the money to build the project is much easier than funding the building operation over the expected lifetime of the building. Operational costs to be considered are utilities, maintenance, additional staffing, repair, and replacement. Before developing an operational cost analysis, the organization should consider the future as it pertains to growth in staffing and programming. Many times, these important areas are overlooked. Neglecting these areas will cost more to the organization in the future than if they were planned for in the present. It is sometimes better to have help in this area from an outside consultant who is able to ask the hard questions and provide guidance.

Finally, the programming phase of a project is important. This is the phase that will determine what spaces will go into your building and their relationship to each other and the overall operation of the building itself. The entire project will be based on this phase, design, cost, and construction. If it does not appear in the program, it will not be designed or constructed. If additional items or desires to the program in the latter stages of design or construction are requested, they will cost extra.

Before starting the program phase, a firm understanding of the current operation and future growth is imperative. Visiting as many facilities around the country as possible to obtain ideas for the new facility is of paramount importance. Before going on these tours\visits, develop a list of questions beforehand to ask the operators of these

facilities. Pictures and videos are beneficial, and developing a catalog of these images helps demonstrate the specific desires in an aquatic facility to the architect.

LEARNING OBJECTIVES

After reading this chapter, the student should be able to

- describe aquatic facility trends,
- design and implement a needs analysis for an aquatic facility, and
- describe the technical considerations for designing both recreational or competitive aquatic facilities.

KEY TERMS

The following key terms will be found in this chapter: air quality, basin construction, compaction of soil, deck surfaces, diving wells, facility sanitation, hydrostatic pressure, lap pools, pre-construction, springboards.

CASE STUDY

A. Situation: The local YMCA, which was constructed in 1910, has an old pool that no longer functions. The Board of Directors has decided to convert the pool area into a cardiovascular facility and add a new swimming pool.

Problems: You are the chairperson for the swimming pool committee. What guidelines will you provide the architect prior to the design phase? Will there be a diving well? Will there be a movable pool floor and bulkhead? How will you handle ADA and OSHA requirements?

B. Situation: The Butterfield Park Authority (BPA) has approved funds for the development of a plan for a recreational/competitive aquatic complex. The BPA has recently completed a needs assessment, which indicated that the average taxpayer was supportive of an indoor/outdoor aquatic facility that would service the community's competitive, instructional, and recreational swimming needs. The two complexes would be constructed on the same site, and the office, locker rooms, and other service areas would be built between the indoor and outdoor facilities.

Problems: You are the newly hired aquatic facility director. What steps would you take to develop this new aquatics facility? How will you ensure that this facility is state-of-the-art and energy efficient? How will you program and schedule such a facility? How will you accommodate persons with disabilities, abiding by the ADA and ABA guidelines? What service areas will you include in the aquatic facilities (e.g., lounge, concessions, spectator seating, restrooms, offices, day care, elder care, strength training, etc.)?

SELF-ASSESSMENT EXERCISES

1. What are the trends in aquatic centers?
2. What is a needs analysis?
3. What are the advantages and disadvantages of basements?
4. What is dehumidification?
5. What is important to consider regarding pool interiors?
6. What is important to consider regarding gutter systems?
7. What are the components of a swimming pool mechanical system? Describe each.
8. What is the difference between sand and DE filters? Is one better than the other?
9. Describe the various issues relating to chemical treatment of pools.
10. What has happened over the past 30 years with the development of bulkheads and movable floors?

11. What are the components of a diving facility?
12. Is there a difference between a competitive diving board and a recreational diving board? If there is a difference, explain it.
13. Why is dehumidification important to a swimming pool? What have been the problems with dehumidification systems?
14. What safety factors are important to consider when designing a pool?

INTERNET EXERCISE

Go to the website for Athletic Business and Aquatics and develop a list of aquatic equipment suppliers and builders.

Chapter 14
Playgrounds

Thomas H. Sawyer, Emeritus Professor, Indiana State University

CHAPTER OVERVIEW

Playgrounds should be an important facility consideration for inclusion in schools, child care centers, parks, and other recreation facilities. The systematic design process outlined in this chapter will produce playgrounds that are safe, as well as foster children's physical, emotional, social, and intellectual development. By paying attention to age-appropriate equipment, proper surfacing under and around equipment, the placement of equipment for easy supervision, and the regular maintenance of the equipment and the environment, HPERD professionals will be able to design a play environment that allows children to be playful. It will also provide a setting in which children can increase their ability to take appropriate challenges without fear of taking inappropriate risks.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- identify key terms in relation to playground design;
- recognize the national guidelines and standards in playground design;
- understand general planning considerations for playground design;
- identify specific planning steps in a planning a playground;
- understand the procedures for installing playground equipment and surfacing; and
- recognize procedures for maintaining, repairing, and inspecting playground equipment and surfacing.

KEY TERMS

The following key terms will be found in this chapter: age-appropriate design, age separation, inspections, sight lines, use zone, zones for play.

CASE STUDY

The Jolly Jean Day Care Center wants to build a playground for its clients. You have been contacted to design a playground for the day care center. What guidelines will you use to design and select playground equipment?

SELF-ASSESSMENT EXERCISES

1. Which organization publishes safety guidelines about playgrounds for use by the general public?
2. Which organization publishes technical standards about playground equipment and surfacing?
3. What four playground safety areas should influence design considerations? Give an example of how these areas should be incorporated in the planning process.
4. What are the issues surrounding the Americans With Disabilities Act and playground accessibility?
5. Discuss how current trends in playground safety are influencing design.
6. What are the four general planning considerations for playground design?
7. Describe specific planning steps involved in designing playgrounds.
8. What factors should be considered in selecting proper surfacing for playgrounds?
9. What procedures should be followed in order to install playground equipment?
10. What is the function of a maintenance program, and how should it be carried out?

INTERNET EXERCISE

Go to the NRPA website and gather additional information regarding playgrounds.

Chapter 15
Designing Facilities for Parks and Recreation

Thomas H. Sawyer, Emeritus Professor, Indiana State University

CHAPTER OVERVIEW

Park and recreation departments aim to build communities and connect citizens through leisure, fitness, and education opportunities. Recreation centers may improve the quality of life for patrons as well as entice new businesses and create jobs in the local area. Park and recreation facilities experience a multitude of trends that impact the planning process. Although planning principles do not typically change, inputs to the planning process are undergoing substantial change.

The last decade may be characterized by a variety of trends, including

- changing participation rates in existing recreation and leisure activities;
- expanding new recreation activities, such as in adventure recreation and exergaming;
- a greater recognition of how cultural and ethnic background impacts the type of recreation and recreation facilities;
- a greater understanding and recognition of women's needs in recreation;
- a changing population and household composition;
- a marked increase of health-associated concerns;
- dramatic innovations in leisure equipment technology;
- the impact of electronic media and burgeoning electronic marketplace;
- changes in world energy and the growing green movement;
- changes in regional economies;
- increased demand for sustainable operations;
- unstable political environments; and
- the slowdown of the economy and resultant impact on recreation facility development, construction, and services.

Facilities and open spaces must clearly be conceptualized and designed to accommodate the dramatic changes occurring in America. The public will need to continue its involvement in the planning process.

LEARNING OBJECTIVES

After completing this chapter the student should

- have a greater understanding of the components of indoor and outdoor recreation facilities, and
- be able to assist architects and planners in designing functional facilities for recreation and leisure activities.

KEY TERMS

The following key terms will be found in this chapter: boat ramps, bridle paths and rings, neighborhood park, exercise trail, fishing dock, fountain, interpretive centers, marinas, nature center, pagoda, play equipment, walking trails.

SELF-ASSESSMENT EXERCISES

1. Describe a master plan concept.
2. What are the key planning considerations for an urban area?
3. What are the components of an indoor community area and facilities?
4. What is a neighborhood center?

5. What is the community center?
6. What guidelines should be followed when developing indoor recreational facilities?
7. What are the components of an outdoor community area and facilities?
8. What is a playlot?
9. What special-use areas and facilities will be found in a citywide or district park?
10. What are the major components of a golf course?
11. What would be found in a marina?
12. What are the components of a snow sports park?
13. What is a nature center?
14. What is an interpretive center?
15. What are the different types camps?
16. What is important to know about planning a waterfront location?
17. How would you go about constructing a waterfront?

INTERNET EXERCISES

Go to the NRPA website and gather additional information about park planning, design, and construction.

Go to the Boy Scouts of America website and gather information about scout camps and waterfronts.

Chapter 16
Campus Recreational Sports Centers

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Over the past 10 years, a number of recreational sports centers have been constructed on campuses to meet the needs of the student bodies and admissions officers seeking to enroll more freshman. These centers have been built for recreational purposes rather than instructional or athletic ones. They have been financed primarily with student fees and state and private funds. Most of the facilities include aquatic centers, entrance/lobby areas, lounge areas, racquetball/wallyball courts, indoor and outdoor tennis courts, basketball courts, dance exercise areas, indoor running/jogging tracks, strength and cardiovascular training areas, climbing walls, locker rooms, indoor and outdoor in-line skating hockey courts, indoor soccer areas, administration areas, pro shops, concessions, and areas for equipment rental.

This chapter provides the planner with an overview of the needs for a campus recreational sports center. The specifics relating to many of the spaces are found in other chapters in this book.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- begin planning a new recreational sports center,
- describe indoor activities and facility needs,
- outline outdoor activities and facility needs, and
- describe the security needs for a recreational sports center.

KEY TERMS

The following key terms will be found in this chapter: indoor facilities, outdoor facilities, security issues.

CASE STUDY

Situation: You have been hired by XYZ University as the new director of recreational sports. The new president has recently come for another university of similar size, where he learned to appreciate the value of the recreational sports center. It was a great marketing tool for attracting new students. The new president has charged you with the responsibility to develop a plan to finance and construct a new recreational sports center on campus.

Problems: What steps will you take to develop the plans for a new facility? What programs will you have, both indoor and outdoor? What program areas will you plan for in the new facility?

SELF-ASSESSMENT EXERCISES

1. What are the common internal components of a recreational sports facility?
2. What are the common outdoor components of a recreational sports facility?
3. What are the security issues relating to a recreational sports facility?

INTERNET EXERCISE

Go to the NIRSA website and gather additional information regarding the development of recreational sports facilities.

