Preliminary Guidelines for the Architectural Design of a Taekwondo Training Hall

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Introduction

This paper discusses some architectural design guidelines for a taekwondo training hall. While many of the design criteria can be used for other martial arts training halls, this paper will concentrate specifically on taekwondo.

It must be noted, that the whole premise of design criteria for a taekwondo training hall in no way is meant to imply that taekwondo cannot be practiced in some place that does not meet these criteria. Taekwondo can be practiced any place that has enough area and is safety to perform either the most basic and fundamental techniques or the most sophisticated, acrobatic or dynamic techniques.

It should be recognized that criteria for a martial arts training hall can really span a wide range, depending upon economic, academic, institutional and commercial factors. These criteria can also change depending upon whether the space in consideration is new construction, rehabilitation of an existing sports facility, a retail store front retrofit, or part of a larger new athletic facility. All of these factors can effect programmatic elements. In many of these cases financing will be critical in what gets built and how it gets built. The focus of this paper is much too narrow to address all of these considerations. Instead, this paper will focus on some general guidelines that can be applied to many of these situations. In this paper I hope to generally address the architectural issues that will be relevant to many of the scenarios for the design of a taekwondo training hall.

It should also be noted that while this paper will investigate issues of great importance to contribute to a successful, useful and valuable training hall, no amount of architecture can substitute for rigorous instruction and disciplined training. Moreover, while an Olympic caliber training hall could be very useful and valuable, most serious practitioners will make due with whatever space is available to them. The architecture exists to support the activity.

Program

The program of a taekwondo training hall is largely dependent upon both the ownership of the institution and the population of the users. Whether or not the training hall is a shared facility, or is part of a larger athletic facility will also influence which and what of the programmatic elements are necessary. As

a general rule, the following elements are the basic requirements for a taekwondo training hall: entrance lobby, administrative office, viewing area for visitors, men's changing rooms, women's changing rooms, storage, and of course, the training area. This paper will briefly discuss all of these program elements, although the emphasis on design guidelines will focus on the training area.

Entrance Lobby

The entrance lobby can take on many different forms and is not entirely necessary. An advantage of an entrance lobby is that there is a certain amount of control as to who is coming in and out of the training facility. The entrance lobby also provides an access point to the other program elements. The entrance lobby can be the first in a sequence of spaces defining the training area and helping to support the intensity of the training experience. In many instances, the entrance lobby can be folded into the viewing area. From the outside, the entrance lobby can help act as a gateway, or a threshold, into the training hall. A strong, clearly identifiable entrance helps to offset a training hall from other surrounding elements. The entrance lobby may be shared with the main entrance in a larger sports facility or may simply be a front door and a few steps in a converted shop front. The entrance lobby helps the participant to make the psychological transition between outside the training hall and inside the training hall. This psychological transition will hopefully intensify the participants' experience inside the training hall, whether as student, instructor or visitor.

Office

The necessity of an office again depends upon the nature of the institution. For a training hall in use year round, whether a private school, a university program or a full time training facility for competitors, the office space allows for the centralization of all of the administrative tasks associated with the running of a training hall. An office with doors also allows for group and one on one meetings and allows for at least one space in the training facility to carry on a private conversation. The office again is not necessary, and could be combined with some of the other program elements, such as the entrance lobby, or the viewing area. The office can offer acoustic insulation to keep the sounds of the training from

disrupting the administrative duties that must be carried out. The office can at the same time keeps noises from office equipment and telecommunications devices from distracting the training. Like the entrance lobby, the office is not necessary to have an effective taekwondo training hall. However, like the entrance lobby, the office can help control activities in and around the training facility to make sure the training hall is as successful as possible.

Viewing Area

The viewing area is an important part of the overall taekwondo training hall in that it allows viewing of the training from a separate and distinct area. This viewing area can be used by instructors, as well as visitors or students watching another class. Any training hall offering instruction for children would want the viewing area for the parents. Private schools and public clubs alike can use the viewing areas to let potential participants observe the training. The viewing area can be combined with the entrance lobby, or used as a buffer and secondary transition zone between the entrance lobby and the training area. This viewing area can be separated from the training area by a wall with windows, a low wall to allow viewing over, or perhaps even a simple change in the flooring. The viewing area should be physically distinct from the training are to emphasize the importance of the training area.

