



**eindhoven
bouwkundewinkel**

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PROJECT: Design for small object in church
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De Bouwkundewinkel is een wetenschapswinkel aan de Technische Universiteit Eindhoven. De Bouwkundewinkel is ontstaan uit een initiatief van studenten en medewerkers aan de Technische Universiteit Eindhoven. Een wetenschapswinkel is een instelling die adviezen en informatie geeft en wetenschappelijk onderzoek verricht. Hiervoor komen in aanmerking groepen en individuen die geen andere toegang hebben tot wetenschappelijk onderzoek en die niet voor onderzoek kunnen betalen. De winkel bestaat uit een groep studenten die steunen op begeleiding van medewerkers van de faculteit Bouwkunde. Dit onderzoek is gedaan in het kader van het projectwerk bij de faculteit Bouwkunde.

De TUE aanvaardt geen aansprakelijkheid voor schade aan personen of zaken die voortvloeit uit de toepassing, of het gebruik van resultaten van het verrichte onderzoek, behoudens in geval van opzet, grove schuld of grove nalatigheid van de TUE of de onderzoekers.

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INTRODUCTION

PROJECT DESCRIPTION

The task is to design an intervention that would divide the interior space of the church in Haarle to create a small chapel inside.

The current church was constructed in 1962 during the post-war baby boom in a very Catholic village. At first, the church was equipped with 900 seats, later reduced to 800. Currently, due to

changing population and smaller number of church goers, the church is normally empty and often visited by up to 50 people. Most of the people attending masses are over 65 years old. The church is full only on special occasions such as funerals, weddings or major annual celebrations.

The task is to design a smaller

chapel inside the existing church, which would make the space more cosier, easier to heat up and more appropriate for small number of visitors. What is more, is it crucial to propose adaptable partition, which could be easily constructed and operated by the local people.

REQUIREMENTS:

- 150 seats in the new space
- improved heating conditions
- the altar can not be remodelled
- easily adaptable solution
- cheap to construct
- easy to construct
- easy to transform from small space to big space
- if possible, to be constructed from recycled materials
- possible to be constructed by local people
- the new space to be connected with the organ / choir

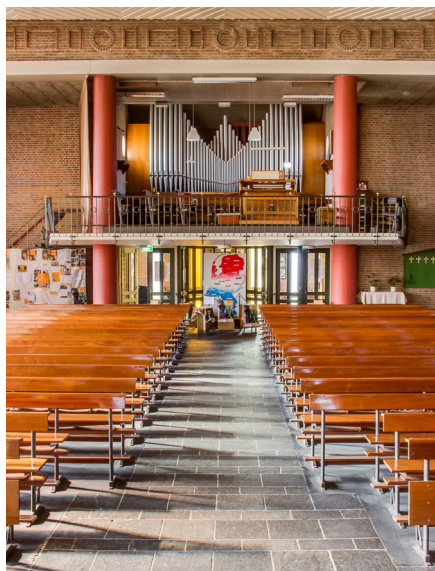


Fig. 1. Photos of the current situation

RESEARCH

LOCATION

The church is located in a small village Haarle in the province of Overijssel and belongs to the municipality of Hellendoorn. Haarle is occupied by around 2200 inhabitants and the number of registered citizens tends to decrease every year.

The church, which is the object of the investigation, is a free standing building, located centrally in the

village. The surrounding consists of several residential buildings, a small park, a cemetery and a convenience centre.

In terms of architectural quality, the neighbourhood consists of typical Dutch single family houses. There are no particular architectural landmarks or buildings of exceptional architectural value in the nearest neighbourhood.



Fig. 2. Location of Haarle within the Netherlands



Fig. 3. Location of the church within Haarle

HISTORY

The history of the church in Haarle dates back the late 18th century, when the first church building was constructed. In 1817, the original church got equipped with a bell and organs making it a more comprehensive design. During the 19th century, the church was visited by number of churchgoers and the religion played an important role in their lives. At the beginning of the 20th century, the church was

significantly rebuilt and enlarged to fit the growing number of the local population.

Further changes in the trends and needs of the church made it necessary to further alter the church's building. The current church was constructed in 1960s, while the previously constructed church was demolished. The current church was constructed just in

front of the older one and for few years both buildings were in use. After all, all the remaining parts of the old church were removed from the site.



Fig. 4. The old church before demolition



Fig. 5. The old church during the demolition



Fig. 6. Construction of the new church

CHURCH ANALYSIS

The church has is characterised by a simple and well defined spaces. The proportionally big altar is surrounded by seats. The organ is located on the balcony above the main entrance. The church is connected with supporting spaces such as the sacristy. The interior of the church is in a shape of a simple box, which is not disturbed by any major partitions. There are supporting columns located on both sides of the church.

The main entrance faces north – west. There are three additional smaller entrances, which face south – east (entrance from the sacristy), again north – west and north. It can be expected that all visitors enter using the main entrance, while the priests or other staff members use the sacristy and the smaller north – western entrance. The main entrance is located just in front of the altar and creates a straight line between the entrance and the altar.

The church despite a rather big volume does not have many windows, making the space dark inside. The major direct sunlight is brought through the north facing windows, which are made out of stained glass-work. The other south facing windows, also stained – glass ones, are much smaller and do not bring much light into the space. Due to small number of openings, the interior needs extensive artificial lighting also during the day.

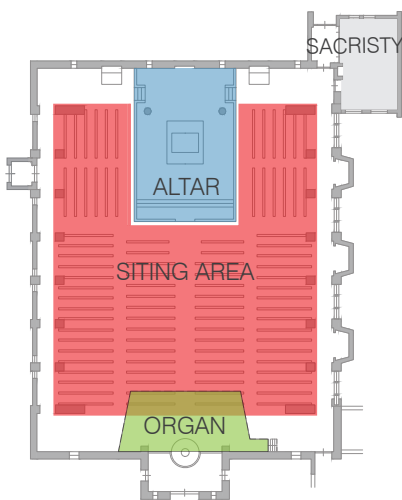


Fig. 7. Existing space division

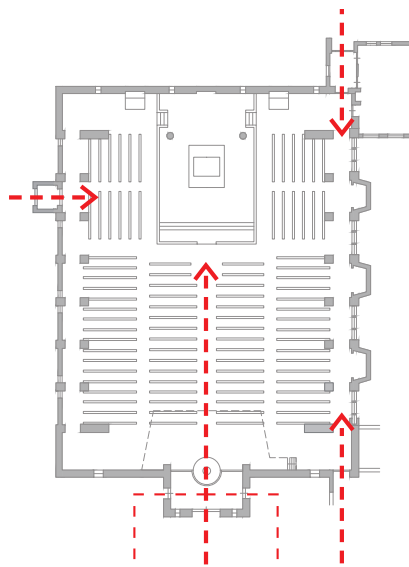


Fig. 8. Entrances

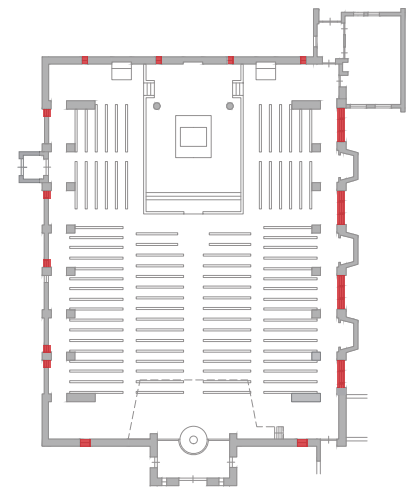


Fig. 9. Major windows

POSSIBILITIES FOR SPACE DIVISION

The church is characterised by a rectangular space, which is not disturbed by any major objects. In order to create a space, that could be sufficient for 150 people, the new chapel needs to cover roughly one third of the current floor space.

The new chapel needs to be oriented towards the altar and ideally, have a direct connection with the choir, which is located above the main entrance.

Number of possibilities were investigated, including rectangular and

oval shapes. The ideal solution for the space division should also ensure, that the new chapel does not create a space, which will become completely isolated from the rest of the church.

