BETWEEN ACT AND ARCHITECTURE:
A TRAVELING STAGE

Illustration 1

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ABSTRACT

"If you manage to make the audience and the performers share the feeling of discovering together, then you have created magic and succeeded"

Mariza Theofylaktopoulou, Greek director-actress

Inspired by the Bee Breeders' recent competition for a "Pavilion of Humanity," this thesis explores the human experience and imagination — across cultures and continents — through the architectural language of the theatrical venue.
In short, what would a "theatre of humanity" look like?

Between Act and Architecture aims to better understand and re-imagine the constant yet ever-changing relationship between culture, space, and the performing arts by developing a traveling culture-neutral venue. Since the dismissal of a permanent structure results in the lack of a determined location, the urban consequences of a mobile theatre construction must be handled unconventionally and thus much more conceptually than the common "black box" establishment. Accordingly, investigations into structural and architectural synergy are best guided by an integrated design process and detailed body of research on not only stage and theatrical venues but also kinetic and smart structures.

The proposed venue holds vast potential for promoting cross-cultural growth, as its design is not intended for only one regional or continental context, nor theatre enthusiasts and arts patrons alone. Its traveling nature speaks to a fundamental truth: curiosity is alive in everyone, everywhere. To initiate this "theatre of humanity," the venue will be assembled and disassembled on one continent and reassembled on another. Traveling from Cairo to Hamburg — the home cities of the authors — the theatre's core principles of adaptability and accessibility, particularly to diverse urban and cultural contexts, come into the spotlight.

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READER'S GUIDE

The most commonly used structure in a theatrical play follows a five-act blueprint. Act I, the exposition, sets the scene as the characters emerge. Act II, the rising action, introduces an issue or conflict and a journey proposal. Act III, the climax, unpacks the experience of that journey for the protagonist and supporting characters. Act IV, the falling action, introduces doubt, a moment of final suspense, and the personal reflections of the characters. Act V, the denouement, resolves the conflict(s). For that reason, this report is divided into five parts or acts, with a few intermissions.

Act I: Problem/introduction (Exposition)
Act II: Analysis (Rising Action)
Intermission I: Reflections on the analysis process
Act III: Sketching (Climax)
Act IV: Synthesis (Falling Action)
Intermission II: Reflections on the sketching and design process
Act V: Presentation (Denouement)
Epilogue: Conclusion and reflection

The program introduces the project, followed by an analysis of the framework of this thesis. It includes a conclusion that will determine the design criteria and a vision to direct and shape the design process. Different case studies were selected to highlight the particular aspects of theatrical architecture theory that inspired the design process.
The second part summarizes the design process, presenting the development of the design and explaining the thoughts behind the final result.
The last part presents the final proposal venue, explained through a series of visualizations, diagrams, texts, and plans. A written conclusion and reflection of the process and result.
The literature is referenced with the Harvard method and all sources and a list of illustrations appear alphabetically at the end of the paper. The appendix will be handed in as a separate document.

Illustration 2

I. PROBLEM & MOTIVATION

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What, Why and How ?

The transfiguration of humans while performing is in part triggered by form and paint, implanted into a surrounding that defines both the individual actor's reaction and the collective interaction (Schlemmer, Moholy-Nagy, Molnár).

Historically, this transfiguration is as old as ancient Greece, where theatre mirrored the politics and society of the state while serving as a platform that not only entertains but also informs. Over the centuries, theatre developed according to the different societies that used and formed it (Wiles).

Still, for all cultures, the theatre is a social gathering that celebrates, even preserves, culture — which is threatened by the ascendancy of the digital age. Although films can be entertaining and culturally educational, they rarely manage to provide the natural interaction between humans and space.

These days, while more and more film actors are being digitally inserted into scenes, theatre allows for a natural spatial relationship. Only this relationship between the architecture and the theatre allows for the actors to perform the act in its full power and meaning (Hunter 26).

Moreover, the theatre offers an integrated experience in which the viewer becomes a participant, therefore a shared experience is made both on and off the stage. In the digital age, and now augment-

Illustration 3: Modern Day TV and Streaming disconnects essential human interaction

I. PROBLEM & MOTIVATION

What, Why and How ?

ed by the COVID-19 pandemic, physical interaction between humans in a natural environment has become rarer than ever before; we live in a paradox of globalization and isolation. To break this paradox, it might be necessary to provide a common assemble area that is not bound to one location and thereby becomes a physical support of globalization. The goal is to then investigate the potentials of a transportable and flexible theatre or venue space that can embrace the spatial relationship between act and architecture to create a powerful and real interaction among humans.

The traveling aspect will be technically challenging while providing the opportunity to develop a new theatre typology. Therefore, a technical challenge will be to design a theatre that can travel the world.

Can architecture and engineering provide a solution that is practical in its application and empowering in its design, can a new typology of stages and theaters be achieved?

Illustration 4: Live stages and performances create unique moments of human interaction

I. METHODOLOGY

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Evidence-Based Design

Evidence-based design, which originally stemmed from medical practice is “A process of the conscientious, explicit and judicious use of current best evidence from research and practice in making critical decisions” (D.Kirk Hamilton, David H.Watkins, 2009) Evidence-based design uses multiple forms of evidence to guide decision making. The types of evidence can range from research papers, opinions from professionals in relation to the topic, interviews, published papers or one's own experience. (Stichler.J 2016) In this paper several investigations will be presented, the history of theaters, the social relation the technical relation, and the users. These topics will be supplemented by research papers, books, and Online credible sources. Interviews will be conducted as well, getting insights from people in the industry and their thoughts on the problem. To assess and direct the design process, an initial investigation of kinetic architecture and technical terminologies will be presented as well. The Idea would then be to use the evidence-based approaches in our integrated design process, mainly in the analysis and sketching phases, to reach a defined and derived design solution.

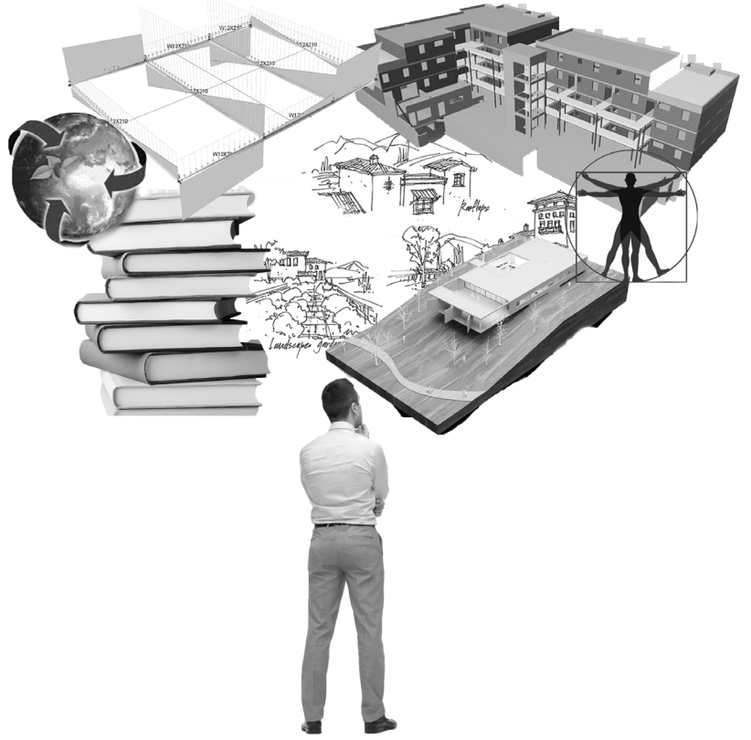

Illustration 5: The Architect and the Tools

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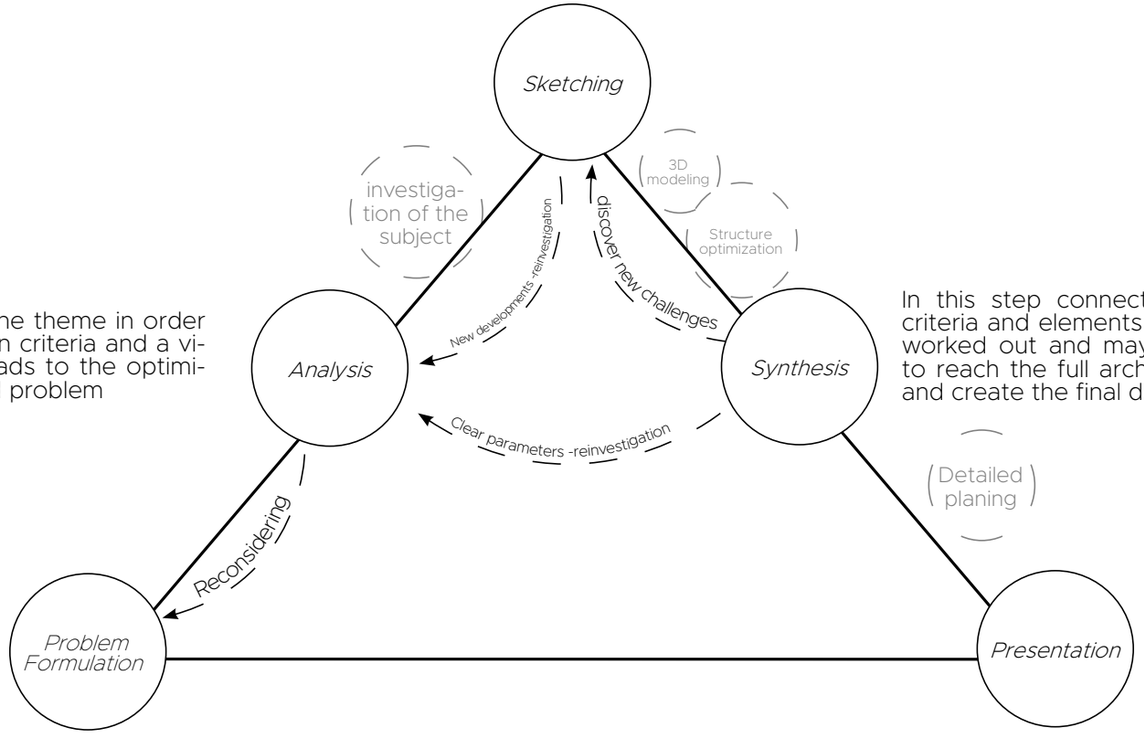
Integrated Design Process

One of the processes in which this paper will be conducted will be the Integrated Design Process method; which can be considered an interdisciplinary method that stems from the problem-based learning concept. The Integrated design process consists of five main key steps that do not have a linear order per se, but a stacked back and forth relation. (Knudstrup, M. A., 2004).

Here, the journey begins, developing the vision into a conceptual shape. Different parameters are applied in sketches, and simulations, which are then optimized.



Investigation of the theme in order to develop design criteria and a vision. This also leads to the optimization of the lead problem

In this step connections between all criteria and elements of the design are worked out and maybe reconsidered, to reach the full architectural potential and create the final design.

The beginning and introduction of the main theme and approaches. Stating the issue or Problem

This phase presents the final result of the design process.

Illustration 6: The integrated design process

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Drama Pyramid

These five steps can also be found in a five-act play. Given the theme of the project, the process will be connected to the framework and development of a theatre play. The novelist Gustav Freytag arranged the play's five acts in a pyramid symbolizing the tension and suspense of the act in the context of the play. This categorization is an abstract approach that can be used to illustrate the course of action of a specific play. In this case, it is used to make a first connection to architecture by relation the plot development of a generic five-act play to the design process. Which will act as a guide through this thesis development.

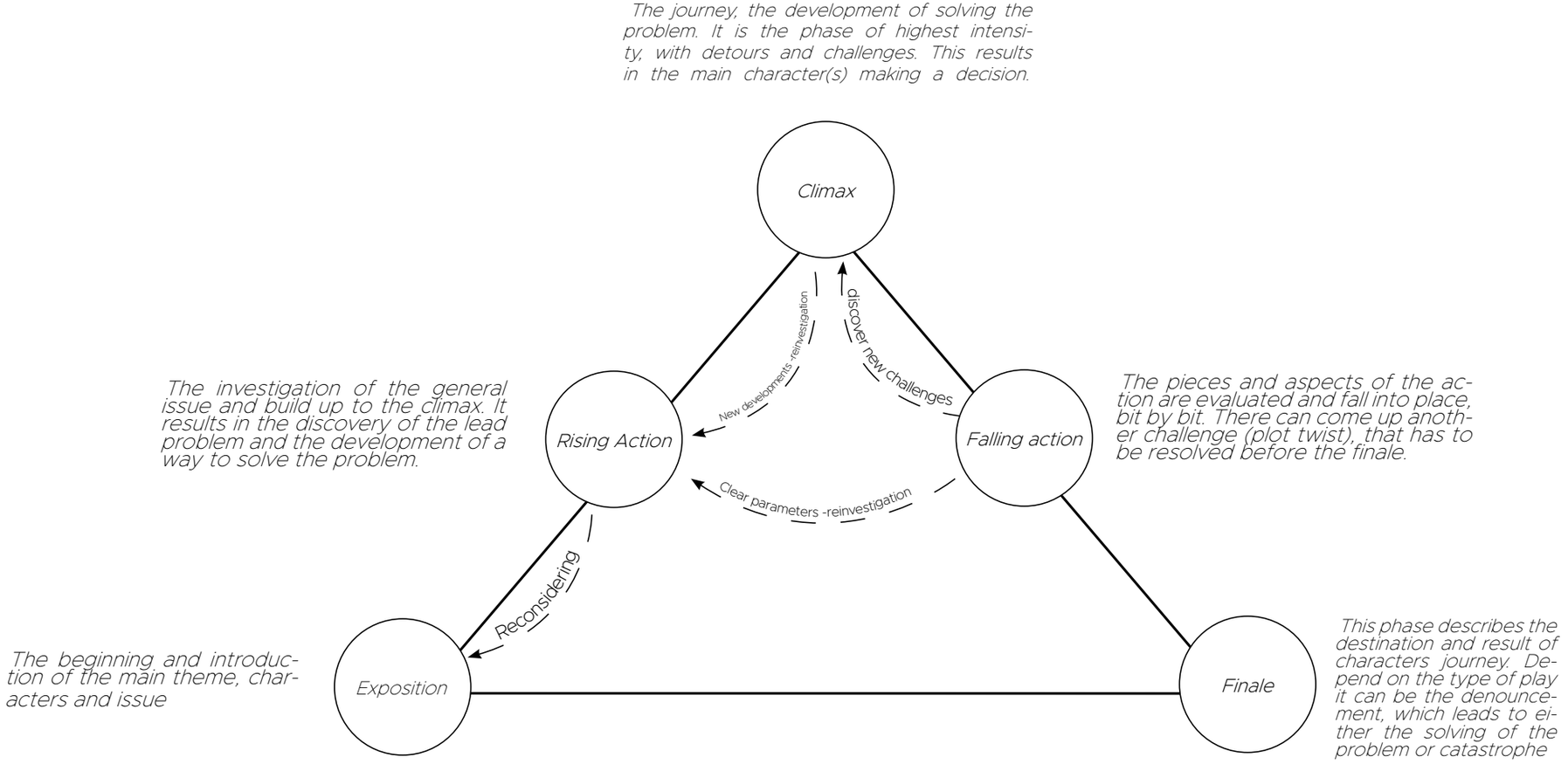


Illustration 7: Gustav Freytags drama pyramid

Illustration 8: What is a theatre ? What is a stage ?

Illustration 9

* More details about the history in the appendix

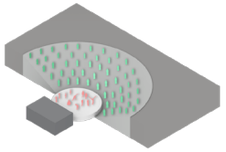
II. HISTORICAL EVOLUTION OF THEATRE : ARCHITECTURAL & SOCIAL

Prehistoric

Pre- 500 BCE

Defined by the telling of stories as an important event of social gathering and education. Here ritual performances can already be differentiated from the drama by either active or passive participation of the audience.

Central stage
Campfire experience



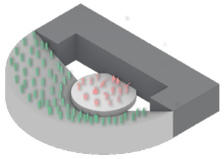
Early Greek theater

500 BCE

The first culture to consider spatial surroundings of actors and audiences were the ancient Greeks and developed the first purposefully planed theatre buildings.
Here, theaters as the stage of (sometimes religious) education were directed at the whole community and were, in combination with the temple facilities, the center of social gatherings.

A theatre event was not just available for everyone, no matter their status, but even compulsory. This demonstrates the importance of theatre as in the democratic society of the ancient Greeks.
More so, the shape of the auditorium allows an equally good view of the stage, but more importantly good acoustics.

Usage of Cone like geometry for seating and acoustics

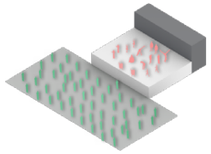


Roman theater

4 BCE

The Roman Empire took over most of the Greek theatre building concepts but added the structure of the circus, which quickly rose in popularity. This building had a less educational intention, but rather focus on the aspect of entertainment. This reflects the society, formally a democracy, aiming to eduction the community, now a monarchy that uses the circus to keep the wide mass entertained.

Usage of Cone like geometry for seating and acoustics while making more use of the back stage

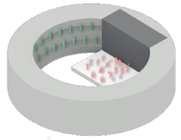


Early middle Ages
Pagent wagons

500 - 1500

A historic example of mobile theaters is the pageant wagons, mostly found in mid-western Europe from the 14th - 16th century. These were mobile theaters where the common people witnessed the plays of the church and later used by trading guilds as entertainment for the masses during bigger assembles, for example, market events.

The wagons would be clustered together to act as a form of early festival, but also pushed together to create a bigger stage.



Elizabethan/
Shakespearian

1500-1600

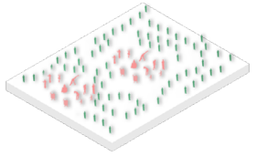
The public attention and popularity of theatre defined a new theatre typology. This re-introduction of theatre made people purposely gathered around a stage again, which required large, permanent stages.

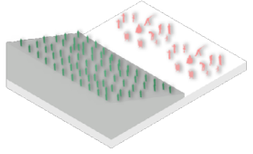
The Elizabethan had a 40 feet square large stage platform. Jet the stage is square and the view to the stage is dependent on the spot in the audience. Therefore, creating a hierarchy of auditorium seats.

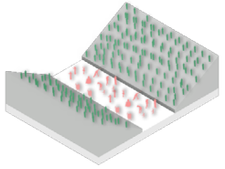
Back Stage
Seating
Stage
Proscenium
Performers
Guests

Architectural
SOCIAL

II. HISTORICAL EVOLUTION OF THEATRE : ARCHITECTURAL & SOCIAL







Social Gatherings for performances, Festivals, Experimental

21st century

1900- Onwards

Theatre experimentations took different forms and shapes. Black Box theatres offered complete flexibility based on the performance, while temporary stages were tailored for specific shows

A new wave of temporary stages also began to be built serving big festivals. These temporary structures coupled with advanced lighting technology and sound systems offered stages for musicians and performers to echo their arts to thousands of people attending.

20 th century

1950 - 2000

Cities invest in Cultural and leisure facilities, creating big multifunction halls that can host thousands of people. The technology of cinema is also advancing greatly.

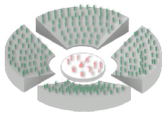
19 & 20 th century

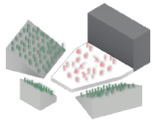
1800 - 1950

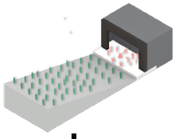
Probably a by-product of the growing theatre popularity of the mid-to-end 1800s was the viable social class separation, the seated area was divided by status and wealth.

The invention of the BioScope. The screening room became a part of the theatre building program.

During World War I & II theatres either operated in secret and expressed political opinions or were used as propaganda







18th century

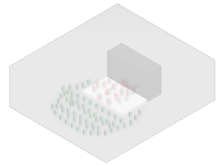
1700 - 1800

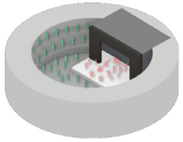
Entertainment and with it theatre being a secondary human need, faded in contrast to the serious matters of the time.

After people were more encouraged to build and innovate in their types of theaters, and from there came the music hall theaters, where the audience became a fluent in- and out-stream of people.

During World War, I & II theatres either operated in secret and expressed political opinions or were used as propaganda

Different forms of theaters and auditoriums showed up like thrust stages, or round stages, or rectangular Proscenium stages





The Renaissance

1600 - 1700

Theatre becomes a private and very exclusive event. Therefore, the area of the play is fully enclosed. These buildings are carefully planned and become monuments for the urban context.

Theaters moved indoors while introducing the "Proscenium"

II. SOCIETY, MEANING AND THEATRE

The relation and the connection

Given the ancient roots of theatre, and the vast range of transformations that it has undergone, one can say that its role amounts to much more than just a form of entertainment. Theatre changed how people related to one another socially, culturally, and politically, as it educated and informed them. At some point, acting was not restricted to the stage, becoming a way for people to navigate life, society, and the world.

The role of education, however, cannot be understood only through the classic sense of transferring information. Often drama can be used to address social questions or conflicts. The stage can be used as a litmus test, or even a playground, of the human condition, experience, and imagination. This is one of the aspects that differentiates the "modern" drama from ancient rituals: the element or problem of conflict that is dramatized, and the viewer that is emotionally involved, but not actively participating in the act, is thereby given the chance to observe. This question or conflict of society is the key to unraveling the purpose and function of modern theatre. (Radivoje Dinulović, 2015)

When looking at the theatre as an educational space for finding answers to the questions and conflicts of the day, it makes sense that every country in the world developed its own kind of drama, aiming to solve the question that is dominant in their society. Because

Illustration 10: Image of the final Scene from The Visit (1956) preformed in Zürich

II. SOCIETY, MEANING AND THEATRE

The relation and the connection

of the now-rapid globalization of our world, the questions of the individual societies will not disappear, but there is a need for addressing collective stories and understandings.

Furthermore, it is undeniable that theatre has played a form giving role on an Urban scale. The cites assembly space, which was previously the church, shifted back to the theatre but never regained the same status as it had in ancient Greek times. But the role of the stage as a literal “center stage”, lost this position towards the end of the 20th century and was used for entertaining purposes only. Before, and during ancient times, the theaters' role could be compared to that of the town hall. A more modern Example of the theatre used as a final stage of democratic decision-making can be found in the final scene of Dürrenmatt’s: The Visit (1956). In the image below, the major (on the stage) and the townspeople (around) have to make a democratic decision which leads to the final action of the story. And although the town has a town hall, this scene, intentionally takes place in the towns' theater.

Illustration 11: Image of the Pulitzer Prize-winning play August: , 2011

II. THEATRE BUILDING AS A BLUEPRINT

Performances and events blueprint.

In more recent years theatre was merge with many other uses to address a wider audience, therefore the theme stage and theatre were considered from a more holistic perspective. The term "stage" and "theater" are very closely connected and thereby it is hard to pinpoint where the stage as "A raised floor or platform" became the theater, as in the entire building that hosts stage and auditorium.

The earliest examples of theaters that were included in the historical investigation were the theatres of the ancient Greek era. Although they have something presented that, according to our modern definition, it would be considered as a classic dramatic performance, the perforce of these plays went way beyond entertainment.

Back then theatre had a similar multipurpose use for the community and was combined with other facilities, much like it was "re-imagined" in the 20th century. Jet we connect theatre with entertainment only because the buildings were more and more designed to fully support complex plays, while university auditoriums been given other requirements. So the purpose of the theatre became associated with keeping the population entertained, especially during the 20th century, and has in that form been overtaken by the film. Nowadays many would consider theatre as a cultural heritage but not think of the many uses a simple stage and auditorium could have when stripped of every-

Theatre

3. " The area in which something happens"

Definition accounting to lexico.com (by the oxford dictionary):

Illustration 12: Image of a standard university auditorium

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THEATRE BUILDING AS A BLUEPRINT

Performances and events blueprint.

thing that makes it "ideal" as theater. Therefore, the lexico.com third definition of theatre as " The area in which something happens" was more fitting to describe the theatre of the 21st century. In order to bring back the multipurpose range of the ancient Greek theatre and its role in society, a building is needed that can offer a flexible stage and auditorium, which can be easily adapted to host different events, by being adjustable to different requirements.

A Stage

"A raised floor or platform, typically in a theatre, on which actors, entertainers, or speakers perform"

Definition accounting to lexico.com (by the oxford dictionary):

Illustration 13: Image of a generic seminar or presenation

II. THEATRE STYLES NOW

Types of Modern Drama

All types of acts or theatrical productions require a certain level of stage and production tools to help strengthen the performance and the type of drama being presented.

The stage set and production tools range from movable backgrounds to certain lighting and lighting control, to pulley systems fitted to lift performers or props. (British Literature Wiki, 2018)

Knowing the different types of drama and their required level of technical production would guide the project in selecting the types of drama that could work for a traveling theatre

Type	Summary	Stage Requirements
Realism	Plays that reflect the direct observation of human behavior.	Requires heavy set production and tools
Social Realism	Plays that reflect the direct observations of human behavior, highlighting political conscienc-es and harsh pictures of poverty	Requires heavy set production and tools
Avant Garde	Plays that portray truths through mixing fiction with reality	Requires heavy set production and tools
Absurdest Drama	Lyrical and poetic theatre, abstract approaches to different topics.	Requires minimal set production and stage tools
Dadaism	An expression stemming from world war I, "Anti-Art". Offends and provokes political and human mischief in war, colonialism and nationalism	Requires minimal set production and stage tools
Symbolism/ Aestheticism	Stylized form of drama, dreams and fantasies being the main driver of the story.	Requires minimal set production and stage tools
Surrealism	Relying on metaphors and experimental performances such as surprises to the audience or the involvement of the audience	Requires medium set production and stage tools
Expressionism	Plays that usually have nameless characters and discuss or warn about our future as humans	Requires medium set production and stage tools
Epic Theatre	Based on Greek epic poetry, usually contains illusions and loud transitions from scenes.	Requires heavy set production and stage tools

(British Literature Wiki, 2018)

Can be performed in a traveling stage

Can be potentially performed in a traveling stage

Might be challenging in a traveling stage

II. STAGES AND SCHEMES

Stage Typologies And Requirements.

"Stage is a representation abstracted from the natural and directing its effect on the human being"

(Oskar Schlemmer, Laszlo Moholy-Nagy, Farkas Molnár ,1961)

Stage in some sense is the playground where the act confronts the spectator. The term Theatre itself always manifests a stage in it. However over the past years, as seen previously, different intentions of the act required different typologies of the stage. Like the famous chicken or egg allegory, Act or shape of space can be considered an allegory as well. As described by Schlemmer in the "Theatre of The Bauhaus, 1961" the stage can be categorized into three acts or intentions, oral and sound stage, play stage, or visual stage. A further diagrammatic analysis based on Schlemmer's studies is presented on the right. From this, similarities and differences between different stage types can be identified, which could help guide the design.

A theatre stage act is quite unique in terms of the stage technicalities and requirements. However, the act of a religious event or festival event is considered in the same category. Maybe a stage typology that can offer facilities for both acts lies in the (Borderline) area. From these relations, we can find mutually exclusive acts and decide which ones the traveling theatre/venue can host.

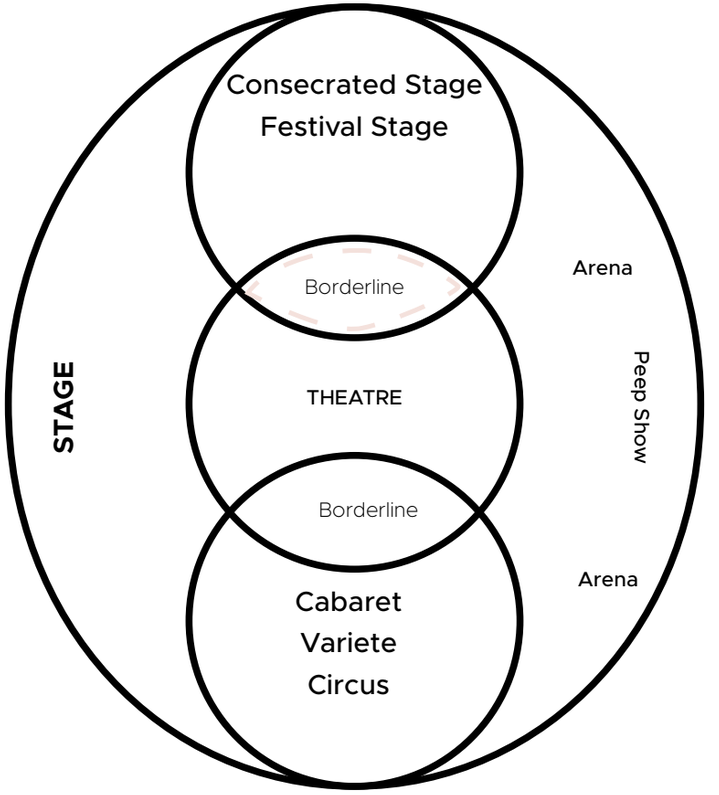

Illustration 14: Based on Schlemmer's Diagram illustrating different stage types and relations based on acts

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PERFORMANCE THEMES SUB CONCLUSION

Across eras and continents, theatre has fulfilled many roles and functions. Most notable is the role of education through entertainment. Whether it was the teachings of religion or mythology, the preservation of culture and history, or the exploration of human behavior, the material was presented in an entertaining form. This process of education through entertainment is still prevalent today. An example is the continual revival of classic plays to not only preserve history and culture, but also to comment on the contemporary moment. Here, the forces of globalization meet the rising interest in both individual cultures and collective stories.

Another lesson theatre teaches us, especially in modern plays, is the power of human expression. By using live performers and thoughtfully directing the energy exchanges between them, endless possibilities for the expression of a deep message or truth can be supported in diverse ways and forms. One of these supports is the architecture of the theatre.

Despite globalization, the theatre of this century is quite individual from country to country. Although being influenced by an international theatre scene, the world has yet to develop a unified international style. But, for the first time in history, the dramatic style is not dependent on technical possibilities, as the technology in film-making, like CGI, creates illusions that are not achievable by live performances. However, stages and theatres have assorted identities and typologies that serve different purposes today. Flexible and temporary stages are a central component of the festival culture, and black box theatres, along with mini-flexible interchangeable theatres, are integral for intimate performances and experimental productions.

By analyzing the origin and history of theatre, and exploring the different architectural approaches, the tremendous impact of theatre on society and culture, and vice versa, comes into clear focus. In doing so, fundamental relations between mutually-inclusive paradigms, architecture, theatre, expression, and the arts are formed.

Take Aways

- Encourage Gatherings
- Making people share experience/ create connections
- Using inspirations from the past in relation to their purpose

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SUSTAINABLE CULTURE

Importance of theatre in culture and society.

Theatre is one of the many tools that the visual and performance arts have to offer that are essential for cultural understanding and hence global sustainability.

Part of the UN Sustainable development goals includes “Ensuring healthy" lives and promote well-being for all at all ages” (Sustainable development Goal number 3). Several studies had established the link between cultural participation and well-being. An engagement in cultural activities had been proven to lead to a balanced and healthy psychological well-being, especially for the elders. In Fact, EU citizens had ranked access to cultural heritage and access to cultural activities such as theaters as a core component of well-being once basic needs were fulfilled. (Culture Action Europe, 2020)

Both theatre art and sustainability can lead to creative and innovative outcomes. Theatre and visual arts play a fundamental role in maintaining cultures and helps build healthy and fair societies. These are attributes that resemble and drive the development of our modern societies. With theatre art being pushed more and more into the background, with other forms of drama emerging, it is important to understand the unique way theatre contributes to cultural communication, understanding, and collaboration. Only by understanding this, the architecture can support the theatrical performance and contribute to the goal of social sustainability.

Ill(25) UN Sustainable Development Goal number 3

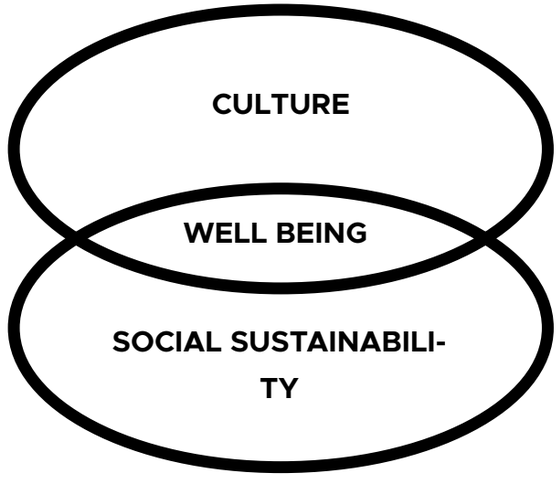

Illustration 15: Illustration showing the mutual exclusive relation between Culture and Social Sustainability

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THEATRE COMMUNICATION

Expression and Language.

It was previously addressed how theater, in contrast to film, is the experienced education (in its most basic form) of human behavior and interaction. In theater, viewers are confronted with new information that is communicated to them not just in visuals or sound, but in the combination of both. To outline this communication theatre also addresses other senses, smell or touch, which invites viewers to experience the performance on an emotional and cognitive level.

The audience does not just conceive the actor by seeing and listening, but by applying the actions to themselves and therefore experiencing the full range of the actions themselves. With this, the viewer experiences a new view, not of the actor, but him-/herself, initiated by the actor. In order to create this phenomenon, the actor needs to be spatially separated from the viewer, to create a state in which the viewer is in a spiritually active position, but not participating as him/herself in the action. Although this spiritual experience is a very personal one and therefore differing from person to person, the viewer is generally considered as a collective audience for whom the individual actor acts.

The expressive power of theatre can be concluded from the way theater, as (only) form of art, naturally incorporates all other forms of art. Literature, music, painting, sculpturing, architecture in addition to act-

"At a live event there are more emotions and eyes the viewer can observe and immediately relate to, unlike a tv screen where one is forced to look where the camera is pointing"

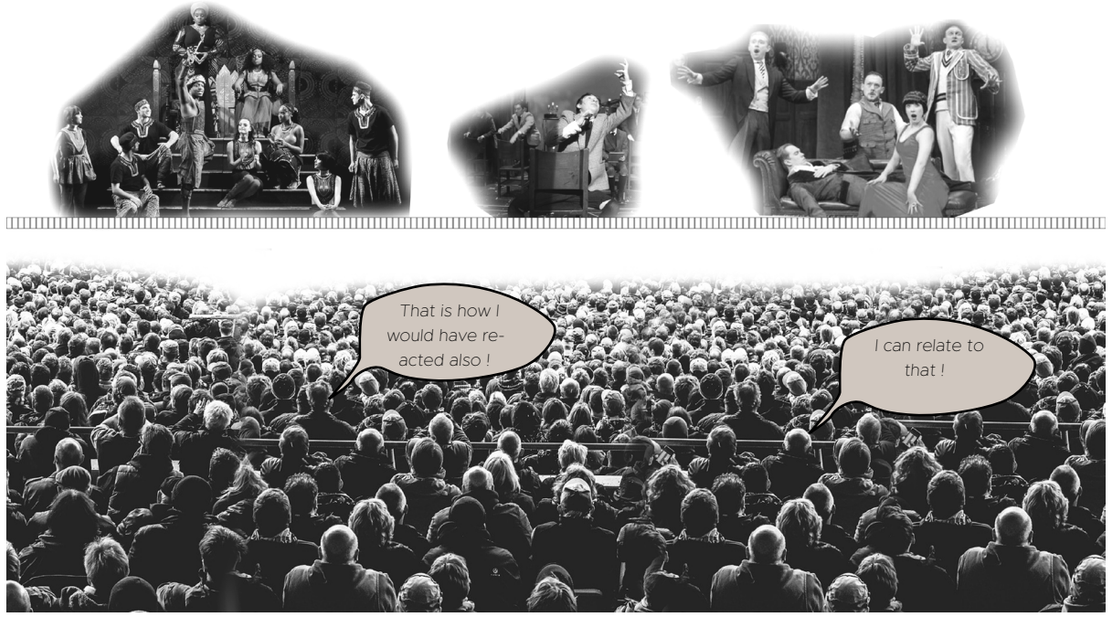


Illustration 16: Illustration showing the energy exchange and relatability of attending a live performance

I.
II.
III.
IV.
V.

THEATRE COMMUNICATION

Expression and Language.

ing which is used only in drama.

The German author Lessing goes so far as to classify all arts into two different categories describing the way the different forms of art communicate information. The first being time (e.g., Music) the second being space (e.g., setting), and by the conclusion the third being the synergy of both. (Radivoje Dinulović, 2015 pages 1-3)

Acting, as previously mentioned, is not just the only form of art that is unique to drama, but also the most characteristic element. Acting includes speech and movement (time & space). These are two actions that come naturally to humans, but while speech is always conscious, movement is an instinctive action or reaction of the human body.

The challenge for actors in drama is to consciously insert movement to create a structure of enactment that builds or maintains tension (Lines of Tension), as a connection to the spiritually active viewer.

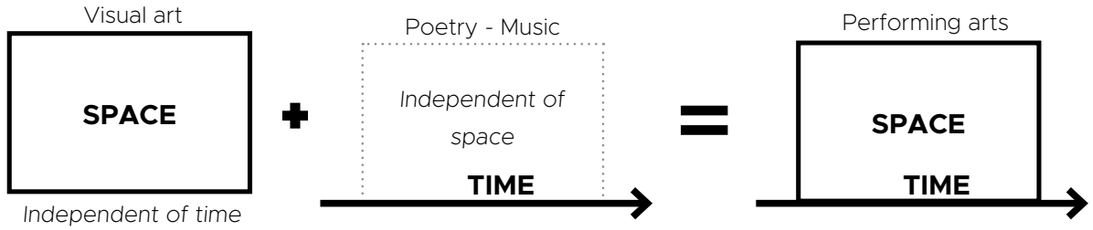


Illustration 17: Illustration showing the categorization of arts in time and/ or space by Lessing

II. CASE STUDY

THE ARTIST IS PRESENT

MARIANA ABRAMOVIC

In 2010 the performing artist Marina Abramović, created a performance consisting of only her, two chairs, (a table), and a viewer. The performance was held in the MoMA in an open area that could be seen from two (maybe more) levels of the Museum. The area in which the performance took place was only enclosed by a white tape rectangle on the floor and string on the height of a railing. The artist sits on one of the chairs and a viewer sits on the other. The Artist does nothing. The purpose of this being to build a connection with the viewer without the standard expressions of speech or movement, in a blank space. This communication simply being an exchange of energy between the two present humans.

This connection was intended to make the actor share the audience's energy and give it back to them with an experience that both can share. The job of an actor is to perform and thereby present. Since there was nothing to present other than the actor, the actor managed to establish a “clean, unique and personal connection” (Marina Abramović in “the artist is present”) between the artist and the audience. (“The Artist is Present”, 2012)

When considering this performance or rather experiment from a spatial point of view, it becomes apparent that although the intention was to not let outer factors influence the performance, the reduction of many usual loader elements, gave access to spatiality becom-

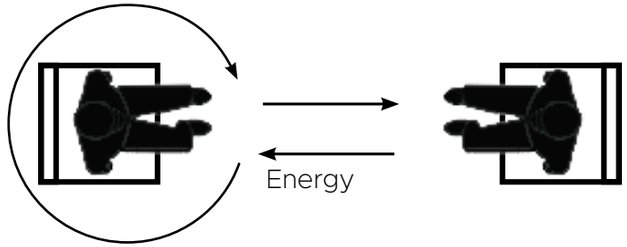


Illustration 17: Illustration showing the energy exchange from the exhibition

ing an important element of influence.

The spacial frame of this performance was: An open atrium of the museum, that was open to visitors at all times The space around the rectangle also crowded with visitors The space created by the artist

Only the first spatial separation is created by the architecture, the others are created by the audience and artist. Here, it has to be clarified that there is a difference between audience and viewer.

The audience in this experiment is the person in the characteristic space (in grey) of the artist, while the viewer is watching from the outside. This is a

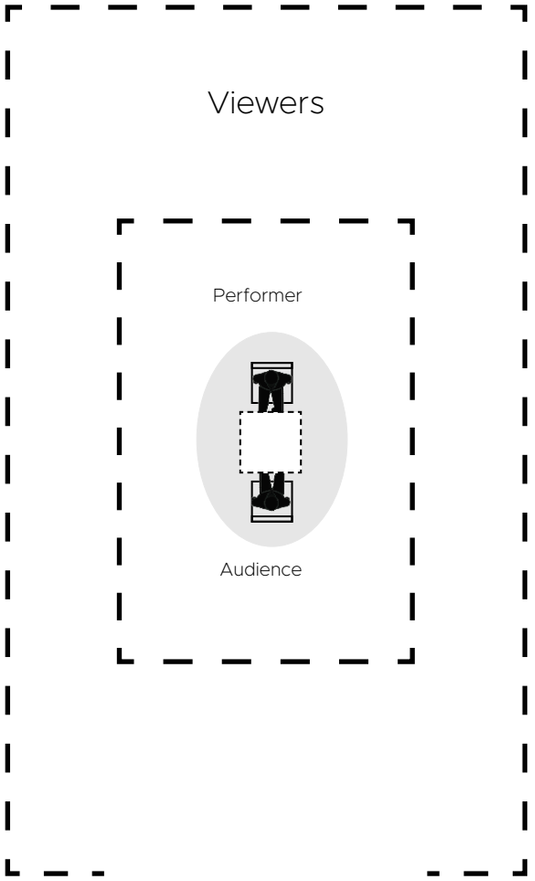


Illustration 18: The set up of chairs (and table) in the museum

perfect example to demonstrate how the audience is not actively, but spiritually participating. While the viewer is not participating at all, since the actor is not initiating the connection to them.

Another interesting element, that can be extracted from this performance, is the necessity of open space to create direct communication.

At the beginning of the performance, a Table was placed between performer and audience. This table was removed after some time because Abramović felt restricted in here connection and the table would block the space. While also saying this blockage was necessary during the early weeks of the performance to get used to the intensity of the connection.

TAKE AWAYS

Consider the experience of user and or viewer

Consider the dialogue of energy exchange in different zones

I.
II.
III.
IV.
V.

SPACES AND STAGES

Spacial Influence of Architecture to Drama.

"There is no theatre of our time, there are different theatres which due to circumstance exist at the same time and space" (Samuel Beckett)

The key element of theatre is the audience's experience of becoming a spiritually active part of another world. This world is communicated in space and time to provoke testing the borderline of the mirror images of reality and illusion. Both forms of communication are mainly influenced by the architectural design of the stage and auditorium. Speech, as an example of something that is affected by time, is influenced and manipulated by the architectural spatial design.

Communication by space is a very general architectural theme, it only becomes connected to drama when creating the "fourth wall", a separation between audience and performers. The viewer still needs to be able to mentally insert himself into the action, without participating as himself. This emplacement of the viewer into the illusion world is often referred to as "Mystification". (Radivoje Dinulović, 2015)

It needs a spatial separation between act and audience to allow for this effect to occur. This separation, however, should not limit or manipulate the connection between actor and viewer. In order for actors to perform their enactment, the stage configuration will influence the movement and therefore the information that is transmitted to the audience. The level of the

Illustration 19: Picture of a play performed in the street, The Fringe initiative, UK

II. SPACES AND STAGES

Spacial Influence of Architecture to Drama.

actor's freedom of movement, in this context also the actor's possibilities of presenting himself (the information) and then withdrawing again, is important for the communication.

Considering how the stages spatial and architectural characteristics influence the act, it is still clearly visible that architecture has a supporting role, while the performance itself has the lead. This becomes apparent when seeing how theatre productions are first written and then planed or fitted to the stage. The environmental influence is rarely considered. The reason for this is quite simple: Theatric plays can be very complex, in order to fulfill the technical requirements of such a play, the theatre building must be purpose-built and fulfill not just the requirements of one-act, but of a grand range of performances and plays. This architecture is purposely designed to create a neutral environment that does not influence the ideas, concepts, or characteristics of the play. This presents the conflict of the permanence of theatre vs. Theatre volatility. (Radivoje Dinulović, 2015)

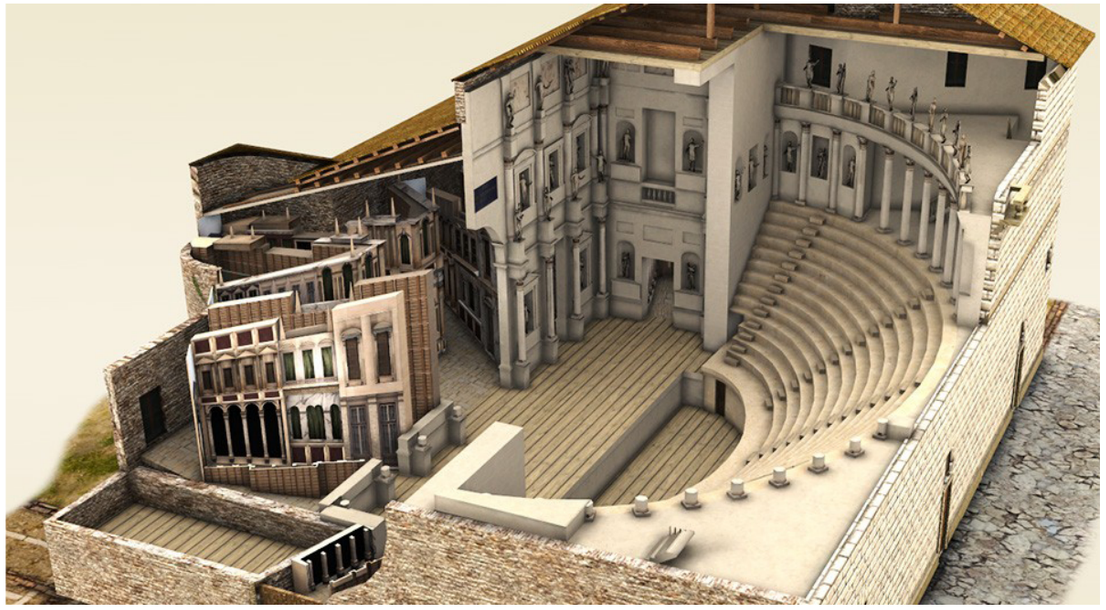


Illustration 20: model of Teatro Olimpico , Vicenza stage and auditorium.

II. CASE STUDY

Project: The total theatre
Location : - (never build)
Architect: Studio Erwin Piscator & Walter Gropius

The total theatre was a concept for a theatre typology that combines the traditions typologies (see history) to one adaptable space which hosts stage and auditorium as one, not two separate stage and auditorium spaces. Hereby, the intention was to break the 4th wall that traditionally separates the audience and performers. The goal was to achieve a "totales Raumgefühl" (complete feel of space).

Erwin Piscator was a theatre director and producer. His understanding of theatre and art, in general, was of a mostly political nature, in which he saw the stage as a pedestal of uncensored communication.

Walter Gropius, as the founder of the Bauhaus school, had previously attempted to design theatre or stage concepts that allowed the stage directors to use the theatre space as an instrument to enhance the theatrical expression, but only with Piscators vision and the merge of ideas, the concept of the total theatre could be worked out. Gropius had the approach of designing first and foremost for the purpose of theater, supporting the theatrical expression, and only secondary for building in its urban context.

WHAT WAS THE SOCIAL AMBITION OF THIS PROJECT?

The two developers and their individual understanding of art are strongly represented in this project. Piscator's

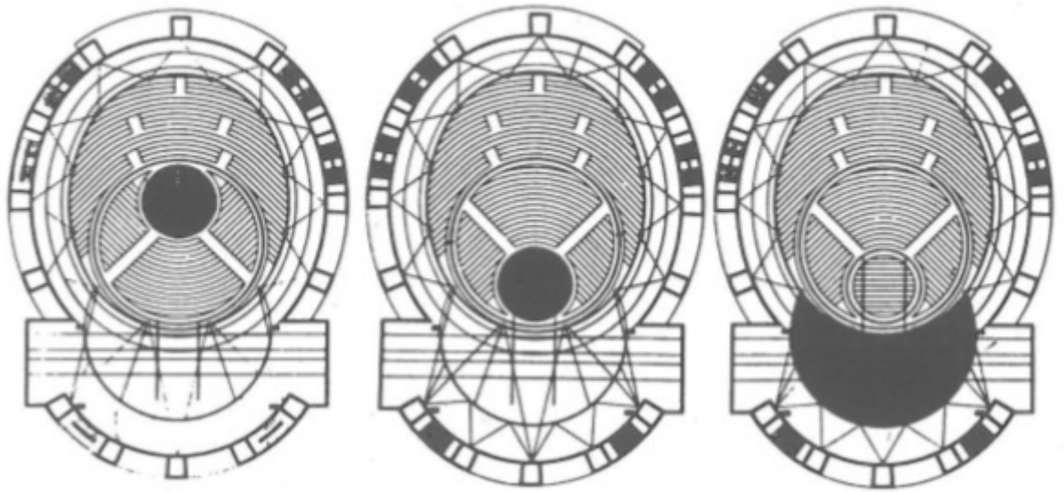


Illustration 21: Plans for the total theatre proposed by the architects

Illustration 22: A visualization showing the auditorium space of the theatre

understanding of art as a political medium can be seen in the breaking of spatial boundaries that would traditionally separate audience and performers and thereby create a hierarchy among them. But when the audience is actively included in the scene they become a necessity for the performance. This was the concept of the "Totale Raum" (total space)

The breaking of the traditional typology also had another intention: the equalization of all viewers. The Layout of the performance space in addition to the inclusion of the walls all around makes every spot in the theatre individual, jet equal.

HOW DOES IT WORK AS AN ARCHITECTURAL EXPRESSION FOR THE PERFORMANCE?

Gropius's architectural approach addresses the viewer experience. By merging the two spaces and the additional technology that allows the space to shift while performing makes the audience is spiritually involved in the play enhanced by the actively moving seating. This phenomenon was previously discussed in the previous chapters and was the driving force of Gropius design. The stage directors and the actors also profited from this stage flexibility since it gave the actors the possibility to use the dimensions of the room to its full extent and thereby enchant the audience. Combining the range of movement with the use of visual art in form of scenes all around the audience is an example of the general Bauhaus approach of combining arts to create a fully artist result, but it was not the initial design driver.

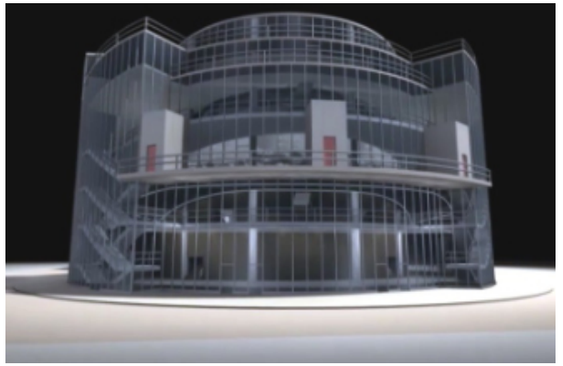


Illustration 23: A visualization showing the theatre from outside

TAKE AWAYS

Using art and expression as a medium for social and cultural influnce

Consider a total space, a space involving audiences and actors as well

I.
II.
III.
IV.
V.

THEATRE VS FILM

Why does it still matter ?

The most obvious difference between theatre and film can be experienced during the COVID19 pandemic by each and every one of us. Having meetings via video call vs. having them in person. By now everyone will have experienced the difference between being physically present and sitting in front of a screen.

Theatre and Film behave quite similarly. Both are derived from the idea of entertainment by drama. Screenplays are more popular than ever, considering the rising popularity of streaming platforms. It seems like movies make everything possible that theatre techniques tried to achieve over the centuries, like supernatural performances with the help of video editing. This points out the first major differences between film and theater: Theatre is always live, it can not be edited to create a different scenery or correct a mistake. This makes every performance unique and influenced by the audience.

A film is a recorded performance that allows the editing of mistakes, and this makes the performance equal every time it is watched. While this gives a great opportunity to visualize human imagination, it lacks the overwhelming emotion and truthfulness that only theatre provides. (Kaoime E. Malloy, last assessed 2021)

The experience of the drama of the 21st. The century could be categorized into 3 different situations. First being the Theater, when actors

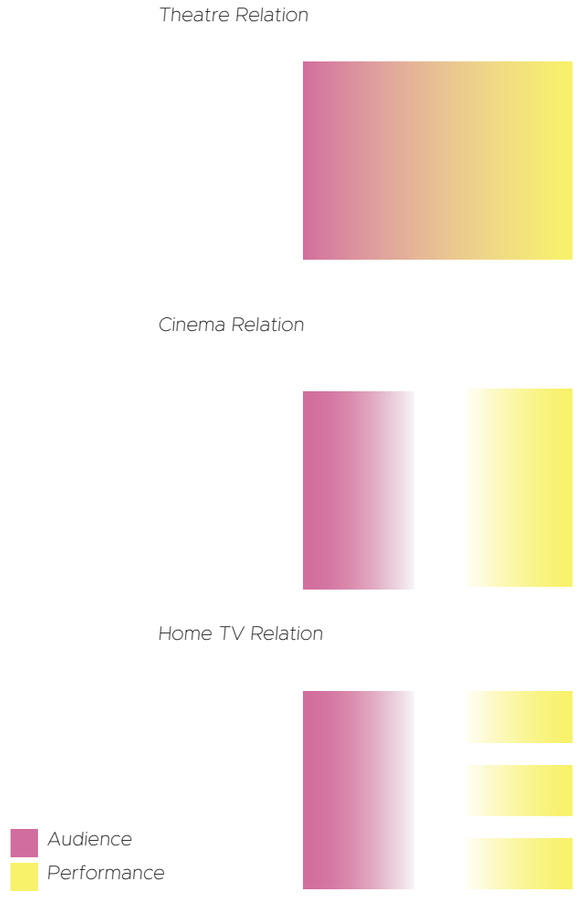


Illustration 24: Diagram of the different relations between audience and proformance

II. THEATRE VS FILM

and the audience are in the same space, both parties experience all influences in the play (light, space, temperature, smell,...) equally. Since the act is always the performance of a humans' reaction to their environment, sharing the same environment, enhances the authenticity and reasonability of the performer's actions, from the audience's perspective. This can lead to social growth and development by everyone sharing the same space thus experience.

Therefore, the movie experience, being the second and third types, have to be considered separate: Cinema and Streaming. The main difference between cinema and streaming is the separation of the audience members. This separation is a step that leads to making the experience more individual, lacking the collective information intake and emotional perception.

A movie itself already lacks the connections between audience and actors by separating the space of the performance (where it's filmed) thereby not giving the audience the full opportunity to relate to the actor, or rather place themselves in the action. In cinema, the audience is left in the same space to react to the performance, while streaming is a step in the development of drama where this is not part of the experience anymore.

Preserving the relation between Audience and Performer

Illustration 25: AUDIENCE - PERFORMANCE RELATIONS

II. FOCUSED SPACIAL IMPORTANCE

Stepping in and out of reality.

The program of the theatre building is an extension of the functions around the main attraction. Mainly the auditorium, including the stage. The relation between stage and audience/ actor and viewer is dependent on the spatial situation of this main area.

This creates a focus of architecture on the stage and the auditorium. Although the stage is the most significant function of the building it is not the only one. The secondary spaces are equally important for the theatrical experience as a whole.

The performance is supported by technical components. Historic development has shown how the stage space was impacted by the size of the audience and the size of technical equipment.

Very underestimated is the area outside of the “mystical world” created by the play. This could be the entrance hall, café, or simply a place that allows gatherings. This area is important for the audience to “demystify”, come back to reality and reflect on the experience. Only then the information is truly conceived. However, it is still important to spatially separate these areas so the audience can actively remove themselves from the mystical world. (Radivoje Dinulović, 2015)

Proscenium: It encapsulates the mystical space of the stage, and hides every hint of reality that might be used for the performance

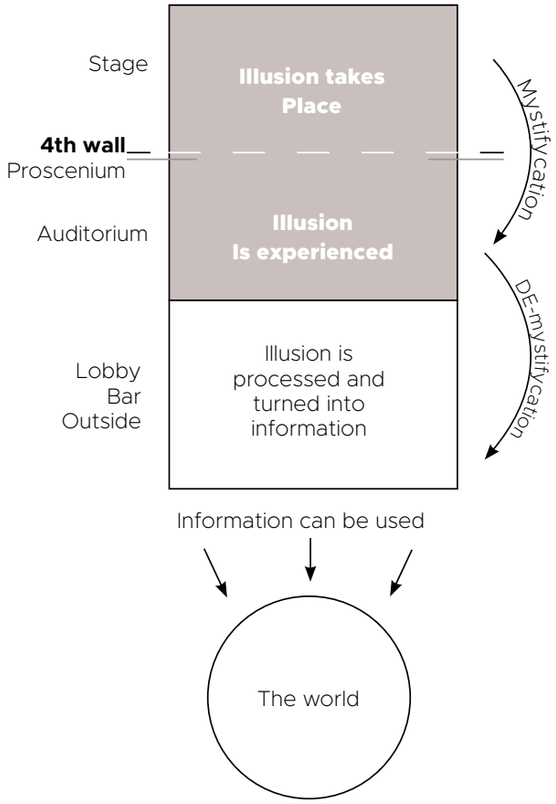


Illustration 26: Spacial Layout

II. SUB-CONCLUSION

The illustration on the right represents an interpretation of the 3 main zones, that when combined create the theatre building. The relation and transition between these 3 main zones guide the experience of the users both physically and psychologically through gestures in the design.

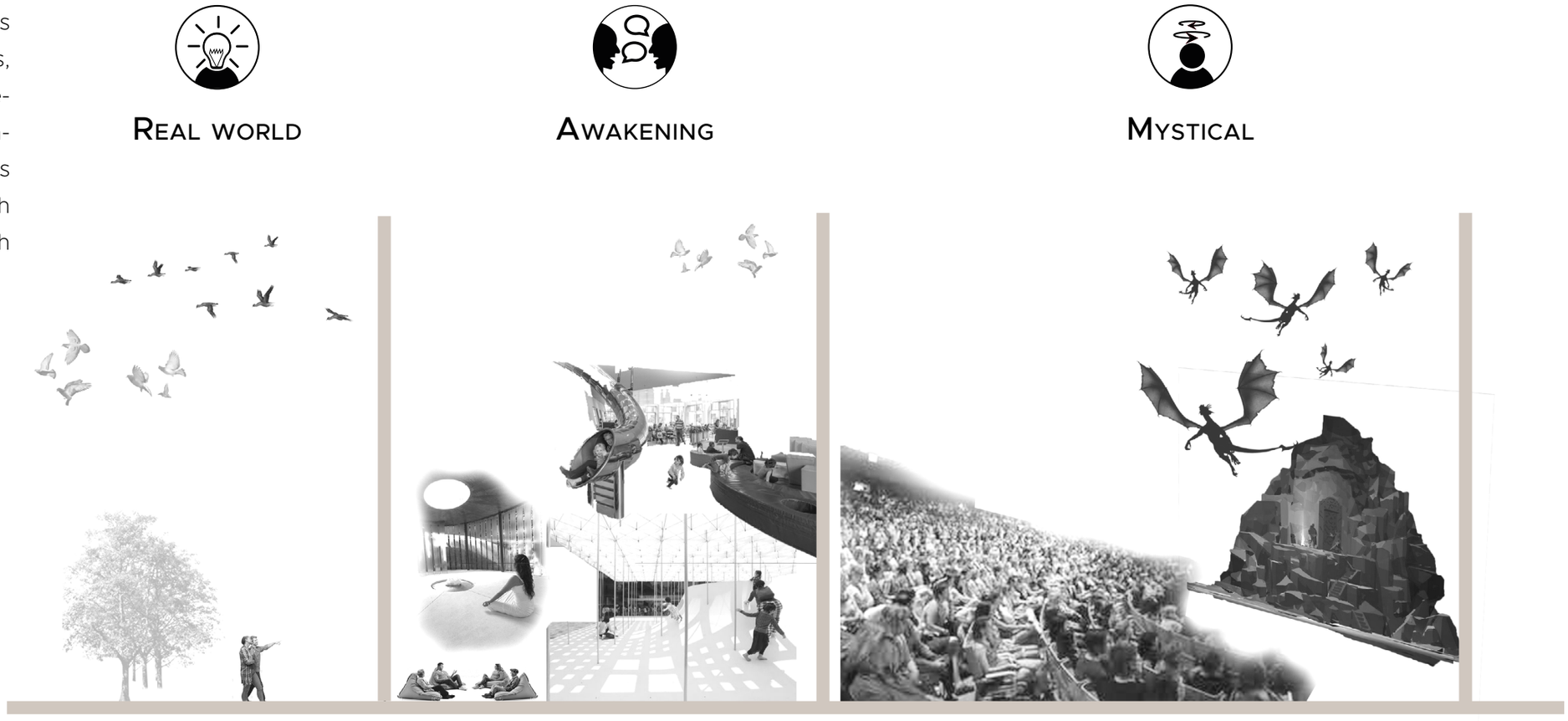
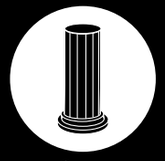
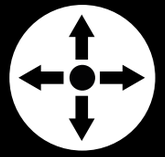


Illustration 27: 3d spacial layout: real world VS Mystical World

II. SUB-CONCLUSION

The main elements of communication can not be ignored while designing a stage. It creates “mystification” for the audience. Four of the seven identified elements of artistic communication are elements of space and thus have a direct connection to architecture, while the other three are indirectly influenced by the architectural support given. For instance, the stage as space sets the freedom or range of the movement, while the spatial design influences the reception of speech and music. Architecture influences the expressions of the performers and the audiences’ perception of their performances. A key challenge in designing a mobile and therefore necessarily simplified theatrical space emerges in questions on how to best utilize the expressive power of these elements. A potential of an adaptable structure is to influence the hierarchy of these elements in relation to the performance and environment. Historically, the hierarchy of these elements were determined by the play and went on to shape the theatre building. These permanent buildings are still used today and prevent new dramatic forms with different hierarchies from unlocking the full potential of the "architectural support" for their expression. In order to design a more sustainable and future-oriented theatre, it must adapt to the hierarchy of elements and spaces, both within and around the venue, from its interior layout to the exterior environment in which it is temporarily activated and integrated.

Elements of communication

Space	Time
 Scene	 Speech
 Costume	 Movement
 Light	 Movement
 Angle of view	

Take Aways

- Provide Mystification and Demystification space
- Adaptability to the hierarchy of elements of communication

II. CASE STUDY

Project: Khor Temporoary Theatre
Location : Amsterdam, Netherlands
Architect: TAAT
Date of completion: 2012

Designed in the Netherlands as a temporary structure, khor I offered a unique theatrical experience both aesthetically and functionally. The structure is designed with timber batons arranged vertically, forming overlapping pyramids. The spacing between the batons allows for light to diffuse as it enters inside. The overall form of the structure gives an impression like it could be a sculptural or an art project, expressing modularity and form.

