From Telluric (Earth)  To Tectonic (Sky)

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Abstract

My graduate thesis is a study of telluric and tectonic architecture. These two ideas inspired me to design a baseball stadium for the town of Blacksburg, Virginia that portrayed the contrasting concepts "of the earth" and "of the sky."
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Introduction

The evolution of the idea for my thesis project began with the concept of introducing a baseball team to the town of Blacksburg, Virginia. My rationale for this is that I see baseball as an activity to unite the community during the summer months and bring some excitement when school concludes and the town activity subsides. Hosting a baseball team involves the need for a feasible venue that can accommodate the competing sports teams, as well as the numerous spectators attending the event. Therefore, I have designed a minor league baseball stadium for Blacksburg, Virginia, with all the amenities characteristic of a state-of-the-art stadium that will be pleasing to the town, visitors, and athletes.
Evolution Of The Architectural Idea

My design process began by sketching freely, with the intention of creating a design that was different from the way we view stadiums currently. As I sat at my desk flipping through my sketch book, a simple asymmetrical diagram caught my eye. It was as if I could see my stadium in this sketch. It was from that point forward that I knew this shape would be the impetus for my final design.
The diagram I chose was a simple sketch that resembled a “fin.” What really struck me about this was the possibility for a different arrangement of spectator seating, unlike the circular or semi-circular shaped seating arrangement used in many stadiums.
I began to explore the spatial potential within this simple sketch, eventually mirroring it, and overlapping the two shapes. Translating the sketch to three-dimensions, I extruded both shapes to produce two contrasting heights, which in turn yielded a unique shape that I saw as the building. As a result, a shape seemingly full of endless design possibilities, and the inception for a thesis idea was conceived.
The formative concept was derived from the perception of the contrasting positions of the two shapes. The lower intended to appear to be telluric, and “of the earth,” while the upper appears to be tectonic, suggesting that it is “of the sky.” It is this concept “of the earth,” and “of the sky,” and the nature of how both are perceived in opposition to each other that constitutes the basis of my thesis.
With a concept in mind, it was now time to begin the transformation of this three dimensional shape into a stadium. In order to initiate this process, I began to overlay a program complete with the location of seating, concessions, and entrances. Simultaneously, questions concerning material properties and how the two elements would be made began to emerge. Answers to these questions led to a better understanding of how each of the two elements could be constructed.
Proposed Site

Choosing an appropriate site for a stadium is vital for the success of the team. The site is located next to the Blacksburg Middle School, off Price's Fork Road in Blacksburg, Virginia. When choosing a site, it is imperative that the size be large enough to accommodate the stadium and playing field, in addition to amenities such as parking, picnic areas, plazas, and sidewalks. It is also important to take into account the positioning of the stadium in regards to the sun, roads, highways, etc.
During the summer months, the beauty and splendor that is Blacksburg, Virginia is heightened by the scenic landscapes that surround the New River Valley. These mountains create a beautiful backdrop that will make any summer evening at the ball park an enjoyable event.
As part of the proposition, I wanted the stadium to be a landmark for the town, similar to that of Burruss Hall and Lane Stadium on the Virginia Tech Campus. The positioning of the stadium, which faces the North, was intended to allow for the enormous curves to be seen on one’s approach from the road. Spectators driving to the game could experience a sense of excitement and intrigue, not only for the game itself, but also for the stadium’s design. Additionally, the direction in which the stadium will face means the evening sun should not pose a problem for the batter’s visibility. Most games during the week will start around 7pm, and the sun will already be setting in the west, creating a glimpse of light over the right shoulder of the stadium.
The location for my design was purposely chosen for its proximity to a major highway (460 West) to accommodate traffic going to and from the stadium. Providing a major route that conveniently provides access to and from the town could alleviate traffic problems for the town of Blacksburg and the Virginia Tech campus.