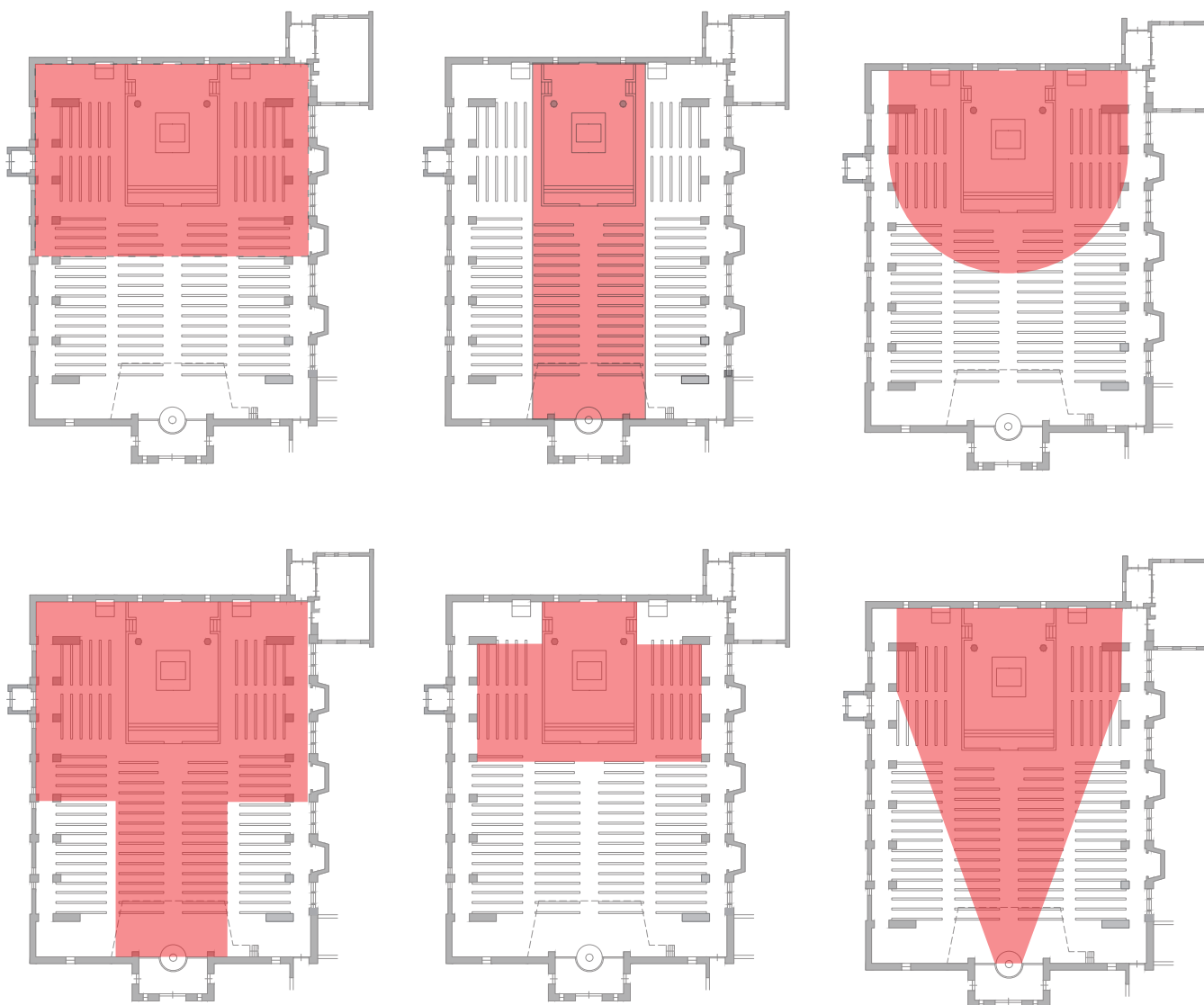
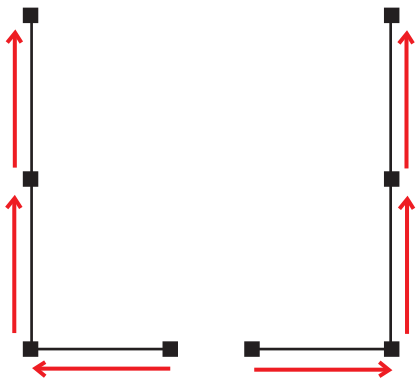
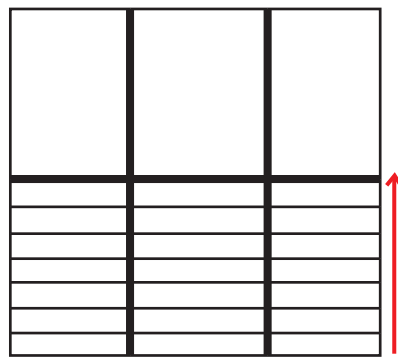


Fig. 10. Possible ways of dividing the floor space

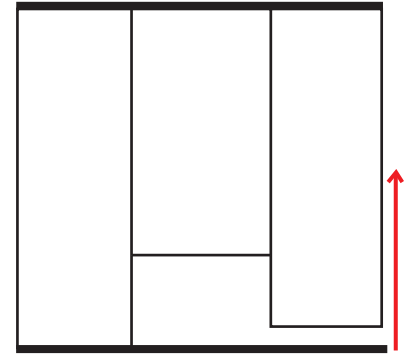
PARTITION ANALYSIS



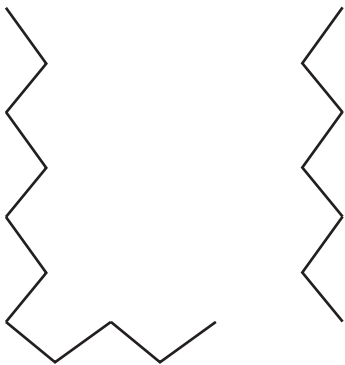
ROLLED INSIDE COLUMNS



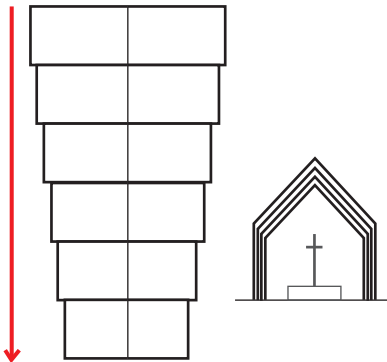
WALL SLIDING UP



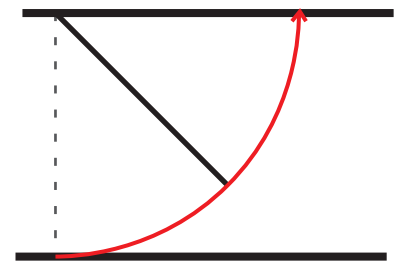
FABRIC ROLLED UP



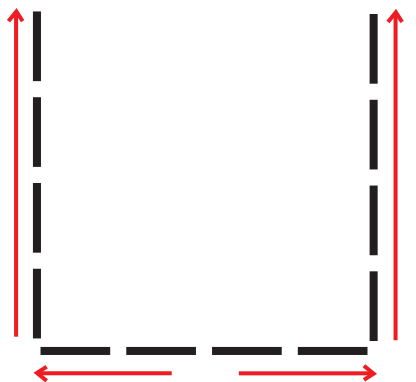
FOLDBABLE MOVEABLE WALL



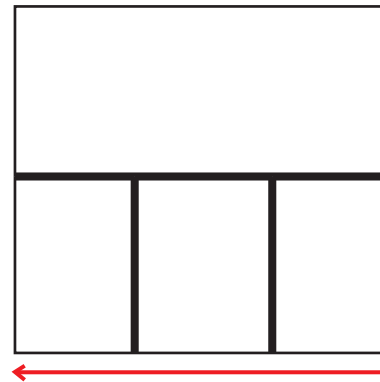
TELESCOPIC "SPACE"



TILTING WALL



MOVEABLE WALL - SLIDING ON INSTALLED RAILINGS



CONCERTINA WALL

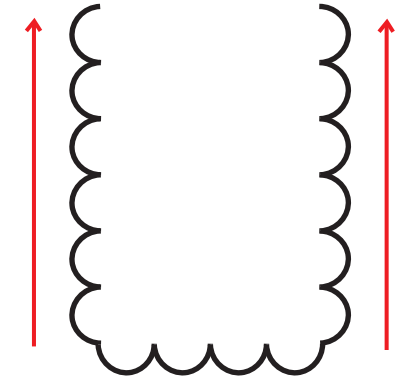


Fig. 11. Possible ways of making new partition

CONCLUSIONS

The current state of the church can be described as a big open and dark space, which lacks warmth and atmosphere. The interior is full of ad hoc decisions and random designs. Number of small elements do not fit the church and were added at some later stage. The space is big and the lack of partitions or cosy elements make it rather unpleasant. What is more, the wooden benches are rather uncomfortable and are not suitable for longer seating, especially for older users.