The theatre was designed for a play that can be performed at any time without any guidance. Visitors go inside and read from rotating cubes as they circulate around the center of the structure, mirroring what Buddhist worshipers do as they move around the temple while sniping wooden prayer wheels. The installation itself explores movement and meditation. (Charlcraft, Emilie 2012)

KHOR I could be considered as an installation that bridges the connection between theatre, architecture, and the visual arts. By using only one material and relatively simple timber joinery techniques, the architecture stands out as stripped to its core and displayed to the users, giving the experience of being in touch with your surroundings with nature and the elements. (Charlcraft, Emilie 2012) The usage of wood as well creates a warm feeling as it is a natural and sustainable material. While the installation

Illustration 29: Outside shot of the project

Illustration 30: Interior of the project

can be disassembled at any time and reassembled it can be considered a sustainable installation as it does not leave a negative impact on the environment it is placed in (Charlcraft, Emilie 2012)

KHOR I is an example of a successful project that merged its function with its architectural expression. Inspiration could be taken from that project, in trying to represent the purpose of the building through architecture. That manifestation or synthesis can through the compulsion or the spacing of elements provide a guide for the user or the overall experience.

TAKE AWAYS

- Trigger experience and emotions to feel the humanity
- Aesthetics of the overall form. Impact-full presence, or a light presence
- Consider using one material for the whole design
- Experiential design approach

II. INVOLVED PEOPLE

Areas Of The Theatre and Crew.

One of the main user groups is the people working in the theatre and creating the performance. The range of involved people can vary, depending on the scale of the theatre and production.

A mobile theatre would be reduced to a "back-to-basics" theatre design, therefore the stakeholders would consist of a selection of the key members of the theatre and performance crew. It needs to be mentioned that by modern customs only the theatre crew is constantly connected to the theater, while the performance crew could travel from theatre to theater.

This opens the question: Should the mobile theatre stage have a permanent crew, or just offer a performance stage area for anyone?

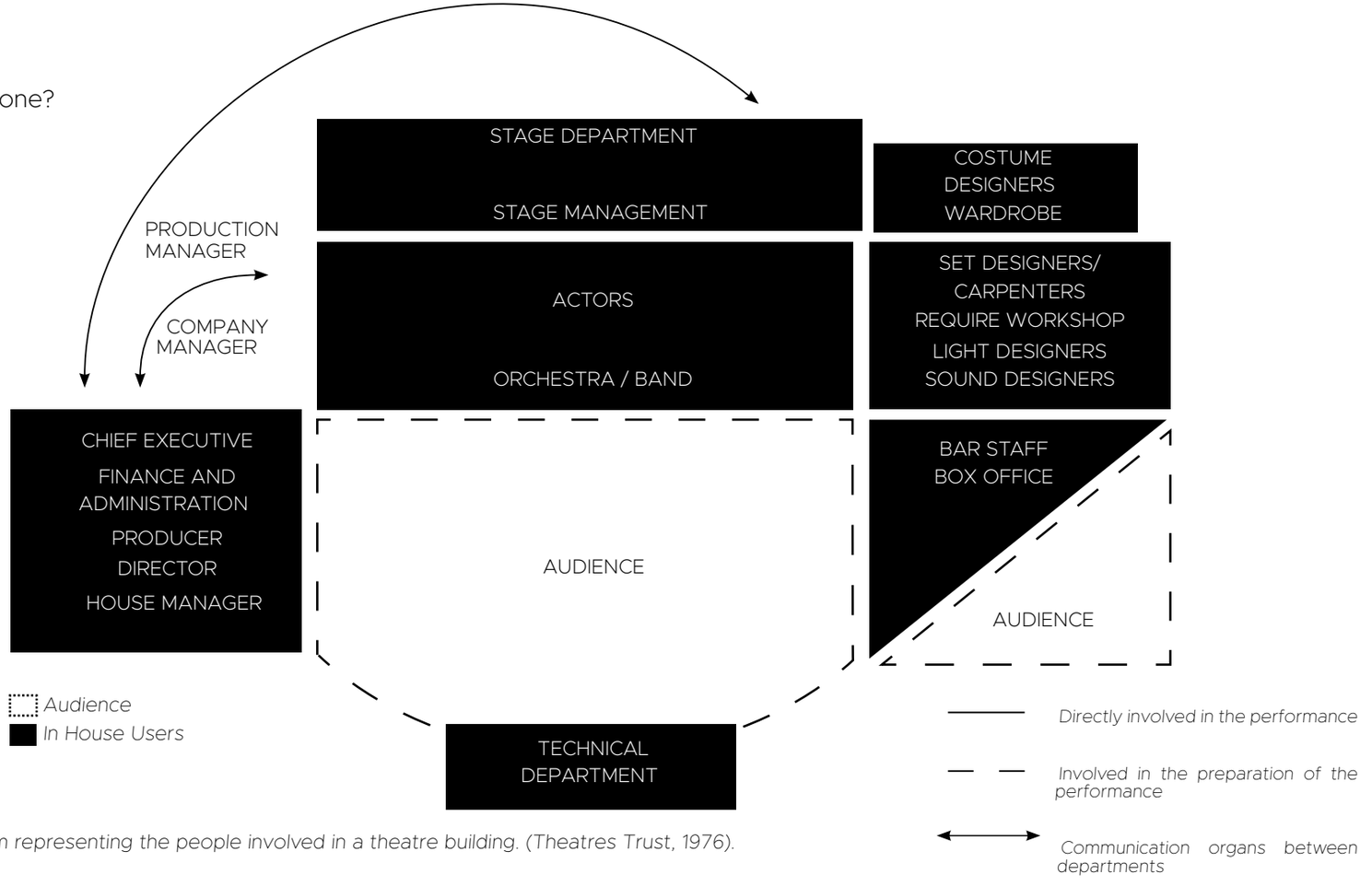


Illustration 27: Diagram representing the people involved in a theatre building. (Theatres Trust, 1976).

II. INTERVIEWS & INTENTION

Who Is Being Interviewed And How.

Part of our methodology and approach in constructing qualitative evidence-based data for our research is interviewing people who are involved in the industry. This introduces the concept of user-oriented design. The user-oriented design approach is quite important as it is a process where the architect takes users' perspectives and translates them and transforms them into data that is able to guide the design.

This design method according to studies increases the design awareness of the architect, empathizing with the user's needs and neglecting personal preferences or perceptions as the best solutions. (TVEDEBRINK,2018) The following five pages will contain an interview per page. Each of these pages is summaries of the interview itself. The interview was conducted in a form of an Online conversation or talk, revolving around four main questions. The questions were given to the interviewees prior to the conversation. During the conversation itself, naturally, the interviewees had given more insights and information beyond the questions asked.

The pages will contain rectangles with the questions asked in them, and dotted circles with the keywords extracted from the interview. The audio files for the interviews are attached with the submission of this document Online.

Format showing the interviews and how they have been translated

Rana Rawia - Actress

www.facebook.com/rana.rawia.official

Rana Rawia has been training & performing since 2014. She holds a degree in Bachelor of Arts in Anthropology. She is an assistant to the American Actor/Director/Acting Coach Gerald James.

Influence of the **stage** on the performance

- Movements are directed
- Prob/ elements in same space
- Viewer to performer relation
- Stage material

Influence of environment on performance ?

- Vision of light/ daylight
- Weather condition
- Sound (pollution)

Potentials of a moving theatre

- Flexibility
- Offering different contexts

Concerns of a moving theatre

- Permits
- Can not hold extravagant plays
- Storage and dressing rooms

Pola Kamel - Actor/Director

https://www.facebook.com/pola.kamel.562

Pola is a student whom attended the American university in Cairo and studied theatre and economics, but found his passion in theatre. Since his university degree and after he graduated he had worked on several theatrical productions as well as acting in them. He is working currently as a director for theatrical plays at the American University in Cairo.

Influence of the **stage** on the performance

- Lines of Tension
- Intimacy with actors and audience
- Set and stage guide directors
- Playing Arena

Needs of a 21st century play or performance

- Depends on intended performance
- Multi-functional spaces
- Rehearsal and revision in Tech Day

Potentials of a moving theatre

- Absurdest and minimalist plays
- If it can be multi-functional that would be cool
- Using the setting as a director

Concerns of a moving theatre

- Challenge of multinational Set
- Can not hold extravagant plays

Mariza Theofylaktopoulou

https://www.facebook.com/Loxodox

Mariza graduated from an acting school in Greece , since then she and her partner had opened a theatre company called Loxodox, based in Athens.

Influence of the **stage** on the performance

- How can it push and pull the space
- The extend of imagination it can offer
- Large theatre requires larger movements
- Depends on sce-nography

Potentials of a moving theatre

- Bring cultures
- Could have a dynamic to speak any language
- It could have a political message

Suggestions of A movable theatre

- How can the space change the point of view
- Change materials or elements on the stage for the audi-ence and actors to discover
- We forget that we are a body and we have an imagination
- Treat the space like a body as well

Concerns of a moving theatre

- What will the ar-chetype be ?
- Needs to be simple

Omar Madkour- Light Designer

http://www.omarmadkour.com/

Omar Madkour, Masters at Kal Arts & design, previously he had graduated from the American university in Cairo studying theatre, then opened his company specializing in lighting design.

Influence of the **stage** on your design process

- Adapting to the space
- Can create own space on stage with light
- Enhances dramaturgy
- Can create intimacy or opposite

Potentials of a moving theatre

- Connects with actor and audience
- Breaks the fourth wall
- Connection to human interaction

Do you rely on pre - designed trusses or structures in a theatre to design your lights ?

- Depends, if all is there then its good
- Can create my own lighting fixtures and structures
- If the venue offers flexibility that would be great

Concerns of a moving theatre

- Installed lights and light board operator
- Needs to be simple

Anna Wiesen

https://www.somewherelse.com/

Anna is the Creative Director and co-founder at Somewherelse. Somewherelse is a creative and production company rooted in arts and culture. We design and produce events, experiences, and content -

Influence of the **awakening area** on the experience - suggestions

- Could also be a **"teasing"** area
- Has to add context to the play
- Experience: Hearing, watching, FEELING
- Place elements that demand discussion

Thoughts about a movable theatre

- Parallels to the circus
- Soft, Light weight structure
- Adding to the context with seaming out of place

Potentials of a moving theatre

- Different venue - different event
- Forming spaces to the events demands
- Cause interest - inviting

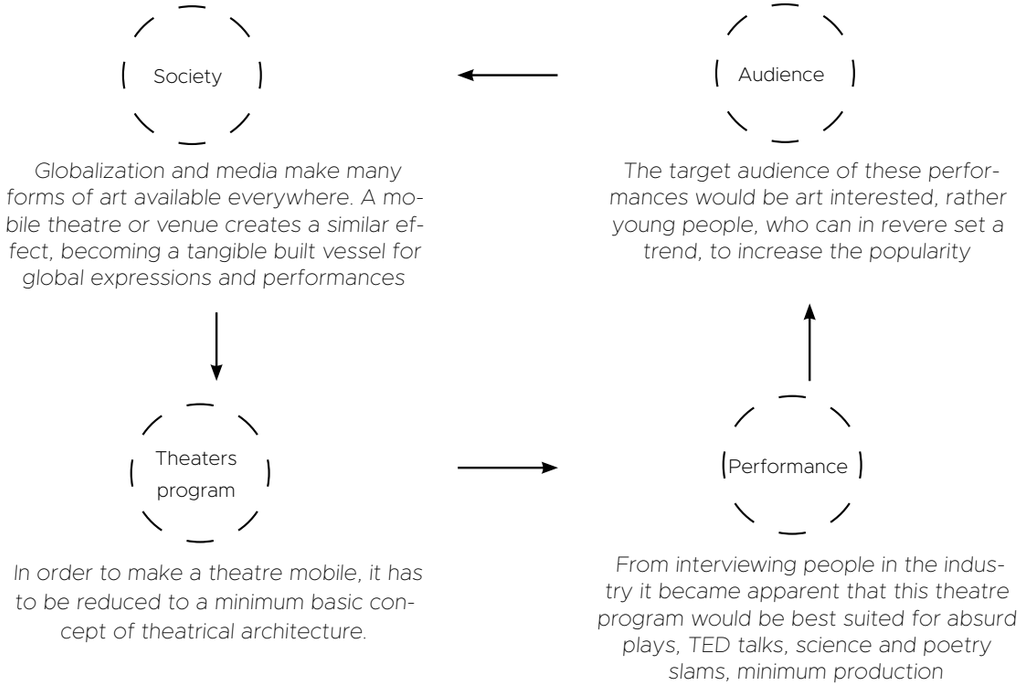
Concerns of a moving theatre

- Inviting but not interrupting the urban context
- Needs to be light - imprint on the site

II. INVOLVED PEOPLE. (THEORY)

Audience And Relations.

The developments of history gave us some access to how theatre relates to society. Here, society is the audience and the main target group. But whereas theatre used to be a mainstream source of entertainment, the potential audience groups are more specific nowadays. submission of this document Online.



Globalization and media make many forms of art available everywhere. A mobile theatre or venue creates a similar effect, becoming a tangible built vessel for global expressions and performances

The target audience of these performances would be art interested, rather young people, who can in revere set a trend, to increase the popularity

In order to make a theatre mobile, it has to be reduced to a minimum basic concept of theatrical architecture.

From interviewing people in the industry it became apparent that this theatre program would be best suited for absurd plays, TED talks, science and poetry slams, minimum production

The previous diagram showed a broad range of influences in theatre and how to reverse theatre influences, not just the audience, but through them, the world. This diagram of influences shows a connection that could shape mobile theatre and its goals in society.

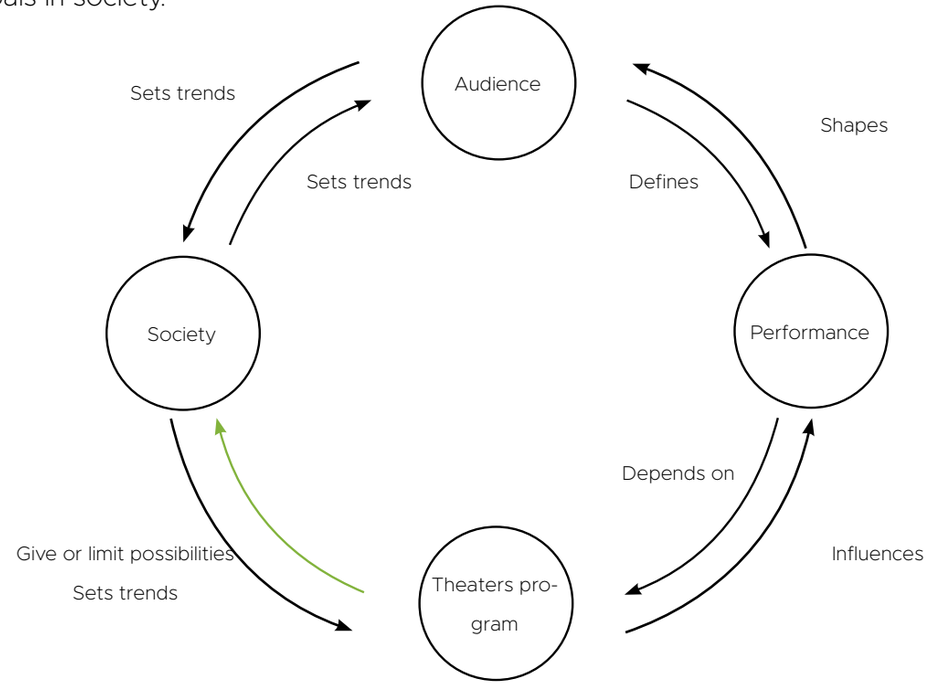


Illustration 28: Diagram representing the modern relation between audience, performers and the influence they have on each other

SUB CONCLUSION

Interviewing people working in the theatre world and industry, provided vivid insight into the production process and what is essential for its success. As a result, the recommendation proposed by the interviewees can offer a deeper understanding of what types of plays can best suit a traveling stage. These could be Absurdist, abstract, or conceptual plays, as they often require fewer technical sets. Another insight was the significance of the hidden functions in a theatre, like the backstage area, which is locked in a mode of perpetual transformation as the performance unfolds.

The interviews also underscored the human-scale relations inside the auditorium itself, as it has a great impact on the whole experience. In the words of Mariza, a Greek director-actress, "If you manage to make the audience and the performers share the feeling of discovering together, then you have created magic and succeeded."

The aspect of mobility inside the theatre was considered the greatest advantage, providing the possibility for making full use of the stage in terms of the play's demands.

The auditorium was advised to be considered as a mobile structure since the build-up of this area can alter the relation and connection between the audience and performers.

The interviewees also described the technical demands of a theatre, and how the placement of these components will influence the perception of the play.

Take Aways

Adaptability to the hierarchy of elements of communication

Optimize spiritual connection between audience and performers

Impact of the placement of the technical elements

I.

II. TERM CLASSIFICATIONS

III.

IV.

V.

Nomenclature and Definitions

The term Transformable architecture can cause some confusion since it is often used to describe, different styles and technicalities of changing or altered structures.

Carolina De Marco Werner addresses this issue in her Master Thesis: “Transformable and transportable Architecture” (2013). She classifies these systems into four categories, depending on the transforming technicalities and purpose.

The differentiation between each of these terms comes from the structural properties of the system and its capabilities and limits.

Adaptable Architecture:

Buildings that are designed to be easily fitted to changing functions/needs. But only before the time of occupancy, not during. Most commonly used in residential buildings, with adaptable wall systems

Kinetic Architecture:

Structures with variable location and/or geometry. Often seen in art installations, retail, and performance space. General mobile structures

Responsive Architecture:

Building or components of buildings that are planned to respond to their (simulated) environment, during the design phase.

Transformable Architecture:

Structures that can quickly change shape, form, function, character. This happens through controlled changes in structure or envelope which are connected by specific articulated joints. The purpose of this transformation is mostly to fulfill functional requirements.

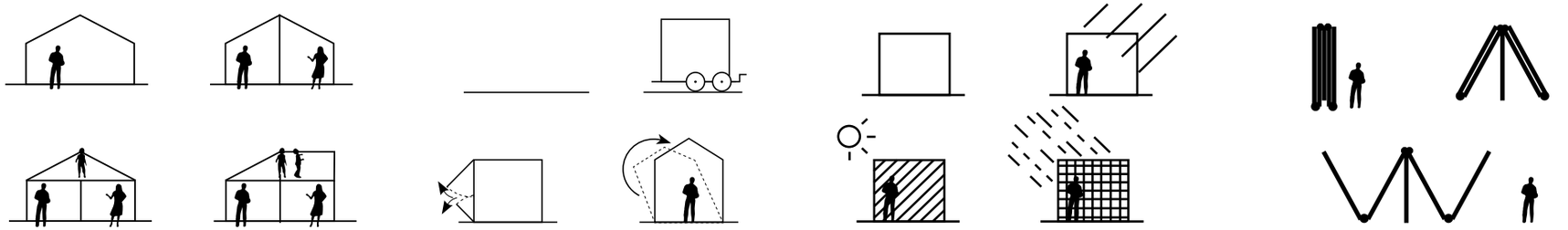


Illustration 31: Illustrations representing the different classifications

II. SYSTEM CLASSIFICATIONS

Nomenclature and Definitions

To discover different structural possibilities of a traveling building, the most relevant were listed. Explaining their characteristics, limits, and possibilities.

Flat packed:
Pre-hinged systems. Commonly used with a folding mechanism

Tensegrity
Structure gains stability from pure Tension and compression with cables and bars.

Pantograph
Hinged systems using a scissors mechanism as a flexible system that can be made rigid easily.

Membrane systems
Able to change shape and geometry. It consist of a membrane attached to a movable but stable structure. By moving the structure, tension is applied to the membrane.

Pneumatics
Similar to the Membrane systems, without the elements of structure. Instead tension is applied to the membrane, by inserting air, into the enclosed space of the membrane.

Pods or capsules
Pods are skin supports, to transport and stabilize a structure. Container volumes are used often as basis support structure and then integrate any of the previously systems.

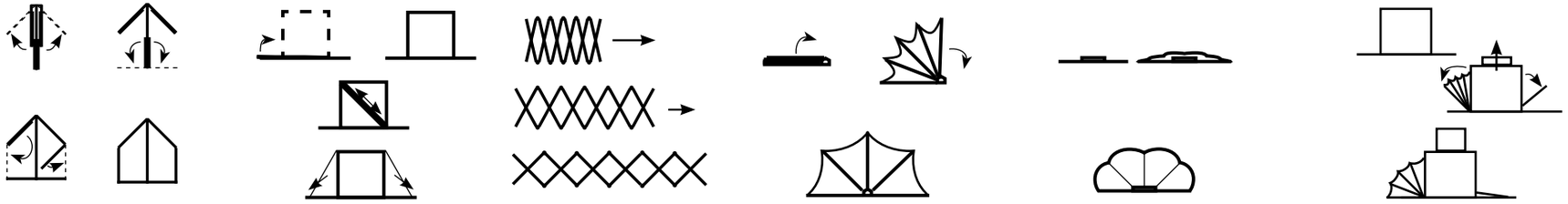


Illustration 32: Illustrations representing the different Systems

II. CASE STUDY

Project: Mobile Theatre
Location : Movable structure
Architect: Emelio Perez Pinero
Date of completion: 1961

Considered as one of the early architects that interlinked technology and architecture, Emelio Perez Pinero had created the collapsible rods bundle system. The system was patented in the sixties as one of its kind collapsible structural systems, combining engineering and architecture. Parts of the discoveries and methods Emelio Perez Pinero had explored and expressed is the idea of repetition in the form of a grid. By Expanding and connecting grids one can reproduce them on any scale and they would give out these specific formed structures that can stand in a three-dimensional space. Repetition is a condition that was influenced by nature. (Clara Oloriz, 2020)

"Systems of rods pivotally connected to each other by couplings which can be distributed by unfolding over a three-dimensional space and be folded until the rods and their coupling connections form a compact bundle which is easily manageable." (Emilio Perez Piñero) This structural system, proposed to be a theatre, traveled from Madrid to Barcelona to San Sebastien to commemorate 25 years of peace since the Spanish Civil war.

The rigid rods forming the mini elements of the structure were considered as mechanisms, these mechanisms together formed by central coupling or hinges created together

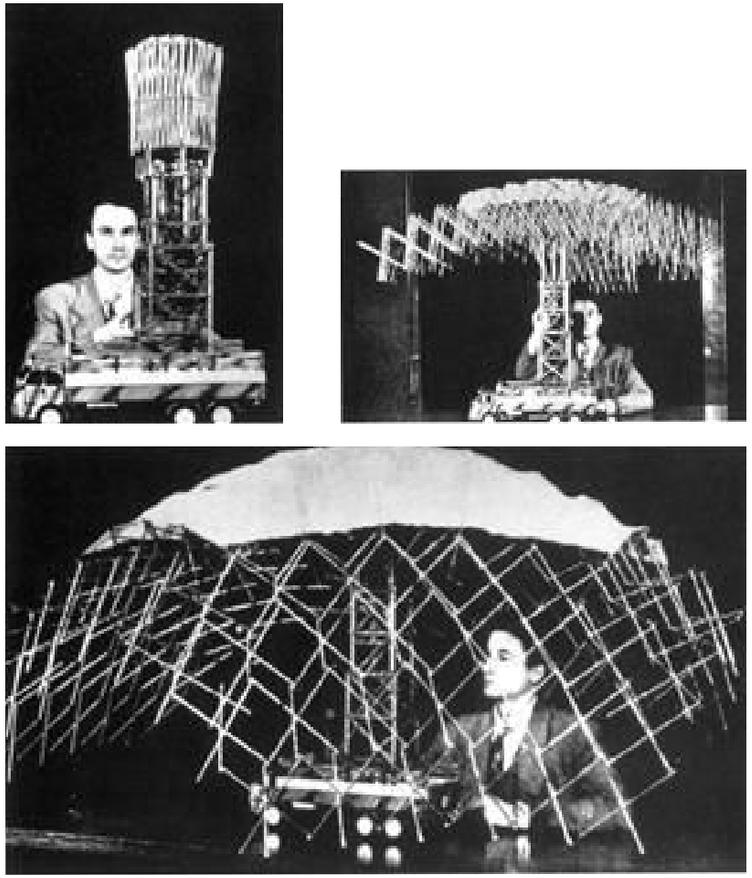
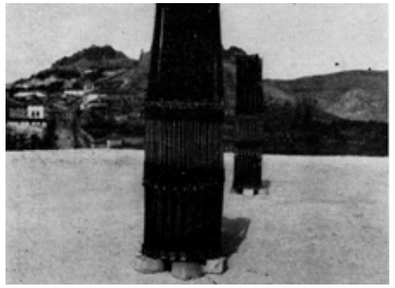
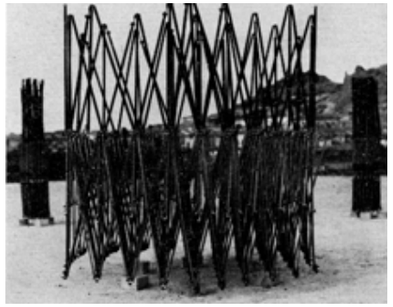
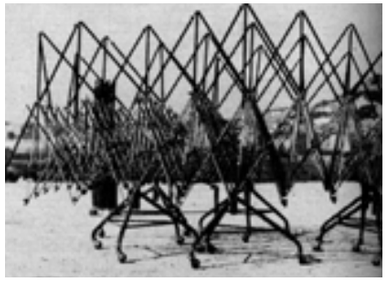


Illustration 33: Images of a prototype of the structure with Emelio Perez







with a kinetic structure. The end joints would then be tied together by tension cables to avoid closing of the elements once they were expanded. Emelio Perez used the analogy of the structural rods being like a skeleton representing the compression of the vertebrae, the tension cables being the muscles that surround the skeleton to maintain its integrity. (Clara Oloriz, 2020) Le Corbusier referred to Emilio's work as " an analogy with language, chemistry, genetics, and music, all of them sharing the lawful combination of a limited number of components into highly complex results" Le Corbusier (1981)

Illustration 34: Images of a part of the structure operating

TAKE AWAYS

- Smart Structure, by a repetitve single element
- Solving stability by adding no more than one additional element
- Kinetic structure approach

II. SURFACE ELEMENTS

Building Skins

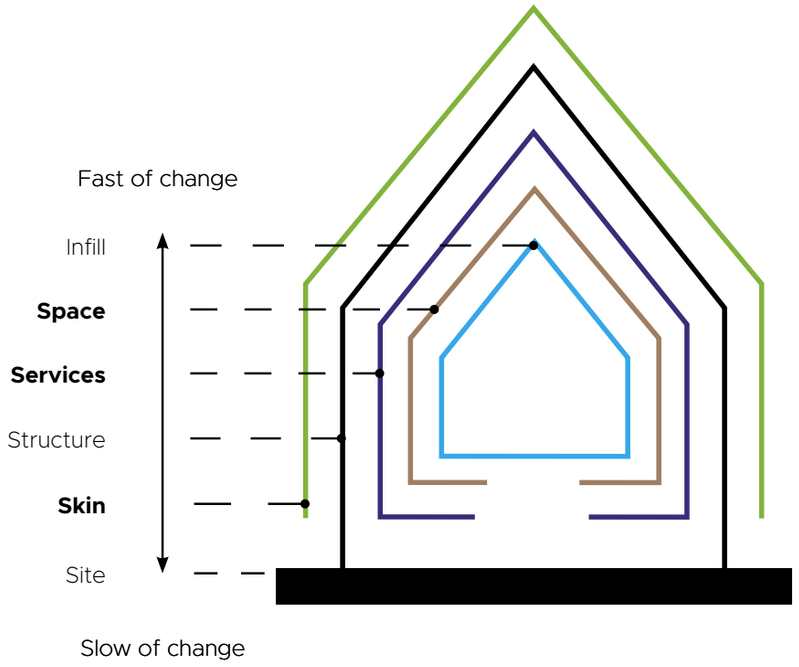


Illustration 35: Illustration of buildings surface elements

A challenge of this design is fulfilling the high basic requirements that theaters demand while trying to design a construction that can be transported easily. Again De Marco's master's thesis: "Transformable and transportable Architecture" (2013), was very helpful. She listed the layers of surface elements and the reason for their necessity: The building's skin on transportable buildings needs to protect the structural elements and the indoor environment from outside influences, such as rain and wind, as well as seal movable parts. Depending on the building's requirements there can be a need for serving systems such as heating, plumbing, electricity, etc. These would be covered from the inside by the space-defining element. This can also be used to install thermal insulation and influence acoustics. (De Marco, 2013)

Concerning the assembly there are two possibilities:

- Creating collapsible layers that can be fixed to each other on-site.
  Exp: Tent.

- Creating elements of all layers that can be disassembled, packed, and reassembled on site.
  Exp: Prefabricated construction elements

II. TEMPORARY STRUCTURES AND IMPACT

Permanent Vs. Temporary

The main difference between permanent structures and temporary structures is the flexibility of adding and removing elements. In permanent structures most materials can not be replaced or recycled but have to be demolished, inflexible structures, members can be assembled and re-assembled and recycled, which makes it easier also to maintain the structure. By reducing assembly parts of a structure and better specific materials to fulfill performance requirements, it becomes faster and cheaper to implement the structure and less potential for failures. (Kendal and Teicher, 2000)

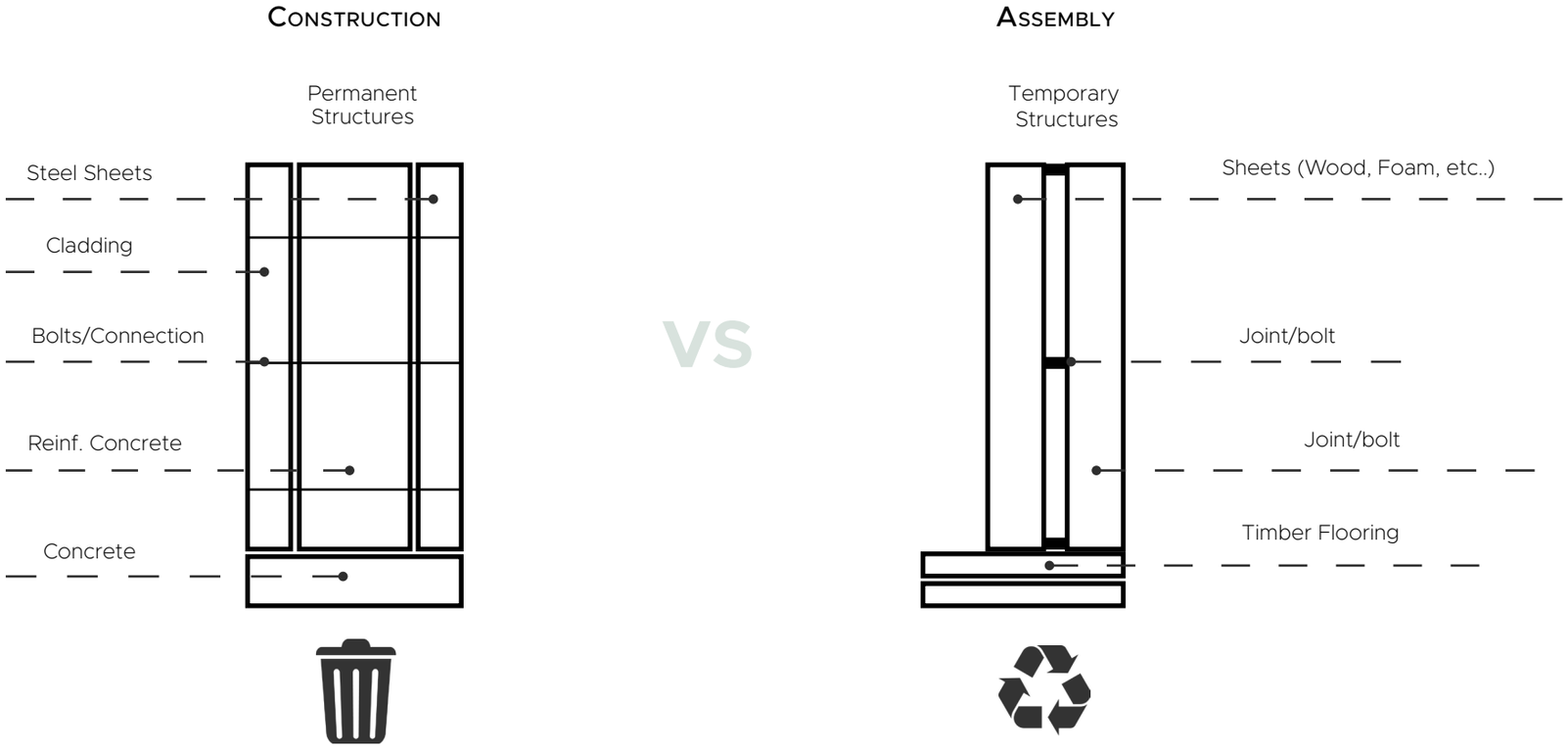


Illustration 36: Illustration showing a generic sections of a permanent VS Temporary Structures

II. LIFE CYCLE ASSESSMENT

Economic, Social and Environmental

One of the key branches in sustainable design is assessing the materials used in the project and the impact those materials have economically socially and environmentally throughout the project's intended life. Since this project is categorized as a temporary building (expected to serve for less than a year in one location before it is disassembled and moved to another location) it is exempted from the application to reduce energy in use as set by the European directive 2010/31/EU due to its short service life. (Grosso. Thibaut 2015). Meaning considerations for zero energy building and internal comfort and energy usage are not the main focus in becoming a sustainable project of that type, but a focus on the materials used and their impact is.

The Life Cycle Assessment analysis comes into play in most projects, even ones not related to architecture design. (LCA) or life cycle assessment analysis helps in the early design phase by giving an understanding of building materials and their impact from cradle to grave, thus allowing to select the best-suited materials by comparing their advantages and disadvantages in the 5 main phases of the project. Considering the LCA and materiality in construction one must also understand the production methods of materials, the durability of materials the lifetime, and re-use if possible. Understanding these paradigms helps in assessing and selecting materials that ensure an improved LCA which helps the environmental impact of the building.

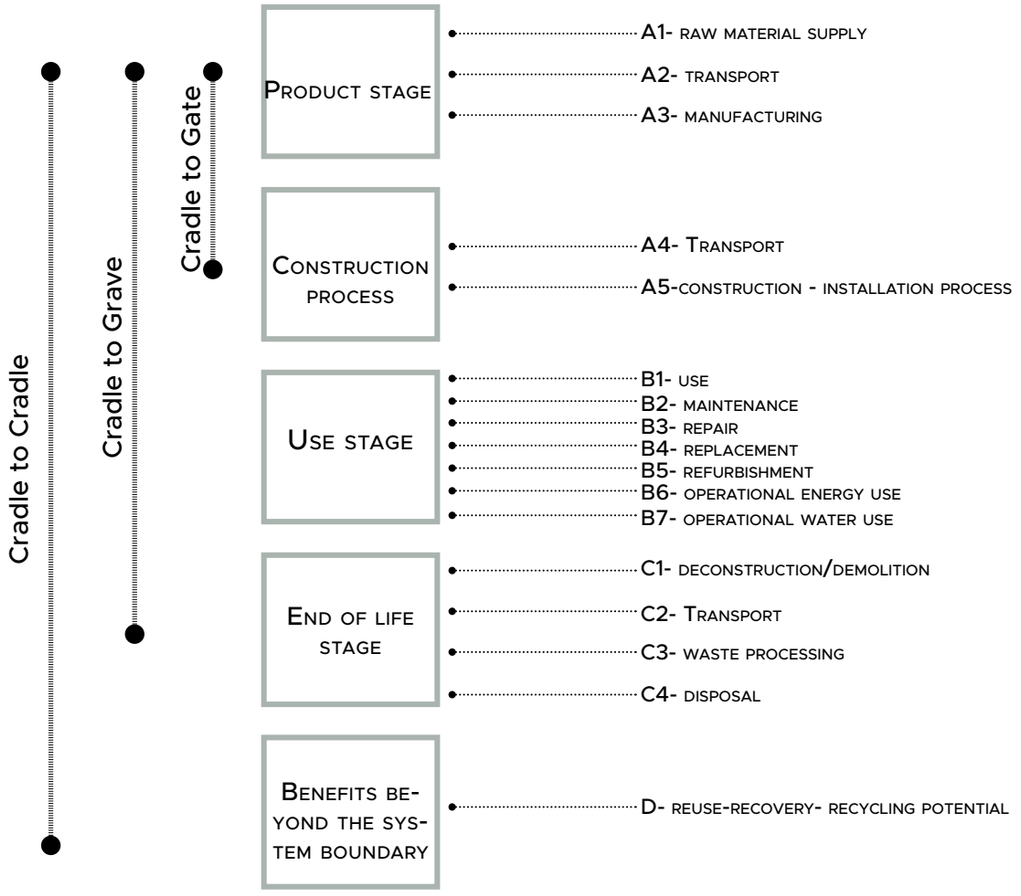


Illustration 37: (L.C.A 5 Stages)

II. LIFE CYCLE ASSESSMENT

Economic, Social and Environmental

The LCA in general covers these 5 phases that are quite complex following up with detailed calculations from the extraction of the raw materials to the disposal or reuse of them, to transportation data. The LCA can get into great detail and complexity that this project will not go into. As a starting point sampled selected potential structural cross-sections having the same exact dimensions (250mmx200mmx2000mm) will be compared according to their Primary energy, PE (Energy used to produce this cross-section), and their Green House gas potential (The amount of carbon the material releases or traps in its production).

The Primary energy is extracted from the database website (Ubakus) and is measured from Cradle to Gate. While the Greenhouse gas potential will be measured along 10 years of the product, from Cradle to Gate as well.

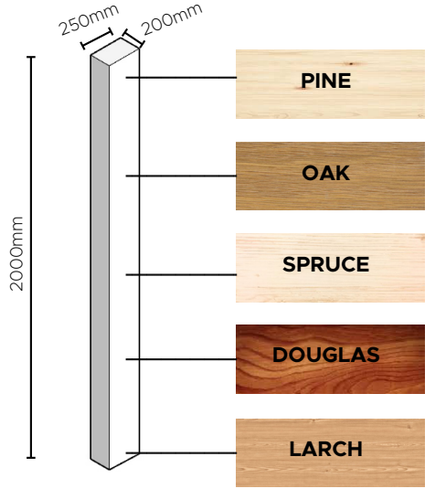


Illustration 38: Dimensions of a sample member

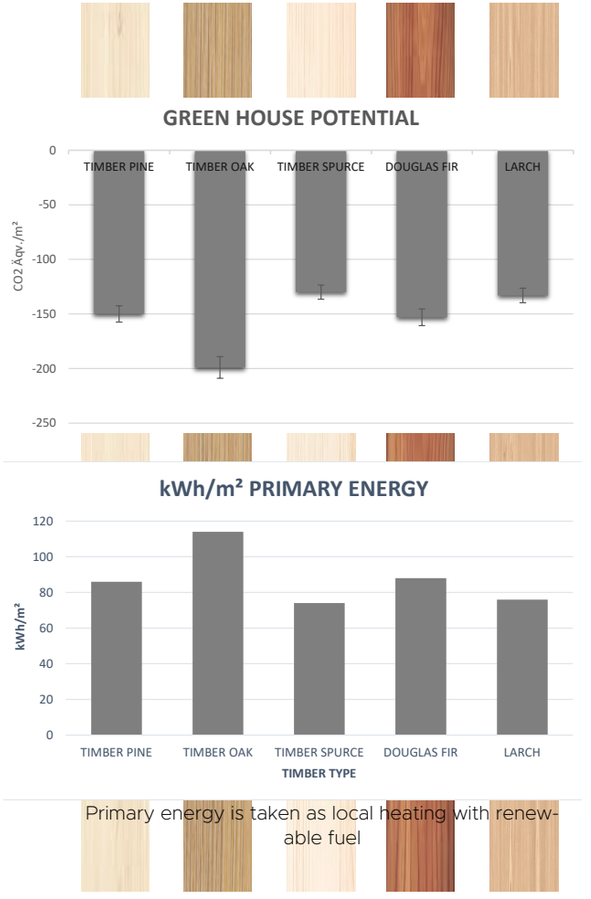


Illustration 39: GHP and PE comparison of different materials

As seen in the table on the left the materials selected to be compared are all timber products. The ambition of the project is to use as much timber in the structure as possible to reduce the CO2 emission and potential from harmful materials production such as steel and or concrete.

A quick analysis regarding the greenhouse potential shows that all timber products actually benefit the global warming potential by trapping CO2 in its early life and production, unlike several other industry-standard materials. It seems that OAK and DOUGLAS timber products trap the most CO2, However, they require more energy to be manufactured. Later in the design process, a detailed selection will be conducted.

CASE STUDY

Project: Hardelot theatre
Location : France
Architect: Studio Andrew Todd
Date of completion: 2016

The location of the Harrdelot theatre is on the ground of Centre Culturel de l'Entente Cordial, which hosts annual summer festivals that celebrate the ties between Great Britain and France through exhibitions conferences theatrical performances, and music. With growing success, the ambition was to have year-round programming, which made the theatre a perfect fit for hosting some of the programs on the site.

The British architect studio based in France decided to revive the old Elizabethan theatre into a modern sustainable and minimal energy usage theatre. An attempt to revive the past and adapt it onto a new synthesis for today.

" I hope this project will demonstrate that we can live fully, joyously and also lightly: theatre is a concentration of life and a worthy analogy for living more closely together, more economically, in mutual awareness and respect," stated Andrew Todd the principal architect and designer of the theatre.

The 400 seating theatre was designed as a globe of our times, taking inspiration from the famous Shakespearean globe theatre, with sustainability and acoustics as driving forces. The layout follows that of an Elizabethan theatre the shift to a circular layout was intended as a design factor to unite society by not having different segregated seatings inside the theatre, where all viewers can see the stage equally.

Illustration 40: Photografy of the Hardelot theatre

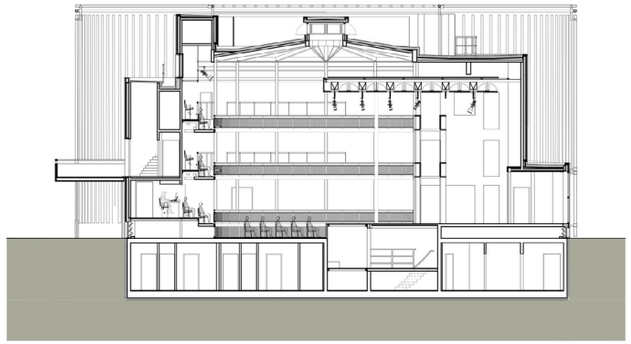


Illustration 41: Section of the Hardelot theatre

Making the building of wood construction has helped capture 100 tonnes of carbon, which easily offsets any carbon emitted in constructing the theatre itself. Not only but also provides a more natural and earthy atmosphere on the inside of the building.

The need for designing a theatre in that location as a reinforcer of cultural exchange and celebration between France and the United Kingdom justifies the importance of venue spaces and gathering spaces generally as a typology of architecture that is integral in maintaining and a balanced and sustainable social infrastructure, especially one that has a diverse culture or traditions in it.

Illustration 42: Interior of the Hardelot theatre

TAKE AWAYS

- Re-interpreting Old theatre Designs
- Usage of Wood as a main structure and Element
- Purpose of theatre to re-einforce Cultural engagement

II. CASE STUDY

Project: Bamboo theatre
Location : Noordwijkm, Netherlands
Architect: Studio Akkerhuis
Date of completion: 2017

Studio Akkerhuis designed a temporary theatre located on a famous beachfront in Noordwijkm Netherlands. The goal was to design a light temporary, resistant, and transportable structure. The project was initiated by a local cultural association called -Kunstklank-, as they organize every two years a theatrical production on the beach of Noordwijkm. Up until the project was required they had mostly open-air performances which proved to be a successful activity for the area in bringing the guests and locals together and sharing classical opera plays re-interpreted in a minimalist setting.

The project is a compact space similar to an amphitheater mixed with a Bedouin tent, with joints made of ropes and metal screws, designed entirely by bamboo. Space can hold between 250 to 300 people, with a diameter of only 20 meters, which made the furthest distance from the center stage 10 meters. The seating consisted of stacked bamboo creating a tribune all around the parameter of the circular form. The theatre itself can be assembled in different forms as well. (Dejitar, Fabian 2017)

Bamboo was chosen as the main building material as it is lightweight, naturally available, strong, and cheaper than most building products that offer the same characteristics. The bamboo elements never surpassed the length of 5.8m, so they can be easily stored in shipping containers, while they can be easily moved by an individual person.

This project is an example of a successful attempt in creating a somewhat temporary

Illustration 43: Images of the project assembly and from the Inside

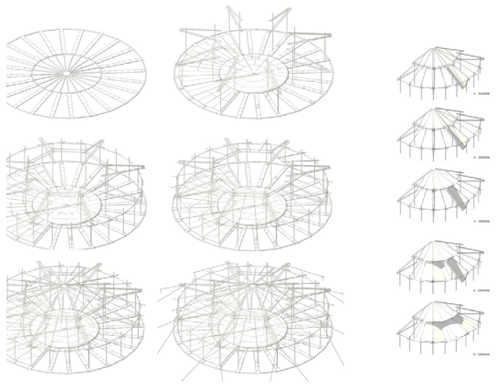


Illustration 44: Images of the project Details

light theatre. However, it does also raise some important considerations for temporary structures, like accounting for external uncontrolled loads like the wind. Given that the main members used were bamboo, which is considered light in nature, they needed to add external groundworks for it to fully be operable, which means that it relies on the groundworks to be able to work.

TAKE AWAYS

- Consider how the structure can be secured to the ground
- Consider the usage of elements that do not require heavy machinery
- Consider keeping the line of sight from the audience to the stage minimal

II. ACOUSTICS IN THE AUDITORIUM

Theory of acoustics

Reflecting sound: If the speaker needs to be understood across a wide span.

Therefore, any usable reflection area should be used to distribute the sound into the back of the room.

Exp 1. Sound is absorbed instead of distributed

Exp. 2 Sound can be directed to the back and is absorbed behind the last audience member so the sound doesn't echo back

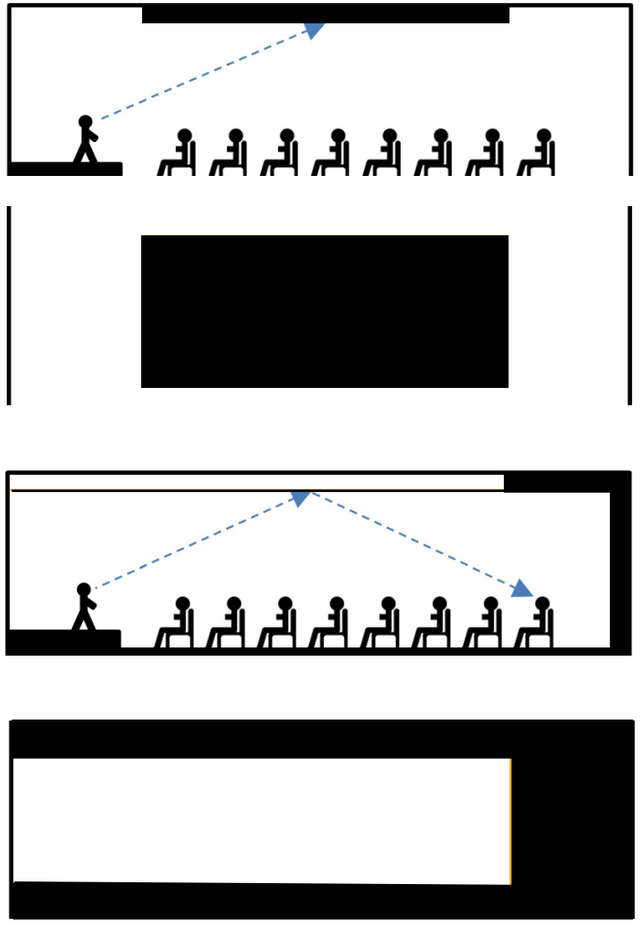
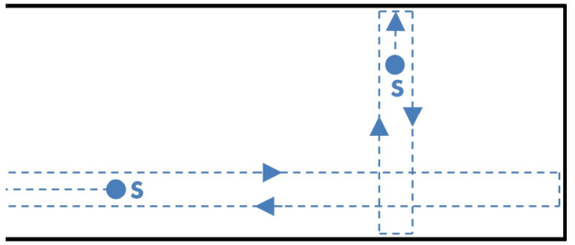
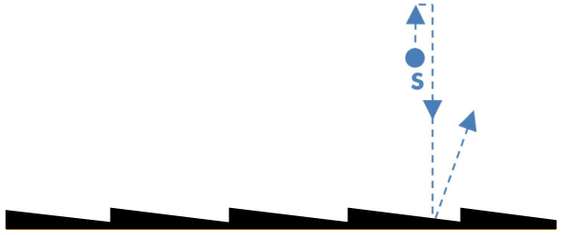


Illustration 45: Acoustic distribution

Avoiding a "Flutter echo" This phenomenon occurs when reverberating surfaces are place parallel to each other. For example in a box shape (ill. a) This could lead to decreased speech intelligibility and irritation of the speaker.



Can be avoided by redirecting the rays by adding slanted elements of min. 5



Can be avoided by adsorbing the rays with wide absorbing panels (yellow lines)

II. ACOUSTICS IN THE AUDITORIUM

The Placement of absorbing and reflecting surfaces should be placed according to the audience. While not reflecting sound back to the speaker

Good:
Placing an adsorbing surface behind the audience to avoid the reflecting back to the speaker

Better:
Placing a slanted, reflective surface behind the audience to direct the sound to the receivers.

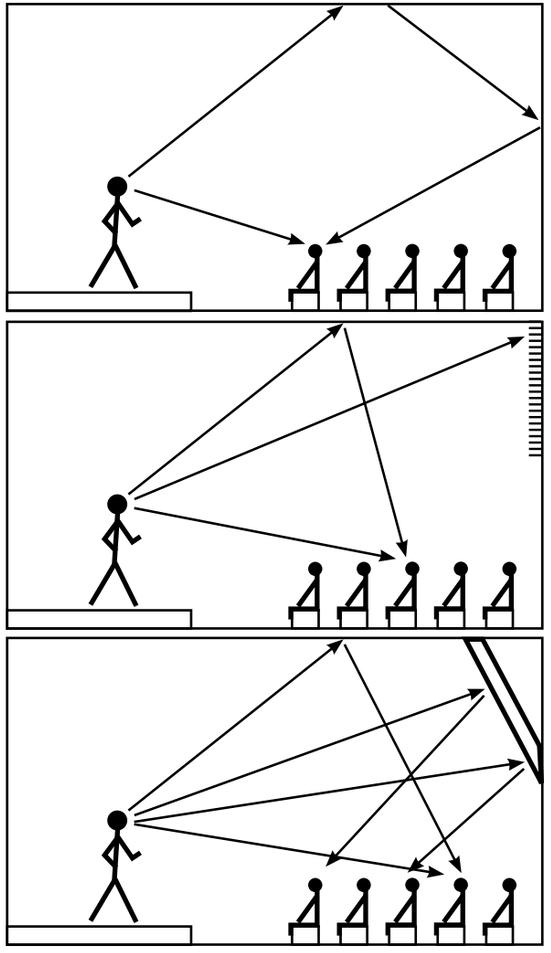


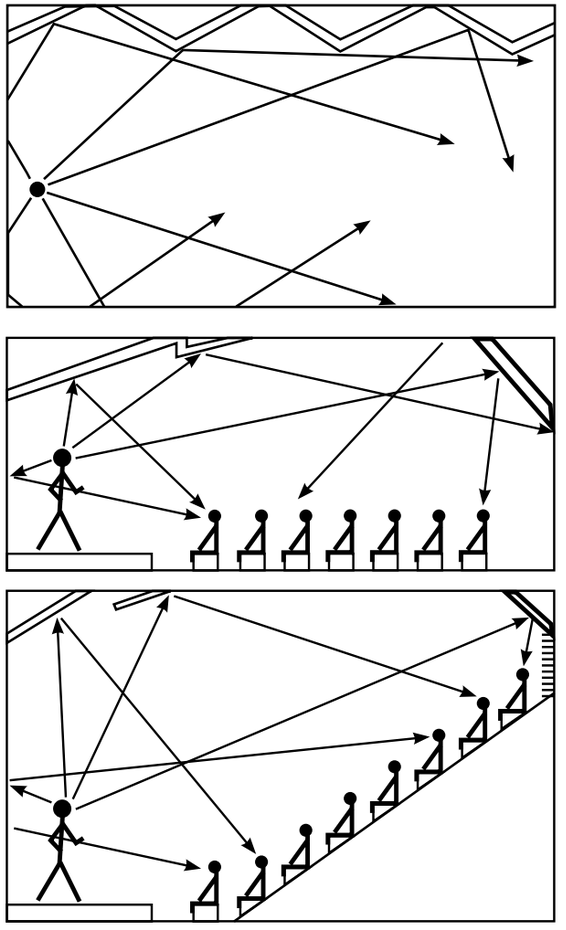
Illustration 46: Acoustic distribution

Examples of room geometry that increases the rays that arrive at the receiver

Slanted and changeable wall elements that direct sound into the back of the auditorium

Reflecting backdrop behind the speaker to reflect sound.
Slanted lower ceiling a the middle at the beginning of the seated area and slanted walls behind the audience hat directs the towards the audience and spreads the sound equally in the auditorium

- Reflecting backdrop
- Slanted wall and ceiling lowered additional ceiling
- Rising seating in the auditorium to take advantage of the natural spread of sound



SUB-CONCLUSION

As a starting point, the technical themes chapter gives direction and guidance to the extent of the project and its diverse considerations.

The different system and term classifications serve as a manual for selecting which kinds of terms should be used and explored in identifying the project, in addition to which types of systems can be integrated into the structure of the project. It could be that various structural approaches and classifications can be used simultaneously to achieve a more flexible project outcome. By exploring the individual system types in the design phase, an exploration of the elements' joinery will naturally follow.

By identifying the surface elements of what makes a building, a reduction of the construction components appears to be the best way to address the assembly-disassembly paradigm. It would be ideal to have minimal building components that offer different characteristics that can resolve more than one problem, such as structural rigidity and partitions, or acoustic and expressive properties. The lesser the components, the easier it is to be assembled and disassembled.

The materiality of the project is a crucial factor that will affect the overall look and feel of the design, and will also affect the density of the materials based on the calculations needed to have a working and sound structure. Furthermore, the materiality must seek out sustainable solutions as much as possible, thereby reducing any negative effects on the site in which it is situated. As part of the shifting consciousness in the industry, sustainability is a factor that must be present in all design projects. By way of illustration, a "theatre of humanity" would be a self-defeating, hollow endeavor if it does not respect the ecosystems upon which all living things depend.

Take Aways

- Form and function define the experience
- Building components fulfilling more than one function
- Low to no impact on the different sites
- Protective building envelope

II. NO SITE ARCHITECTURE

What are the Challenges ?

An important element of architecture is the relationship between building and site. Therefore analyzing the site and its surroundings would usually be a good design approach, to create architecture that is shaped by its context. Not designing in a specific environmental context, creates more than just the issue of having to choose a different design approach. Not having a site brings along several issues that could initiate the design process.

Problem number 1

Energy and water supply
Without being connected to the local network

The answer could be off-grid solutions, that can adapt to changing climactic circumstances

Potential Solutions

Off grid strategies

Energy and clean water is produced by the theatre itself and is independent of its environment

Energy and clean water are produced and collected from the environment in classic off-grid strategies such as light, wind, and water. This would require more than one strategy because of the changing environment.

Energy and clean water are produced and collected during/ from the travel and stored.

Illustration 47: Off Grid Energy Solutions

II. NO SITE ARCHITECTURE

What are the Challenges ?

Problem number 2

Building requirements

The building needs to be able to adapt to the different requirements created by different environments.

Problem number 3

Foundations

The building must stay stable on different underground textures

Problem number 4

Poetic exchange with the context

Without context, there is no relation to nature, image, or history the architecture can connect to

To draw inspiration from different urban situations, the thesis will use the author's very different home climates as starting points of investigation.

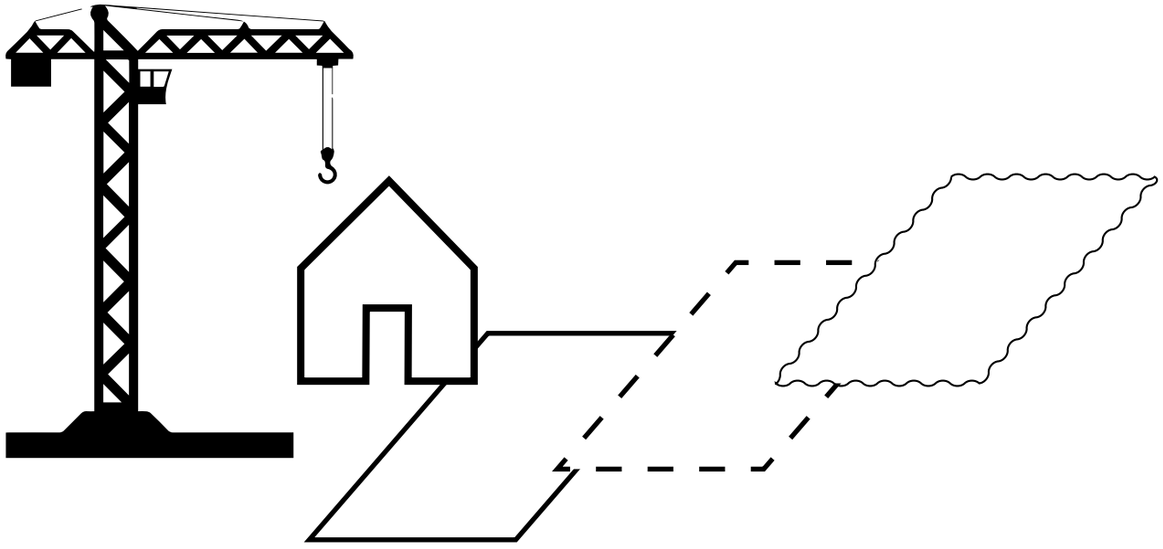
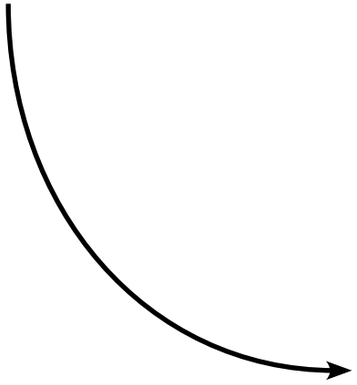


Illustration 48: Adapting to different soils and grounds




Hamburg
Cairo

II. TWO POTENTIAL SITES

Familiar Environments.

The building needs to be able to adapt to the different requirements created by different environments.

Many factors that influence architecture, the site, and the site's environment, can not be neglected. The building should be designed to work everywhere in the world.

Therefore, a universal structure that is present in all cities around the world could create a connection to the site, while still being unique in every location

The idea is to design a building that can adapt to these two zones. If this succeeds the design should be robust enough to work in other climatic zones as well.

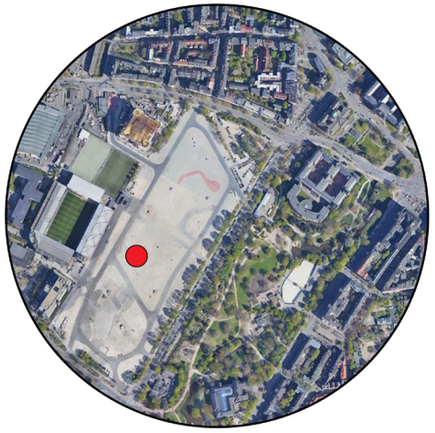
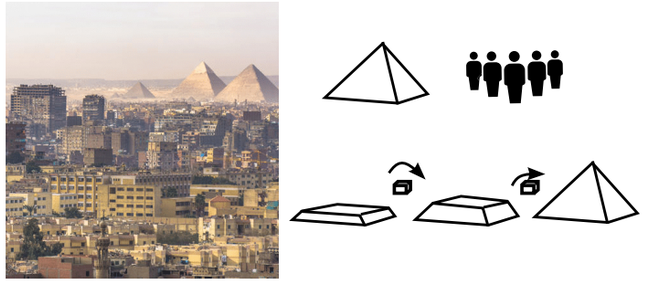


Illustration 49: Fish market in Hamburg



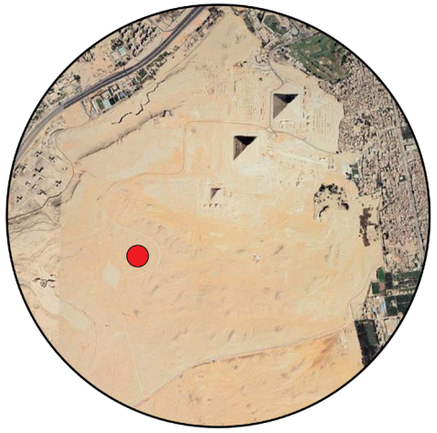


Illustration 50: Giza pyramids in Cairo

II. TRAVELING ROUTE OPTIONS

How Can It Be Transported ?

Considering the LCA, the question about possible ways of traveling arises. It also has to be considered if the transportation mechanism will be included in the theatre construction itself.
This would only be an option for some of the traveling possibilities.

Issues

Potential

This provides a general idea of the options and their qualities, but the discussion might be connected to parameters that will be discovered during the design phase.

