GUIDELINES FOR INDOOR BADMINTON FACILITIES

Edited by
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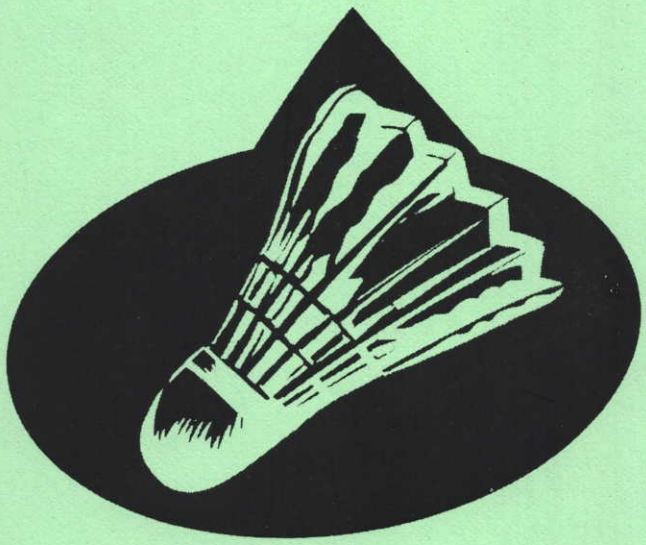

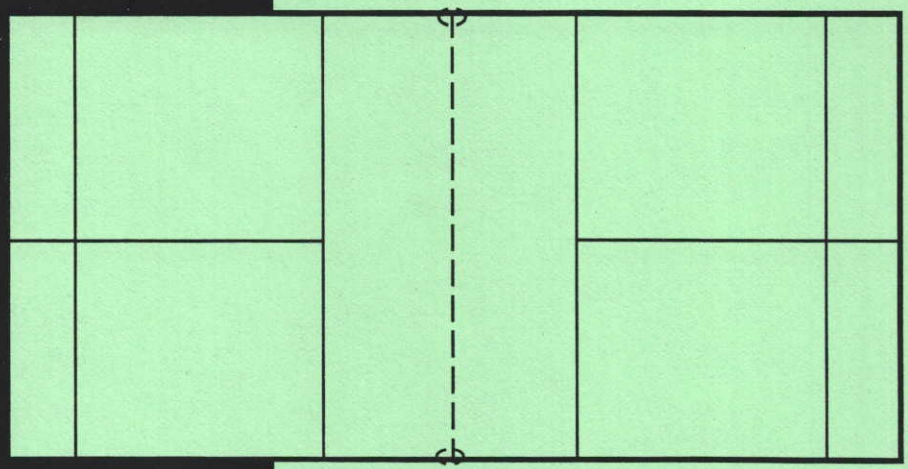

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USA BADMINTON

CONTENTS

Each of the topics in sections I-VI is discussed as it applies to an existing building, a multi-sport gym in construction, or a new badminton facility.

PREFACE

Badminton is a unique indoor sport because of the extent to which the playing area and conditions impact the competition. Therefore, this guidebook takes great care to help design the best possible playing conditions in a variety of indoor situations. The only material that applies to the outdoor game (which is never used for formal competition) is the section on court layout and fixtures.

Many of the recommendations in this guidebook are derived from visits and photographs of existing badminton buildings in Canada and Denmark.

In addition to suggesting designs for optimum badminton playing conditions, this guide also discusses ways in which these design features can be altered to adhere to a multi-sport facility. This guide **does not**, however, contain detailed engineering specifications.

I. FLOOR AND PLAYING SURFACE

A. Existing Building

In this situation the badminton courts will be laid out on an existing gym surface, most of which are wood. Variety is a possibility, particularly in newer facilities, where low maintenance, synthetic surfaces have become popular.

What all of these surfaces have in common, however, is a degree of built-in "springiness." This cushioning is essential for any sport that requires a great deal of movement, jumping, etc. Unyielding surfaces such as concrete or asphalt are particularly hard on an athlete and can result in any number of ailments.

The only practical alternative to playing on an existing surface is to use a portable court. Made of synthetics, this type of court can be unrolled on any surface, with lines permanently in place. To prevent sliding, the court must be firmly fastened in place with heavy tape. Though they are referred to as "portable," these courts are actually quite bulky and heavy, making frequent handling awkward. (See the APPENDIX for more information on portable courts.)

Wood, however, remains the most common surface material, valued for its inherent resiliency. The exceptions are "parquet" style wood floors, which come close to concrete in terms of lack of give and resulting injuries. Parquet floors are rare in North American athletic buildings, so most existing wood athletic surfaces are sufficiently yielding for badminton.

When the wood surface is used for other sports, it can be difficult to ensure proper badminton conditions, so careful maintenance is a necessity. Because badminton requires constant movement (starting, stopping, changing direction) in a small area, the floor can be neither slippery, nor "tacky" to the point where the feet can not slide at all. A varnish finish must achieve a delicate balance between the two; however, even after a re-finishing, it is doubtful that floor conditions in a multi-sport building will remain suitable for any length of time. Frequent sweeping or wet mopping will diminish the effects of constant use, dirt and dust.

As an aside, one must use caution when putting badminton courts on floors also used for indoor tennis. The different materials used in tennis courts range from "fast" to "slow." In some instances, conditions have been altered on "fast" courts using a paint containing a mineral mix, which prevents the surface from being too slick. This treatment may make a surface unusable for badminton, if for no other reason than the damage it can cause to shoes.

B. Special Badminton Facility or New Multi-Sport Gym

Much of the previous section is applicable here as well. The only significant difference lies in pre-construction preparation, where designers can establish the desired level of floor resiliency and then prescribe the materials and construction specifications to produce that result. Many wooden floors can be specially designed to supplement wood's natural resiliency, through either careful spacing of the under-floor joists or the incorporation of other materials, such as springs, under the floor supports. (The designers of the Accord Pond Racquet Club in Rockland, Mass., inserted blocks of neoprene in the floor supports to improve resiliency.)

In a pure badminton hall, the finish on a wood floor calls for special attention, but can be expected to survive extensive use with less maintenance than the floor in a multi-sport gym. Actually, varnish is not necessary for a badminton surface -- one drawback to a varnish finish is that it can produce distracting reflections, especially for spectators, when combined with certain types of lighting. (See section on LIGHTING.) Instead of a shiny varnish, try: (1) Flat paint, which produces a non-reflective finish but will wear off faster; or (2) no paint on the courts and flat green paint on the remainder of the floor. The latter option, popular in many Canadian clubs, minimizes the visible wear on the natural wood floor. Any contrast in color between the courts and the rest of the floor is ideal, producing a clearer demarcation of the actual playing area.