Men's and Women's Changing Areas

Whenever possible, taekwondo training facilities should provide changing areas for men and women. Depending upon the size of the facility and the number of participants and viewers, the changing areas can be combined with showers, sinks and toilets. For obvious reasons, the changing areas are necessary for hygiene and privacy. At the same time, the changing area also serves as another transition zone as the participant prepares to enter the training area. The changing area allows the participant to remove themselves from the world outside the training hall. The changing into the taekwondo uniform reinforces this preparation. The participant can then emerge from the changing area wearing the uniform and move directly to the training area. Of course all changing, toilet and shower facilities should meet or exceed local, state and national accessibility codes, laws and standards.

Storage

The storage area of the taekwondo training hall can vary depending upon available space and need. This area can range in size from a set of lockers or a broom closet to large enclosed rooms or mezzanines able to store equipment to produce a competitive tournament. The storage area is an important place to keep both maintenance equipment, such as brooms, buckets and cleaning supplies, as well as equipment used for instruction, such as kicking paddles, extra mats, heavy bags and shared body armor. The storage area helps to keep the training area clean and well kept, promoting its importance. Storage areas also help to allow for future changes in the requirements of the training facility. This can include the acquisition of new equipment, the storage of administrative records, or the warehousing of new uniforms for students. Accounting for storage early on in the design of the training facility ensures flexibility and adaptability for inevitable future changes in the physical requirements of the facility.

Training Hall

Of course the fundamental and essential piece of the taekwondo training facility is the training area. The other program elements exist in a large part to serve and support the taekwondo training that takes place here. As the program focus of the facility, the training hall perhaps presents the strongest pull to also be the architectural focus of the facility. While by no means does the training area need to be grand or ornate, it still needs to be clearly distinct from the other areas of the facility. This can be implied, as a participant enters through a doorway or over a threshold, or it can be physically manifested in changes in the floor, the walls, the ceiling, as well as in the lighting. The training area is a place of spiritual focus as well as mental and physical discipline. The trust and commradery among taekwondo practitioners training together can be deeper and stronger than in other day to day activity. This is not only because of the overall goal of personal growth and character development, but also because of the very real risks they are exposed to in their training. As such, the training hall must provide the taekwondo practitioner a safe and comfortable physical haven for practice.

Circulation and Adjacencies

Circulation

The circulation in a taekwondo training facility is important to consider for two reasons. The first reason is logistics. The physical relationship of program elements to each other and the sequence in which one passes from one to another should be efficient and logical. The relationships may give choices to a person moving through the facility, such as having two different doors from the changing rooms, one opening to the viewing area, and the other opening directly to the training hall. All of these choices should make sense. The circulation patterns are also important architecturally in that they can intensify a person's experience in the training facility. For example, if the assumption is that the training area should be a very different place than the public activities outside on the street, then the circulation sequence could be carefully choreographed to take a person through several distinct places before arriving at the training area. A possible circulation sequence could be: first enter through the main door of the facility, second the person could pass through the entrance lobby and into the viewing area. Each of the areas can be made physically distinct with permanent walls and fixtures and dramatically different lighting, or the could simply be separated by a moveable screen. Next the person could move from the viewing area to the changing room. After changing into the taekwondo uniform the person can then step out into the training area, having gone through several transitional spaces physically to help prepare them mentally.

Given the above mentioned program elements the following are possible circulation sequences, depending upon whether one is a student, a guest or an instructor at the facility:

Instructor: 1. Main Door 2. Lobby 3. Office or Storage 4. Changing Area
5. Viewing Area or Training Area

Visitor 1. Main Door 2. Lobby 3. Office or Viewing Area

Student 1. Main Door 2. Lobby or Office or Storage 4. Changing Area
5. Training Area

None of the three scenarios are dramatically different for several reasons. The first reason is that there really are not that many different program elements from which to choose. The second reason is that more likely than not the Instructor, the Visitor or the Student have come to watch or participate in the activity of the Training Area. As such, all three enter the Main Door, and all three move in the direction of the Training Area.