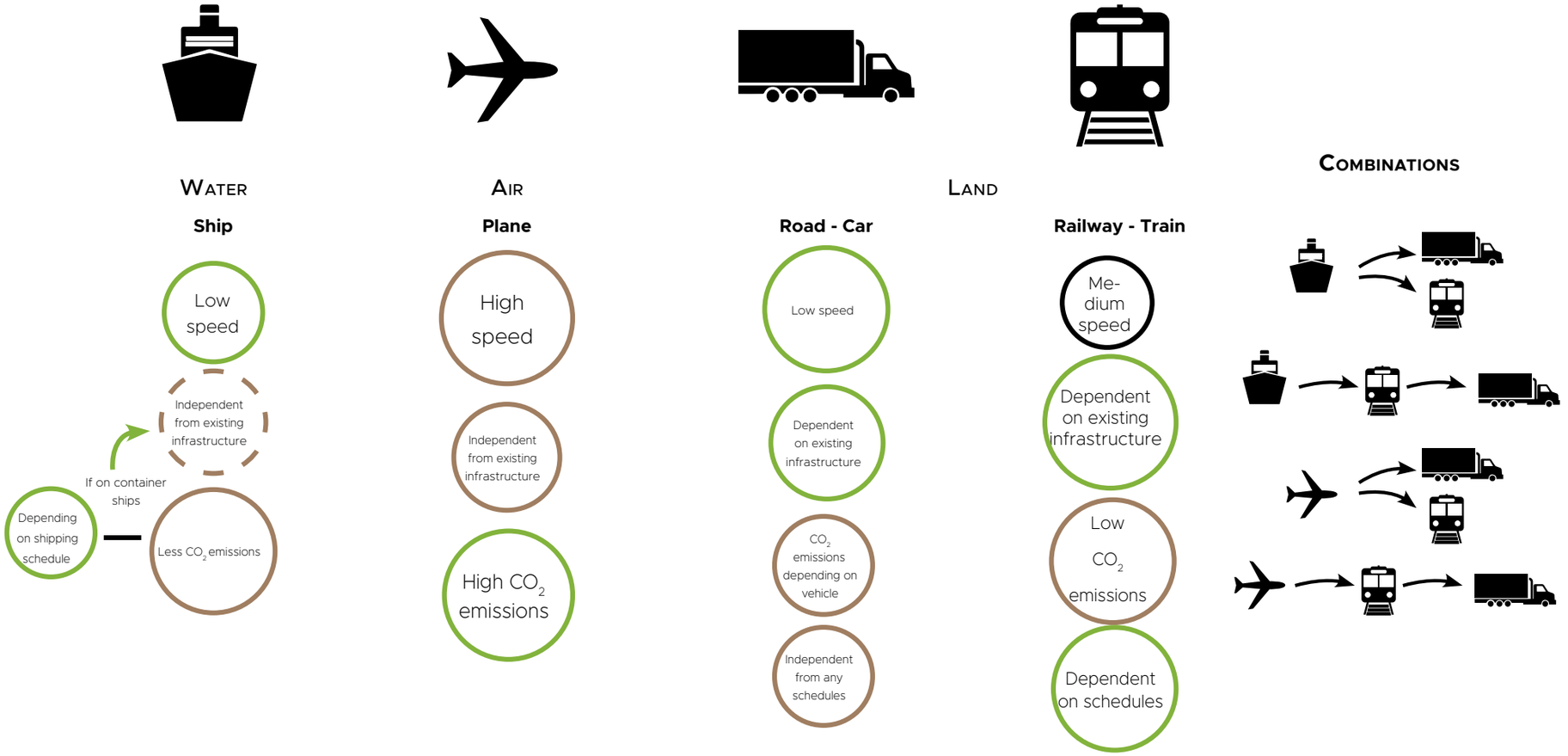


Illustration 51: Conceptual Ddagram of comparing different ways of transportation

II. CASE STUDY

Project: Charles and Dee Theatre
Location : Dallas, United States
Architect: OMA,REX
Date of completion: 2009

The project located in Dallas is a twelve-story building that consists of a full-service theatre capable of seating up to 600 people depending on the configuration, while also offering a rehearsal room, office area lunge, and other functions. This project had switched the traditional approach of space layouts by stacking both the back of the house and front of the house functions above and below the auditorium itself, shifting the traditional approach of having the front of the house served in the facade or entrance area, and back of the house hidden in the back of the building.

The auditorium itself or the stage area is surrounded by glass that can be covered with blinds during certain performances or opened to view the city. The seating area and the stage area is designed in a way that it could be configured to suit different types of performances. (Etherington, 2009)

The auditorium area itself can be mechanically reconfigured by a push of a button. The auditorium itself also can be accessed from an entrance lobby area or directly from the outside. The stage itself is flexible and can offer multiple configurations depending on the production. The seating also can be transformed offering intimate shows or more public and big shows. The chamber or the stage area and theatre is surrounded by glazed facades that can be covered with blackout blinds , or open to the view of the city to act as a backdrop (Etherington, 2009) The flexibility the building offers works as an instrument for directors to set get creative with their products and create different experiences for the users.

Illustration 52: 3d section showing the re-ordeing of the spaces and function in the building

TAKE AWAYS

More possibilities by moving spaces and functions

Movable stage and seating offers different venue typologies

II. CONTEXT-LESS ARCHITECTURE

Interview with Atelier APA

When designing architecture the context, referring to the building's interaction with its environment is one of the cornerstones of the process. One that does not exist in our project due to the concept of changing locations.

The French architectural firm "Atelier APA" was confronted with a similar problem when designing storage units that should be placed in various locations. The project was therefore named "Architecture without context"

When interviewed about the project the Atelier discusses the approach they used on the project that is "independent from his building site" (Atelier APA, 2017). Different from a traveling theater, these storage units did not just lack a site but also lacked an architectural program.

Therefore the Atelier focused on a more abstract approach of "composition and volumetry." (Atelier APA, 2017) Of these lacking design approaches the traveling still has an important program to consider in the process. The traveling theatre however has a program. In fact, when designing a theater, the program could be considered the most important design driver. Often the architectural success of a theatre building is directly measured by the composition of the architectural program in relation to the theatrical program.

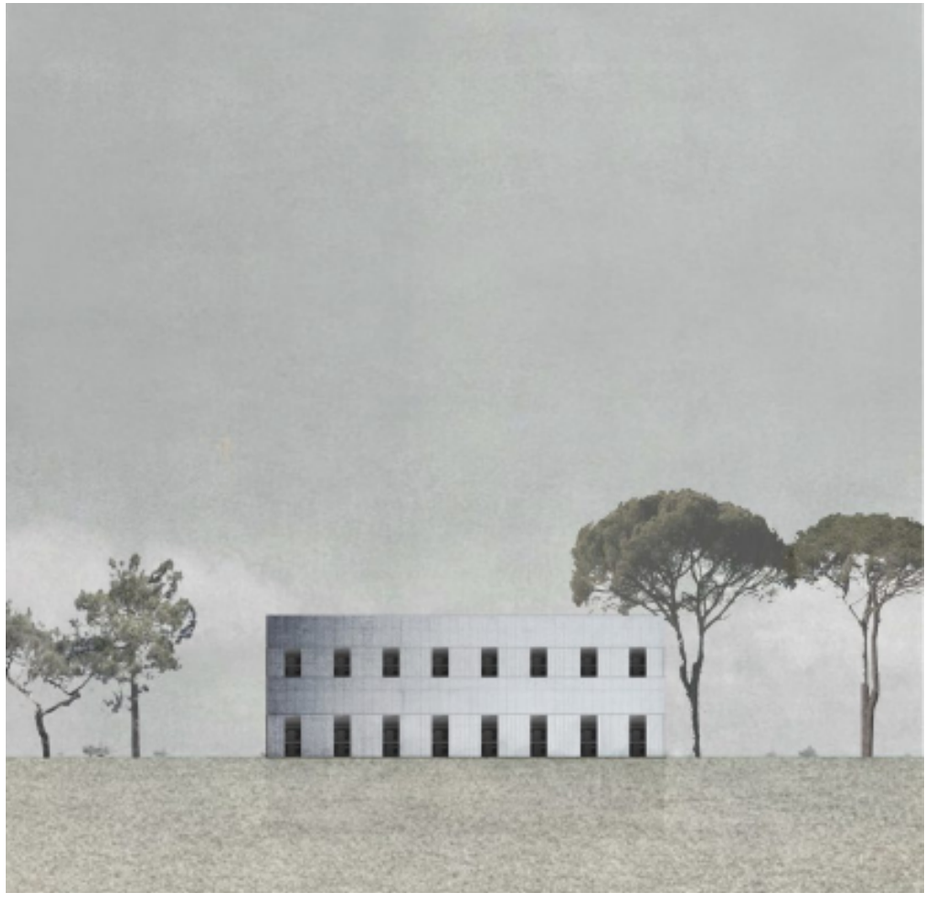


Illustration 53: A site unspecific render from Atelier APA

Illustration 54

VISION

We believe that it takes an authentic and undivided energy exchange to develop open-minded and curious societies. In the past, theatres played an important role in defining citizenship, preserving (or rewriting) history, and teaching cultural and social behaviors and values. Today, through this traveling "theatre of humanity," we propose a stage that aims to be a thought-provoking architectural tool for human-to-human energy exchange in our age of rapid globalization and digitalization.

To travel, the stage must be built for assembly and disassembly, from one country or continent to the next, while also providing interior flexibility. The auditorium should be adaptable to diverse styles and themes without forcing an adaptation to the spacial boundaries of a theatre building that was designed for a specific cultural style. From theatrical productions to concerts, conferences, and performances or gatherings of all kinds, the venue should be treated as a canvas that the event planner can shape and reshape in whatever way they see fit.

The project should also create a meaningful connection with the local context of each location, thus being designed with sustainability in mind, and through the use of environmentally-conscious materials and assembly techniques; any true embrace of humanity must also embrace the natural world with the same awareness and consideration. Ultimately, in its final form, this venue should be able to adapt to any city worldwide. Given that the designers hail from Hamburg, Germany, and Cairo, Egypt, these distinct cities will be investigated as the theatre's geographical and societal starting points.

DESIGN PROBLEM AND CRITERIA JOURNEY

How can we design a transformable and transportable theatre/venue that is able to promote cross-cultural social exchange while adapting to different climatic conditions ?

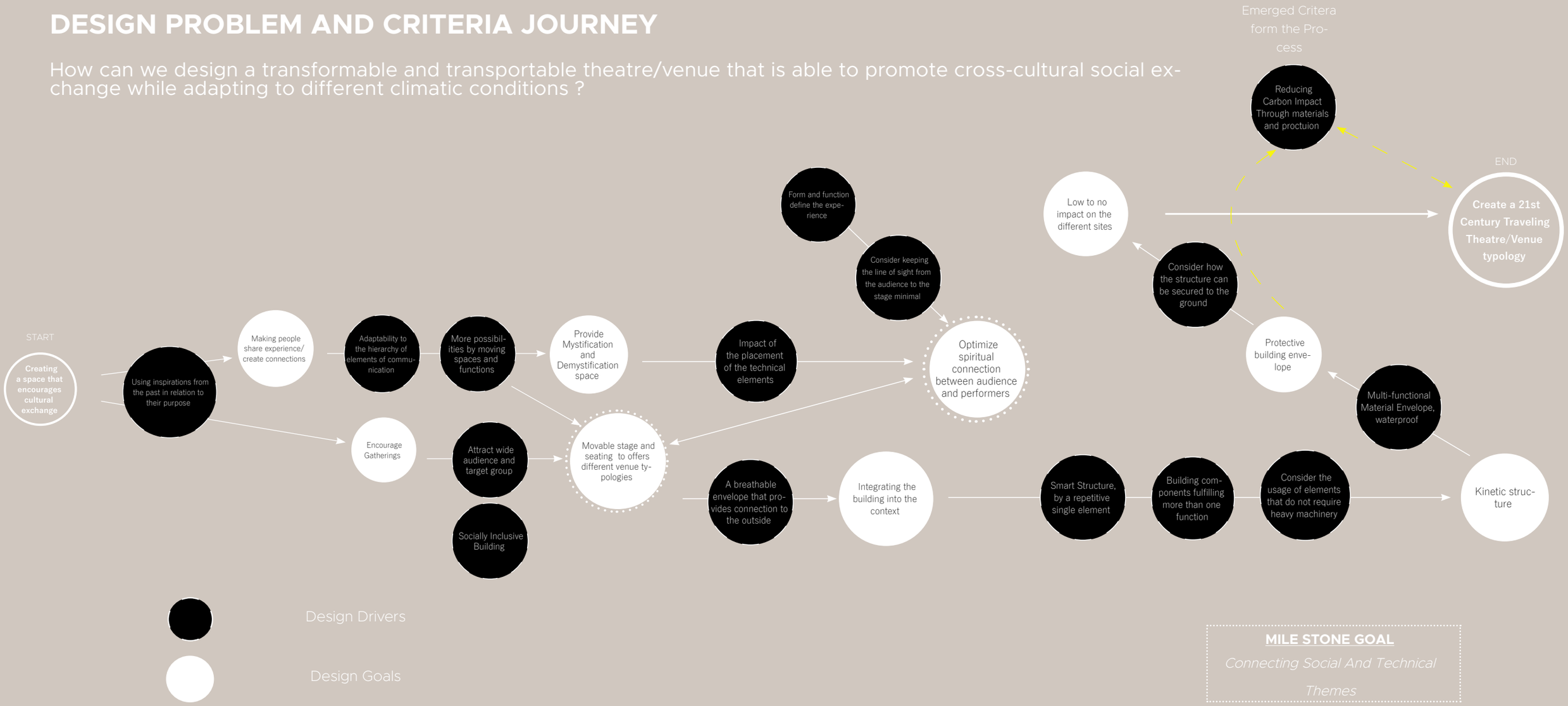


Illustration 55

II.

III. SCHEDULE OF OCCUPATION

IV.

V.

The program and space layout present is extracted from different theatre plans and setups. It is narrowed down to the basic rooms and functions needed. The purpose is to identify the relations between the varied spaces and times that each space comes alive.

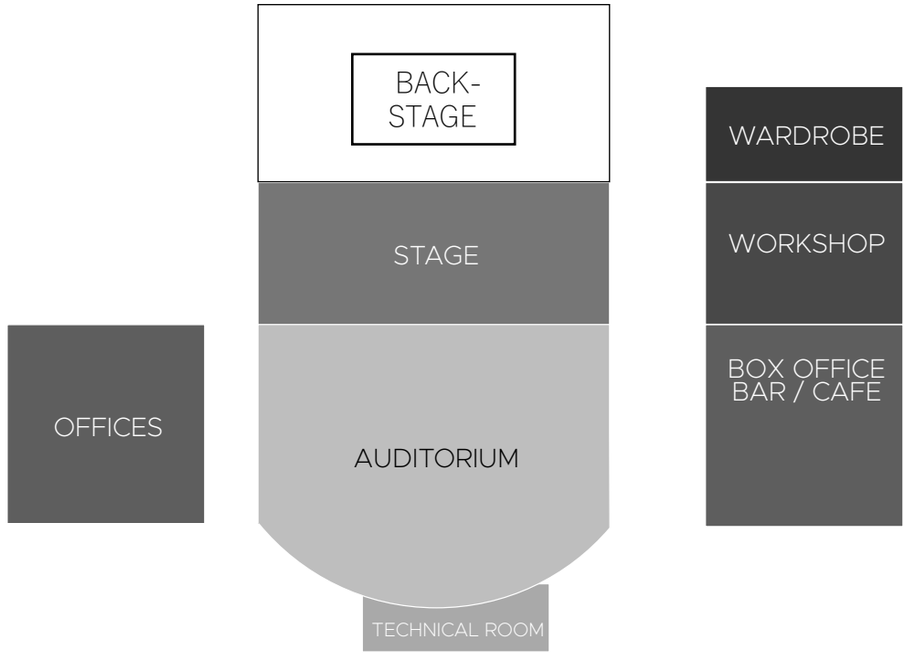


Illustration 56: Generic Theater layout

Room	**Occupants**	**Time of usage Requirements**
Stage	Actors / Performers Band & Orchestra	During the performance For rehearsals
Auditorium	Audience (150 people)	During the performance
Backstage Wardrobe	Actors Costume designer Stage Department Stage Management	During the performance In preparation for performances
Entrée Box office Bar	Audience Box office staff Bar staff	During performance
Technical room	Technical department (Light designers) (Sound designers)	During performance In preparation of the performance
Offices	Chief executive Finance & Administration Producer Director House manager Production manager Company manager	During the daytime
	Set designers Carpenters (Light designers) (Sound designers)	During the daytime

II.

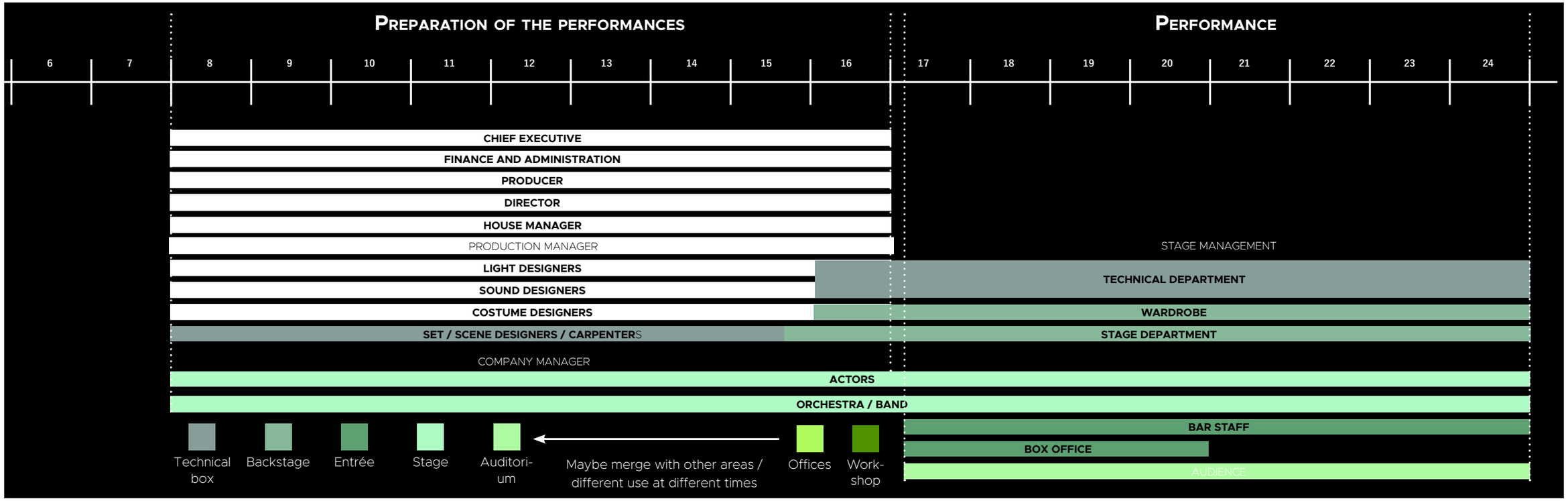
III. SCHEDULE OF OCCUPATION

IV.

V.

An understanding of the time and occupation

Not all of the users occupy the spaces on a simultaneous basis. In order to minimize the required area, this schedule shows the estimated purpose and time of use of the identified spaces. Although working hours may shift and/or depend on the (theatre) season, there are five areas that are engaged simultaneously and thus require spacial separation.



SPACE DIAGRAMS

Identifying Spaces In Relation To Time

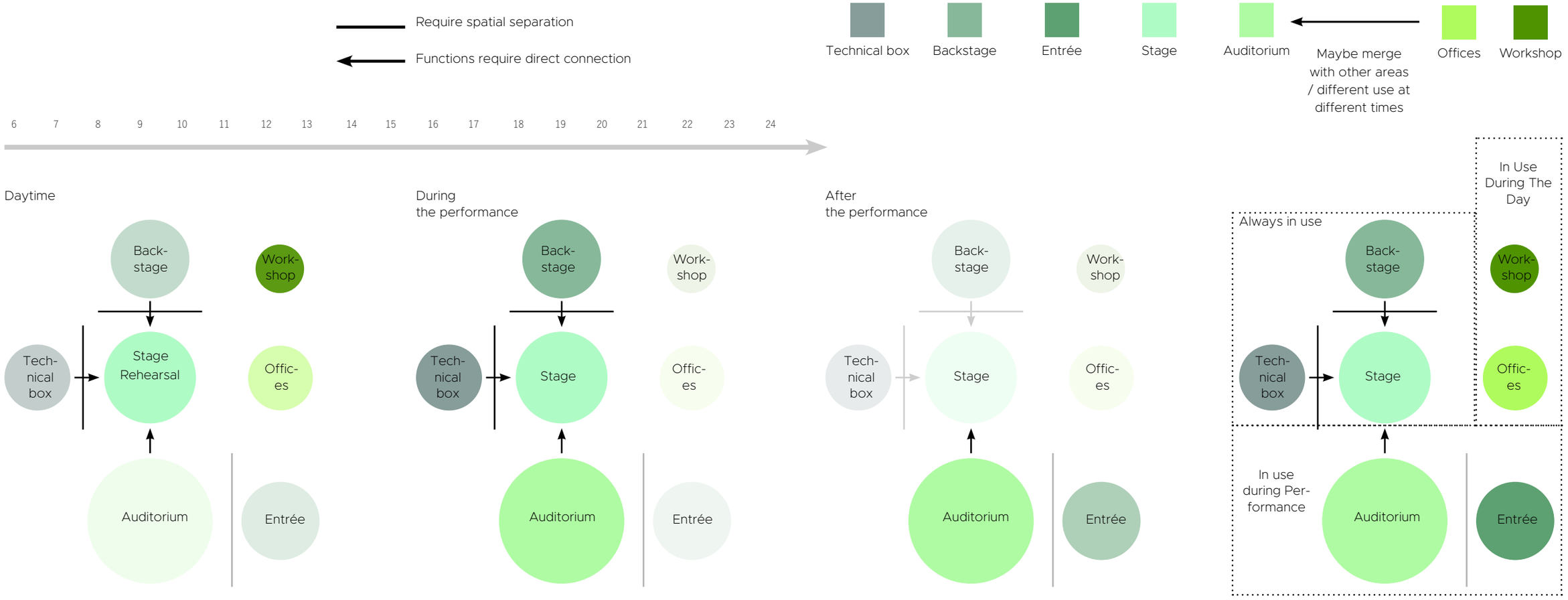


Illustration 57: Relation of the different spaces and functions

III. SPACE DIAGRAMS

Space Optimization

Some programs can coexist in the same zone with the right timing and occupancy level. For instance, when there are gaps in the performance schedule, the workshops can be integrated into the backstage area and the offices into the auditorium zone to save space and optimize functions.

The entrance

Daytime

There are three main zones that create a venue or theatre space: the entrance and reception area, our gateway to another world; the auditorium area, which can host several activities and endless ideas all at once; and the backstage area, the wind behind the performance.

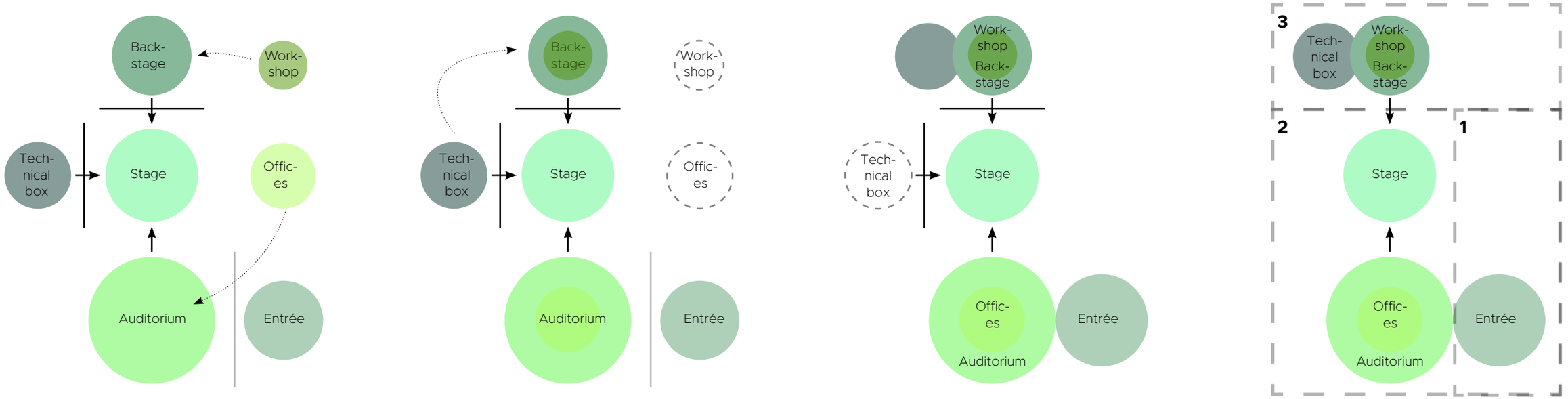
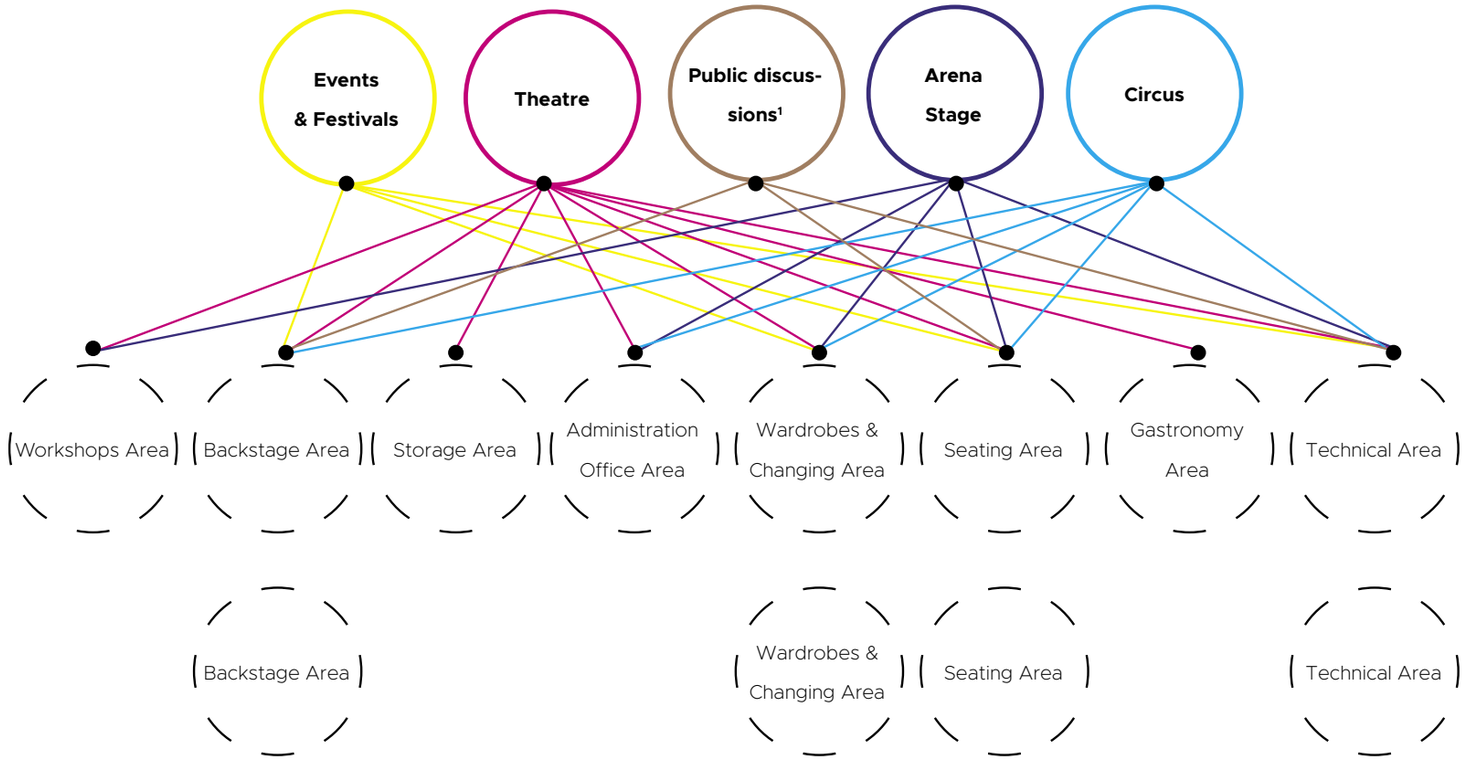


Illustration 58: Relation overlappig spaces and functions

II. STAGES AND PROGRAM RELATIONS



1. For examble: TED talks, poetry or science slam

Illustration 59: comparative deductive illustration showing the most common programs

III. WHAT IS THE NARRATIVE?

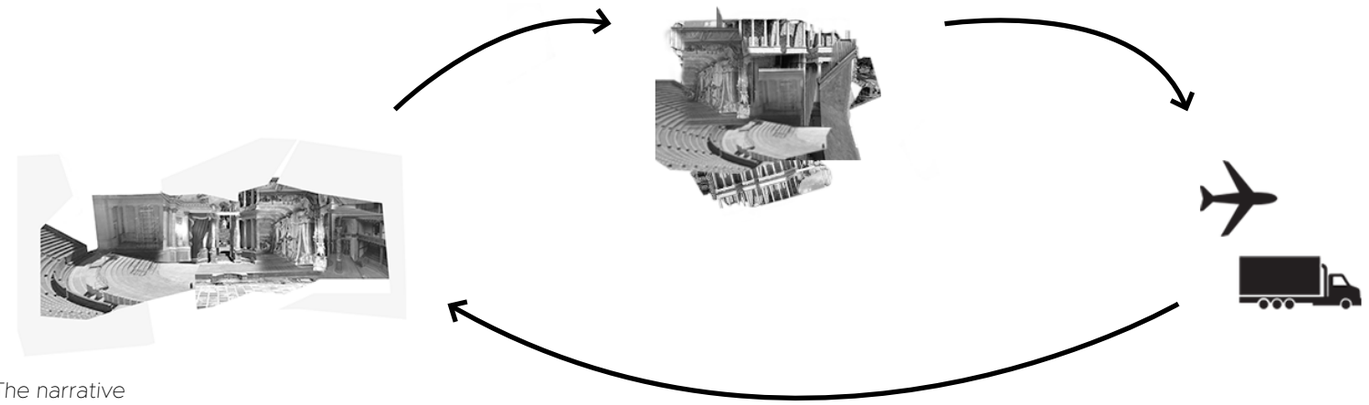


Illustration 60:The narrative

A theatre or venue that travels across continents and cultures must be adaptable and agile. It should have the ability to undergo a sort of cyclical metamorphosis: once assembled, it can be disassembled, shipped and then reassembled. By reimagining the relations between the theatre and the typology of architecture that it commonly follows, as well as between theatre as an architectural program and theatre as an art form, a traditional black box can be transformed into a contemporary traveling stage. The essence of a performance or theatrical experience can be categorized into three main experiential moments, even worlds. First, there is the entry to the space itself, an exit from the outside world. Second, there is the entry into the parallel or mystical world of the auditorium, where imagination takes hold as the ACTS unfold. And third, there is a liminal space that wraps around the exterior of the auditorium, creating a distinct in-between place that invites contemplation, referred to as the “Awakening.” The goal is to accentuate the nature of these three different zones of experience through architectural techniques, including layout or hierarchy, materiality and atmosphere, as well as architectonic expression.

II.

III. WHAT SHOULD IT OFFER EACH CITY ?

IV.

V.

The transformable and transportable language of the traveling stage speaks to the ever-changing social and structural landscapes of city life. As the city adapts to change, so do the people living in it, and vice versa. Therefore, a new typology of theatre or venue space should offer the same type of adaptability to be relevant — to connect. It should be a space of experimentation and exploration, where performers and audiences alike can (re)visit or (re)connect with a range of artistic and cultural expressions, including plays, concerts, talks, and other immersive audiovisual forms. And most importantly, it should be a space that invites a contemplative exchange of emotional and physical energies, creating a site that exists both within and beyond everyday life.

II.

III. WHAT IS THE SUBLIME EXPERIENCE

IV.

V.

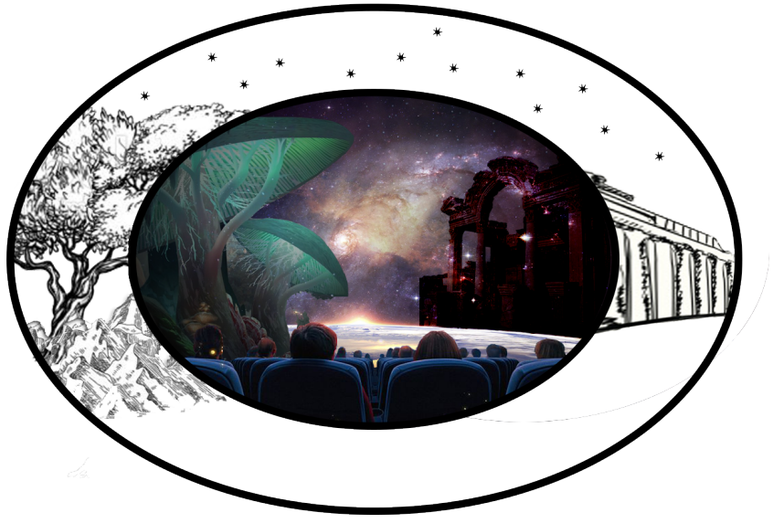


Illustration 61: The different zones (Mystical and awakening area)

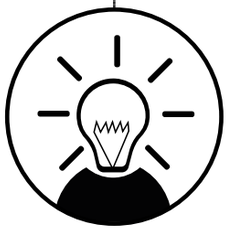
The traveling stage should be seen as a creative tool for moving between the limits of the everyday and the limitless sublime. From an architectural perspective, the conceptual connection between real and parallel worlds can play out in a structure that incorporates an in-between space specifically designed for contemplation. This “Awakening” area builds on the transcendental nature of the live performance by literally opening up different perspectives, whether it’s viewing the real world around the auditorium or the parallel one within it.

II.

III. THE THREE MAIN ZONES

IV.

V.

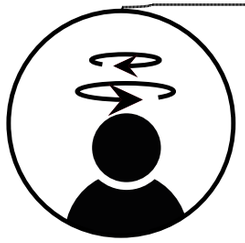


The real world:

"Where everyday life unfolds; the place we leave behind upon stepping into the venue."

The Awakening zone:

"Where audience members may process the experience and reflect on the performance in close proximity to the real world; a sort of buffer zone between the dream of the illusion and the reality that awaits "



The parallel world (Mystical world)

"Where performers help audience members to mentally participate in the illusion; a place of freedom for the human imagination."

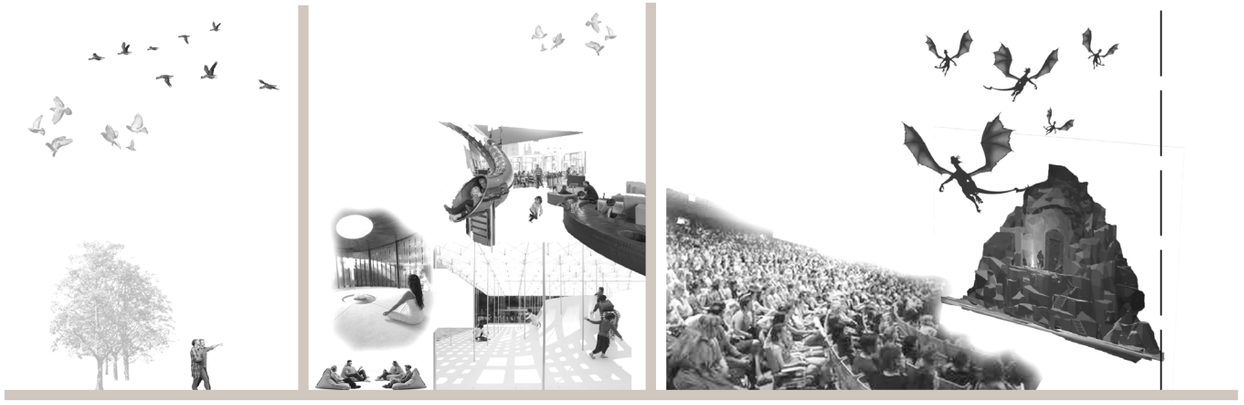


Illustration 62: The different zones (Mystical and awakening area)

MYSTICAL WORLD AREA

ATMOSPHERE

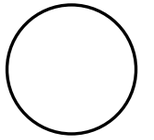
An immersive atmosphere that triggers a sense of fascination and wonder.

Illustration 63: The mystical world

METEOROLOGICAL STRATEGY

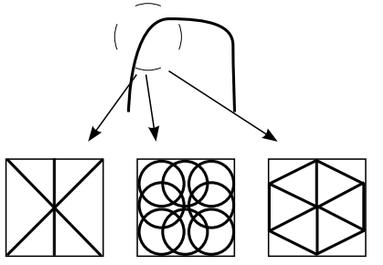
Playing with light inside the space

COLLECTIVE IMAGINARY STRATEGY



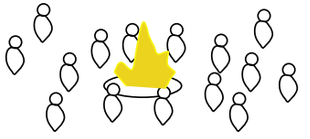
No corners, with minimal structural columns in the center, to foster unity

TECTONIC AND STRUCTURAL STRATEGY



Playing with Patterns of elements or structures or fabrics.

INNATE AND DISTINCTIVE IDENTITY STRATEGY



The feeling of a bonfire gathering

II.

III. AWAKENING AREA

IV.

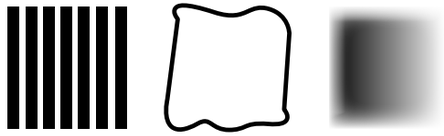
V.

ATMOSPHERE

An atmosphere that integrates part of the mystical world, distorting the view port to the real world, while also illuminating the worlds within the human mind.

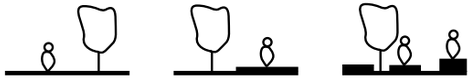
Illustration 64: The awakening area

AESTHETICALLY STRATEGY



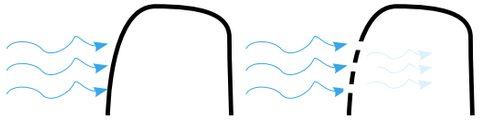
Playing with Materials and textures

PERCEPTIVE STRATEGY



Playing with levels and elevations create separation of zones or hierarchy of zones

ENVIRONMENTAL-CONTROL STRATEGY



Playing with Air flow and temperature using the fabric layer or membrane

EXPERIENTIAL STRATEGY

Volumes or geometries that are inviting or change perception of users

II.

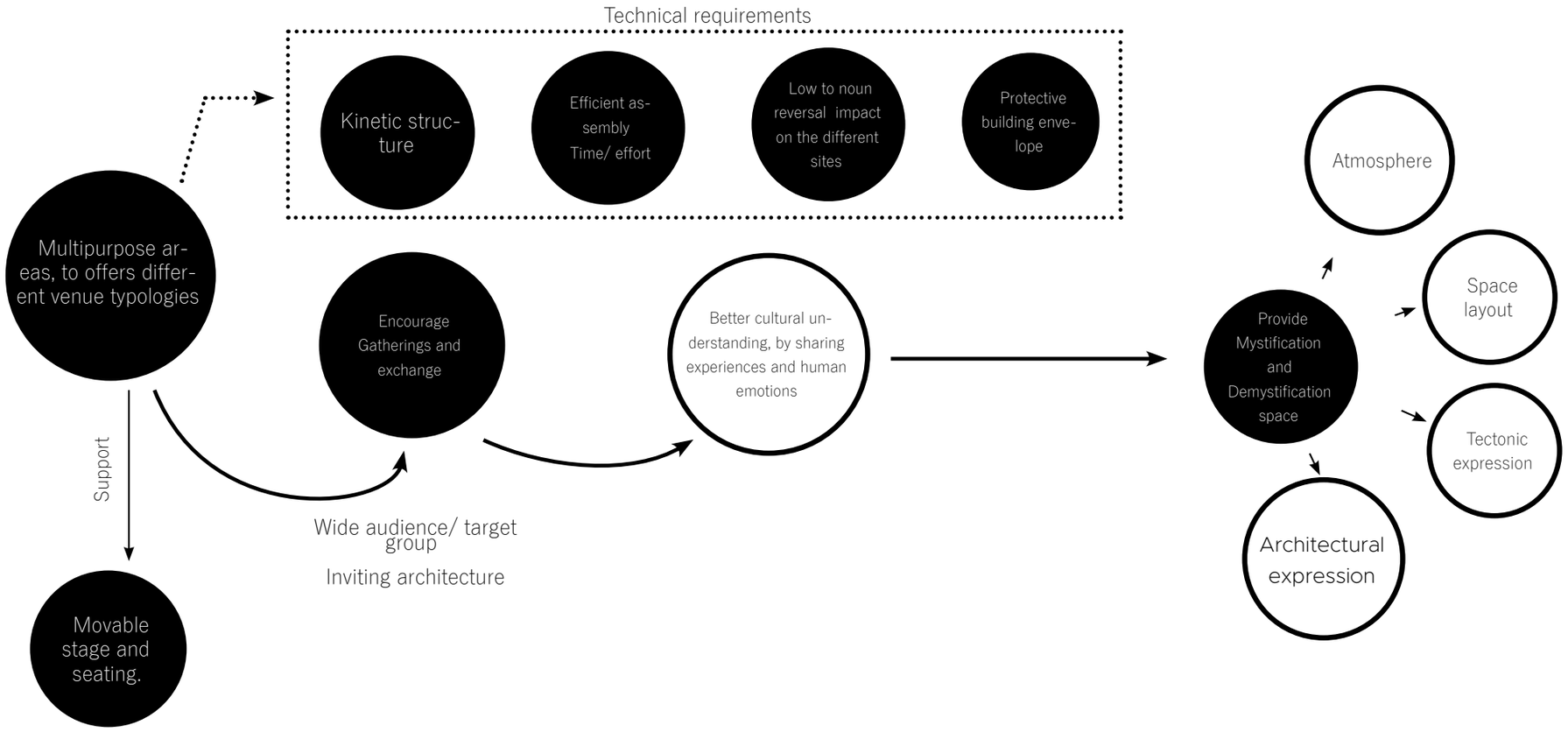
III. DESIGN STRATEGIES

IV.

V.

Bringing back the strategies into perspective

Revisiting the design goals and ambitions led to critical evaluation and thus a more informed approach. This Diagram is the extracted focus points in which the design process started with



CONCEPT DEVELOPMENT PHASE II

TIMELINE OF DESIGN JOURNEY

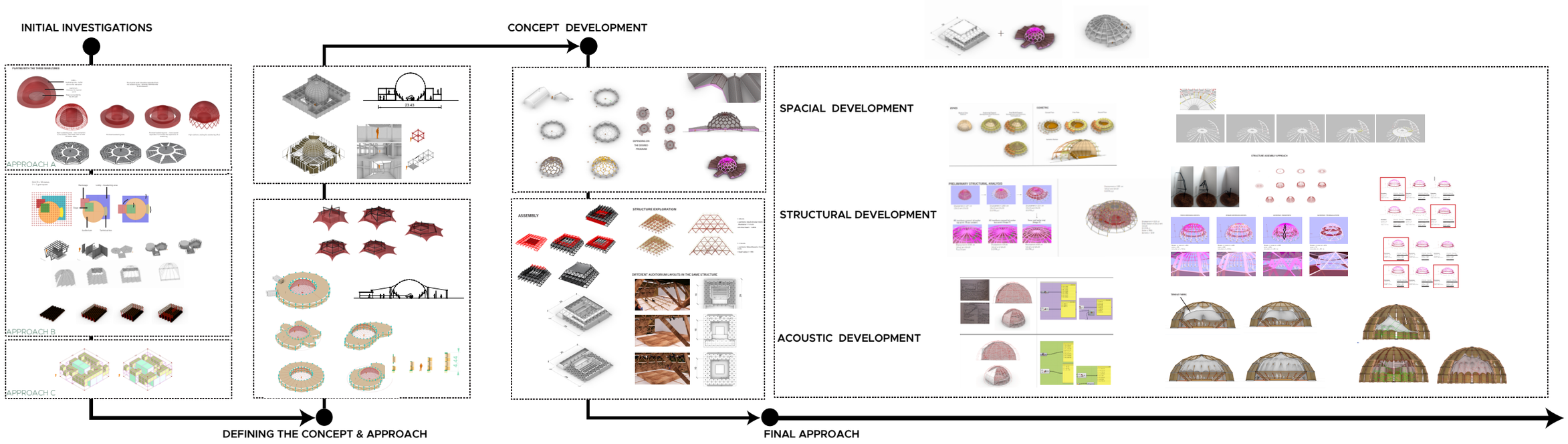


Illustration 65: Timeline of the design journey

1. CONCEPT APPROACH . (ORGANIC FORM)

Flexibility of the Primary structures

The auditorium, or parallel world that holds the “mystical” realm, is a constant variable in the design; only the arrangement of the stage and seating is changeable. It is the first structure that is built, and it is the central support for the Awakening. This multi-leveled area that wraps around the auditorium can be seen as a responding variable, one that is formed and reformed, much like the mind as copious thoughts and inputs pass through it, affecting perception and inspiring reflection on the surrounding world(s).

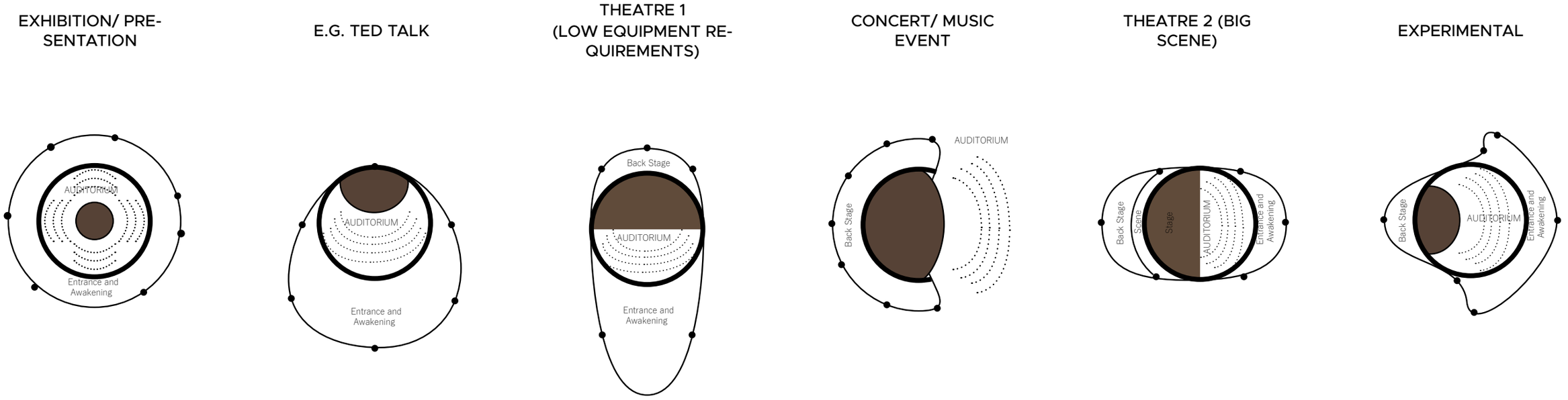


Illustration 66: 1. Concept approach (organic form)

III. ITERATION 01: ORGANIC FORM

Geodesic center with kinetic exterior

The first iteration of the concept was rooted in a central geodesic dome that could serve as the auditorium. The secondary offsetted circle, the Awakening, would then be designed with flexibility in mind to accommodate diverse layouts, conceptual approaches, and relationships between each zone (and world). The fabric walls of the dome could create an atmosphere of the performers' choice (i.e., covered or uncovered, open or closed), expanding upon the concept of the traditional stage curtains. Just as the auditorium and Awakening represent a circle within a circle, the fabric walls and curtain represent a partition within a partition when covered and closed.

The columns would be custom pre-fabricated for ease of transportation and installation in different locations. By moving these columns and placing them around the dome, different geometric forms could be achieved, as seen in the images on the right. An addition of flexible walls could also be placed in the interior to demarcate the distinct zones and create specific atmospheric expressions.

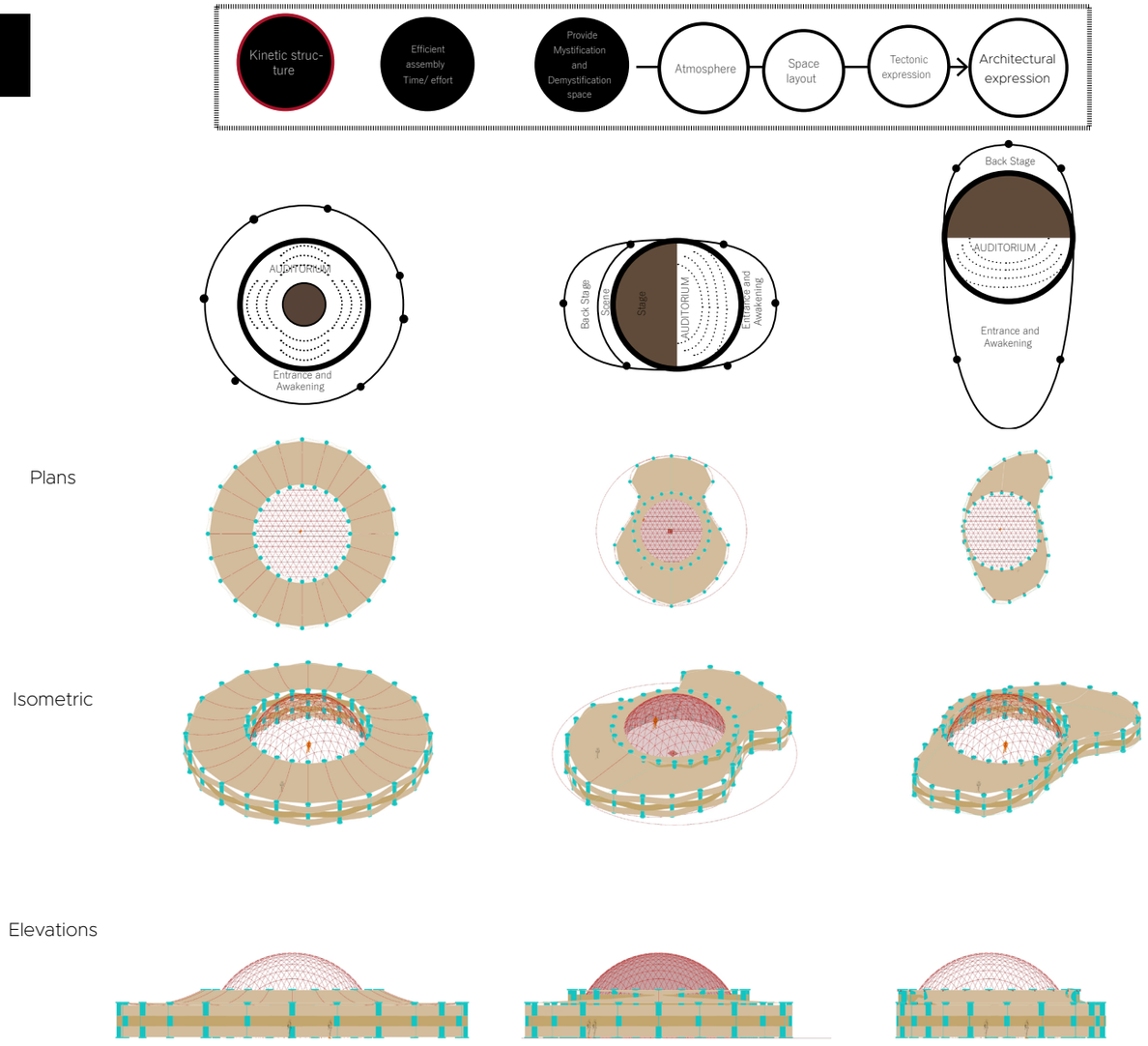
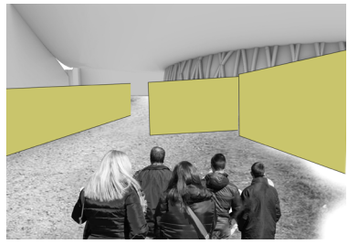


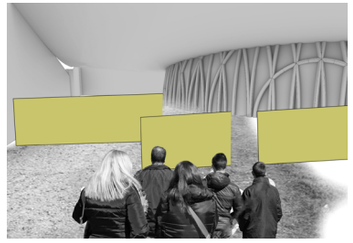
Illustration 67: 1. Concept approach (organic form) - first sketches

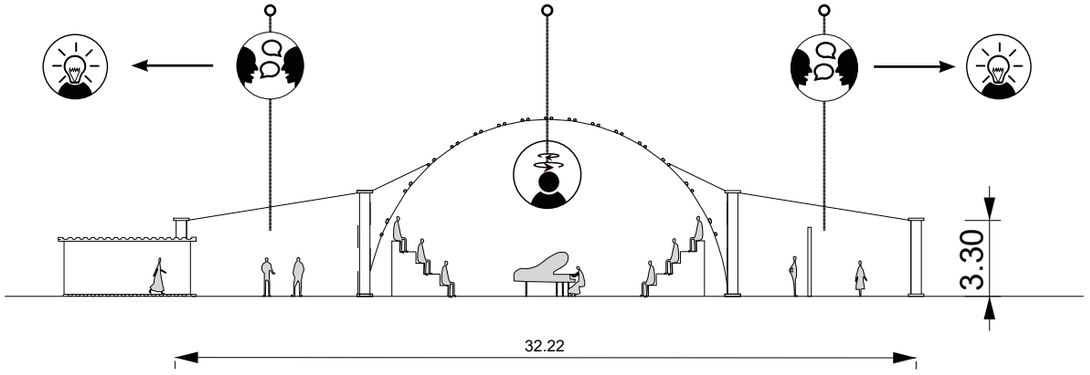
ITERATION 01: ORGANIC FORM

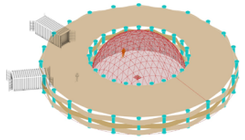
Geodesic center with kinetic exterior

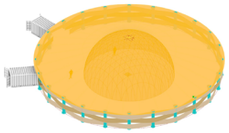
As the audience members enter the space, easily-installed, flexible walls would guide their movements and experience while also serving as partitions between zones.
These partitions could also be used as exhibition space for elements that "tease" the play, including posters, props, and other objects that reference the performance.



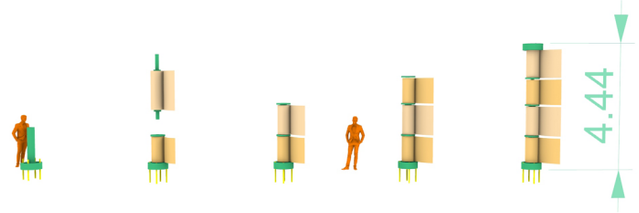


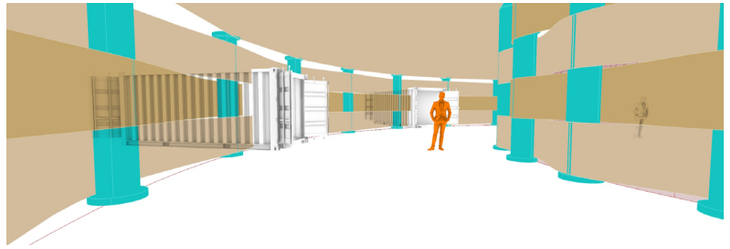






Custom column assembly





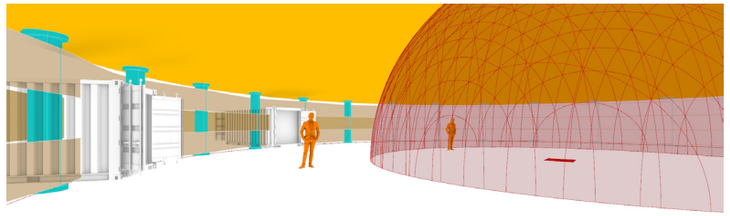
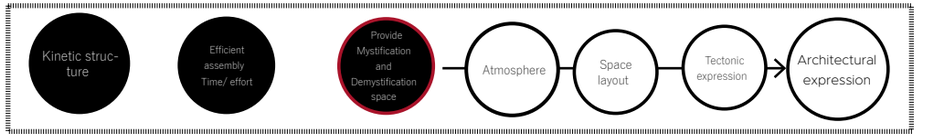


Illustration 68: Iteration 1 (organic form) - first sketches

II.
III.
IV.
V.

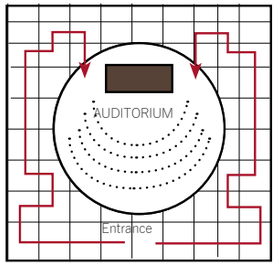
2. CONCEPT APPROACH . (RIGID STRUCTURE)

Flexibility of the Primary structures

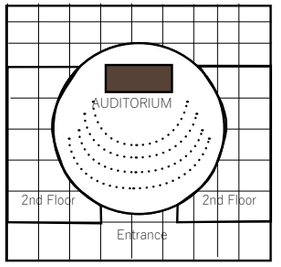


The same concept can be applied to a modular approach that could provide more practical structural solutions.

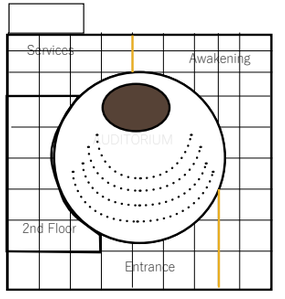
EXHIBITION/ PRESENTATION



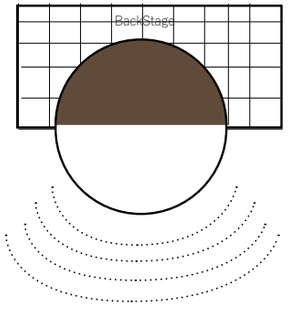
E.G. TED TALK



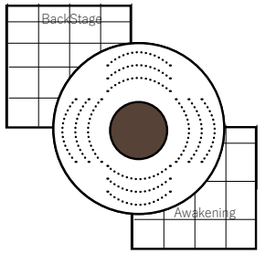
THEATRE 1 (LOW EQUIPMENT REQUIREMENTS)



CONCERT/ MUSIC EVENT



THEATRE 2 (BIG SCENE)



EXPERIMENTAL

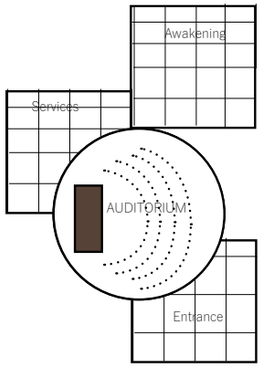


Illustration 69: 2. Concept approach (rigid structure)

ITERATION 02: RIGID STRUCTURE

DOME CENTER WITH MODULAR EXTERIOR

The second iteration of the concept followed a modular structural approach in which each element could not exceed three and a half meters. These elements would be assembled together creating a three-dimensional frame that could be attached to identical frames, thus producing a three-dimensional space.

It would be a structurally stable grid system that could be easily interchanged, following the concept and approach to the design problem. The modular grid seemed to provide better structural potential while even opening up the possibility of a multi-leveled space.

The different modules could then be covered by fabric, lamella, or other materials, to realize the interior space and help create specific atmospheric expressions. Each zone would then have its own atmospheric character based on the materials used to enclose it and the height or location from which it extends. The central dome, the auditorium, would remain constant, hosting a flexible interior where the seating and stage are movable and transformable.