Chapter 17
Strength and Cardiovascular Training

Lawrence W. Judge, Ball State University

CHAPTER OVERVIEW

During the past 35 or so years, the popularity of resistance training has increased enormously. Weight lifting facilities of yesteryear were a novelty, as most athletes were advised that serious resistance training might hurt their flexibility and athleticism. According to the American College of Sports Medicine (ACSM, 2011), strength training should be performed at least twice per week with eight to 12 repetitions of eight to 10 different exercises targeting all major muscle groups. As the benefits of resistance training have been accepted by athletes, coaches, and the mainstream population, the demand for facilities has increased. Many school corporations, colleges, and universities (state-of-the-art recreation centers) and community organizations such as the YMCA have developed multiuse strength and conditioning facilities. As the financial stakes of recreation and sport continue to expand, programs continue to seek opportunities to expand the user base.

Strength and cardiovascular training facilities (SCF) for use in physical education, recreation, athletics, and community wellness programs have become larger and more sophisticated over the years. The increasing use of these facilities, combined with the key administrative issues of equipping and staffing, creates a need to better understand these facilities. Strength and cardiovascular training areas (commonly referred to as the fitness floor) are the lifeblood of any existing or future recreation/sports facility. When facilities motivate their members by captivating their attention and imagination and ensuring healthy activity by promoting safety, the facilities will sustain their existence even with the growing number of competing exercise facilities (Sawyer & Stowe, 2005).

SCF coordinators must embrace the advances in technology and recognize the value of incorporating entertainment mediums (televisions overhead, personal televisions for each piece of cardio equipment, music over speakers throughout the facility that leads someone to a workout site for a tip of the day, etc.) as they develop or refine existing programs, refurbish existing facilities, or plan to expand or construct new facilities. The coordinator's responsibilities are demanding; however, when armed with the correct knowledge base, the coordinator can create a facility through an arduous process with a successful outcome.

SCF coordinators must be involved with every phase of the development process and continue to be heavily involved in day-to-day operations. From facility design concepts, to choosing equipment, to facility maintenance, the most successful planners immerse themselves in the process and understand every detail concerning strength and cardiovascular equipment and training. This chapter will take the reader on a journey through the full process of planning and operating SCFs.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- identify the industry standards for strength and cardiovascular facilities,
- assess the needs of an existing or new facility,
- understand the design concepts and philosophies for revitalizing existing facilities and
- the construction of new recreational facilities,
- plan and organize an existing or new facility for maximum usage, and
- understand the environmental factors affecting facility development.

KEY TERMS

The following key terms will be found in this chapter: cardiovascular training, strength training.

CASE STUDY

Situation: You have been hired by a regional hospital to design a strength and cardiovascular facility. This facility will provide service for local industry, Level 2 and 3 cardiovascular rehabilitation, local residents, and in- and outpatient rehabilitation. This will be a new facility constructed adjacent to the main hospital building, connected by a walkway over a main street separating the two buildings.

Problems: How will you determine the program needs? How will you determine the equipment needs? How will you determine the size of the facility? Prepare an equipment list for the facility. Prepare a draft floor plan for the facility.

SELF-ASSESSMENT EXERCISES

1. What questions need to be asked when planning a cardiovascular and fitness area?
2. What are the guidelines established by the NSCA for safe and efficient use of equipment?
3. What needs to be considered when organizing the existing or new facility for maximum usage?
4. What must be considered when considering flooring and wall coverings?
5. What are the common procedures for maintaining equipment?
6. What does the designer need to define when developing spaces for a new facility?
7. What special security issues need to be addressed when planning for a facility?
8. What do the IHRSA, NSCA, and ACSM suggest for equipment for the strength and cardiovascular training area?
9. How would you design the testing area?

INTERNET EXERCISE

Go to the IHRSA, NSCA, and/or ACSM website to gather additional information regarding strength and cardiovascular facilities development.

Chapter 18
Adventure Programming Facilities

Donald Rogers, Indiana State University

CHAPTER OVERVIEW

Adventure programs involve reasonable risk-taking activities designed to foster trust and cooperation, enhance self-image and confidence, and improve physical skills while being fun and exciting. Adventure activities are usually done as games or problems, as sports or recreational activities, or as climbing activities. Only programs that include climbing activities tend to have distinct facilities and equipment, climbing walls, and challenge ropes courses. The planning, designing, and building process for these adventure program facilities is similar to that of other athletic facilities. Common design and construction planning steps include creating a schematic design, developing this design, establishing construction drawings, and contracting with a contractor to build the facilities. Throughout this process many design, construction, and equipment decisions need to be made. Having a comprehensive vision for both the program and the support facilities will guide many of these facility and equipment decisions. Climbing walls and challenge ropes courses are specialized facilities that must be built to industry standards, and building them usually requires the assistance of experienced adventure program facility builders or consultants.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- discuss the four design and construction planning steps used to develop adventure facilities;
- identify and compare the three categories of adventure programs;
- evaluate selection characteristics for a variety of climbing wall and challenge ropes courses components such as support poles, ropes, helmets and climbing hardware, handholds, harnesses, and flooring; and
- apply sound safety risk management and administrative practices to building and operating adventure facilities.

KEY TERMS

The following key terms will be found in this chapter: climbing wall, handhold, high challenge ropes course, low challenge ropes course, ropes course.

CASE STUDY

Situation: You have been appointed to Athletic Facility Review Committee at your college. One of the initial findings was that the popularity of handball and racquetball has declined significantly. A utilization study of the racquetball courts recommended that two of the racquetball courts be converted to another use. The Outdoor Adventure Program at the school is very popular, but lacks indoor facilities to use during inclement weather. You have been put in charge of converting the two excess racquetball courts into an indoor climbing wall.

Problem: Outline the steps you will take to develop the climbing facility.

SELF-ASSESSMENT EXERCISES

1. Why build a climbing wall?
2. What decisions need to be made regarding the design development phase for a climbing wall?
3. Describe the safety and security issues surrounding a climbing wall.

4. What are the different types of climbing walls?
5. Describe the various climbing wall features and equipment.
6. Who has established the climbing wall standards? Describe each of the current standards
7. Why build a ropes course?
8. What are the key design and development considerations for a high or low ropes course?
9. What are the common learning objectives of challenge ropes courses?
10. What are the elements of a low challenge ropes course?
11. What are the elements of a high challenge ropes course?
12. Describe the ropes course equipment

INTERNET EXERCISES

Complete the following using a different website for each exercise:

Name and briefly describe one low rope element and one high rope element.
Web reference: _____
Low Rope Element _____, Description:
Low Rope Element _____, Description:

What are zip lines and how are they used in a ropes course?
Web reference: _____
Zip Lines are:

Identify and briefly describe three pieces of equipment needed to support an indoor climbing program.
Web reference: _____,
A. Item _____, Description
B. Item _____, Description
C. Item _____, Description

Name the two subgroups of ORCA that are involved in establishing and promoting indoor climbing wall standards.
Web reference: _____
A. CWIG: _____
B. CGA: _____

Chapter 19
Skateparks, Roller Skating Rinks, and Winter Sports Areas

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Skateparks

In the new millennium, there continues to be a skateboarding renaissance. Facility development, equipment quality, skateboarders' techniques and abilities, and participant attitudes and maturity levels have all reached new peaks. High-performance facilities and equipment for every style of skating are available. The abilities of professional skaters visibly advance each month seeing athletes (yes, I said athletes) literally reaching new heights. Skaters have become less clique oriented and more open minded. All disciplines of skating are now respected.

These changes have made skating more accessible to people of varying ages. Presently, there are over 10 million skaters in the United States making it the sixth largest sport (National Inline Hockey Association [NIHA], 2000). Skateboarding has become the third most popular sport among 6- to 18-year-olds. (International Association of Skateboard Companies [IASC], 2001) Furthermore, 1 in 10 U.S. teenagers owns a skateboard (IASC, 2001). The popularity that skateboarding now enjoys is also reflected in the media. Skateboarding is regularly featured on major television networks such as Fox, MTV, TSN, OLN, ESPN's notorious Extreme-Games (X-Games), and NBC's Gravity Games, thus bringing it into today's spotlight. Finally, this coverage, along with skating's appearance in marketing campaigns for Nike, The

Gap, The National Fluid Milk Processor Promotion Board, Coca-Cola, and Nintendo, has seen skateboarding appear on billboards, in magazines, and on television. All this exposure has greatly expanded public acceptance of skaters and skating.

Roller Rinks

Roller skating is traveling on smooth surfaces with roller skates. It is a form of recreation, as well as a sport, and can also be a form of transportation. Skates generally come in three basic varieties: quad roller skates, inline skates or blades, and tri-skates, though some have experimented with a single-wheeled "quintessence skate" or other variations on the basic skate design. In America, this hobby was most popular in the 1970s and the 1990s.

The following is a short history (http://en.wikipedia.org/wiki/Roller_skating) of roller skating:

- 1743: First recorded use of roller skates, in a London stage performance. The inventor of this skate is lost to history.
- 1760: First recorded skate invention, by John Joseph Merlin, who demonstrated a primitive in-line skate with metal wheels.
- 1819: First patented roller skate design, in France by M. Petitbled. These early skates were similar to today's in-line skates, but they were not very maneuverable; it was difficult for the user of these skates to do anything but move in a straight line and perhaps make wide sweeping turns. For the rest of the 19th century, inventors continued to work on improving skate design.
- 1863: The four-wheeled turning roller skate, or quad skate, with four wheels set in two side-by-side pairs was first designed in New York City by James Leonard Plimpton in an attempt to improve upon previous designs. The skate contained a pivoting action using a rubber cushion that allowed the skater to skate a curve by leaning to one side. It was a huge success, so much so that the first public skating rink was opened in 1866 in Newport, Rhode Island, with the support of Plimpton. The design of the quad skate allowed easier turns and maneuverability, and the quad skate dominated the industry for more than a century.
- 1876: William Brown in Birmingham, England, patented a design for roller skates wheels. Brown's design embodied his effort to keep the two bearing surfaces of an axle, fixed and moving, apart. Brown worked

closely with Joseph Henry Hughes, who drew up the patent for a ball or roller bearing race for bicycle and carriage wheels in 1877. Hughes' patent included all the elements of an adjustable system. These two men are thus responsible for modern-day roller skate and skateboard wheels, as well as the ball bearing race inclusion in velocipedes, later to become motorbikes and automobiles. This was arguably the most important advance in the realistic use of roller skates as a pleasurable pastime.