The strategy should be rather easy but drastic. It would be good to propose a design that focuses not only on the primary design brief that is dividing the space but also on creating an attractive inner

atmosphere. A church is a place for contemplation, meetings and thinking. Therefore, the space should stimulate the churchgoers and should inspire them. The design should bring cosiness to the space but also make the new chapel fully functional.

The analysis of the church shows that the current stage allows for number of various possibilities. The main constraints at this point are budget and easy of construction. Some of the possibilities for space division seem interesting but their cost might be too high. Therefore, the strategy should be to make a decision towards a cheaper solution but ensuring that the cosiness created by light, materials and colours is the priority.

DESIGN PROPOSAL

The final proposal consists of three elements:

- steel profiles formed in the shape of arches
- roller blinds in the middle section making up the inner chapel
- new floor tiles marking the new chapel space.

The intervention divides the church into three zones: one central, which makes the new chapel and two supporting zones on the sides. The roller blinds are installed on the steel profiles and roll up and down to open and close the space. The blinds system is easy to install and also very easy to operate. The blinds are made out of translucent fabric, which will

let the light to penetrate the chapel with diffused light.

In addition, steel arches create an inspiring inner atmosphere, resembling old churches and their naves. Their slim design ensures that the spaces does not become overcrowded but instead gives interesting decorative character.

The roller blinds can also be rolled up to form entrances. The roller blinds mounted into steel frames are also installed below the choir balcony to ensure that the area of the new chapel is completely closed up to keep warm air inside the new addition.