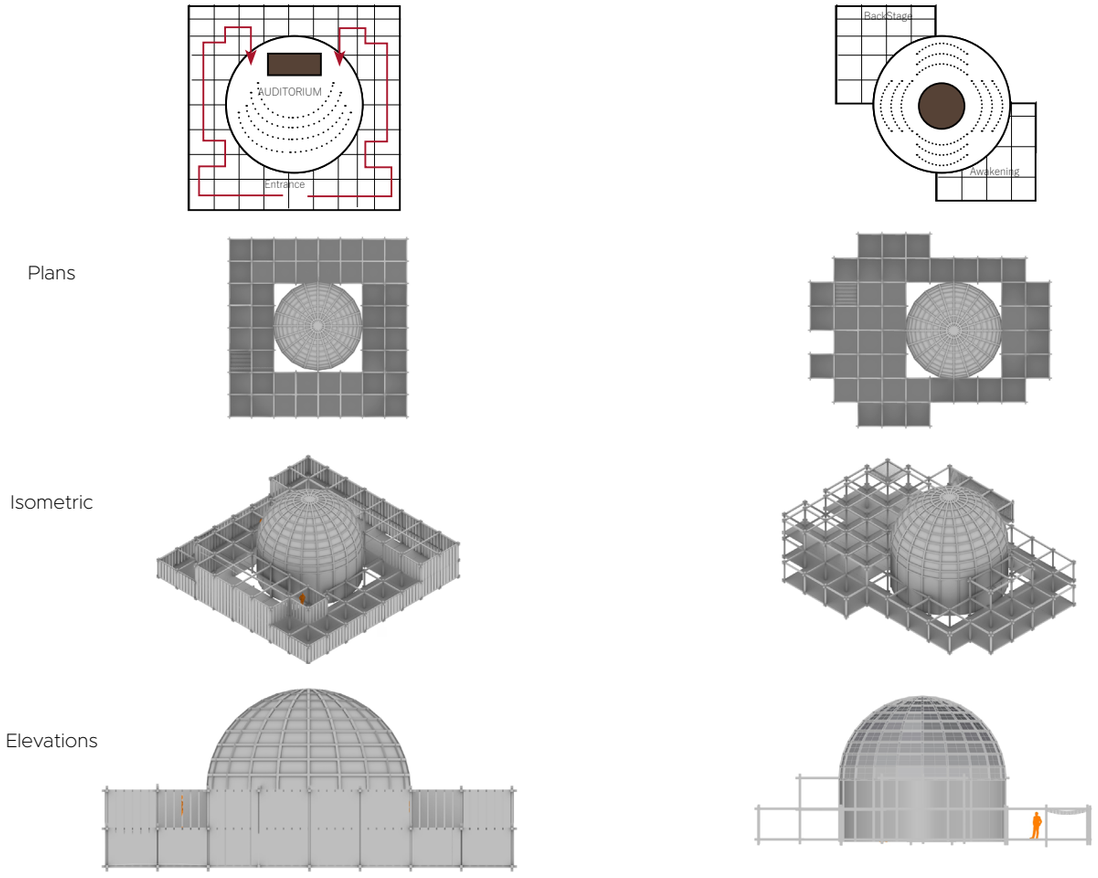
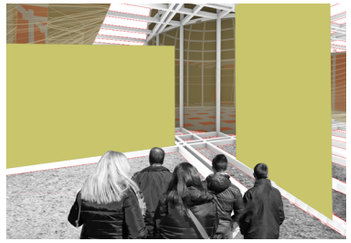
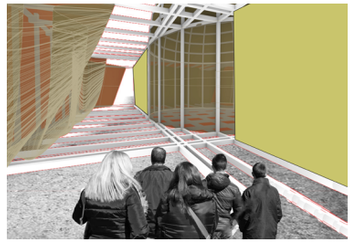


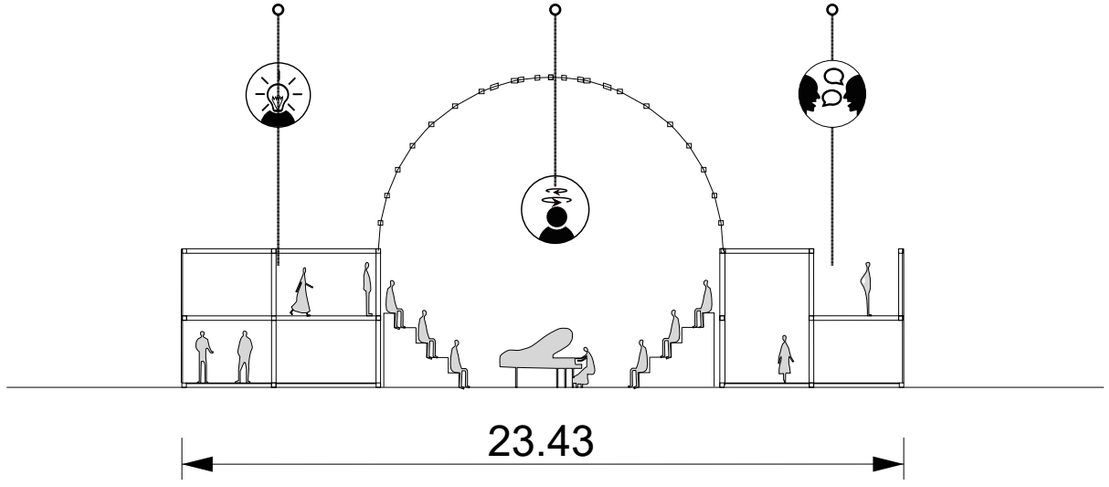
Illustration 70: 2. Iteration 2 (rigid structure)

ITERATION 02: RIGID STRUCTURE

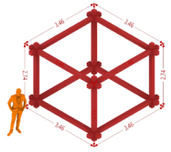
DOME CENTER WITH MODULAR EXTERIOR

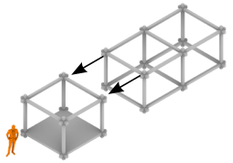


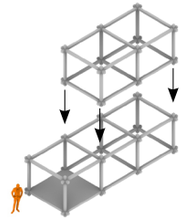


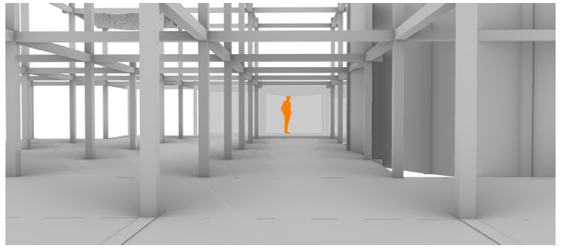


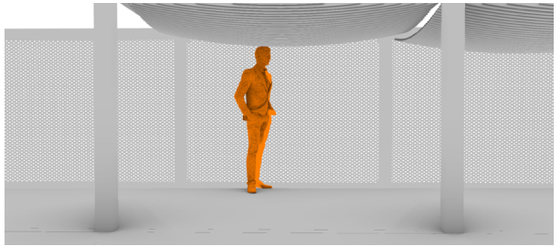
3d Grid Module

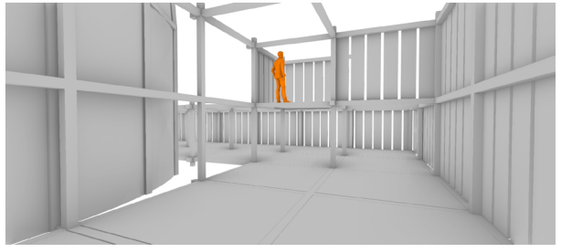












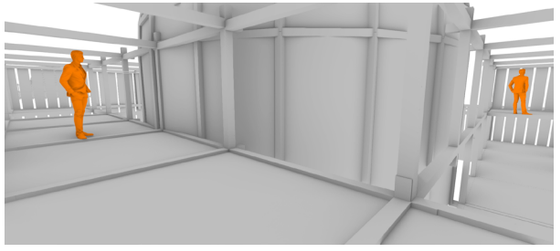


Illustration 71: 2. Iteration 2 (rigid structure) - sketches

CONCEPT DEVELOPMENT PHASE II

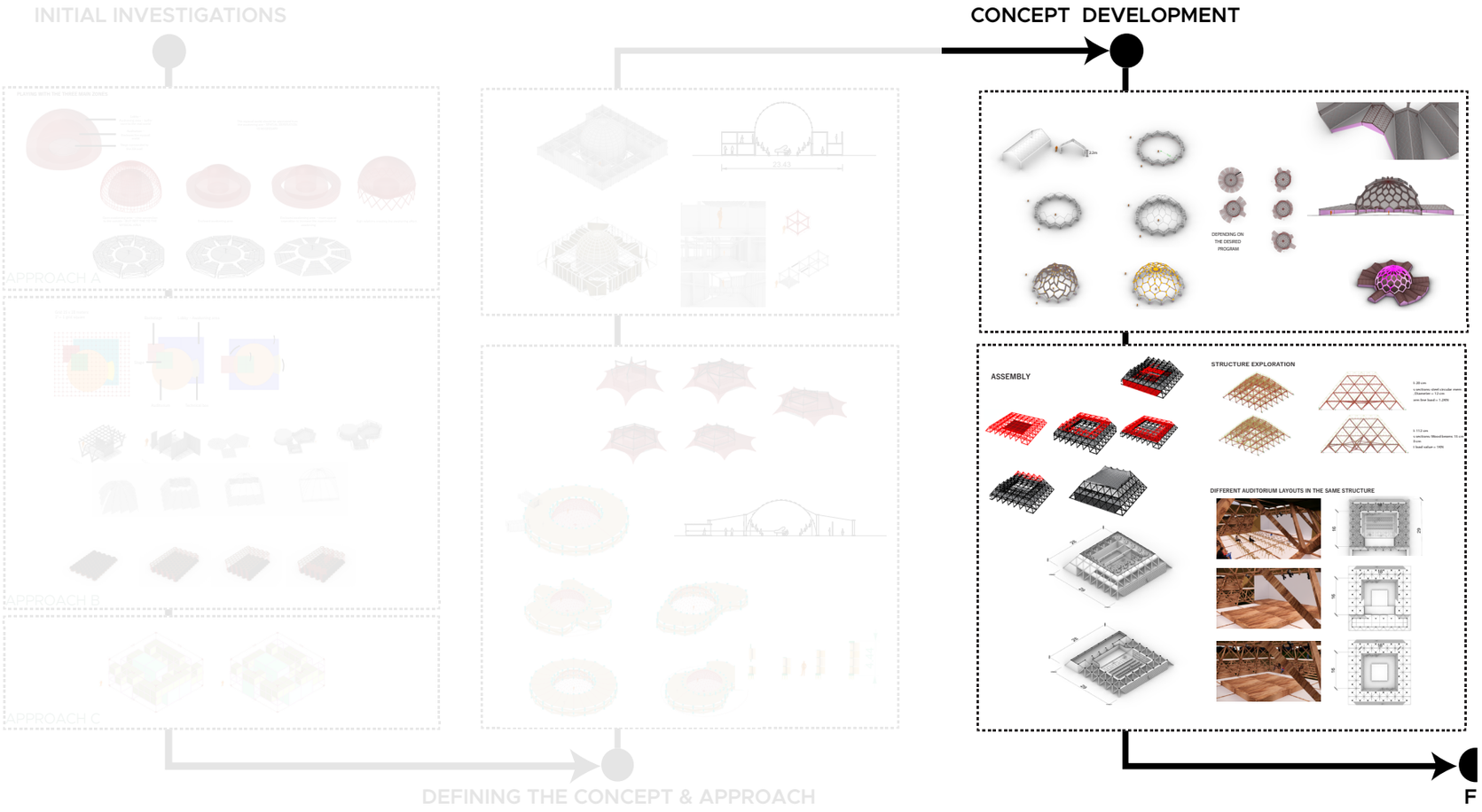


Illustration 72: Developing 2 approaches

1. CONCEPT DEVELOPMENT: ORGANIC FORM

Geodesic center with kinetic exterior

Phase two of the concept development involved the evolution of both iterations by focusing on the materiality and feasibility of the structure. The organic form approach had been developed to include a kinetic, pre-fabricated structure that is able to expand like a pair of lungs, creating a larger enclosed space. That structure would be assembled in a polar grid, serving as the base for the dome before being erected to host the auditorium itself.

This approach could incorporate such materials as timber fabrics and steel for the kinetic element. Structural investigations were conducted using timber alone and steel alone. The environmental impact of these respective materials were further investigated

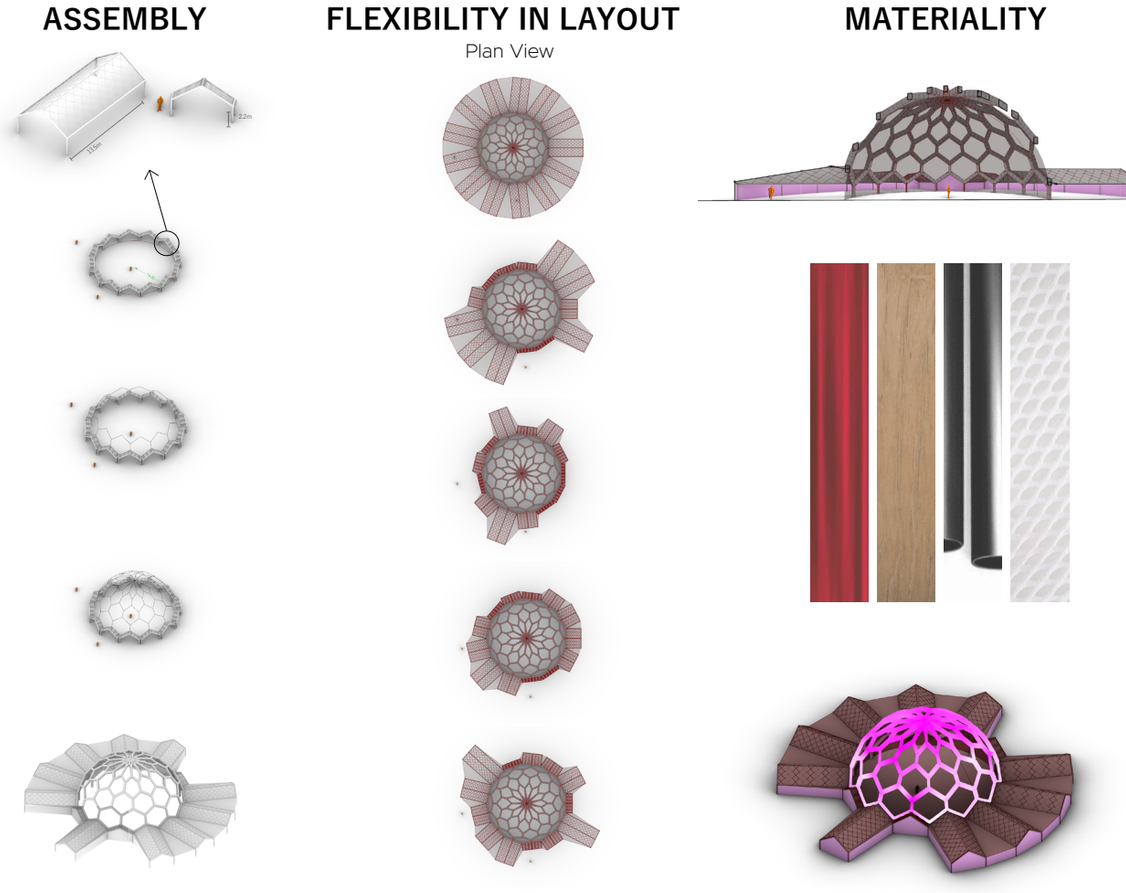


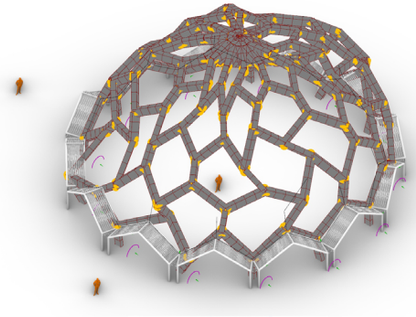
Illustration 73: Concept development: Organic form

1. CONCEPT DEVELOPMENT: ORGANIC FORM

Geodesic center with kinetic exterior

at this stage, favoring the use of CLT against an all steel structure to reduce the carbon emission and footprint of the structure. The features that stood out in this approach were the geometry of the auditorium and the language of the dome as a gathering or meeting point, as well as the multiple access points to the performance and the kinetic flexible members that offer ease and versatility in terms of creating the desired layouts and zones. The dimensions of the members could have been optimized to reduce construction time and hand-ability by individuals. The approach also required additional iterations and elements to be added to influence the atmospheric and architectural expressions, enabling each zone or space to assume a unique identity.

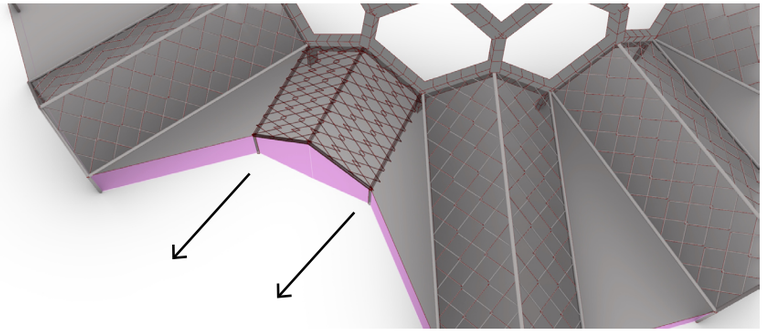
STRUCTURE EXPLORATION

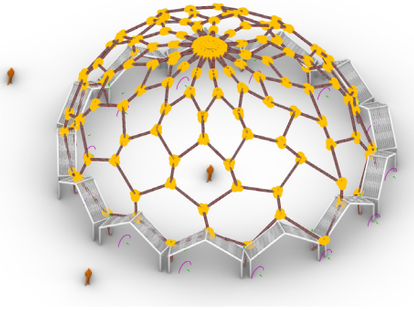


Displ: 62 cm

Cross sections: Wood beams dimenstions= 250 x 450 cm

point load value = 1KN





Displ: 30 cm

Cross sections: Steel Circle Section
Diameter = 23 cm

point load value = 1KN

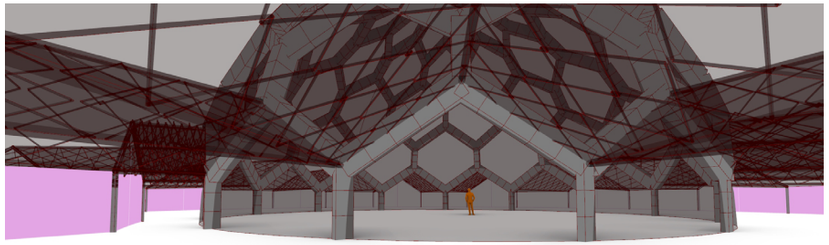


Illustration 74: Concept development: Organic form

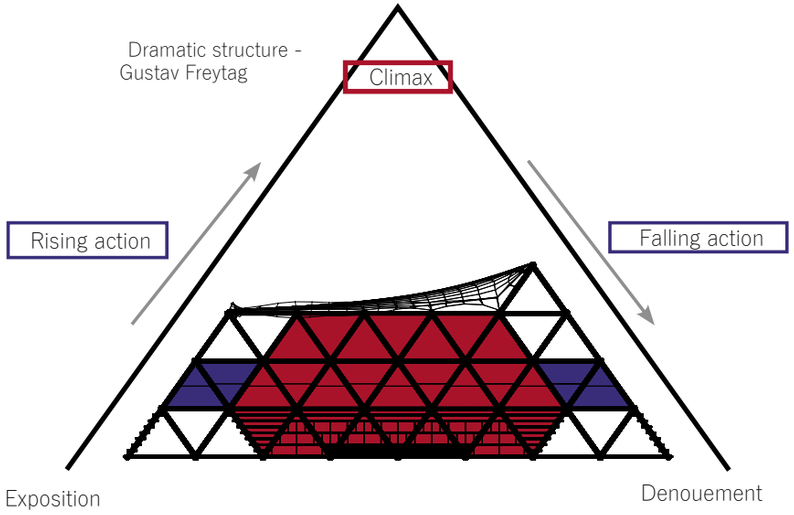
2. CONCEPT DEVELOPMENT: RIGID STRUCTURE

Center with modular exterior

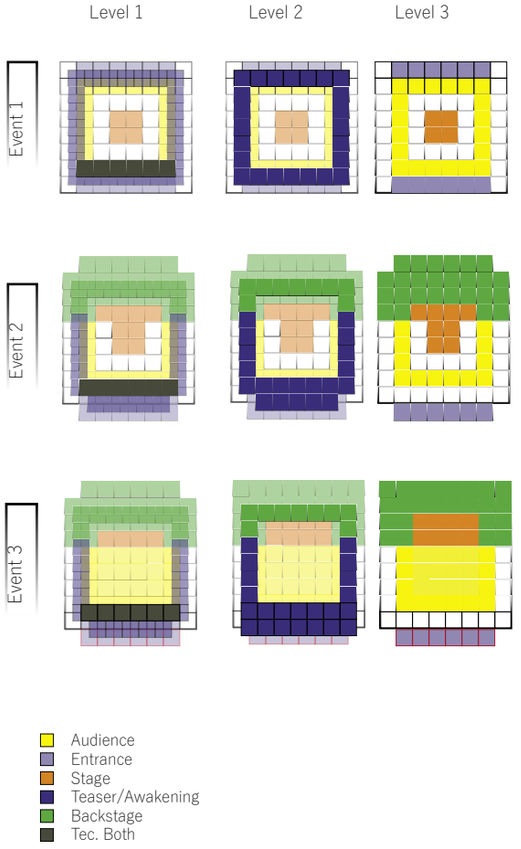
The modular grid approach had been developed further by changing the module itself into a triangular module. The triangular module offered a more architecturally expressive space with the ability to influence the atmosphere by creating different levels, and providing a **unified structural that is homogeneous in its form.** The module also proved to be useful in integrating elements such as seating or stairs.

The structure was analyzed using Karamba as well, both as a steel module and a timber module.

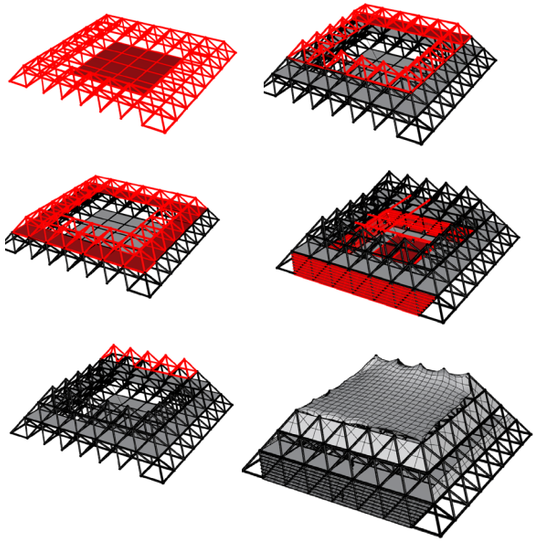
APPROACH



FLEXIBILITY IN PLAN AND LAYOUT



ASSEMBLY



MODULE

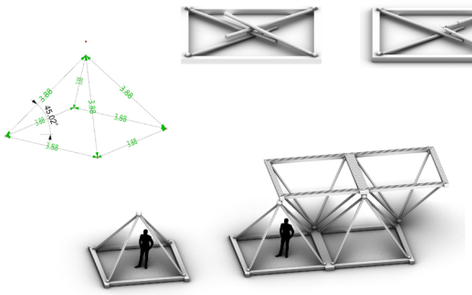


Illustration 75: Concept development: Rigid structure

II.
III.
IV.
V.

ITERATION 02: RIGID STRUCTURE

Center with modular exterior

Detailing this approach simultaneously presented more challenges and opportunities in terms of the modular structural system. While the main challenge concerned the multiplicity of elements and associated time-intensive construction process, there was great opportunity in having different levels to separate the zones. The latter was inspired by Gustav Freytag's Pyramid for dramatic structure — a design criteria of symbolic importance.

ISOMETRIC LAYOUT AND SECTIONS

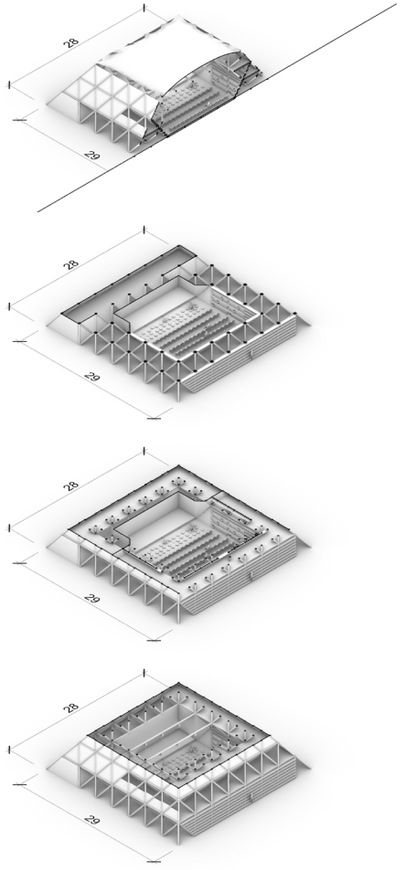
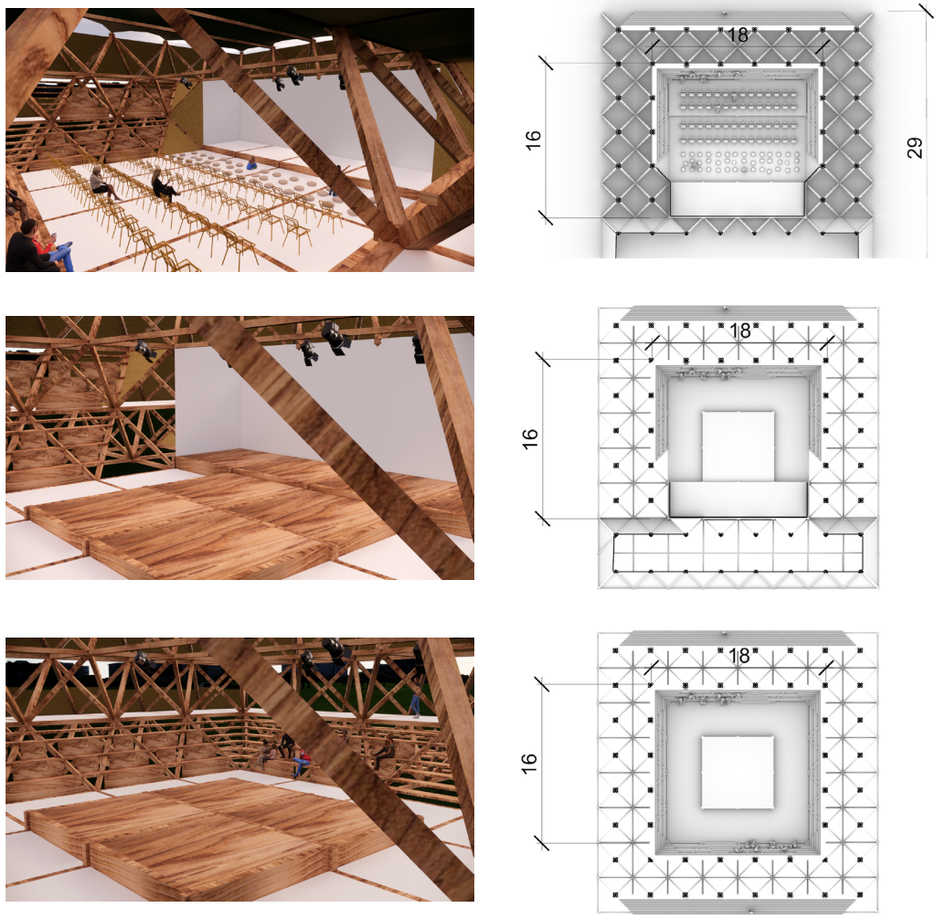


Illustration 76: Concept development: Rigid structure

DIFFERENT AUDITORIUM LAYOUTS IN THE SAME STRUCTURE



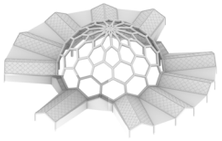
II.

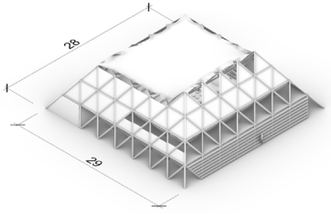
III. APPROACHES COMPARISON

IV.

V.

Comparing different design goals guiding the project





Atmosphere	Space layout	Tectonic expression	Architectural expression	Low impact on different sites	Efficient assembly Time/effort	Movable stage and seating.
Organic kinetic form, (The ability to customize the interior qualities with sub components (seating, stage, curtains and wall dividers) Sense of unity and meeting in a central space/ equality	Constant central space (Auditorium)Flexibility to shape space around auditorium Open area, Space dimensions have a thresh Hold (maximum expansion, constant height)	Kinetic structure + Dome Global form (Hexagonal) , can be potentially changed as well.	Festive/Circus vibe. A global dome enclosure or structure that provides a Column free auditorium with expandable walls. Emelio Perez (Kinetic Theatre) Influence Two separate shapes	Might require minor pile foundations but has low impact on the sites. Must be placed on a flat land/ground.	Assembly would be done by a group of people (5+) with one crane or truck to be faster Will depend on the final connection detailing and the assembly of the kinetic element	Offers the auditorium as a black box type of experience, where furniture pieces are easily moved around creating any space required.
Closed area - dense space - many elements Encouraging encounters between visitors??? Impression of a solid and stable structure	Flexible inside the grid: - Flexible auditorium and stage - Limited flexibility of supporting areas	Inside functions, furniture as integrated/ part of the construction All functions and their needed support elements can be moved / applied in the grid	Impression of a solid and stable structure Pyramid being a often represented architectural shape - can connect to the urban context - globe shape One shape	Low impact depending on the development of the "ground level" of the grid Potential of using slopes / stairs / surroundings on site	Depending on the development of the module at the current state - to long and high effort Straight forward assembly - less risk of making mistakes that decrease the stability of the structure	Stage (plus Backstage) - Very movable inside the frame of the grid Seating - depended on the structure but expendable with the grid

II.

III. TIME LINE OF DESIGN DEVELOPMENT

IV.

V.

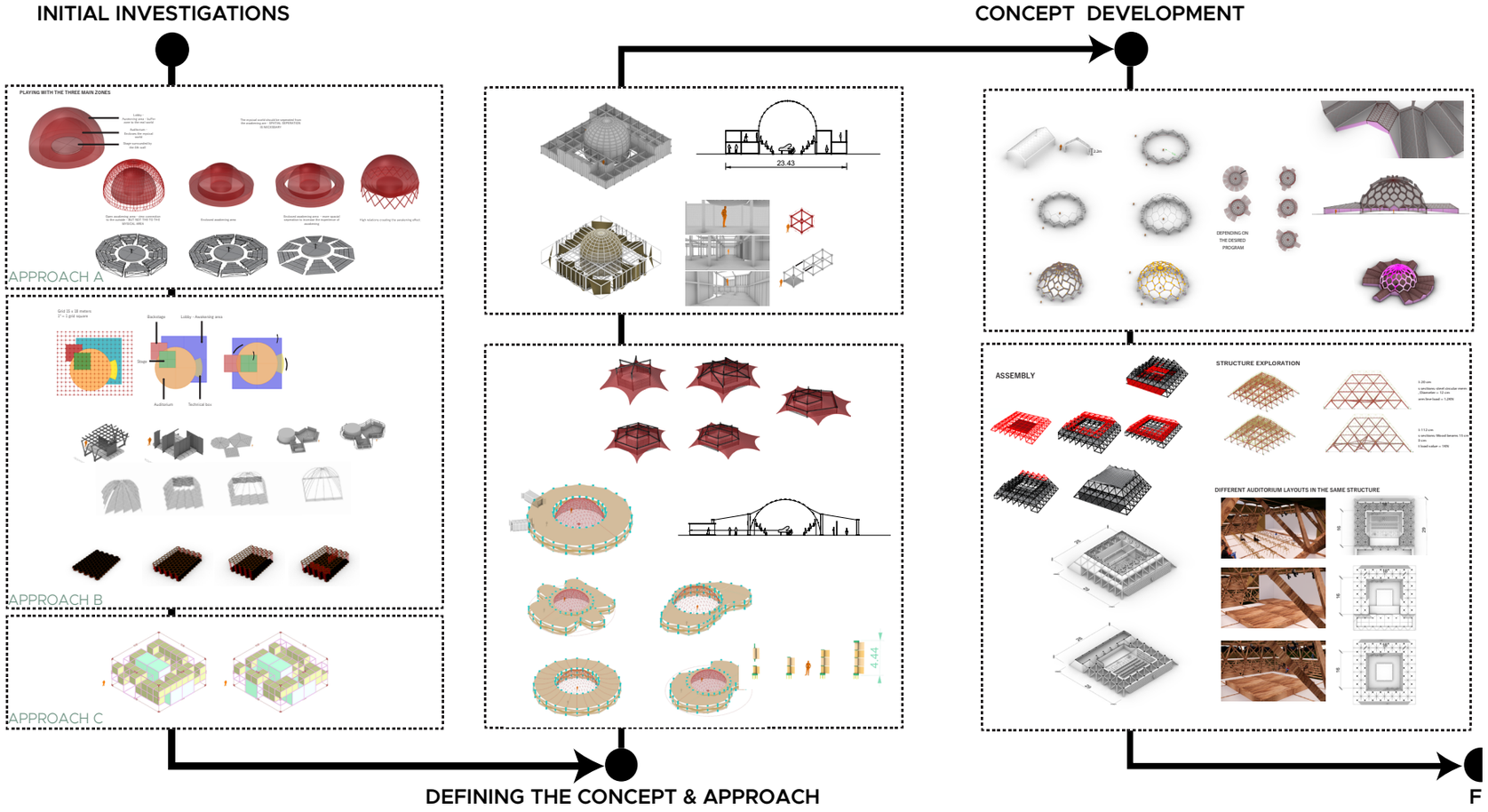


Illustration 77: Conclusion of the skeching phase

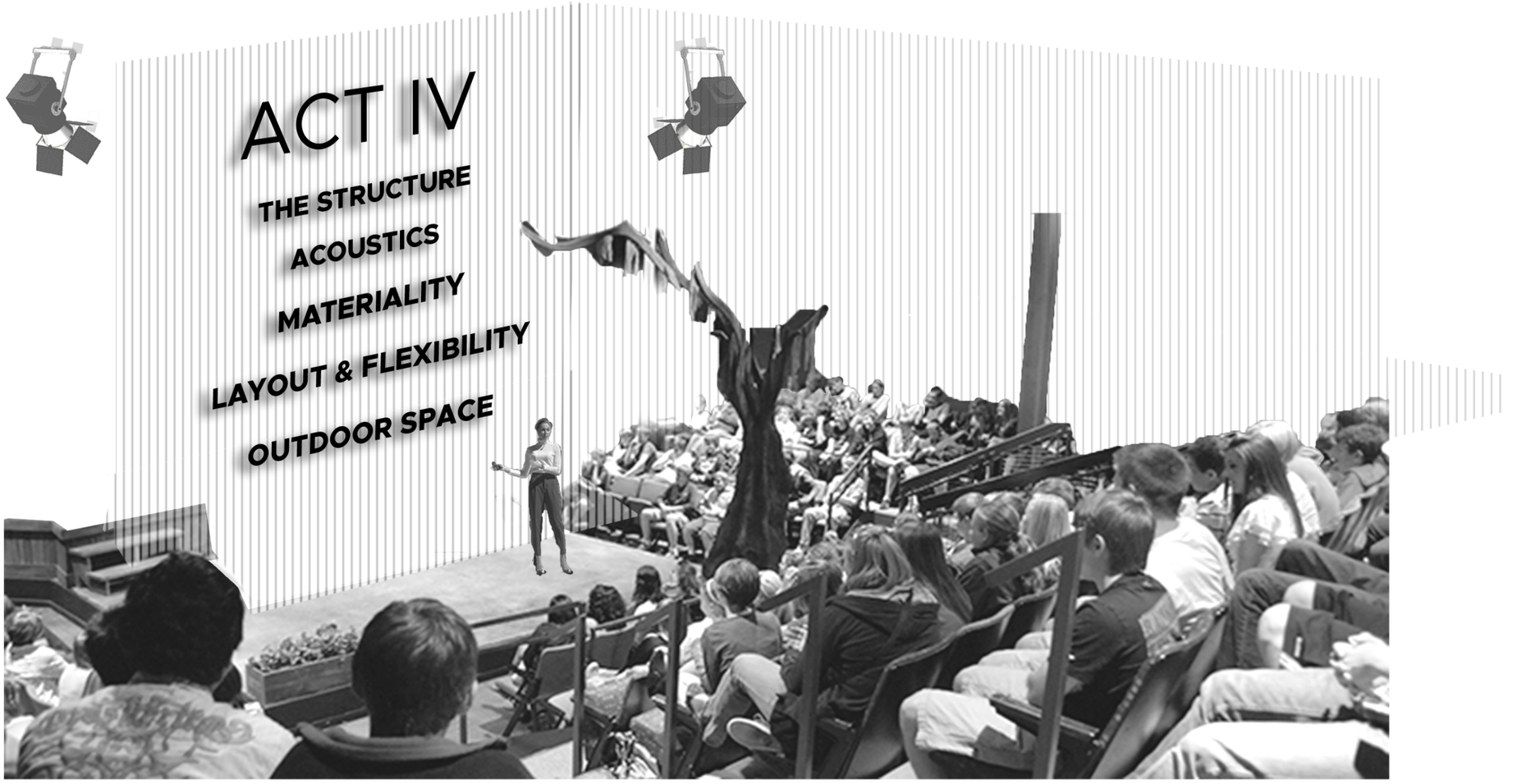


Illustration 78: Act IV

SYNTHESIS : "the combining of the constituent elements of separate material or abstract entities into a single or unified entity (opposed to analysis,) the separating of any material or abstract entity into its constituent elements."

www.dictionary.com/

After critically and creatively work-shopping the previously explored iterations, a design or synthesis emerged where the modularity and three-dimensional layer of the second approach intermingled with the accessibility factor of the organic form approach, to be exact, having additional floors alongside a central domic auditorium. The result was an arch-ribbed dome within a dome that offers both modularity and flexibility in the design while still maintaining a central gathering point — the auditorium.

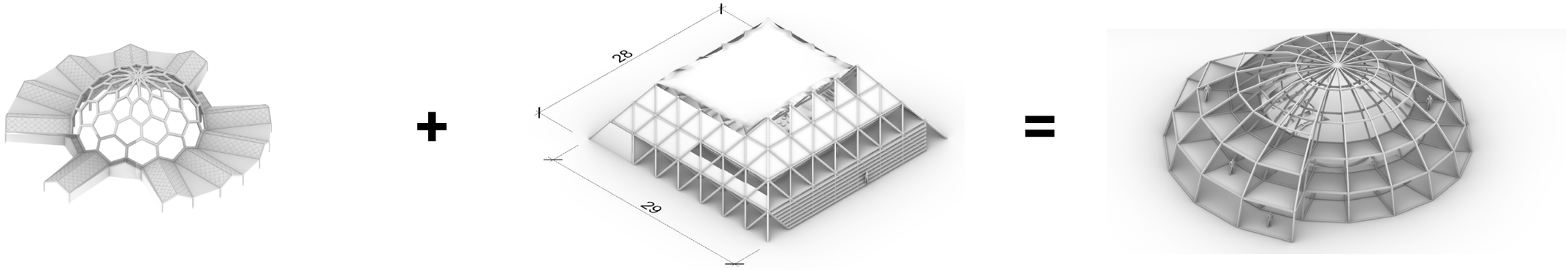


Illustration 79: Merging the concepts

III.

IV. INITIAL SPACE AND LAYOUT WITH CONCEPT

V.

Selected Structure and approach

Following up with the initial concept of having the central auditorium as the constant variable and main space with an added outer offset that can be shaped and reshaped to offer the varied Awakening and real world areas of the initial approach.

The integration of an inner dome structure inside an outer dome structure satisfied the conditions of having multiple levels and access points to the auditorium, while also keeping the auditorium a circular space. From a structural point of view, the approach also provided a grid-like structure and modularity that could be optimized to serve technical design criteria, like faster and smarter (dis)assembly and specific acoustical conditions, without limiting the explorations of the social themes.

Introducing a tertiary space that is another exterior offset of the dome that can be easily moved around would boost the customization of the zones while also reserving each dome as a separate zone with its own unique atmosphere.

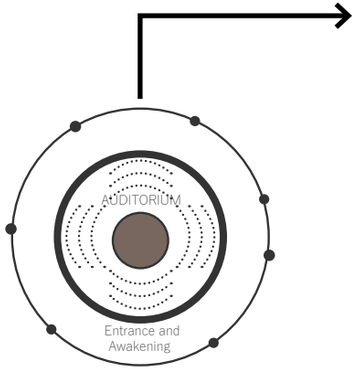
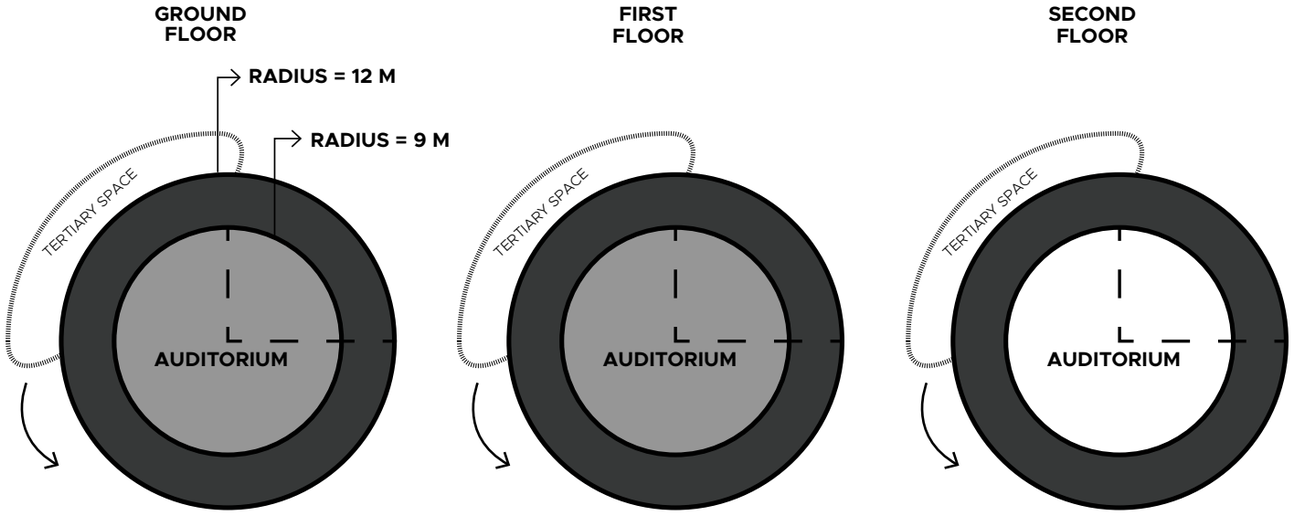


Illustration 80: Approaching the three zones



The auditorium would be a minimum of nine meters radius to host around 100 to 140 patrons, with the lines of sight towards the stage being less than fifteen meters depending on the layout.

The first floor could be accessed from the outside and directly lead to the auditorium and second floor.

The second floor could hold the technical booth and area, plus part of the Awakening, depending on the program and vision of the production, for example, the director or performers' desired layout.

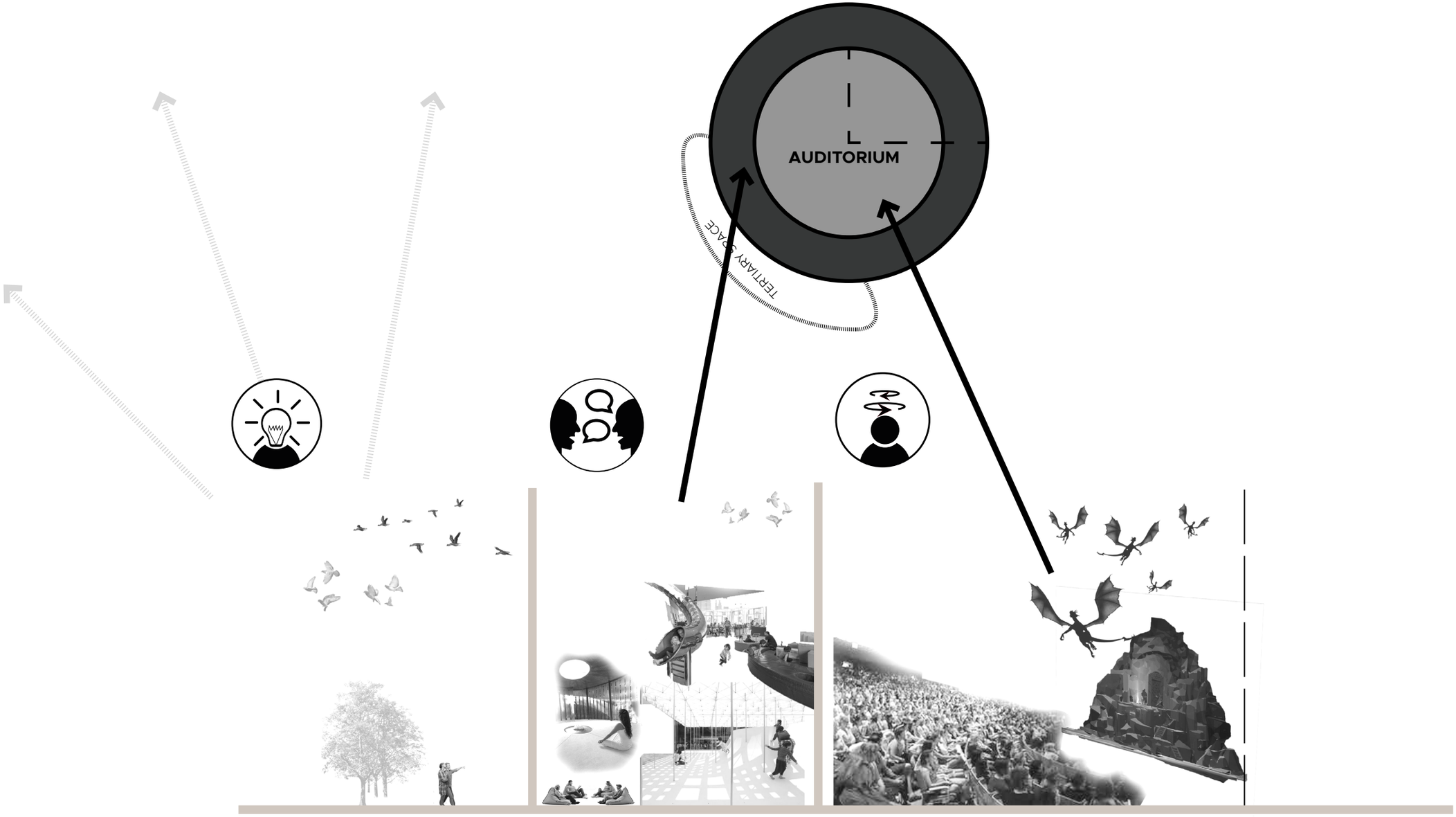


Illustration 81 : the three zones

III.

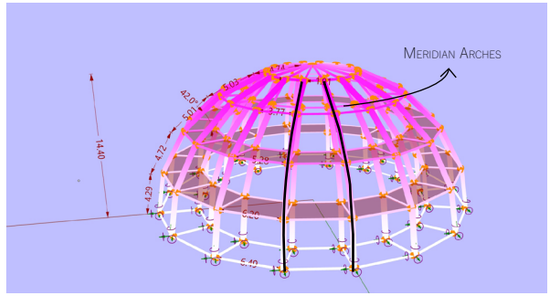
IV. STRUCTURAL ANALYSIS AND OPTIMIZATION

V.

Selected Structure and detailing

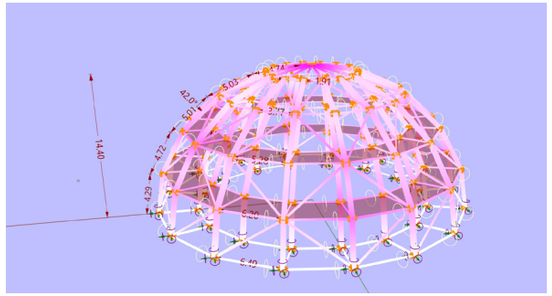
After developing the structural geometry that encompasses the potentialities of the previous iterations, the next challenge was to develop the structure itself. Two main dome structural designs were explored: the arch-ribbed domes, and the geodesic dome. The latter dome naturally required less members to be structurally sound; however, the member dimensions would have to be quite large, or they would have to decrease in size while greatly increasing in quantity to be functional. The geodesic form also proved difficult in terms of integrating extensions without introducing a new structure. The arched-ribbed domes provided a more conventional, structurally sound module that is capable of integrating additional elements, such as seating, extensions, or even enclosing the facade itself. The main challenge with the meridian dome approach was the fixation of the meridian arches for the structure to withstand the compressive stresses on it, otherwise as shown in the “hinged Mediterranean arches” approach, and so additional triangulated elements were required to stabilize the structure. Fixed joints meant that the whole meridian arch had to behave like one big fixed element. The main challenge with this was the transportation and packing of the structure, ideally the members would be separate and not exceed two and a half meters in more than one axis for easier handling and to fit in shipping containers. In the end, the most promising solution was an arch-ribbed dome.

Fixed Meridian Arches



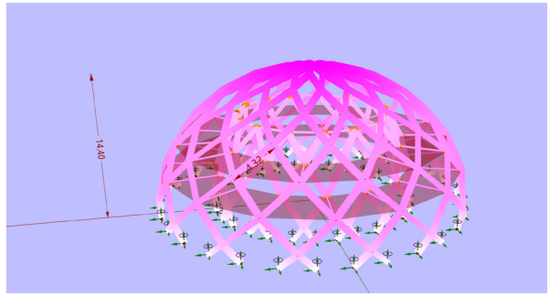
Number of elements = 352
Nodes = 145
Displacement = 1.4cm

Hinged Meridian Arches



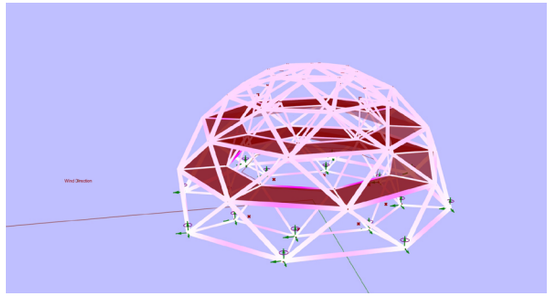
Number of elements = 640
Nodes = 369
Displacement = 0.8cm

Geodesic (diamonds)



Number of elements = 389
Nodes = 226
Displacement = 4.5 cm

Geodesic (triangulation)



Number of elements =216
Nodes = 73
Displacement = 4.2 cm

Illustration 82: Structure optimization

III.

IV. STRUCTURAL ASSEMBLY AND DETAILS

V.

Selected Structure and detailing

This particular domic form was then explored with different scales by reducing the total height of the dome. The idea was to reduce the dimensions of the members and the total height to enable easier assembly. However, decreasing the dome height in relation to its width as an arched-ribbed dome seemed to cause more inconveniences than improvements.

As the scale of the dome decreases in the Z direction, it affects both the top floor head height and the structural integrity. Thus, returning to the original form of half a sphere made sense as it provides a more accessible floor complete with a more structurally sound form.

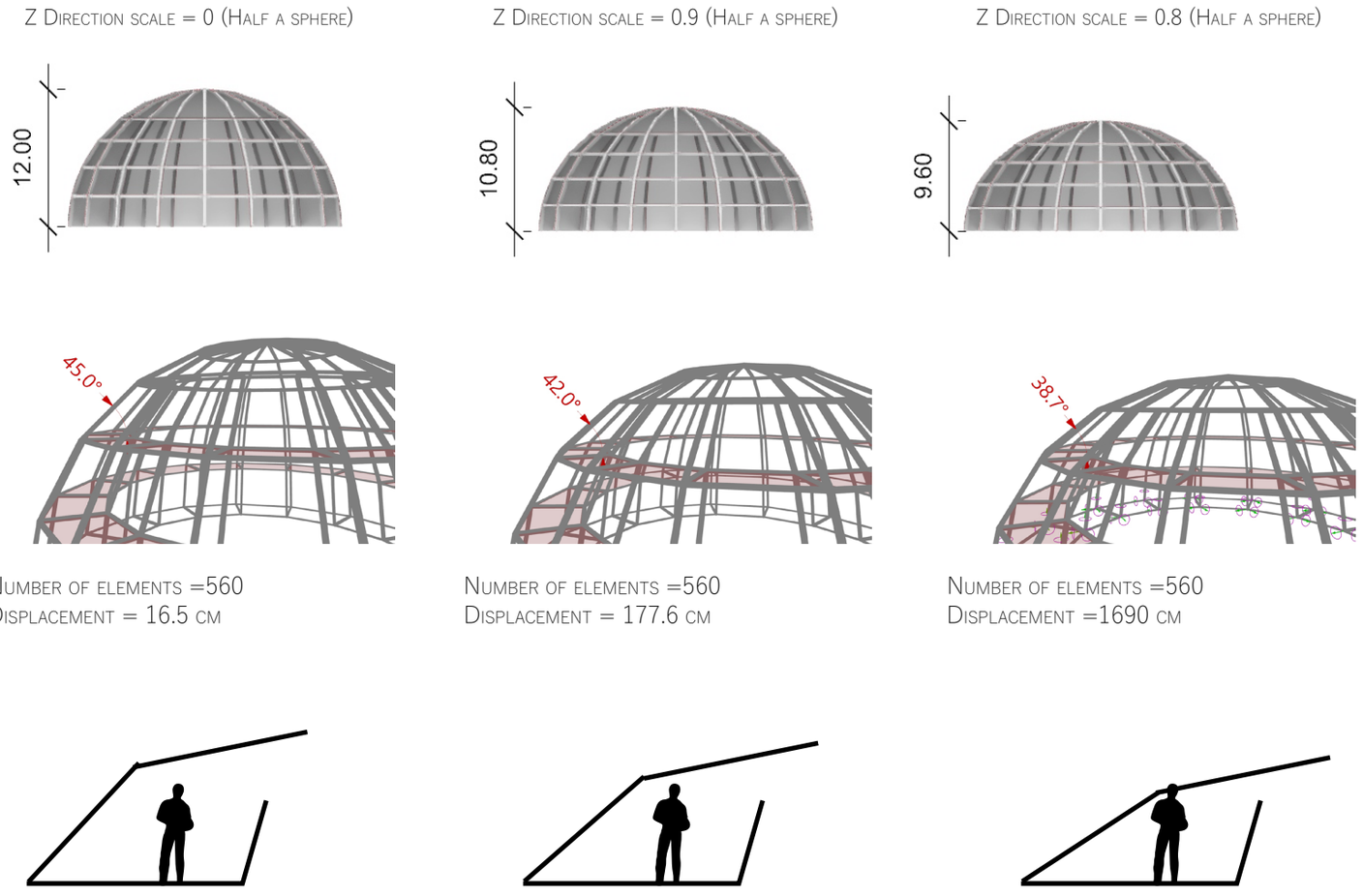


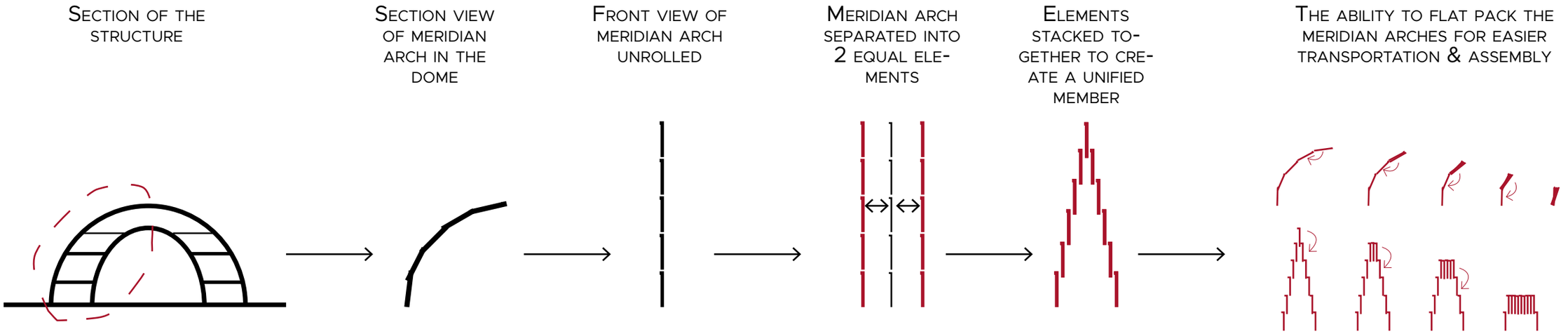
Illustration 83: Dimention optimization

III.

IV. STRUCTURAL ASSEMBLY AND DETAILS

V.

Structural concept



After determining the form and structural approach, an investigation into how the structure can satisfy themes of assembly-disassembly and transportability, the very origin points of this concept. Taking the meridian arch, which if met with another meridian fixed arch would create a stable structure, and then treating it as half of the structure that can be packed, led the development of the above-illustrated approach. The strategy is to divide the arch into segments that then split further apart towards the bottom of the arch, leaving space for the segments from above to fold into the lower element. This creates a flat-packed arch that can be easily stacked and shipped.

Illustration 84: Spliting the columns to create an easy packing strategy

III.

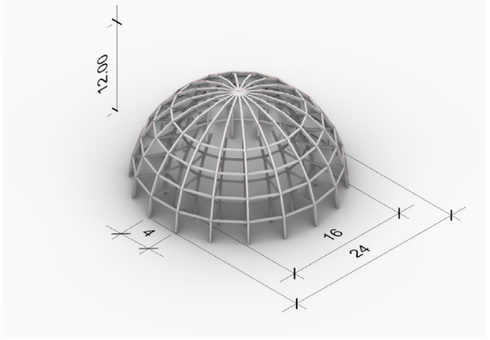
IV. STRUCTURAL ANALYSIS AND OPTIMIZATION

V.

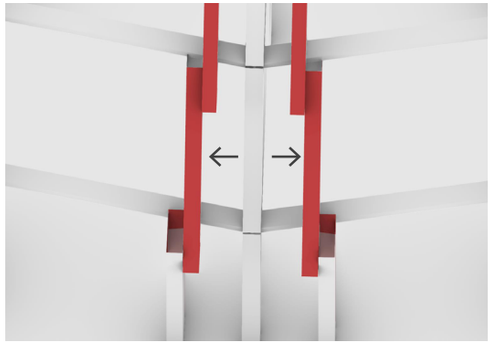
Selected Structure and detailing

This double beam concept was further explored using a physical model made of plastic straws and sewing pins to see how the individual elements would behave together. The exploration of the structure in this tactile maner proved that some modifications were need for the folding concept to work — the first being, each element had to incrementally decrease in size from the ground element to the top one, and secondly, the connection between the inner dome had to be separate or attachable to the fordable module.

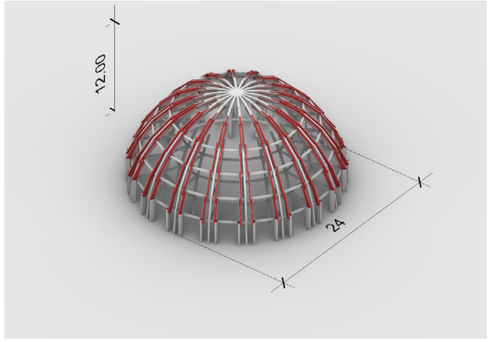
Initial arched ribbed dome



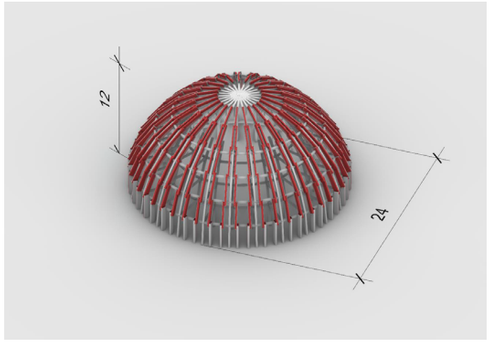
Dividing each meridian arch in two



Applying the same concept for the inner dome



Increasing the number of meridian arches



Exploration of the structure with straws & pins

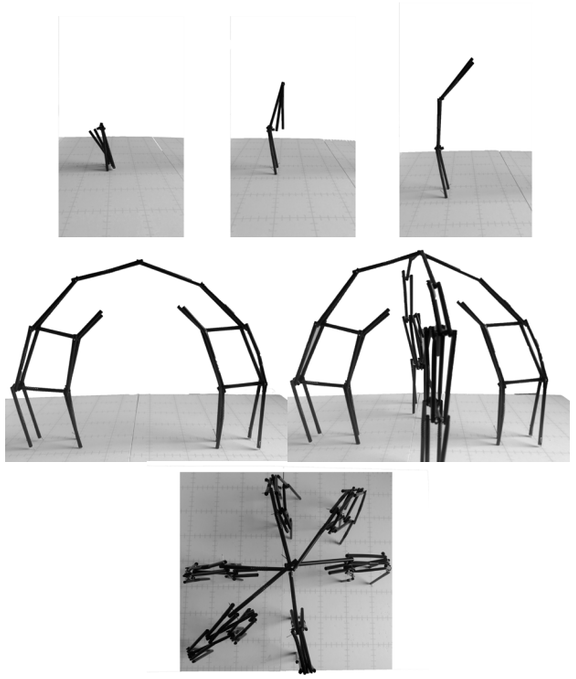


Illustration 84: Structural optimization with the new columns

III.

IV. STRUCTURAL ANALYSIS AND OPTIMIZATION

V.

Selected Structure and detailing

The meridian arch module had gone through several optimizations to reach a solution that can make practical sense in how it is folded or packed. Beginning from iteration one of the concept to iteration three, the main optimization was reducing the member sizes incrementally towards the top so the members would not clash when being folded; adding the inner beam connection required another adjustment of the height of the members. Part of the design goal is to have member sizes that do not exceed three meters for easier handling and shipping purposes.

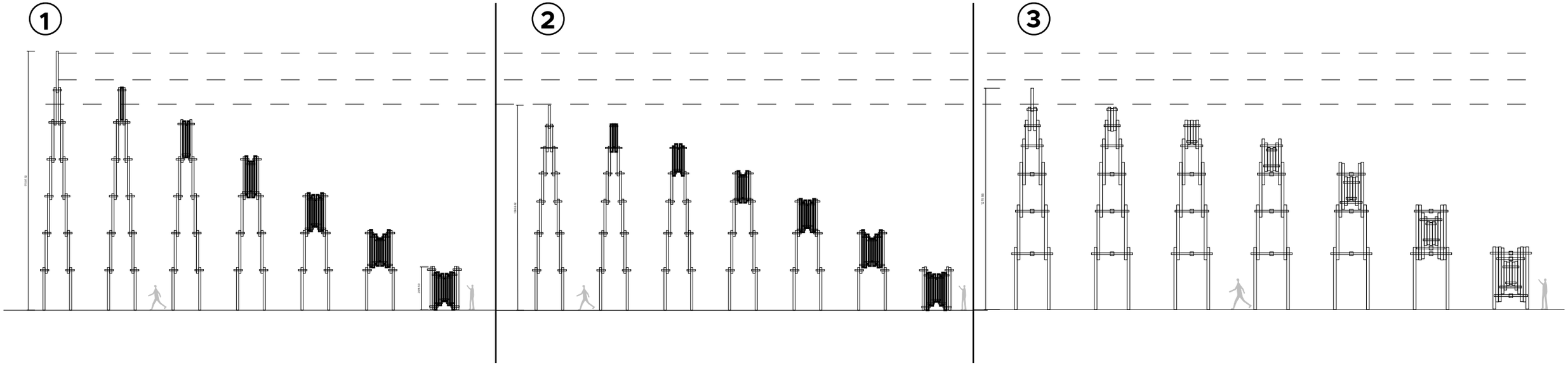


Illustration 85: Optimizing the collapsing strategy

III.

IV. STRUCTURAL ANALYSIS AND OPTIMIZATION

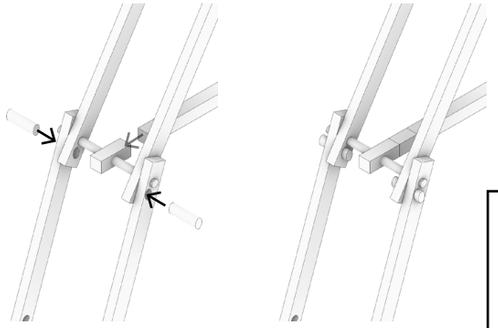
V.

Selected Structure and detailing

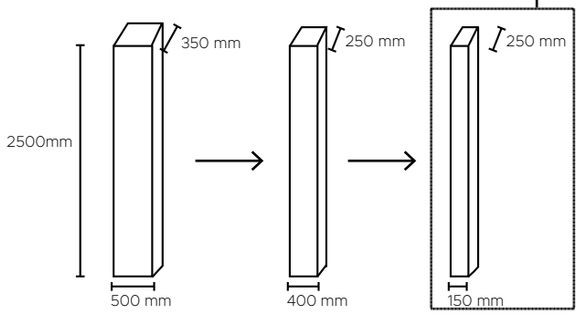
To finalize the structural integrity of the form, the model went through Karamba and was structurally analyzed with real-life load cases, from wind load to dead loads and live loads with different conditions. The structure performs well when unfolded and then fixed by dowels in the right position.