- 1876: The toe stop was first patented. This provided skaters with the ability to stop promptly upon tipping the skate onto the toe. Toe stops are still used today on most quad skates and on some in-line skates.
- 1877: The Royal Skating indoor skating ring building is erected in rue Veydt, Brussels.
- 1880s: Roller skates were being mass produced in America from then. This was the sport's first of several boom periods. Micajah C. Henley of Richmond, Indiana, produced thousands of skates every week during peak sales. Henley skates were the first skate with adjustable tension via a screw, the ancestor of the kingbolt mechanism on modern quad skates.
- 1884: Levant M. Richardson received a patent for the use of steel ball bearings in skate wheels to reduce friction, allowing skaters to increase speed with minimum effort.
- 1898: Richardson started the Richardson Ball Bearing and Skate Company, which provided skates to most professional skate racers of the time, including Harley Davidson (no relation to the Harley-Davidson® motorcycle brand). A 24-hr roller skating endurance competition was held in Paris in 1911.
- The design of the quad skate has remained essentially unchanged since then and remained the dominant roller skate design until nearly the end of the 20th century. The quad skate has begun to make a comeback recently due to the popularity of roller derby and jam skating.
- 1979: Scott Olson and Brennan Olson of Minneapolis, Minnesota, came across a pair of in-line skates created in the 1960s by the Chicago Roller Skate Company and, seeing the potential for off-ice hockey training, set about redesigning the skates using modern materials and attaching ice hockey boots. A few years later Scott Olson began heavily promoting the skates and launched the company Rollerblade, Inc. (History section)

During the late 1980s and early 1990s, the Rollerblade®-branded skates became so successful that they inspired many other companies to create similar in-line skates, and the in-line design became more popular than the traditional quads. The Rollerblade® skates became synonymous in the minds of many with "in-line skates" and skating, so much so that many people came to call any form of skating "rollerblading," thus becoming a genericized trademark.

For much of the 1980s and into the 1990s, in-line skate models typically sold for general public use employed a hard plastic boot similar to ski boots. In or about 1995, "soft boot" designs were introduced to the market, primarily by the sporting goods firm K2 Inc., and were promoted for use as fitness skates. Other companies quickly followed, and by the early 2000s, the development of hard-shell skates and skeletons became primarily limited to the aggressive in-line skating discipline and other specialized designs.

The single-wheel "quintessence skate" was made in 1988 by Miyshael F. Gailson of Caples Lake Resort, California, for the purpose of cross-country ski skating and telemark skiing training. Other skate designs have been experimented with over the years, including two-wheeled (heel and toe) in-line skate frames, but the vast majority of skates on the market today are either quad or standard in-line design.

WINTER SPORTS AREAS

Winter sports areas included in this chapter consist of ice hockey, ice-skating, sledding, skiing, and snowboarding.

LEARNING OBJECTIVES

After reading this chapter, the student should be able to

- develop a plan for a safe skateboard park,
- plan for a roller skating rink facility, and
- design a safe winter sports area.

KEY TERMS

The following key terms will be found in this chapter: concrete skatepark, wood ramp, air, barge, backside, freestyle skating, frontside, flatland, grind, ollie, rail, revert, slam, street skating, tweak, vertical skating, artistic skating, speed skating, group skating, roller hockey, roller derby, downhill skiing, cross-country skiing, coasting, tobogganing.

CASE STUDY

A. Situation: The local Boys Club, of which you serve on the Board of Directors, wants to construct a skatepark. The funding will be combination of local governmental bonds and private individual and corporate donations. You have been selected as the chairperson for the skatepark building committee.

Problem: What guidelines will you provide the architect for the design development phase of the protect?

B. Situation: The City of Illianna, of which you have been employed as the new Director of Parks, wants to construct an indoor and outdoor roller skating rink adjacent to the newly constructed skatepark. The city needs to seek funding for this project, as well as design specifications.

Problem: As the new Director of Parks for the City of Illianna you need to provide two major plans for approval by the Park Board and City Council. These plans include one to secure the necessary funding for the project and another to assist the architect in designing the two facilities.

SELF-ASSESSMENT EXERCISES

1. Describe the evolution of skateboarding in America.
2. Why is skateboarding so popular?
3. Is skateboarding a safe activity? Explain
4. What services would you expect from a consultant?
5. What services would you expect from a designer?
6. What is important to understand regarding the construction of wooden ramps?
7. What are the advantages of concrete parks over wooden?
8. Define the following terms: air, barge, backside, freestyle skating, frontside, flatland, grind, ollie, rail, revert, slam, street skating, tweak, and vertical skating.
9. What are the five common types of roller skating?
10. Describe the key components of a roller rink.
11. What is the main feature of planning a floor for a roller rink?
12. How would you design a safe sledding area?
13. Describe the criteria for the selection of ski facilities for beginners' classes.
14. Describe the criteria for the selection of ski facilities for advanced classes.
15. Discuss the design components of an ice-skating rink?
16. Discuss the design components for an ice hockey rink.

INTERNET EXERCISES

Because skateboarding is a fast growing sporting activity, it is recommended that the students go to the following websites to ascertain what changes have occurred and the relationships that exist between skateboarders and these related associations.

National Inline Skate Series
310-823-1826
http://www.niss.com

United Skateboarding Association
732-823-2726
Competition/tour, amateur circuit
http://www.usa.com

Aggressive Skaters Association
310-823-1865
http://www.asa.com

National Amateur Sports Association
760-632-0275
http://www.nasa.com

National Hockey League In-line Series
212-789-2000
http://www.nhl.com

National Bike League
800-886-bmx1
http://www.nbl.com

National Private Sports Partnership
710-637-1542
FAX: 719-637-1543
http://www.npsp.com

United Skateboarders Federation
909-883-6176
http://www.usf.com

International Association of Skateboard Companies
805-683-5676
http://www.iasc.com

International Inline Skate Association
301-942-9770
http://www.iisa.com

Roller Skating International Association
317-347-2626
http://www.rollerskating.org

Chapter 20
Camps

Tonya L. Sawyer, Indiana State University

CHAPTER OVERVIEW

Historically, the word camping signified simple living outdoors and engaging in activities related primarily to the outdoors. Today, the term has broadened tremendously and encompasses a wide spectrum of developments for families and children. Resident centers, day camps, group camps, family camps, and wilderness camps are the common designations used for the various types of camps.

Camps have been developed by public agencies at all levels of government and by many voluntary youth-serving organizations. The rapidly increasing participation of children and adults in camping necessitates careful consideration of desirable areas and facilities.

Although most organized camping takes place on agency-owned or private property, public land is becoming increasingly involved. Public land is one of the major resources for school outdoor educational programs, and many resident centers have been constructed on public property or by public funds.

Schools use the facilities during the school year, and park and recreation agencies use them during the summer. The purposes of outdoor education, whether sponsored by park and recreation departments or by schools, are similar in many respects, and cooperative planning is not only necessary to get the most from the community dollar but also imperative if suitable lands and sites are to be obtained. If adequate facilities are to be provided to meet the needs of both organized camping groups and schools, the facilities must be designed for year-round use.

LEARNING OBJECTIVES

After reading this chapter, the student should be able to

- prepare a program guide to be used by an architect to construct an entire camp or specific areas including residential cabins, kitchen and dining hall, gymnasium, arts and crafts building, maintenance areas, field areas, or a waterfront.

KEY TERMS

The following key terms will be found in this chapter: artificial waterfronts, campgrounds, day camp, docks, family camps, floats, group camps, natural waterfronts.

CASE STUDY

Situation: Camp Sleepy Haven has just hired you as the camp director for this new camp that will begin operations within the next 18 months. The owners have purchased over 400 acres surrounding a 30-acre lake with an earthen dam. The area has not been developed. A family who had four tree farms previously owned it. The lake was created by building an earthen dam across a 600-foot natural valley with a flowing stream. The lake is 20 feet deep at the deepest point. The area flooded was mostly grassy with very few trees.

Problem: Your job is to develop a program for an architect to design a camp for 150 young ladies and 150 young men from upper middle class families. The owners have indicated they would like to have the following facilities for the camp: administration building; laundry area; dining hall and kitchen; cabins for the campers; staff quarters; indoor sports facility; baseball and softball fields; soccer fields; waterfront for swimming, boating, canoeing, and sailing; arts and crafts area; shooting area; adventure area; indoor games area; entertainment area (e.g., music, TV, and movies); maintenance area; and other areas from your imagination. The document you prepare will be detailed, including all equipment and supplies needed for each area developed.

SELF-ASSESSMENT EXERCISES

1. What is a day camp?
2. What is a group camp?
3. What is a campground?
4. What is a family camp?
5. What is a specialty camp?
6. Identify and describe the various facilities found in a camp.
7. How can a waterfront be programmed?
8. What are the criteria for natural waterfronts?
9. Describe issues related to water condition characteristics.
10. Discuss bottom characteristics.
11. What impact do climate conditions have on the development of a camp?
12. Why is it important to consider environmental conditions?
13. Identify and discuss the key components of waterfronts.

INTERNET EXERCISES

Using the resources below determine what the guidelines are for establishing the various types of camps.

American Camping Association
www.acacamps.org

Canadian Camping Association
www.allcampgrounds.org

Campground Association
www.allcampgrounds.com

Diabetes Camping Association
www.diabetescamps.org

Chapter 21
Track and Field and Cross-Country Facilities

Lawrence W. Judge, Ball State University

CHAPTER OVERVIEW

A track and field competition complex is complicated at best when compared to other outdoor or indoor sports spaces, such as an indoor basketball or volleyball court or a baseball, football, or soccer field.

LEARNING OBJECTIVES

After reading this chapter, the student should be able to

- select an appropriate site, and
- design proper track and field and cross-country facilities.

KEY TERMS

The following key terms will be found in this chapter: discus area, hammer area, high jump, hurdles, javelin area, pole vault, running track, runways, shot put areas, starting blocks, starting system, steeplechase, throwing circles.

CASE STUDY

Situation: You have been hired as the new track and field and cross-country coach for Advanta University, a medium-sized private liberal arts college in the Midwest. The university uses a local high school facility to practice and compete. The director of athletics has informed you that the 5-year capital campaign that the university just completed included funds for a new track and field facility, as well as a cross-country course.