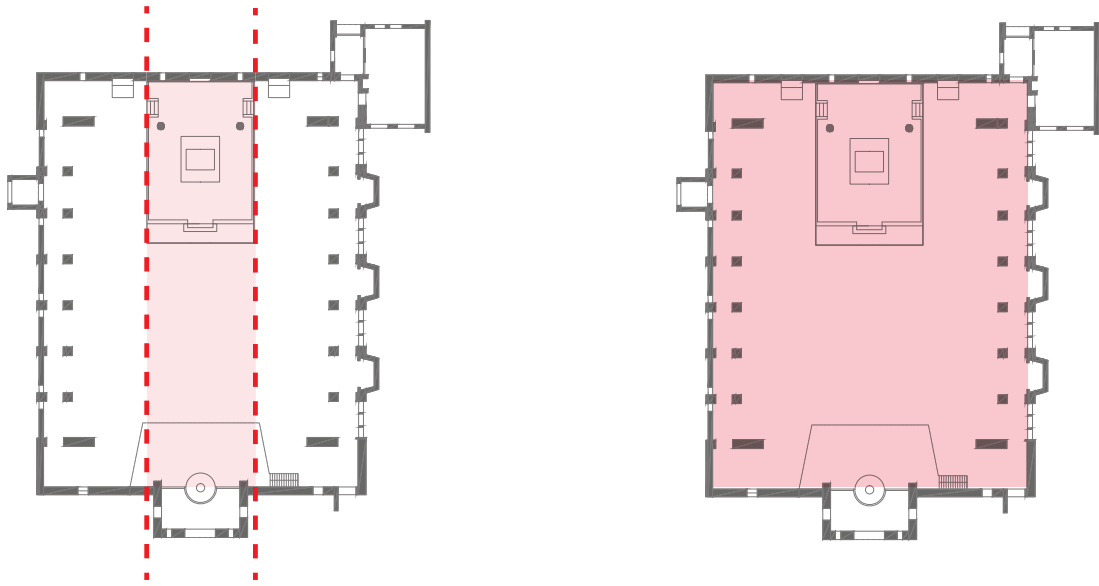


Fig. 12. usable space in small (left) and big (right) church

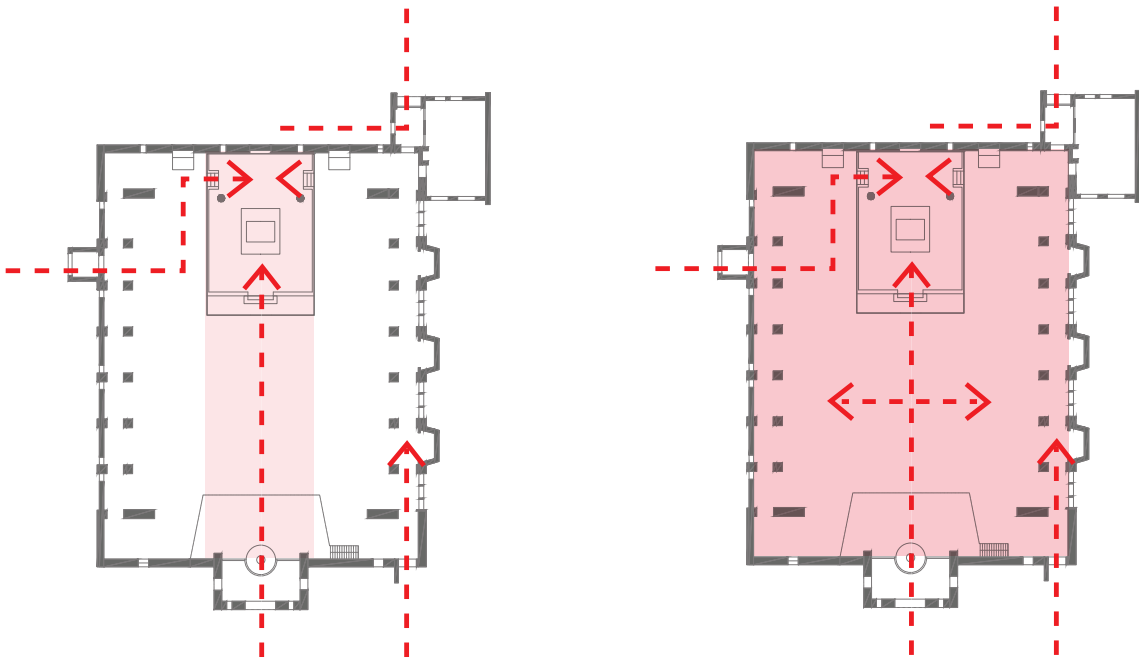


Fig. 13. circulation in small (left) and big (right) church

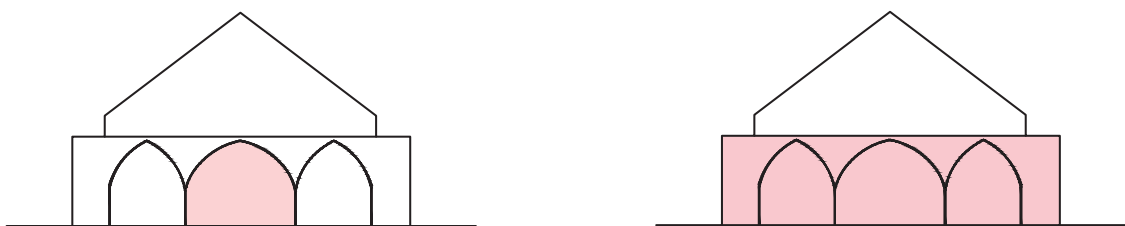
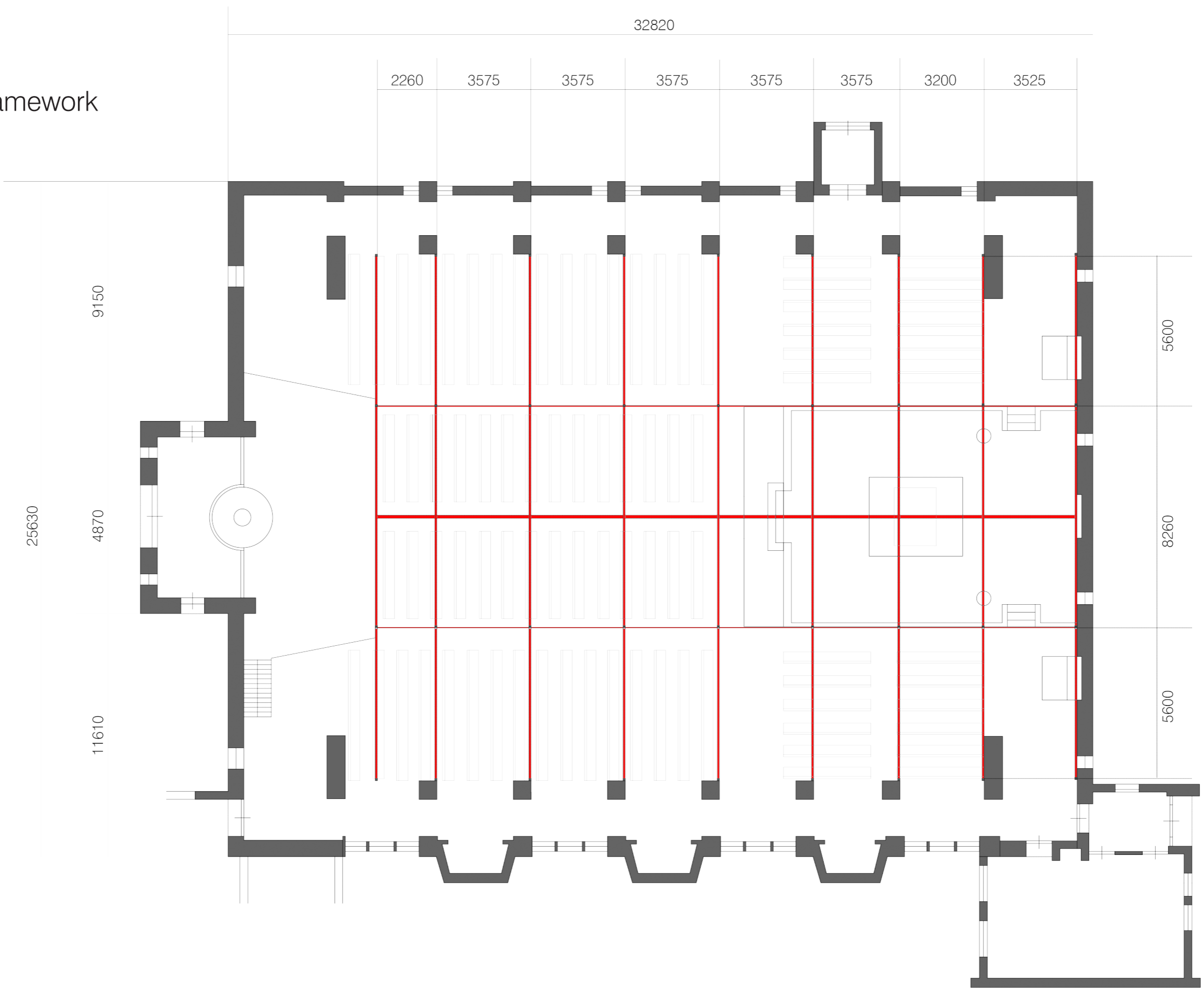