While developing the structure, another optimization was conducted to reduce the spacing in between each module. The reason to do so was to reduce the dimensions of the floor planks that will connect each module, in addition to the distance in between them to create a more rigid fixation. Increasing the amount of modules also meant that the dimensions of the members could be reduced to make for easier handling and a less dense module.

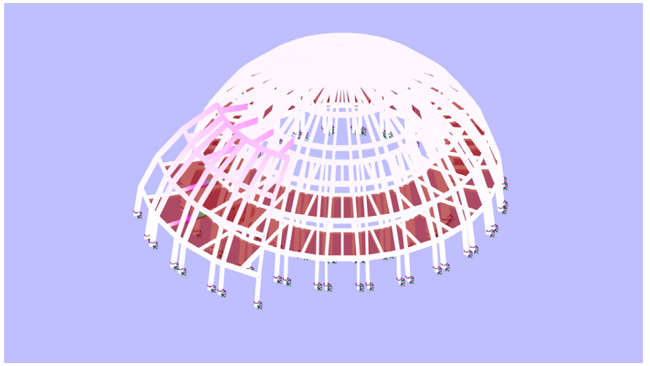
Module approach for fixation



MEMBER DIMENSIONS

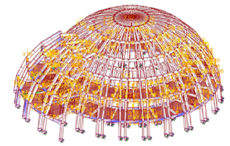


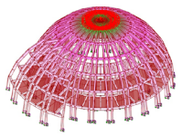
Karamba analysis

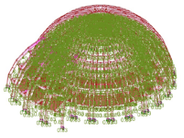


Number of arched modules (outer dome) = 24
Number of arched modules (Inner dome) = 24
displacement = 57.6 cm

The loads applied indicate that there are around 100 people on each floor at the same time, which would be more than the full capacity of the structure itself.







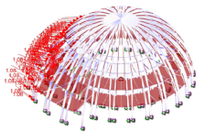


Illustration 86: Detailing the collapsing strategy

IV. STRUCTURAL ASSEMBLY AND DETAILS

V. Selected Structure and detailing

Throughout the diverse design phases, the steadfast focus was ease of assembly and packaging of the building elements. Two assembly approaches could be realized with this structural approach. The first approach involves placing the ground grid modules to pinpoint the locations of the meridian arches (modules), before attaching them to the central top ring while a crane lifts the central ring to the required height, then fixing the meridian arches by inserting the fixation dowel, and finally, the inner dome is constructed with the flooring.

The second assembly approach involves an incremental assembly, beginning with the ground grid, then folding both the inner and outer dome — level by level — while fixing them and attaching the floors until the top ring is reached.

Assembly approach 1
With a crane

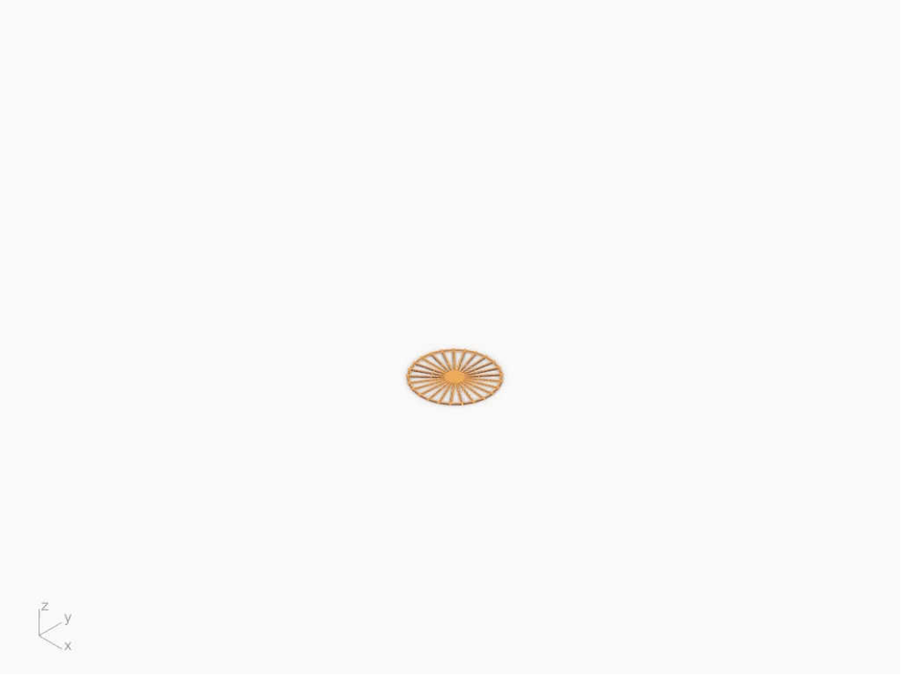


Illustration 87: Gif of assembly stategy 1

Assembly approach 2
Without a crane

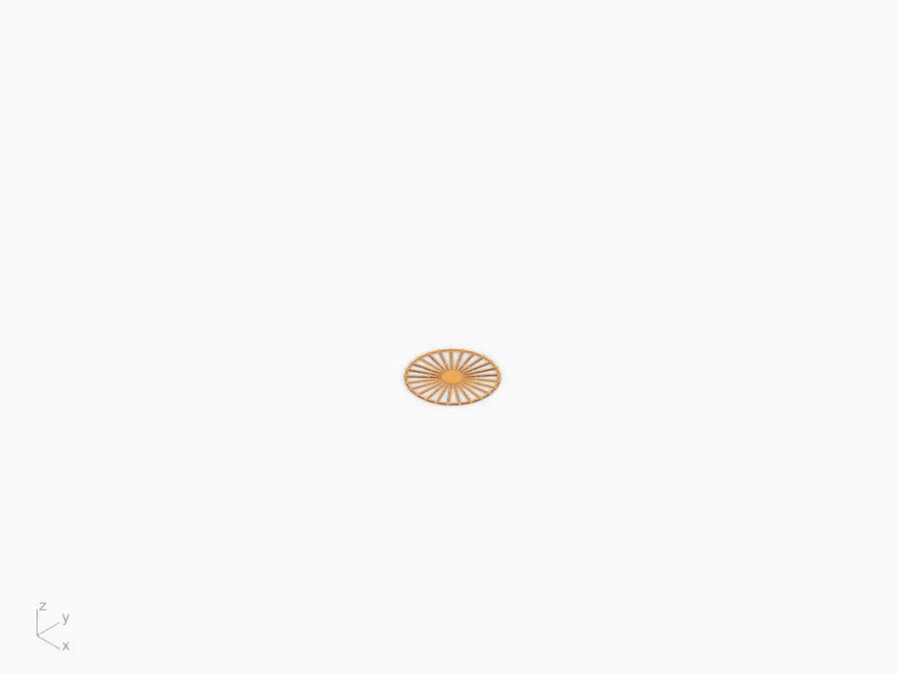


Illustration 88: Gif of assembly stategy 2

Assembly approach 1
With a crane -Sequence

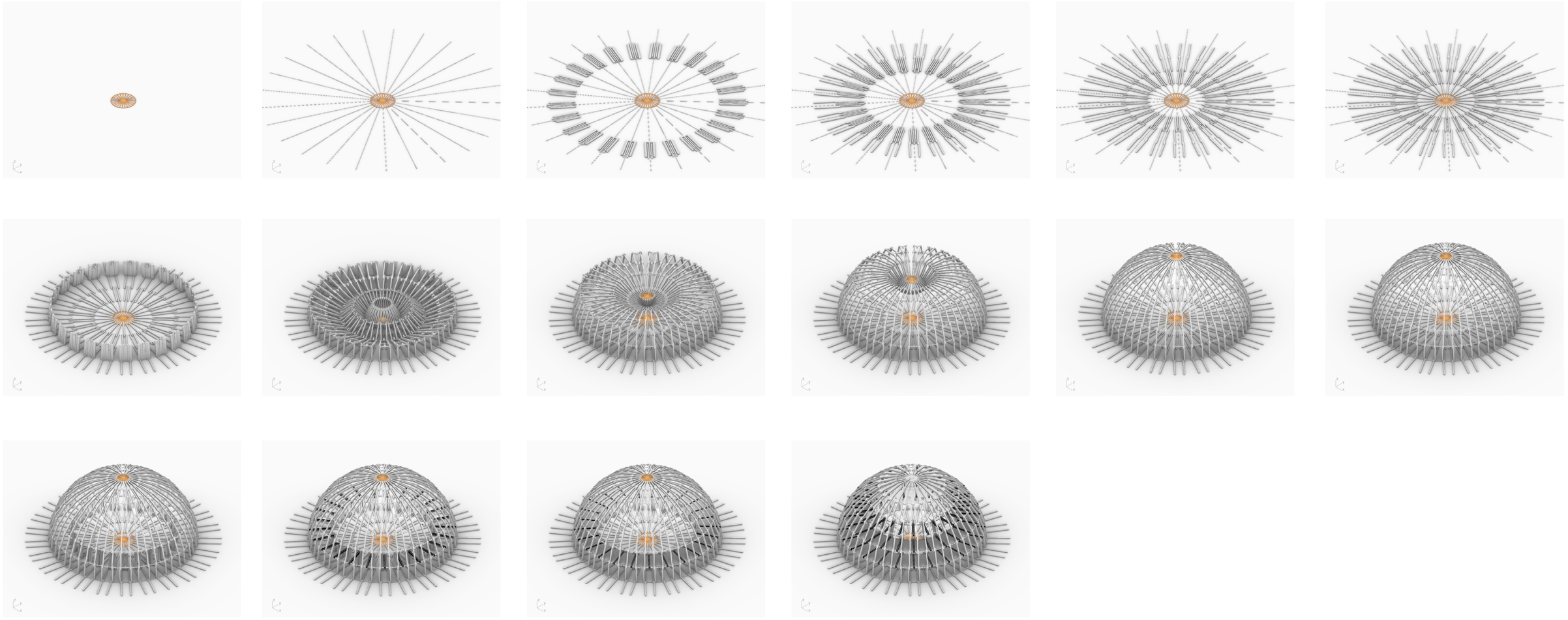


Illustration 89: elements of Gif 1

Assembly approach 2
Without a crane -Sequence

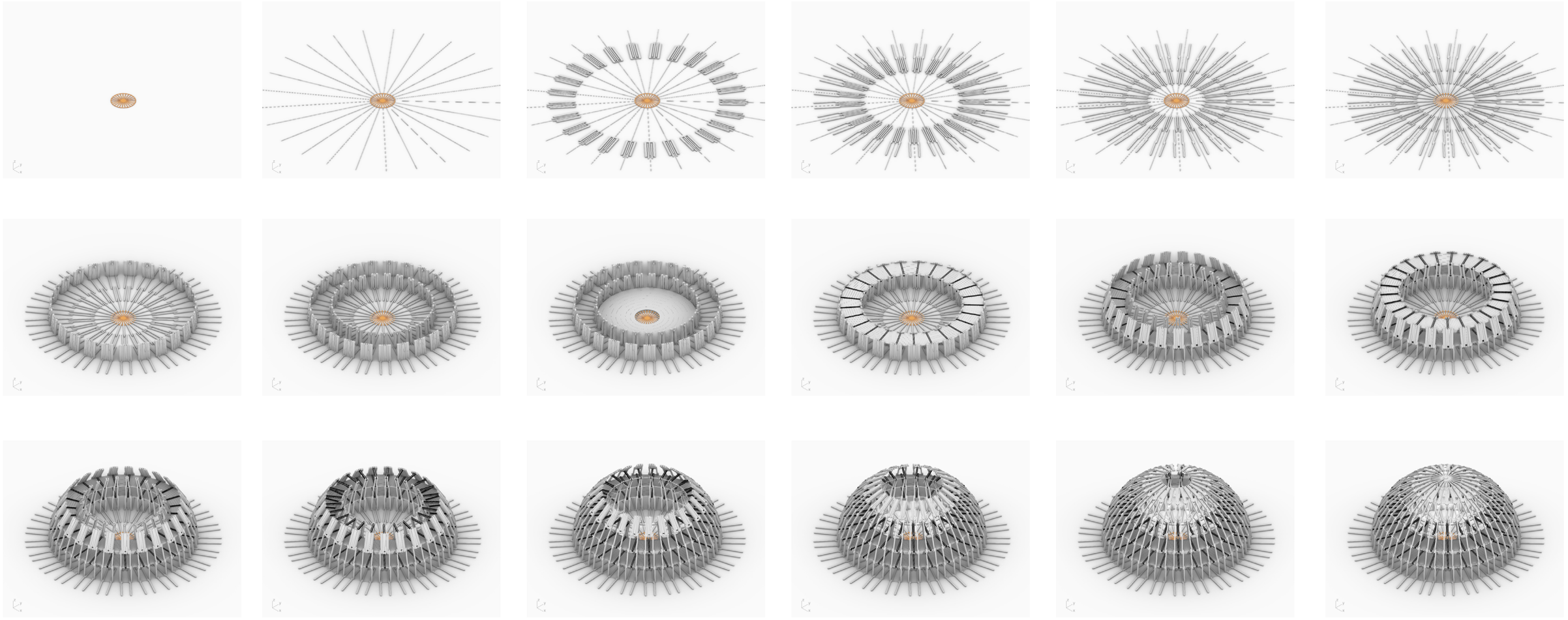


Illustration 90: elements of Gif 2

III.

IV. STRUCTURAL ASSEMBLY AND DETAILS

V.

Inner dome and outer dome

As the structure evolved, and a clear assembly-disassembly method emerged, another level of detailing was investigated to ensure the relations between the elements were not unharmonious and unfeasible. At this stage, optimizing the details and aforementioned method would require several iterations and stages to reach the most sophisticated and ideal solution. Given the time frame of the project and the complexities associated with designing a transformable and transportable structure — not to mention, one that can travel between the diverse environments of Germany and Egypt — not all of the details have fully developed yet. However, a simple but thoughtful and functional example of the final design has come together.

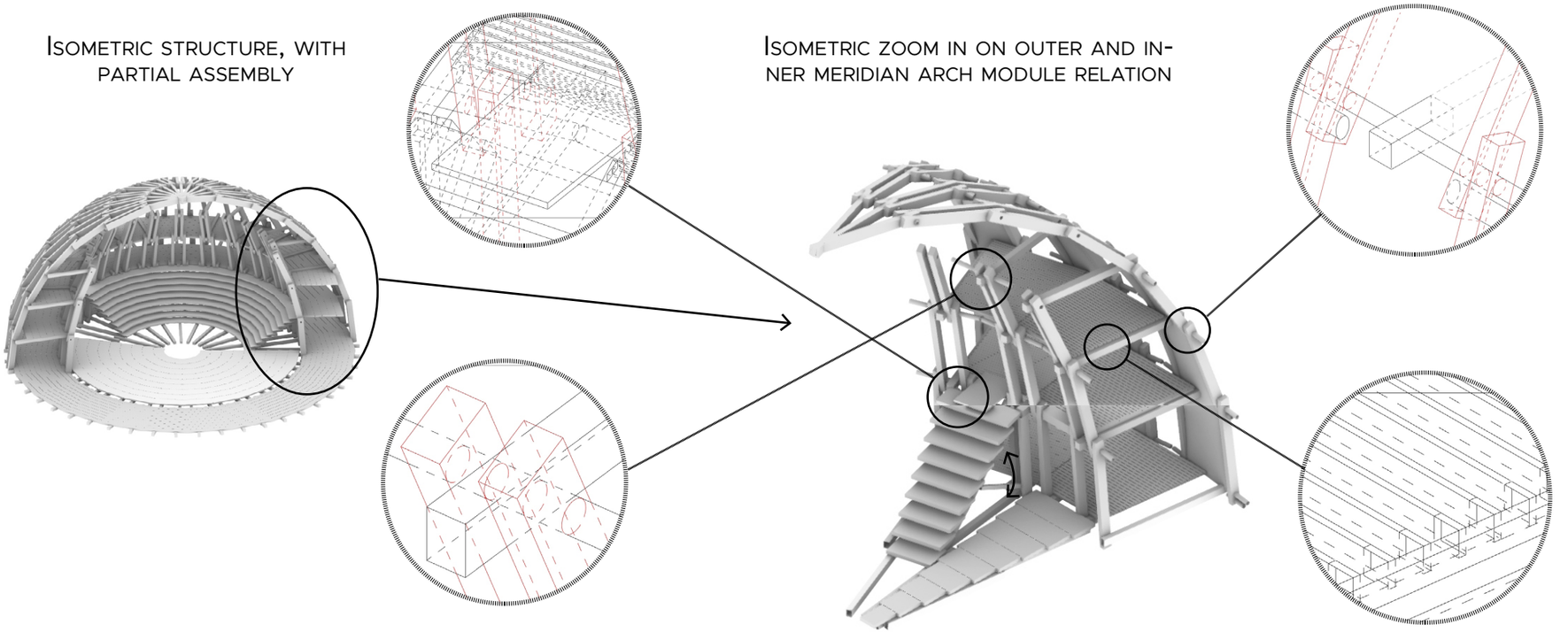


Illustration 91: Details of the one building slice

III.

IV. PACKING OF STRUCTURE

V.

PACKAGING THE STRUCTURE (FLAT-PACKING)

Throughout the design process, and as the structure arrived to its final form, ease of assembly-disassembly and packagabilty were at constant play. Packaging the structure is a process in and of itself, and thus requires further development for full optimization.

Standard transportation crate sizes (12.03m x 2.35m) were used to pack the structure. Six of these crates can hold all the components and elements of the structure if they are tightly packed; adding an additional crate or two will help simplify the process.

A potential ease of assembly-disassembly for the structure's flooring is to color code the similar members, thus helping the construction team to easily distinguish between the first and second floors.

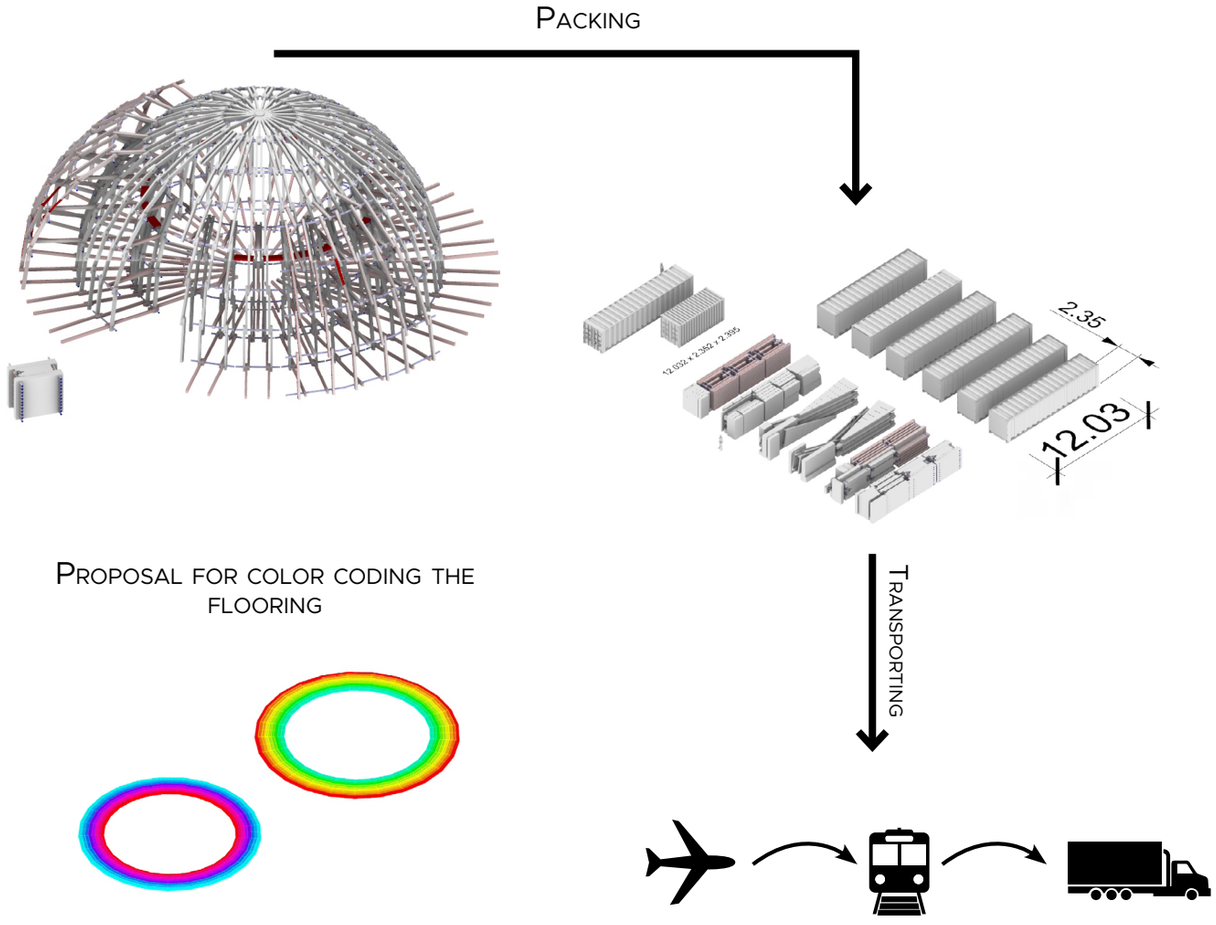


Illustration 112: Packing the building into shipping crates

III.

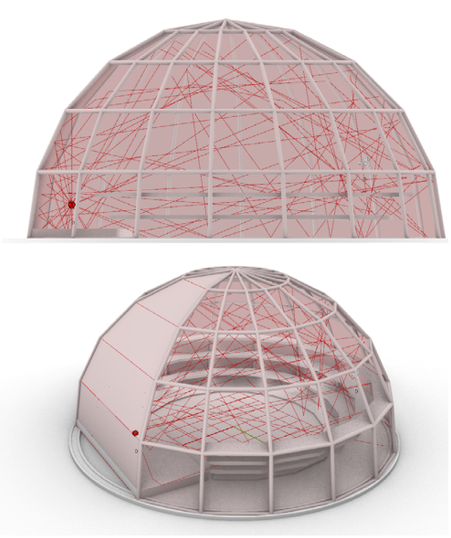
IV. ACOUSTIC INVESTIGATION

V.

Initial ideas

In the development of the interior dome, the auditorium, the acoustic performance came into focus. The two main categories selected for measuring acoustics were the Speech Transmission Index (STI) and the Sound Definition (D50). Initial investigations looked into adding a flexible backdrop surface behind the stage to redirect the sound of the speaker. Following the general acoustic theory explored in Act II, different investigations in Pachyderm were made to enhance the sonic character of this project. The simulations included male and female speakers.

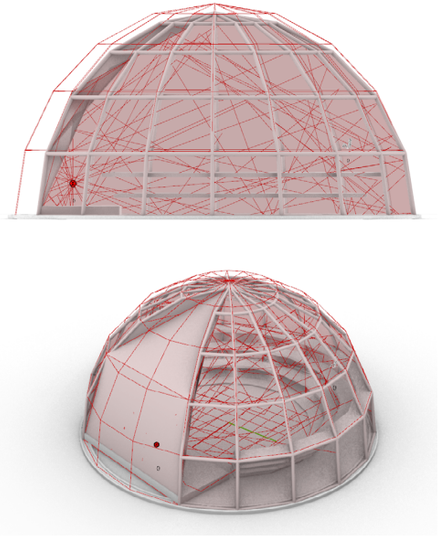
Initial acoustic investigations



STI(MALE) = 0.65
STI(FEMALE)=0.66
STI (GENERAL)= 0.67

Emitter = female in "competing conversation "

Initial acoustic investigations



STI(MALE) = 0.79
STI(FEMALE)=0.79
STI (GENERAL)= 0.80

Illustration 92: Acoustic investigations

III.

IV. ACOUSTIC INVESTIGATION

V.

CONCEPT

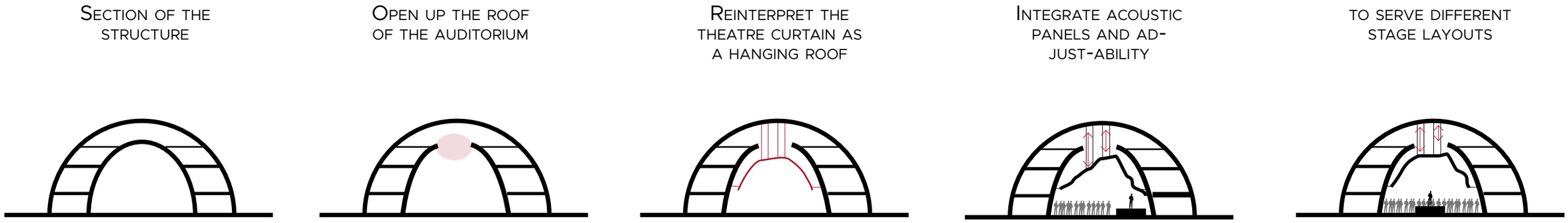


Illustration 93: The acoustic fabric approach

Over multiple workshops, the atmosphere and expression of the auditorium were reconsidered. The auditorium should provide the feeling of stepping into a new world, and so it must set itself apart from the rest of the structure. Taking the acoustic investigations into consideration, the acoustic panel fabric was introduced.

The concept for the project's acoustic treatment is a reinterpretation of the traditional theatre curtain that serves as a visual separation between acts. Here, the curtain is used as a shape-shifting roof, dictating both the atmosphere and the acoustics of the auditorium itself. By opening up the inner dome's roof and hanging an acoustically-treated curtain that can be easily shaped into different forms, a unique experience can be customized based on the scenographic vision and aims.

III.

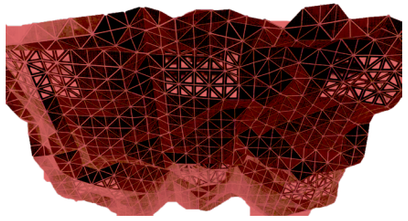
IV. ACOUSTIC INVESTIGATION

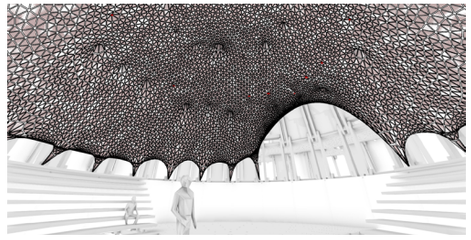
V.

Acoustics of the auditorium : concept integration

The integration of fabric roof acted as a defining factor in the auditorium, creating a flexible ceiling that evokes a mystical sense of space, while also serving the acoustic criteria.

This “fabric acoustic roof” concept draws inspiration from the Italian company WOOD- SKIN1, which manufactures a relatively new and versatile wood composite mixed with textiles and fabrics that ultimately acts as acoustic panels. With ease of packaging in mind, a similar product can be developed for this project by sewing together fabric and triangulated wooden panels to be used in the auditorium space.





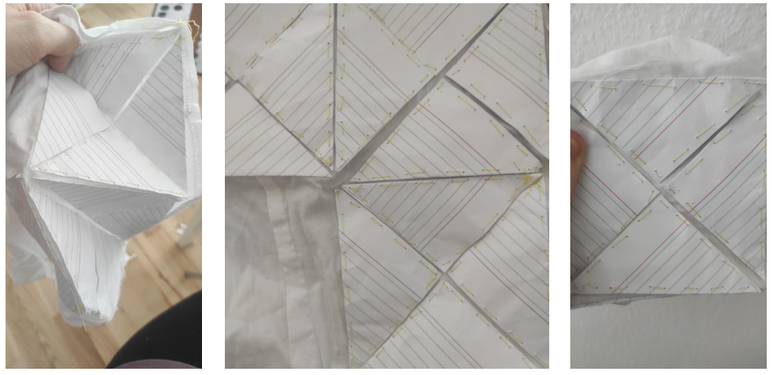
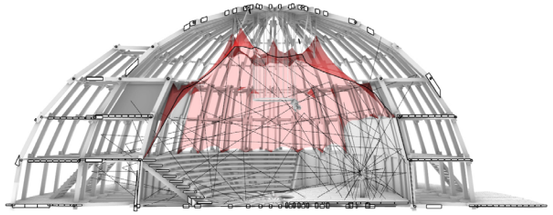
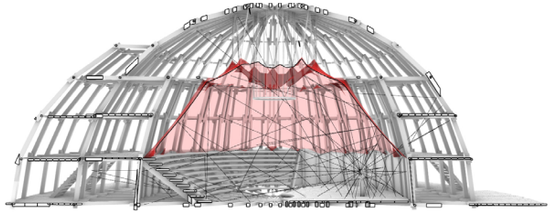


Illustration 94: The acoustic fabric - sketches

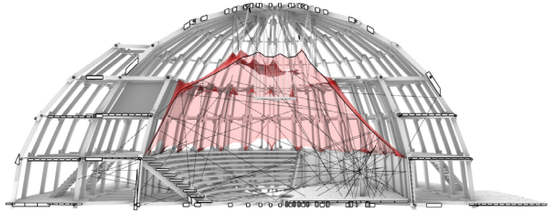
Higher reverberation suitable for music settings



Average setting for plays or shows



Directed sound for (speeches,comedy shows, talks,etc...)



SECTION ANIMATION SHOWING THE DIFFERENT POSSIBILITIES OF THE FABRIC SHAPING THE AUDITORIUM
(IMAGE SEQUENCE)

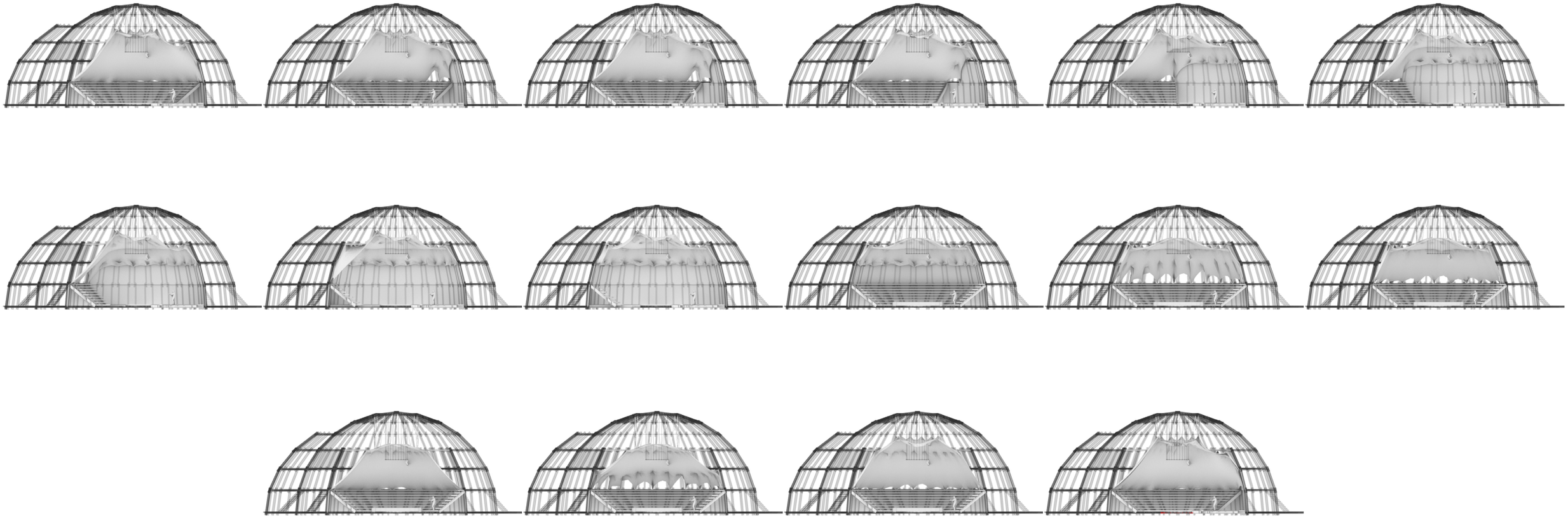


Illustration 96: Elements of the Gif

III.

IV. MATERIALITY AND SUSTAINABILITY

V.

A HOLISTIC APPROACH - LCA AND CARBON IMPACT

Low to noun reversal impact on the different sites

Protective building enve-lope

Part of the design outcomes of the project is to ensure sustainability and the use of materials that would help in reducing the carbon footprint.

There are three chief materials that consti-tute the structure: the timber columns, the steel connections in the timber columns, and the fabrics that enclose each space.

As mentioned in Act II, an initial com-parison of various timber products on their potential primary energy and greenhouse gas implication was con-ducted. As seen on the right, oak seems to trap the most carbon. It is considered a hardwood with a densi-ty of 690 Kg/m3, which is quite heavy in terms of being carried and moved

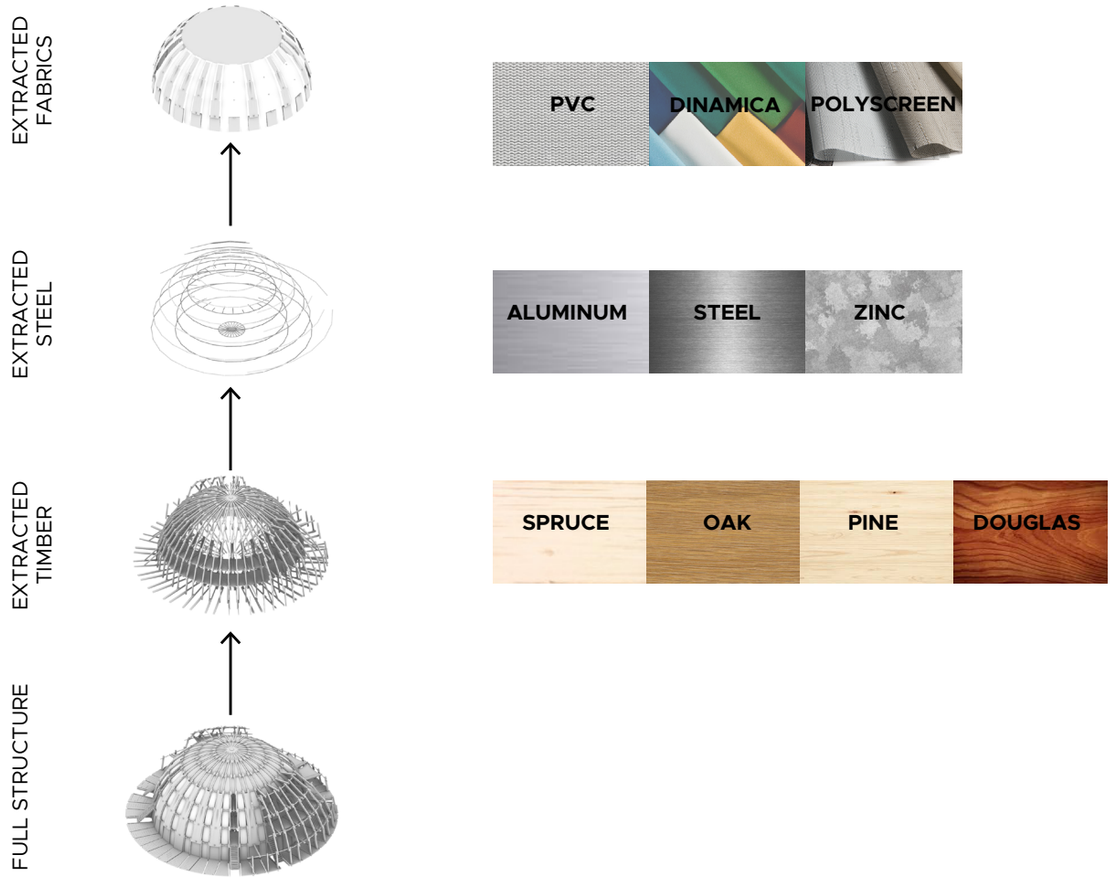


Illustration 97: Explosion showing the different layer of the construction and the used materials

by individuals, even with optimized di-mensions of the structure being less than four meters. Spruce and pine are considered soft woods and are usual-ly less dense, with the former having a density of 450 Kg/m3, and latter a density of 520 Kg/m3.

For this project, spruce was ultimately selected as the main structural timber, as it weighs less than the other variet-ies. Moreover, spruce is less perme-able than pine, which in turn makes it less susceptible to wood rot and water damage.

III.

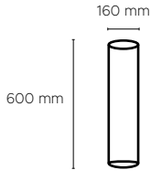
IV. MATERIALITY AND SUSTAINABILITY

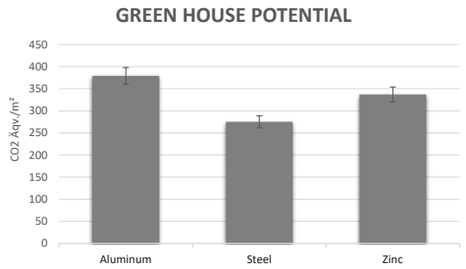
V.

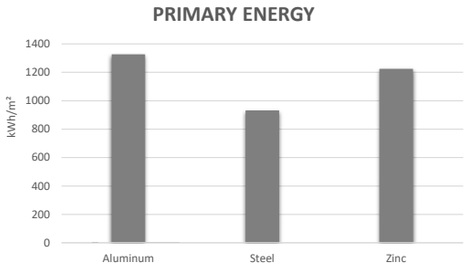
A HOLISTIC APPROACH - LCA AND CARBON IMPACT

As the project continued to evolve, additional materials would be required to support and enclose the spaces, like steel components to create the dowels and fixations, and curtains to cover the structure both inside and out. An initial investigation into the primary energy and greenhouse gas potential for some steel products for the dowels and the fixation elements was needed to select the best-suited material, both for the project and the environment.

From the initial investigation in the production of three metals, as seen to the right, steel requires less energy to produce and contributes less to the greenhouse gases and thus the unfolding climate crisis. Given that the joinery connections will be prefabricated and would hold a lot of forces, steel seems to be the better option since it is capable of withstanding more forces while contributing less emissions.





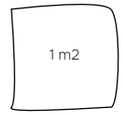


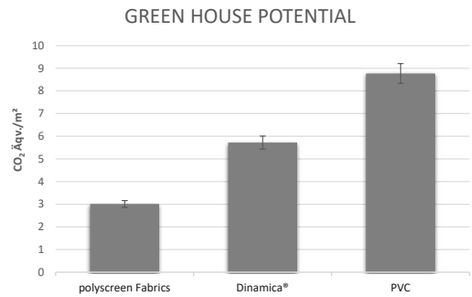
Primary energy is taken as local heating with renewable fuel

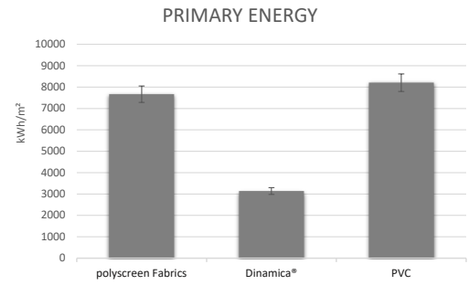
Illustration 98: Comparing GHP and PE of the planed-with materials

As for the fabrics, a comparison between three main types of architecture fabrics is conducted as well. The most common element used in fabricating these tensile fabrics is PVC, a synthetic plastic. Not a lot of data was found relating to primary energy and greenhouse potential of other fabric materials that are commonly used in the market, so these three fabrics were chosen as an initial analysis.

As much as PVC is more harmful than most fabrics in its production, it is one of the main materials used for fabrics. Ideally, a fabric that is mixed with PVC and POLYSCREEN would serve best for the outer dome, and DINAMICA fabrics can be used for the inner dome.







Primary energy is taken as local heating with renewable fuel

Illustration 99: Comparing GHP and PE of the planed-with materials

III.

IV. MATERIALITY AND SUSTAINABILITY

V.

A HOLISTIC APPROACH - LCA AND CARBON IMPACT

The overall narrowing down of use materials can be a lengthy and exceptionally detailed process that involves several other influences or factors as suggested in the LCA. A holistic approach to the materials that still proves valuable as a comparison is made not only for the material's strength and durability, but also its effects and emissions.

Following the selection of the three main elements, another analysis was conducted by using EC3[1] The analysis shed the light on the relation between the registered EPDs of the different manufacturers of the materials, along with their locations, taking into consideration distance traveled from the factory to the assembly area, which was chosen as Hamburg for the sake of analysis.

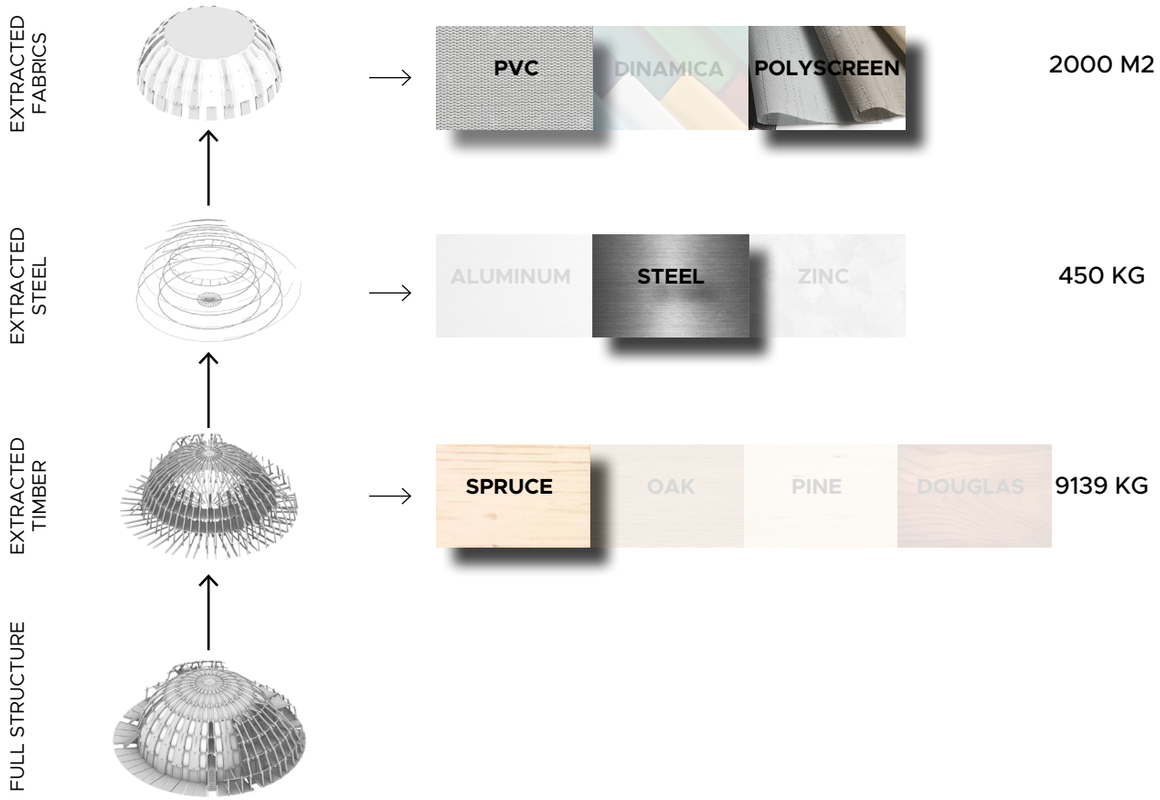
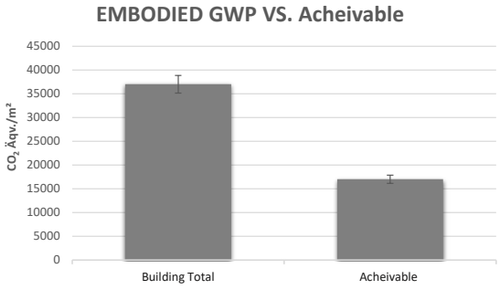


Illustration 100: Explosion showing the different layer of the construction and the used materials



The graph above shows the total building's global warming potential per meter squared. The achievable lower global warming building potential can be reached by selecting different manufacturers that are either closer to the assembly area to reduce CO2 emissions by transportation, or produce similar products that are less harmful in their initial production

1 (Embodied Carbon in Construction) is An Online web tool that helps calculate carbon footprints in building products. https://buildingtransparency.org/ec3

III.

IV. FLEXIBILITY OF LAYOUT

V.

Flexibility in the layout depending on the required venue

The project offers a canvas that can be shaped and engaged no matter the production, required setting, and geographic location. Below are some different layout usages with the same plan but shifted depending on the desired program.

Illustration 101: Diagramm of the different ways of sectioning the layout

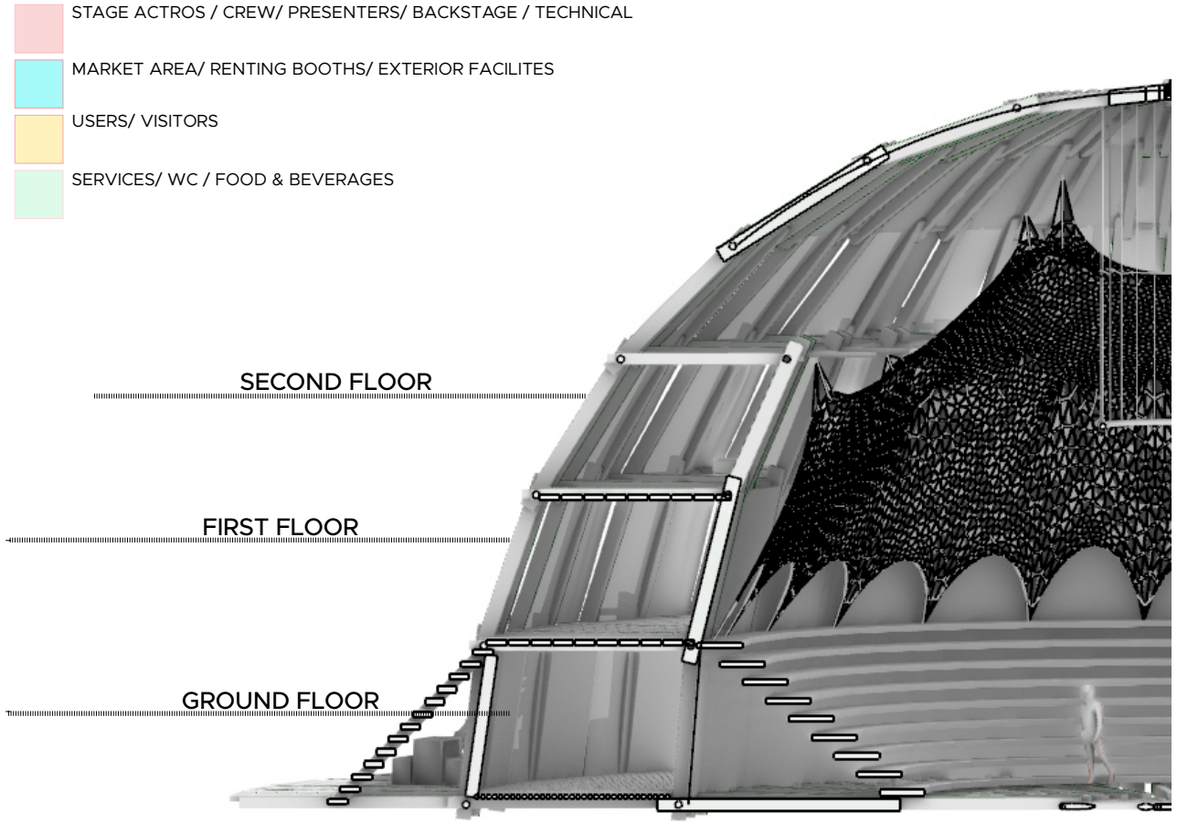


Illustration 102: Section showing the three floors

III.

IV. FLEXIBILITY OF LAYOUT

V.

Integrating elements that help defining the awakening area.

The previous graphic visualizations demonstrated the flexibility of the layout by dividing the space into distinct spaces. For this fabric partition, elements are integrated and attached to the structure, creating an adjustable and operational layout.

The attachable curtains or modules can be fixed to any of the cross beams

Integrated seating on the second floor allows visitors to sit as they take in the atmosphere and environment around them.

Isometric zoom in on outer and inner meridian arch module relation

Attachable and retractable fabrics enclose part of the space, creating a separation of zones.

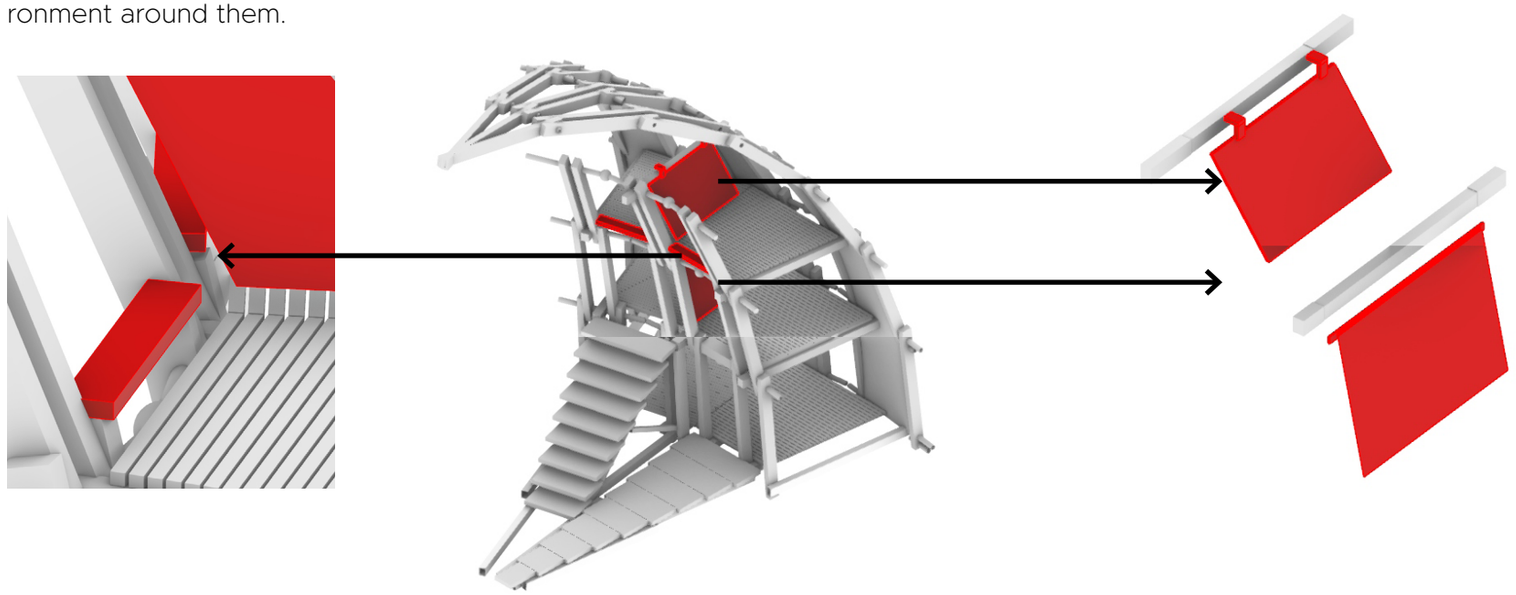


Illustration 103: Use of partition elements

III.

IV. FLEXIBILITY OF LAYOUT

V.

Auditorium Space

The inner dome, or auditorium and "parallel world," was first developed to offer flexibility and freedom in the layout of the stage area. The wooden floor grids offer a base to attach a retractable and fold-able bench construction that transforms into seating and stairs when it's open and the stage when closed or flattened.

Sectional plan of the ground floor (Auditorium area) Seating and stage

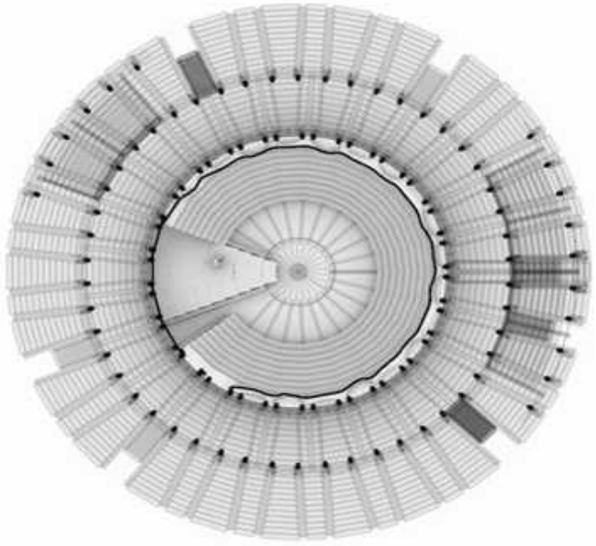


Illustration 104: Gif of different stage layouts

Isometric zoom in on outer and inner meridian arch module relation

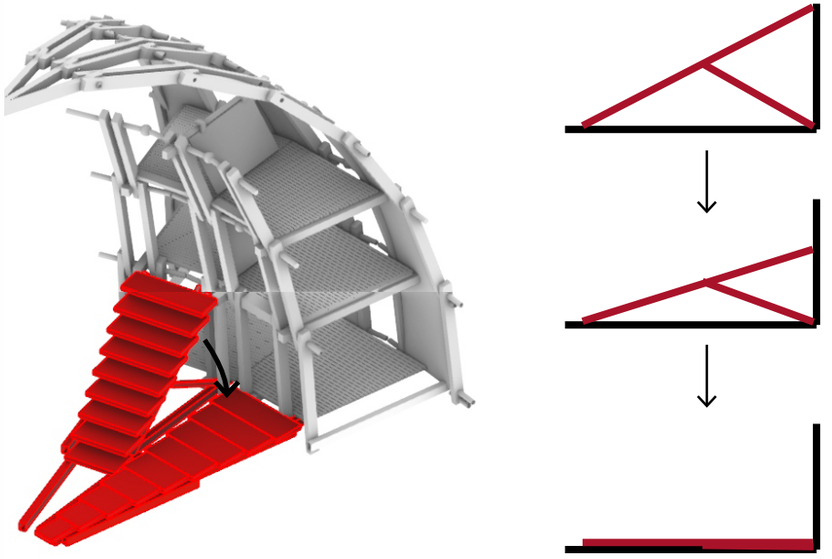


Illustration 105: Changing stage to seating by lifting the element

Sectional plan of the ground floor (Auditorium area) Seating and stage) (Images Sequence)

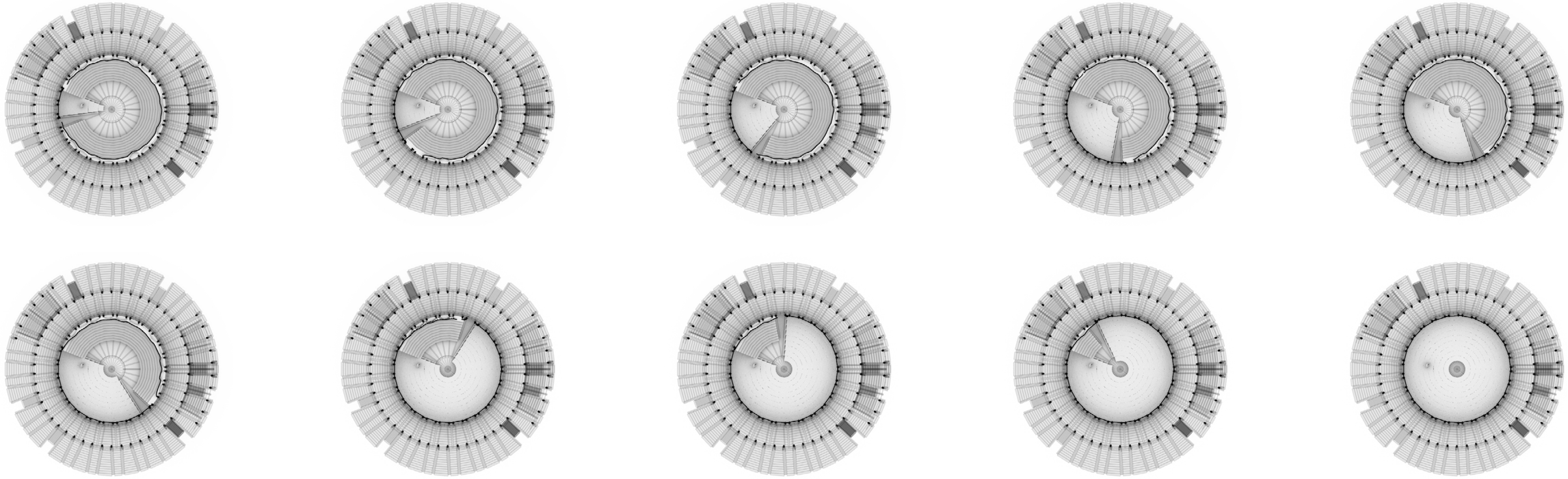


Illustration 105: Elements of the previous Gif

III.

IV. FLEXIBILITY OF LAYOUT

V.

Auditorium Space

As mentioned earlier, the auditorium itself was also developed to host an acoustic curtain with the capacity to reshape the roof. Traditional theatres, or black box venues, usually have backdrops or large-scale sceneographic forms. A solution for this compact traveling venue is the proposed hanging chandelier that would have a projector attached to it, creating the opportunity for still and moving imagery to be projected onto the walls of the auditorium (as seen in red on the right).

Section of the structure focusing on the auditorium area

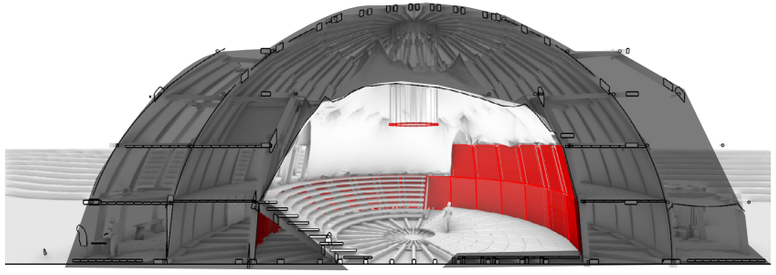


Illustration 104: Section showing the auditorium

Perspective view inside the auditorium showing the back

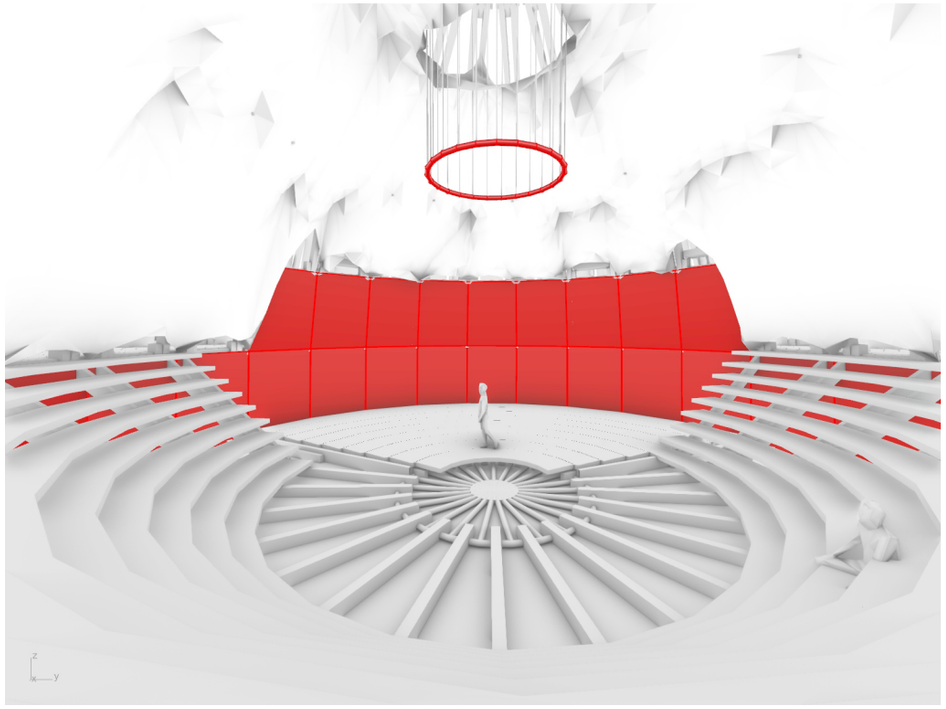


Illustration 105: A view of the auditorium

III.

IV. FLEXIBILITY OF LAYOUT

V.

Tertiary Space

The initial idea behind the tertiary space — which is essentially an expanded slice of the central dome — was to provide a flexible and portable space that can help form the whole building program as desired by the production and/or performers. This tertiary space is made of the same elements that create the dome itself, meaning, it uses the same principles and folding for packing as the main structure.

The tertiary space provides an additional lounge-like area for patrons. It can be used for seating, facilities (e.g. bar, canteen, information desk), or vertical circulation. The space is like an afterthought: it's constructed and then added to the whole auditorium and outer structure once it has been erected.

Isometric view of the tertiary space attached to the main dome

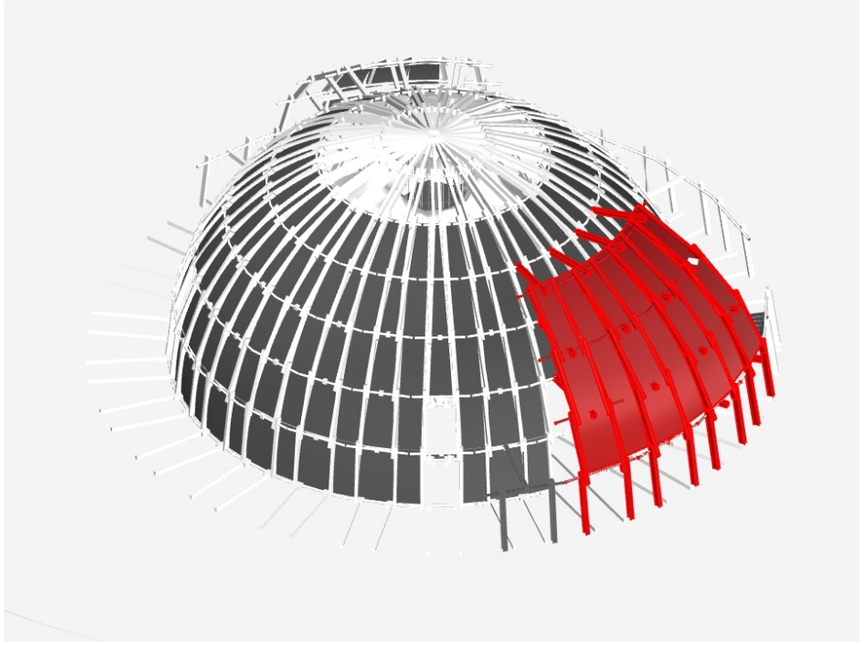
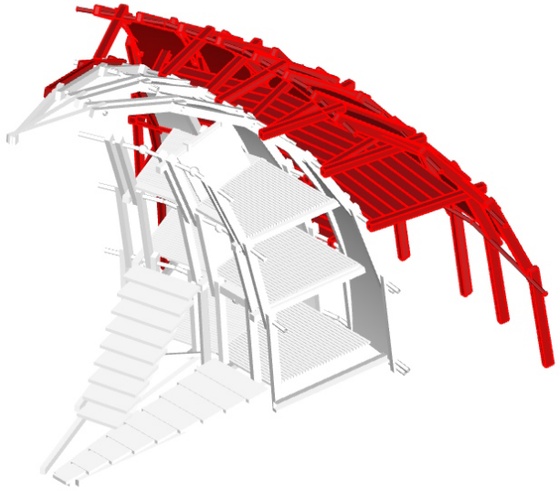


Illustration 106: The 3rd zone

Isometric view of the 3 modules in relation to each other



III.