Problem: You have been appointed the chair of the university's design committee for these two new facilities. Describe the steps that you will take in planning these facilities, and outline what you will request to be part of the facilities.

SELF-ASSESSMENT EXERCISES

1. What are the three basic designs for tracks?
2. What is a runway?
3. Describe how a track should be marked
4. How should the water jump be constructed?
5. Describe the jumping areas.
6. Describe the throwing areas.
7. What are the common types of surfaces used for outdoor tracks? indoor tracks?
8. What is important to remember regarding the construction of the discus and hammer cages?
9. Describe the components of finish line towers and press boxes.
10. What are the basic pieces of equipment found at track and field facilities?
11. What is important to remember about a cross-country course layout?

INTERNET EXERCISE

Go to the Internet and develop a list of track and field equipment suppliers and track contractors.

Chapter 22
Designing Facilities for K–12 Health, Physical Education, and Driver Education

Thomas H. Sawyer, Emeritus Professor, Indiana State University

CHAPTER OVERVIEW

In a public school building, the unit of primary importance is the room or space where teaching occurs. All other parts of the school plant are, in a real sense, secondary. In physical education, therefore, determining the number and character of the teaching stations is basic to the planning process. Furthermore, it is important to locate these facilities in a separate wing for a number of reasons, including noise, evening and weekend use, and non-school-sponsored uses.

The term teaching station identifies any room or space where one teacher can instruct or supervise the learning experience of a class or group of students. For instance, a gymnasium is a teaching station and, if divided, could provide two or more teaching stations. Swimming pools, auxiliary physical education teaching stations, and dance rooms are also examples of teaching stations. The number of students accommodated by a teaching station is controlled by the nature of the specific activity, the size of the facility, whether the facility is indoors or outdoors, and accessibility concerns.

The number of teaching stations required is dictated by enrollment, policies pertaining to instructional physical education, average class size, diversity of program, number of periods in the school day, and other facility uses.

Folding partitions and combinations of vinyl and mesh curtains can be effectively used for flexibility and to increase the number of teaching stations.

Planners should be aware that indoor facilities for physical education, athletics, and recreation are difficult and costly to expand at some future date. School planners should know the peak enrollment potential for each space. The anticipated enrollment 5 to 10 years after completion of construction should serve as a basis for determining the required number of original teaching stations. Long-range planning is imperative to provide for the logical and most economical expansion. The initial design should make provisions for the anticipated construction.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- consult on the design of either an elementary or secondary physical education facilities,
- develop a program guide for architects to use to design the facilities, and
- implement equipment and facility standards to ensure a safe environment for students.

KEY TERMS

The following key terms will be found in this chapter: cargo nets, climbing walls, driver education, health instruction, health services, health suite, ropes, simulator laboratory, teaching stations.

CASE STUDY

Situation: As director of health and physical education for the Addison School District, you are involved in the planning for a new $50 million high school. Your subcommittee is composed of driver education teachers, health education teachers, physical education teachers, athletic director, and coaches. The task of the subcommittee is to design the indoor and outdoor activity spaces, offices, locker rooms, the entrance/lobby area for the athletic complex, athletic training spaces, and classroom spaces.

Problems: What activity spaces will be included? How will the office spaces be designed? How will the competitive areas be designed? How many locker rooms will there be? What ancillary areas will be necessary for the athletic areas? What must be considered for the health classrooms and the health suite? What needs to be done for driver education spaces indoor and out?

SELF-ASSESSMENT EXERCISES

1. What type of floor surfaces will be applied to the following areas: gymnasium, multipurpose area, strength and cardiovascular areas, classrooms, locker rooms, storage areas, entrance, and lobby area?
2. What type of wall surfaces will be used in the above spaces?
3. What type of ceiling surface will be used in the above areas?
4. What are the security issues that need to be considered?
5. What are the competitive/spectator issues that need to be considered?
6. What are the sound and acoustical issues for these spaces?
7. What must be considered regarding climate control?
8. What must be considered regarding storage areas?
9. What do the planners need to consider relative to office spaces and classrooms?
10. What are the differences in planning between an elementary school and a secondary school?
11. What are the programming considerations for a playroom?
12. What must be considered in the development of an adapted physical education space?
13. What formulas are used in determining teaching station size?
14. What would be found in a freestanding gymnastics area?
15. What needs to be considered regarding a strength and cardiovascular area?
16. What must the planners include in a health classroom and health suite?
17. What are the health services that need to be included in a secondary school for students?
18. What should be included in the driver education areas?

INTERNET EXERCISES

Go to the NASPE website to determine what additional information is available regarding physical education facilities.

Go to the AHEA website to determine what additional information is available for health facilities.

Go to the NFHS website to determine what additional information is available for sports facilities.

Chapter 23
Developing Combative Areas for Boxing and Martial Arts

Jason Winkle, Monroe County YMCA

CHAPTER OVERVIEW

Boxing

This section provides readers with information that will allow them to use existing space in the physical education area to design a multipurpose boxing facility that meets existing standards for safety and use of proper equipment for boxing.

Martial Arts

The term martial arts comprises a wide range of fighting systems that are practiced for physical fitness, sports competition, and self-defense (Borkowski & Manzo, 1999). Lawler (1996) stated that traditionally martial arts are various Asian fighting systems that teach combat-specific techniques. Most of the modern martial arts have roots that go back to the ancient martial arts of Asia. It is commonly believed that some martial arts started before 2000 BC (Winkle & Ozmun, 2001). Different philosophies, interpretations, and interests of instructors and students have produced the wide range of martial arts practiced today.

Building or renovating a martial arts facility requires extensive planning. This chapter will provide information to assist martial arts facility developers with design and construction decisions. Planners and developers of martial arts facilities must understand at least the general nature of martial arts if they are to make informed decisions. The major classifications of martial arts are summarized in this chapter to provide this knowledge base.

LEARNING OBJECTIVES

After reading this chapter, the student should be able to

- apply general facility planning principles to planning martial arts facilities,
- identify the two general types of martial arts facilities,
- identify the major martial arts styles and determine which of the facility types is most
- appropriate for each style, and
- list the equipment and key design features for each of the martial arts facilities.

KEY TERMS

The following key terms can be found in this chapter:

- Armor (kendo): jacket and pants (hakama) covered by a breastplate (do), heavily padded headgear with steel grill face mask (men), padded fencing glove (kote), and padded waistband (tare), which provide protection while training with weapons.
- Bag (heavy training): durable bag used to practice kicking and punching skills (numerous styles)
- Speed Bag (double-ended striking): a padded ball or bag suspended between two bungee cords, used to practice fast punching or kicking
- Blockers: padded bat or wand used to block kicks, sweeps, and punches
- Bo: staff used as an offensive and defensive weapon
- Boots (padded): padded boot that provides foot protection while sparring
- Breaking Boards (rebreakable): boards used for striking practice, can be rejoined and used multiple times (natural three quarter-inch white pine boards are also used)
- Escrima stick: staff or baton used to practice stick skills

- Focus target: handheld padded target used to practice striking skills
- Hand pads (padded gloves): padded gloves that provide hand protection while striking and sparring
- Headgear: heavily padded head protection (numerous styles)
- Mats: shock-absorbing floor and wall covering
- Mouthpiece: shock-absorbing guard for the teeth
- Nunchaku: two sticks connected by a rope or chain used as a weapon
- Pads: shock-absorbing coverings for forearms, hands, elbows, shins, ribs, and insteps of the feet
- Shield: relatively large handheld padded target used training striking techniques
- Swords: any one of a variety of long-bladed weapons
- Uniforms: traditional martial arts uniforms consist of numerous variations of the judogi (a durable, generously cut pant and jacket with a heavy waist belt)

CASE STUDY

A. Situation: The Twinkle Toes Dance Emporium has decided to increase its membership by adding a martial arts program. You have been involved with martial arts for a number of years.

Problem: The owner of the dance emporium has contacted you to develop a plan for the martial arts addition. What activities will be provided in the martial arts program? What are the issues that need to be considered when developing a plan for a martial arts facility? What will be the components of the martial arts facility?

B. Situation: The United States Military Academy has an extensive combative program that includes a Judo Club and a Martial Arts Club. The combative rooms used to support these programs have been demolished due to a building renovation project. Fortunately, two large unobstructed rooms in an old child care center have been made available.

Problem: As both the martial arts (tae kwon do) team coach and the judo team coach, you have been asked to help remodel these rooms to accommodate the team practices and competitions. What features would you recommend? As a minimum, what would be your recommendation for flooring, wall coverings, lighting, installed equipment, and storage for the judo facility and the tae kwon do facility.

SELF-ASSESSMENT EXERCISES

1. Identify at least five groups of individuals that should be included in a martial arts facility "needs analysis."
2. Briefly describe each of the seven martial arts and indicate which should be practiced in a "grappling facility" and which should be practiced in a "striking facility."
3. Compare and contrast the recommended flooring used in grappling martial arts facilities and striking martial arts facilities.
4. List and briefly discuss five martial arts facility design features other than flooring and matting.

INTERNET EXERCISE

Using at least four different Web sources, compare and contrast the nature of two martial arts discussed in this chapter, the facility that is required to practice each style, and the equipment needed to conduct a teaching program

Martial Art #1 - _____ Martial Art #2 - _____
Web address - _____Web Address - _____
Web address - _____Web Address - _____
Web address - _____Web Address - _____

Chapter 24
Equestrian Spaces

Debra Powell, St. Mary-of-the-Woods College

CHAPTER OVERVIEW

Many variables are involved in the planning of equestrian facilities. These variables include purpose, budget, image, climate, available material and labor, personal preferences, and future plans, to name a few. These variables make good planning critical to the overall success of the project.

Equestrian facilities incorporate several different components, including

- barns,
- work areas,
- turnout areas, and
- arenas.

Each component serves a specific function in the overall operation of the equestrian program.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- discuss the key components for a stable area,
- describe various types of materials used for construction of a stable,
- identify various safety features to be incorporated in a stable, and
- compare and contrast the different facility needs for the equestrian events.