II. WALLS AND BACKGROUND

A. **Existing Building**

When laying down badminton courts in an existing structure, one must pay special attention to the walls. The primary concern should be the walls that constitute the background behind the ends of the court; ideally, all walls should be uniform, as even a side wall that is too reflective can have an adverse effect.

Any source of light behind the ends of a badminton court, such as a doorway, a window or a light fixture can interfere with "tracking" the shuttle in flight, so these should be avoided. Doorways should be closed and secured during play to avoid the distractions and light fluctuations that result from opening and closing. Similarly, windows should be fitted with shutters or curtains. In short, the objective should be to eliminate all sources of background light.

Most important is the color and texture of the walls themselves. Most gyms are built with light-colored walls to provide natural illumination; however, these conditions are unsuitable to badminton, as the shuttle is easily lost in a light background. Assuming it is acceptable to others who use the gym, it would be best to paint the walls a darker color, especially behind the ends of the courts. Should painting be impractical, one could hang curtains of dark material from the walls. Hanging from a cable, the curtains would be retractable for other events. Adopting either one of these measures is vital for creating acceptable playing conditions.

Ideally, the background would be painted in dark green, using a flat paint applied to create a textured surface. This surface will eliminate reflection from the wall or any light fixtures.

These alterations are among the most important for improving the quality of playing conditions.

B. **Special Badminton Facility or New Multi-Sport Gym**

The same principles described above apply equally to a new badminton facility. However, one can build in the desired qualities quite easily from the blueprint stage.

To sum up, the two objectives in this area of design are to eliminate outside light and to provide a uniformly dark background to make the in-flight shuttlecock stand out. Thus, a new badminton facility should avoid windows and skylights, and the doors should be located away from background areas. The interior walls should be painted with a uniform dark color, preferably dark green.

III. LIGHTING

Lighting is the most critical element of an indoor badminton court. Good lighting brings out the best in all players, while lighting installed without regard for the game hinders even the best players. Understandably, our discussion of lighting will be more extensive and detailed than previous sections.

A. Existing Building

The major problem with the lighting in existing facilities is that it normally illuminates from above, blinding the badminton player who is usually looking up at the shuttle. In setting up a court, the goal is to minimize the interference in tracking the shuttle. It is important to remember that, because the shuttle is white, it is easy to see without brilliant illumination, especially if the gym has dark backgrounds. Thus, one goal is to eliminate as much excess illumination as possible.

Generally, the option of modifying the lighting system for badminton in an existing gym does not exist. Therefore, it is important to use imagination and creativity to make improvements through minor adjustments. Here are some ideas for various existing situations:

1. Building has overhead drop lights using large incandescent bulbs.

    •Try to position the courts so that there will be a minimum number of lights directly above the courts.

    •Unscrew some of the bulbs in the fixtures directly over the court (if they are accessible).

    •Diffuse the glare of the bulbs with a white cloth, providing the cloth can be attached far enough from the bulb to avoid burning.

2. Building has recessed ceiling lights with incandescent bulbs.

    •Though they are usually covered with glass, these fixtures can still be troublesome if they are directly over the courts -- the above measures still apply.

3. Building has fluorescent light fixtures attached to the ceiling.

    •Though the light from these fixtures is not as intense or potentially blinding, it can still cause problems, especially when "banked" in solid rows covering the ceiling. The lights themselves are not blinding, but the shuttle is easily lost against the rows of tubes. Under these conditions, the facility is virtually unusable for badminton -- there is usually no provision for cutting only partial light.

B. **New Multi-Sport Gym**

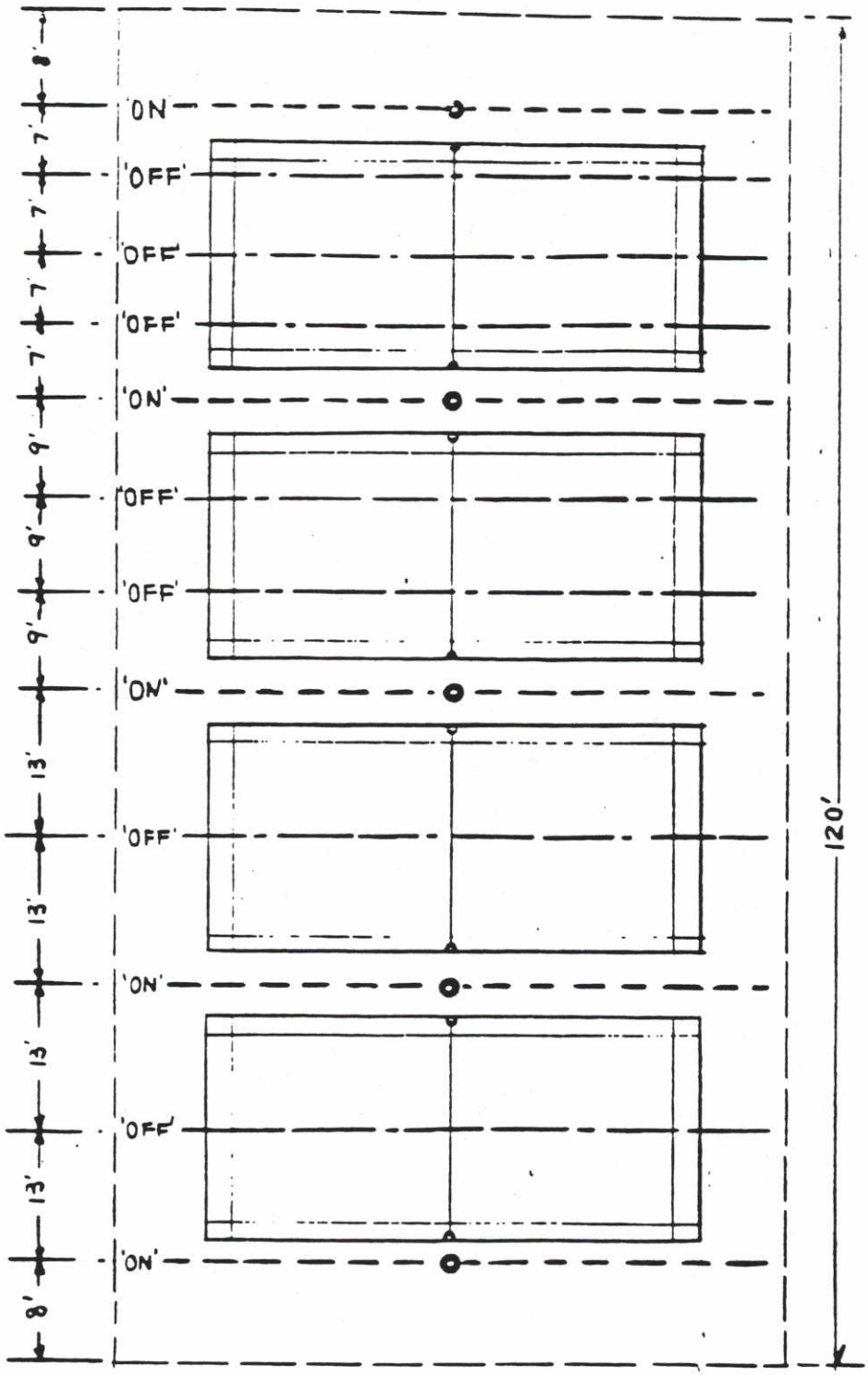
Standard practice for most public multiple-sport facilities is to provide high-intensity lighting for the entire floor area using drop lights, in-the-ceiling fixtures, or fluorescent lights. These setups provide adequate lighting for basketball, volleyball, wrestling, etc. -- sports in which the participants rarely look directly up. If badminton is to be included, the challenge is to design a lighting system that can selectively reduce the excess illumination.