IV. OUTDOOR AREA AND ACTIVITIES

V.

Community Engagement

As part of the project developed it made sense to create an inviting and extroverted space outside the auditorium and the awakening area. Reviving the age-old urbanism inspired from the pageant wagon concept of combining the event with the gathering at markets, where the communities engage in trade. Similar concepts can also be found in the eras before when theatre was combined with other holiday related events such as in the ancient Greek and roman period.

In this layer of the concept the community is approached in a more inclusive way, so not just theatre enthusiasts are targeted.

The concept of a market is still a global phenomena that can be found in every country in the world in different cultural interpretations. These different interpretations make every market unique representing the culture and society. Just have a look at any travel guide to any bigger city in the world, there will be at least one famous local market recommended in it.

Therefore, the exterior of the building creates a connection to the context no matter where it is located. As this approach was developed towards the final weeks of the required deadline for the document hand in, different iteration will be presented in the coming pages, but still none had fully reached the best integration in the project.

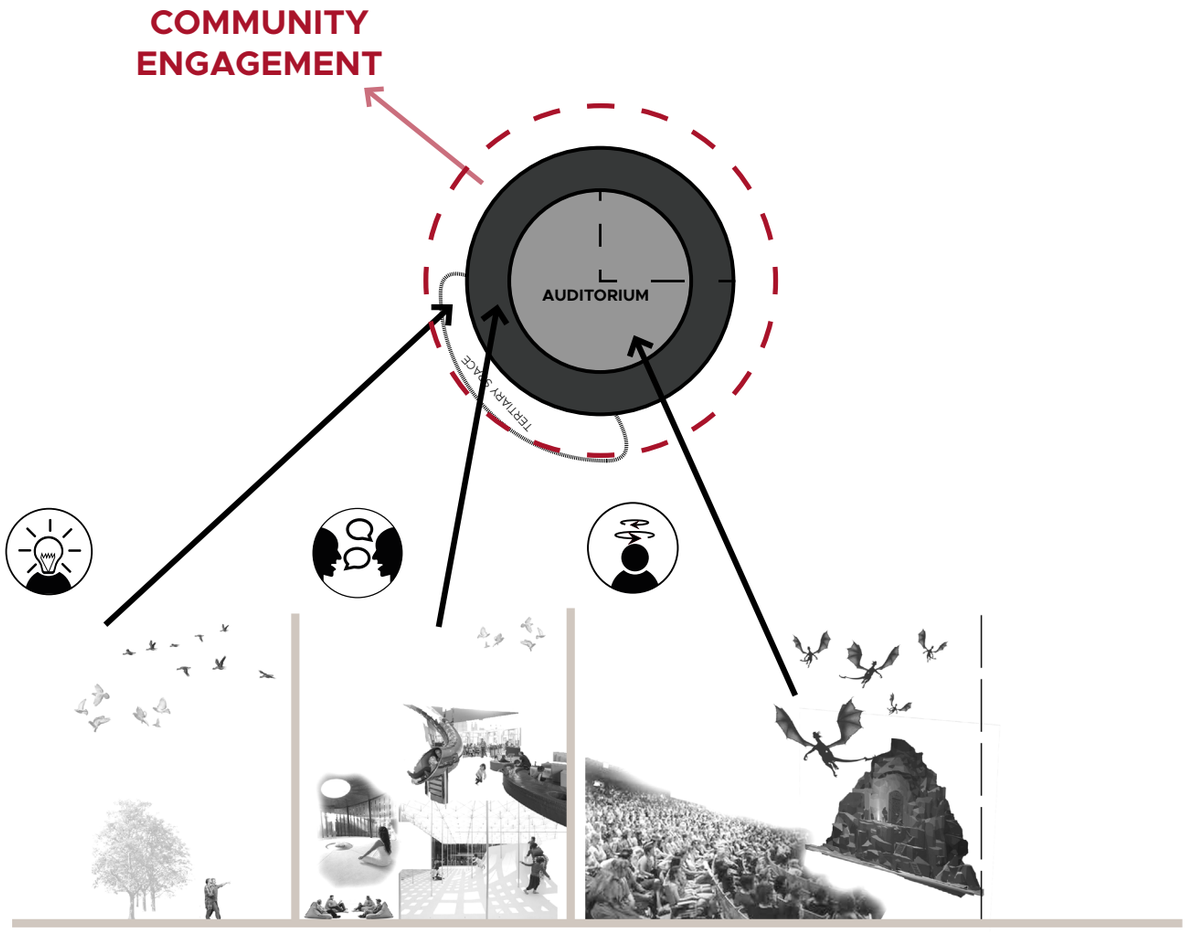


Illustration 107: integratiing the exterior

III.

IV. OUTDOOR AREA AND ACTIVITIES

V.

Iteration 1

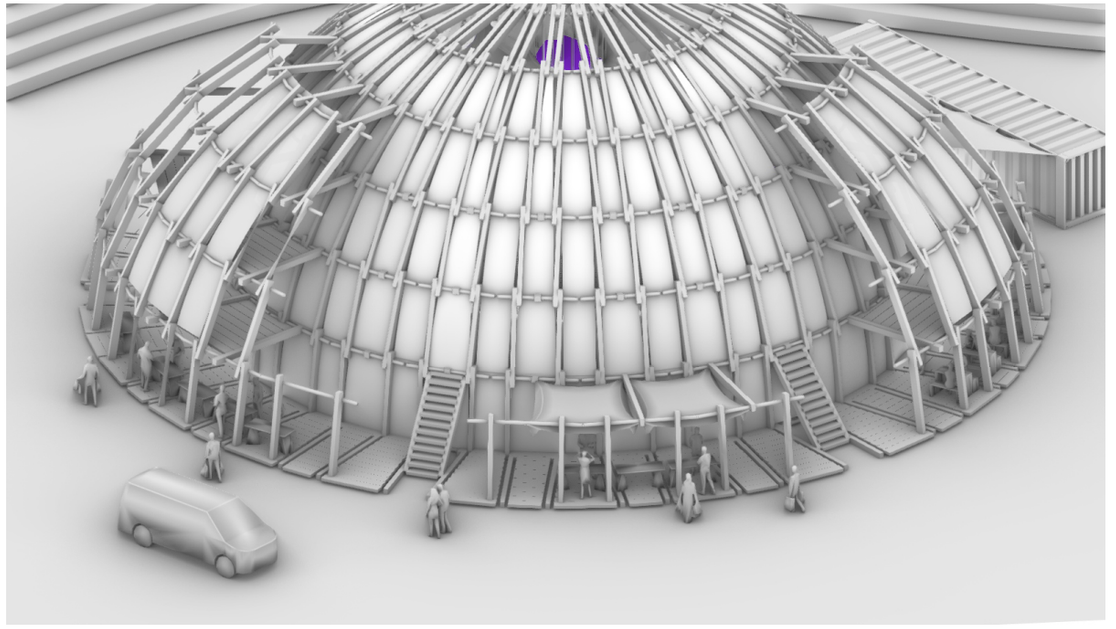


Illustration 108: Exterior iteration 1

The first iteration includes an extension of the ground grid towards the outside and integrates a similar approach of how the theatre seating can collapse and then double as a stage. By adding similar elements that build up the arches, smaller enclosures and zones can host spaces or stalls for vendors to sell their goods and products, or for groups and organizations to showcase their advocacy and promote the concepts and causes that unite them.

III.

IV. OUTDOOR AREA AND ACTIVITIES

V.

Iteration 2

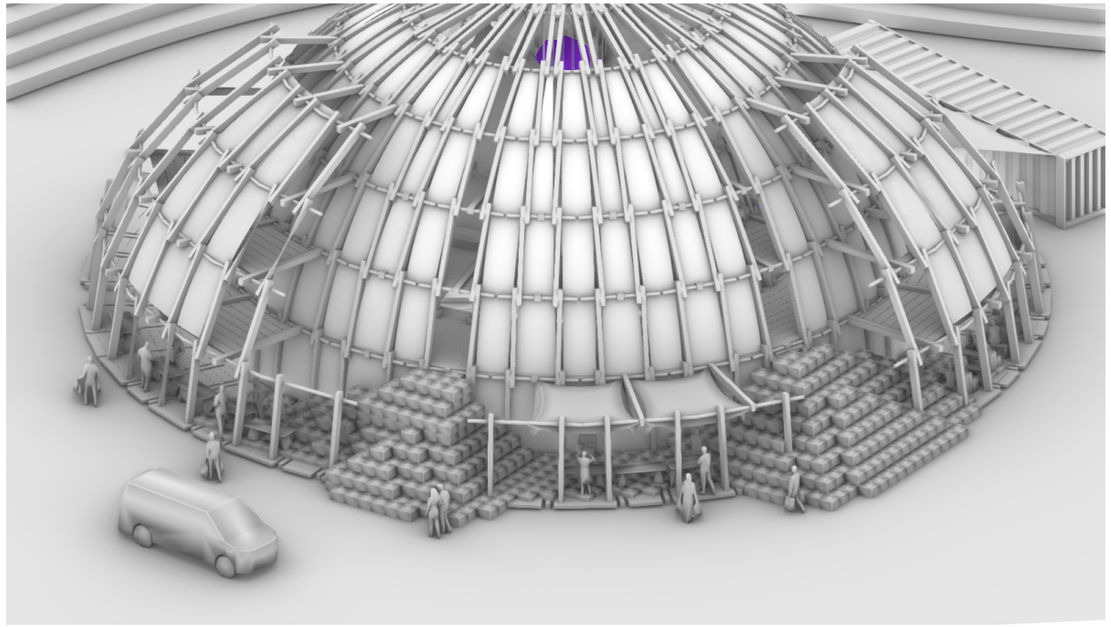


Illustration 109: Exterior iteration 2

For this second iteration, instead of integrating stairs that are part of the structure, it disrupts or breaks the radial grid and starts introducing smaller recycled plastic boxes. When stacked together, these boxes create stairs that lead to the first floor, or even shape hardscape elements for patrons to sit on, while also serving to define the outdoor zones.

III.

IV. OUTDOOR AREA AND ACTIVITIES

V.

Iteration 3

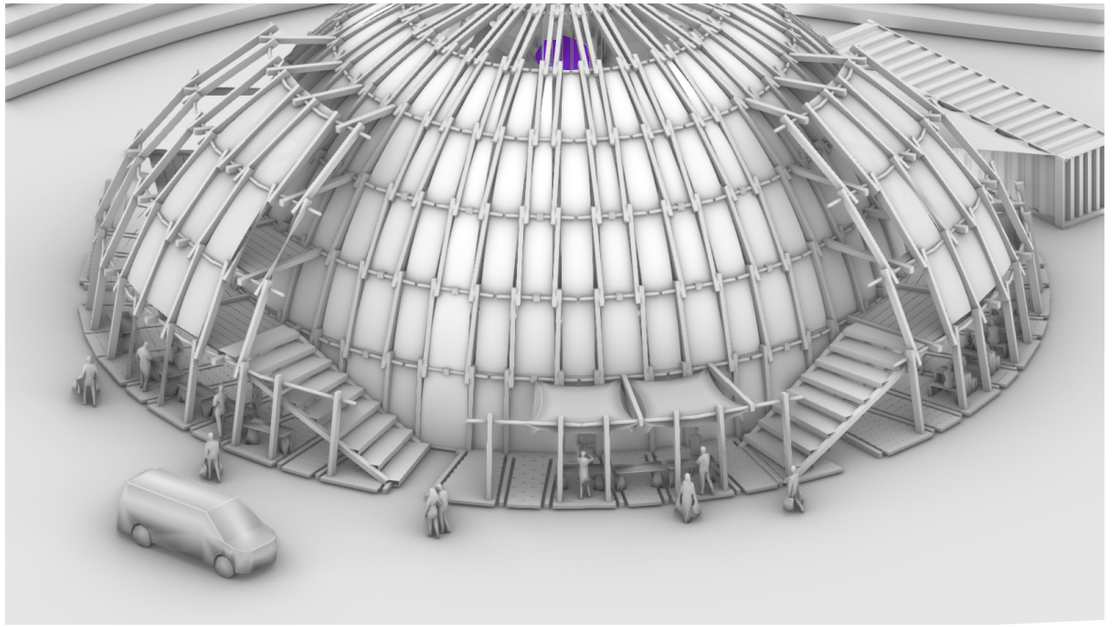


Illustration 110: Exterior iteration 3

The third iteration introduces a wider staircase that leads to the Awakening and the doors to the parallel world. Although this wider staircase emphasizes the entrances, it would require more detailing for their operation and packaging.

III.

IV. OUTDOOR AREA AND ACTIVITIES

V.

Iteration 4

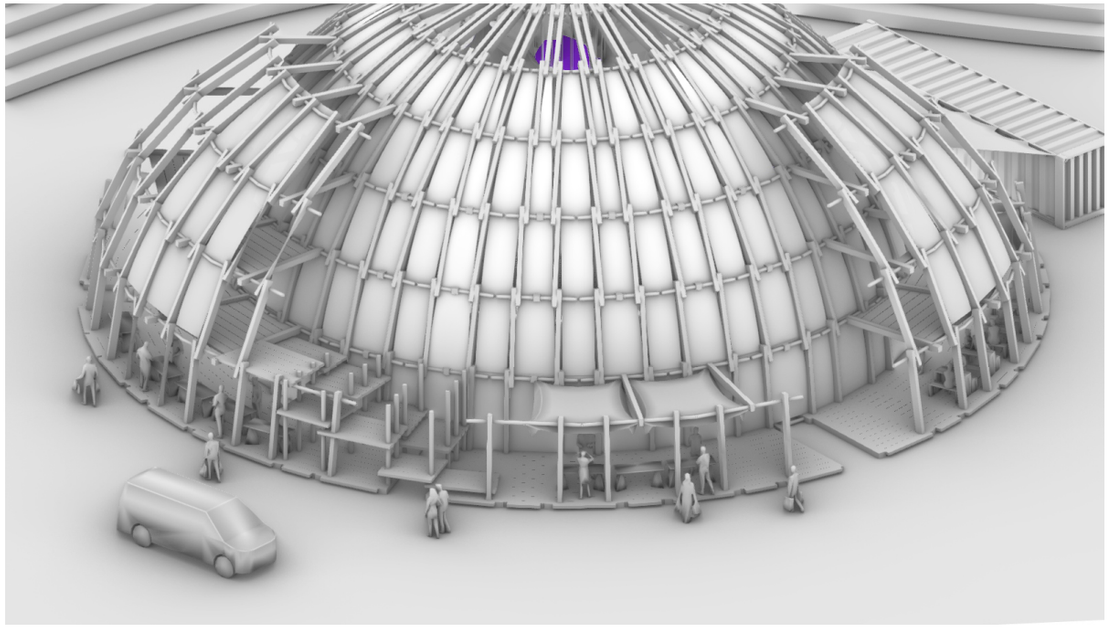


Illustration 111: Exterior iteration 4

As with the previous iteration, this fourth one introduces steps or platforms that lead to the tertiary space before reaching the entrance(s) to the auditorium. These steps can act as hardscape elements for people to sit on, or they could even define the outdoor vendor spaces themselves.

Illustration 113: Intermission II

REFLECTION ON DESIGN PROCESS

The design process followed a chronological development of two approaches. One focusing on modularity as a main structural approach, and the other focused on flexibility in shaping the zones of the project. Assessing the two approaches and conducting a workshop lead to the development of the final design, which merges qualities from both approaches. While going through the design process the design drivers where guiding each intention and iteration, while the ability to pack and create an easy yet versatile structure was always a main driver. The Following chapter will include the presentation of the project and the final outcome of the design process.

VISION

We propose a stage that aims to be a thought-provoking architectural tool for human-to-human energy exchange in our age of rapid globalization and digitalization.

To travel, the stage must be built for assembly and disassembly, from one country or continent to the next, while also providing interior flexibility. The auditorium should be adaptable to diverse styles and themes without forcing an adaptation to the spacial boundaries of a theatre building that was designed for a specific cultural style. From theatrical productions to concerts, conferences, and performances or gatherings of all kinds, the venue should be treated as a canvas that the event planner can shape and reshape in whatever way they see fit.

The project should also create a meaningful connection with the local context of each location, thus being designed with sustainability in mind, and through the use of environmentally-conscious materials and assembly techniques; any true embrace of humanity must also embrace the natural world with the same awareness and consideration. Ultimately, in its final form, this venue should be able to adapt to any city worldwide. Given that the designers hail from Hamburg, Germany, and Cairo, Egypt, these distinct cities will be investigated as the theatre's geographical and societal starting points.

Illustration 114: Act V

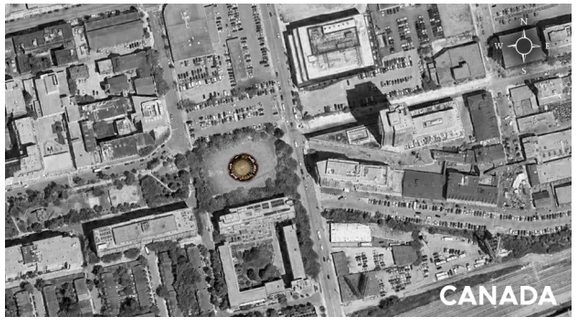
BETWEEN ACT AND ARCHITECTURE : A TRAVELING STAGE

THE STORY

Illustration 115: Gif of the building placed in different locations around the world

We believe that it takes authentic and uncorrupted energy exchange to develop open-minded and curious societies, that than have the potential to bring forth healthy and aware humans., By looking into the past of how theatres and stages served an important role in defining citizenship and teaching culture and social behavior. We are proposing a stage that takes advantage of rising globalization and already existing curiosity by traveling the world. A stage that can be assembled and disassembled and offers the flexibility in adapting to type of event that it can host. Ranging from minimalistic plays, to comedy talks, to social gatherings to even poetry slams. The Stage then becomes a canvas that the event planner can shape and form the way they see fit.

DIFFERENT LOCATIONS AROUND THE WORLD (IMAGES)



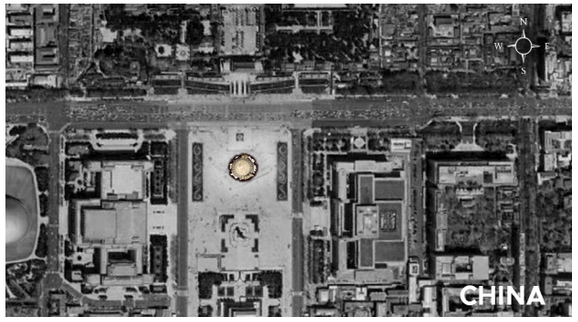


Illustration 116: Elements of the previous Gif

UNPACKING

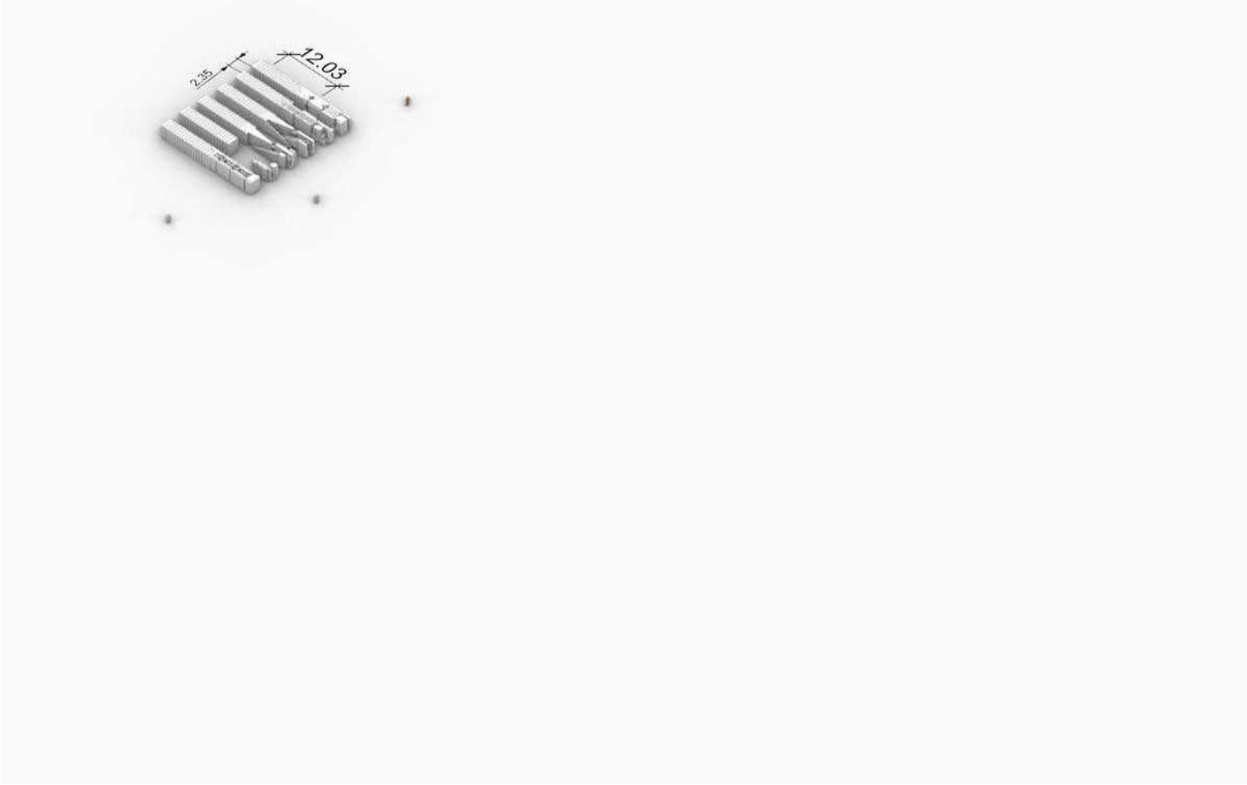


Illustration 117: Gif of the packing and unpacking process

The venue Fits in six standard shipping containers when fully packed. As the shipping containers arrive on site the process of getting the elements out can be done wit a group of volunteers. The elements where optimized to so that they do not exceed 2.5m when they are fully packed, however depending on the element, they will weight heavily. A fork lift might help speed the process as well. Once the elements are out they can be grouped by similarity and then proceed to assembly.

UNPACKING FROM TRANSPORTATION CRATES (IMAGES)

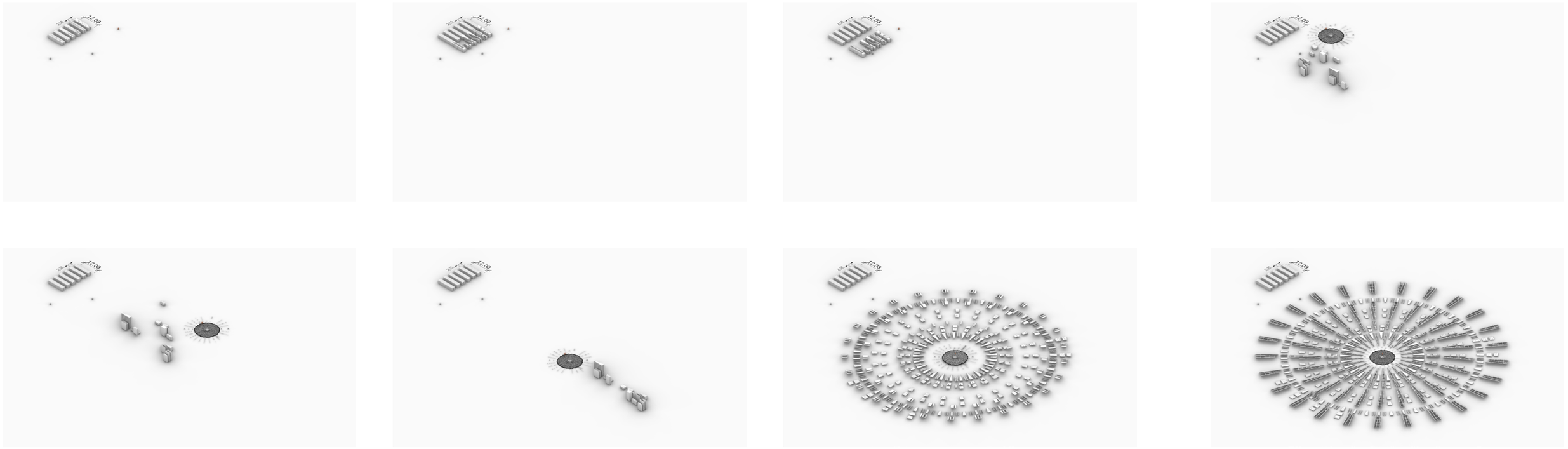


Illustration 118: Elements of the previous Gif

ASSEMBLY

Assembly approach 1
With a crane

Assembly approach 2
Without a crane

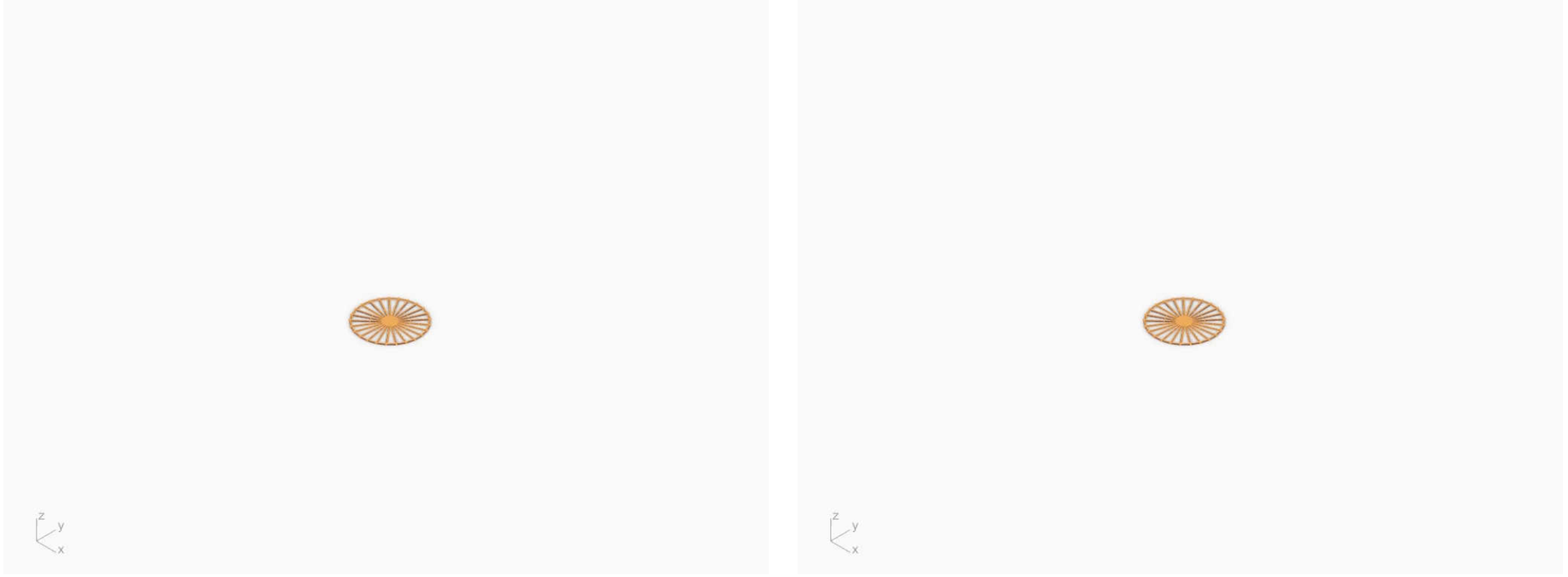


Illustration 119: Two different assembly strategies

The assembly of the structure can be done through two methods. The first ,with a help of a crane, lifting all connected outer modules up then fixating them by the steel connectors. After that erecting the inner dome structure. The second approach is unfolding the modules and connecting both the outer and inner dome level by level until reaching the top ring.

ASSEMBLY APPROACH (IMAGES)

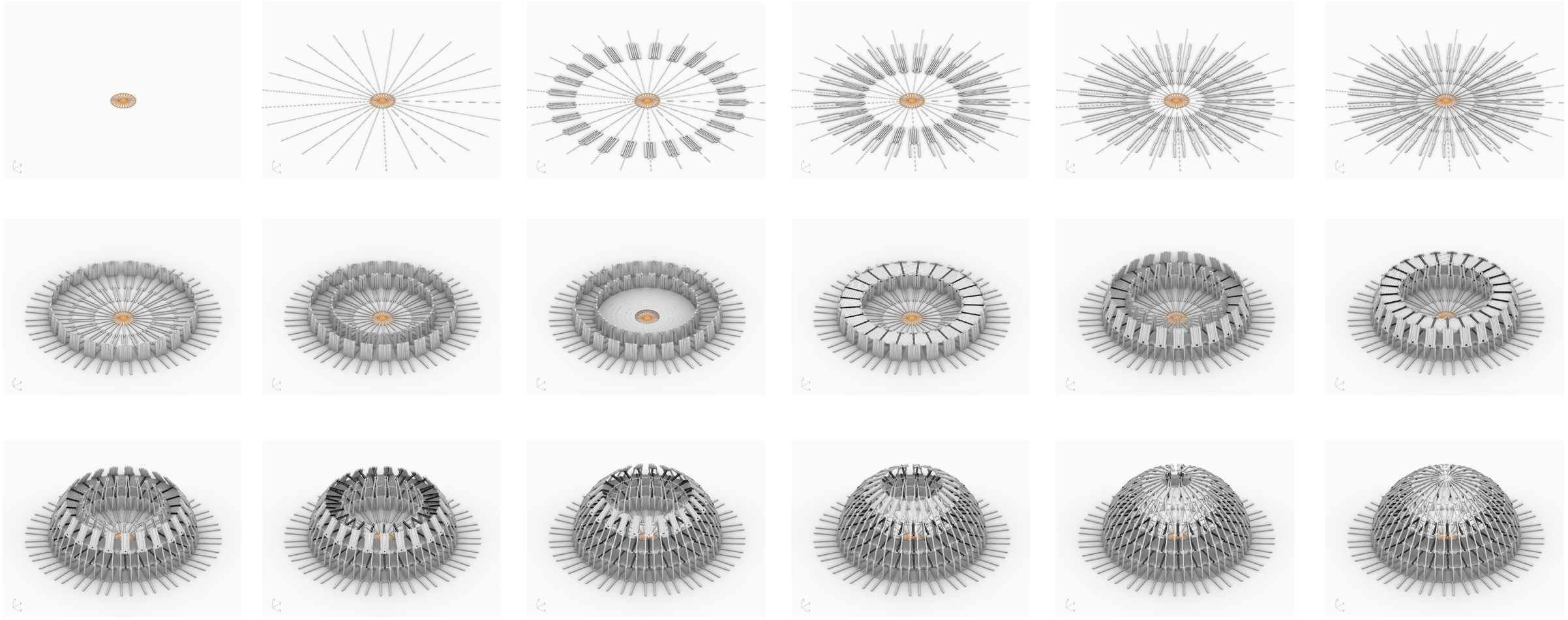
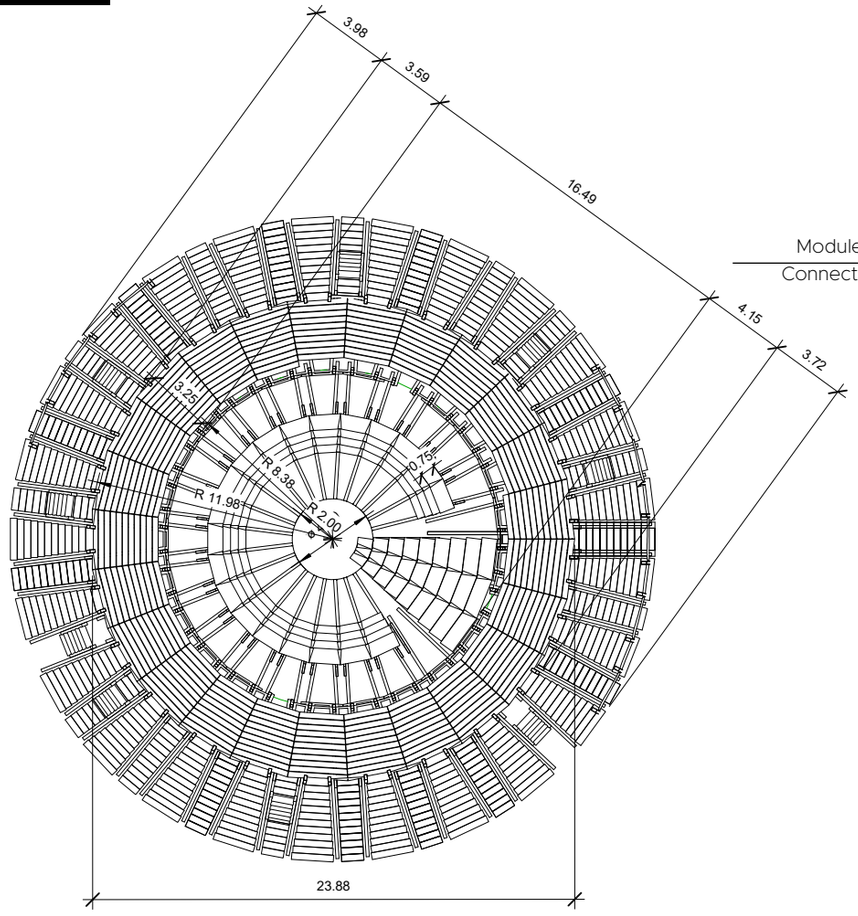
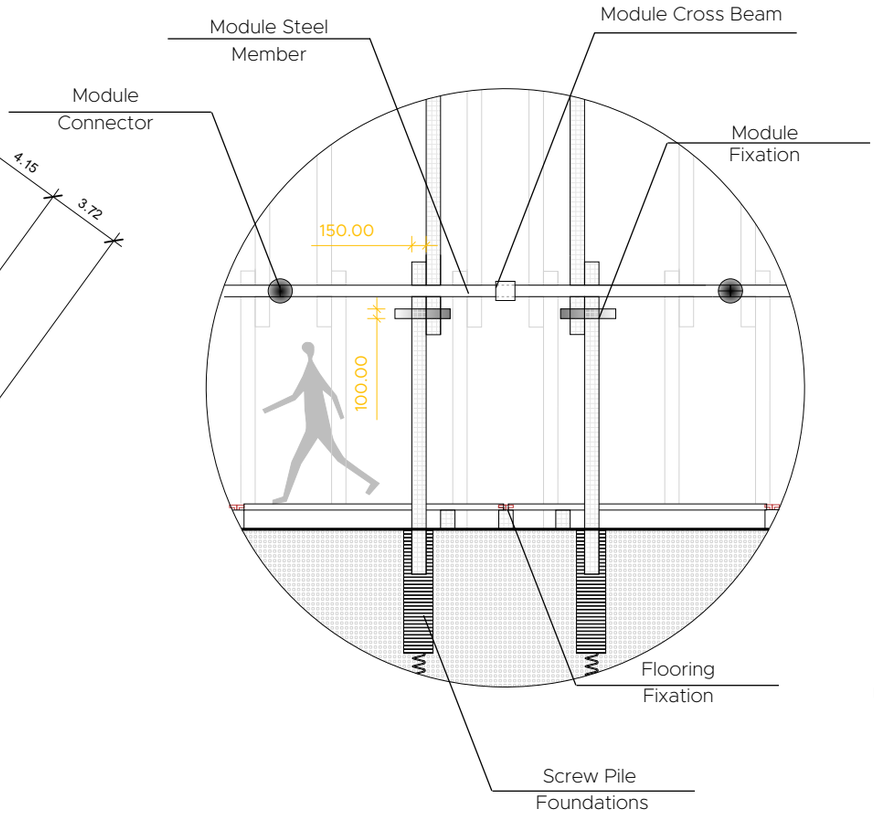
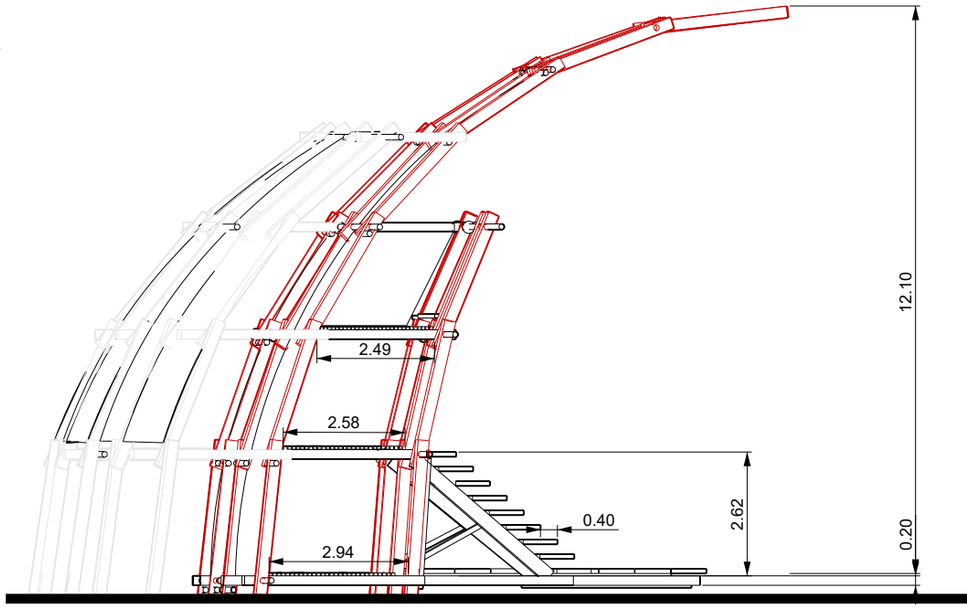


Illustration 120: Elements of the previous Gif

DIMENSIONS


3.98
3.59
16.49
4.15
3.72
3.25
R 8.38
R 11.98
R 2.00
0.75
23.88


Module Steel Member
Module Cross Beam
Module Connector
Module Fixation
150.00
100.00
Flooring Fixation
Screw Pile Foundations


12.10
2.49
2.58
0.40
2.62
2.94
0.20

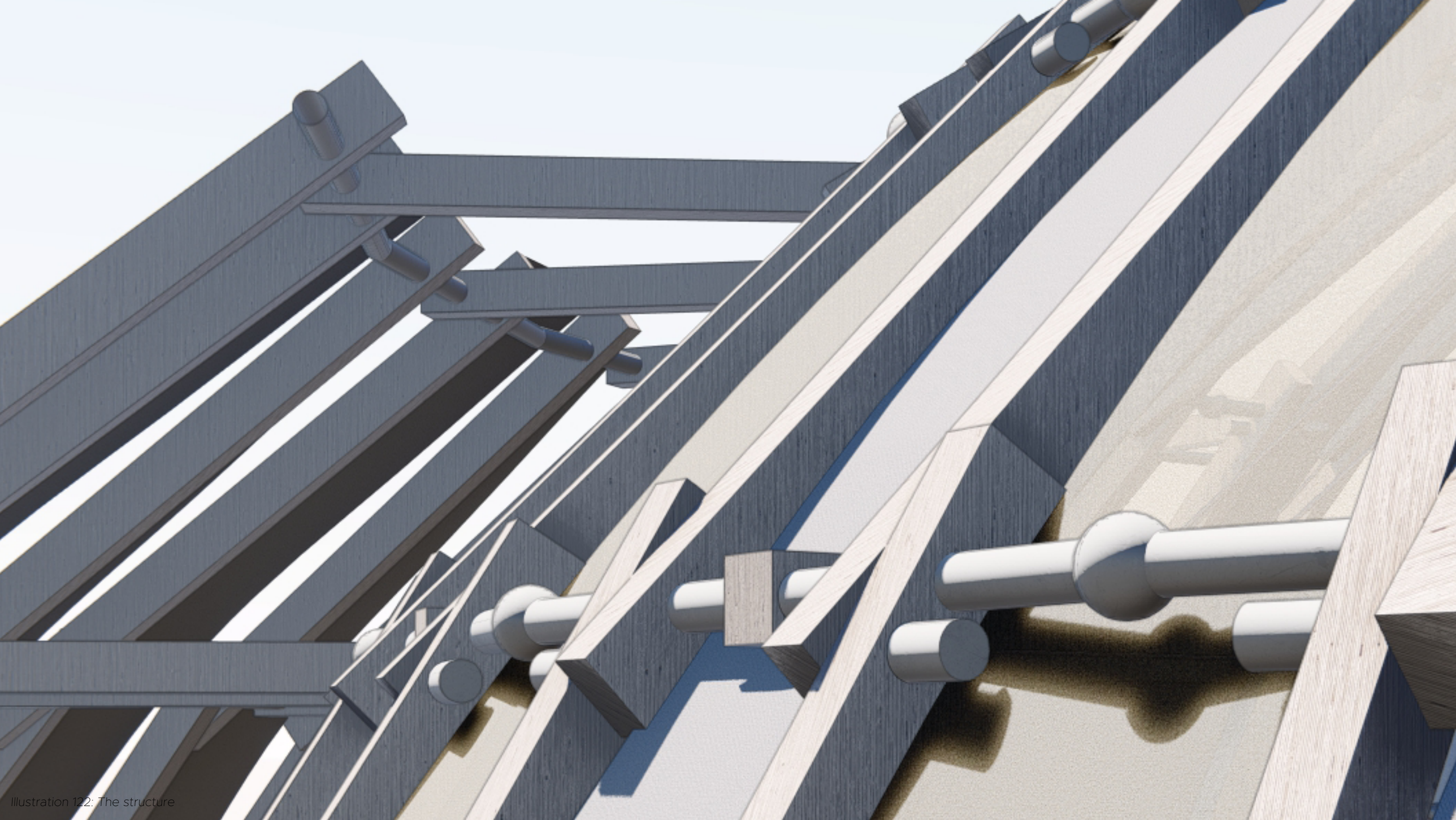


Illustration 122: The structure

EGYPT/CAIRO

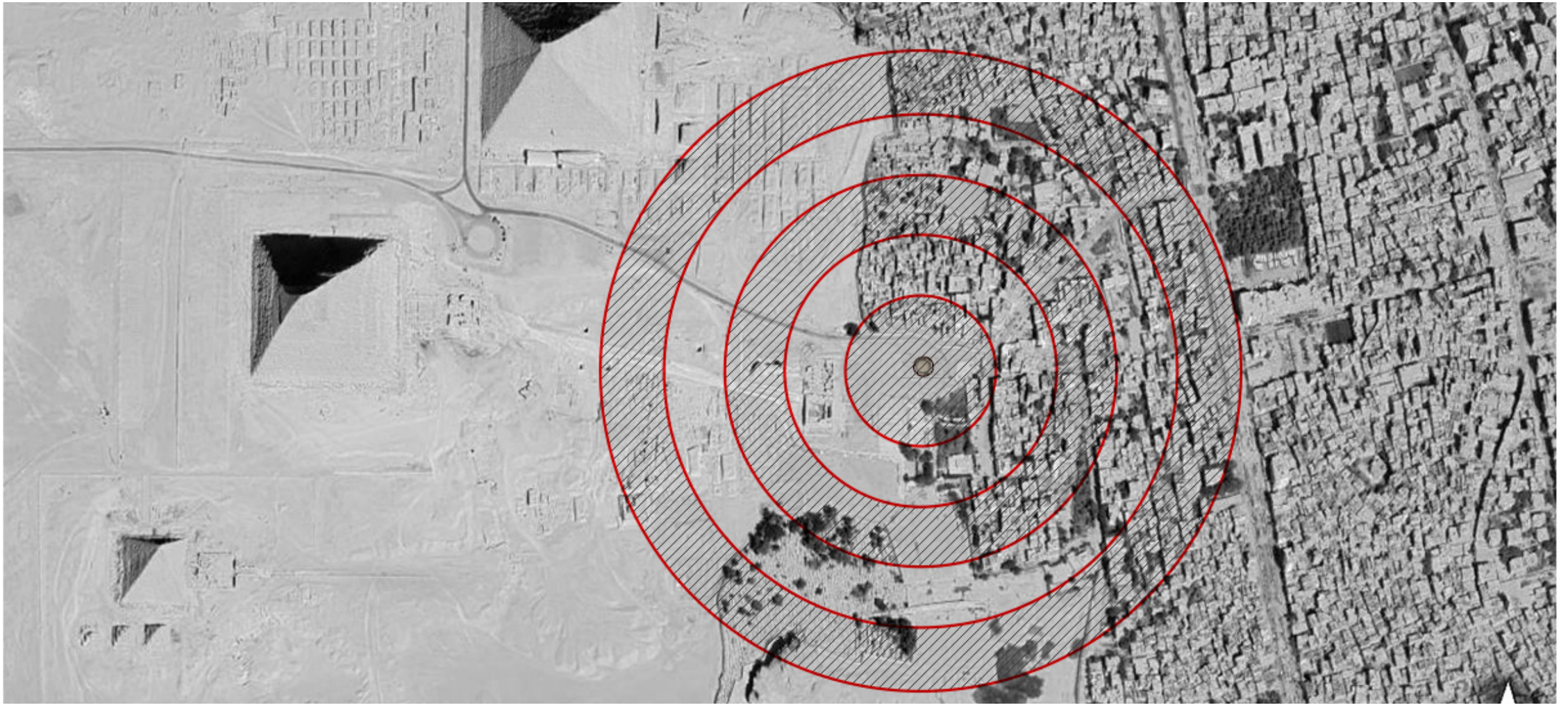


Illustration 123: Location Cairo

EGYPT/CAIRO

In Cairo, the Venue could be placed next to the Giza pyramids, at an intersection between a historical context and the dense urban fabric that hosts several markets, restaurants and residential buildings. The area is active mostly in the morning and less active by night. The venue could attract anyone passing, by integrating current street vendors and bazaars in the outer area of the venue, and by offering different performances and cultural and heritage awareness plays and talks, which attracts to both and foreigners.

Pedestrian Roads

Car Roads

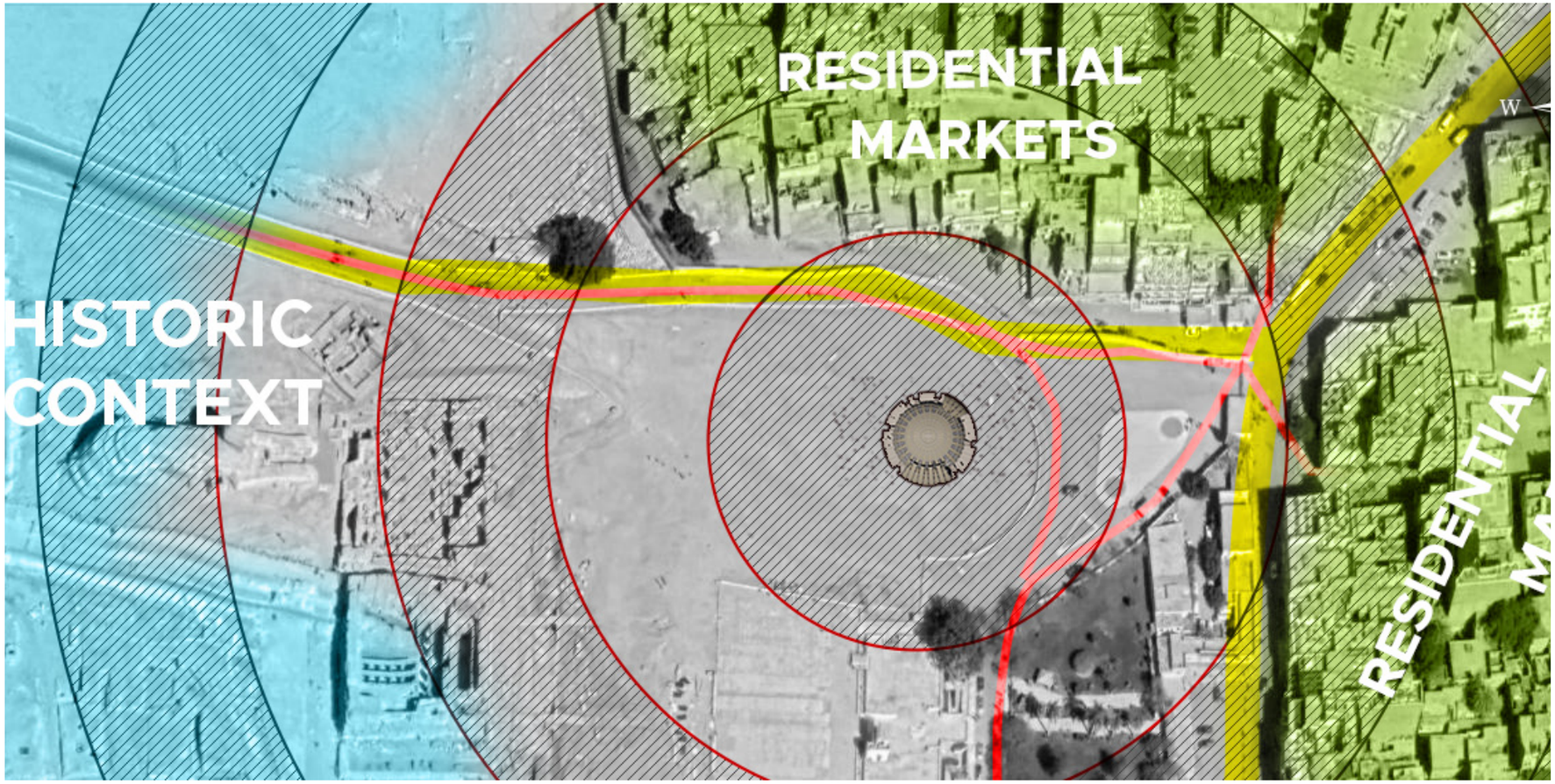


Illustration 124: Location Cairo with context

EGYPT/CAIRO

Illustration 125: The building placed in Cairo

GERMANY/HAMBURG

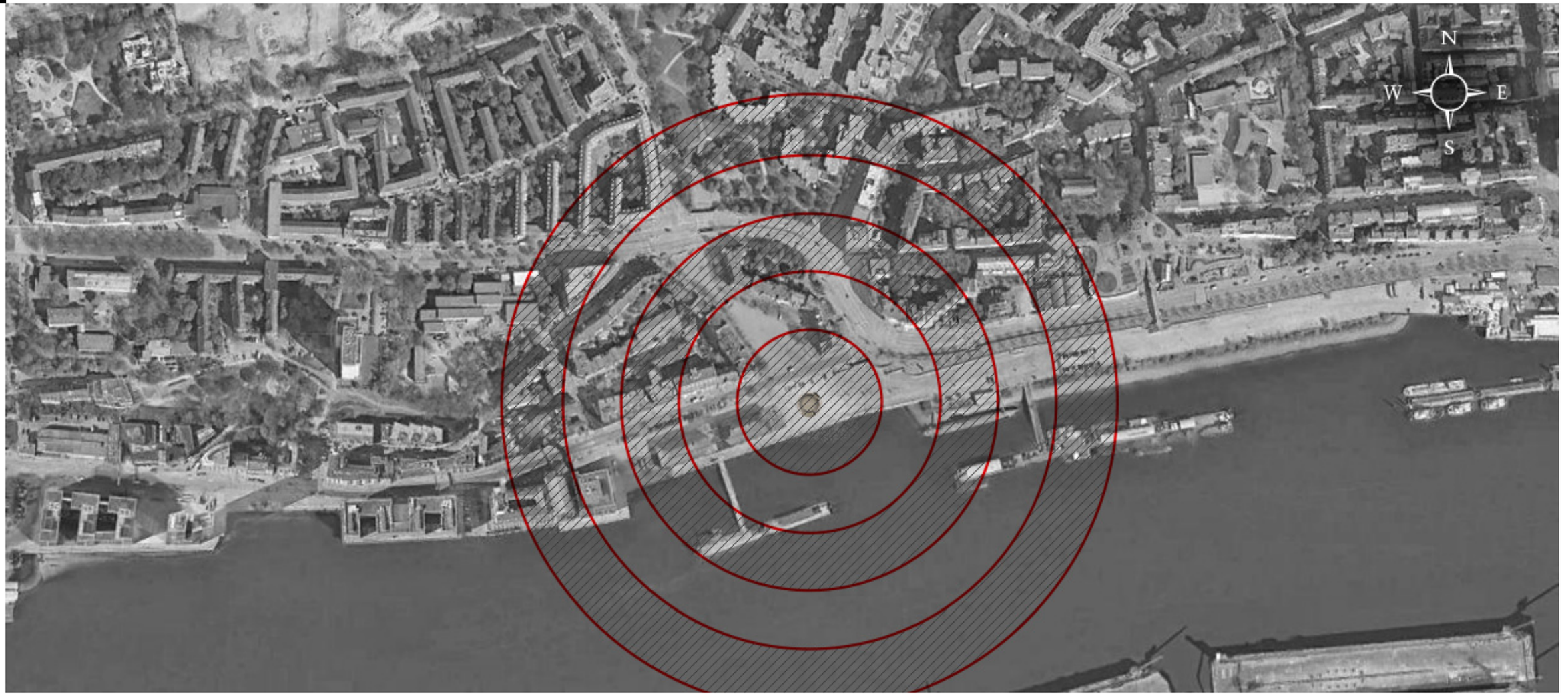


Illustration 126: Location Hamburg

GERMANY/HAMBURG

In Hamburg, the venue can be placed in the seafront next to the infamous fish market. This area is highly active especially on the weekends where the whole seafront and courtyard next to where the venue is placed turn into and outdoor fish market. (The Green Color Coded Zone)

The outdoor area for the venue can be used for local vendors that sell not only fish, but other local products to promote and attract people, while at night the venue itself can host several different activities, from minimalistic plays to talks or even social event gatherings.

Pedestrian Roads

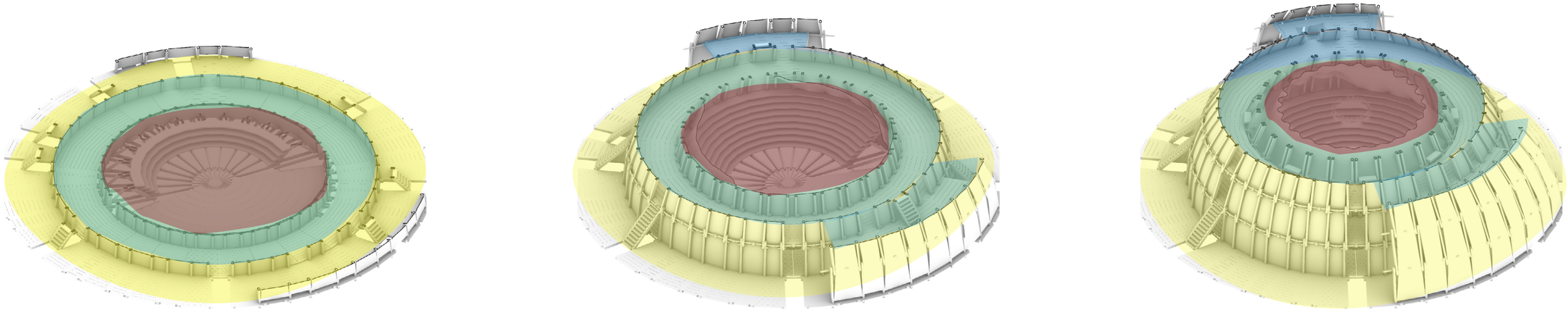
Car Roads

Illustration 127: Location Hamburg with context

GERMANY/HAMBURG

Illustration 128: The building placed in Hamburg

V. THREE MAIN ZONES



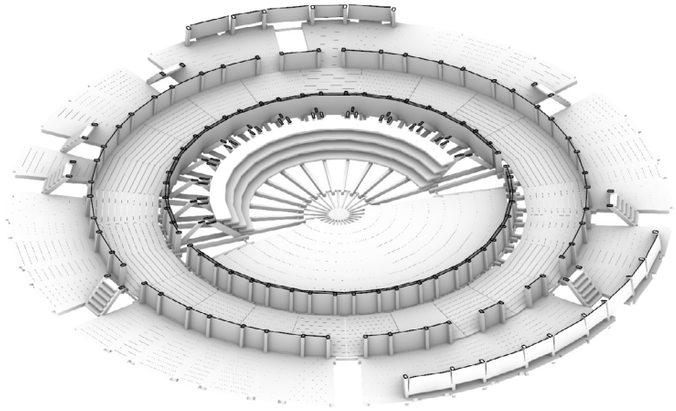
Outdoor area (Real World)

Liminal Space(Awakening Area)

Auditrium (Mystical/Parallel World)

Illustration 129: The three zones in the building

V. PLANS : GROUND FLOOR



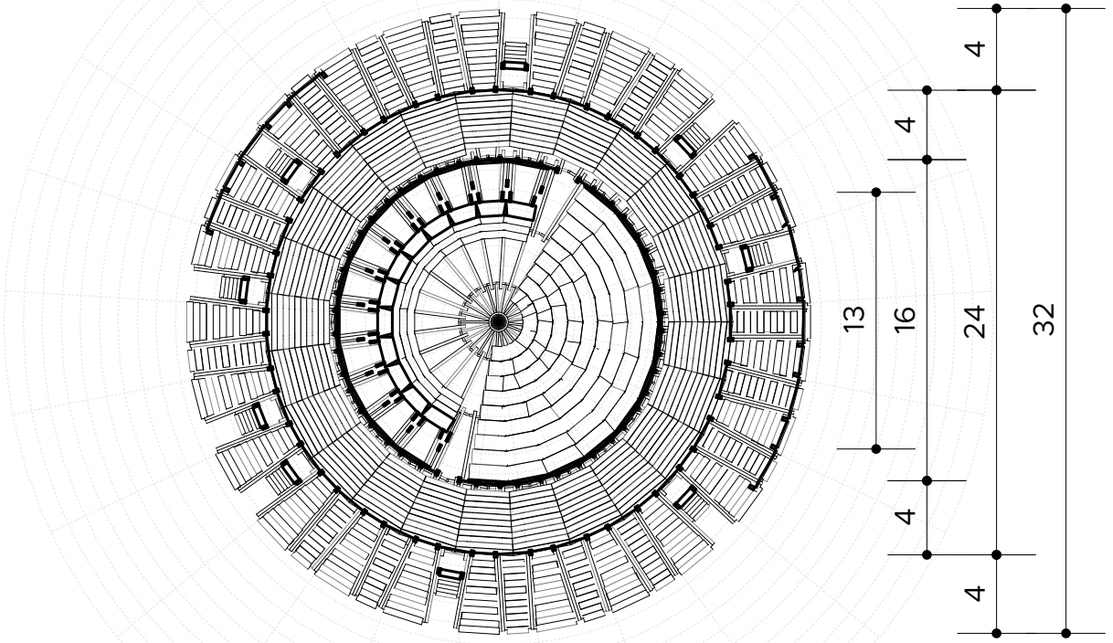
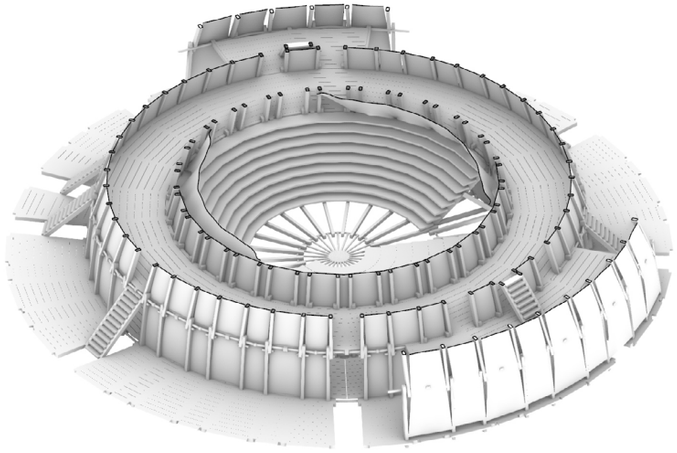


Illustration 130: Ground floor plan

V. PLANS : FIRST FLOOR



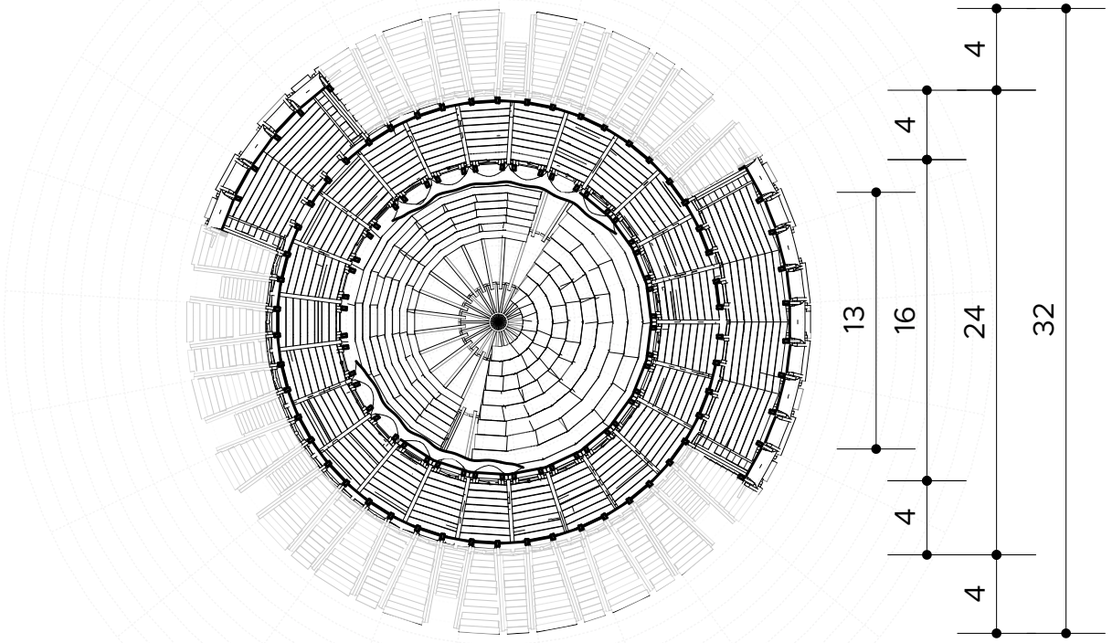
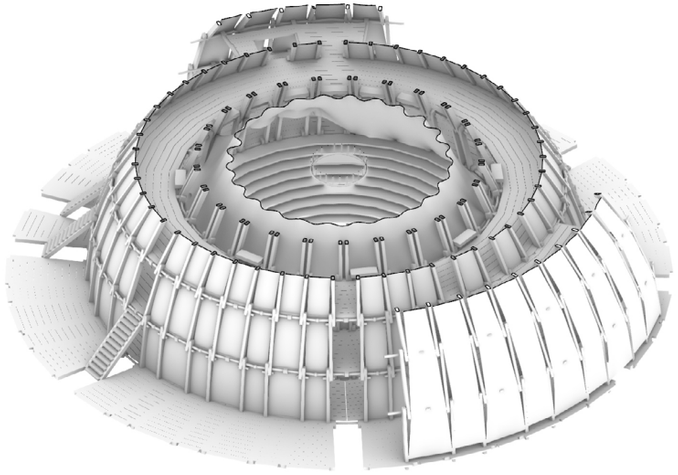


Illustration 131: First floor plan

V. PLANS: SECOND FLOOR



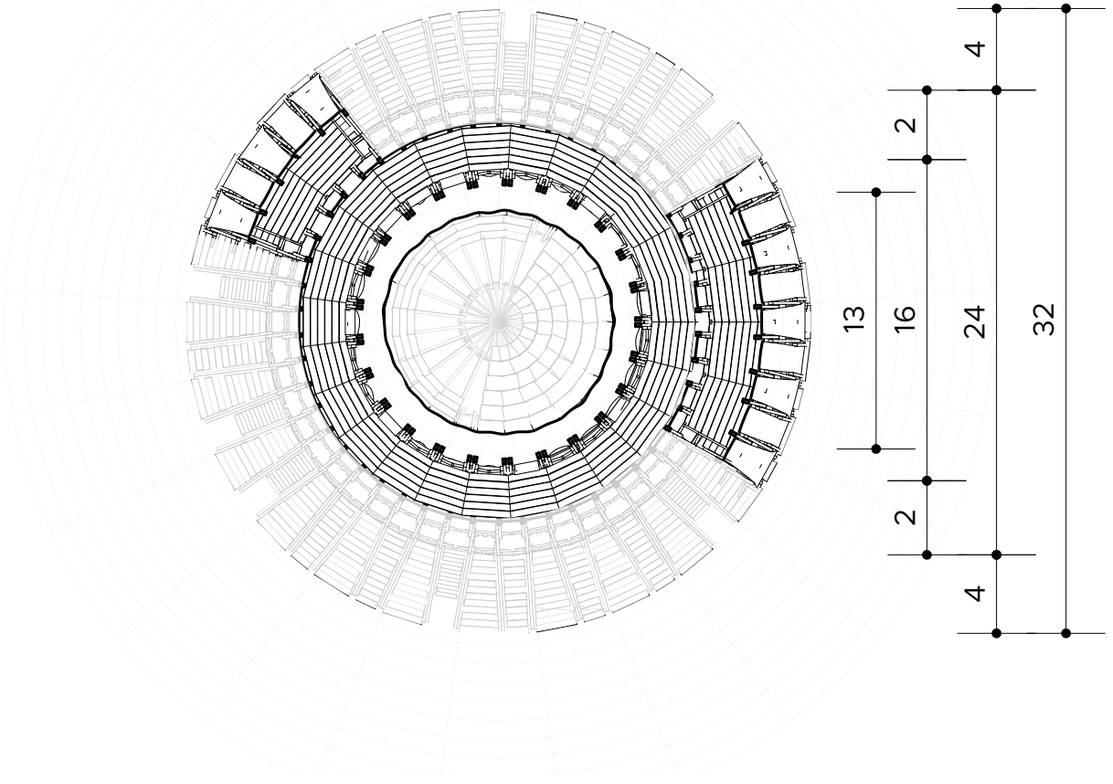
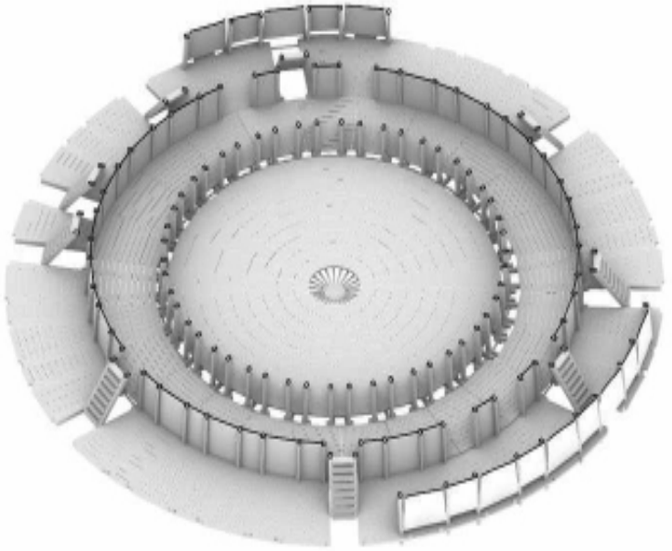


Illustration 132: Second floor plan

V. ADAPTABLE AND FLEXIBLE AUDITORIUM



The flexibility of the ground floor auditorium or the mystical world, can be interchanged easily into different layouts depending on the required venue. The flooring itself is can fold and unfold creating seating, stairs or a stage.

