RESTORATION OF ZAZADIN HAN
A 13TH CENTURY SELJUKID CARAVANSERAI NEAR KONYA

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MUSTAFA ÖNGE

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IN

RESTORATION IN THE DEPARTMENT OF ARCHITECTURE

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Approval of the Graduate School of Natural and Applied Sciences

_____

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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ABSTRACT

RESTORATION OF ZAZADIN HAN
A 13TH CENTURY SELJUKID CARAVANSERAI NEAR KONYA

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The subject of this thesis is the restoration project of Zazadin Han, which is a 13th century Seljukid caravanserai near Konya. Following a brief description of the building, the values of the building and the aim of study are discussed in the introduction chapter. It is followed by the methodology of the study, detailed description of the building, analysis about the structural, material and construction features of the Han, historical study about the building type and the building itself, respectively. The restitution chapter is based on the information gathered in the previous parts. In the last chapter, a restoration project is proposed for Zazadin han.

Keywords: Restoration, caravanserai, han, Anatolian Seljuk Caravanserais, Konya

ÖZ

KONYA YAKINLARINDA BİR 13.YY. SELÇUKLU KERVANSARAYI OLAN ZAZADIN HAN'IN RESTORASYONU

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Yüksek Lisans, Restorasyon Anabilim Dalı, Mimarlık Bölümü
Tez Yöneticisi: Doç. Dr. Emre MADRAN

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Bu tezin konusu, Konya yakınlarında bir 13.yy. Selçuklu kervansarayı olan Zazadin Han'ın restorasyonudur. Giriş bölümünde yapının tanıtımı, sahip olduğu değerler ve çalışmanın amacı belirtilmektedir. Bunun akabinde çalışmanın metodolojisi, yapının detaylı tasviri, yapıya dair strüktürel, malzeme ve inşaat özelliklerini içeren analizler, binanin türü ve binanin kendisine dair tarihi araştırma, ve daha önceki bölümlerden edinilen bilgilere dayanan restitüsyon kısmı yeralmaktadır. En son olarak restorasyon projesi önerisi sunulmuştur.

Anahtar kelimeler: Restorasyon, Kervansaray, Han, Anadolu Selçuklu Kervansarayları, Konya

To my father, Prof. Dr. Yılmaz Önge, who spent a lifetime for the preservation of cultural heritage...

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I would like to thank Prof. Dr. Ataman Demir from Department of Architecture of Mimar Sinan University and Prof. Dr. Haluk Karamağaralı for sharing their photo archives with me, archaeologist Sadi Bayram from General Directorate of Pious Foundations and Assoc. Prof. Dr. Ali Baş from Selçuk University for additional references.

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INTRODUCTION

Zazadin Han is a 13th century Seljukid caravanserai located 22km northeast of Konya at Kayacık district. It is a stone construction monument donated by, probably the most important statesman of its time, Emir Sadeddin Köpek. It was built in two parts in the years of 1236 and 1237.

Zazadin Han is one of the most important and most intact Seljukid caravanserais that have unique features amongst the other buildings of similar type. It is not currently being used and it is subject to destructive effects of human and weather conditions.

The aim of this thesis is to prepare a restoration project for Zazadin Han and its vicinity, which has to be carried to the future generations with its historical, cultural and architectural values.

This thesis has eight chapters. The first chapter is the introduction, comprising the subject, aim and brief summary of the thesis. The second chapter gives the methodology, which includes the information about the process, methods and equipment. The third chapter comprises the description, which includes the visual and written information about different parts of the building by means of examining the form, dimensions, materials, construction techniques, structural

system and deterioration of material and structural problems of the building. The fourth chapter is the analyses of structural system, construction material, construction technique, structural and material problems and the interpretation of the evidences. The fifth chapter comprises the historical research, which includes the historical analysis about the development of trade in Anatolian Seljuk era, the caravan routes in Anatolian Seljuk era, the problem of the origin of caravanserais, the history of Zazadin Han and information about its donor. The sixth chapter includes the comparative study to better understand the significance of Zazadin Han amongst other caravanserais of the era. The seventh chapter includes the restitution proposal with alternatives. And finally, the eighth chapter comprises the restoration project including the interventions and the new function proposal.

This single volume, comprises only the most significant plates and photographs. The entire original documents prepared for this study are submitted to the archive of the graduate programme in Restoration and Conservation of Historical Monuments, in Department of Architecture.

CHAPTER 2

METHODOLOGY

2.1. Field Survey

Zazadin Han was visited for the first time in March 2001, during the travels to Konya, Beyşehir, Karaman, Ereğli, Aksaray and Kayseri. The second and the third visits to the han was in June 2001. The sketches of the plan, sections and elevations were drawn for the survey, during this visit.

The written permissions required for the survey was taken from the local authorities and the office of General Directorate of Pious Foundations in Konya in the first and second weeks of July. The equipment became available in this two weeks and the survey team was assembled. The survey team was consisted of only three people at the beginning. One of them was the technician, who accompanied the team only for a day and used the theodolite. The number of the helpers increased to four in the following days.

Zazadin Han is visited for the fourth time between the dates of 13th of July 2001 and 30th of July 2001. This was the first stage of the survey and in this stage, the plan, the arches, the vaults and the sections are measured. The fifth visit to Han was between the dates of 26th of August2001 and 31st of August 2001, which was the second stage of the survey. The facades, the masjid, the roof and the dome are measured and missing measurements of the previous stage are taken during this

time. The photographic documentation of the monuments, which begun in the first stage, is completed at the end of the second. And also a video record is prepared in 24th of July. September 2001 was the date of the sixth visit to the han. Some extra photo documentation is done and missing vault measurements of three spaces are taken. The last visit to the han was between the dates of 15th of June 2002 and 16th June 2002. Some of the fallen pieces, some important re-used stones and the joints of the buttresses are photographed.

2.2. Methodology of Field Survey

The plan was measured at the beginning. The coordinates of 361 points were recorded with 21 polygons for both exterior and the interior of the plan. The details of the plan and interiors of the spaces were measured by hand with steel tapes using triangulation method. In the following day the datum line was set. Hilti PM10 laser aided levelling instrument was used to define it. The datum line was carried up and down 0.5m and 1m due to the changing ground levels at different parts. The aches and the vaults are surveyed right after. These are hand measured with steel tapes using coordinate and triangulation methods, regarding to the reference points on the datum line.

The sections and the elevations are hand measured with steel tapes. The butresses and the walls are used as plan references for the horizontal measurements. The vertical measurements are taken refer to the datum line.

The last measured parts were the masjid, roof, dome and details. Firstly, the datum line was carried 7m higher to the roof and 4.5m higher to the masjid with the steel tapes and laser aided levelling instrument. The top levels of the superstructure and the levels of water spouts were measured regarding this reference which were cross-checked with the heights of the exterior elevations and courtyard elevations. The vertical measurements of the dome were taken refer to the elevated datum line and its plan was measured from its demolished top part using triangulation method with steel tapes and Hilti PD20 laser-meter.

The plan of the masjid was measured using triangulation method with steel tapes. The facades of the masjid and the details like mihrab were also hand measured with steel tapes.

2.3. Methodology in the Preparation of Visual Media

The visual documents have always been vital sources for the restoration projects. The visual media is used for detecting the problems and better understanding the conditions that the monument is in.

2.3.1. Method of Photo Documentation

The photo documentation is the essential part of every survey. In this study a Minolta SRT 303 reflex camera with 28mm, 50mm, 200mm Vivitar lenses and Kobol 25S flash unit was used. The films were 100 ASA, Fuji and Polaroid brand.

The photographs of the building were taken from every part where enough distance and lighting were available. First the photographs of the surroundings and exterior elevations were taken. The photographs of exterior elevations were taken from long distances exceeding 250m with 200mm tele-lens to minimize the perspective effect. This was done at the time when the sun was at its top level, having the shallowest shades. Then the courtyard elevations, the interiors of the spaces, the interior of the shelter and the roof were photographed.

The previously taken photographs of the monument, including the aerial photographs were collected and processed for restitution purposes from different sources. The aerial photographs were obtained from the archives of General Command of Cartography and the others were obtained from the archives of Prof. Dr. Haluk Karamağaralı, Prof. Dr. Ataman Demir and Prof. Dr. Yılmaz Önge.

2.3.2. Method of Video Documentation

The video record was intended for the better documentation of the monument than the photographs. Unfortunately, only the surroundings, exterior elevations and the courtyard of the building were documented due to technical problems. This record was prepared in VHS-C compact cassette format first, and then a VCD is produced.

2.4. Preparation of Survey Drawings

The survey drawings of the Han are prepared in two sets. The first one is the measured set and the second one is the rendered set. The details and the site plan are drawn as single sets as exceptions, containing both measurements and renderings.

The measured drawing set is prepared first, beginning with the reference points, which are fed to computer. Then the measured parts are set regarding these. The rendered drawing set is prepared on a copy of the measured set without measurements. The photographs were very useful for renderings. The scanned and rectified photographs are imported to the CAD software and mounted on the drawings with very small tolerances. Then the renderings are completed.

The site plan is drawn with the help of the aerial photograph of the han and its surroundings.

The drawings of the han are prepared in 1/100, while the details are drawn in 1/50 and 1/20, and the site plan is drawn in 1/1000 scales[1]. Autocad R14 and Autocad 2000 software are used during all the drawing process. Photoshop 5.0 and Corel Photo-paint 8.0 photo editor software are preferred for photo rectification.

[1] Not included in this volume but submitted to the archives of the Department of Architecture.

2.5. Method of Description

The descriptions are organised from the general to detail regularly. The common features of the elevations and spaces are explained under the general titles and the detailed information about each part is given under its own title. The information is visualised using photographs and drawings where necessary.

The descriptions begin with the description of the vicinity of Zazadin Han. Its location and surroundings are described refer to the global landmarks like settlements and roads. This is followed by the description of the exterior elevations, courtyard, courtyard elevations and spaces.

The elevations of the Han are described on the counter clockwise direction. For each elevation, the parts of the elevation, its corresponding spaces and the overall dimensions are explained at first. Then the parts of the elevation are described giving information about the dimensions and architectural elements.

The spaces in the Han are described in groups of spaces and semi-open spaces. The spaces in each group are described with an order regarding their location and turning counter clockwise around the courtyard. For each space, the dimensions and the features that are different from the common title are explained.

2.6. Method of Analysis

The analyses are all prepared using cad software except the condition of the fabric analysis, which was prepared with conventional techniques using colored markers and airbrush on 1/100 copies of survey drawings, then scanned and adjusted.

In general, all the information categories are prepared as graphic expressions on the copies of survey drawings in 1/100 and 1/200 scale. The information about

the related categories are obtained from notes taken in situ, the photographs and video record. These are also used for expressing the required information.

The analysis comprises the following titles: Construction Material, Structural System, Construction Technique, Architectural Elements, Interpretation of Evidence, Condition of the Fabric. The information obtained from these analyses are combined and discussed in the evaluation part.

2.7. Method of Historical Research

The historical research begins with the development of trade activities and caravan roads during Seljukid era and then continues with the history of the caravanserais. Finally the subject is focused on Zazadin Han.

As the archive information about Zazadin Han is insufficient its history is narrated regarding the information obtained from the visual and written sources.

2.8. Method of Comparative Study

The comparative study is prepared in two parts. The first part aims to understand the significance of Zazadin Han amongst the other caravanserai. The second is prepared to obtain information about the elements of the Seljukid era buildings, which is needed for the restitution of Zazadin Han. This second part is combined with the restitution problems study of restitution in Chapter 7.

The comparative study is in the form of a matrix. The column on the left end contains the categories of plan dimensions, space organisation, structural elements, construction technique and material. From left to right every column contains data about one caravanserai. The columns are arranged in chronological order regarding their construction dates. The caravanserais of unknown construction dates are placed at the end. The aim to do this is to discuss if this

type of caravanserais had a schematic development through its history or not. The results of Comparative Study is discussed in the evaluation part.

2.9. Method of Restitution

In the phase of restitution each missing part of Zazadin Han is studied as a single problem. These problems are numbered regarding their location and reciprocal relations and shown on the survey drawings with marks, which are linked to boxes that contain information about each missing part in various categories. The distinction of the categories of information and the sources that they are coming from, are also explained in this part.

In the second part of this study, regarding the collected information on the previous part, the restitution alternatives are presented and reliability degrees for each problem are detected. In the last part of this chapter, the final restitution project is presented.

2.10. Method of Restoration

The values and the problems of Zazadin Han and its vicinity are studied at first in order to make the final preparations for the restoration project. Then, the aim of the restoration project and restoration criteria for the Han and its surrounding area are presented. This is followed by the intervention proposals, which will affect the outlines of the new function proposal. In order to understand the potential of the spaces for the new function, the space potential analysis are made. Finally the new function proposal and restoration project proposal are presented.