The diagram on page 7, which shows a layout of four badminton courts in a 120' X 60' floor area, illustrates a solution provided the lighting system shown is included from the design stage. Looking at the two courts on the LEFT of the diagram, the five series of broken lines represent five rows of overhead lights that might be used for any other all-floor athletic activity. Two of these rows of lights are directly over the badminton courts.

The RIGHT side of the diagram illustrates a situation in which the rows of lights are more closely spaced. Instead of the 13-foot spacing of the left hand courts, the third court from the left has two rows of lights spaced nine feet apart, while the court to the far right has three rows spaced seven feet apart. In any of these situations, the over-the-court lights can be turned off together for badminton. (Designated by the word "OFF" in the diagram.) The calculations for the spacing of the lights is dependent on the overall room available and the room between courts.

Planned in advance, this system would be adaptable, inexpensive, and fairly easy to wire. (All between-court lights on one switch; all above-court lights on separate switch.) In turn, the resulting elimination of excess light would drastically increase the quality of badminton playing conditions.

If there are permanent spectator galleries, the lighting in the areas behind the playing floor may be refined as well. In many facilities with permanent seating the lights run from wall-to-wall, extending into the spectator areas and creating unnecessary illumination in the stands behind the courts. In order to keep these background areas as dark as possible (see SECTION II), the lighting system should be engineered so that the spectator area can be darkened independently of the playing floor. Once again, a special wiring set-up, with separate switches for the playing and spectator areas is the solution. Though not complicated, this type of lighting system is almost impossible to implement after a building has been conventionally wired, so it must be planned from the outset of a new project.



THREE LIGHTING SCHEMES

SCALE: 1/16" = 1'-0"

C. Special Badminton Facility

Lighting for a hall built solely for badminton is relatively easy to set up -- there are no demands for more illumination and there is really only one lighting scheme to be considered. The best lighting occurs when all sources of light are placed outside the court(s). In the case of a multi-court layout, the fixtures should be mounted above a between-court area and designed to cast light in both directions using either incandescent bulbs or fluorescent tubes.

The diagram on page 7 (four-court layout, six feet between courts) illustrates this lighting scheme using the five broken lines that do not run through the courts. Each light source is three feet off the net post, exactly between the courts. The style and height of the installation depends both on the design of the ceiling above the courts (see SECTION IV) and the kind of light used.

Incandescent Lights

Generally, incandescent bulbs are positioned 12-15 feet above the floor, approximately halfway between the floor and the ceiling. This system provides the most uniform illumination of the shuttle, but is impossible in a facility that has a level ceiling without interior supports. The best solution is to suspend lights from cables from the ceiling, as floor pedestals with lights placed in between courts would constitute hazardous obstacles.

In a hall where the roof above the court is supported by beams or trusses spaced to create a separate "bay" for each court (see SECTION IV), the fixtures can be hung from or mounted on the underside of these structures.

Because of badminton's unique needs, the lighting system in a badminton hall needs to provide adequate light to illuminate the shuttle at all points -- including the four corners of the court and the overhead space all the way to the ceiling -- without the benefit of windows or skylights. Thus, the type of fixture installed gains added importance.

These requirements preclude the use of a "drop light" fixture, which hangs from a chain and wears a reflecting shade that projects the light primarily downward. These fixtures leave a dark zone above the lights unsuitable for badminton. Therefore, it is usually necessary to design a special fixture that will fulfill all of badminton's illumination requirements.

One solution is to employ a reflector system, projecting light throughout the area of each court. The between-court light sources would consist of a two-sided fixture -- a double set of bulbs, each set backed by its own reflector, placed back-to-back and facing in opposite directions. This type of fixture has typically employed six to eight small bulbs in a row, minimizing the size of the reflector required. While this system adequately lights the mid-court area (10-15 feet on each side of the net), it may not provide sufficient illumination for the end of the court.

A variation on the reflector fixture solves this problem. With this fixture, the two sides are divided into two panels, each angled toward one-half of the court. The actual apparatus would be comprised of two back-to-back triangles, each with an interior angle of 120 degrees closest to the net, while the other two faces would be 30 degrees from being parallel to the sideline. While this type of fixture may be heavier and more costly, it would result in more uniform illumination throughout the playing area.