Adaptable Auditorium (IMAGES)

Illustration 134: Elements of the previous Gif

V. ARENA STAGE PLAN LAYOUT

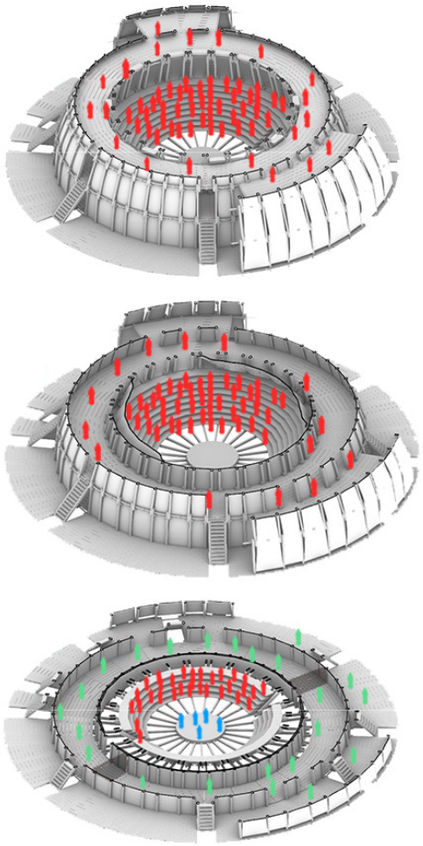


Illustration 135: Use of an area set up

Inspired from the ancient theatres of a central stage, the arena layout offers a 360 seating venue, capable of hosting up to 180 people. The central stage is highlighted as the hanging technical chandelier floats above it. This layout is can work for experimental minimalistic plays, talks, or even community engagement events, such as shows or games.

VISITORS

PERFORMERS

CREW

Illustration 136: Image of the use as area set up

Illustration 137: Top view of the stage and acoustic fabric

V. MINI THEATRE PLAN LAYOUT

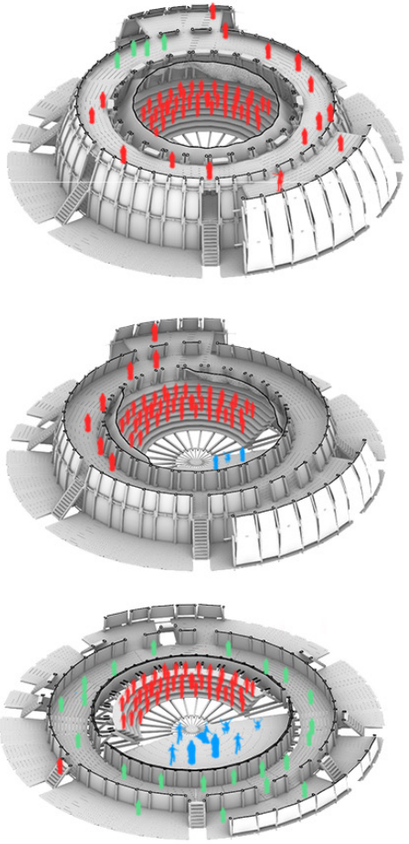


Illustration 138: Use of an mini theater layout

The mini theatre layout offers a stage on one side and seating on the other side that can host up to 100 people. The projector can help in projecting different scenes depending on the play. There could be a backstage area for the crew and for changing for the actors.

VISITORS

PERFORMERS

CREW

Illustration 139: Image of the mini theater layout

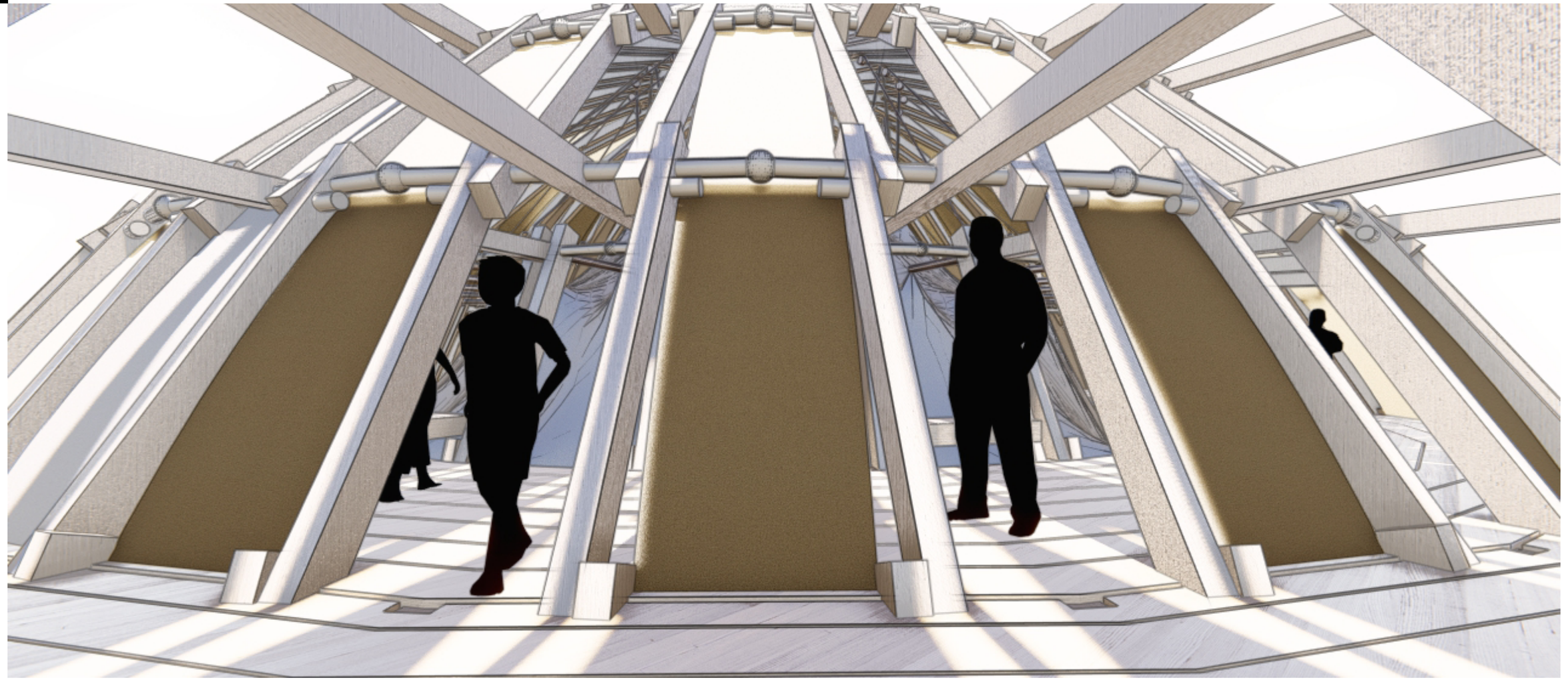


Illustration 140: View from the tertiary space

V. OPEN THEATRE PLAN LAYOUT

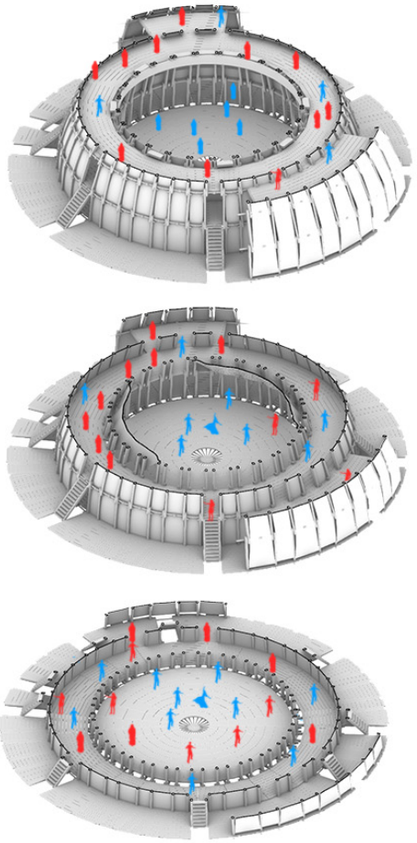


Illustration 141: Use of an open theater layout

Open plan layout offers several different possibilities. By lifting the acoustic fabric and removing the fabric enclosing the first floor, it becomes a hall that can host music events, experimental role-playing theatre, or even parties. The first floor becomes part of the auditorium, while the second floor remains partially visually disconnecting from that area,

VISITORS

PERFORMERS

CREW

Illustration 142: Image of the open theater layout

Illustration 143: View of the open theater layout from the second floor

V. TALK/COMEDY/COZY EVENT PLAN LAYOUT

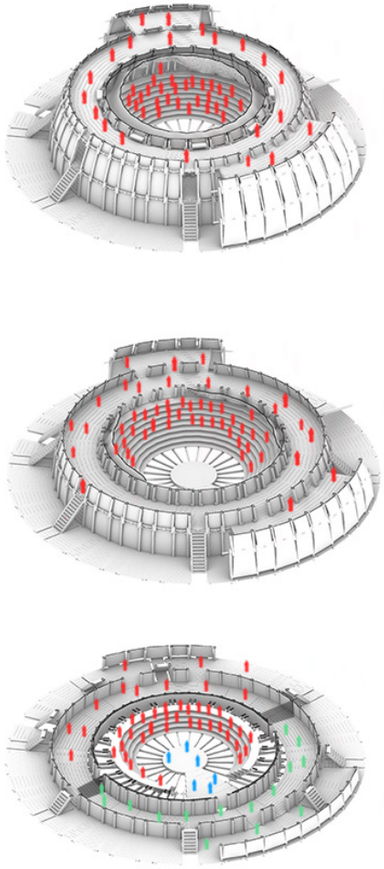


Illustration 144: Use of an open event layout

The partial stage can offer a cozier setting, where it can be suitable for talks or educational presentations or even fashion or showcasing shows. The ground floor can be divided into two zones, one for the crew and one for visitors to access.

VISITORS

PERFORMERS

CREW

Illustration 145: Image of the open event layout

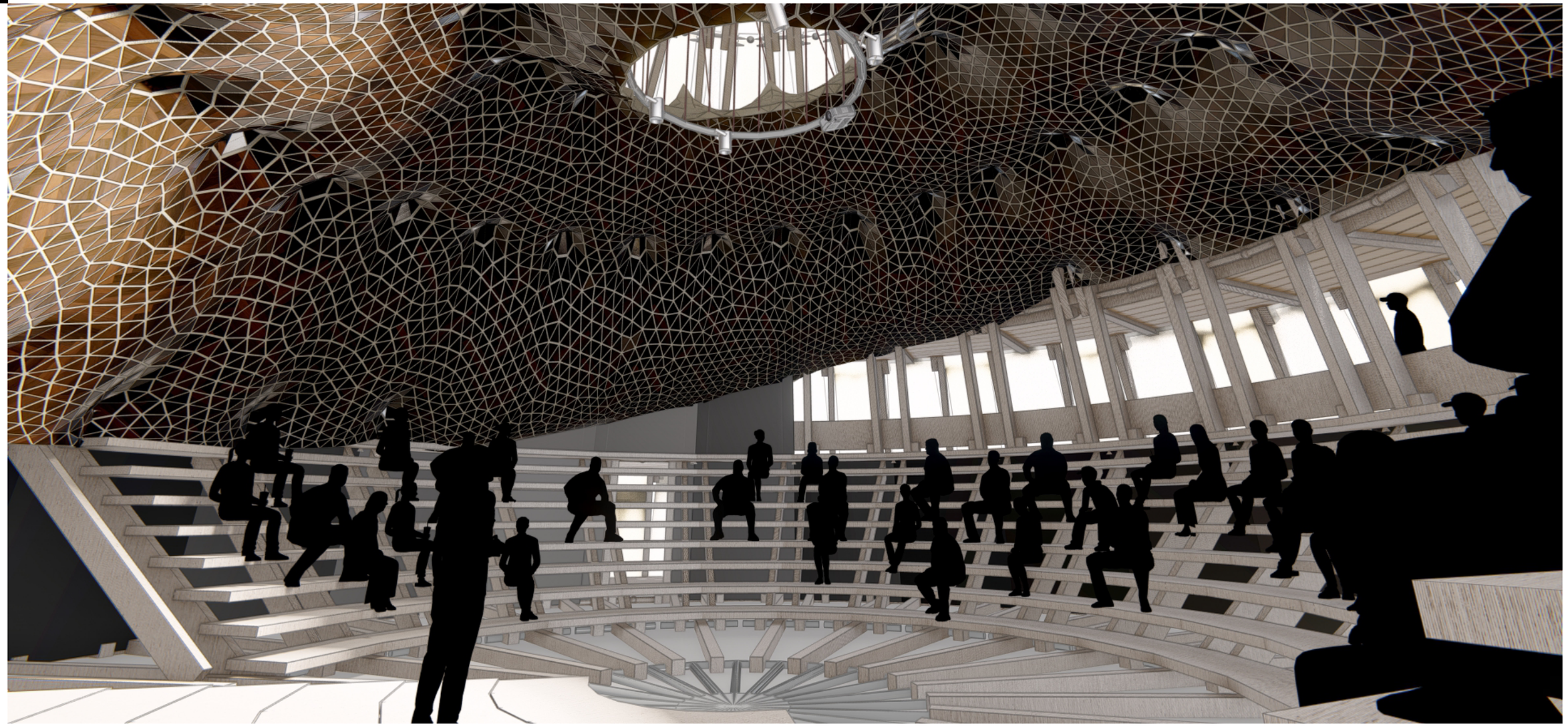


Illustration 146: View into the auditorium from the side of the stage/ backstage

Illustration 147: View into the entrance with market outside of a city

Illustration 148: View of the awakening area

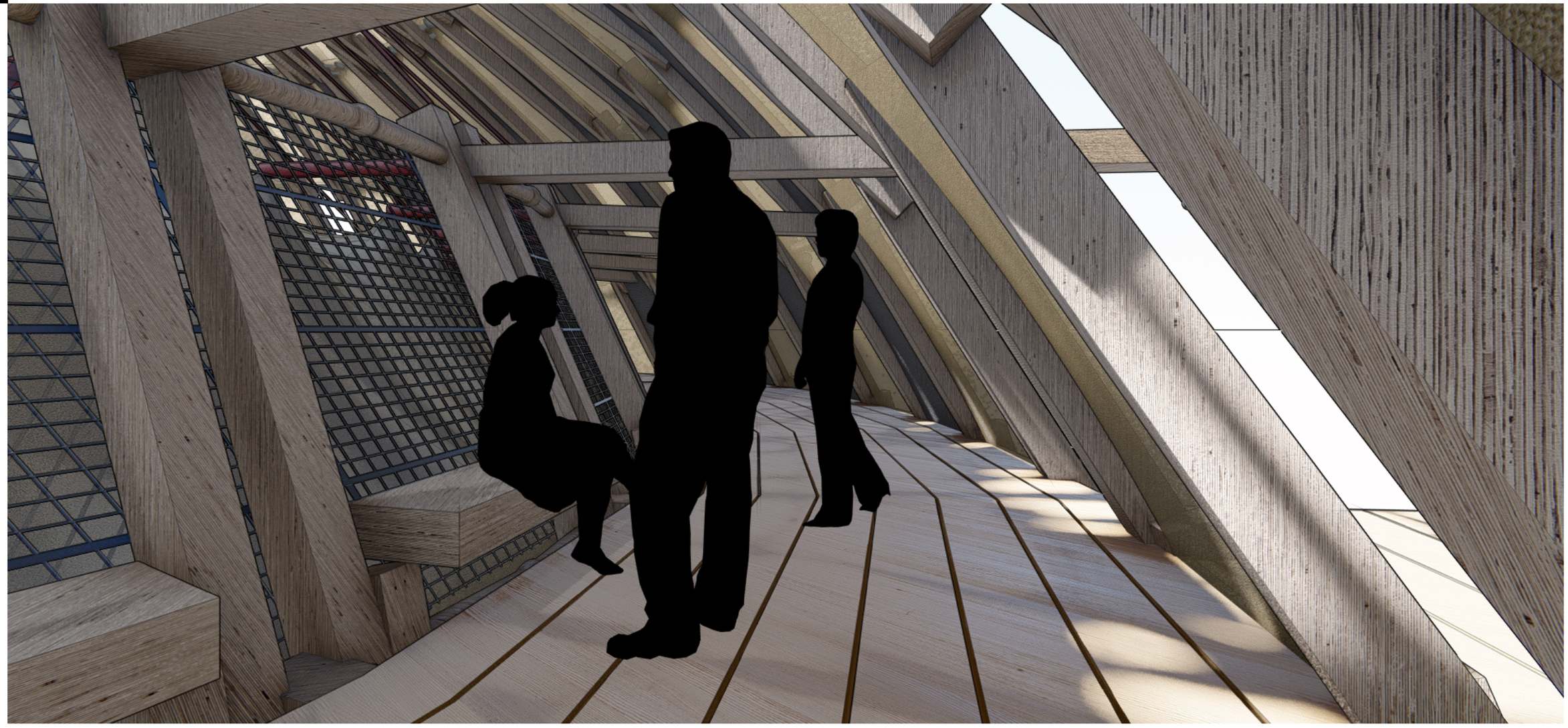


Illustration 149: View of the awakening area

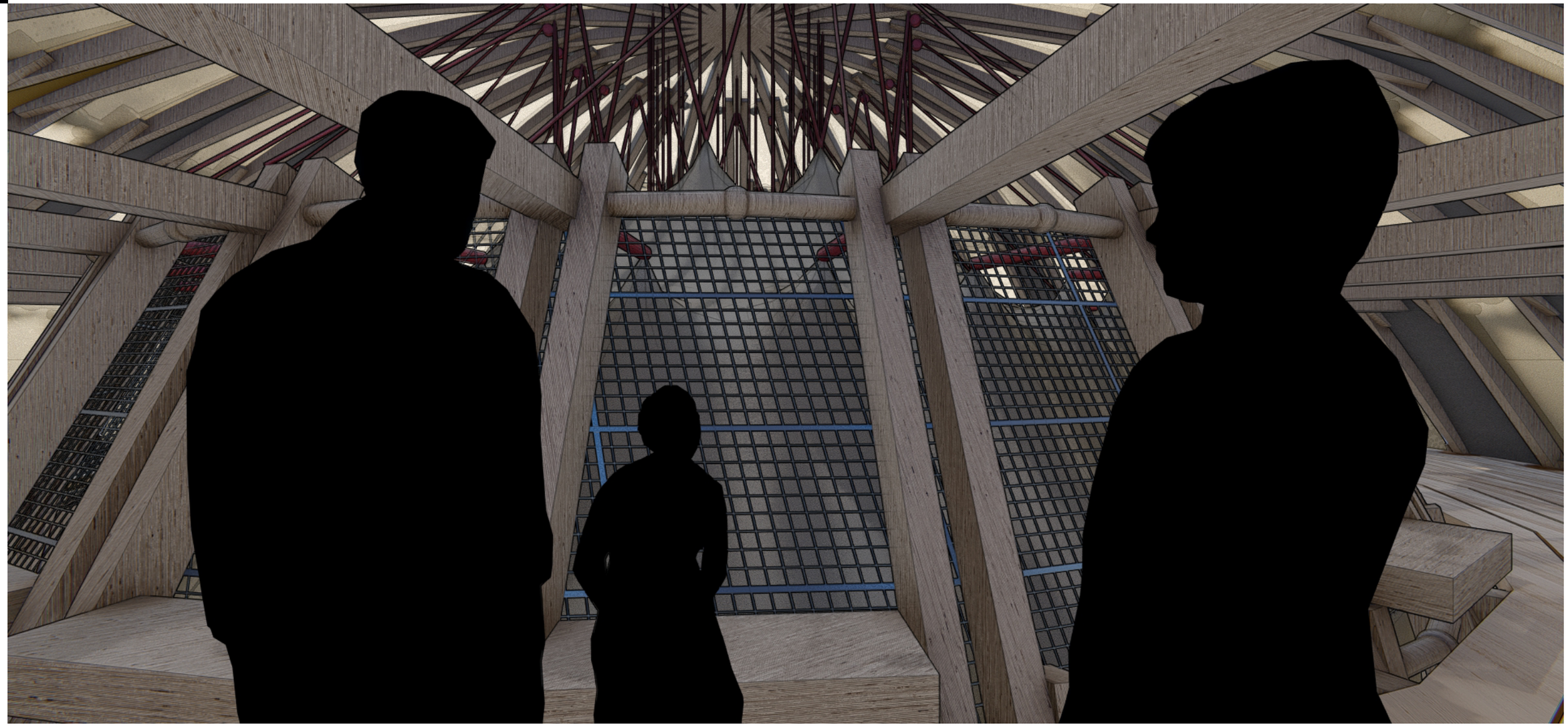


Illustration 150: View of the awakening area

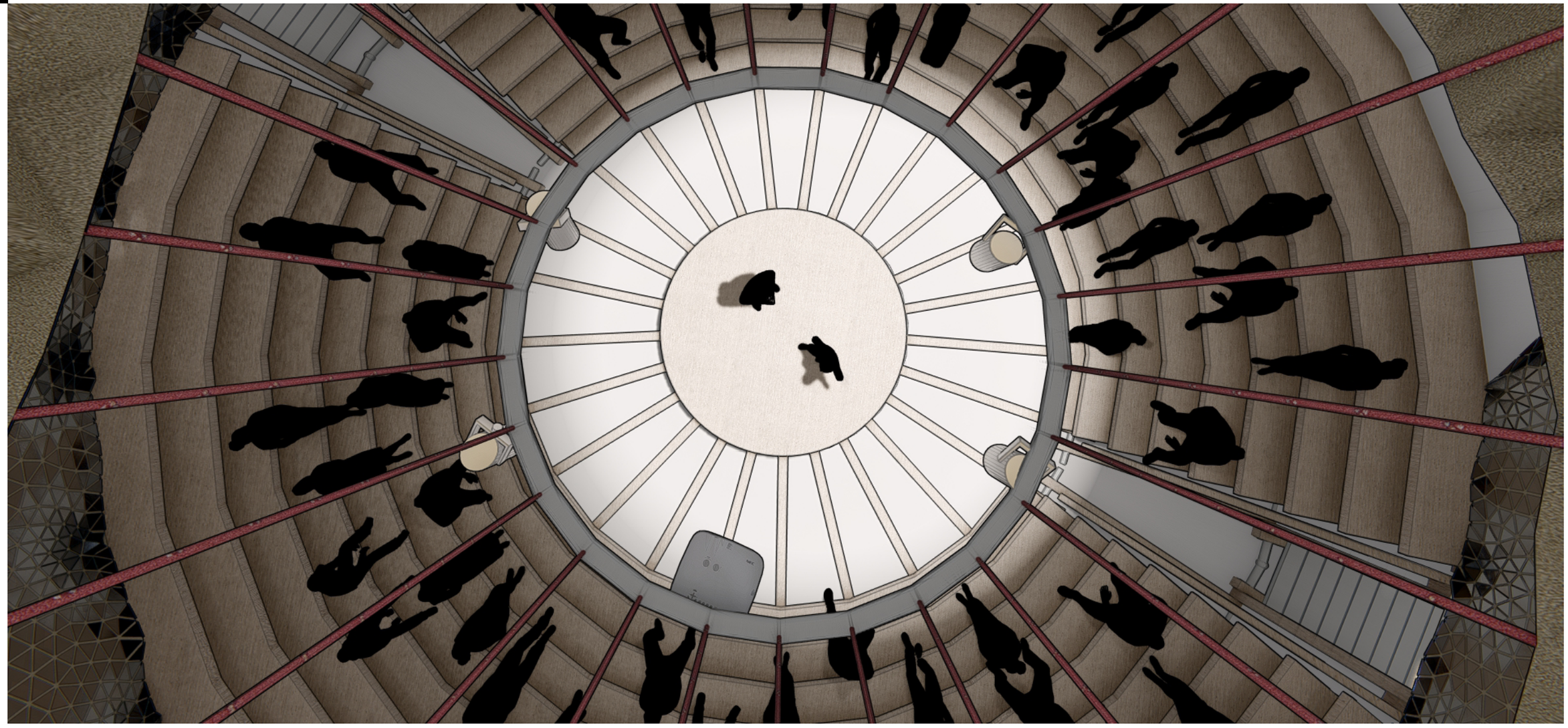


Illustration 151: View into the auditorium

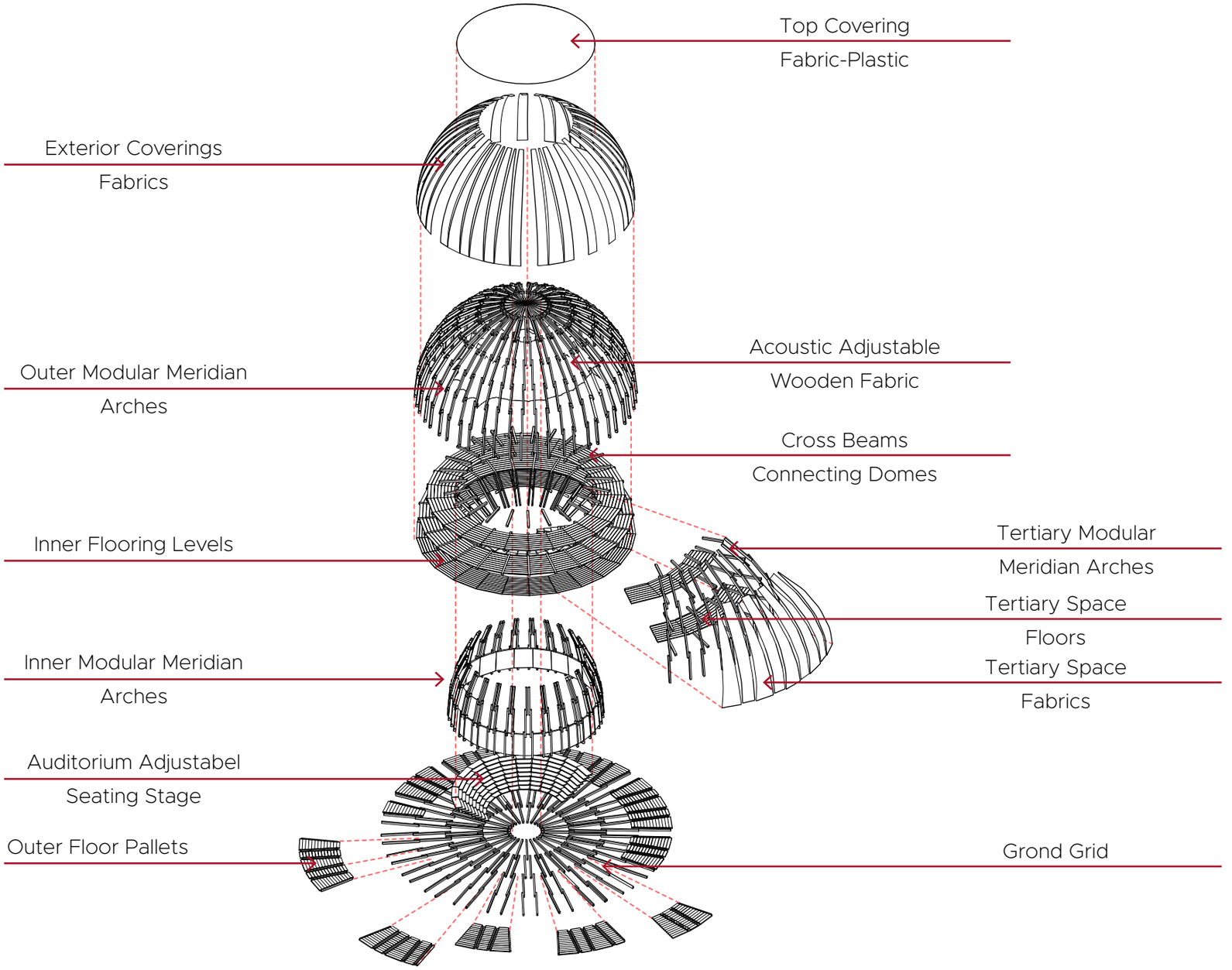


Illustration 152: Exploded image showing all elements

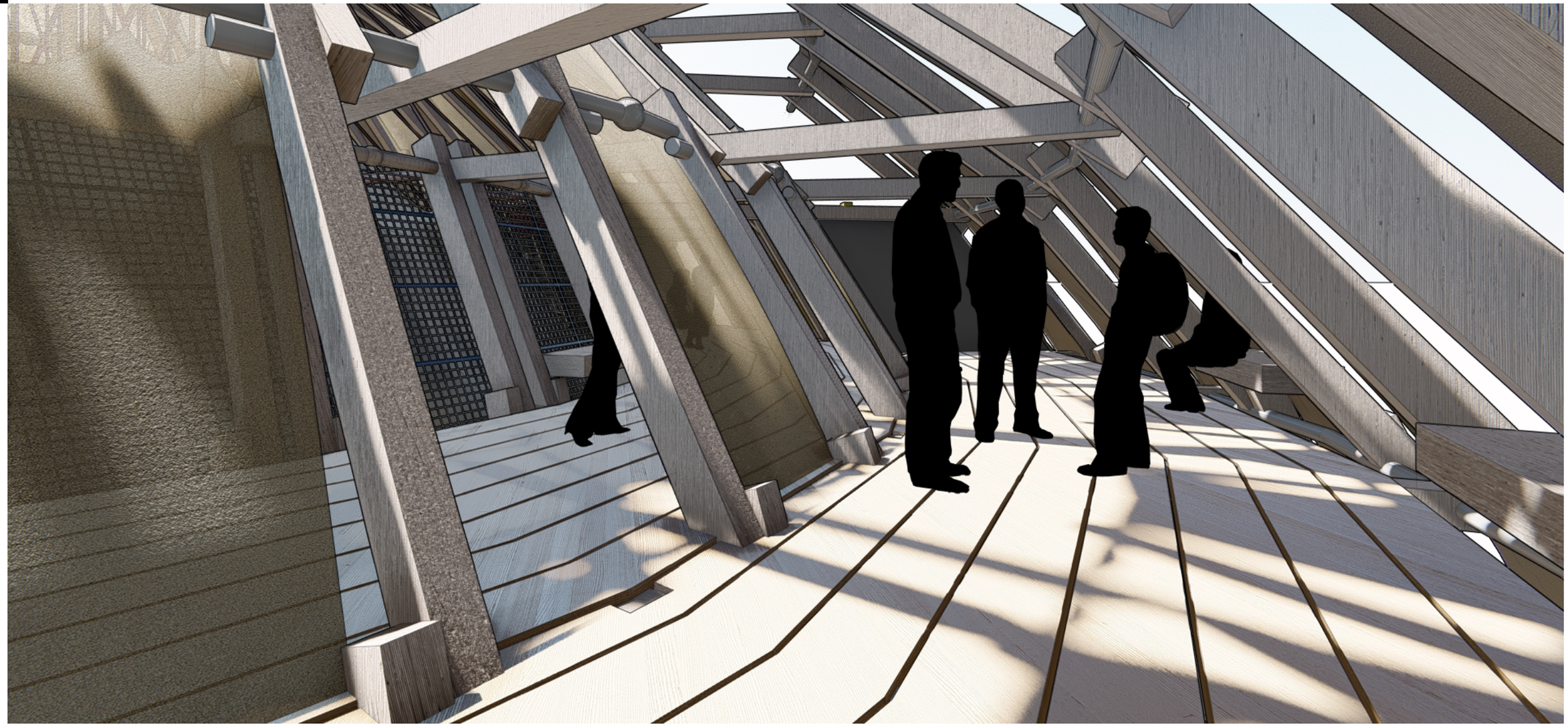


Illustration 153: View into the awakening area

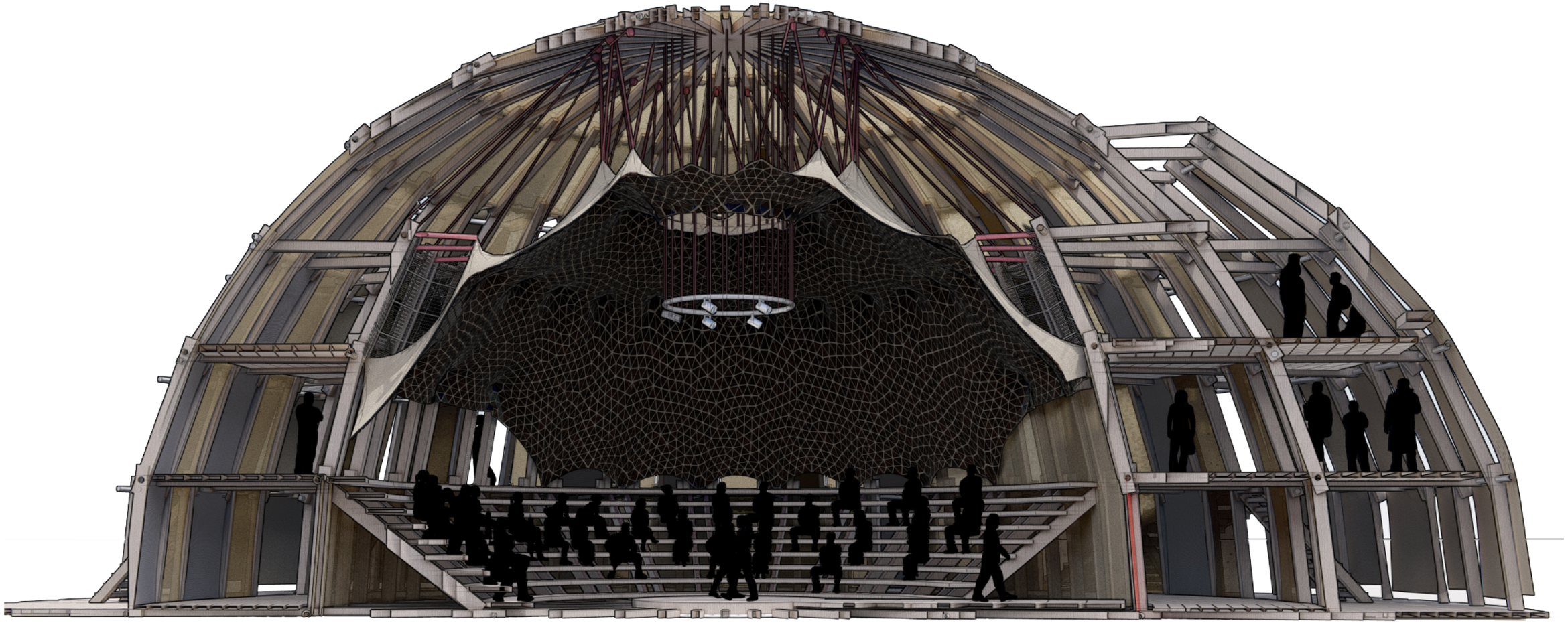


Illustration 154: Section of the entire building

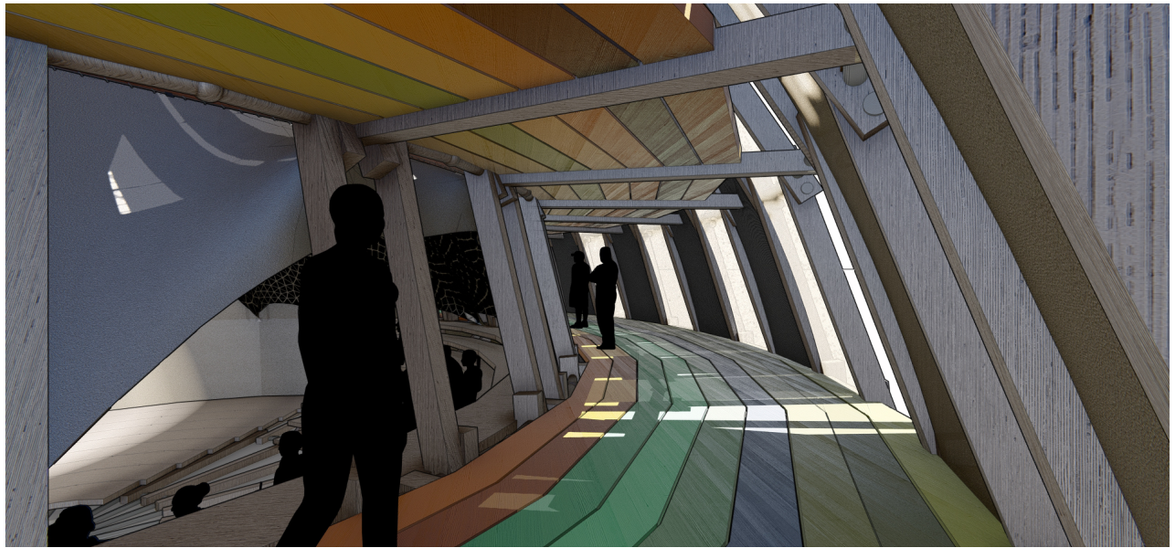


Illustration 155: Floor with color coding

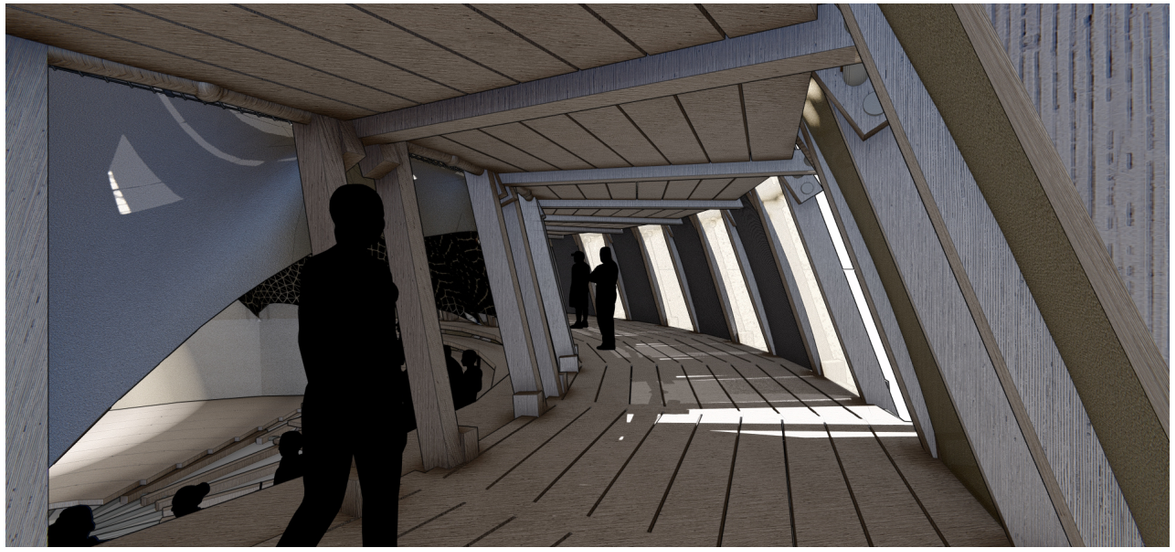


Illustration 156: Floor without color coding

An option to the flooring could be the coloring of the floor panels to allow for easier assembly and packing, while also giving a different atmospheric experience to the interior of te structure.

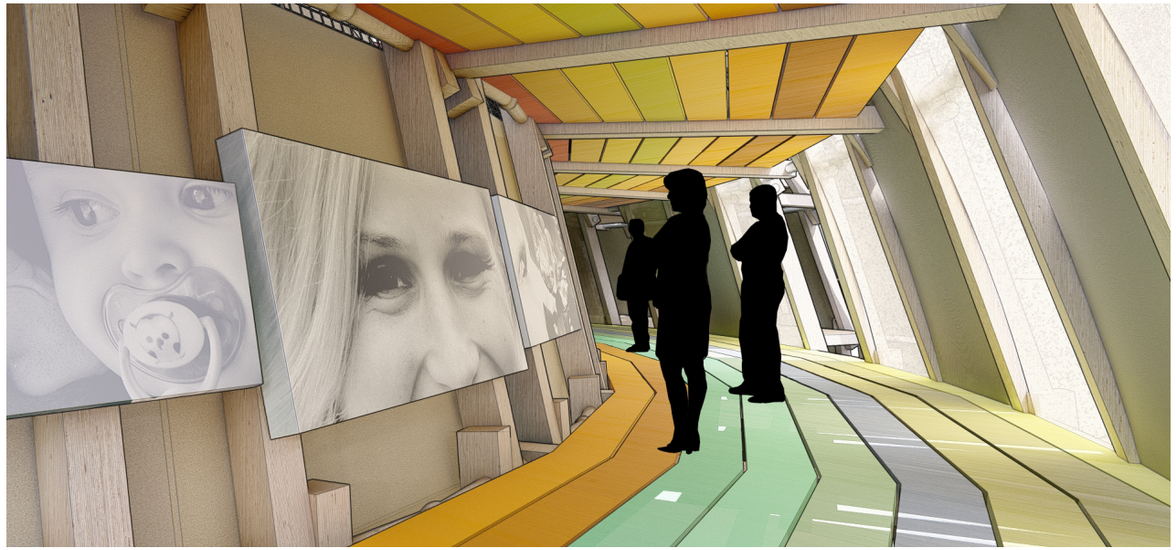


Illustration 157: Awakening area with color coding

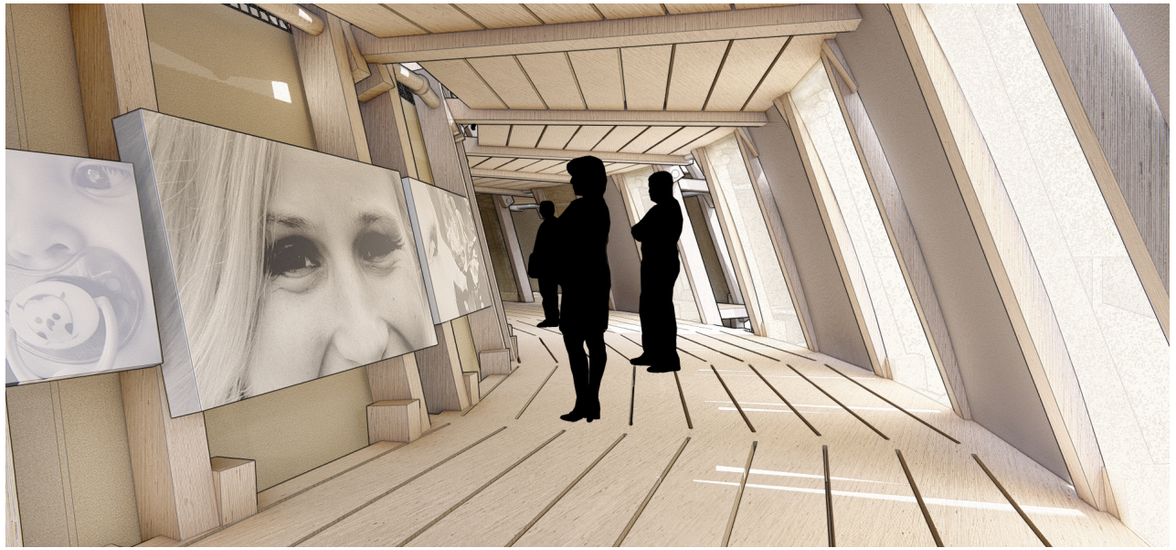


Illustration 158: Awakening area without color coding

The path circulating the auditorium can be used in several different ways as seen previously, and one of which can be a gallery space.

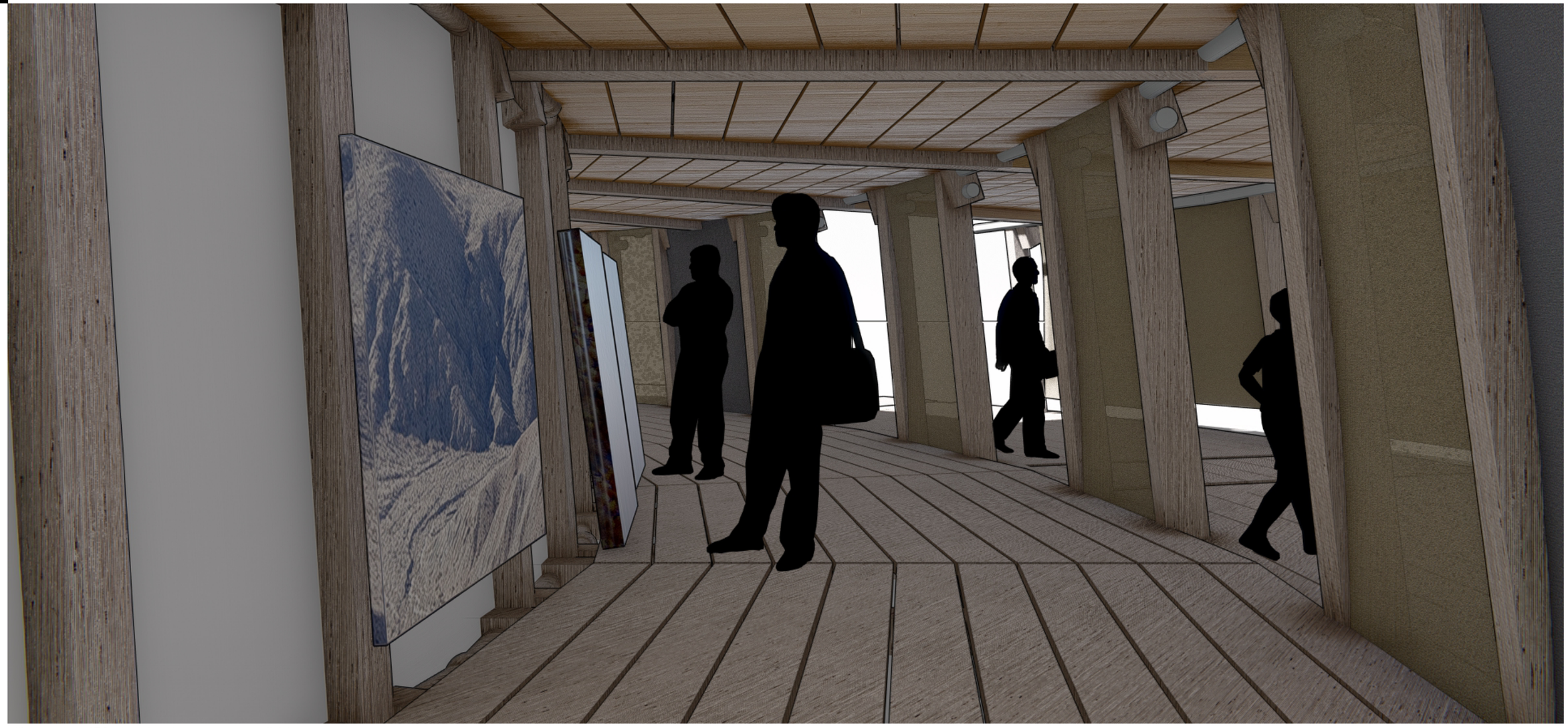


Illustration 159: Awakening area as exibition space

CONCLUSION

V. CONCLUSION

Creating a new typology of a venue space that is able to travel the world, promoting cultural interaction and human energy exchange, proved to be a challenging yet inspiring journey. While exploring the origins of today's theatres and stages, and how they've long shaped society and our social interactions, the true potential of this twenty-first century "traveling stage" came to light: not only could this venue tell its own story, but also the story of humanity. Everyone, everywhere, is curious and interconnected, and so this space could also serve as a powerful tool for realizing the project's core objectives of accessibility and sustainability.

Live theatre is no longer in the spotlight, as the movie empire, especially with online platforms, commands the global imagination. There is certainly not a lack of interesting and inspiring plays in the world, so perhaps the "black box" building typologies are just less appealing than the comforts of one's own devices and home, especially in these times of social and physical distancing. Theatre is more novelty than everyday.

Over the last century, theatre had to constantly adapt to the fast-moving technological developments of the day, which resulted in buildings that provide extravagant and expensive shows to finance their state-of-the-art equipment and facilities. However, in this century, the interest for technological extremes and parallel worlds is often satisfied by the film industry. In response to that reality, this new typology is welcoming by nature: the same theatre that is assembled in northern Europe is reassembled in North Africa. To "think outside the [black] box" is to envision a structure that sheds the hard shell of the traditional approach, opening itself up to new communities and forms of cultural and social expression.

After a series of interviews were conducted with professionals working in the performing arts — including, playwrights, directors, performers, and events managers on three different continents — the typology of the proposed venue evolved to accommodate the importance of the "performer-audience relationship." This venue should not only consider the collective experience and humanity-centered story, but also the intimate connection between performers and audience members. Their insights shaped a deeper contemporary understanding of theatre's connection to architecture, especially as a spacial boundary between the stage and the auditorium. Also, the communication in theatre, and how it is processed afterwards, was explored as each interviewee shared their thoughts on the venue's three-part structure: the real world, the mystical or parallel world, and the Awakening. The consensus was that this new typology offers a range of possibilities and freedoms

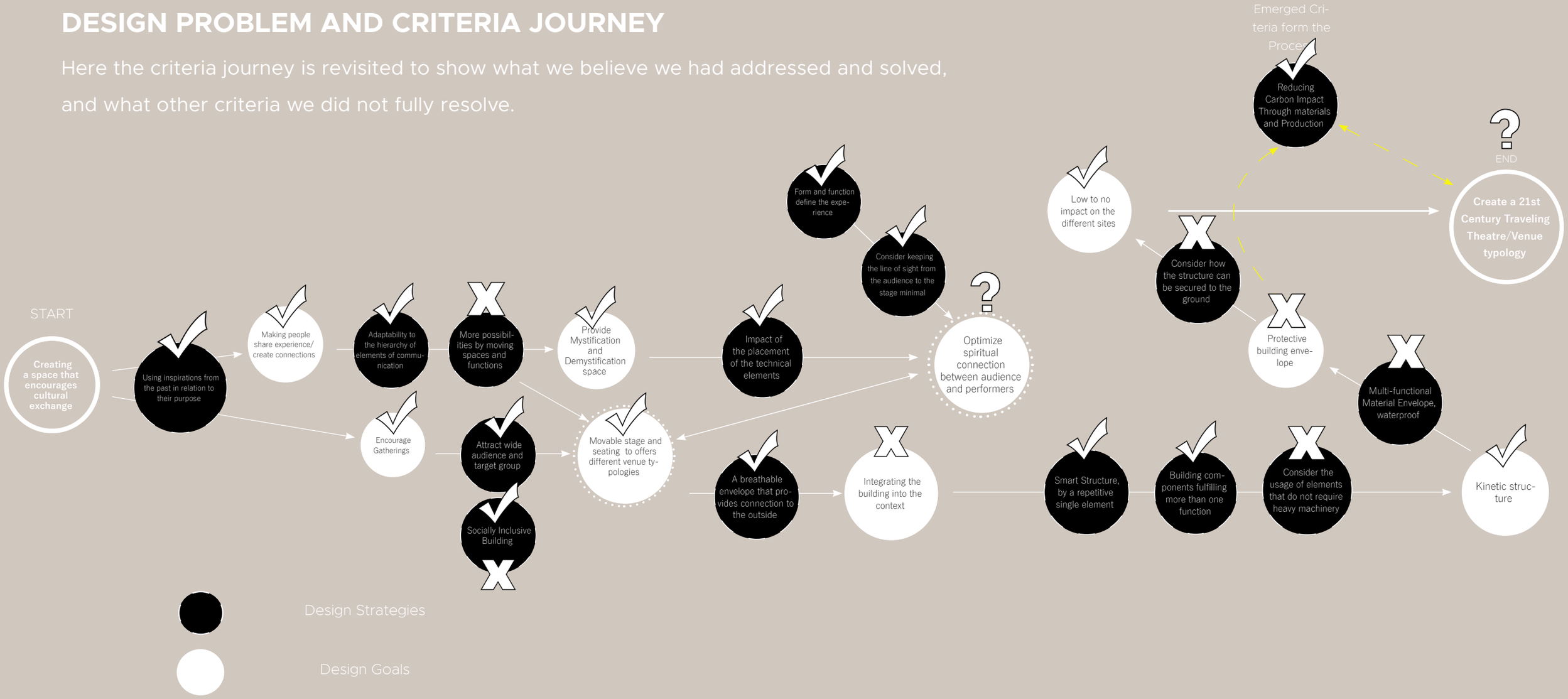
for the creative theatre teams. Moreover, it's transformable and traveling nature reminds us that, as one director-actress from Greece said, "we are a body."

The form and structure, including the materials, are a re-imagining of ancient theatrical themes and concepts that still serve the theatre of today, and which can be easily adapted for the theatre of tomorrow. Drawing from the past, present, and probable future, this venue proves itself as sustainable in nature not only from a materiality perspective, but also from a life cycle perspective, aiming to work with the natural environment and local context, not against it. Here and then gone, it would be an energy-saving structure rather than a year-round consumer. The concept could be a sustainable blueprint for any theatre typology in the future. At the same time, the design embraced a conceptual re-purposing by extending the classic theatre curtains into facade elements and roof covers, as well as by reinterpreting ancient columns that once defined Greek and Roman theatres into modern modular and flat-packed arched columns. Further, the minimalist layouts and functions of the classic Elizabethan and Shakespearean theatres served as an inspiration in this new typology that aims to simplify and amplify the theatrical experience.

Lastly, two major driving forces of the design were the structural assembly and packing of the project, as well as the user-experience in relation to the context. Both of these forces are driven by the temporary or impermanent nature of the structure, and how, with its flexibility, it can offer each location a wide range of possibilities that revolve around human interactivity, cultural engagement, and community building. Being able to be packed and placed into shipping containers, and then assembled and disassembled in different locations, opens up the possibility for a sort of global-local cultural hub or gathering place that exists equally in different countries.

DESIGN PROBLEM AND CRITERIA JOURNEY

Here the criteria journey is revisited to show what we believe we had addressed and solved, and what other criteria we did not fully resolve.



V. REFLECTION

This thesis presented a unique challenge that required innovative solutions. Inspired by the ancient concepts of the architecture-theater and performer-audience relationship, the resulting structure seeks to reflect the ever-changing and intangible nature of both the performing arts and the human experience. After gaining a contemporary and future-facing understanding of these relations, particularly through a series of readings, studies, and interviews, the design criteria came into sharper focus.

From the initial design phase, all the way to the synthesis stage, this project saw many conceptual shifts and structural iterations. While all of the ideas and approaches were assessed for their range of strengths, weaknesses, and potential, the focus mostly concerned the construction and technical reason-ability of the decisions to be made and the related details to be solved. This process consumed a considerable amount of time, some of which could have been invested in the translation of the three-part research theory — i.e., the real word, the mystical world, the Awakening — into even more architecturally expressive solutions. The ambition to fully solve every technical demand led to the dismissal of some proposals or solutions that could have worked better on an architectural level.

As it turned out, this project often required new ideas and solutions with few precedents. Accordingly, full optimization would have only been achievable with the expertise of professionals in the acoustic, structural, and mechanical engineering fields, perhaps having them integrated in the process as early as the sketching phase. For instance, a mechanical engineer could have helped to optimize the complex joinery — i.e., hybrid joints that are both hinged and fixed — and an acoustic engineer would need to be consulted on use of the acoustic fabric ceiling, as it's a relatively new product and approach.

It has to be mentioned that paradoxically this project on the importance of interacting in the same spacial boundaries was developed entirely Online. This discrepancy spotlit the problems that come along with not communicating face-to-face, creating opportunity after opportunity for the active application of acquired research knowledge to help optimize the socially-distanced work flow. As the stage traveled back and forth between us, we stepped outside of our design norms and into the parallel world of this new typology.

APPENDIX


A Breif History

PRE-500 BCE. Early Theater

In order to propose a new typology of theatre , a historic understanding of the relationship between theater, architecture and society is crucial.
This chapter will explore this connection in a brief history of theatrical architecture.

Before speaking of theater, by modern definition, the campfire gatherings of past civilizations must be mentioned. The telling of stories and mythology was an important event for social gathering and eduction. Here, the development turned rituals into a early form of theater. This was done by a separation of actor or “priestly caste” and the audience, who were now no longer actively participating in the performance. (Howard Bay, Clive Barker, George C. Izenour)

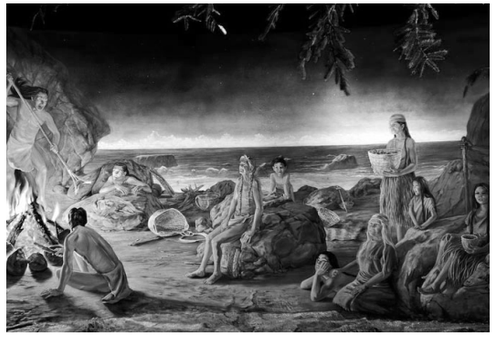


Illustration 1.1 Camp Fire Sharing Hunting Stories

500 BCE. GREEK

The first culture to develop a purposefully planed building for performances were the ancient Greeks.