Fig. 14. usable space in small (left) and big (right) church

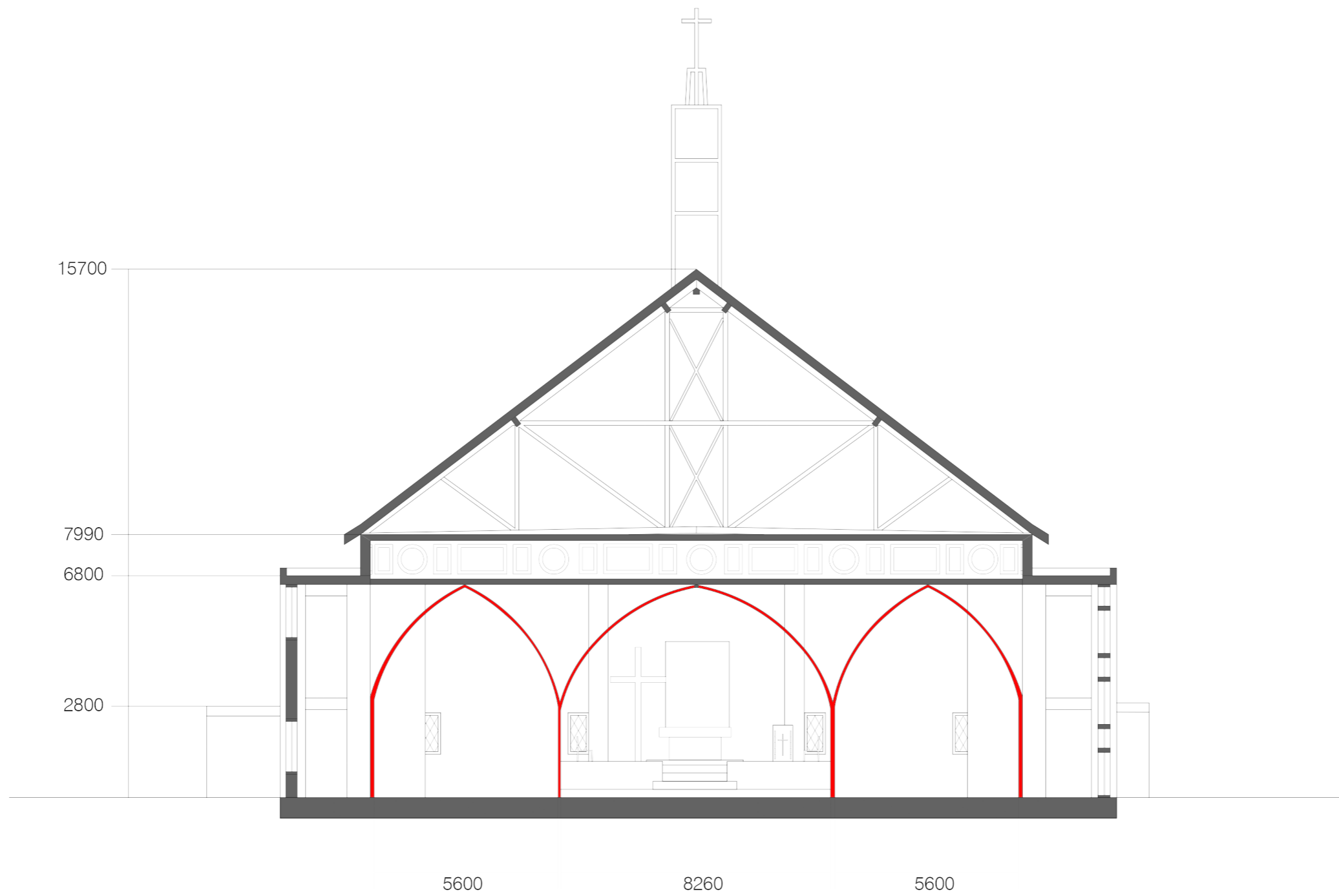
PLAN
with visible framework
marked red

1:150



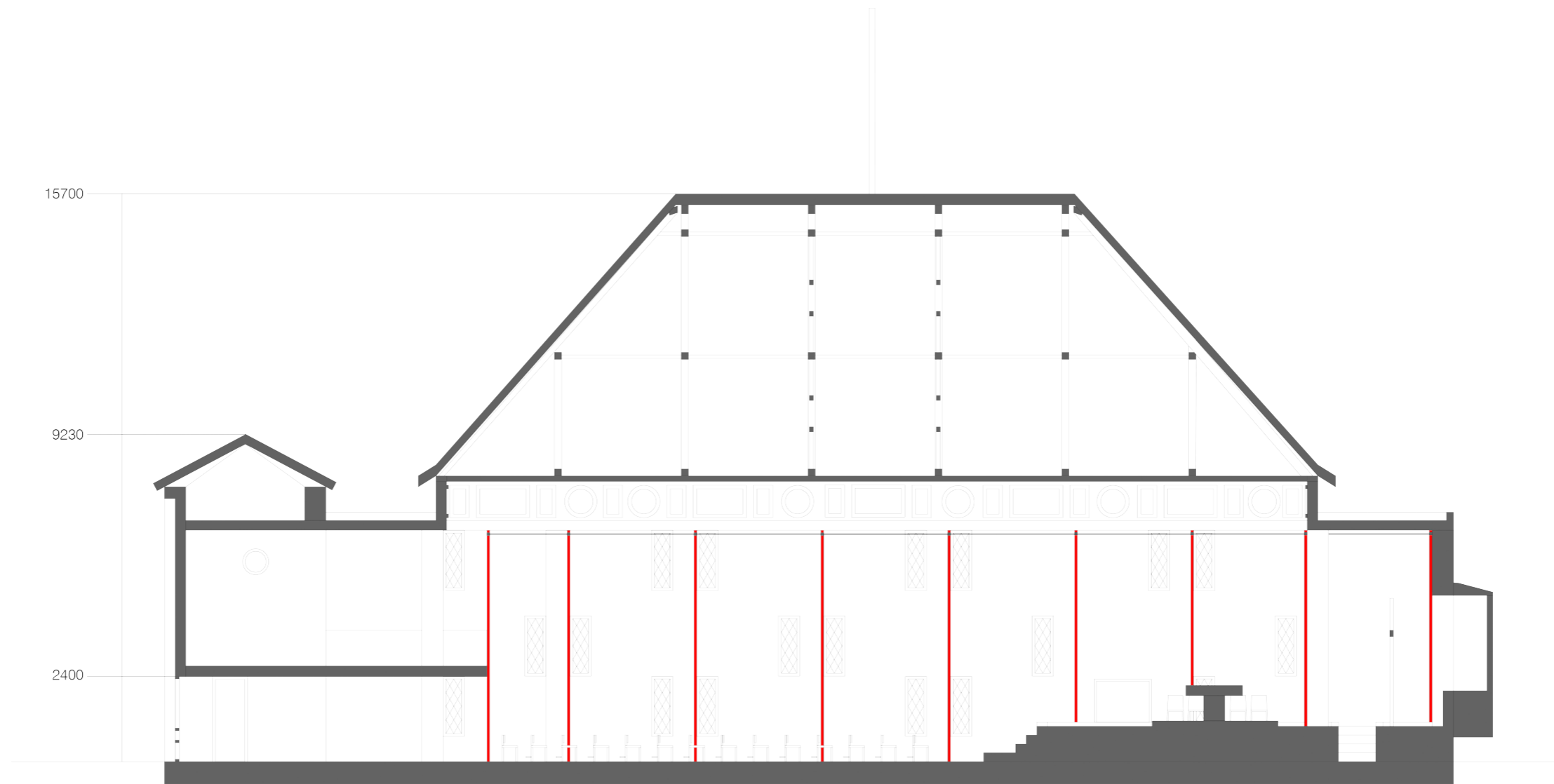
SHORT SECTION
with visible framework
marked red

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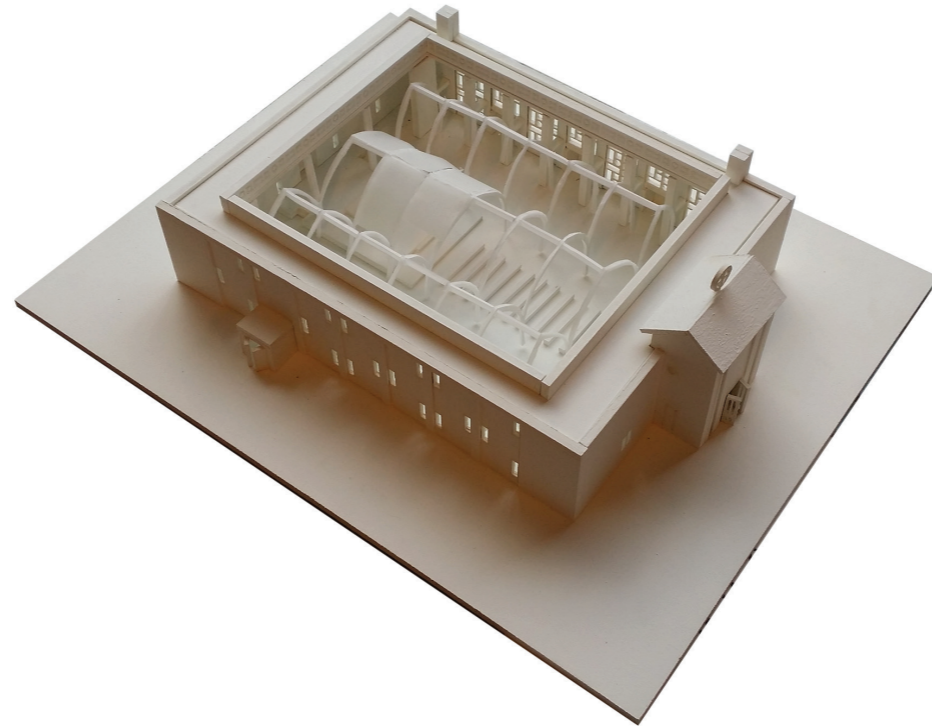
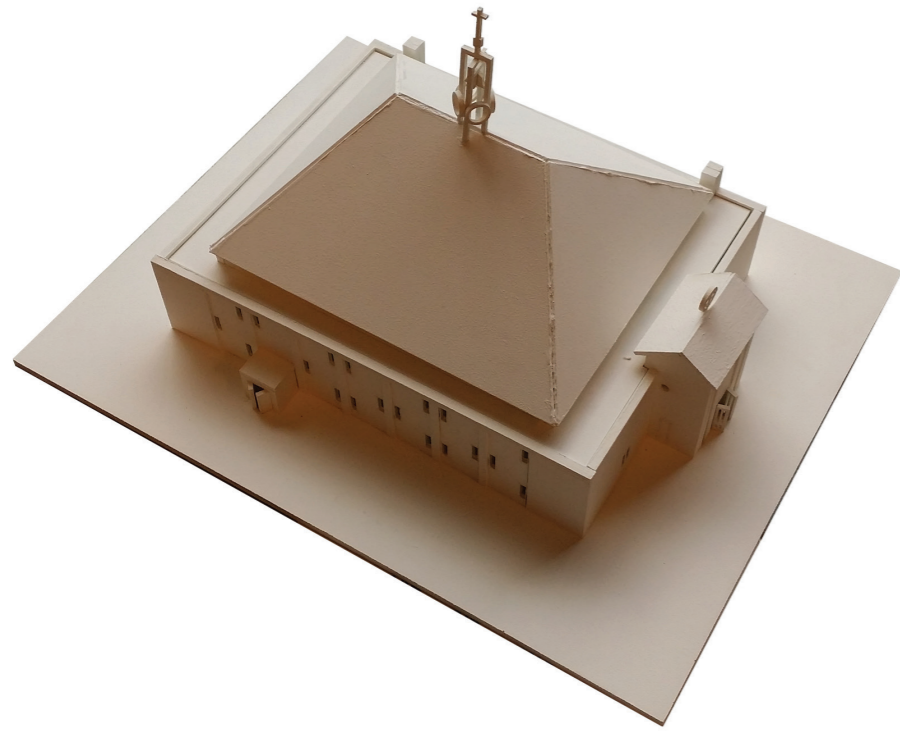


LONG SECTION
with visible framework
marked red

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PHOTOS OF THE PHYSICAL MODEL