Another alternative would be to use large (500, 750, 1,000 watt) bulbs, which usually require special sockets but would eliminate the need for reflectors. Grouped in rows of two, three or four sockets mounted in the standard position above and in between the net posts, this setup would spread 1,000-2,000 watts on each side of each court. (See diagram, page 10)

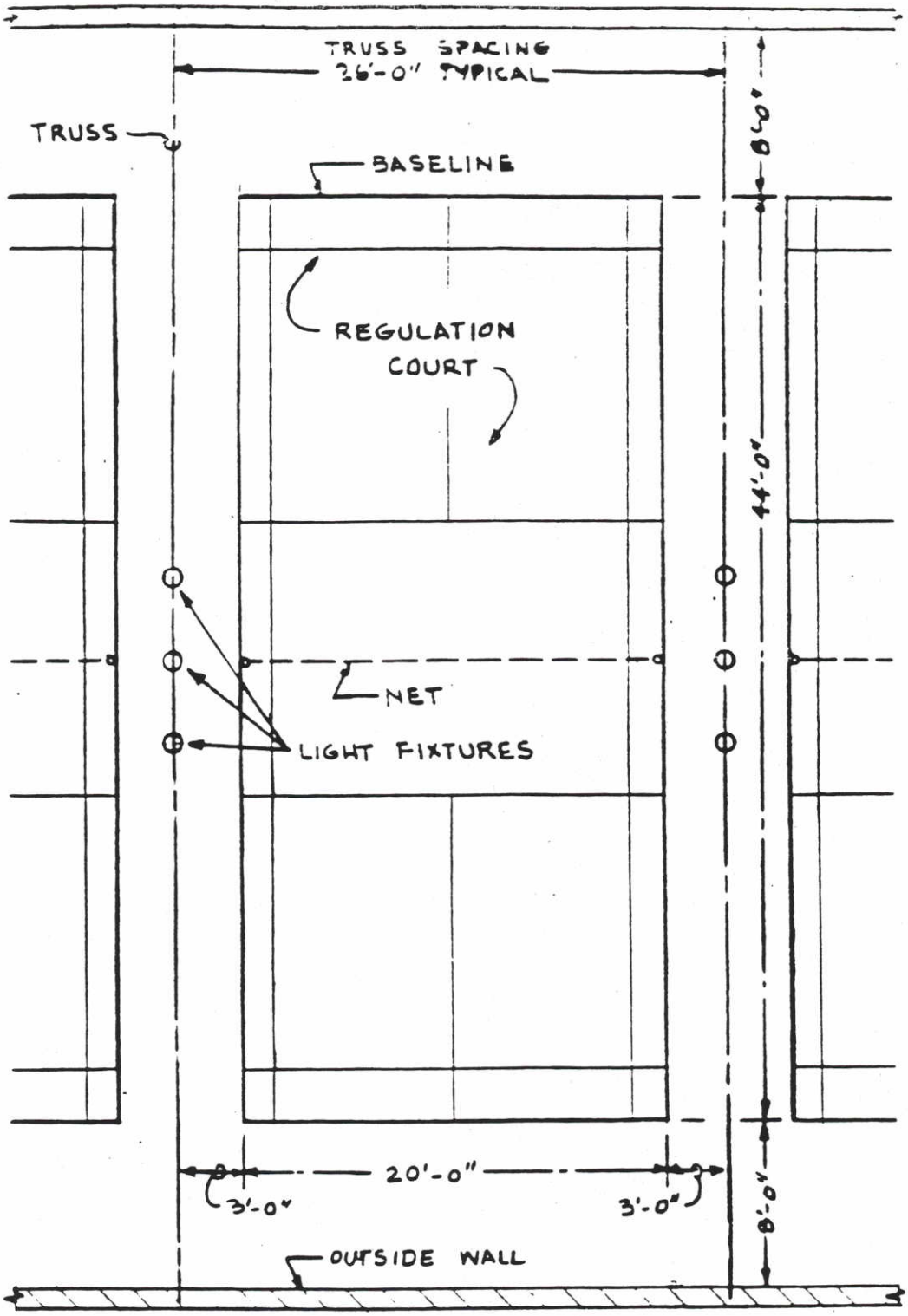
Any of the incandescent bulb fixtures described above share the common problem of the glare of the filament in each bulb made of clear glass. (Most of the bulbs over 300 watts only come in clear glass.) Though the off-court light location minimizes this problem, the players may still have occasion to look into the glare. There are two solutions to alleviate this problem and diffuse the glare. For a small bulb and reflector setup, each row of bulbs can be placed behind a sheet of frosted or textured glass without losing much intensity. The big bulbs can be diffused by surrounding them with a "skirt" of white gauze, large enough so that it doesn't touch the hot glass. This type of diffusion technique is used in many Canadian clubs.

Fluorescent Lights

Fluorescent lights are becoming increasingly common in many multi-sport and badminton facilities because of the built-in diffusion they provide; however, the light intensity is not always sufficiently high for badminton unless many light sources are used. Combined with the fact that fluorescent tubes require special sockets, fluorescent lighting is not nearly as flexible as incandescent.

Several additional drawbacks to fluorescent lighting exist. Because of their lower intensity, multiple fixtures are needed for adequate illumination, often running the entire length of the between-courts space. In addition, fluorescent lights primarily illuminate downward, with a little sideways dispersion. Thus, unless the lights are directly against the ceiling (as in the University Club in Boston and The Manhattan Beach Badminton Club in California), there will be a darker zone above the lights. This problem arises in clubs with curved or peaked roofs, where they have solved the problem by attaching a row of six or more tubes to a metal rod that runs across the building, 10 feet above the between-courts space.

While fluorescent lighting has its drawbacks, it is an economical system that can yield acceptable playing conditions if properly designed and installed.



REGULATION BADMINTON COURT

CLEARANCES AND LIGHTING

SCALE : 1/8" = 1'-0"

Other Kinds of Light Sources

An additional form of lighting gaining popularity in new gymnasiums is the haloid lamp, primarily for the intense illumination it provides. Because haloid lamps are specialized features, they will not be discussed here -- consult a professional lighting engineer on their suitability for badminton and on the technical aspects of their installation. In all probability, haloids are unnecessary for badminton because the sport does not require super-intense lighting if the proper background is provided.

Indirect Lighting

Although significant advances have been made in indirect lighting techniques, the fundamental principle of indirect lighting clashes with standard badminton hall design. Because indirect lighting must be directed at a light-colored background to produce the desired illumination, and badminton courts require dark walls and ceilings, it may not be a good solution for a large hall needing between-the-court light sources.

However, in a small, one or two-court badminton hall, indirect lighting is a possibility. At the Gut 'n' Feathers Club in Marblehead, Mass., two courts have been crammed into an old church. The club has left the end walls and the ceiling dark, but has been able to secure adequate indirect lighting from rows of shielded fluorescent lights reflected off the light-colored side walls.

IV. OVERHEAD SPACE AND CEILING CLEARANCE

A. Existing Building

This is another truly critical dimension of the game, and one that is not easily modified in an existing facility. While official laws of the game mandate twelve meters (39.0 feet) clearance for international competition, most players will find a ceiling height of nine meters (30.0 feet) adequate. Any height lower than 30 feet may force players to alter the delivery of their high service.