Here, theaters had a religious and educational purpose directed at the whole community and theaters always belonged to the temple facilities, which was the center of social gatherings.
Theaters consisted of a central stage area for dancing, warship and performance. Early on stages also included an alter, placed in the center. In later theaters, religion began to imbue with performances , shortly after it had developed to educational drama. This can be seen in the shift of focus from orchestra to actor. It has to be mentioned that the attendance of such performances was not just available for everyone, but compulsory. (Howard Bay, Clive Barker, George C. Izenour)

This demonstrates the importance of theatre in the democratic society of the ancient Greeks. The theaters main role was to educate citizens, regardless of their social position. This purpose of theatre is underlined by the fact that ac
tors where educated member of the community. The spreading of the culture and growing population demanded more complexity of the acts, the Proskenion (first Scene) and the Skene (Backstage) were added. (Howard Bay, Clive Barker, George C. Izenour)

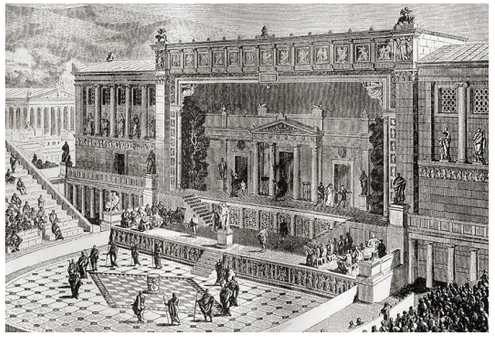


Illustration 2.1 The Theatre of Dionysus Painting

The quickly growing audiences also caused concern to the seating area and acoustics. The Greeks used methods that are astonishing even by modern standards. The seating area was shaped according a spherical distribution of sound. For a secure structure, the natural landscape was used as much as possible.
The Audiences perception of the play was always of top most concern. Not just the auditive, but also the right interpretation of movement and images on stage. For example, the Greek theatre invent the idea of letting actors enter the stage from different angles, when the characters came from different places, this added another layer of communication to the performance.

Illustration 3.1 Ancient Greek Theatre : Syracuse

500 BCE. Roman

The Roman theatre has to be divided into the theater, which was taken over from the Greek culture and kept its educational value, and the commonly more popular CIRCUS which combined theater, racetrack and arena. It main purpose was entertaining and amusing the people.
(Howard Bay, Clive Barker)
Where as, the democratic Greek society, build theaters to educate the common people, during Roman times the center of power shifted to a single monarch and the surrounding aristocrats. Keeping the people entertained, rather than educated could have been a way of securing the balance of power in the empire.
Although the construction of the Circus shows many characteristics of the Greek theatre or racetrack, the dimension and design of the building clearly shows a focus on visual requirements rather than acoustics, which results in a limitation of transferring information.

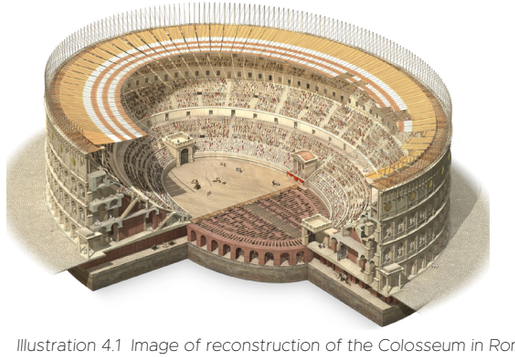


Illustration 4.1 Image of reconstruction of the Colosseum in Rome.

4BCE. Vitruvius

The roman architect Virtuvius dedicated the 4th book of the “De architectura libri decem” to the architecture of public buildings including theater. He classifies the purpose of the theatre as entertainment.

His experiences are hereby based mostly on Greek (Hellenistic) theatre that would later inspire Roman designs and construction.

The way he defines architecture is by considering th principles geometry, mathematics, layout and proportion.

In his books he defines architecture as “A science arising out of many other sciences”.
Ca. 15 B.C (Bill Thayer)

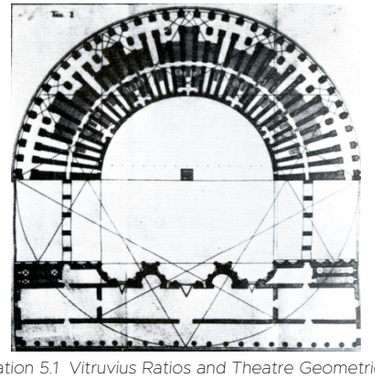


Illustration 5.1 Vitruvius Ratios and Theatre Geometric Relations

500 BCE Pageant Wagons

A historic example of mobile theaters are the pageant wagons, mostly found in mid-western Europe from the 14th - 16th century.

After Christianity had spread in Europe, theatre lost most of its purpose and social value. By this time it was replaced by the Church building, as a center of social gathering and education of Christian principals. This lead to the invention of Pageant wagons. These were mobile theaters where the common people witnessed the plays of the church.

They were usually used in one town, so their mobility was limited. Nevertheless, the theatre could and should have been able to drive through town.
The wagons would be clustered together to act as a form of early festival, but also pushed together to create a bigger stage, attached to existing public platforms or used individually. Every stage would present a different story of the bible.

The construction consisted of the wagon, a platform and a tent structure, the “mansions”, which served as background and scene at once. Sometimes different wagons could be used to create different locations, e.g. heaven and hell.

These performances where usually very long (up to 16 hours), wherefore the play was divided into episodes, so called Pageants.

At first the main purpose was to educate about the Christian principals and bible texts, later the themes focused more on the story of individual saints and heroes. The plays became more abstract and adventurous, when the wagons where taken over by merchants and trading guilds.
These now mostly entertaining acts were not overseen by church or politics. This way theatre could be used as mouthpiece to speak freely, as it can be found, in different forms throughout history.
(Howard Bay, Clive Barker)

Nevertheless, the degree of freedom has to be considered in relation to the society and laws of the time. In contrast to the bible text reading in church, these plays were performed in the commonly spoken language of the country. This explained how the non religious population could be actively involved in the play, while the church could use these theaters as a more entertaining and expressive way of preaching Christian behavior and morals. From this, theatre developed into a different defining time period.

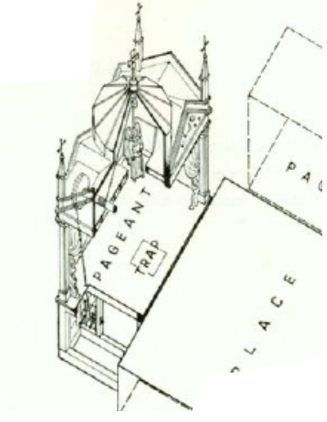


Illustration 6.1 Isometric illustration of a pageant wagon

500 BCE. Elizabethan theater

The Elizabethan age, was most famously known for the works of Shakespeare. The public attention and popularity of theatre defined a new theatre typology. The Elizabethan had a 40 feet square large stage-platform. The auditorium was arranged in a circular building shape before and around the stage. An important design development was the addition of different levels of stages, which gave actors a new layer of movement.
(Howard Bay, Clive Barker)
This re-introduction of theatre made people purposely gathered around a stage again, which required large, permanent stages.

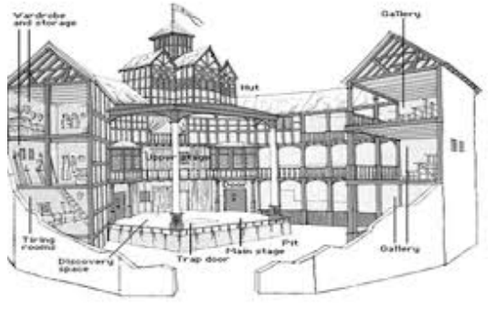


Illustration 7.1 Diagram Section: Detail of Elizabethan Theatre

1500-1600s. The Renaissance

The renaissance brought along a revival of the old classic Greek and roman theatre designs. Vitruvius' treatise on classical architecture inspired many developments of the renaissance theater. (Howard Bay, Clive Barker)

A biggest social change of this theatre was that theatre became a rather private event, for the people who were interested and could afford it. The people that gathered in theatre now had an educated background which reflected in the complexity of the plays and the needed equipment. E.g., this period introduced the proscenium.
But the most notable architectural change, that resulted from a specific target group was that theatre became an enclosed space and brought along new architectural challenges of light and acoustics, which had to be planned carefully.
The theatre of the Renaissance is the theatre that begins to consider the whole range of different forms of art.

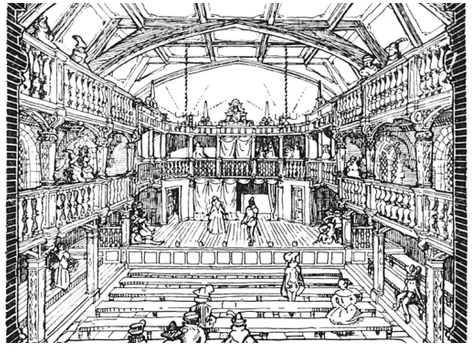


Illustration 7.1 Diagram. Detail of Elizabethan Theatre

1800s. "Das Gesamtkunstwerk"

This synergy of arts reaches its peak in Richard Wagner's Operas. He saw the Operas production as a "total work of art" including all forms of art to create a historical truth in a dramatic display of human experiences. Which was the main theme of the "Sturm und Drang" (Storm and Stress) movement at the time. (Howard Bay, Clive Barker)

The aim of the "Gesamtkunstwerk" or "total work of art" , was to create operas lead by aspects of the performing arts being music and visual arts, stage space and design and lighting, to create a work of art that was authentic to the cultural statement of art and history.

His plays were mostly performed at the Festspielhaus in Bayreuth (beginning 1876) which in typology returns to a classic, democratic principles of theatre design. The sited are is shaped like a fan in front of the stage. The lighting aims to create sight lines to the stage. The orchestra is lowered into a pit ("mystic gulf "- Wagner).

This inspired the ideas of historic studies and the active combination of architecture and theater. The theatre director Saxe-Meining realized that the stage design, similar to architecture, shapes and directs the humans or (on stage) the actors behavior and movement. (Howard Bay, Clive Barker)

Illustration 8.1 Image of the Festspielhaus in Bayreuth

1800s. Nineteenth Century

In the early 1800's theatre attendance and usage declined, mainly due to the poor economic situation of the time. When the Industrial revolution began, more people started migrating to towns or cities, that are engaged and expanding with the industrial revolution. (Theatres Trust 1976)

This sheds the light on entertainment and theatre being a secondary human need, as life gets threatened by poverty, secondary needs and entertainment are not important.

The Theaters Act removed its monopoly on building theaters and licensing theaters legally. After that people where more encouraged to build and innovate in their own types of theaters, and from there came the music hall theaters, were the audience became a fluent in- and out-stream of people.
Probably a by-product of the growing theatre popularity of the mid-to-end 1800s, was the viable social class separation, the seated area was divided by status and wealth. (Theatres Trust 1976)

Where as, whenever theatre is an underground art, directed at a very specific audience, wealth and social division didn't matter.
Theatre becoming "mainstream" also threatens the equality of the auditorium.

Illustration 9.1 Drury Lane Theatre in London

1900s. Twentieth Century

The period between 1880's to the first world war was considered the golden era and age of theatre.
However after the invention of the BioScope, or moving pictures the theatre took a big hit.
The screening room became a part of the theatre buildings program. Still, actual theaters where needed since the Films where silent and had to be accompanied with live music.
World War I had suspended theatre and only some theaters where operating in secret, or as clubs where people pay memberships to join. These theaters where tiny and showed experimental content and sometimes forbidden content whether political or comedic or foreign arts and expressions.
Between World War I and World War II, theatre was used as means to advocate social change and spread political agendas or to educate the masses. (*Theatres Trust 1976*)

In previous eras in history, theatre has been used as a tool of communication from underground communities to expresses different opinions. Here, we see the revered use of this tool. The use of theatre propaganda during World War II, reminds of ancient roman times. Theatre was used as a way of spoon-feeding and entertaining civilians, to control the transfer of information.
This control of arts by the government, created an understanding of the relation between arts and society. Nowadays, hardly anything else, is protected as a subject of free speech more than the realm of arts.

After World War II, theatre was mainly replaced by television. Due to costs and given the global economic state, many theaters were shut down and the

buildings were converted into different usage. In the 1960s and 1970s some countries made the theatre part of the general cultural arts and leisure programs, so theaters were merged with other functions of culture and leisure, such as clubs and restaurants or shopping malls.

Only the concerns over old theaters being lost pushed architects and historians to preserve and restore several old theaters as they symbolized certain eras or cultural and artistic History. (*Theatres Trust 1976*)

Illustration 10.1 Drury Lane Theatre in London

2000s. Twenty-first Century

Beginning the 21st century, theaters had already gone through several shifts and changes. Different typologies and purposes had emerged. From black box theaters, to Fringe theaters, to experimental spaces to even integrated theaters in a multi-functional building, like a mall - theatre - restaurant for example.

Another shift in the theatre occurred as countries and cities began to get wealthier and invest in Cultural and leisure facilities, creating big multifunction halls that can host thousands of people. These halls would have different events ranging from theatrical plays to concerts to any form of visual art entertainment. While the technology of cinema had also advanced greatly and new cinemas where popping up everywhere, still stages and theaters served as an important cultural and arts spine in any country. (*Theatres Trust 1976*)

A new wave of temporary stages also began to be built serving big festivals. These temporary structures coupled with advanced lighting technology and sound systems offered stages for musicians and performers to echo their arts to thousands of people attending. Some festivals even took it further by mixing visual arts and stage designs on the temporary structures where they would build huge add ons to the front facade of the stage or "proscenium" decorating it or expanding it to several meters.

PRESENT

Illustration 11.1 DWU BlackBox Theatre.

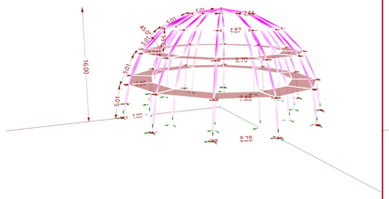
Illustration 12.1 Glastonbury Theatre.

Illustration 13.1 BurningMan Stage.

Illustration 14.1 St. Michael's Cathedral Cave – Gibraltar

V. APPENDIX

STRUCTURAL EXPLORATIONS



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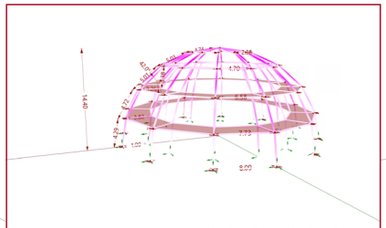

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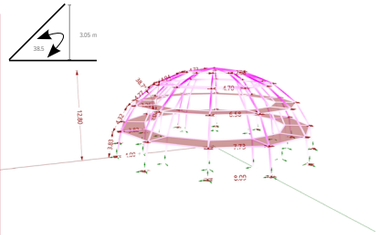

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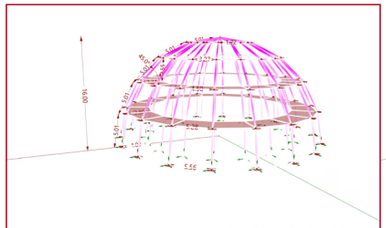

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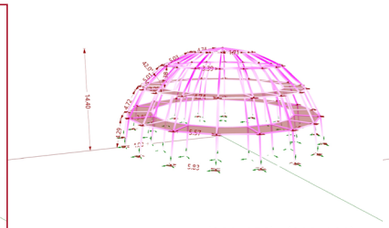

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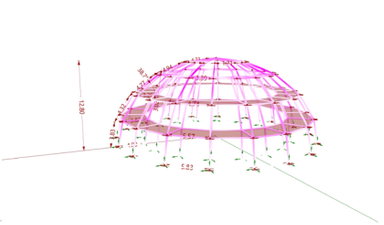

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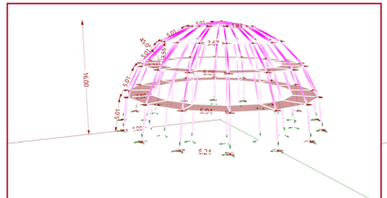
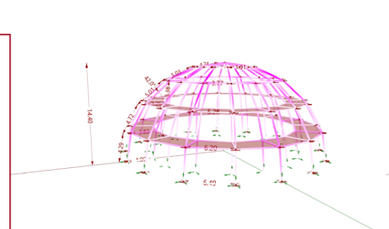
Scale= 0.80 (Z Dir.)

(200x150) (200x120)
Largest memb. = 5.83m
2nd.Flr = 3.02m
No.Elem. =630
Displc. 4.84cm



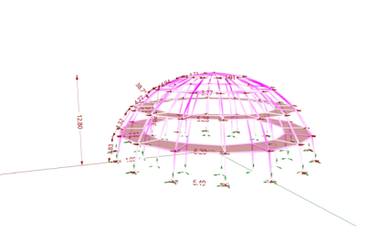
Parameters
UCount = 16
VCount= 10
Scale= 1 (Z Dir.)

(200x150) (200x120)
Largest memb. = 6.24m
2nd.Flr = 3.55m
No.Elem. =560
Displc. 2.79cm



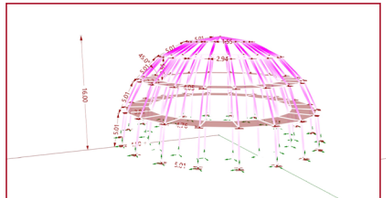
Parameters
UCount = 16
VCount= 10
Scale= 0.90 (Z Dir.)

(200x150) (200x120)
Largest memb. = 6.49m
2nd.Flr = 3.38m
No.Elem. =560
Displc. 4.17 cm



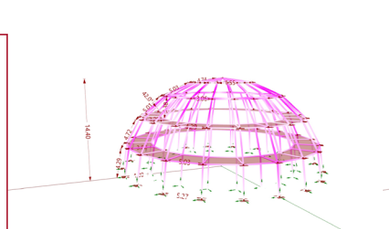
Parameters
UCount = 16
VCount= 10
Scale= 0.80 (Z Dir.)

(200x150) (200x120)
Largest memb. = 8.09m
2nd.Flr = 3.02m
No.Elem. =560
Displc. 4.20 cm



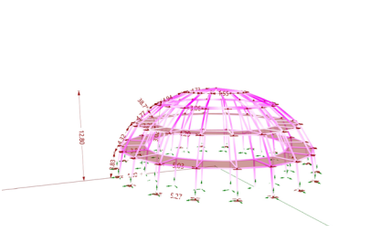
Parameters
UCount = 20
VCount= 10
Scale= 1 (Z Dir.)

(200x150) (200x120)
Largest memb. = 5.01m
2nd.Flr = 3.55m
No.Elem. =700
Displc. 2.54cm



Parameters
UCount = 20
VCount= 10
Scale= 0.90 (Z Dir.)

(200x150) (200x120)
Largest memb. = 5.27m
2nd.Flr = 3.38m
No.Elem. =700
Displc. 3.17cm

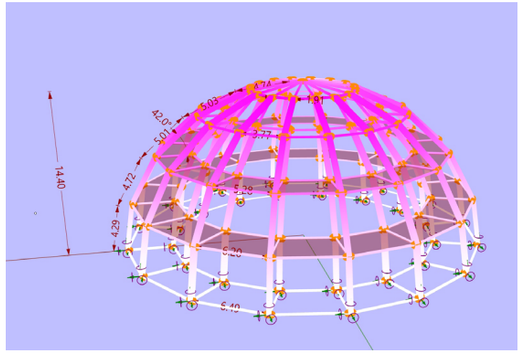


Parameters
UCount = 20
VCount= 10
Scale= 0.80 (Z Dir.)

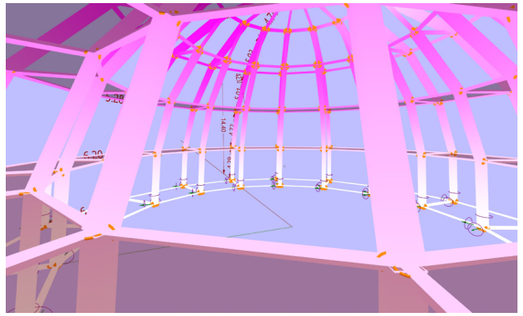
(200x150) (200x120)
Largest memb. = 5.07m
2nd.Flr = 3.02m
No.Elem. =700
Displc. 3.29 cm

STRUCTURAL EXPLORATIONS

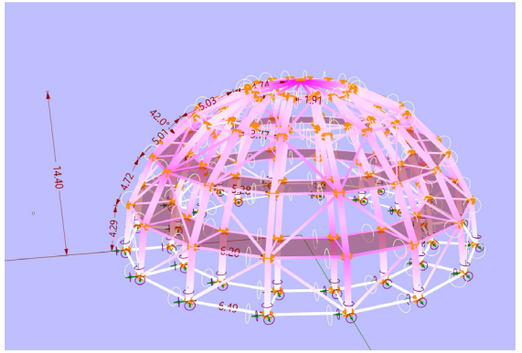
FIXED MERIDIAN ARCHES



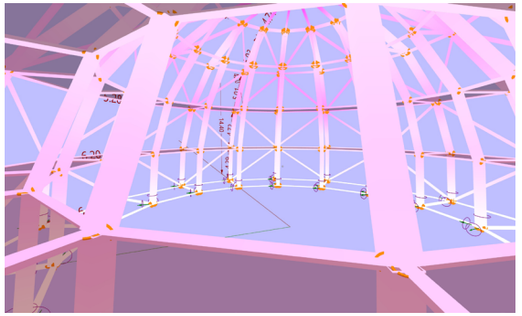
NUMBER OF ELEMENTS = 352
NODES = 145
DISPLACEMENT = 1.4CM



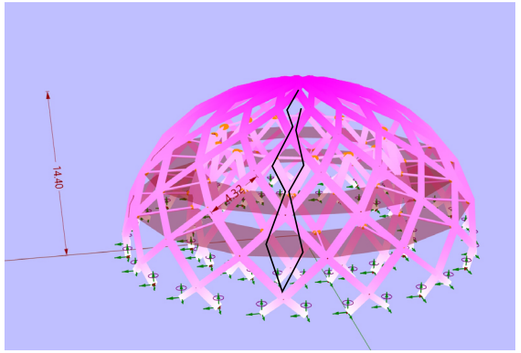
HINGED MERIDIAN ARCHES



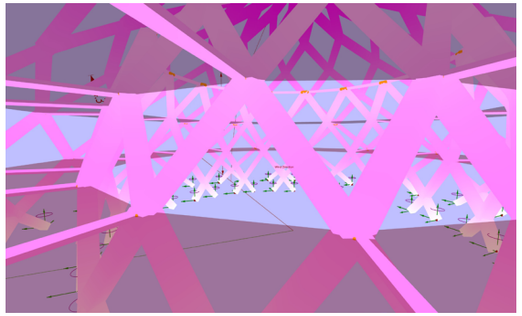
NUMBER OF ELEMENTS = 640
NODES = 369
DISPLACEMENT = 0.8CM



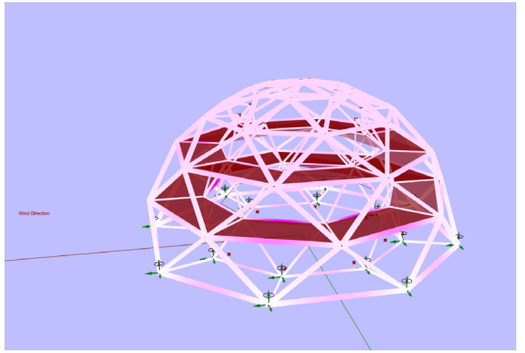
GEODESIC (DIAMONDS)



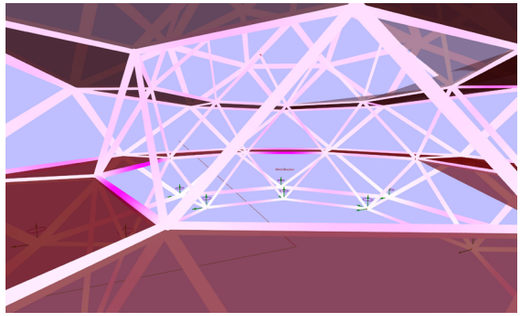
NUMBER OF ELEMENTS = 389
NODES = 226
DISPLACEMENT = 4.5 CM



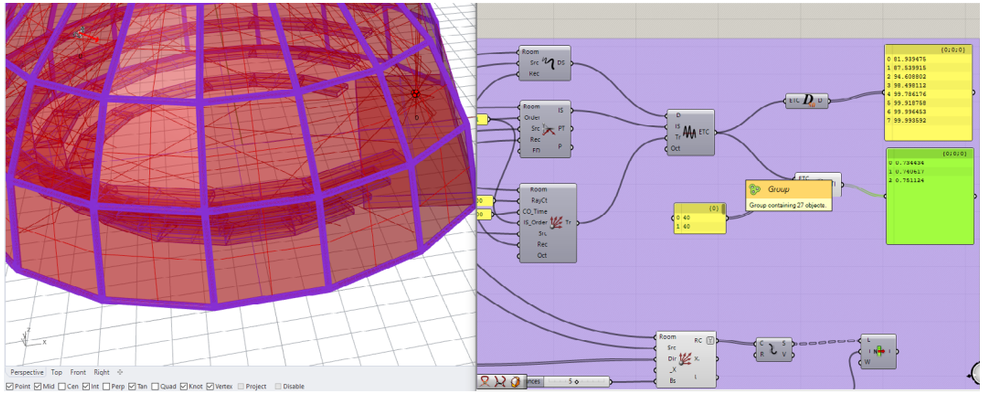
GEODESIC (TRIANGULATION)

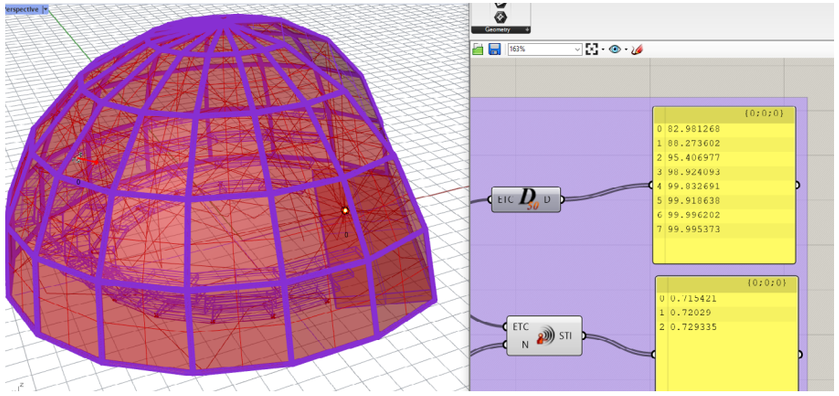


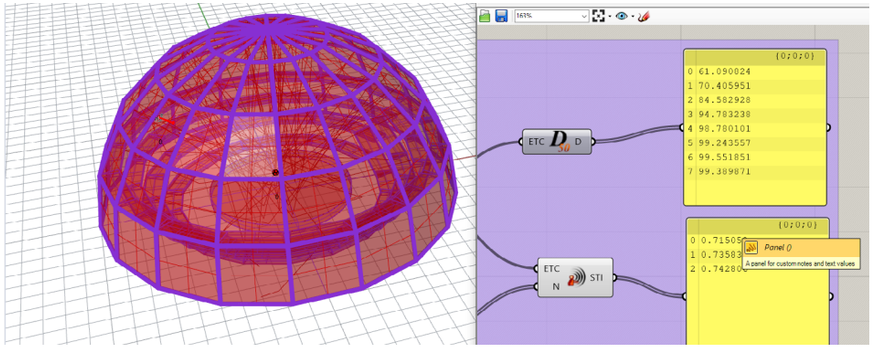
NUMBER OF ELEMENTS =216
NODES = 73
DISPLACEMENT = 4.2 CM



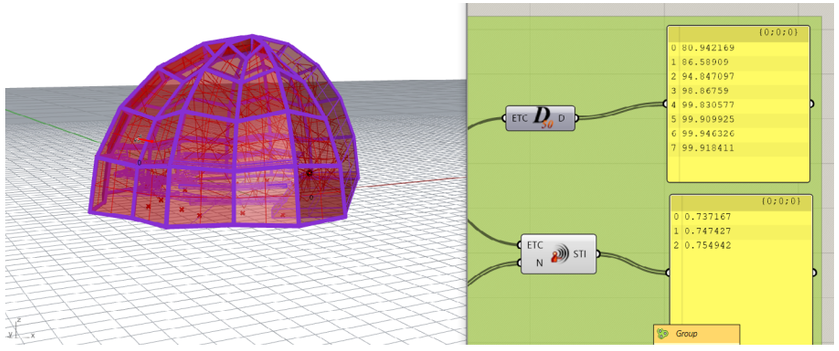
ACOUSTIC INVESTIGATIONS

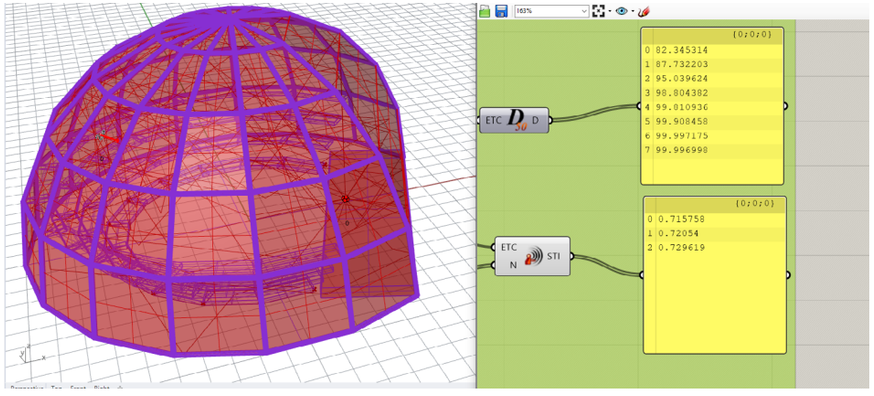


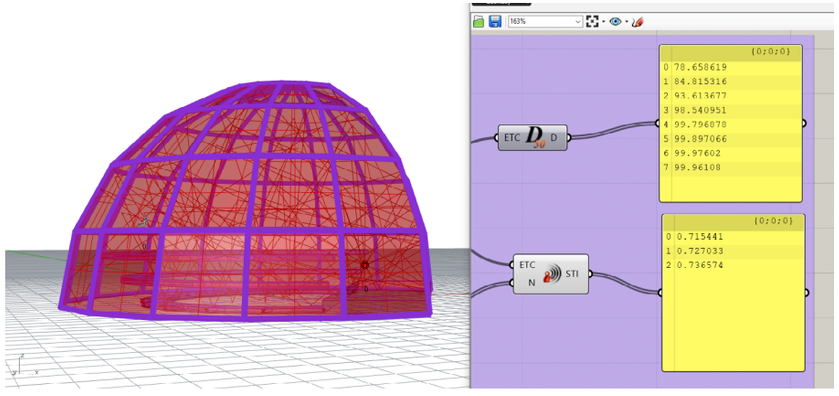




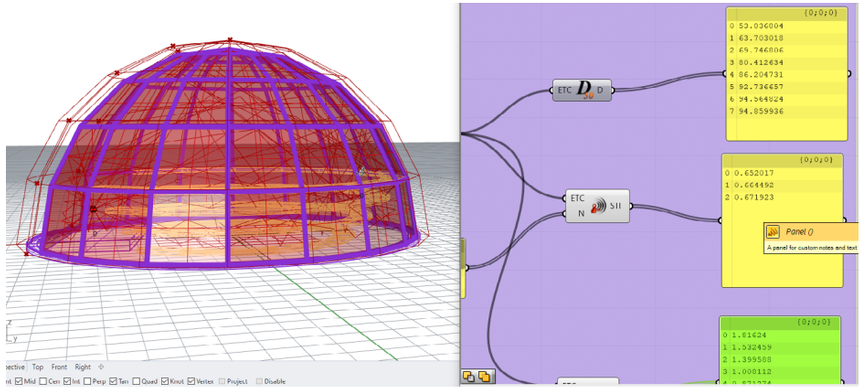
Testing different backdrops in Pachyderm

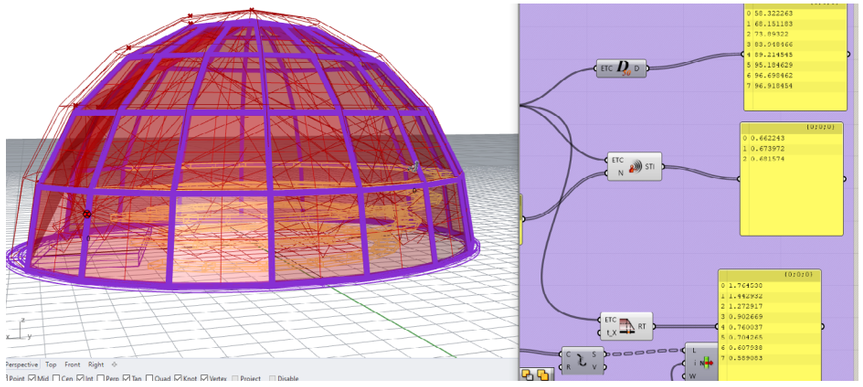




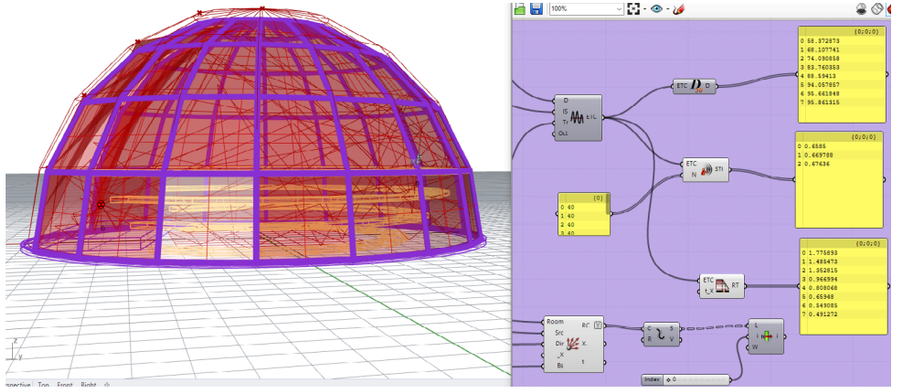


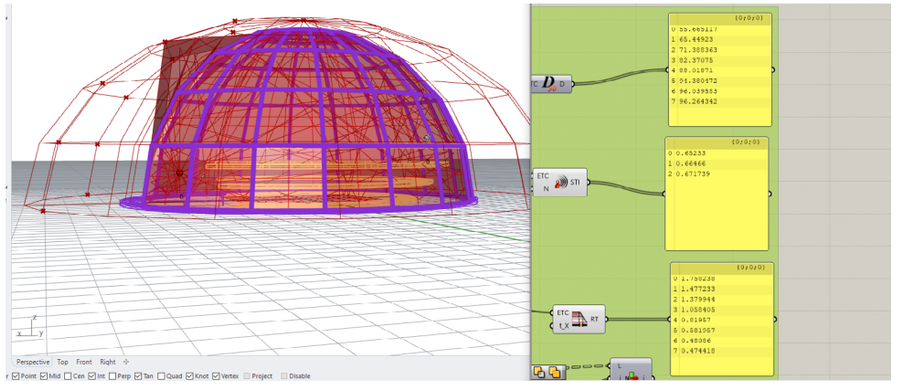
ACOUSTIC INVESTIGATIONS

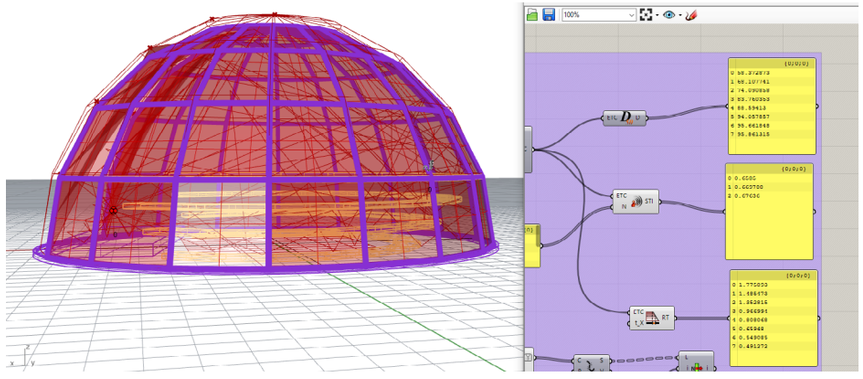


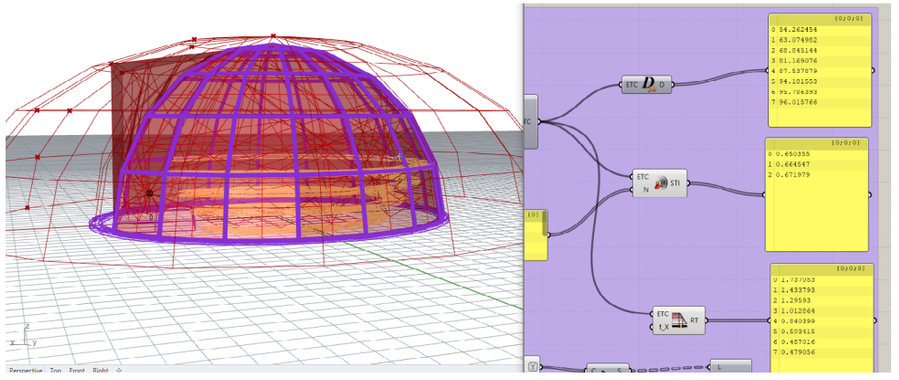


Testing different backdrops - expedition of the original structure

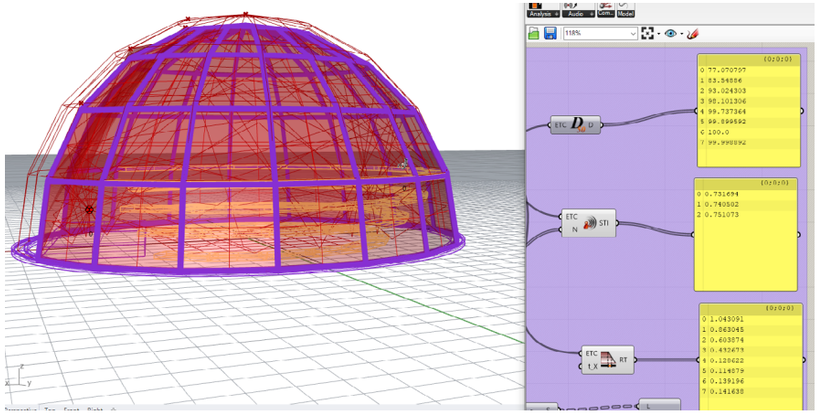


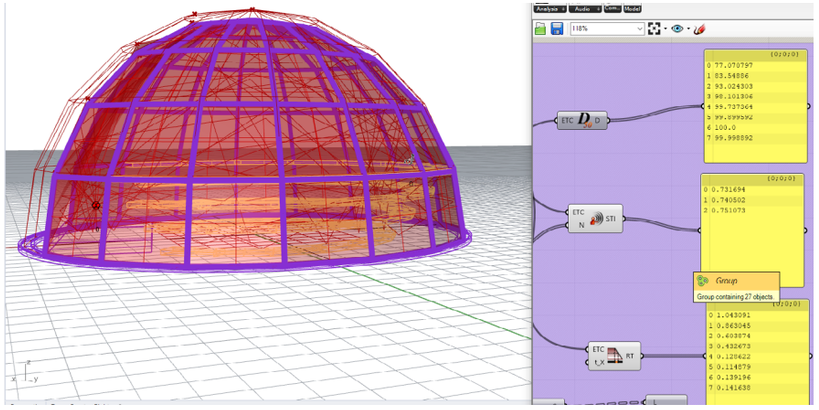


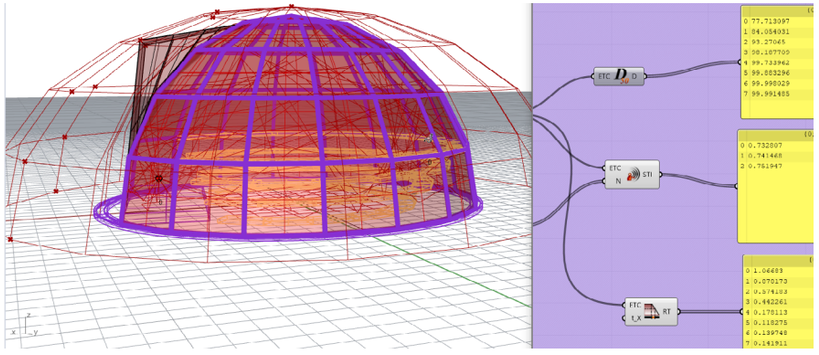




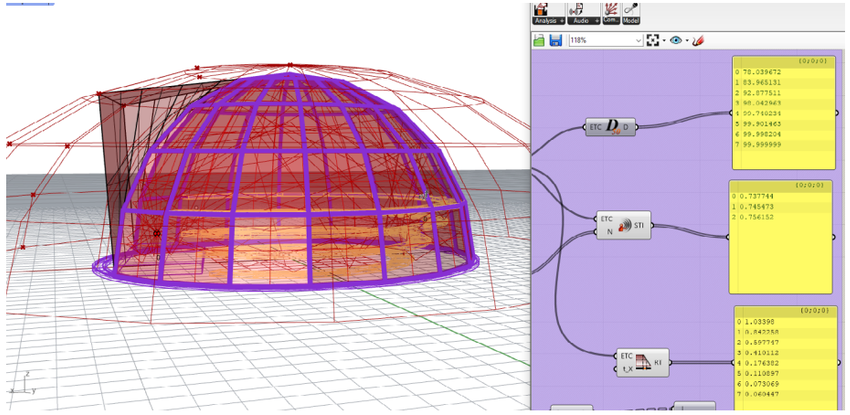
ACOUSTIC INVESTIGATIONS



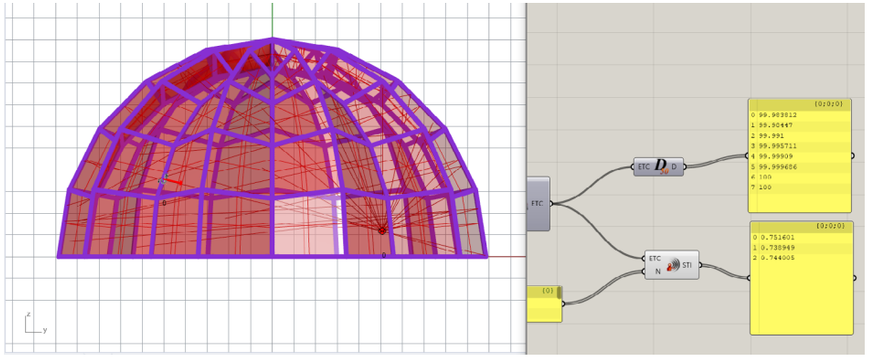


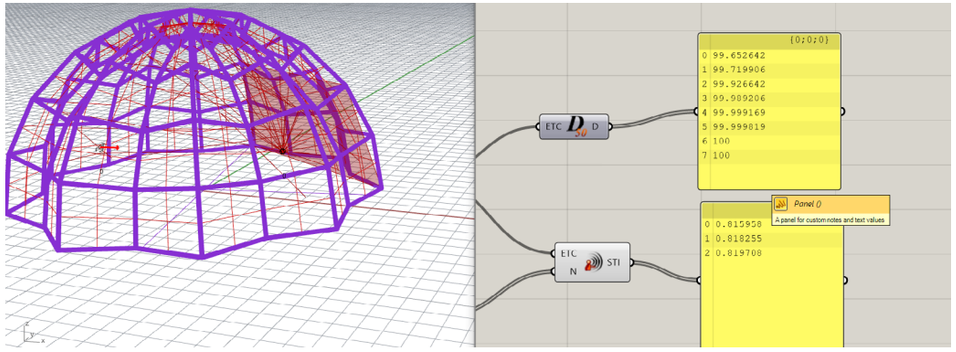


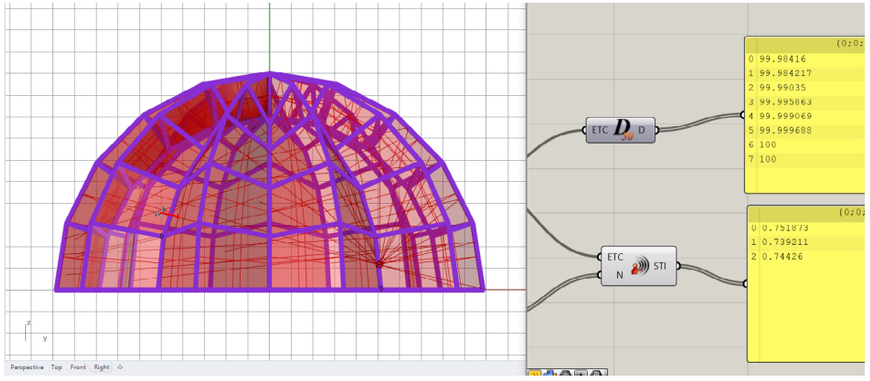
Testing different backdrops - expedition of the original structure



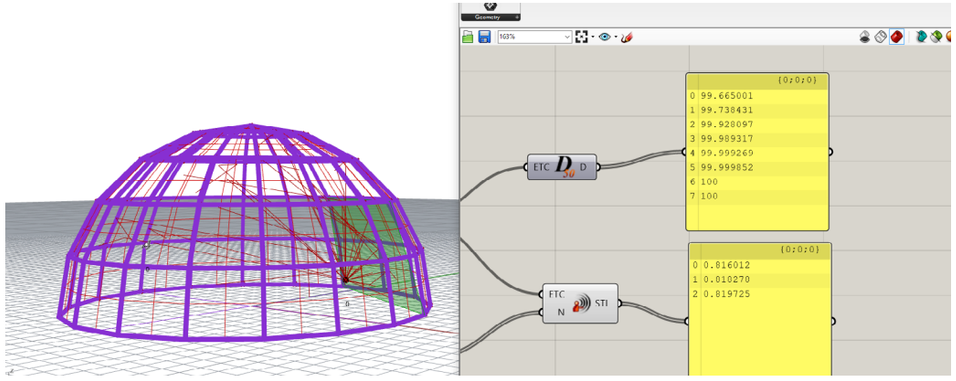
ACOUSTIC INVESTIGATIONS

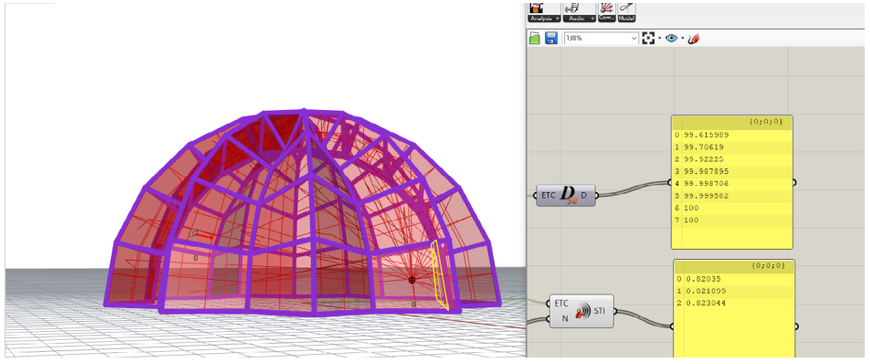




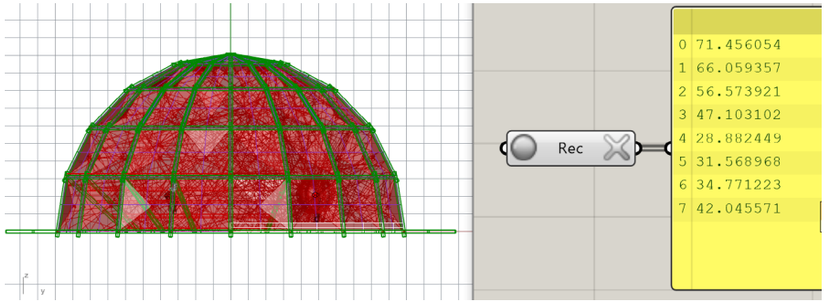


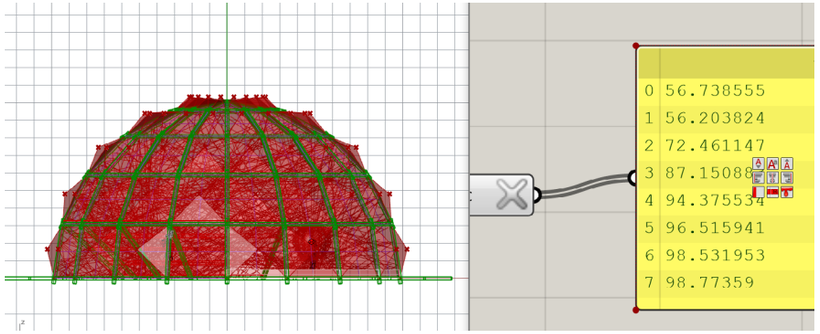
Testing different dome geometries



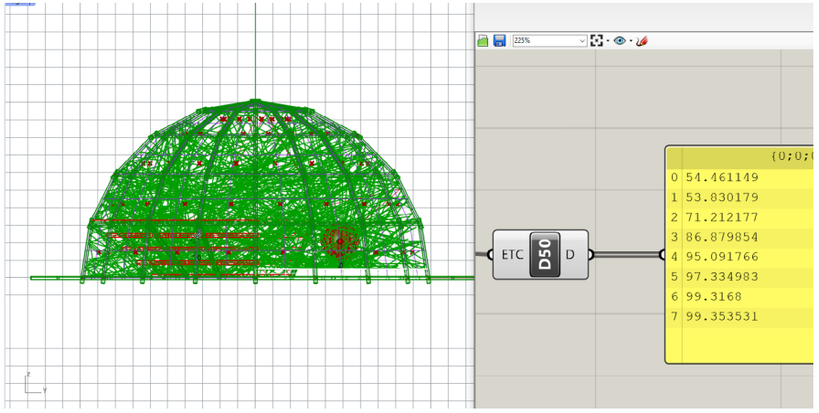


ACOUSTIC INVESTIGATIONS

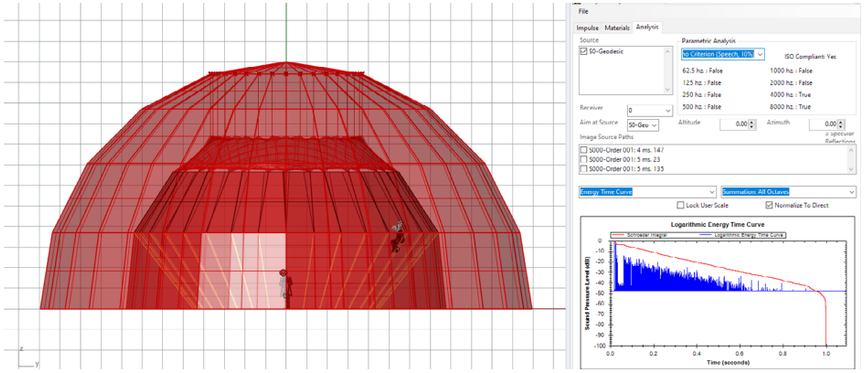


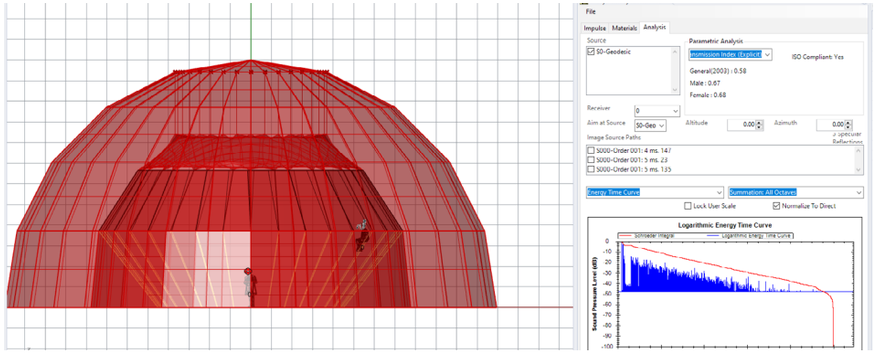


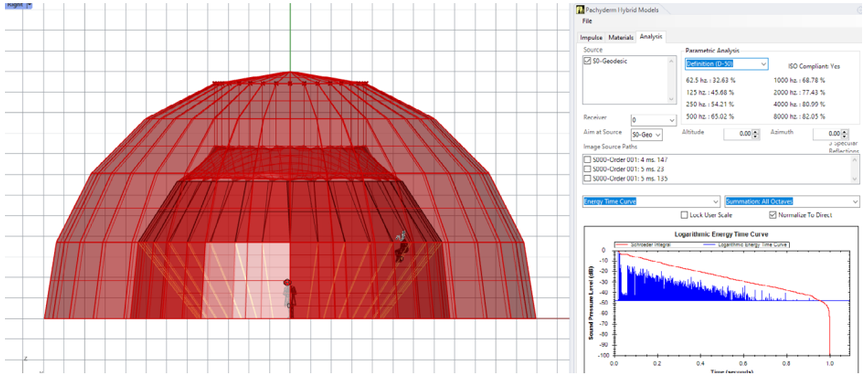
Testing different cover geometries



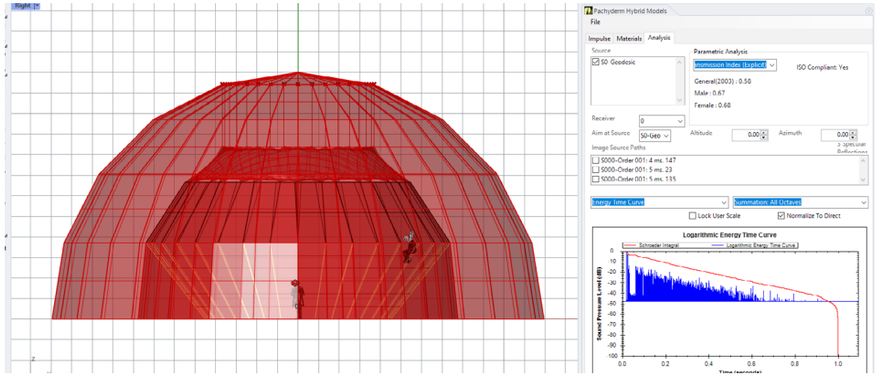
ACOUSTIC INVESTIGATIONS

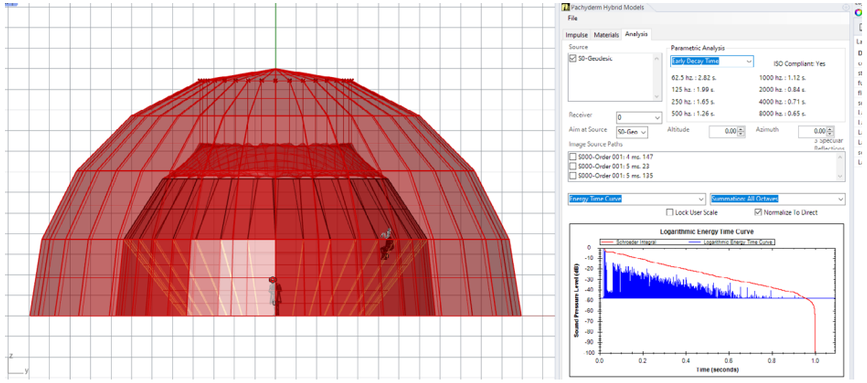


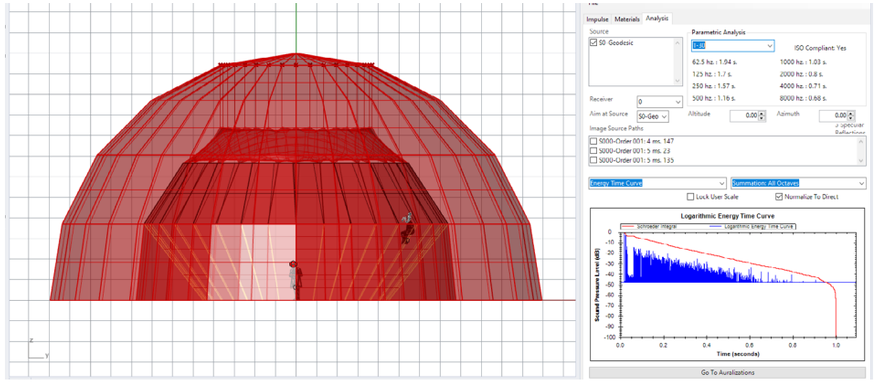




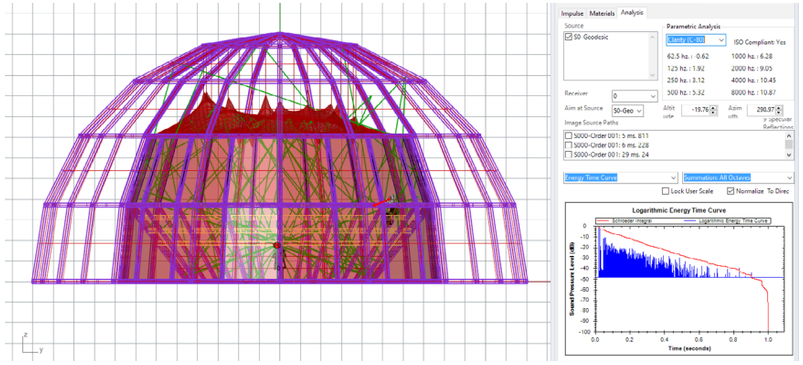
Testing different proportions of the auditorium

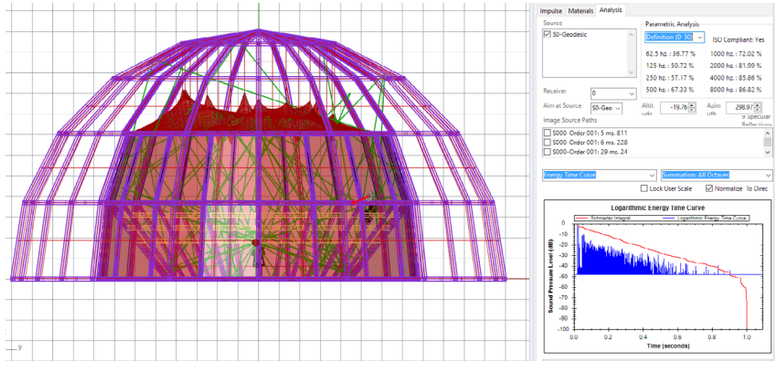


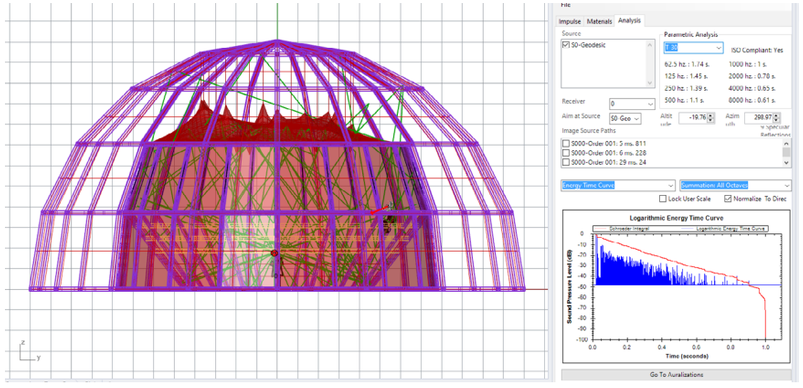




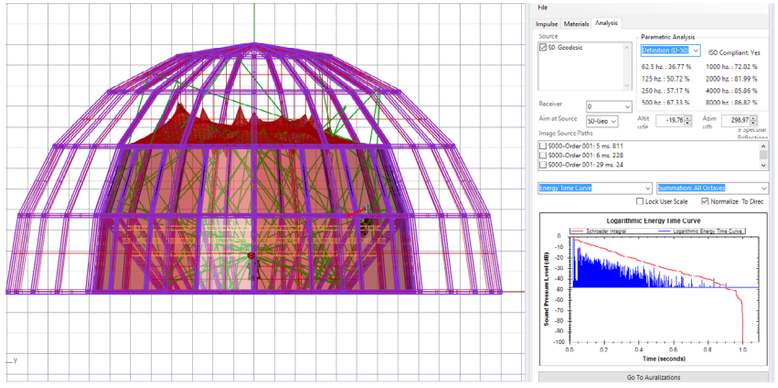
ACOUSTIC INVESTIGATIONS

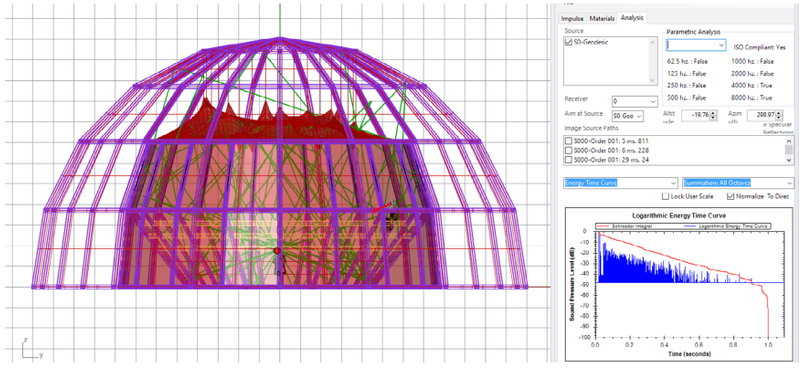


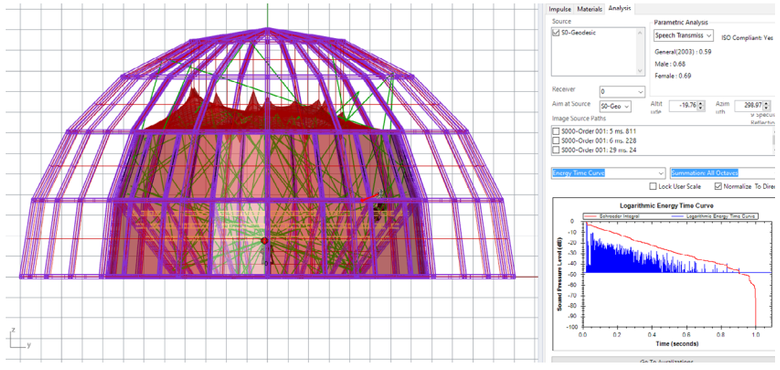




Results of a random auditorium arrangement - final design







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