CHAPTER 3

DESCRIPTION

3.1. Location & Surroundings:

Fig. 3.1. Location of Zazadin Han [1]

Zazadin Han is located on the northeast of Konya 22km. away. The han is between Konya-Ankara and Konya-Aksaray motorways, 5km. away from each one and 1km. south of Tömek village.

[1] Redrawn after, İç Anadolu Haritası Bölüm #1, *Atlas*, 2002, Sayı: 113 Eki, Doğan Burda Rizzoli Yayıncılık, İstanbul.

Zazadin Han can be reached by following two routes: One is the road branching from the junction on the Konya-Ankara highway at 22nd kilometer via Tömek village. The road branching from the junction on Konya-Aksaray highway at 23rd kilometer is the other way directly leading to the han. *(Fig. 3.1)*

Zazadin han is the only building in its setting. The land is flat; therefore the han is visible from 5km. The nearest buildings in the area are few kilometers away from the han that is surrounded by uncultivated fields. *(Fig. 3.2)*

Fig.3.2. Vicinity of Zazadin Han

The road branching from Konya-Aksaray motorway to Tömek is at the east, 25m away from the han. *(Fig. 3.3)* This road is elevated from the land at different heights about 0.5 - 0.7m and forms a loop around the han. There are three secondary roads branching from this loop, which lead to the surrounding fields. *(Fig. 3.4)*

Fig. 3.3. View from the road near the Han

There are two electricity lines carried by 15m high pre-cast concrete posts near the Han. *(see Fig. 3.4)* The first one is located at 250m northwest of the Han, lying in the southwest - northeast direction. The second one is 50m northeast of it, which is a part of a line extending in the north–northwest - south-southeast direction.

There are three water sources near the Han, two of which are wells. The first is located 100m south and the second is 300m southwest of it *(Fig. 3.5, Fig. 3.6.).* The first one consists of a borehole, a lift and a drinking basin next to the borehole for the animals. These all are placed on a concrete base except the posts of the lift, which are erected into a concrete filled pre-cast concrete ring. The borehole is constructed using pre-cast concrete rings put over each other. The bottom of the well is not visible. The pre-cast construction of the borehole continues up to 0.3m above the ground level and ends with a concrete cap. A white curbstone that looks like a column base is placed on top of it. The drinking basin, which is made of cast concrete, lies next to the borehole, connected to the pre-cast concrete rings on its narrow side. The lift and the water bucket of the well are missing. The second well is similar to the first one. It has a cast concrete construction; its base is larger and includes some stones of irregular shape that have roughly 20-30cm. diameters. There are two drinking basins instead of one and there are some irregular shaped stones with 40-50cm. diameters roughly at

the bottom of the posts for support. There is also a third drinking basin that consists of a carved stone block, resting on the ground apart from the concrete base at the north. The third water source is an artesian located approximately 50m southeast of the Han.

There are several small dumps of earth spreaded on the area at the southwest of the Han, 40m away. These are approximately 0.6-0.7m high dumps of earth, which were carried to the area in 1996, following the excavation and cleaning conducted by The Department of The History of Art of Selçuk University inside the han[2]. They contain several small shards, pieces of brick and terracotta.

There are irregularities in the form of large and small heaps indicate to ruins. The first one is next to the first electric post mentioned above *(Fig. 3.7, Fig. 3.8)*, the second one is 250m north of the han at the border of the two fields and 120m east of the first ruin *(Fig. 3.9, Fig. 3.10)*. The third and the fourth ruins are at the northwest of the Han 100m away. The last one is in front of the north façade of the han on the west. The first and second one consist of remains of walls and the rest are earth dumps with several small pieces of stone and terracotta scattered surrounding them.

3.2. General Description

Zazadin Han is a partially damaged stone building with 100m x 30m dimensions. It lies on the east-west direction. Zazadin han carries the name of its donor, Seljuk vizier “Saadeddin Köpek”; the name “Zazadin” is a deformed version of the name “Saadeddin”.

[2] I obtained this information from Prof.Dr.Haşim Karpuz, who conducted the study in the summer of 1996.

It basically consists of two parts: The shelter[3] and the courtyard with service spaces around it. *(Fig. 3.11)* The shelter is located at the west of the courtyard. The services surround the courtyard north, south and east.

The entrance to the building is on the south wall and it opens to the courtyard. The courtyard provides access to the shelter and the service spaces.

3.3. Elevations

The two short and two long elevations of the Han are quite intact, standing to 6.00m height in different parts, almost under and above the level of the gutters. The upper parts of the walls are not regular due to the loss of courses as well as face stones. Because of this, the upper parts of the vaults of corresponding spaces are visible.

The walls are constructed with cut stones in pseudo-isodomic coursing. Since most of them are re-used, the coursing is not always regular, but tending to be random. A band or two of high stones alternate with a low course in general, and there are differences of workmanship depending on the location. The dominant stone type is travertine. There are also gray-brown tufa and various kinds of light colored marble. These are used at the portal and the buttress on the southeast corner of the Han (B5) with an order of alternating rows of dark and light colored stones. The top stone rows at the east parts of the elevations consist of non-processed re-used stones in irregular shapes, which are laid like rubble stone

All the walls are subdivided with buttresses of different plans, all projecting from the surface of the walls. There are slit windows at different parts of the elevations, the highest of which locate roughly 5.00m above the ground level.

[3] For the term “shelter” see Yavuz, A.T., 1991, “Anadolu Selçuklu Kervansaraylarında Mekan-İşlev İlişkisi İçinde Savunma ve Barınma”, *IX.Vakıf Haftası Kitabı*, Ankara, s.253-284, s: 260.

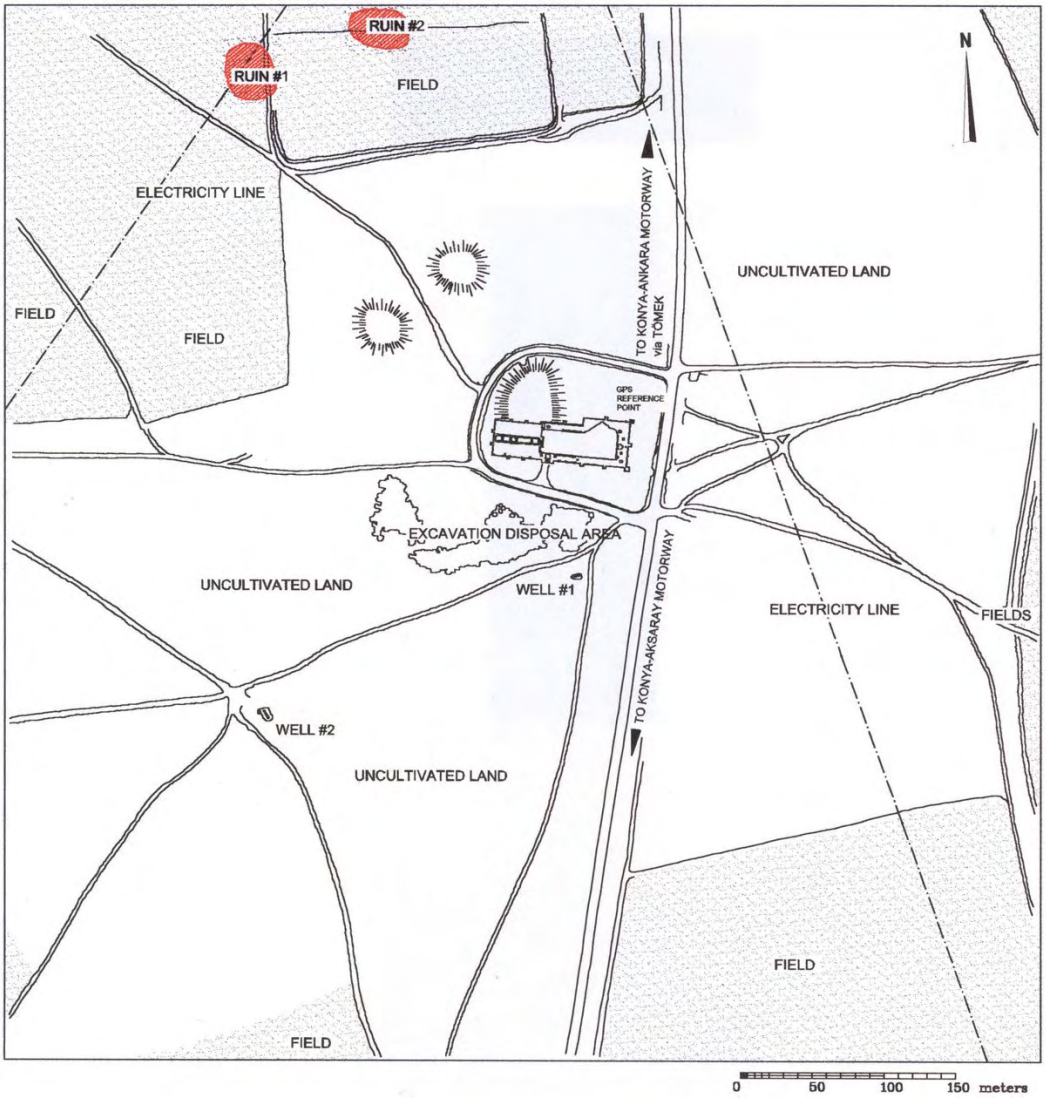


Fig.3.4. Site plan

Fig.3.5. Well #1

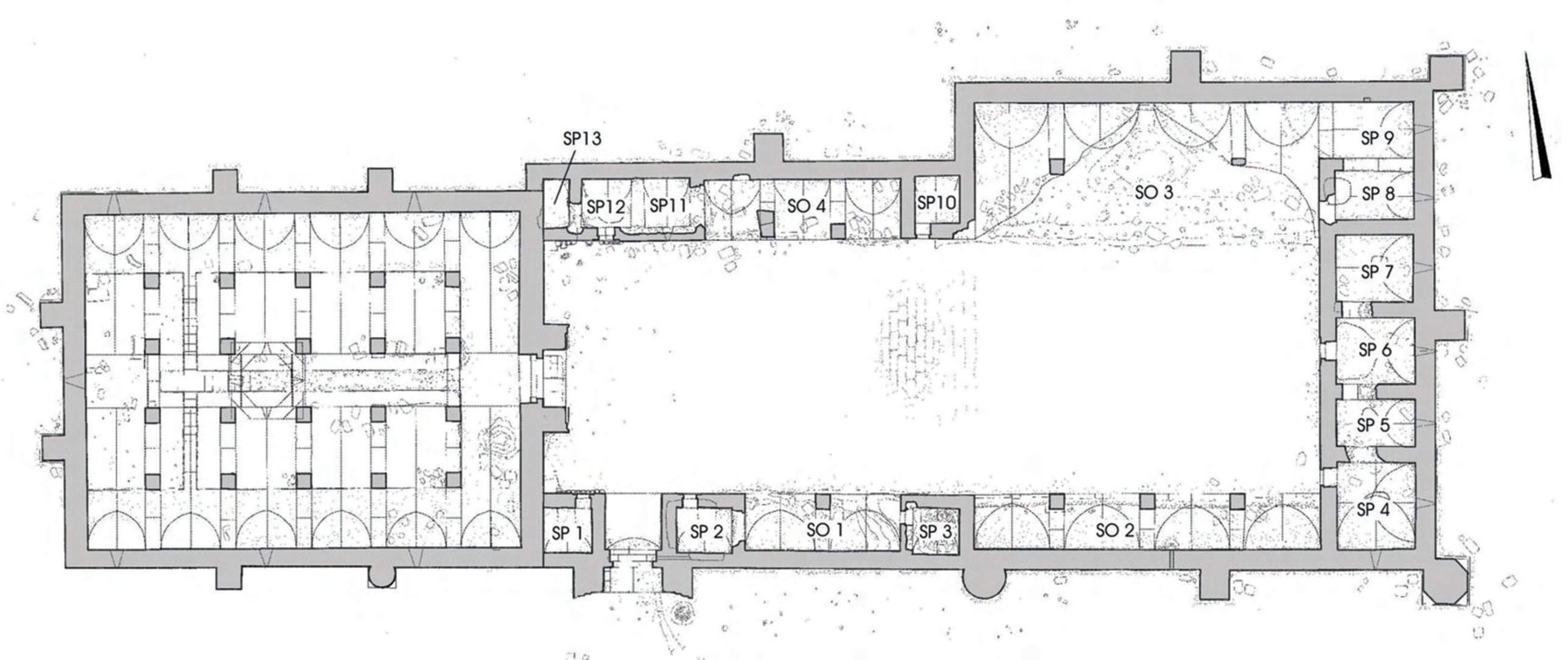
Fig.3.6. Well #2

Fig.3.7. Location of Ruin #1

Fig.3.8. Ruin #1 close up view

Fig.3.9. Location of Ruin #2

Fig. 3.10. Ruin #2, close up view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SO 2

The bottom parts of all elevations are heavily weathered. The damage is especially serious at the south and west elevations to 1 or 1.5m heights. There are some khaki-green and red-brown colored deposits on the face stones, with varying densities depending on the orientation and location. There are also color changes at the lower parts of the elevations, which very probably indicate to rising damp.