Height is not the only determinant in the quality of a facility's overhead space. The presence of other athletic equipment, such as basketball backboards or gymnastics equipment, diminishes the quality of the facility as a badminton hall. Even if the equipment is pulled against the ceiling, it most likely constitutes a sizeable intrusion into the badminton playing area.

Some facilities do not have fixed, level ceilings, but instead have roofs supported with visible beams, girders or trusses. Because these roofs are generally more than eight or nine meters high, the clearance is fine if the courts are place between girders. It is rare, however, to find a multi-sport facility with the 24-28 foot space between girders that is necessary to accommodate a row of badminton courts. In facilities where the spacing of the girders is less than 24 feet and/or the height is less than 30, the courts will provide sub-standard playing conditions.

B. Special Badminton Facility or New Multi-Sport Gym

Clearly, the basic guidelines of overhead clearance should be adhered to in the designs for a new facility, whether it have a ceiling or a roof. A multi-purpose gym would most likely be constructed with a flat ceiling. Obviously it should be at least 30 feet tall, with special attention to minimizing the intrusion of overhead apparatus above the badminton courts.

For a badminton-only facility, the designers have some latitude in choosing either the ceiling or roof option. However, this choice must be coordinated with the overall characteristics of the structure (see SECTIONS V and VII) and the lighting arrangement used (see SECTION III). Two examples of facilities with roofs with trusses spaced to create bays for badminton courts can be found at:

- The Boulevard Club, Lakeshore Blvd., Toronto, Ontario.

- The Winnipeg Badminton Club, River Avenue, Winnipeg, Manitoba. (This club is no longer used for badminton, but the structure is essentially unchanged.

V. LAYOUT OF COURTS

The layout of badminton courts is inescapably interwoven with the previously discussed specifications for background, clearance and lighting. Clearly, badminton courts should be installed with due consideration for (1) background doors, windows or colors; (2) variations in ceiling or roof height and construction; (3) obstructing equipment in overhead space; and, (4) the position of lighting fixtures. Thus, the actual floor space available becomes of secondary importance.

Building a new structure, the opportunity to plan a facility amenable to badminton will exist. In a multi-sport facility, the needs of more popular sports such as volleyball and basketball will be more readily addressed, while the modifications needed by a "minor" sport like badminton will be ignored. Thus, choices are limited in most facilities where badminton is played in the U.S.

A. **Existing Building**

While many existing athletic facilities (high school and college gyms, Y.M.C.A.'s and Y.W.C.A.'s, etc.) already have markings for badminton courts, the layout of these courts is often dictated by factors other than finding the best possible badminton playing conditions. Often the courts are either laid down on the periphery of a gym, perhaps in an area usually covered by folding bleachers, or crammed too close together. In other situations, the badminton lines are entwined with the markings of other sports in the same area, creating a confusing mass of multi-colored lines.

The shape and dimension of the existing gym dictate the layout of any badminton courts to be added. In a gym longer than it is wide (basketball court), the only solution would be to lay down a bank of as many side-by-side courts as would fit. The number of courts would also depend on whether the baskets were retractable enough to allow adequate clearance.

A square gym, on the other hand, offers the opportunity to lay out two banks of four courts. The gym would need to be at least 110' X 110' in order to accommodate this many courts and still leave six feet between each court and the four walls.

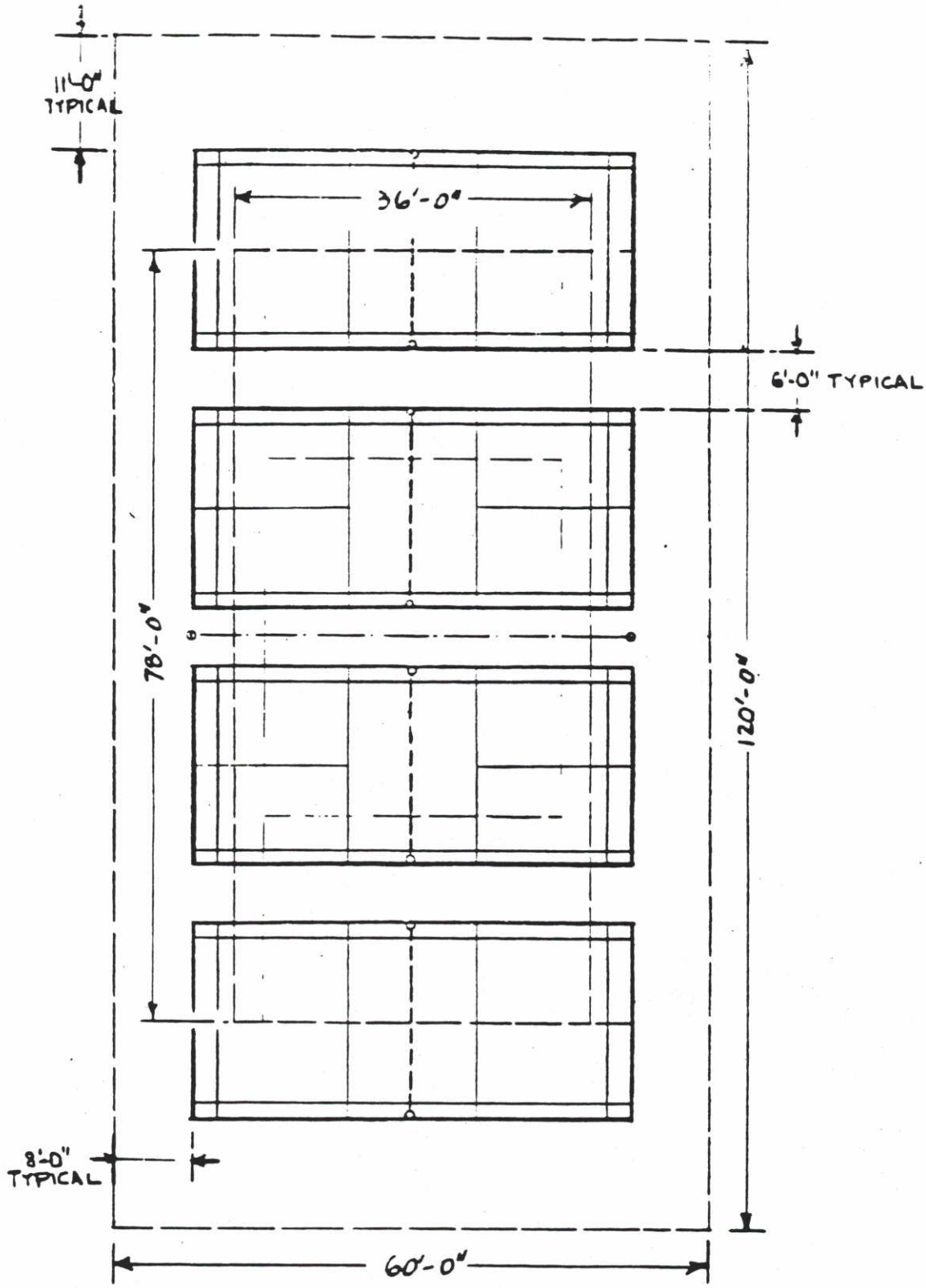
Often, a gym like the one described above will have a sliding partition, dividing the hall into two areas of equal size. Take advantage of this feature if it is available; if not, rig one yourself by attaching a lightweight, dark-colored curtain to a cable. The curtain should be removable for other sports. This divider is necessary to eliminate the distraction and lack of depth perception for the player playing with his/her back to the wall. By blocking out the action on the other courts and providing a temporary dark background, one can avoid these potential problems.