In an effort to work cooperatively with the community, because of its proposed location next to the Blacksburg Middle School, additional parking overflow might be accommodated (with permission) using the school’s parking lot.
Telluric (Of The Earth)

Telluric is defined as “of or relating to the earth.” This process of architectural building is characterized by a structure of excessive size and volume, constructed from similar units significantly heavy in weight.
The telluric element is made up of the underground locker rooms, ground floor concourse, and two different sets of grandstands (middle and lower). All the contents in the "of the earth" portion are constructed of concrete, a material that draws many comparisons to the solid, heavy nature of the ground. The type of environment portrayed in this lower portion of the stadium is suggestive of mass and enclosure, in addition to having a very limited amount of light present.
The construction method for this lower portion must convey the idea “of the earth.” In order to achieve this, I designed the lower element to be constructed of a series of concrete components (partitions) that express that they rise from the ground. These components would be the main structure for the locker rooms, concourse on the ground level, and the support for the middle and lower set of grandstands.
It was essential that these partitions be perceived as rising from the earth, suggesting that they could not sit flush with the floor. A viable solution was to “sink” each one into the floor by introducing a 6 inch notched channel at the base of each partition. The “reveal” joint at the base of each partition makes visible the reality that the walls rise from beneath the floor.
Each concrete partition is cast in place, producing a surface texture that is smooth. The desired texture was achieved by using high density overlay plywood as a form liner, a material that is extremely cost efficient because it can be reused several times during casting. Each element appears to cut through the earth, similar to the way in which a knife would cut resulting in a flat, even surface.
The "of the earth" portion of the stadium begins in the subterranean level. Here is where the locker rooms, bathrooms, and showers for both the home and visiting teams are located. Each locker room is accessible by way of a ramp that is located next to each one of the dugouts.
Subterranean Level

1) Home Locker Room
2) Visitor Locker Room
3) Bathrooms
4) Showers
5) Manager’s Office
6) Access to Locker Rooms
7) Dugouts
Exiting The Shower And Bathroom
The lower section of grandstands was designed to be on level with the playing field, providing spectators with the closest possible view of the game. This lower seating serves as a reserved ticket area, in addition to private box seats.
The lower grandstands are constructed of a series of cast in place concrete partitions that support a diagonal concrete stringer. Attached to the different levels on the stringer are precast concrete platforms. Each platform is bolted to the steel rods embedded in each of the concrete stringers. The spectator seating is complete once each stadium seat has been bolted to the top of each of the concrete platforms.
The playing field, which consists of four different layers, is constructed of a lower layer of stone carpet that houses the drainage system for the field. A thin layer of binding (ash, crushed stone) separates a thicker layer of sand and soil mix placed on top of the stone carpet. Atop the sand and soil mix, the playing field is completed with a layer of natural grass or dirt along the baselines and around the bases and homeplate.
The middle grandstands, also used for reserved seating, were designed to rise at least five feet off of the ground. The reason for this was to provide spectators seated in the lowest row with an unabstructed view of the playing field. Located underneath this section of seating resides the concession stands and the main concourse for the ground level.
The middle grandstands are constructed in a similar way to the lower grandstands. Both the seating and the maincourse behind it are constructed of a series of cast in place concrete partitions reemphasizing that they are “of the earth.”
The additional partitions supporting the surrounding ground level concourse never appear to meet the ceiling, but continue to rise to the next level above. In order to achieve this, the floor at the top of each partition is pulled back, while a number of steel beams are cast in the concrete to allow light from above to wash down each wall.
Ground Level

1) Entrances/Exits
2) Concessions
3) Men’s Restroom
4) Women’s Restroom
5) Elevator
6) Access Ramps
7) Access to Spectator Seating
8) Picnic Areas
Looking Toward The West End Of The Stadium
Ground Level
1/64" = 1'-0"
Ground Level
1/64" = 1'-0"

Traveling The Length Of The Ground Level Concourse
Looking Toward The East End Of The Stadium
Ground Level

1/64" = 1'-0"

Transition From Telluric (Of The Earth) To Tectonic (Of The Sky)
Tectonic (Of The Sky)