Fig. 3.12. South Elevation

3.3.1. South Elevation

The south elevation is the entrance elevation of the Han. It is composed of two unequal parts with the projecting entrance portal in between. The off-center portal is located near the west corner of the south wall of the courtyard; the west part corresponds to the shelter and the east part to south exterior wall of the spaces along the south wall of the courtyard *(Fig. 3.12).* The elevation locates on a terrain that slopes towards the corners. The total length is 96m and the average height is about 6.60m.

The west part of the elevation is 34.85m. The highest part is 7.11m. The wall is divided into three similar parts by two buttresses. There is a slit window on each part, located near the west corner. Starting from the west the first part is 10.39m long, 7.10m high, the second part is 8.61m long, 5.72m high and the third part is 12.11m long, 6.07m high.

There is a construction joint between the buttress (B2) and the portal at the third part. It extends up to 5.40m above the ground level (+4.84, -0.56) and separates the south exterior wall of the shelter from the courtyard and services. *(Fig. 3.13)*

Fig.3.13. Construction joint on the South Elevation

The east part of the elevation is 53,25m long. Its highest part is 8.10m. The wall is divided into three unequal parts by two buttresses and ended by another. There is a slit window on the third part near the east corner. Starting at the west the first part is 18.52m long, 5.50m high, the second part is 13.30m long, 7.00m high and the third part is 13.23m long, 8.02m high respectively.

The portal, projecting 2.04m from the wall, is a rectangular frame with an arched opening at the center *(Fig. 3.14).* The entrance portal is totally 8.17m long and 8.16m (+7.14, -1.02) high, up to the existing part. The opening is 4.05m, and the height of the two-centered pointed arch is 2.40m from its springing line. This arch has 0.38m, 0.23m and 0.39m high three rows of voussoirs. The voussoirs of this arch are arranged in an alternating order in harmony with the entrance portal. The top of the portal, above the level of the keystone of the first row, is demolished. The entrance door is at the center of the portal 2.65m wide and 3.38m high. The door is framed with a segmental arch that is 0.53m high. This arch consists of 0.5m high 11 voussoirs. The threshold of the door is hardly visible. There are two iron door wings that seem to be later additions. The two similar platforms on both sides of the door are ruined due to heavy weathering. The dimensions of these are (1.67m. x 0.4m. x 0.37m.). There is an inscription panel 1.35m above the door opening, which is bordered by a pointed trefoil arch. The upper part of both arch and the inscription panel are missing.

Fig. 3.14. Portal on the South Elevation (Entrance portal)

Fig. 3.15. Ornament frames on the Entrance Portal

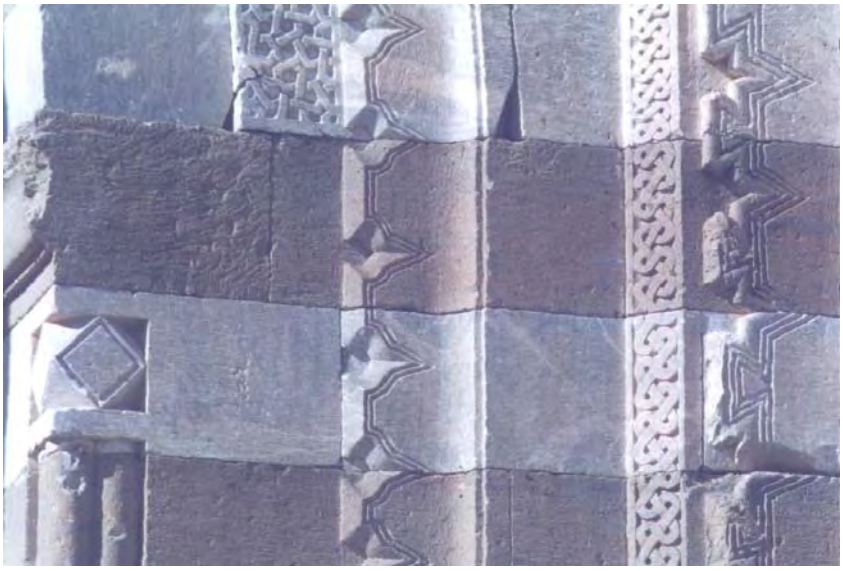


Fig. 3.16. Detail from the ornaments

The entrance portal is the only decorated part of the façade. There are four ornament frames *(Fig. 3.15).* Two of these are engraved vertically parallel to the both sides of the portal. The third one is parallel to these up to the springing line of the two-centered pointed arch and then, continues on the third row of the voussoirs of it. The fourth frame is only existent on the second row of voussoirs of this arch. The first frame consists of a 0.08m wide entwining band. The second consists of two bands: One of them is an entwining band of geometric patterns and the other is a moulding with half-star motifs. The third frame is a combined band of cavetto moulding and motifs like half-star. The fourth frame consists of entwining polygonal geometric ornaments. There are also entwining bands in high relief at the corners. These bands end below the impost stone of the pointed superimposed arch with a diamond shaped moulding *(Fig. 3.16).* There are ornaments below the cantilever parts of the impost stones of the segmental arch; however, these are not clearly visible due to weathering.

Fig. 3.17. East Elevation

3.3.2. East Elevation

The east elevation is composed of 2 equal parts divided by a buttress at the middle (B6) and bordered by two, which are located on the southeast and northeast corners (B5 and B7) *(Fig. 3.17).* Both parts correspond to spaces at the east of the courtyard. The total length of the east elevation is 36.76m and the average height is 7.50m. The elevation locates on a terrain slightly slopes to south.

There are 3 slit windows on each part, one at the middle the others on both sides close to the buttresses. The south part is 14.67m long 7.79m high and the north part is 14.58m long 7.52m high.

Fig. 3.18. Buttress B7

There is a diagonal structural crack on the buttress at the northeast corner (B7). The two stone faces 3.87 and 4.40 m from the ground level are detached and resting on the ground at the bottom of this buttress. *(Fig. 3.18)* The color change mentioned above is visible on both parts up to 3m from the ground level.

Fig. 3.19. North Elevation

3.3.3. North Elevation

The north elevation is composed of gradually projecting 3 unequal parts, from west to east, respectively. The west part corresponds to the shelter, the middle and east parts correspond to the north exterior walls of the spaces along the north wall of the courtyard. *(Fig. 3.19)*

The elevation locates on a terrain that slopes towards the corners. The total length and average height of the façade are 96.24m and 6.00m, respectively.

The west part is 31.93m long and 6.48m high at its highest part. The wall is divided into three parts by two buttresses (B10 & B11). There is a slit window on each part, quite similar to the west part of south elevation. Starting from the east, the first part is 10.47m long 5.30m high, the second part is 8.89m long 5.46m high and the third part is 10.47m long 6.17m high.

The middle part is 29.41m long, 6.42m high. It projects 1.80m from the west part. The wall is divided into two parts by a buttress (B9). The first part is 15.66m long 5.54m high, and the second part is 11.73m long 6.42m high.

The east part, projecting 5.22m from the middle part is 34.90m long 7.38m high. The wall is divided into two parts by a buttress and ended by another on the east. The first part is 14.83m long 6.21m high, and the second part is 15.68m long 7.54m high.

The problem of khaki-green and red-brown deposits on the stone surfaces, which indicates to lichen colonization, is remarkably serious on the north elevation. These form a dark colored thick patina on the whole elevation, especially under the gutters.

Fig.3.20. West Elevation

3.3.4. West Elevation

The west elevation is composed of three similar parts divided by two buttresses (B12 & B13) and it corresponds to the shelter. *(Fig. 3.20)* There is a centered slit window at the top of the middle part, the upper part of which is demolished.

The total length is 25.06m; the average height of the facade is 7.00m. The first part is 7.21m long 6.52m high, the second part is 7.23m long 7.62m high and the third part is 7.22m long, 7.12m high.

3.4. Plan Layout

The courtyard is at the center of the Han and provides direct or indirect access to the spaces, semi-open spaces, masjid, roof and the shelter. *(Fig. 3.11)*

The spaces, which have a total number of 13, form two triple groups at the northwest (SP #11, SP #12, SP #13) and at the east of the courtyard (SP #5, SP #6, SP #7). In these groups, the spaces on both sides are accessed from the space at the middle, which opens to the courtyard. In addition to these, there are two more spaces (SP #8, SP #9) on the north and one space (SP #4) on the south of the second space group. And there are also two spaces (SP #10 and SP #3) on the north and on the south of the courtyard, each locate between two semi-open spaces. There are two more spaces (SP #1 and SP #2) and the entrance space in between, at the southwest of the courtyard.

The semi-open spaces have a total number of four. Two of them locate on the south of the courtyard and two of them locate on the north.

The masjid that locates over the entrance space, and the roof are accessed through two stairs located at the southwest and the northwest corners of the courtyard respectively. The first few steps of these stairs are on the floor and the rest are cantilever steps, on the north and south walls of the courtyard.

3.4.1. Courtyard

The courtyard is accessed from the entrance space. It is an open space 53.32m long, 16.89m wide and slopes east and west from the middle, about %3.

The floor covering of the courtyard is cut stone. This is only visible in front of the portal of the shelter and at the middle of the courtyard, due to earth deposits, several fallen stones and plants.

3.4.1.1. Courtyard Elevations

The courtyard elevations of the Han are standing to (approximately) 7m height in different parts to the level of cornices at the top of the walls. The walls are not regular due to the loss of cornices and face stones of the upper and lower parts of the walls.

The walls are holed with arched openings and doors with different widths and heights. The arched openings, which are framed by two centered pointed arches with double rows of voussoirs, lead to the semi-open spaces. The doors with segmental arch or lintel at the top, lead to the corresponding spaces that are directly accessed from the courtyard.

The courtyard walls are constructed with cut stones similar to the exterior elevations, but the coursing and the types of stones vary depending on the location. The most common stone is travertine. The tufa is used especially for cornices and stairs. The first rows of voussoirs of the two centered pointed arches are constructed in alternating order similar to the arches of the entrance portal, but the second row of voussoirs are constructed only with travertine.

3.4.1.1.1. South Elevation

The wall of south elevation is holed with seven arched openings, four on the east and three on the west, which lead to semi-open spaces #2, #1 and the entrance space, respectively. The third opening on the west part is lower than the others and has a segmental arch at its top. The wall above this opening, where the masjid corresponds, is heavily damaged. Therefore the interior of the masjid is visible. There are two similar segmental arched doors that are fitted in

rectangular frames, on the east and west of this opening, which lead to Space #1 and Space #2 *(Fig. 3.21).* The overall length of the elevation is 53.20m and the height is 7.10m at its highest part.

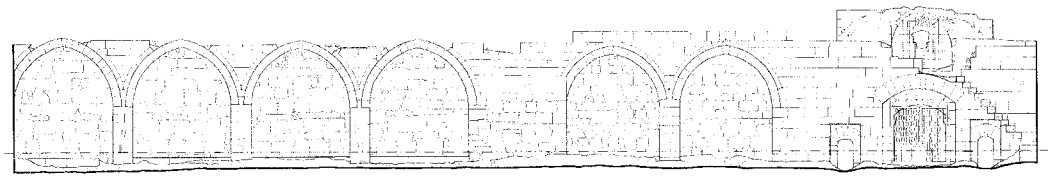


Fig. 3.21. South Elevation of Courtyard

The steps of the stairs leading to the masjid, begin 0.2m above the floor level on the west, continue over the door of Space #1 up to the last step, which is 4.30m high *(Fig. 3.22).* There are a total number of 10 heavily damaged cantilever steps, which are 0.32m high, 0.46m wide and projecting roughly 0.25m from the wall. There are remains of ornaments under the projecting part of the steps like *muqarnas*, which are not clearly visible due to the damage *(Fig. 3.23)*.

There is a remarkable difference of workmanship on the wall, between the two groups of arched openings. The face stones below 3.00m are constructed with semi-processed re-used stones unlike the rest *(Fig. 3.24).*

Fig. 3.22. Stairs to the Masjid

Fig.3.23. Detail from the steps

Fig. 3.24. Difference of workmanship on the south elevation of courtyard

3.4.1.1.2. East Elevation

The east elevation consists of a wall that is holed with only two door openings. The one at the middle is exactly similar to the door of Space #1 and the other, which is close to the south end of the elevation, has a lintel and a flat relieving arch at the top. The first door leads to Space #6 and the second leads to Space #4. The overall length of the elevation is 17.10m and the height is 6.00m at its highest part.

The wall is constructed with ashlars in isodomic coursing unlike the other courtyard elevations. The heights of the courses change at the north part of the elevation.