B. **Special Badminton Facility or New Multi-Sport Gym**

When laying down badminton courts in a new facility, all of the same considerations mentioned above should be taken into account. In the case of a multi-sport gym, athletic directors and their architects will, in all likelihood, be reluctant to design the space allotted for other sports to be shared with badminton. So until badminton gains popularity and is in position to exert more influence, it will have to make do with whatever space is available.

Obviously, in a hall specifically designed for badminton, a planner can avoid these limitations. The typical setup is a bank of as many courts in a row as space allows. To accommodate such a layout, the hall should have a minimum width of 60 feet, which would leave only eight feet behind each end line. If needed, width can be added to accommodate a bench, seats or passage to another court. (See diagram on page 15)

A four-court layout, with the preferred six-foot spacing between courts, should have a minimum length of 120 feet. This allows for 11 feet at each end of the floor for entrance or circulation. If the facility is going to be used for tournaments involving a sizeable number of participants and/or spectators, additional space should be provided at the entrance end of the hall to handle the inevitable milling about without disturbing play on the nearest court.



FOUR BADMINTON COURTS

SUPERIMPOSED UPON A TENNIS COURT

SCALE: 1/16" = 1'-0"

VI. COURT FIXTURES

The one essential feature of a badminton court that bears discussion is the net and its support posts. While the net is a standardized product (specifications appear in the IBF statute book and the USBA rule book), the specialized net posts are often unavailable in multi-sport facilities.

A. Existing Building or New Multi-Sport Gym

Most multi-sport gyms are equipped with posts intended for a volleyball net that can also secure a net cord at the proper badminton height of 5'1". Nonetheless, these posts are usually unsuitable for badminton. For one, they usually come with large base plates which intrude into the playing area when the posts are placed on or near the outer sidelines, making net play dangerous. In addition, the tie- or screw-down points for these post are often positioned only for volleyball, making them useless for badminton. Finally, the posts are generally too tall and project into the space above the net. Though this equipment is often used for badminton, it tends to distort the strict dimensions of the game and hardly provides ideal playing conditions.

As an alternative, one can purchase ready-made posts manufactured exclusively for badminton, (See APPENDIX for information) or fabricate equipment that comes close to the ideal and is still acceptable to the facility manager. Another choice that needs to be made is whether to use the tie- or screw-down style of post or the free-standing style which needs to be stabilized by other means. Chances are there will be resistance to installing a number of new tie-down plates in a multi-sport facility, so the latter option is probably the most feasible.

Free-standing, portable posts can be used in any number of ways. One way is to use them as supports for a continuous cable running through the entire bank of courts, with the nets hung at proper intervals. Because the posts would not need to apply any lateral force, they could be constructed of lightweight material. To reach the necessary tension, the cable would be anchored either by fixtures in the wall or on posts set in the floor outside the playing area. However, this setup has several drawbacks: (1) It is difficult to reach the 1" sag required for each net; (2) Any action that moves the cable in one court will have an effect on the other courts; and (3) The cable, running 5'1" off the ground across the entire gym, is dangerous for those moving about in the between-courts areas.

Because the badminton courts will have to be easily assembled and disassembled for use in a multi-sport gym, the best option is probably the manufactured free-standing posts mentioned above. Though made of steel, they are not nearly as bulky as the usual volleyball standards. The posts are exactly 5'1" high, including base plate. The base plate is equipped with a space for weights (facing away from the court) and a finger-like extension (extending slightly onto the court) to provide a counterbalance to the tension of the net cord. Two more short arms provide additional lateral stability. All of these features ensure that the posts remain perfectly vertical at all times without the use of tie-down points or guy wires.

B. **Special Badminton Facility**

Although posts are permanent fixtures in a badminton facility, it is probably best to make them removable if certain occasions call for it. While permanent sockets or tie-down points are acceptable, the posts themselves should be detachable. An alternative to screw- or tie-down posts is to sink a pipe at least several feet in the ground and drop the net posts in. For this to work well the net posts must fit snugly into the pipe so the post does not give. (This system is used at the previously mentioned Accord Pond Racquet Club.)

VII. GENERAL CONSIDERATIONS FOR A SPECIAL BADMINTON FACILITY

Aside from the actual playing area, there are several other factors to consider when designing a badminton hall.

A. Basic Structure, Including Walls and Roof

An initial consideration is whether to erect the facility from ground level or to start building partially underground. In general, there is a substantial increase in construction costs for building a wall over 20 feet high. Sinking the building six to ten feet underground may be less expensive than building the upper six to ten feet of the wall. Also, building underground assists temperature control in extreme climates.