Tectonic is defined as “of or relating to building or construction.” This process of architectural building is characterized by a seemingly weightless structure, constructed from lightweight units of different lengths.
The tectonic element consists primarily of the largest section of spectator seats lifted to the sky. To reduce its visual weight this element is constructed of steel. Being a relatively thin, sleek material, steel lightens this upper element, letting it “float” in the sky. The type of environment portrayed in this upper portion of the stadium is suggestive of structure and openness, in addition to an enormous presence of light.
The configuration for the upper portion of my stadium is constructed of a series of steel columns that support the grandstands. To achieve the perception that this element is “of the sky,” each column was designed to appear as if it were floating off the ground.
Similar to the attention given to the concrete partitions, the steel columns were designed in such a way as to reinforce the idea that they were "of the sky." Even though the solution to this problem lay at the base of the column, the treatment of the column meeting the floor had to be different from that of the concrete elements. My proposition was to add material rather than remove it. For this, an extension of the base plate that lies above the pack of nonshrink grout provided the best possible impression that the column was floating above the floor.
In order to continue the idea that the contents “of the sky” portion appear to float above the ground, the window mullion system that is apart of the outermost portion of the steel frame was additionally raised above the floor. In order to achieve this, the steel plates underneath the columns were extended to support the mullion system as well. Uniting the column and the glass proved to be a simple method that brought the outer portion of the stadium together as a single floating structure.
This portion of the stadium serves as the transition from the concourse on the upper level to the uppermost section of stands. Here lies an architecturally significant area of my stadium’s design where the elements “of the earth” and “of the sky” meet.
Since this is a point where both elements unite, it is important to ensure both ideas are evident. For this, the end of the steel beam is supported by a concrete partition that is rising from the floor. The steel beam meets the partition at the top, and is welded to an oversized steel plate, which in turn is anchor bolted to the concrete. The oversized plate is used here, in addition to the base of the steel columns, to reemphasize the perception that the steel appears to be floating.
Seating in the upper section of grandstands will be general admission to all spectators. Located underneath the steel stands is the upper level concourse. This section includes the press box, concession stands, and bathrooms.
The steel bleachers are supported by a diagonal steel beam that spans from the top of the stadium to the concrete partitions on the second level concourse. Each diagonal steel support rests on a series of spandrel beams running in a lateral direction, which in turn are supported by a series of steel columns.
The outer portion of the steel framework is made up of a glass and mullion system, which is cladded with corrugated metal. Openings of different sizes were cut in the layers of corrugation to allow light to illuminate the space inside.
The mullion system for the glass windows is positioned by way of a continuous steel angle and joined by a ¼" neoprene sealant on the steel. The corrugated metal sheets that line the outside are in turn screwed onto a series of angle clips that are welded to the outside of the steel frame.
Corrugated Metal

Angle Clip Welded To Flange

1/4" Neoprene Sealant

Horizontal Steel Beam

Continuous Steel Angle

Horizontal Mullion

1" Double-Pane Glass

1 1/2" = 1'-0"
Upper Level

1) Press Box
2) Concessions
3) Men’s Restroom
4) Women’s Restroom
5) Elevator
6) Access Ramps
7) Access to Spectator
   Seating
Upper Level
1/64" = 1'-0"
Traveling The Length Of The Upper Level Concourse
Entrance To Upper Level Grandstands
Baseball Stadium

Approaching The Stadium From The Parking Lot
The Main Entrance For Spectators
Arial View Depicting The Telluric (Of The Earth) Portion Of The Stadium
Observing The Steel And Metal Corrugation That Is Tectonic (Of The Sky)
Aerial View Depicting The Tectonic (Of The Sky) Portion Of The Stadium
Upper Grandstands That Are Tectonic (Of The Sky)
Middle Grandstands That Are Telluric (Of The Earth)
Blanket And Lawn Chair Area
Conclusion

“As humans we exist literally and figuratively between the earth and the sky... Architecture not only reflects and represents our world, but is intimately woven into the very reality of our existence. We inhabit it, dwell in it, live it. It structures and articulates our relationship to the earth, to the sky, to nature and our fellow beings, and ultimately to ourselves... Works of architecture, through their form and order gather, condense, and give presence to the earth and the sky, and bring them into harmonious congruence.”
- Guntar Dittmar

It is through this harmonious congruence that I hoped to achieve true beauty through my design. By combining the telluric and tectonic concepts of architecture it is my aspiration to instill another reason for cheering among the players, spectators, and community.
Bibliography


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