KEY TERMS

The following are common terms and phrases used by equestrians: stalls, feed room, hay storage, straw storage/alternative, bedding, feed storage, wash and cleaning room (drying facilities), tack room, utility stall, manure disposal, brushes, curry combs (rubber and metal), electric clippers, scissors, shedding blades, soft cloths, sponges, sweat scrapers, bell boots, lead ropes, leg wraps, longe lines, ropes, saddles, tail wraps, awls, latigo leather, neatsfoot oil, nylon string, rivets, saddle leather, saddle soap, sheepskin, and waxed linen string.

CASE STUDY

Situation: You have been hired by Southern Seminary Junior College for Women to lead the new equestrian program for the college. During your first year, you will develop the 2-year curriculum, a marketing plan for the new program, and a program guide for the architects to construct the new equestrian facilities for the program.

Problem: Using what you have learned from this chapter, prepare the program guide for the Southern Seminary Junior College's George and Marilyn Legends Equestrian Center.

SELF-ASSESSMENT EXERCISES

1. List and discuss the components of an equestrian facility.
2. Describe the site considerations for an equestrian barn.
3. List and discuss the basic components for a typical equestrian barn facility.
4. Discuss the various types of flooring for an equestrian barn.
5. What is important about stall construction?

6. What are the common types of flooring found in stalls?
7. Discuss the issues related to feed rooms, hay storage, bedding storage, and tack rooms.
8. Describe the issues related to manure disposal.
9. What are the key components for turnout areas?
10. List and describe the competitive areas.
11. Discuss the types of fencing that should be used in an equestrian area.

INTERNET EXERCISES

Go to http://en.wikipedia.org/wiki/Equestrianism and learn about equestrianism and the history of equestrianism.

Go to US Equestrian Federation, Inc. @ www.usef.org and learn about equestrians in the Olympic Games.

WEBSITES

USA Equestrian
www.equestrian.org

Equestrian Facility Development
www.BarnPros.com
www.equestrianfacilities.com
www.parks.ca.gov/default.asp?page_id=24063

Chapter 25
Athletic Training Facilities

Andrew R. Gallucci, Baylor Univerfsity
Jeffrey C. Petersen, Baylor University

CHAPTER OVERVIEW

Athletic training facilities are a highly specific ancillary space that provides a location for sport medicine services to athletes. Athletic training (AT) facilities are typically designed as a component within a larger athletic complex; however, the unique design components and issues associated with these facilities should be carefully considered with the input of athletic training staff during the design and development process. Common component of the athletic training facilities including taping and preparation, treatment and rehabilitation, hydrotherapy, offices, exam rooms, rest rooms and storage areas all must be designed for optimal operation and in consideration of the equipment and supplies required.

LEARNING OBJECTIVES

Through the study of this chapter the student will:

- identify and apply the 10 design considerations for athletic training facility components,
- define and describe the seven primary facility components of an athletic training facility,
- discuss the facility space allocations research and recommendation for athletic training facilities,
- identify the equipment required for effective operation of an athletic training facility, and
- differentiate between game day and satellite athletic training facilities.

KEY TERMS

The following key terms will be found in this chapter: American Academy of Orthopaedic Surgeons, Commission on Accreditation of Allied Health Education Programs, hydrotherapy Room, National Athletic Trainers' Association, rehabilitation room, taping, wrapping, and weighing room, ultrasound, whirlpool.

CASE STUDIES

1. Assume that you are a member of the planning committee for a new comprehensive high school including all aspects of the athletic and physical education facilities. Determine where within the complex you would locate the athletic training facility and explain your rationale. Further determine the total amount of space to include for this facility including recommendations for the components spaces: Team Preparation and Prevention, Treatment and Rehabilitation Area, Hydrotherapy/Wet Areas, Private Examination Room(s), Office Areas, Restroom/Changing Room, and Storage Areas.
2. Consider the scenario where a new stadium is being constructed for your football program (you determine the level at high school, college, or professional). It is determined that a game day athletic training facility should be included within the facility. Make a listing of AT facility components that should be included in this game day facility along with a recommendation of where this AT facility should be located in relation to the locker rooms, playing field and other stadium elements.
3. Assume that you are serving as the director of athletics and will be consulting with your head athletic trainer regarding the equipment and supplies needed within a renovated athletic training facility at your NCAA Division I university that does not play football. Identify the key pieces of equipment that you would include within the facility and your rationale behind your decision. You might refer to Table 25.2 from the textbook for additional information.

SELF-ASSESSMENT EXERCISES

1. What organization helped to lead to the professionalization of the field of athletic training?
2. What are the 10 design considerations when planning the various spaces of the athletic training facility?
3. What is one of the primary activities of athletic trainers in the team preparation area?
4. What are at least three whirlpool options within a wet treatment area?
5. What are the similarities between a game day and satellite athletic training facility?
6. What are the differences between a game day and satellite athletic training facility?
7. How does the storage of medical records in athletic training differ from other athletic training equipment and supplies?
8. What are some of the equipment differences for athletic training facilities at the NCAA Division I level between FBS schools, FCS schools, and non-football schools?
9. How have athletic training facility space recommendations or guidelines changed over time?

INTERNET EXERCISES

Access the World Wide Web and search for vendors of various types of equipment to be used in a training room. Review the specifications for each piece of equipment and then determine which, if any, you would want to include in a 1,000-square-foot facility.

Access the website for the NATA. What guidelines are found on the website regarding the planning of an athletic training room?

INTERNET LINKS

AlterG - https://www.alterg.com/anti-gravity-treadmills

Athletic Training Room Equipment - https://www.teamedgeathletics.com/

https://www.medco-athletics.com/products-medco/athletic-training-room-furniture-and-supplies/taping-treatment-tables

http://www.proteamtables.com/

Athletic Training Modalities - https://www.prohealthcareproducts.com/blog/the-modalities-of-sports-therapy/

https://www.dynatronics.com/blog/physical-therapy-modalities-explained

https://www.verywellhealth.com/physical-therapy-treatments-and-modalities-2696683

HydroWorx - https://www.hydroworx.com/

National Athletic Trainers' Association - https://www.nata.org/

Chapter 26
Shooting Facilities: Archery, Rifle, and Pistol

Jason Winkle, Monroe County YMCA

CHAPTER OVERVIEW

The evolution of modern shooting sports can be traced back to early man's development of bows, arrows, and spears for protection and to gather food. Around 3500 BC, the Egyptians used archery as a weapon of war (USA Archery, 2008). Much of the early development of archery was based on designing archery equipment for a military application. Bows and arrows were used not only as weapons but also for leisure activities and contests. Homer, in the Iliad, referenced archery contests in which archers shot at tethered doves. During the 14th century in England, archery practice was mandatory for all able-bodied men (Van Dalen & Bennett, 1971). The advent of gunpowder led to the decline of archery as a tool of war and to the increased development of firearm activities. Organized firearms shooting began in Europe when the first shooting clubs were formed. Public shooting matches were first seen in Europe around the 16th century and in America in the early 1700s.

The rules for shooting sports began to standardize when the National Rifle Association (NRA) was founded in the United States in 1871 and the National Archery Association (NAA) was formed in 1879. Numerous disciplines have developed for rifle, pistol, and archery sports; therefore, the facilities, equipment, and procedures used for shooting activities and competitions vary greatly. This chapter will focus on facilities, equipment, and operational procedures required when developing and operating competitive indoor rifle and pistol facilities and both indoor and outdoor archery facilities. The equipment, facility design, and risk management issues associated with these competitive shooting facilities can be applied or adapted to other shooting activities and facilities.

LEARNING OBJECTIVES

After studying this chapter, the students will be able to

- apply general facility planning and development concepts to building or renovating a rifle, pistol, or archery shooting facility;
- identify the key design features for competitive target archery, rifle, and pistol facilities;
- develop a standard equipment list to support each type of shooting facility;
- define terms associated with the design, operation, and management of shooting facilities;
- develop sound risk management policies and procedures for shooting facilities;
- access information from professional organizations that establish standards for shooting facilities, and apply this information to design, develop or operate a shooting facility; and
- adapt structured competitive shooting rules and procedures for instructional, recreational, and other less formal settings.

KEY TERMS

The following key terms will be found in this chapter: armguard, baffle, ballistic, security, caliber, clicker, end, finger tab, fletching, FITA, FITA Round, group, guide wire system, inner ring, limb, muzzle velocity, nock, Olympic Round, quiver, Range Master, release aid, riser, sight, stabilizer, shooting stall steel track system.

CASE STUDY

Situation: All-American High School added archery to the physical education curriculum. The program has gained in popularity, and the students, teachers, and administrators have decided to expand the archery program.

Problem: You are asked to take the lead in developing an outdoor competitive archery range and set up an indoor practice facility. The school has numerous athletic fields, a large level open field, an indoor gymnasium, and an old bus garage available as possible archery ranges.

SELF-ASSESSMENT EXERCISES

1. What are the recognized national and international sanctioning agencies for archery and for shooting?
2. What are the two types of bows used in competitive target shooting?
3. What are target butts, and what materials are used to make them?
4. Identify at least eight risk management considerations for shooting facilities.
5. What are the most common types of bullet traps used in shooting facilities?
6. Name the two most common target retrieval systems used in shooting facilities.
7. Identify three ballistic security measures used in shooting facilities.
8. What equipment items will be needed to conduct an archery program?

INTERNET EXERCISES

Find the homepage for the national and international sanctioning agencies for both archery and shooting competitions. Briefly describe the information they provide.

Find three sites that sell bows and three that sell air rifles. Select one bow from each site and one rifle form each site and compare the features. Which would you buy for a high school archery program or shooting program?

Chapter 27
Dance Spaces

Thomas H. Sawyer, Emeritus Professor, Indiana State University

CHAPTER OVERVIEW

Dance in education is not a new idea. At all education levels it has existed by virtue of dedicated individuals. In the elementary schools, dance activities under a number of aliases—eurhythmics, rhythms, play party games, singing games, and folk dance—have been offered. Coming into the elementary school curriculum as an offshoot of the playground movement, the dance materials presented were usually happenstance (with a few exceptions in experimental schools). A classroom teacher may have been interested in folk dance or been faced with the necessity to prepare a May Day, a pageant, or a festival.

Within the past few years, many privately administered elementary schools and some public schools have made provisions for dance in the curriculum. By and large, existing physical education facilities are used.