3.4.1.1.3. North Elevation

The east part of the façade is partly demolished. The two arched openings on the west lead to the Semi-open space #4 and the demolished part leads to Semi-open space #3 respectively. There are two door openings, one at the west end of the façade similar to the door of Space #1 and the other at the middle, between the demolished part and the arched openings, with a lintel at the top. The first one leads to Space #12 and the second leads to Space #10. The overall length of the elevation is 53.16m and the height is 5.60m at its highest part.

The steps of the stairs leading to the roof are on the west and above the door of Space #12, begin at 0.19m from the ground level. The last step is 4.45m high. There are 9 steps existent and several others are missing due to the damage above the door. Each step is 0.31m high and 0.43m wide and projecting approx. 0.15m from the wall. There are also ornaments under these, similar to that of the stairs to the masjid *(Fig. 3.25).*

Fig. 3.25. Detail from the stairs to the roof

There is a strange difference of workmanship on the wall, on both sides of the door of Space #10, which is very similar to what is mentioned on the south elevation *(Fig. 3.26).*

Fig. 3.26. Difference of workmanship on the north elevation of courtyard

3.4.1.1.4. West Elevation

The west elevation consists of a massive wall with the portal of the Shelter at the middle. The wall is constructed in pseuo-isodomic coursing similar to the south exterior elevation. The overall length of the façade is 16.91m and the height is 6.78m at its highest part.

The outlines of the portal of the shelter, including the use of two colored stones, is quite similar to the entrance portal in terms of geometry and material use. The portal is 7.28m long and projecting 1.70m from the wall. The top of it is demolished. The height of the portal is 7.65m from the ground level up to the existing part (+6.90). A two-centered pointed arch with 0.4m and 0.3m high two rows of voussoirs spans the 3.85m wide opening. There is a 2.65m wide 3.42m high door opening at the center of the portal, with segmental arch at the top, which consists of 0.92m high nine voussoirs. There are quite intact two similar platforms 0.38m wide 1.55m long and 0.52m high, on both sides of the door opening. There is an inscription panel 1.18m above the door opening that is bordered with a frame with two-centered pointed arch at the top.

The portal of the shelter has a modest decoration in comparison to the entrance portal. There are two frames of ornaments. The first consists of cavetto moulding and the second consists of half star motifs bordered with a chamfered moulding. There are false columns at the corners of the opening in high relief *(Fig. 3.27).*

Fig. 3.27. Portal of the Shelter

3.4.2. Spaces

The spaces consist of rooms, which are mostly covered with barrel vaults that have two centered pointed profiles.

The floors of the spaces are not regular due to the earth deposits and excavations. Therefore there is only limited information about the floor covering of the spaces, except the thresholds of the doors, which give an idea about the floor levels.

The walls of the spaces are generally constructed with rubble stone and joints of these are pointed smoothly. The overlapping corner joints of the walls, the sills and thresholds of the doors are constructed with cut stones.

The vaults are mostly damaged and even demolished depending on their location. These are generally constructed with rubble stones and plastered with lime plaster that is not existent today except some remains. There are mould holes on the vaults closer to both ends, just above the springing level.

The spaces on the south and north of the courtyard have no windows. On the other hand, there is a centered, single slit window on the east wall of each space that is located at the east of the courtyard. These have an average height of 3.40m from the ground level (+2.30), roughly 0.6m wide and 1.40m high.

The spaces mostly contain dust, garbage, animal droppings and earth deposits. Their vaults, mostly covered with black deposits, are coming off in small pieces due to the ineffective drainage. But the most serious common problem is the damage due to excavations, at the middle parts of the walls, the sills and upper parts of the doors.

3.4.2.1. Entrance Space

The Entrance space, which links the entrance portal to the courtyard, is a corridor covered with a barrel vault with segmental arch profile. *(Fig. 3.28)* The dimensions of the Entrance space are (3.83x3.75x3.15). The height of its vault is 0.75m from the springing line.

Fig. 3.28. Entrance space

The walls and the vault of the Entrance space are constructed with ashlars of travertine and tufa unlike the other spaces. The travertine is extensively used for the construction of both while the tufa is only used on the vault, in small quantities with travertine.

The sills of the entrance door mentioned above, project from the walls in two steps and these projections are connected at the top with a joggled flat arch, forming a doorframe. The remains of the original door system are visible on this frame. There are two hinges carved inside the projecting springers of the flat arch. These are 3.30m (+2.45) high *(Fig. 3.29).* There are holes for the sliding bar on east and west, below the hinges. The heights and diameters of these are 1.39m and 0.19m, respectively.

Fig. 3.29. Hinges of the Entrance door

3.4.2.2. Space #1

The dimensions of Space #1 are 2.94x3.29x 5.50m (+4.90). The west wall of this space is the extension of the west wall of the courtyard, so it is constructed with cut-stone in pseudo-isodomic coursing as an exception. The top of the vault is partly damaged. There is a 1.08m long 1.50m wide hole existent next to the north wall.

3.4.2.3. Space #2

The dimensions of Space #2 are 3.01x3.76x 5.60 (+5.00). Space #2 is one of the most heavily damaged spaces due to the excavations. Its east wall is partly demolished and the other three are deeply excavated. There is a hole at the top of the vault, similar to that of the hole at the vault of Space #1.

3.4.2.4. Space #3

The dimensions of Space #3 are 3.18x3.04x5.55 (+4.95). Space #3 is accessed from Semi-open space #1. The door of Space #3 is on its west wall and similar to the door of Space #1 but it has no rectangular frame *(Fig. 3.30).* It is 0.85m wide 1.30m high. The segmental arch at the top of the door consists of 0.63m high six voussoirs.

Fig. 3.30. Door of Space #3

The floor of Space #3 is deeply excavated, where there is a 1.80m deep pit at the middle. There is an oculus at the top center of the vault with dimensions of 0.28x0.37m. It is 1.29m away from the south wall.

3.4.2.5. Space #4

Space #4 is the biggest space amongst the others and it is located on the southeast corner of the Han. The dimensions of it are 5.30x5.72x6.40m (+5.22). Space #4 is covered with a cross vault constructed with brick unlike the other spaces, the top part of which is damaged *(Fig. 3.31).* There are two windows on the east and south walls, opening to east and south facades. The dimensions of these are, 0.72x1.55 and 0.76x1.47, respectively.

3.4.2.6. Space #5

Space #5 locates on the south of the triple space group, which includes Space #5, Space #6 and Space #7. The dimensions of Space #5 are 3.12x5.40x6.47m (+5.28). There is a 1.03m wide door on the north of the space connecting it to Space #6. The sills and the top of it are heavily damaged, only the threshold exists *(Fig. 3.32).* The vault of Space #5 is damaged similar to the Space #4.

Fig. 3.31. Vault of Space #4

Fig. 3.32. Door of Space #5

3.4.2.7. Space #6

Space #6 is at the center of the triple space group mentioned above. The dimensions of it are 4.40x5.39x6.63m (+5.37). The vault of Space #6 is half demolished like the upper part of the west wall.

3.4.2.8. Space #7

The dimensions of Space #7 are 4.40x5.32x6.65m (+5.39). Space #7 is quite intact except its vault and its south wall. Its vault is damaged on its east end and its top. It is connected to Space #6 with a 1.05m wide door. The top part and sills of this door are damaged similar to that of Space #5. *(Fig. 3.33)*

Fig. 3.33. Door of Space #7

3.4.2.9. Space #8

The dimensions of Space #8 are 3.27x5.40x6.25 (+5.45). Space #8 is separated from Space #9 by a wall having an arched opening. But regarding the wall traces near its irregular shaped voussoirs, this arched opening looks like a construction error or a big demolished niche belonging to Space #9. It is 1.40m above the ground level and 2.12m high from its springing line. *(Fig. 3.34)* There is a quite low door opening on the west wall of the space. It is partly closed due to the fallen stones from the exterior. The sills and top part of the door are heavily damaged *(Fig. 3.35).* The west part of the vault from the middle to the west wall is partially demolished.

3.4.2.10. Space #9

Space #9 is accessed from Semi-open space #3, through an arched opening on its east wall. The dimensions of Space #9 are 3.74x5.52x6.65m (+5.55). There is a small niche on the north wall of the space, 2.23m (+0.91) high. The dimensions of it are 0.35x0.28x0.44m *(Fig. 3.36).*

Fig. 3.34. Arched opening between Space #8 and Space #9

Fig. 3.35. Door of Space #8

Fig. 3.36. Niche on the north wall of Space #9

3.4.2.11. Space #10

The dimensions of Space #10 are 3.06x3.16x5.50 (+4.90).

3.4.2.12. Space #11

Space #11 locates on the east of the second triple space group mentioned above. Its dimensions are 3.15x3.20x 5.65(+5.03). The west wall, separating it from Space #12 is demolished up to 2.20m above the floor level. The south wall is heavily damaged due to excavations and the east wall is partly demolished *(Fig. 3.37).* There is a slit window on the south wall, opening to the courtyard and it is 3.15m high. The dimensions of the window are 0.84x1.14m.

Fig. 3.37. Damaged south wall of Space #11

3.4.2.13. Space #12

Space #12 is at the center of the triple space group mentioned above. The dimensions of Space #12 are 3.22x3.40x 5.45(+4.93). The walls of Space #12 are heavily damaged due to excavations similar to the previous space. The west wall separating this space from Space #13 and the south wall are partly demolished. *(Fig. 3.38)* The sills and the top part of the door of Space #12 are damaged. There

are two fallen stones resting on the floor at the bottom of the west-wall. These are the corner stones of the corniche at the top of the courtyard wall.

Fig. 3.38. West wall and the door of Space #12

3.4.2.14. Space #13

Space #13 is the smallest space amongst the others. The dimensions of this space are 1.73x3.25x5.05 (+4.85). This space is accessed through the opening on its partly demolished east wall. The current floor level of Space #13 is roughly 0.6m higher than the previous space due to the deposits. The vault of this space is totally demolished. There is a construction joint on the west wall of this space. The south part of the joint is constructed with ashlars in pseudo-isodomic coursing as it is the extension of the west wall of courtyard, and the north part is rubble stone.

3.4.3. Semi-open Spaces

The semi-open spaces consist of groups of galleries opening to the courtyard, which are covered by barrel vaults with two-centered pointed profile. Walls with arched openings that have two-centered pointed profiles, separate these galleries from each other.

The floors of semi-open spaces are in disorder like the spaces, and they are entirely or partially raised with platforms, which are in ruins.

The walls of the semi open spaces are constructed with semi-processed re-used cut stones in general, similar to the north exterior elevation, except the walls with arched openings, which are constructed with ashlar.

The vaults of semi-open spaces are quite similar to the vaults of spaces. The ends of the vaults, where they meet the courtyard wall and turn into arched openings, are constructed with cut stone. The plasters of the vaults are mostly fallen at the top parts.

3.4.3.1. Semi-open Space #1

Semi-open space #1 consists of two galleries. The dimensions of the galleries are 3.78x4.78x5.09 (+4.94) and 3.78x4.89x 5.09 (+4.94) from west to east respectively. The door mentioned above, leading to Space #3, is on the east wall. In addition to the common forms of damage, there is a vertical crack on the vault of the first gallery above the arched opening of the east wall. *(Fig. 3.39)*

3.4.3.2. Semi-open Space #2

Semi-open space #2 consists of four galleries. The dimensions of the galleries are 3.62x5.20x5.51m (+5.28), 3.63x5.20x5.43m (+5.26), 3.67x5.20x5.58m (+5.34), 3.75x5.28x5.67m (+5.39) from west to east respectively.

The west wall of the first gallery is constructed with ashlars in pseudo-isodomic coursing unlike the others *(Fig. 3.40).* The borders of the platforms are quite intact, standing to 0.5m height above the floor level of the courtyard. The floor is

excavated behind these, and the earth is emptied[4] to the socles. There are dumps of fallen stones on the ground of the last gallery on the east. There is a 0.23m wide channel on the south wall of the third gallery, below the current floor level, opening to the east part of south exterior elevation.

Fig. 3.39. Crack on the vault of Semi-open space #1

Fig.3.40. West wall of the first gallery of Semi-open space #2

3.4.3.3. Semi-open Space #3

Semi-open space #3 consists of partially demolished, four galleries. There is a roughly, 1.5m high dump at the middle, which consists of the remains and fallen pieces. The dimensions of the galleries are 5.05x9.02x6.26m (+5.46),

[4] This space is excavated in the cleaning studies done by Selçuk University, Department of

5.17x9.02x5.84m (+5.51), 5.18x9.13x5.65m (+5.49), 5.01x9.13x6.02m (+5.49) from east to west, respectively. The east wall of the first gallery is constructed with fine ashlar like courtyard elevations unlike the other walls. There is a construction joint on the west wall of the fourth gallery. The south part of this joint is constructed with ashlar in pseudo-isodomic coursing and the north part is constructed with semi-processed re-used cut stones. There are vertical cracks on the west and east walls and vaults of the second and third galleries, close to the fallen part. The voussoirs of the arches close to the ground at these walls are heavily weathered and there are signs of rising damp.