INTERIOR 3D

closed

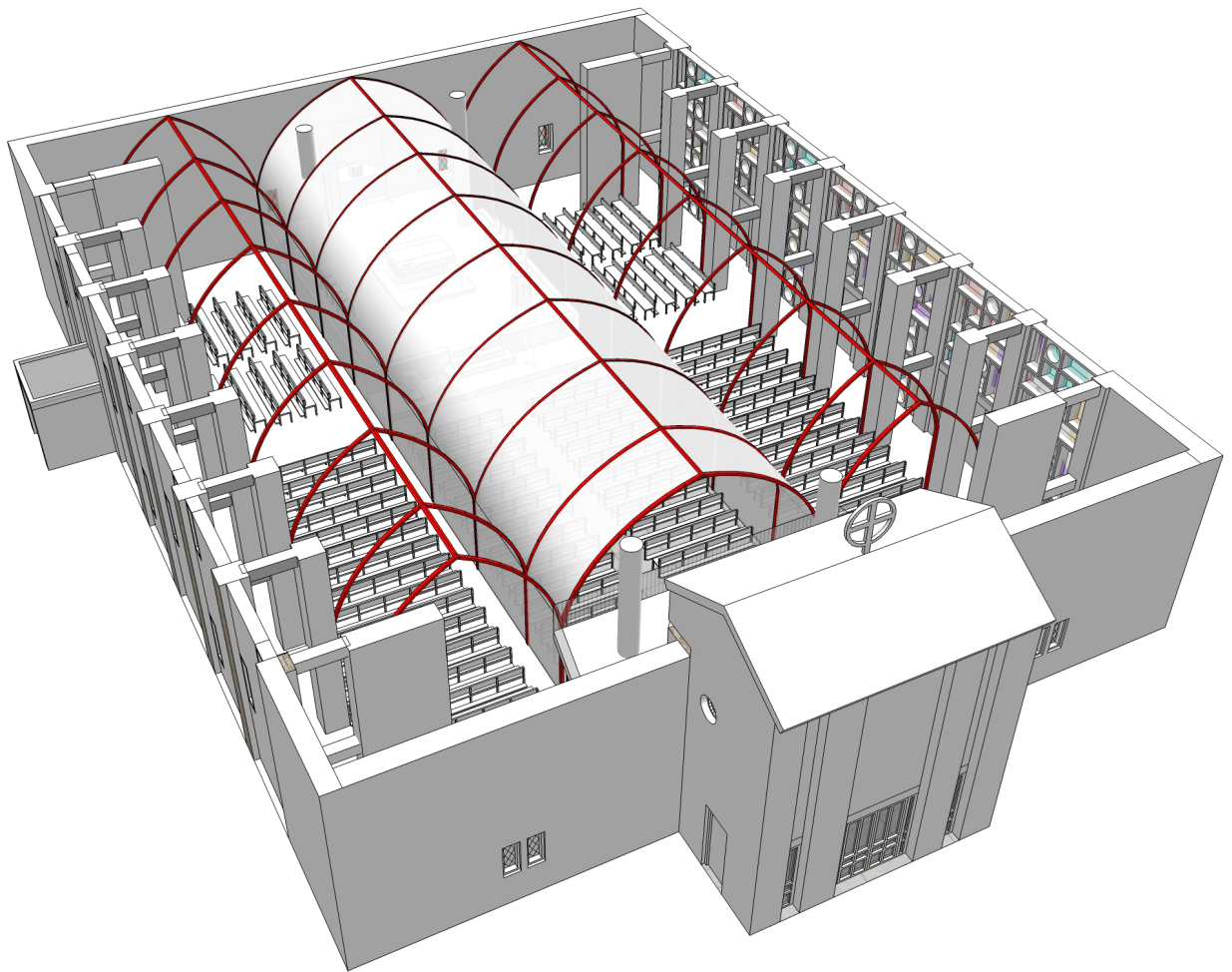


Fig. 15. Interior of the church (closed blinds)

opened

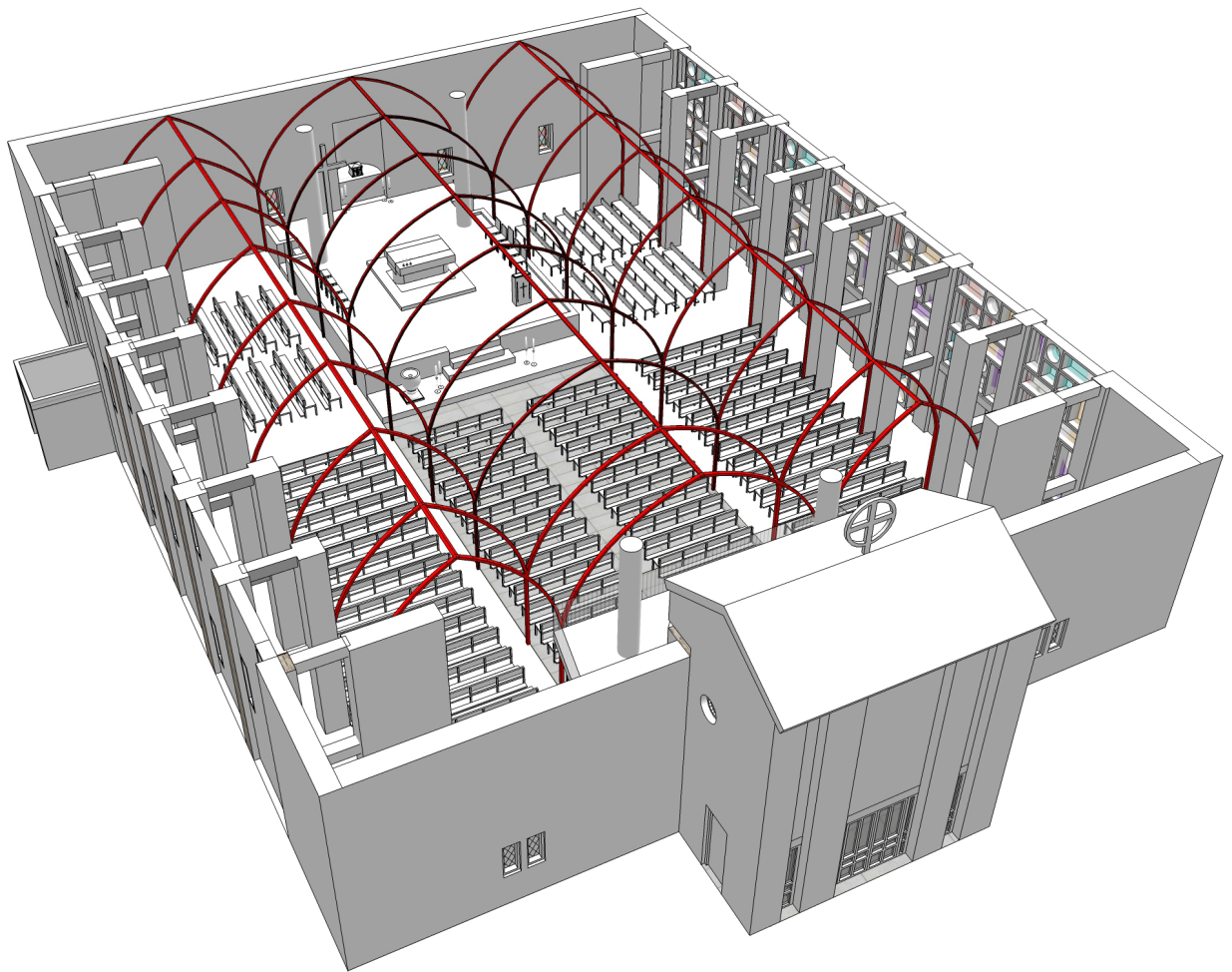


Fig. 16. Interior of the church (opened blinds)