Since the turn of the century, folk dance (usually European in origin) has been offered in physical education classes for girls in secondary schools. When folk dance lessons were first introduced, they were often limited in content and skill, and were, as in the elementary school, an outcome of the playground movement. Toward the end of the 19th century, a few secondary schools in large cities had gymnasiums that were primarily equipped for gymnastics and other sports using limited-size courts. The use of these areas for dance was spasmodic and usually occurred in preparation for special events.

In the 1920s, dance in education was materially advanced when Margaret H'Doubler initiated the first dance major at the University of Wisconsin. During this period, clog and tap dance assumed a leading role in dance education, and Henry Ford promoted a return to the formal square dances of an earlier day, such as the Lancers (NDA, 2010).

By the 1930s, the country was sufficiently removed from its pioneer beginnings to acknowledge the joy and value of square dancing. The teaching of social dance was heavily emphasized as a means of implementing the social values of physical education. Modern dance—stemming from natural dance and from the influences of Martha Graham, Doris Humphrey, Charles Weidman, and others—began a slow but steady growth in curricular offerings. In 1931, great impetus was given to dance in education with the establishment of the National Section on Dance within the American Association for Health, Physical Education, and Recreation (NDA, 2010).

The advancement of physical education programs was not without trauma for teachers and administrators. Until World War I, with its emphasis upon fitness and recognition of the recreational needs of service personnel, it was difficult to finance facilities and staff for physical education. Immediately after the war, mobility and better communications enhanced the athletic program and, as the result of athletic needs, more gymnasiums and stadiums were built. The need for a gymnasium in secondary schools was thereby placed on a firm basis. The depression of the late 1920s and early 1930s, however, curbed these programs and the extensive expansion of facilities. World War II not only emphasized fitness and the recreational needs of service personnel but added a new dimension-recreational needs of war workers in factories, shipyards, and munition plants. The Cold War and the possibility of increased leisure time have reiterated the needs for enriched curricula and additional facilities.

Until recently, studios for dance at the secondary school level had dropped in priority behind athletic and aquatic facilities. At the beginning of the 20th century, dance was often better off than were sports in the low-ceilinged basement rooms and narrow hallways. As gymnasiums were built primarily for basketball programs, dance was relegated to a low priority in the use of these facilities both for class and after-school clubs. Moreover, the finish or seal on gymnasium floors made certain dance activities uncomfortable and precluded others. Within the past 10 to 15 years, there has been a growing consciousness of the needs of girls in secondary schools. As dance has proved its worth as a physiologically demanding and aesthetically rewarding activity, consideration is being given to the employment of specialized teachers and the provision of specialized areas for teaching dance at the secondary level.

Gradually, clog and tap dance, natural dance, and later ballroom and square dance as well as modern dance have appeared in the secondary school curriculum. Of significance is the increasing interest of boys in the various forms of dance, especially modern jazz. Frequently, dance programs at the secondary school level are the result of grants from the National Endowment for the Arts (NDA, 2009).

As was true in elementary and secondary schools, facilities for dance education at the college level have developed slowly. The gymnasium dominated the scene, with dance scheduled "catch-as-catch-can" during available hours. As emphasis upon dance in teacher preparation increased and as colleges and universities became more involved in all phases of the arts, auxiliary rooms were planned for dance and related activities.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- discuss the basic dance facility assumptions;
- describe the criteria for determining facility needs;
- list and describe the construction components of modern dance and ballet areas;
- discuss in detail the construction components of folk and social dance areas;
- describe the ancillary areas needed for dance spaces;
- discuss the specific dance facility needs of elementary, middle, and high schools and colleges and universities; and
- plan performance areas for dance activities.

KEY TERMS

The following key terms will be found in this chapter: ballet, ballet barres, ballroom/social dance, box office, choreography, costume space, custodial area, folk dance, makeup space, modern dance, props, sets, scene and prop area, and square dance.

CASE STUDY

Situation: St. Tonya of the Briar College has employed you as the first dance specialist for the college composed of 1,750 young women. The college's Board of Trustees has approved a new dance curriculum to be linked to the theater curriculum. The Board has also agreed to support the construction of a new Arts building housing theater and dance. As the new dance specialist, you are charged with developing the dance curriculum leading to a BFA in dance.

Problem: Presently the college does not have a dance facility or a dance curriculum. Your task will be to develop the dance curriculum and prepare a facility planning document for the new dance curriculum. The facility will need to provide practice areas and a performance space.

SELF-ASSESSMENT EXERCISES

1. What are the five basic forms of dance?
2. List and discuss the basic dance facility components.
3. Describe the criteria for determining facility needs.
4. Discuss the planning for modern dance and ballet areas.
5. Describe the planning for folk, social, and square dance areas.
6. List and describe the ancillary areas needed for a dance facility.
7. How should dance spaces be adapted for elementary, middle, and high schools?
8. What would be the components of a university dance facility?

INTERNET EXERCISE

Go to the Internet and search for dance facility designs.

Chapter 28
Design Trends in Stadiums and Arenas

Todd L. Seidler, University of New Mexico
John J. Miller, University of Southern Mississippi

CHAPTER OVERVIEW

This chapter presents an overview and analysis of certain recent trends and innovations in stadium and arena design. It is by no means a complete look at these unique sports facilities.

In the process of building a new facility or completing major renovations of an existing facility for physical activity or sport, the planning process typically focuses on the building itself. At times the focus may shift to major building systems such as the electrical; heating, ventilating, and air-conditioning (HVAC); plumbing; or structural systems. Although these aspects of the building or renovation process are important, the needs of facility users must remain the greatest consideration. Although the facility itself needs to be a high priority in the building process, it is also crucial that the equipment and supplies required within the facility are carefully considered and selected. The equipment and supplies are just as vital as the building itself if the facility is to fully serve its intended purposes for the users.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- understand negligence and become familiar with the basic legal duties expected of facility managers;
- understand the role that good facility planning has in the design and construction of safe facilities;
- identify at least five methods of controlling access to facilities;
- describe the importance of and identify the minimal guidelines for safety or buffer zones;
- discuss the problem of traffic patterns within facilities and identify alternatives; and
- understand the need for selecting the proper materials for floors, walls, and ceilings.

KEY TERMS

The following key terms will be found in this chapter: air-supported structures, cable domes, fabric structures, retractable roof stadiums, temporary air structures, tension structures, wooden domes.

CASE STUDY

Situation: You are employed by a facility development firm that specializes in sports-related facilities. A minor league baseball team has been purchased by an organization in your community. This organization, which has been involved in many community-related activities, has requested your company to present the most up-to-date information regarding sports facilities. The organization wants the best material for the new facility, but they also want it to be as economically and ecologically feasible as possible. To be economically feasible, the state-of-the-art facility should allow them to hold several different events, sometimes within the same day, throughout the year. Additionally, they want a facility that will be environmentally sustainable.

The city in which the new team will be located is in the southwestern part of the United States and has several nationally recognized companies, as well as a number thriving, locally owned companies. The city has a population of 600,000 people, and the local airport provides international travel through several national airlines. Although interest in the new baseball team is great, other sports and cultural activities hold significant appeal by the population. Though the climate during the fall is generally mild, spring days are predisposed to rain and wind, summer days tend to be extremely hot and sunny, and winter may bring cold temperatures due to the relatively high elevation of the city.

Problem: The challenge you and your company face is fourfold:

- Identify the avenues that are available to you to help offset the cost of building the new stadium. Which one would you recommend and why?
- Identify and explain which six new sports facility trends discussed in the chapter you would present to the new owners.
- What type(s) of building materials will you recommend to the new owners? Explain why.
- Explain how these sports facility trends will be implemented to be economically and ecologically feasible.

SELF-ASSESSMENT EXERCISES

1. Identify the three main types of fabric structures.
2. About how much does it cost to add a retractable roof to the design of a new stadium?
3. List three design features of new arenas that are meant to enhance the changeover for events.
4. List three advantages of fabric structures over standard construction.
5. List three disadvantages of fabric structures compared with standard construction.
6. Why is it that we may not see more large air-supported structures built?
7. Why has the addition of luxury suites become so important in arena and stadium design?
8. What is the primary purpose of modern stadiums and arenas today?

INTERNET EXERCISE

Go to the Athletic Business, National Association for Sport and Physical Education, National Athletic Trainers' Association, American College of Sports Medicine, and Sport Business Journal websites to gather additional information regarding future trends in facility development.

Internet Links

Ballparks of Baseball – The Fields of Major League Baseball
http://www.ballparksofbaseball.com

Stadiums of the NFL: From the Past to the Future
http://www.stadiumsofnfl.com

Panstadia International
http://www.panstadia.com/frames-main.htm

Chapter 29
Trends in Equipment and Supplies

Jeffrey C. Petersen, Baylor University

CHAPTER OVERVIEW

The planning of the physical structure and spaces for physical activity and sport typically occupies the forefront of the planning process, but an equally important part of the planning process for the effective operation of a facility includes the equipment and supplies used within the physical structure itself. The equipment and supplies, also often referred to as the furniture, fixtures, and equipment or FF&E, form an instrumental element of the planning process, and the facility managers must consider the unique needs for equipment and supplies and the ongoing trends to best operate these facilities within the physical activity and sport environments. This chapter will provide an overview of a number of trends associated with equipment and supplies within the various settings including: spectator venues (stadiums, arenas and gymnasiums), fitness centers, sportsplexes, and esports venues.

LEARNING OBJECTIVES

Through the study of this chapter the student will:

- define and differentiate between equipment and supplies;
- identify and describe key equipment trends within spectator venues (stadiums, arenas and gymnasiums) including video boards, LED lighting, and magnetometers;
- identify and describe key equipment trends within fitness venues related to strength and cardio equipment;
- define the term AED and identify the legal and liability implications related to AED availability in spectator venues and fitness centers;
- describe the growth of Youth Sportsplex facilities and their implications for equipment and supplies;
- identify key examples of eSport uses of traditional sport venues as well as eSport-specific venues, and identify key equipment and supplies needed within eSport venues and events;
- describe why supply trends are more difficult to identify with sport and physical activity facility settings, and additionally describe how online search and bid processes impact supply procurement;
- differentiate between the terms equipment and supplies;
- analyze the balance between the user needs and the equipment costs;
- identify selected equipment trends for stadiums, arenas, and gymnasiums and the causes of those trends;
- identify selected equipment trends in fitness venues;
- define an Automated External Defibrillator (AED) and describe factors behind its growing placement in facilities;
- describe the impact of "extreme sports" on facilities and equipment;
- identify selected supply trends;
- describe storage options available for supplies and equipment; and
- estimate space needs for storage of equipment and supplies.