There is a fallen gutter at the top of the dump mentioned above. It is made of tufa and its dimensions are 1.03x0.54x0.35m. *(Fig.3.41)*

Fig. 3.41. Fallen gutter at Semi-open space #3

3.4.3.4. Semi-open Space #4

Semi-open space #4 consists of three galleries. Dimensions of these are 3.77x4.01x5.12m (+4.74) , 3.80x4.03x5.03m (+4.67) and 3.82x4.01x4.85m (+4.73) from east to west respectively. There are remains of the borders of the platforms at the middle gallery and the gallery on the west. The walls are intact, except the west wall of the west gallery. A face stone with an inscription, on the north wall of the same gallery is detached and resting on the ground. There is a

History of Art, in the summer of 1996.

very primitive concrete support on the wall that separates the middle gallery and the gallery on the west *(Fig. 3.42).*

Fig. 3.42. Concrete repair at Semi-open space #4

3.4.4. Shelter

The shelter consists of two series of galleries on the north and on the south, which are similar to the semi-open spaces, meeting a higher central gallery on east-west direction. There are six galleries on each group, which makes a total number of 13 with the central gallery. The shelter is accessed through the door of shelter on the east wall of the central gallery. The overall dimensions of the shelter are: (29.87 N, 22.48 E, 29.69 S, 22.38 W) *(Fig. 3.43)*

The dimensions of the central gallery are 3.54x29.65m. The vaults covering the central gallery, the upper part of the dome and the top parts of the east and west walls are demolished, however four of the five rib arches, and the lower part of the off-center dome that rests on the second and third rib arches are intact. There are arched openings on the north and south walls of the central gallery that lead to the side galleries. These are roughly 3.00m high up to the springing lines of the arches, the heights of which are 2.40m from their springing level. These arches consist of single row of voussoirs except the arched opening below the dome that have double rows.

The rib arches, rest on approximately 0.3m high, 0.9m wide stone cantilevers on the north and south walls and 6.00 (+5.70) high from the ground level. These arches are 2.05m high and have two-centered pointed profiles.

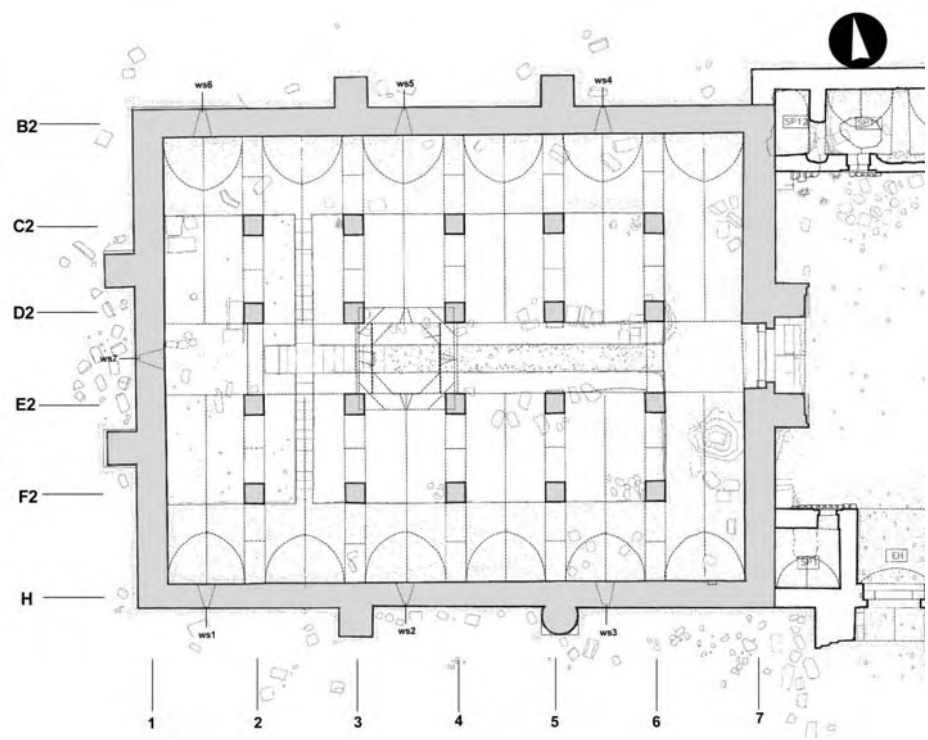


Fig.3.43. Key plan for the Shelter

The lower part of the dome has a 3.53x 3.53m square plan, which turns into an octagon with squinches having muqarnases inside *(Fig. 3.44).* The walls between the squinches are embellished with slit windows. There are two relieving arches with two-centered pointed profiles on the north and south walls. *(Fig. 3.45)* There are a totally four slit windows. The top part of the slit window on the east is demolished. The height of the dome is 11.18m (+10.39) up to the existing part.

Fig. 3.44. Squinches at the transition part of the dome

Fig. 3.45. Relieving arch on the south wall of the dome

Fig. 3.46. One of the hinges of the door of the Shelter

The door of the shelter is in a 3.25m wide 1.24m deep niche framed with a two-centered pointed arch on the east wall. There is a joggled flat arch with a flat relieving arch in this niche. The hinges of the original door are carved in the projecting springers of the flat arch *(Fig. 3.46).* The hole of the sliding bar is on the north of the niche 1.37m above the cut-stone threshold of the door (+0.58). Its dimensions are 0.2x0.2m.

There is a slit window on the west wall of the central gallery. It is 4.16m high from the ground level (+3.39) and 1.10m wide. The upper part of this window is demolished.

The side galleries of the shelter are deeper than the galleries of the semi-open spaces. The dimensions of side galleries are all similar and approximately 4.10x9.40m. The arches of the walls separating the galleries consist of single row of voussoirs and there are two openings on each wall. The openings are all similar, 3.40m wide close to the central gallery and 3.95m wide close to the north and south walls. The arches are 2.00m high from their springing levels. The walls with arched openings turn into short pillars from up to down. The dimensions of these are 1.05x1.05m. There are totally six slit windows, three on the north and three on the south walls of the side galleries, which are 3.10m high from the ground level (+2.15), with dimensions of 0.93x1.85. There is one window on the first, third and fifth galleries on both sides from west to east, respectively. There is a niche on the south wall of the sixth gallery, which is similar to that of Space #10. The lower part of the niche is damaged. Its dimensions are: 0.42x0.19x0.60.

The floor of the shelter has two main levels: The platform and the stables. The platform is located at the middle of the shelter and it is elevated from the stables. It lies to the second pillar of each gallery on north and south, to the sixth gallery on the east and to the west wall of the shelter. The platform is divided into three parts by a passage lying on east-west and north-south directions forming a “T” shape and opening to the stables *(Fig. 3.47).* Its dimensions are 1.05x20.58m on east-west direction, 0.87x13.20m on north-south direction. The passage is

roughly 0.5m lower than the platform. The overall dimensions of the platform are: (25.73 N, 14.48 E, 25.69 S, 14.56 W). The stables surround the platform on north, south and east. The widths of the stables are 4.06m on east, 3.98m on north and south.

Fig. 3.47. Passage in the Shelter

3.4.5. Masjid

The masjid has a 3.18x3.18m square plan. The superstructure and top parts of the walls except the south wall, where the mihrab exists, are demolished. There are small remains indicating to a star vault on the southeast and southwest corners of the masjid *(Fig.3.48).*

The walls, vault and floor are constructed with fine cut stone. The original flooring of the masjid is not entirely intact, but the remains are visible at the bottom of the south wall.

The mihrab consists of a niche surrounded with a series of rectangular frames of mouldings. The top part of mihrab is damaged. Its overall dimensions are 1.87x2.68 and the depth of the niche is 0.47m. The niche has a half-octagonal plan with false columns in high relief at the corners. The upper part of the niche is demolished and the rest are badly weathered. The mouldings and entwining

geometric ornaments of the frames are not clearly visible due to khaki-green layers of lichen colonization.

Fig. 3.48. Masjid, overall view

3.4.6. Roof

The roof is covered with a varying thickness gray earth layer with a carpet like plant formation. The top parts of the extradoxes of the vaults are visible amongst these deposits. This is a common view, except the masjid and the roof of the shelter where the dome and arches project upwards.

The extradoxes of the vaults produce wide gutters at their meeting points that are linked to the waterspouts on the exterior walls. There is one waterspout at the end of each gutter. This draining system is not clearly visible at the roof of the spaces on the east of the courtyard due to the earth deposits. Neither gutters, nor traces of missing gutters exist at this part.

The gutters have varying heights between 4.91m - 6.86m (+4.47m - +4.85m) from the ground level, projecting from the exterior walls. They are all made of tufa similar to the fallen one at the Semi-open space #3. There are 25 heavily

weathered gutters existing today. And 11 gutters are missing, regarding the hollow parts of the missing ones.

The original roofing material is not visible due to the problem described above. However, there is a small part of plaster, which looks like cement mortar on the vault close to the fallen part of the roof of Semi open space #3. *(Fig. 3.49)*

The dome is 3.97m high from the roof up to the existing part. The 4.88x5.12m square plan of the dome turns into octagon with stop-chamfers through the top. The stop-chamfers correspond to the squinches mentioned above. The north and south walls are rough-cut stone up to 1.87m (+8.00), and then ashlar to the top. The four slit windows of the dome are 2.63m (+8.84) high. *(Fig. 3.50)*

The rubble stone walls have partially intact extensions, through east and west till the back of the portal of the shelter and west wall of the shelter. And these correspond to the top of the north and south walls of central gallery.

Fig. 3.49. Mortar remains at the roof of Semi-open space #3

Fig. 3.50. East elevation of the dome

CHAPTER 4

ANALYSES[1]

4.1. Construction Material

The construction material analysis aims to systematically present list and account of the materials that are used for the construction of Zazadin Han.

The main construction material of the Han is stone. It is used as either cut stone or rubble stone and binded with lime mortar. The brick, concrete and iron are other materials. The cut stones are mostly re-used material in different colors and types. The most common stone type is the travertine[2], but there are also, dark colored (grey-brown) tufa, white marble and a few different types of marble in various colors and textures. However, a complete survey of the types and quantities of the stones will not be given in this study, as this is not the main subject.

The cut stones are discussed in five groups regarding the process that it had gone through. The first group comprises 'scratch built' cut stones, which are very possibly taken from the quarry (or other sources) and specially prepared for their places. These stones have no signs proving their being re-used material. There are

[1] The information presented in the analysis is obtained from the visual documents and in situ taken notes of observation. Therefore the analysis may not always depict the exact status precisely.
[2] The travertine is known as 'Gödene Taşı' around Konya. It is used on many monuments in and out of Konya city center.

mason's marks on them, which are presumed to be an important evidence of distinction *(Fig. 4.1)*. Refer to some sources the re-used stones do not have mason's marks[3]. The second group comprises processed re-used cut stones. It comprises re-used stone pieces that are finely processed *(Fig. 4.2)*. These stones have various engravings on them, including inscriptions and crosses[4]. This is the obvious evidence of their being reused. On the other hand, considering the demolition or the detachment process these pieces must have been partially damaged at the corners or edges. But this these pieces have straight edges and pointed corners as if they had been specially prepared. The third group is semi-processed re-used stones. These stones are not finely processed like what is described above. These pieces are mostly in regular geometry with weathered round edges and corners. Although they had not gone through process like previous examples, these pieces must have been divided or cut to fit in courses. Therefore, the word 'semi-processed' is used for them *(Fig. 4.3)*. The fourth group is non-processed re-used cut stones. These stones have no signs of process and they are laid just as what they are, in regular arrangement like rubble stone *(Fig.4.4)*. The rough-cut stones are the fifth group. It comprises the roughly squared stone pieces *(Fig.4.5)*.

Fig. 4.1. Masons marks on the scratch built stones

[3] Yavuz, A., 2002, "Anadolu selçuklu Mimarisinin Yapı Özellikleri", Selçuklu Çağında Anadolu Sanatı (Derleyen: D. Kuban), Yapı Kredi Yayınları, Promat A.Ş., İstanbul, s.271.
[4] The re-used stones must have been obtained from the Byzantine monuments. The inscriptions and crosses on them are the evidences of this. There is even a Byzantine tombstone amongst the face stones on the west elevation.

Fig. 4.2. Processed re-used face stones at south elevation

Fig. 4.3. Semi-processed re-used face stones at west elevation

Fig. 4.4. Non-processed re-used stones on east elevation.