Depending on available natural and financial resources, any number of design and material combinations will work for a badminton hall. Some possibilities:

1. Cinder block walls and a flat roof.

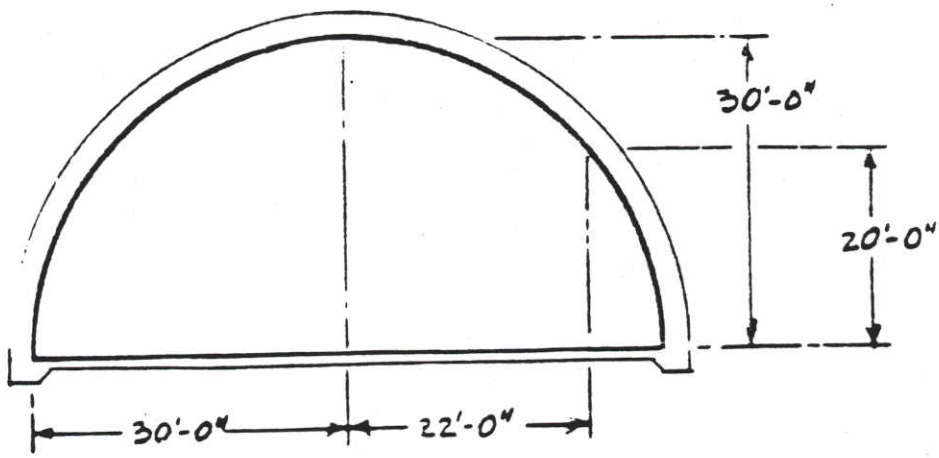
2. Cinder block walls and a peaked/rounded roof. Cinder blocks provide the best protection against extremes of temperature, and the peaked roof is best for where winter snows are heavy.

3. Steel framework for vertical supports and roof, with a choice of wall materials, with or without insulation. Many pre-fabricated steel elements come in standardized dimensions which are unsuitable for badminton; in order to use these materials, they must be subject to costly modifications.

4. Wood construction throughout, using "Quonset" hut design.

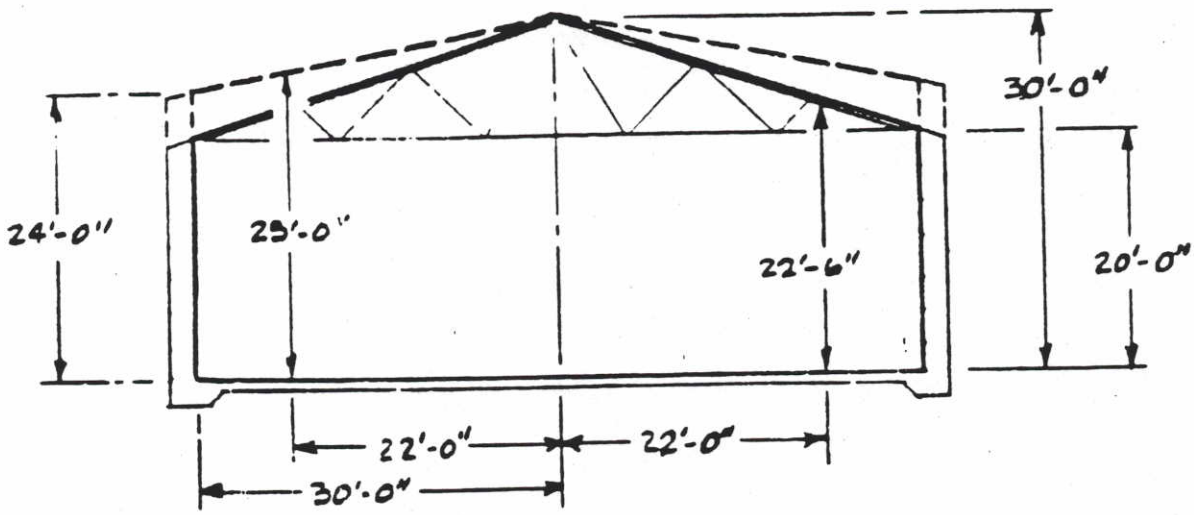
5. Wood construction with a peaked/rounded roof supported by transverse trusses. Wood is the lightest and most flexible construction material either for the roof only or for the entire structure. In mild weather and/or heavy construction areas, plywood is an alternative material to standard lumber.

The distinctive "quonset" hut design, which uses wood to produce a rounded shape, incorporates a series of either semi-circular or parabolic wooden beams that are covered with a light-weight skin of wood or plywood. Many clubs of this style have been built in Denmark for a relatively low cost. (See diagram on page 19) One drawback to this design is that the curve of the walls/roof will restrict the desired clearance over the baseline of the badminton courts (note in diagram that it is only 20 feet). To avoid this problem one could make the building wider (increasing floor space not used for play) or start the curved portion of the walls higher up -- setting the semi-circular shape on top of walls that are vertical for the first eight to ten feet.



TYPICAL QUONSET TYPE STRUCTURE

NO SCALE



TYPICAL PITCHED ROOF STRUCTURE

NO SCALE

In a hall designed for more than two courts, a wooden structure with a peaked/rounded roof will require transverse trusses for support. As has been explained previously, the trusses should be 24-28 feet apart to create suitable "bays" for courts four to eight feet apart. Ideally, the trusses would also be used to mount incandescent bulbs on the sides of the courts. If the clearance over the courts was between 30-34 feet high and the walls were dark-colored, this would constitute the ideal design for a multiple-court badminton facility.

B. **Entrances**

Access to a pure badminton hall should be carefully planned, giving due consideration to the future uses of the facility. If the building is planned only for informal recreational play and practice (an unlikely possibility), then a single entrance would probably be adequate. If the structure is expected to be used for tournaments, the hall should include additional doors to handle players and spectators. The entrances should be positioned to allow people to circulate without interfering with play.

A new facility should also include a larger access doorway for transporting oversize equipment, such as demountable bleachers, umpires' chairs, T.V. cameras, or anything else that might be needed for running a tournament. This utility entrance should be at the opposite end of the playing hall from the clubhouse (see below), and should be accessed by an approach driveway big enough for trucks.

C. **Other internal facilities and equipment**

Aside from space for utilities and storage, a new badminton hall needs both locker room space for men and women and a pro shop for the club coach and to sell merchandise. Another recommended addition would be some sort of lounge area equipped with a compact kitchen and serving area -- useful for club socializing or post-tournament entertainment.

The above structures are usually combined in a clubhouse structure attached to one end of the playing hall, so as not to lessen the quality of the playing background. A common arrangement is to place the pro shop and locker rooms at court level and the lounge on the second floor. If the wall of the lounge that faces the courts is equipped with large plate glass windows, the lounge becomes an excellent viewing area. Examples of this setup can be found at the former Winnipeg Badminton Club, the Strathgowan Club (Toronto) and the Gentofte Club (Copenhagen).