SCHEMATIC VIEW

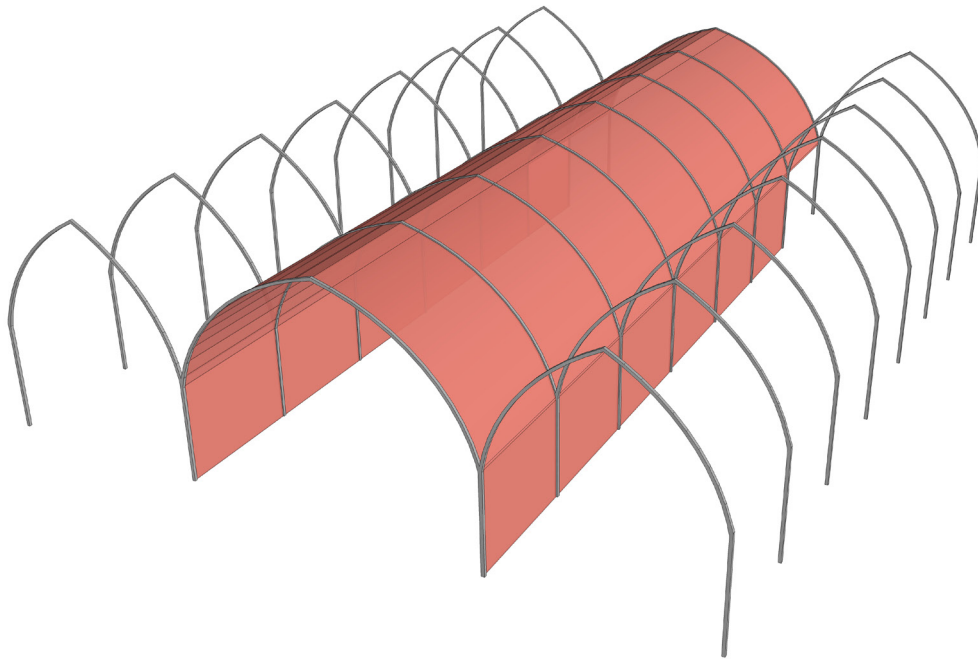


Fig. 19. The structure of the arches

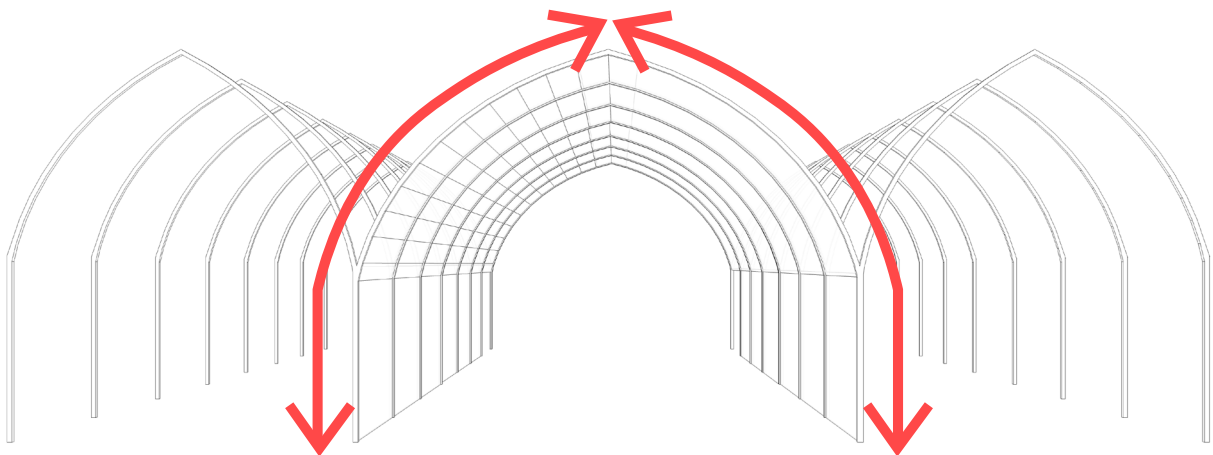


Fig. 20. Movement of the roller blinds

INTERIOR

The translucent fabric used for the blinds allows for light to enter the chapel as well as gives limited visibility from the chapel into the rest of the church. The translucency helps to create a space, which does not feel too closed or claustrophobic but still gives a well enclosed space. In addition, white translucent fabric connects well with new white floor tiles, making a coherent space.



Fig. 17. Interior - opened blinds



Fig. 18. Interior - closed blinds

ROLLER BLINDS

The roller blinds will be mounted along the arch frames. The type of roller blinds with side channels will be used. The channels will be installed through the entire length of the arch with cassette on top of the arch (next to the steel profile

connecting arches). The cassette will be mounted to the steel profiles with the side brackets. The blinds will be moving on the installed channels ensuring that the rolling is smooth, fast and easy to operate. The advantage is that

it can be decided how much will the blind be rolled up or down. By rolling the blind out only partially, an entrance to the chapel can be created.

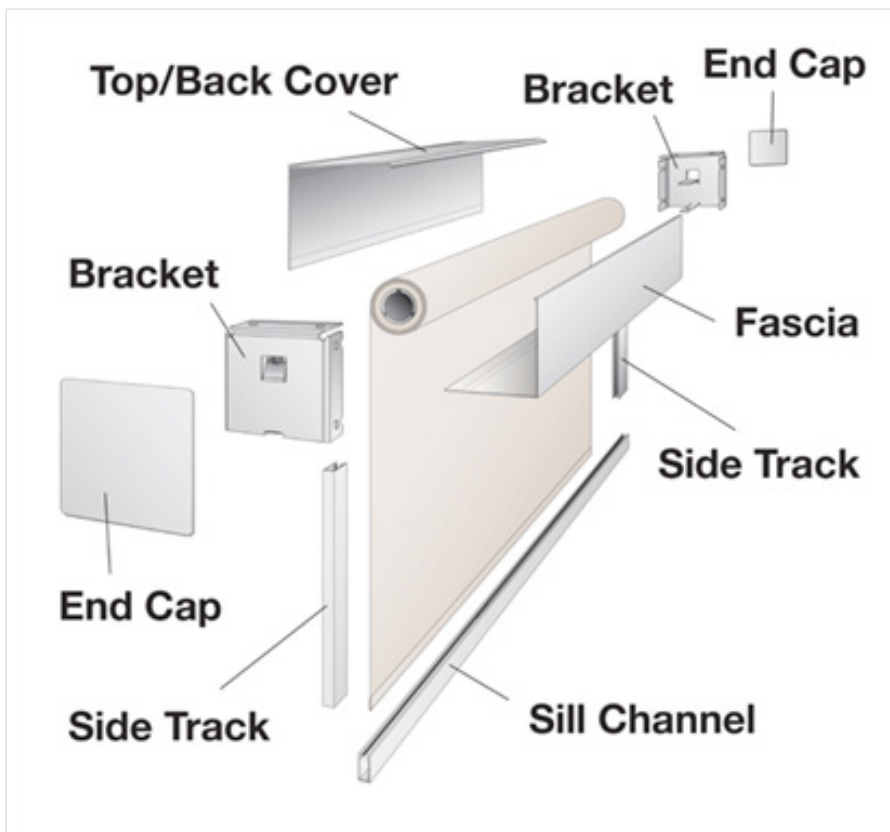


Fig. 21. exploded view of the roller blinds with side channels
source: <https://cdn2.hubspot.net/hub/76244/file-15532795-png/images/avshade.png>



Fig. 22. examples of the roller blinds with side channels (left)

LIGHTING

The inner space of the current church is dark and the natural lighting is not sufficient. Therefore, artificial lighting will be required to lighten up the new space. It is proposed to use LED lights in a form of strips mounted on the

structure of the arches. The arches are made out of hollow tubes, so all the wires can be easily hidden inside the tubes. In addition, the natural lighting will be used as much as possible. The semi-transparent material of the blinds allows

for natural light penetration. It is a diffused light that helps in creation of an inspiring inner atmosphere.