Fig. 4.5 Rough cut face stones at the north elevation of the dome

There are also rubble stones used on the various parts of the monument. They are in two types. The first one consists of some whitish stone arranged in random coursing and used on the wall faces *(Fig. 4.6)*. The second one consists of flat pinky colored volcanic rubble stones in general and used on the vaults in radial arrangement *(Fig. 4.7)*.

Fig. 4.6 Rubble stone wall at Space #5 interior

Fig. 4.7 Flat rubble stone in radial order at the vaults of Semi-open space #3

The rubble stone-mortar combination is another category of material. It is used as the infill in the load bearing system elements. There is also a very limited brick use. It is only used on the superstructure of Space #4 *(Fig. 4.8)*.

Fig. 4.8 Brick construction superstructure of Space #4

The only finishing material used in Zazadin Han is the lime plaster. There are remains of it at the intradoxes of the vaults *(Fig. 4.9)*. Concrete and iron are the miscellaneous materials used on the later additions.

Fig. 4.9 Lime plaster at the vaults of Semi-open space #4

The distribution of the construction materials is presented in figure 4.10. The scratch built cut stones are used on the vault ends, the arches at both portals (regardless of its type), the superstructure of entrance space and rib arches at the shelter. The stone pieces on the mentioned parts have no traces of a secondary use. All the transition arches at the Shelter and semi-open spaces, the west part of

the walls of north and south elevations of the courtyard are constructed with ‘scratch built pieces’, which have masons marks on them. The corniches, the steps of the stairs, the floorings and the inscription panels are presumed to be made of scratch built stones regarding the process of precise workmanship.

‘Processed re-used stone’ and ‘Semi-processed re-used stone’ are one of the most commonly used material groups. Both of them are generally used on wall and buttress faces. The upper part of the dome, the south and east exterior elevations the butresses at the south and east exterior elevations including the corner buttresses, both portals except the arches and inscription panels, the pillars, the west and east elevations of the courtyard are constructed in processed re-used stone. Semi-processed re-used stone is used on the north and west exterior elevations, interior wall faces of the Shelter (except the walls with arched openings that separate the galleries), interior faces of the north wall of semi-open spaces #3 and #4, interior wall faces of the south wall of semi-open spaces #1 and #2. Semi-processed re-used stones are also used partially on the walls of north and south elevations of the courtyard between two-semi open spaces.

‘Non-processed re-used stone’ is not very common amongst the others. These are mainly used at two locations. The first is on both sides of the slit windows on the exterior elevations. The pieces used here tend to be similar on all of them. The second location is the top row of stones at the east part of the south elevation, the east part of the north elevation and the east elevation.

The rough cut stone is used on the exterior of north and south walls of the lower part of the dome and on the walls of the galleries of both semi-open spaces and the Shelter. The mentioned parts are above the semi-processed re-used construction faces of the walls, which meet the vaults vertically. Also there is a very limited rough cut stone use at the bottom parts of the superstructure of Space #4.

The first group of rubble stone is used on the walls between the spaces #4, #5, #6, #7, #8, #9, #11, #12, #13. In addition to this the rubble stone is used on the other interior walls of all spaces. The second group of rubble stone is used on the vaults of all spaces, semi-open spaces and shelter, except Space #4 and Entrance space. The 'rubble stone lime mortar mixture' infill more or less exists in all the walls, pillars, buttresses and portals. It is visible anywhere damaged or the wall faces are lost. But the infill is best seen at the demolished upper parts of these.

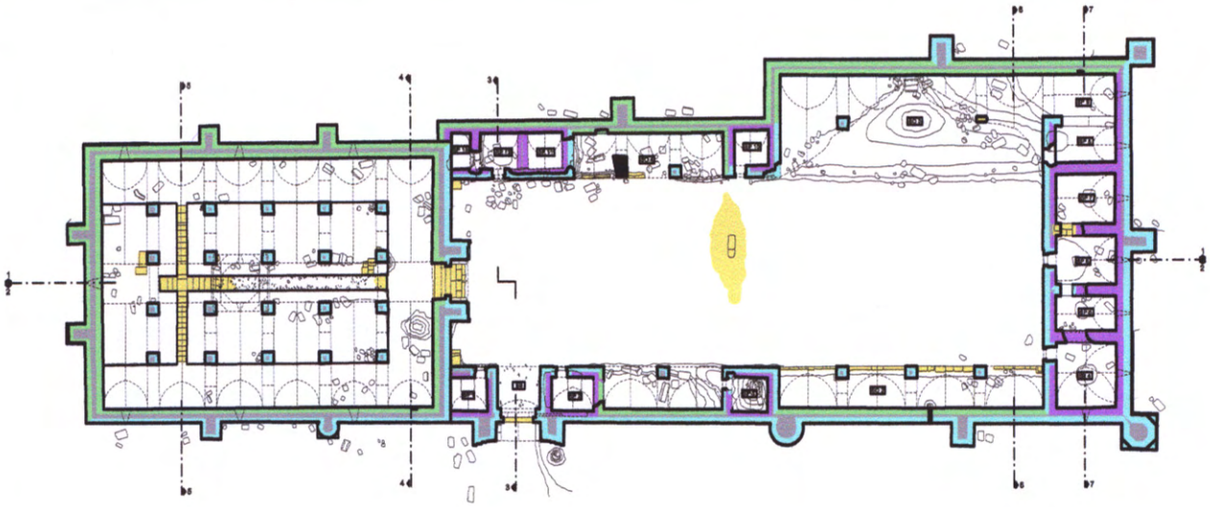
Brick is only used at the superstructure of Space #4 with the rough cut stone. The cross vault of this space is constructed in brick except the parts close to the corners. There were no undamaged fallen bricks; therefore the dimensions of the bricks are not detected.

Lime plaster is only used on the rubble stone parts of the vaults. It is used on the vaults of all the spaces, semi-open spaces and Shelter. There are no traces of plaster on the brick vault of Space #4 and the cut stone vault of the Entrance space.

The concrete is used for the consolidation of the damaged pillar at Semi-open space #4. It covers the part from the springing level of the arches to the remains of the pillar on the ground. There are also some rubble stones and cut stones combined with the concrete. Iron is only used on the welded iron construction door of the Han that currently exists.

When Zazadin Han is evaluated by means of its construction material, it can be seen that the re-used material, which most probably be obtained from any Byzantine building[5], obviously constitute the vast majority regardless of the process it had gone through. In most cases, it is difficult to understand if the material is re-used or not. However, all the foreground surfaces of the building seem to be constructed in processed cut stone whilst the others are constructed with semi processed re-used stone or the other categories.

[5] Considering the amount of the material it can be thought that was quite possibly obtained from some source more than one monument.



This analysis is prepared regarding the evidences of materials at the damaged parts of the han. This is a graphic presentation, therefore the objects presented here may not depict the actual status with all the details.

STONE

- CUT STONE (SCRATCH BUILT)
- PROCESSED RE-USED CUT STONE
- SEMI-PROCESSED RE-USED STONE
- NON-PROCESSED RE-USED STONE
- ROUGH CUT STONE
- RUBBLE STONE
- RUBBLE STONE #2
- RUBBLE STONE - LIME MORTAR MIX

BRICK

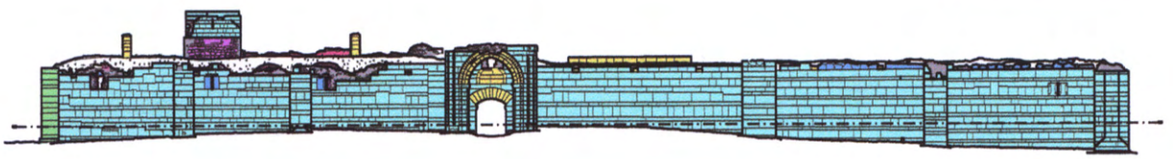
- BRICK

FINISHING MATERIALS

- LIME PLASTER

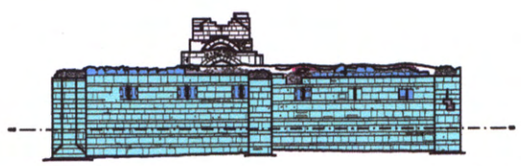
MISC. MATERIALS

- CONCRETE
- IRON



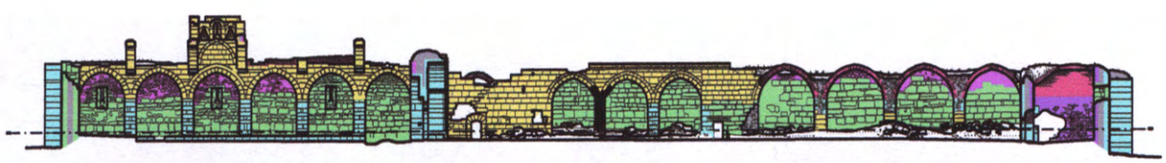
SOUTH ELEVATION

NORTH ELEVATION



EAST ELEVATION

WEST ELEVATION



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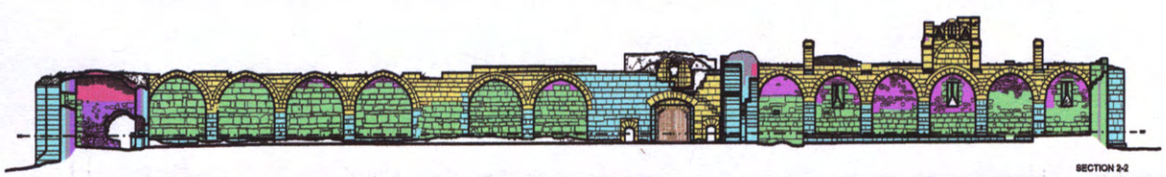

SECTION 2-2

SECTION 3-3

SECTION 5-5

SECTION 4-4

SECTION 6-6

SECTION 7-7

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FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR:
ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY:
MUSTAFA ONGE

CONSTRUCTION MATERIAL ANALYSIS

SCALE: 1/200

0 10 20m

N

W E

- MEASURED SURVEY
- ANALYSIS
- RESTITUTION
- RESTORATION

SHEET NUMBER:

4.2. Structural System

The Structural System analysis comprises two parts. The first part is about the main structural body of the building and the behaviours of structural elements. The second is about the relationships between the openings and forms of arches and vaults.

The structural system of Zazadin Han and its structural components are discussed in three main groups. The first one is the load bearing system. This group comprises continuous structural elements and single structural elements. The continuous elements include the load bearing wall system. The load-bearing walls, buttresses, projecting parts of the portal and relieving arches are the members of it. The single elements consist of pillars. The second group is the transition elements, which contains the arches and squinches. The third group is the elements of superstructure. Ribbed arches, barrel vaults with two centered pointed and segmental profiles, and the cross vaults are in this group.

The walls and the pillars of the load bearing system transmit their own loads and the loads of superstructure to the foundations. The load bearing walls are supported with buttresses and projections of portal, on the exterior, in order to increase the resistance of them against the lateral forces produced by the superstructure *(Fig. 4.11)*[6]. The relieving arches are located at the north and south walls of the dome. They help the distribution of the loads of the dome on the pillars *(Fig. 4.12)*.

[6] The projecting parts of the portals are discussed as structural elements in this analysis. Their structural behaviours are very possibly like buttresses. The evidences of this are very visible. The locations of both portals are important. At the shelter, the portal is located on the east wall. The east and west walls of the Shelter are thicker than the others as they are subject to lateral thrusts of the superstructure. The portal of the Shelter surrounds the door opening, strengthening the wall and maintaining its rigidity against lateral thrusts. The entrance portal locates on a section where there are no buttresses. If the existence of the construction joint at the same part is taken into consideration, the necessity of an element of rigidity can easily be presumed. This is the entrance portal.

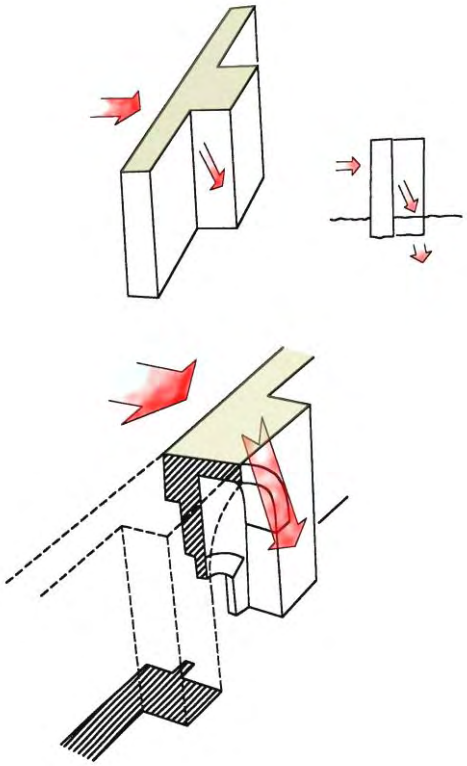


Fig. 4.11. Structural behaviours of buttresses and portals

The arches are the most common transition elements in the Han. They span the openings between the pillars and from down to up, turn the lines of pillars into load bearing walls. The squinches only exist at the top part of the dome. They turn the square plan of the dome into octagon. There are muqarnases inside these squinches but these have very possibly no structural function.