Adjacencies

Again, given the above mentioned program, or parts thereof, the adjacencies between program elements have a limited number of combinations. None the less, the adjacencies should be logical and help to fortify one's experience while in the training facility. The following are some suggested adjacencies that meet these goals. They are simply suggestions.

Lobby and Entrance could be adjacent to: Office, Viewing Area, Changing Area, Storage. Depending upon the attitude of the facility's administrators, the Lobby and Entrance could be adjacent to the Training Area as a means of attracting potential new participants, or the Lobby and Entrance could be buffered from the Training Area purposefully to allow for privacy and focus.

The Office could be adjacent to: The Lobby and Entrance, as a means of greeting visitors and participants, and well as to serve as a security control point for the facility. The office could also be next to the Training Area to observe and coordinate activities.

The Viewing Area could be adjacent to: The Lobby and Entrance for simple and straightforward circulation. The Training Area to allow for viewing.

The Men's and Women's Changing Areas could be adjacent to: The Lobby and Entrance to allow for convenience. The Training Area, to maintain the mental and physical transition from outside activity to taekwondo training.

The Storage Area could be adjacent to: The Office or the Training Area if being used for uniforms or frequently used training equipment. The Storage Area could also be adjacent to the Changing Areas if it is used for cleaning and maintenance equipment.

The Training Area could be adjacent to: The Viewing Area, to allow visitors to observe the training. The Changing Areas, for safe, clean and simple transitions for the participants between outside activity and taekwondo training.

Acoustics

Acoustics are a crucial element of almost any architectural design. Acoustics often go unnoticed, unless of course they are problematic. "The acoustical design of spaces involves the reinforcement of desirable sounds and the control of undesirable noise."[1] Acoustics are also important in the design of a taekwondo training hall. As with most other architectural situations the two main acoustical issues involved are sound transmission and sound absorption. All sound within the taekwondo training facility will either be absorbed or reflected. It should be within the architects' scope of work to ensure that the acoustics within the training facility are conducive to successful training. There are several acoustical issues worth noting. These include the ability of the instructor to be heard clearly throughout the training hall, the minimizing of sounds transmitted from the other areas of the training facility to the training hall, the minimization of unwanted transmitted sound to neighboring rooms or buildings, and the minimization of reverberation in the training hall where many tens of students may be jumping, stomping and shouting at once.

Many of these issues can be effectively addressed with sound absorptive materials and sound insulating construction details. In general, hard smooth surfaces reflect sound and textured, porous surfaces absorb sound. For instance, a training hall with a floor of wood or exposed concrete and painted masonry block wall would be acoustically live, perhaps to its detriment. All of the surfaces would reflect sound back into the training hall where it would continue to bounce off other surfaces until the energy is fully dissipated. One or two people training at a time would hardly create enough sound to become a distraction. However, a class of fifteen, twenty, thirty students or more would quickly fill the room with the sound of the foot fall and voices. The reflection of all of these sounds could not only be distracting for the participants, but could also keep the instructor from being clearly heard and understood. On the other hand, a training area with carpeted or matted floors and padded walls and ceiling with acoustical tiles would be covered in softer more porous materials. These materials would help to absorb sound and diminish the reflected and reverberated sounds in the training hall. These materials can help make the training hall

[1]Ching, Francis D.K.. Building Construction Illustrated. New York: Van Nostrand Reinhold, 1991, p.A.16.

less noisy and distracting, allowing the participants to focus on their training.

Acoustic absorption is also important for other areas of the training facility that are spatially continuous with the training area. These areas can include the entrance lobby and the viewing area. With acoustically absorptive materials in place in these areas, unwanted and distracting sounds such as outside automobile traffic, foot falls and human voices will not be reflected in the training area.