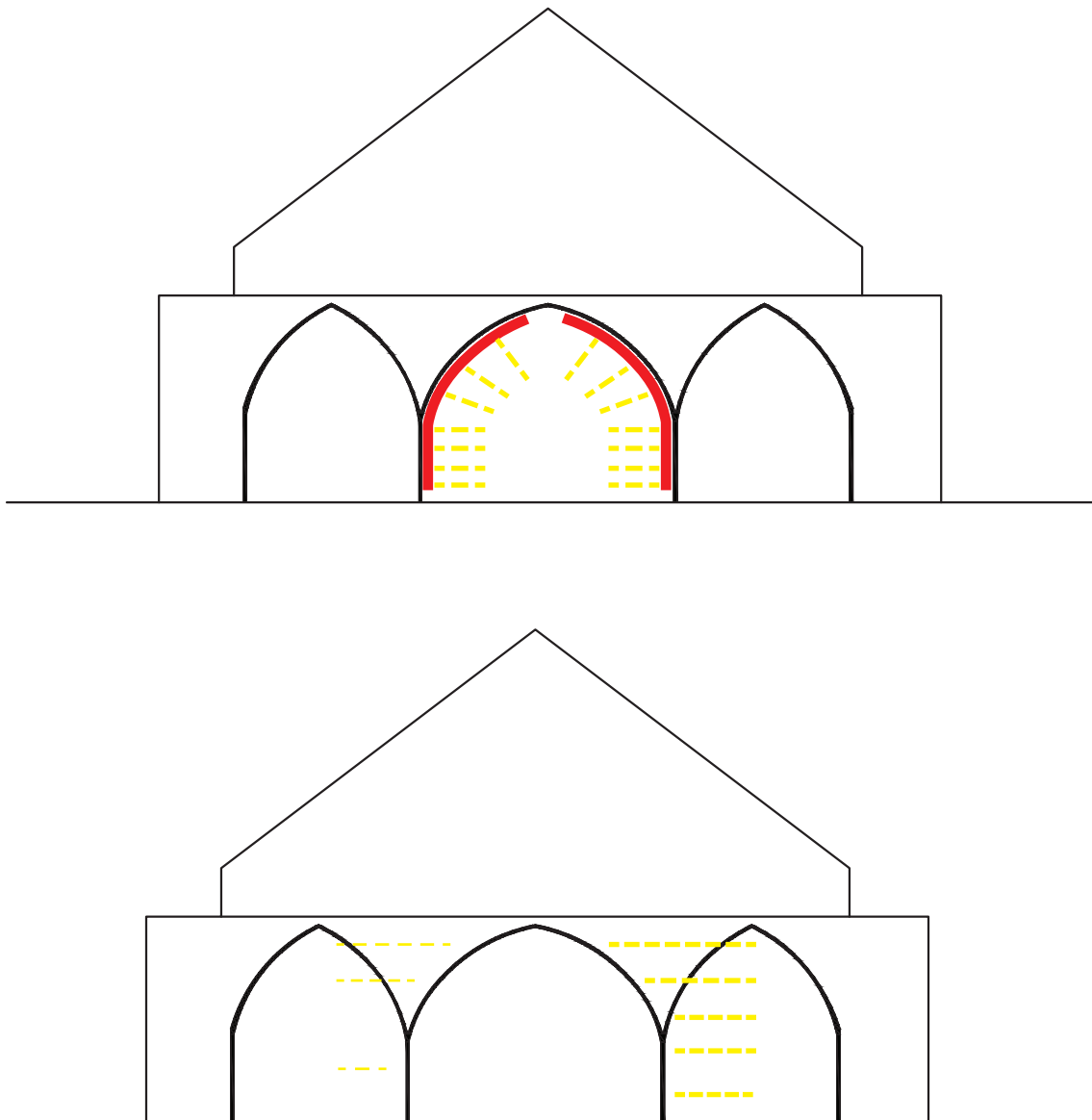


Fig. 21.artificial light (top) and natural light (bottom)

HEATING

The new chapel will be heated up using under floor heating. In order to reduce costs, only the central part of the church will have the heating installed and running. In order to further decrease the operational costs, a new floor tiles with high thermal conductivity will be installed. The new tiles made out of thin stone (up to 15mm) will ensure that the space is heated quickly and efficiently. Floor heating helps to evenly distribute the heat in the entire space.

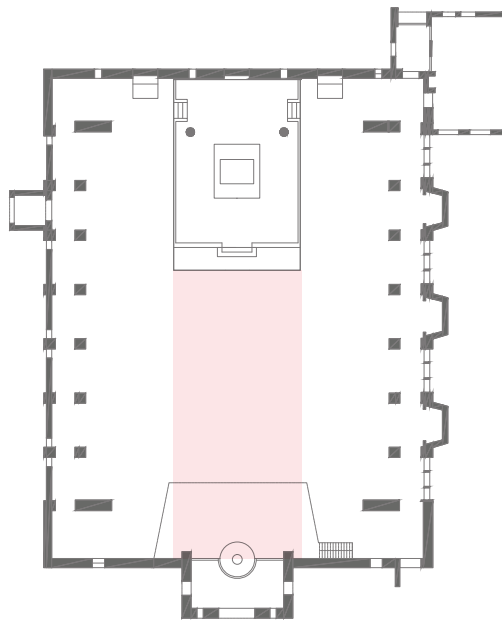


Fig. 22. surface covered with the floor heating

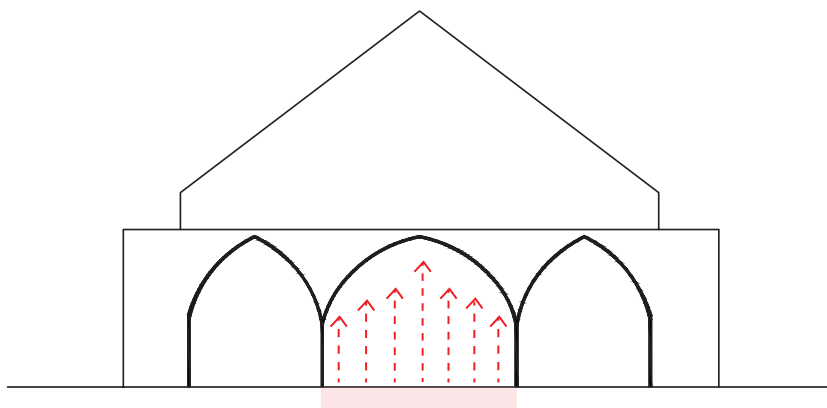


Fig. 23. heat rising from the floor heating making the chapel evenly heated

FINANCE

The objective of the project was to provide design that will be cheap and easy to construct. In order to further minimize the cost of the construction, the intervention should be easy enough to be constructed the local people.

The intervention is created out of steel profiles, roller blinds and floor tiles. Assuming that everything will

be constructed by local people, no labour costs will be added to the calculations.

The provided costs are just rough estimations. All elements are meant to be custom made. Therefore, it is crucial to contact manufactures in order to get more accurate information about the cost of steel profile of the roller blinds.

Additional costs include refurbishment of benches.

In order to reduce the total costs, some proposals such as changing the floor tiles can be skipped.

STEEL PROFILES

making 8 main and 16 secondary arches

32m x 8 x 10 Euro / m = 2560 Euro

based on: http://www.brindley-steel-forging.co.uk/acatalog/R_H_S.html

ROLLER BLINDS

including translucent fabric, the entire mechanism and cassette

8m length / 3.5m width x 14 = 9000 Euro

rough estimate based on: <http://dako.eu>

WHITE FLOOR TILES

white MOSA tiles; 30 Euro / m²

total: 4740 Euro

based on: <http://www.mosa.com/en-gb>

TOTAL COST:

including additional shipping and number of additional materials:

18 000 Euro

CONCLUSIONS

The aim of the project was to propose a solution for a chapel design located inside an already existing church. At first, the project was challenging as the design requirements do not allow for much of freedom in terms of space or type of intervention. The need to connect the altar and the organ as well as requirement for a flexible solution made it difficult to find an alternative solution. Number of possibilities for moveable walls were investigated but none of them seemed good in terms of aesthetics or practicality. Therefore, an easier and also cheaper solution of roller blinds installed on steel frames of the arches and operated in side channels was chosen. The steel arches not only

provide a stable support but also create a unique interior space, which resembles nave organisation in traditional churches.

The project required a comprehensive thinking as it was crucial to focus on number of aspects such as aesthetics, budget, ease of construction and maintenance as well as lighting etc. Therefore, it was interesting to work on such project as it is rather unusual to have an opportunity to work for a real client, while still being an architecture student. The project showed that architecture is much more than just a pleasant design but in fact it is a long journey, which is build of number of compromises and challenges.

Het werk van de Bouwkundewinkel Eindhoven wordt mede mogelijk gemaakt door:



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