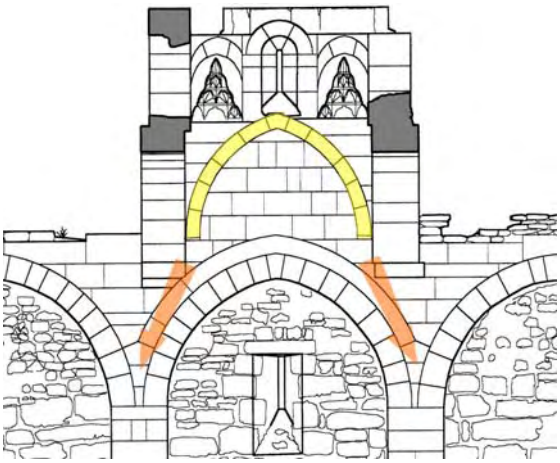
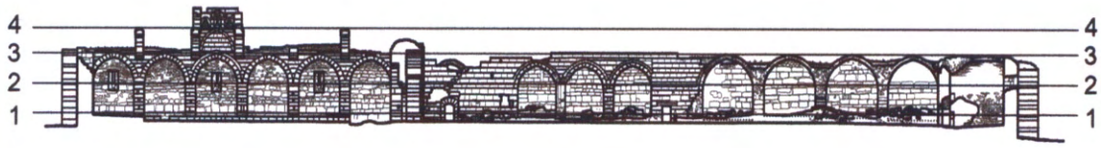


Fig. 4.12. Relieving arch at the dome



The load bearing system of Zazadin han contains 2 structural element groups: The load bearing walls system (continuous elements) and pillars (single elements). The opening between the pillars are spanned by arches, and from down to up the whole structure turns into load bearing walls on which the vaults of the superstructure can rest on. (fig.1)

The load bearing walls are strenghtened with buttresses and portal projections, on the exterior, against lateral forces that the vaults of the superstructure may produce. (fig. 2)

Note: There is no information about the foundations of the building, as the building is mostly intact and partially covered with earth.

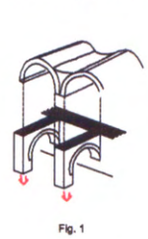


Fig. 1

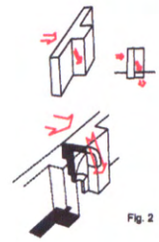
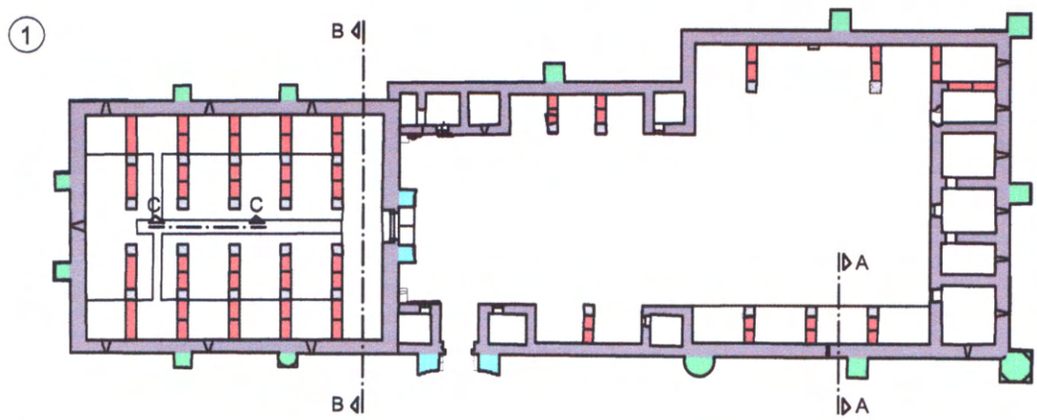
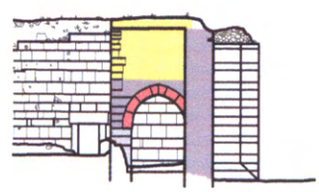


Fig. 2





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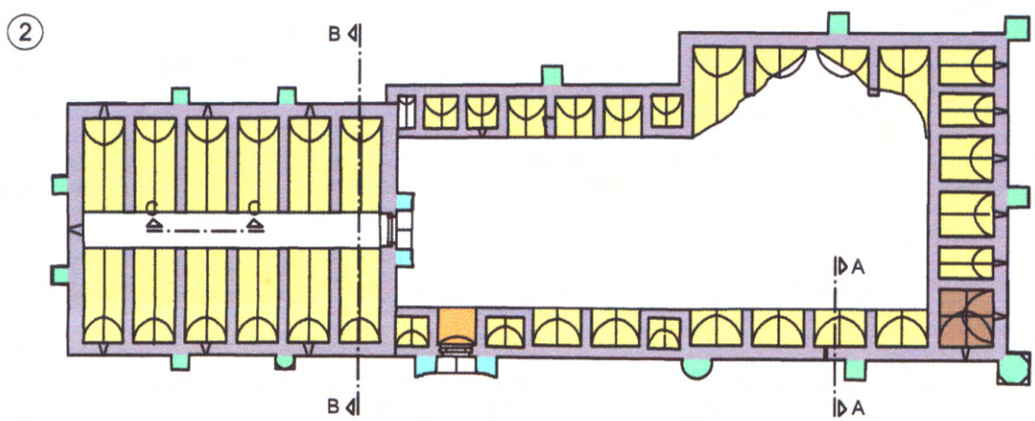

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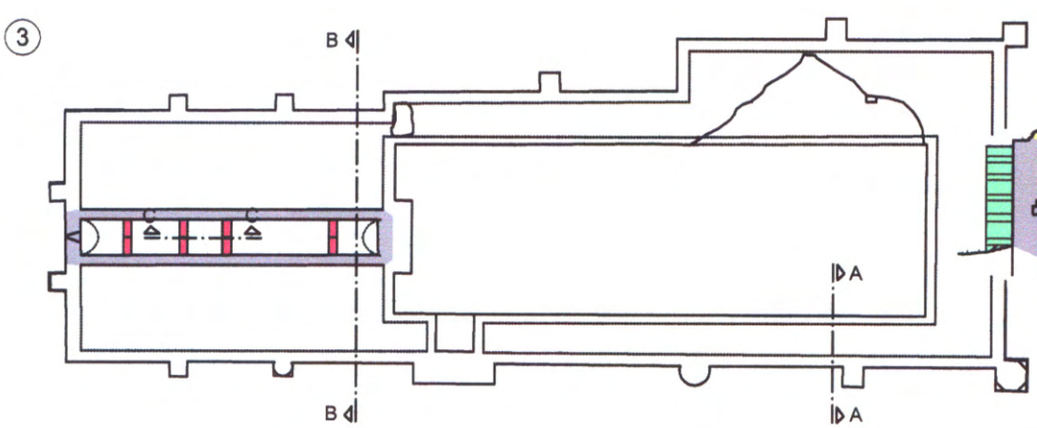

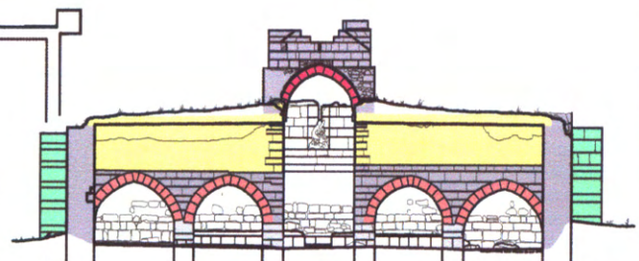

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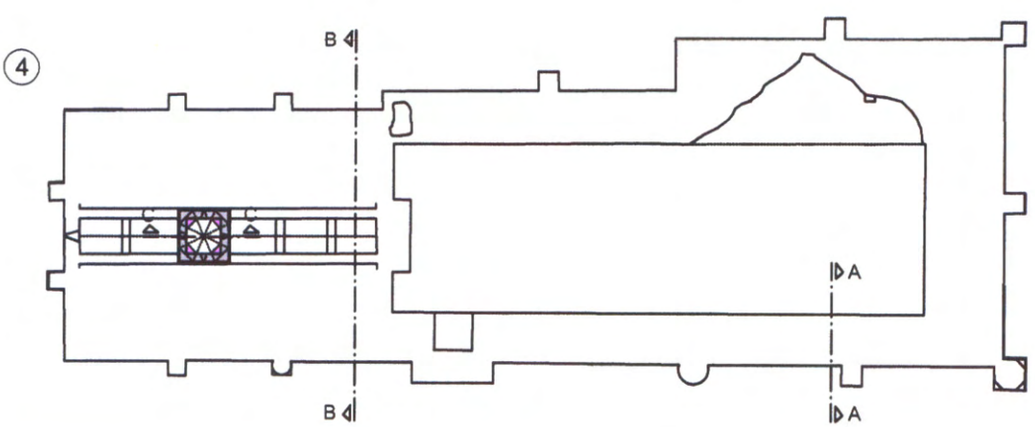

LOAD BEARING SYSTEM ELEMENTS

a) CONTINUOUS STRUCTURAL ELEMENTS

LOAD BEARING WALL SYSTEM

- LOAD BEARING WALL
- BUTRESS
- PROJECTION OF PORTAL
- RELIEVING ARCH

b) SINGLE STRUCTURAL ELEMENTS

- PILLAR

TRANSITION ELEMENTS

- ARCH
- SQUINCH

ELEMENTS OF SUPERSTRUCTURE

ARCHES

- RIBBED ARCH

VAULTS

- BARREL VAULT WITH TWO CENTERED POINTED PROFILE
- BARREL VAULT WITH SEGMENTAL PROFILE
- CROSS VAULT

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STRUCTURAL SYSTEM ANALYSIS

SCALE: 1/200

0 10 20 30 METERS

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- MEASURED SURVEY
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- RESTITUTION
- RESTORATION

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The superstructure of Zazadin Han, mostly consists of barrel vaults with two-centered pointed profiles. The vaults of all the spaces except the Entrance space and Space #4 are two-centered pointed type. At the central gallery of the Shelter, the two-centered pointed barrel vaults are integrated with ribbed arches[7]. Also the currently existing part of the dome rest on two of these. The Entrance space and Space #4 are covered with a barrel vault that has segmental profile and a cross vault respectively. The distribution of all structural elements and their classifications are shown in figure 4.13.

There is such a sample structural order repeating with variations: In spaces, the vaults of the superstructure rest on the load bearing walls. At the galleries, like the galleries of the shelter or other semi-open spaces, from down to up, the openings between the pillars are spanned by transition arches, which turn them into load bearing walls; these walls vertically connect the other load bearing walls. Finally the vaults of the superstructure rest on them *(Fig. 4.14)*. The foundations of Zazadin Han are not visible. Therefore, there is no information about them in this analysis.

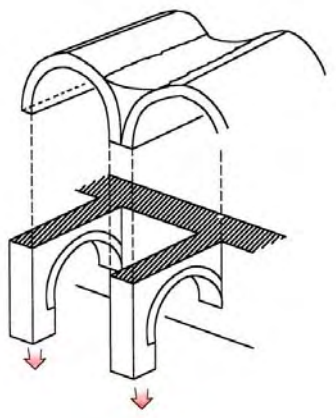


Figure 4.14. Sample structural order

[7] The structural function of the ribbed arches (or rib arches) is not very clear. According to Prof. A. Yavuz these arches are constructed for dividing the construction of the vaults into periods and they possibly have no structural features. She points out the examples in which the arch was demolished but the vault remained intact. However this hypothesis cannot be generalised for all the examples (the vaults may not collapse but deform), and it needs the approach of a structural engineer to become a theorem.