Within the training facility, the walls, floors and ceiling must be detailed and built with materials in such a way as to minimize sound transmission between rooms. This sound transmission should be reduced in both directions to avoid disturbing neighbors and to avoid distracting those in the taekwondo training hall. For example the sounds of office equipment and human voices in the office may be distracting to those training. As such, the walls and openings of the office should be detailed in such a way that those sounds are not transmitted into the training area. Another example where sound transmission would be unwanted would be in a taekwondo training area sharing an adjacent wall with a dance or aerobics studios. The sounds from classes on either side of the wall would be distracting to those on the other side. Some very general rules about minimizing sound transmission are "Sound transmission loss through a material increases in proportion to its mass. Air spaces increase transmission loss."[2] In terms of construction both the office and neighboring dance studio noise situations could be rectified by building walls that were either massive (i.e. concrete block with dry fill insulation) or with isolated structural layers (i.e. staggered stud construction). Another possibility to reduce sound transmission from the training hall to neighbors would be to strategically place the changing rooms, the office or the storage closet along the adjoining wall. This way the wall constructions can act to absorb sound while the air space in the buffer rooms can also help to keep unwanted sound from being transmitted.

Floor

The floor of the training area is a particularly critical architectural element. Like most of the architectural elements of a taekwondo training hall, the floor will most likely be constrained to either existing conditions or economic feasibility. However, the materials and architectural detailing of the floor are critical to its overall durability and longevity. Moreover, as taekwondo is practiced barefoot, the participant's relationship to the floor is perhaps more familiar than in other athletics where shoes are worn. With the constant running, skipping, stomping

[2]Ibid p. A.16.

and jumping, as well as intentional and accidental falling, the floor must be able to provide a high degree of safety, for the durability and longevity of the participants.

Also, because the floor of the training hall is often the single largest continuous area, it can also be the source for the most acoustic reflectivity or absorption, depending on its surface materials and construction. Bare concrete or wood would increase the noise in the room for two reasons. For one, they would not absorb the sound of foot falls, but would only amplify it. Secondly the hard, smooth surfaces of concrete and wood would reflect all much of the sound in the room, including foot falls and voices. With its highly textured surface, and porous support pads, a carpeted floor would help to absorb the sound of the initial foot falls, as well as the reflection of the other sounds in the room. A floor covered in martial arts mats, up to 3cm thick of dense foam, would help absorb sound even more. A wood or concrete floor partially covered in carpet or mats would not be as effective in absorbing sound as a fully covered floor, but would be better than a completely bare floor.[3]

There are a variety of common floor constructions and finishes that could be used in a taekwondo training hall. In most all applications, the supporting structure would either be of wood, concrete or steel. If the training hall floor is at ground level, sufficient vapor barriers must be taken into consideration, especially in the case of wood flooring. The finished surface of the floor could be exposed concrete slab, carpet over concrete or wood sub-floor, or strips of wood over wood sub-floor.

The exposed concrete would be the least desirable. In fact, according to the "Gyoroogi Competition Rules of the United States Taekwondo Union, Inc.", "The national, regional, state or local U.S.T.U. sanctioned tournaments shall NOT be held on cement or concrete floor".[4] While very few training halls would be used for competitive tournaments, the spirit of this article is that the concrete floor has an unacceptably low level of safety for the participants. Given its hardness, it would be the least safe. Its hardness would have a cumulative impact on feet, ankle and knee joints over long term training. The unforgiving surface would also be dangerous in case of intentional and accidental falling. The smoothness of the surface would be especially dangerous, increasing the risk of falling, especially when covered with even the least amount of moisture. Moreover, the concrete floor would be thermally inefficient, and perhaps even uncomfortable during cool periods. As stated above, the concrete would also be highly reflective acoustically, contributing to an undesirably noisy environment. While a fully exposed concrete

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[3]Salter, Charles M.. Reader For Architectural Acoustics . San Francisco: Charles M. Salter, P.E. 1995.

[4]Kim, Koang Woong, ed.. "Gyoroogi Competition Rules of the United States Taekwondo Union, Inc.". 1993. Article3.1.5. As found in Textbook: U.S. Referee Seminar. The United States Taekwondo Union, Inc. 1995. Pp.67-68.

floor would probably be unacceptable for the reason's noted, a concrete floor partially covered with secured pads or mats could prove to be safe and useful.