KEY TERMS

The following key terms will be found in this chapter: air-supported structures, cable domes, fabric structures, retractable roof stadiums, temporary air structures, tension structures, wooden domes.

CASE STUDIES

1. Consider the development of a new Youth Sportsplex in your community. Outline the size, scope, and potential location of the facility (indoor, outdoor or both) as well as the number of courts, fields, and support areas needed. Once the size and space parameters of this Sportsplex have been determined develop a comprehensive list of sports to be hosted along with the equipment and supplies that would be required for the operation of the facility. From that list, research online and report the costs of these equipment and supplies.
2. Assume that you are in charge of the fitness center or strength and conditioning center either within a college/university recreation center or within a for-profit gym. Identify your setting and create a master list of the types of number of cardio and strength equipment that would be provided within your facility. How does this listing relate to the trends identified in tables 28.3, 28.4 and 28.5? What type or types of strength equipment would you include in your facility (free weights, plate loaded or selectorized) and what is your rationale for these selections?
3. Assume that you are leading a committee to develop and operate an esports venue within your community or region. What would be the size and scope of the venue that you would propose (spectator capacity, player amenities, fan amenities, video production etc.). Where would you propose to locate this facility. Would you propose this venue to be esports exclusive or would you create a venue with use for both traditional sport as well as esports (explain your rationale)?
4. You are a new reporter for the *Sport Business Journal*. Your first assignment is to develop a story focusing on the future trends in equipment and supplies. In order to show the future trends, it will be important to review the past accomplishments.

Problem: Your article will include photographs of current and past equipment and supplies and graphics of new equipment.

5. Assume that you are an athletic administrator of a high school with a student body of 2,000 and your gymnasium is being renovated as a competition venue.

Problem: Determine the seating options and scoreboard options available for this renovation project through the use of trade magazines and/or the Internet.

6. After identifying the possibilities, identify your top preference in seating and scoreboards.

Describe the rationale behind your decision. To what extent would the factors of cost, ease of maintenance, spectator comfort, and spectator safety impact your decisions on these matters?

SELF-ASSESSMENT EXERCISES

1. How do the factors of price and life span or duration of use impact the differentiation between equipment and supplies?
2. Identify and describe how LED video boards are used in spectator venues in sport, and what factors have fostered the growth in size and number of video boards and displays used in sport venues.
3. What are the advantages of using LED lighting within sport venues?
4. Which of the Big 4 Sport Leagues in the U.S. (MLB, NBA, HHL, NFL) was the first to adopt magnetometer use?
5. What is the SAFETY Act, and how has it influenced spectator venues? What are the three classifications for companies and venues within the SAFETY Act?
6. How are plate-loaded and selectorized strength machines different in their structure, operation and price?

7. What types of fitness equipment are most popular and common within fitness centers, recreation centers, and gyms.
8. How are AEDs placed in sport and fitness centers and how does state and federal law impact their placement?
9. What is a sportsplex, and what types of specialized equipment might be needed within an indoor or outdoor sportsplex?
10. What type of equipment would be needed for either a temporary or permanent esport venue?
11. What is the difference between equipment and supplies?
12. When selecting equipment and supplies for fitness and sport, what factors should remain as primary considerations?
13. What are some of the trends for equipment in stadiums and arenas?
14. What are the advantages and disadvantages to each of the three types of LED video board manufacturing methods?
15. What is the difference between outsourcing and contracting, and how can these business practices impact the equipment needs for a sports organization?
16. What are several reasons why bleacher replacement could be justified in a gymnasium setting?
17. What are the technology and entertainment trends impacting fitness equipment?
18. List at least six popular cardio machines.
19. What are the three weight training forms or formats?
20. What "extreme sports" are now gaining more widespread acceptance as evidenced by new facility construction and by documented high numbers of participants?
21. Describe the two major equipment and supply storage space location options.
22. Identify the standard storage space that would be recommended for high schools, small colleges, and large colleges.

INTERNET EXERCISE

Complete a Web search of outsourcing, and identify at least four corporations specializing in facility maintenance or management. Narrow the search to the area of sports facility maintenance or management, and identify up to four corporations providing outsourcing in this more specific area. Compile a list of these websites in each category and compare these with others in your class to better grasp the scope of possible options in this area. Be prepared to identify and discuss the search engine(s) you used in your search.

INTERNET LINKS

AED - https://www.nhlbi.nih.gov/health-topics/defibrillators

Athletic Bid - http://www.athleticbid.com/

Daktronics - https://www.daktronics.com/en-us/markets/sports

Esports Venues - https://www.bdcnetwork.com/gamers-paradise-rise-esports-arenas https://populous.com/esportsvenue

Magnetometers - https://www.garrett.com/securitysite/security_division_en.aspx

https://www.ceia.net/security/ap_events.aspx

Mitsubishi - https://www.mitsubishielectric-displaysolutions.com/products/led-displays

NCS4 - https://www.ncs4.com/home

SAFETY Act - https://www.safetyact.gov/

Strength and Cardio Training Equipment - https://garagegymplanner.com/identifying-various-gym-equipment-with-images/

Chapter 30
History of the Council on Facilities and Equipment

Thomas H. Sawyer, Emeritus Professor, Indiana State University

CHAPTER OVERVIEW

The Council on Facilities and Equipment (CFE) focuses on concerns regarding facilities and equipment in relationship to physical activity and sport. The CFE works to develop policies, standards, guidelines, and innovations to ensure the safest and most effective means for quality health, physical education, recreation, dance, sport, and fitness facilities and equipment for the young through the aging populations.

LEARNING OBJECTIVES

After reading this chapter, the student will be able to

- describe the history of the Council on Facilities and Equipment;
- discuss the impact the Council has on the construction of health, physical activity, recreation, and sports facilities; and
- outline the development of the facilities planning and design and facility management books.

KEY TERMS

The following key terms will be found in this chapter: AAHPER, AAHPERD, General Division, ARAPC, ARAPCS, AAALF, AAPAR, CFE.

SELF-ASSESSMENT EXERCISE

1. Describe the early history of physical education facilities.
2. Discuss the history of the American Alliance.
3. Identify and describe the various transitions of the General Division to AAPAR.
4. Identify and discuss the 12 sections within AAPAR.
5. Describe the birth and history of the Guide for planning facilities.
6. Describe the benefits of belonging to AAHPERD.

INTERNET EXERCISE

Go to www.aahperd.org and review the various aspects of the Alliance and AAPAR.

Chapter 31
Equipment and Facility Design Standards

Thomas H. Sawyer, Emeritus Professor, Indiana State University

CHAPTER OVERVIEW

Standards are the basis by which fitness, physical activity, recreation, sports products, and facilities can be harmonized between companies, between sports associations, trade associations, and between countries. Standards that have been developed over the past 50 years have provided a uniform approach to producing devices and parts used in fitness, physical activity, recreation, and sports equipment and in the construction elements of a facility. Standards have also provided sports organizations with consistency among levels of a sport and variations of the game itself. This has perhaps been the weakest aspect of standardization, as various sports organizations have similarities and differences that become the competitive edge for control of that market.

A standard is something established for use as a rule or basis of comparison in measuring or judging capacity. A standard applies to some measure, principle, model, and so forth, with which things of the same class are compared in order to determine their quantity, value, or quality. A standard has a set of criteria used to test or measure the excellence, fitness, or correctness of something.

Standards for facilities and equipment are established by associations, societies, trades, or federal and state governments. The American Society for Testing and Materials (ASTM) is an example of a society that establishes standards. From the work of 132 technical standards- writing committees, ASTM (http://www.astm.org) publishes standard specifications, tests, practices, guides, and definitions for materials, products, systems, and services. ASTM also publishes books containing reports on state-of-the-art testing techniques and their possible applications. These standards and related information are used throughout the world.

LEARNING OBJECTIVES

After reading this chapter, students will be able to

- describe a standard,
- discuss the difference between a mandatory and voluntary standard,
- define a standard of practice,
- describe a standard of core,
- discuss the evolution of standards,
- define a guideline, and
- compare and contrast a guideline and a standard.

KEY TERMS

The following key terms will be found in this chapter: ANSI, ASTM, OSHA, IEH&S, IAPC, NFPA, CEN, ISO, IOS, NSPI, WWA, guidelines, standards.

SELF-ASSESSMENT EXERCISES

1. What is a standard?
2. What is a mandatory standard?
3. What is a voluntary standard?
4. Compare and contrast mandatory and voluntary standards.
5. What is a guideline?
6. Compare and contrast a guideline and standard.

7. What is more important, a standard or a guideline? Explain your answer.
8. What is ANSI?
9. What is ASTM?
10. Compare and contrast ANSI and ASTM.
11. What is OSHA?

INTERNET EXERCISES

Go to www.ansi.org and learn more about the organization and its standards.

Go to www.astm.org and learn more about the organization and its standards.

Go to the Internet and search "standards of sports facilities" and compile a list of sources for standards of sports facilities.

Go to the Internet and search "guidelines for the development of safe recreation and sports facilities" and compile a list of sources for guidelines.

Chapter 32
Facility Maintenance

John J. Miller, University of Southern Mississippi

CHAPTER OVERVIEW

Over the past 20 years, the significance of the role of facility maintenance has increased. Facility maintenance is a professional field that affects every organization regardless of size. Facility maintenance represents an extensive gamut of management endeavors, including facility services, office, procurement, and financial management. Furthermore, maintenance costs have traditionally been cited as the second biggest portion of any operational budget, only behind energy costs. As part of a multifaceted industry, individuals in professional facilities maintenance aim to manage the supply and demand of facility usage. Thus, an understanding of sport facility maintenance is essential.

This chapter identifies the maintenance strategies that sport facilities may employ. From such a strategic approach, the next section will discuss the four stages of the facility life cycle. The planning steps for major maintenance issues will be addressed in the next section. The chapter concludes with a consideration of work order systems and tracking along with their maintenance implications.