There are two means to avoid distracting reflections from the lighting in the lounge area: (1) Use only low level indirect lighting in the lounge (except for parties); or (2) Tilt the lounge windows from the vertical, outward from bottom to top, to sufficiently eliminate reflections from the lounge lighting.

D. **Temperature Control and Ventilation**

This is a very technical subject, so it will not be discussed in detail. Here, however, are some guidelines:

1. If the climate demands it, the roof should be built strong enough to hold snow and with enough insulation to keep out excessive solar heat.

2. Cinder block walls generally help maintain a uniform interior temperature suitable for athletics. Alternative materials such as wood, metal sheeting, etc., will require interior insulation against extremes of cold or heat.

3. While most multi-purpose gyms are overheated and subject to a uniform temperature setting, the temperature in a badminton hall should be kept at a lower level. The hall should be able to keep out the summer heat and provide enough artificial warmth in the winter to maintain a temperature of around 50 degrees, possibly even 40. Many badminton facilities use electric radiant heat fixtures positioned in the side wall or above the clear areas behind the court end lines.

Because the flight of a badminton shuttle is affected by even the slightest air current, ventilation presents quite a challenge. Air conditioning and forced air ventilation are out of the question while games are in progress. Louvered wall vents would provide a degree of ventilation but would be insufficient during intense periods of usage, such as a tournament. Thus, the building should be equipped with strategically located blowers and vents, which would quickly circulate fresh air during short breaks in the action. This system, designed by a professional ventilation engineer, would be able to completely replace the air in the hall in 15-20 minutes.

VIII. ADDITIONAL COMMENTS

A. Layout of Courts

Earlier in this guidebook, the possibility of sharing space in a multi-sport facility was discussed, as was the probability of having to paint badminton lines overlapping the lines for other sports. Depending on the colors used for the other sports, it is possible that the badminton lines may not be painted white. While this is fine for informal play or practice, it is unacceptable for tournament play. An expedient solution is to use white masking tape to lay down the courts when white lines are needed for official play. The tape can be used either on top of existing lines or to create new courts.

B. Tournaments

While tournament organization is not the specific domain of this guidebook, there are specific design features that have an impact on tournaments. Here are some:

1. Tournament Director -- A facility holding a badminton tournament needs an area for the tournament director to supervise and maintain direct contact with the action on all courts. To do all of this effectively, the director should be situated on an elevated post in the playing hall, with ample room for his working papers and a communication system by which he can summon players and make announcements.

A multi-sport gym is likely to have such a feature, but it is often a problem in the tight confines of a badminton hall. Looking at the diagram on page 14, one possibility would be to locate a director's post in one of the corners of the floor. If there is no room on the playing floor, the director may be able to operate from a lounge with a view.

2. Spectators -- While spectator accommodations have already been discussed, permanent space for spectators is neither practical nor affordable. However, if a tournament final or semi-final, which would only use one or two courts, promised a sizable crowd, demountable bleachers could be set up on the two end courts (in a four-court hall) to provide seating for several hundred people. The special entrances described in SECTION VII will allow for the handling of the bleachers and crowd control.

Two additional precautionary hints:

- If spectators are entering the hall from the outside, rubber mats should be laid down to protect the floors from snow and mud.

- Prohibiting smoking will ease any ventilation problems.

IX. SUMMARY AND CONCLUSION

Each of the three different circumstances for setting up badminton courts presents unique challenges. The most difficult situation is trying to introduce badminton into an existing, multi-sport facility. Even if courts have already been laid down, they most likely were placed without regard to playing conditions. These situations call for some of the imaginative solutions we have described in the previous pages -- even minor adjustments will vastly improve playing conditions.

Conversely, building a facility from scratch is the easiest way to ensure the design specifications for ideal playing conditions. Obviously, other aspects of a new facility, such as size or materials, will involve factors such as cost, ease of maintenance, etc.

The middle ground situation is when badminton is to be included in a new multi-sport facility. While compromise will probably be necessary, some design modifications may be possible if the inclusion of badminton is a firm commitment. The key is getting involved in the project while it is still in the blueprint stage -- many of the special features required for badminton must be built into the structure from the start. This requires a great deal of awareness of community planning, as well as the initiative to request any desired specifications.

In most cases, badminton advocates are without the clout of representatives of other sports, making headway difficult. Nevertheless, in order for badminton to gain wider acceptance, the effort must be made to fight for the best playing conditions, even if the final result reflects an unavoidable compromise.

APPENDIX

Structural Elements

Pre-fabricated steel frames

Butler Manufacturing Company
7400 East 13th Street
Kansas City, MO 64126

Lightweight tubular steel frames

Symons Corporation
200 East Touhy Avenue
Des Plaines, IL 60018

Plywood components

Rigid frames, trusses, box beams, skin panels, etc.

American Plywood Association
119 "A" Street
Tacoma, WA 98401

Semi-sprung plywood flooring

Contiwood, Ltd.
75 Baker Street
London, W1M 1AH, England

Portable Courts

"Supreme Court"

Allweather Surfaces, Inc.
P.O. Box #1263
Cartersville, GA 30120

"Boll-Tex"

Norfida, Halmstad, Sweden

(U.S. Distributor)
Albany International Corporation
1373 Broadway
P.O. Box #1109
Albany, NY 12201

"Hova"

Reinforced Shuttlecocks, Ltd.
6-9 Charterhouse Square
London EC1M 6ES, England

This firm also sells the special net posts described in SECTION VI

"En-Tout-Cas"

En-Tout-Cas, Ltd.
Sports Equipment Division, Dept. B
Syston, Leicester LE7 8NP, England

Facilities and Clubs

U.S.A.

• Accord Pond Racquet Club (2 courts) - Rockland, MA

• Camargo Club (2 courts) - Country Club in Indiana Hills, Cincinnati, OH

• Connecticut College (8 courts) - New London, CT

• Gut 'n Feathers Club (2 courts) - Marblehead, MA

• Manhattan Beach Badminton Club (5 courts) - Manhattan Beach, CA

• Municipal Gym (10 courts) - Federal Building, Balboa Park, San Diego, CA

• University Club (4 courts) - Boston, MA

Canada

*# •Boulevard Club (5 courts) - Toronto, Ontario

• Strathgowan Club (4 courts) - Toronto, Ontario

•Winnipeg Badminton Club (7 courts) - currently inactive - Winnipeg, Manitoba

Denmark

•Gentofte Club (5 courts) - Copenhagen, Denmark

* Incorporated into a multi-sport club
# Facility specially built for badminton