A carpeted floor has several good qualities for use in a taekwondo training hall. Carpet can be very durable, and when it is worn out, it can be easily replaced. With a heavy pad beneath, carpet can provide a fair amount of shock absorption. This shock absorption can help to provide an acceptable level of safety for the participants, both for the long term stress on joints, as well as for the impacts of falling. As noted above, carpet can also greatly help to reduce noise in the training hall. Carpet with its underlying pad can also help to increase the thermal efficiency of the training hall. This thermal efficiency will help to provide a comfortable surface at points of bodily contact, whether just the feet or the whole body during warm ups and stretching. Carpet can be installed on top of a wood sub-floor over a concrete slab. Ideally, the carpet could be installed over strips of wood on top of sleepers mounted on spring-steel chairs. These spring-steel chairs provide extra elasticity to the floor increasing safety and allowing for greater athletic jumping. This is a typical construction used in basketball courts. A carpeted floor can easily be used for other activities adding greater flexibility to the training hall.

A wood strips surface, like that of a basketball court, could also be used as the floor of a taekwondo training hall. The wood surface would be durable and easy to maintain, but difficult and costly to replace. If the wood strips were laid over sleepers mounted on spring-steel chairs as noted above, the floor would have a certain amount of springiness to help reduce long term injuries due to stresses on the joints. However, taekwondo is practiced barefoot. The taekwondo practitioner does not have the advantage a basketball player or tennis player receives from the safety, support and padding of shoes. The hardness of the wood floor could also potentially prove to be dangerous in case of falls. These safety factors could potentially be remedied by the addition of mats or pads placed over parts of the wood floor. A wood floor is also acoustically live and would not help in achieving ideal noise levels in the training hall.

Walls

The walls in the taekwondo training hall are also a very critical architectural element. The materials and the construction of the walls, like the floor, can help provide for the safety of the participants, as well as help to create an ideal environment for the practice of taekwondo. Given their large surface area, the walls of the training hall can also be designed to enhance the acoustics of the training hall.

Wall construction will vary greatly among the many different scenarios in which a training could be built. Several factors must still be taken into consideration. The walls of the training hall, whether they are interior or exterior envelope, should be thermally efficient. Thermal efficiency will help to provide a comfortable environment in which to practice. The thermal efficiency of the walls will prevent great temperature swings as the outside climate changes.

The finish of the walls must be durable. Participants will inevitably come in a great deal of contact with the walls of the training hall. Some of this contact will be voluntary. Some of it will not. As such, the walls must be finished with a material that can withstand a beating. The wall must also be finished with a material that will not crack or break, and must in all cases insure the safety of the participants. Gypsum board, due to its fragility would be unacceptable. Fabric wrapped panels could provide the safety factor, although their durability in this context is questionable. Painted plywood or concrete block could provide the durability. Any type of fasteners would have to be recessed or hidden to insure safety. Pads or carpet on top of block or sheathed stud wall covering the lowest two meters of a wall could provide both the durability and the safety needed. Padded or carpeted walls would also reduce the acoustic reflectivity in the room helping to provide acceptable sound levels. In a small training hall the walls should be light in color to keep from creating too cramped and dark an atmosphere.

Mirrors could also be installed over portions of the walls. Mirrors are of great use for participants to critique their own techniques. They are also good for classes allowing added viewing angles for students standing in different areas around the training hall. Mirrors can also help to increase the sense of space in a room, which is particularly helpful in a small volume. The mirrors can be made of “highly polished noncorrosive metal with reinforced rounded corners and edges”.[5] The method of mirror attachment should likewise be detailed to maintain personal safety.

Summary

This paper has meant to serve as the beginning of an investigation into guidelines for the design of a taekwondo training hall. It is by no means exhaustive. Instead, the paper focuses on several topics which are critical to consider at the earliest stages of design. These topics include the program, circulation, adjacencies, acoustics, as well as materials and construction used for the walls and floor of the training hall. The criteria

[5]Packard, Robert, T. ed.. Architectural Graphic Standards seventh edition. New York: John Wiley & Sons, 1989, p.265.

addressed in this paper were clearly biased towards issues of safety as well as architectural efficiency. Due to the limited scope of this paper, many important issues were either address only in a limited fashion, or not addressed at all. These issues include: economics and financing, the nature of the inhabiting institution, whether university club, private school or national training center, mechanical systems, heating, cooling and ventilation, just to name a few. The design and building of a taekwondo training hall is a complex and sophisticated task, and deserves rigorous study and preparation. While many of the issues involved concern physical phenomenon, they are by no means simple. This paper is meant to serve as a point of departure for such a rigorous undertaking.

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