LEARNING OBJECTIVES

After reading this chapter, students will be able to

- describe the various types of maintenance strategies;
- discuss risk-based maintenance;
- define facility life cycle and the various stages;
- implement a life cycle assessment;
- describe the four phases in a life cycle assessment investigation;
- discuss a life cycle cost analysis;
- define a facility condition assessment;
- describe a facility condition index;
- discuss capital improvement planning;
- describe work order systems, tracking, and the various types of work orders and software; and
- compare and contrast corrective and preventive maintenance

KEY TERMS

The following key terms will be found in this chapter: Life cycle, life cycle assessment investigation, life cycle cost analysis, facility condition assessment, facility condition index, capital improvement planning, work order system, and corrective and preventive maintenance.

CASE STUDY

"Doing more with less" is an all-too-common phrase for maintenance and engineering managers these days, especially in education facilities where school budgets continue to shrink.

The Altar Valley School District encompasses nearly 600 square miles of high Sonoran desert and mountains just outside of Tucson, Ariz. Summers in this area of Arizona can be extremely hot and students often face outdoor temperatures in excess of 100 degrees at the beginning of the school year.

ABM Building Services had been providing custodial services to the Altar Valley School District for more than a year when it became aware of the HVAC, energy efficiency and budget concerns confronting the school. Foremost among them were new budget cuts, as last November voters rejected the renewal of a 10% maintenance and

operations budget override that effectively lowered the school's budget every year for the next seven years. This was to begin in the 2014-2015 school year with an estimated budget decrease of $147,000, meaning administrators were faced with the possibility of having to cut spending in art, physical education, and full-day kindergarten classes to charging in-state fees for sports participation or even the possibility of increasing class sizes across grade levels.

After six months of careful analysis, ABM found a way to implement more than $430,000 in facility upgrades using their bundled energy solutions program to completely fund energy efficiency and infrastructure improvements with money already in the district's operating budget. In fact, the customized program is guaranteed to save more than $732,000 in energy and operating costs over the next 15 years.

"From inception to final completion this process has been an interesting and educational experience for me as the district's operation manager," says Patrick Carano. "This project has been a great challenge for ABM. One element which stands out for me was the elimination of metered water used for our irrigation system. This undertaking consisted of using an existing well located at the school and rerouting the water to newly installed water lines, which are tied into the current infrastructure, accommodating water to irrigation system. The entire project was not an easy task to complete, but the outcome for the district is one which will result in substantial water savings for the district."

Energy-efficiency improvements included installing a web-based, automated energy control system to better manage energy use, reduce repair costs to HVAC equipment and notify staff of problems as they arise at Robles Elementary, the district's administration office and transportation buildings. ABM installed LED lighting in Robles Elementary School's library and cafeteria. Also of significant benefit to the district are the HVAC equipment upgrades at Altar Valley Middle School's library, the district's administration office and transportation buildings. An abandoned well at Altar Valley Middle School was also restored to working order, enabling irrigation of campuses and athletic fields across the entire district. This one change alone provides annual savings of approximately $23,000.

SELF-ASSESSMENT EXERCISES

1. Describe the preventative maintenance/corrective maintenance formula.
2. Discuss capital improvement planning.
3. List and describe the various types of maintenance strategies.
4. What is life cycle?
5. What are the components of a life cycle assessment investigation?
6. What are the components of a life cycle cost analysis?
7. What are the components of a facility condition assessment?
8. Describe the facility condition index.
9. What is a work order?
10. What are the three types of work orders and explain each?

INTERNET EXERCISE

Have your students go to the Internet to find a solution(s) to save energy and time to clean the bleachers after home football or basketball games.

Have your students go to the internet to find a solution(s) to recycle beverage containers used during athletic contests by spectators.

Chapter 33
Planning for Security in Sport Facilities

Craig Morehead, Indiana State University
Brad Stinnett, Western Kentucky University

CHAPTER OVERVIEW

Facility managers have an obligation to provide secure venues, and this has only grown in importance since the terrorist activity of September 11, 2001. The Department of Homeland has identified recreation and sport activities, leagues, and venues as potential targets for security breaches due to limited security barriers, large population densities, and public access. Therefore, facility managers should implement a multi-faceted approach to security planning, which includes recognizing threats, designing and constructing secure facilities, implementing proper policies and procedures, and mitigating security risks through staff training.

The Department of Homeland Security has identified recreation and sport activities, leagues, and venues as soft targets for security breaches due to heightened recognition, limited security barriers, large population densities, and public access. Of the threats faced by facility managers, issues related to crowd management, violence, terrorism, and natural disasters are omni-present. Crowd management is key because it describes a proactive process where facility managers engage in strategic management to protect stakeholders and the physical environment. Therefore, crowd managers must (a) recognize the signs of distress amongst patrons, and (b) understand how the layout of the venue affects pedestrian traffic. Facility managers must also be cognizant of physical violence that occurs within a facility that may affect innocent spectators and participants, such as assault, fighting, verbal abuse, pitch invasion, throwing projectiles, vandalism, and terrorism. The most recognizable terrorist attack occurred on September 11, 2001, and had an immediate impact on facility managers, who are now in constant lookout for active shooters, explosive devices, chemical, biological, and radiological attacks, and weapons of mass destruction. Facility managers must also be situationally aware of potential natural disasters such as precipitation, lightning, high wind, extreme temperatures, tornadoes, and hurricanes, as they can cause extensive harm to facilities and stakeholders.

When in the initial planning and design stages of facility development, it is imperative to include security specialists on the design team in an effort to minimize oversights. Such individuals may include venue security staff, law enforcement representatives, emergency management officials, third-party consultants, as well as state/federal government officials. Facility managers should also incorporate strategies to reduce opportunities for crime within the physical space, conduct vulnerability and risk assessments, and visit existing facilities to glean information that may help the design team conceptualize a more secure facility. Common design considerations that are known to help strength facility security profiles include site selection and zoning, access control, architectural barriers, command centers, technology (e.g., surveillance systems), and anti-terrorism measures (e.g., safety glass). In addition to physical design elements, facility managers must also develop and implement operational policies and procedures, such as security checkpoints, venue prohibitions, clear bags, codes of conduct, alcohol policies, drone policies, public relations initiatives, seating requirements, and weather safety protocols.

No matter the importance of planning, design, and policy development, no physical feature or carefully formulated policy is going to be sufficient in creating a secure environment for stakeholders, This is because individuals from the security staff must carry out facility operations and policy implementation, which requires various levels of training. In addition to online, in-house, and experiential training modules, simulations should be coordinated with local services to ensure security plans are adequate. Facility and security professionals can receive additional professional development certification and credentialing through NCS4 and IAVM.

LEARNING OBJECTIVES

After reviewing this chapter, the student should be able to

- identify security threats related to crowd management, violence, terrorism, and natural disasters;
- recommend stakeholders and concepts that can be employed during facility planning and design to enhance venue security;
- describe design considerations that can help strengthen security in a facility;
- describe various safety- and security-related policies that have been implemented to help protect facilities and patrons against threats; and
- recognize industry-specific professional development opportunities and resources available to facility professionals.

KEY TERMS

The following key terms will be found in this chapter: Access control, alcohol management, architectural barriers, assault, benchmarking, celebratory violence, clear bag policies, codes of conduct, command centers, discharge of missile, drones, fighting, hooliganism, proactive supervision, pitch invasion, reactionary supervision, terrorism, vandalism, verbal abuse, and zoning.

CASE STUDY - 1
FACILITY RENOVATION

Situation

Your university athletic department received approval to renovate the existing football stadium on campus. The stadium was originally constructed in the 1960s and is need of a makeover that will include modern features and amenities. Additionally, the venue was constructed without an emphasis on security and lacks many of the design features that are considered essential to the protection of today's intercollegiate facilities.

You have been asked to serve on the master plan committee because of your role and professional experience in athletic facilities. Specifically, you have been charged with researching best practices associated with securing the modern college football stadium. Additionally, an athletic facility improvement grant is available through a federal organization to pursue for this project. The major stipulation in the grant is that the funds must be directed to upgrading security efforts and initiatives at the facility.

Questions

1. Assuming the existing venue does not include any modern design features, elaborate on the elements that you will suggest be considered for the project. What security threats to the facility do these recommendations help combat?
2. What professionals in the industry would you consult to assist in developing your recommendations? Provide rationale for each individual you selected.
3. How could professional associations/organizations in the industry assist in your efforts of preparing the grant proposal? Select at least two organizations and detail specifically how you could benefit from collaborating with them.

CASE STUDY 2 – FACILITY POLICY

Situation

You are the facility manager for a multipurpose outdoor recreation facility located in Topeka, KS that includes soccer, softball, and baseball fields. Recently, there have been a few "close calls" when inclement weather has nearly caught patrons on the fields for practices and games.

Question

1. You have been asked by the recreation board to write an inclement weather evacuation policy. Please write your suggested policy.

SELF-ASSESSMENT EXERCISES

1. Describe the five zones that segment sections of the facility. Be sure to discuss both the primary purpose of the section and how that section relates to safety.
2. Explain the purpose of an architectural barrier for facility safety, and provide two examples.
3. Describe one anti-terrorism measure than can be incorporated into a recreation or sport facility to help protect patrons.
4. What is the purpose of the Crime Prevention Through Environmental Design (CPTED) approach? Describe the intent of employing CPTED strategies.
5. Define the role of a Command Center and describe the recommended staffing within the center.
6. What are some professional associations and organizations available to facility professionals to enhance efforts relative to venue security planning?

INTERNET LINKS

Collegiate Event and Facility Management Association
https://nacda.com/index.aspx?path=cefma

Department of Homeland Security
https://www.dhs.gov/

Department of Homeland Security – Commercial Facilities Sector-Specific Plan
https://www.dhs.gov/sites/default/files/publications/nipp-ssp-commercial-facilities-2015-508.pdf

Department of Homeland Security – If you see something, say something
https://www.dhs.gov/see-something-say-something

Fare Network Discrimination Incidents List
https://farenet.org/get-involved/report-discrimination/incidents-lists/

Federal Emergency Management Agency
https://www.fema.gov/

International Association of Venue Managers
https://www.iavm.org/

International Centre for Sport Security
http://theicss.org/

International Crime Prevention Through Environment Design Association
http://www.cpted.net/

National Center for Spectator Sports Safety and Security
https://www.ncs4.com/home

NIRSA: Leaders in Collegiate Recreation
https://nirsa.net/nirsa/

Stadium Managers Association
https://www.stadiummanagers.org/

Techniques for Effective Alcohol Management
https://teamcoalition.org/