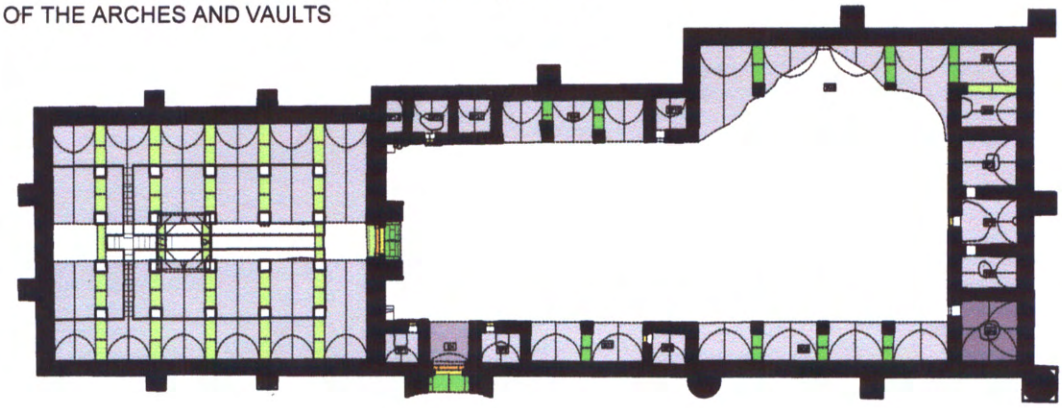
The analysis about the relationships between the openings and forms of arches and vaults consists of two parts. The first art aims to find out the possible relations between the openings and the forms of arches or vaults. This study also examines the reason of the existence of double rows of voussoirs at the ends of vaults at semi-open spaces and at the third gallery of the shelter (See Arches and Vaults in Construction Technique Analysis for further info.). There could be a distinction between the openings of the vaults carried by the pillars and the vaults carried by the load bearing walls. This is also amongst the things discussed in this analysis *(Fig. 4.15)*. The second part of the analysis is a study for the discussion of a theory. Prof. Dr. A.Yavuz informs about the existence of a relation between the opening and the height of the arch (or the vault) spanning it[8]. The arches and vault profiles are classified in this part whether they fit into this theory and prove it or not.

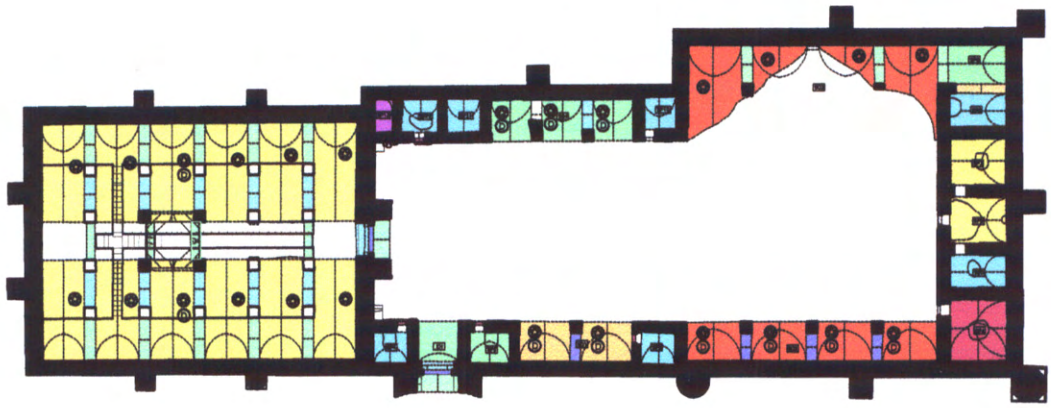
The two-centered pointed form is common for most of the arches and vaults of Zazadin han. There are two rows of voussoirs at the transition arches and vault ends of all the semi-open spaces. The vaults of the third galleries both on the north and on the south of the shelter have vault ends with double rows of voussoirs.

These second rows are not related to the openings as what is understood from the analysis. The openings spanned at the galleries of the Shelter are bigger than that of Semi-open space #4. But the vaults covering these galleries have vault ends with only single row of voussoirs except the third galleries on the north and on the south. The vaults of these two galleries end at a location where the dome exists. It can be presumed that the vaults of these two galleries have vault ends with double rows of voussoirs to maintain their rigidity *(see Fig. 4.12)* against the loads of the dome. The builder must have given importance to the rigidity of arches and vaults especially at the semi-open spaces.

[8] Yavuz, A. T., 1983, Anadolu Selçuklu Mimarisinde Tonoz ve Kemer, Kelaynak Yayınevi, Ankara.

THE RELATIONS BETWEEN THE OPENINGS & FORMS OF THE ARCHES AND VAULTS





ARCHES

- FLAT ARCHES
- SEGMENTAL ARCHES
- TWO CENTERED POINTED ARCHES
- TWO CENTERED POINTED ARCHES WITH DOUBLE ROWS OF VOUSSOIRS

VAULTS

- DEPRESSED VAULTS WITH SEGMENTAL ARCH PROFILE
- BARREL VAULTS WITH TWO CENTERED POINTED ARCH PROFILE
- CROSS VAULTS

WALLS AND BUTRESSES

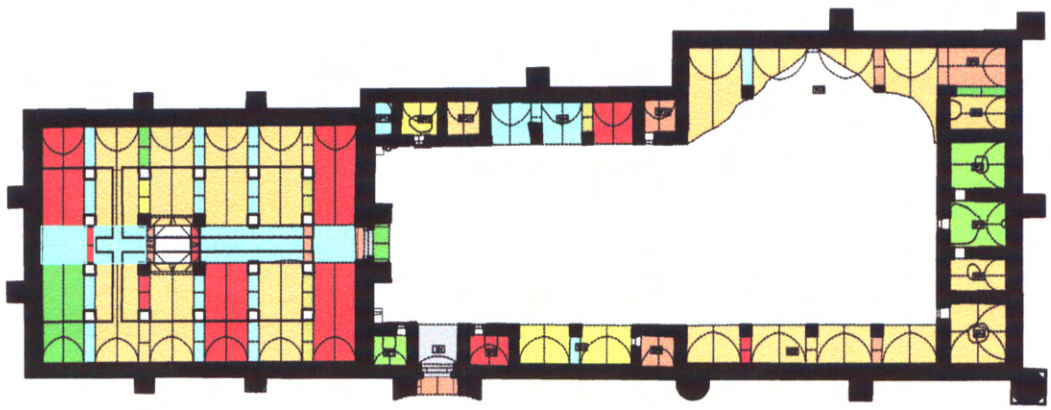
	ARCH	VAULT	
BIG SPAN 4.50 - 6.00m			5.30 - 5.72m.
			5.01 - 5.18m.
			4.61 - 4.80m.
MEDIUM SPAN 3.00 - 4.50m			4.04 - 4.49m.
			3.52 - 3.99m.
			3.06 - 3.41m.
SMALL SPAN 0 - 3m			2.64 - 2.98m.
			1.73m.
			0.84 - 1.01m.

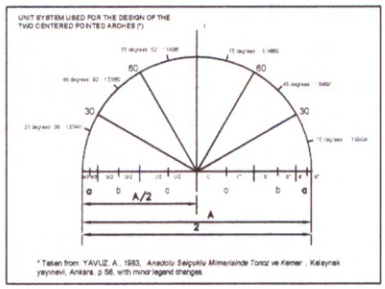
The vaults that are carried by pillars

(D) The vaults which are ended as two-centered pointed arches with double rows of voussoirs

Results:
1) The biggest opening is 5.72m on north-south direction in space #4. The space is covered with a brick construction cross vault.
2) The biggest opening spanned by an arch is 4.80m. This arch is a two centered pointed one.
3) The most common vault form has a two-centered pointed profile and the most common arch form is the two centered pointed one.
4) The transition arches at all semi-open spaces have double rows of voussoirs.
5)There is no relationship between the openings and the vaults that are carried by pillars or the vaults that are carried by load bearing walls.
6) The second row of voussoirs at the cut stone ends of the vaults of semi-open spaces is not related to the openings. The reason of their existence may due to the problems of rigidity.

THE RELATIONSHIP BETWEEN THE OPENING & THE HEIGHT OF THE ARCH





* Taken from: YAVUZ, A., 1983, *Anadolu Selçuklu Mimarisinde Tonoz ve Kemer*, Kelaynak yayınevi, Ankara, p.56, with minor legend changes.

- A/2 + b/2 = h
- A/2 + b' = h
- A/2 + b'' = h
- A/2 + a = h
- A/2 + a' = h
- A/2 > h (depressed)
- NO REATIONSHIP COULD BE ESTABLISHED
- OUT OF QUALIFICATION (FLAT OR SEGMENTAL ARCHES OR MULTI WITH SEGMENTAL ARCH PROFILES)
- NOT MEASURED

Results:
1) There is an obvious relationship between the opening and the height of the arch profile. The units defined above works perfectly for the definition of this.
2) A/2 + b''=h is the most common formula.

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"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN
PREPARED BY: MUSTAFA ONGE

ANALYSIS ABOUT ARCHES AND VAULTS

0 10 20 30 METERS

SCALE: 1/200

N
W E

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER
00

There are segmental arches at both portals that span the door opening and there are also some smaller segmental arches at the doors of spaces #1, #2, #3, #6 and #12. The flat arches exist at both portals next to the segmental arches, but these are only visible from the interiors. The biggest opening is 5.72m at Space #4 on north-south direction and this space is covered with a cross vault. The biggest opening spanned by an arch, which is a two centered pointed arch, is 4.80m. This arch is located between Space #8 and Space #9. There are also some smaller openings about 0.84-1.05m, which are the doors of the spaces. These are spanned by segmental arches or lintels depending on the location.

The vaults of semi-open spaces are mostly carried by pillars and the vaults of spaces are carried by load bearing walls. But this has no relationship with the openings. Such as, the opening spanned at Space #7 is smaller than that of Semi-open space #2. However the vault of Space #7 is carried by load bearing walls while the vaults of Semi-open Space #2 is carried by pillars.

The theory about the relation between the opening and the height of the two centered pointed arch is presented in 1983 by Prof. A. Yavuz.[9] According to her, the height of the arch is equal to the sum of a special unit that is obtained from a semicircle with a diameter that is equal to the opening itself, and the half of the opening. The units and the geometric division of this semicircle are shown in the diagram below. *(Fig. 4.16)*

In this diagram, the symbol “A” is the opening, “h” is the height of the arch from its springing level. a/2, b/2, c/2, a’, a”, b’, b”, c’, c” are the units obtained from the semicircle. Therefore the formula for the relationship is h=A/2+b’ (or any other unit).

[9] YAVUZ, A.T., 1983, *Anadolu Selçuklu Mimarisinde Tonoz ve Kemer*, Kelaynak Yayınevi, Ankara.

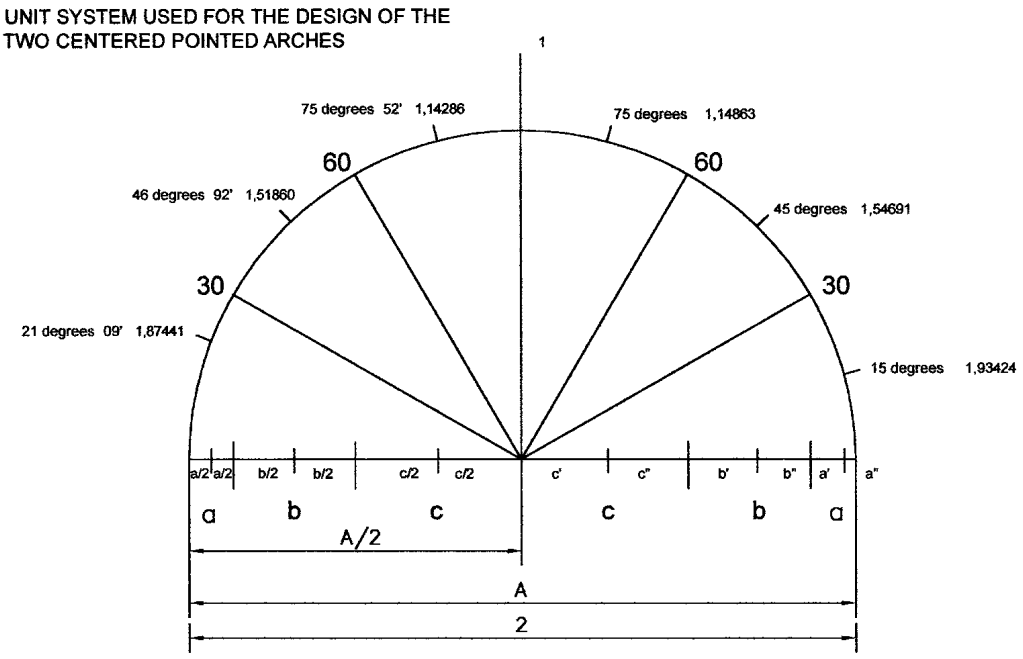


Fig. 4.16. Units possibly used for the design of two centered pointed arches

The application of the theory on the arches and vault profiles shows that it is valid for most of them. The most common relationship is h=A/2+b". This is valid for the vaults of semi-open spaces #2, #3, spaces #4, #5, #8, #11 and seven of the side galleries of the Shelter. The relationship h=A/2+b/2 is valid for the vaults of semi-open space #4, Space #2 and the side galleries of the Shelter. The relationship h=A/2+b' is valid for Space #3, Space #9 and Space #10. The relationship h=A/2+a is only valid for the vaults of Semi-open space #1. The vaults of Space #6, Space #7 and Space #3 have depressed profiles, which are inapplicable for the confirmation of this theory. For the arches the situation is very confusing. The transition arches at the same semi-open spaces rarely have the similar height-opening relationships. This is also common for the transition arches at the Shelter. The transition arches at the east of the Shelter are similar by this means and at the Semi-open space #3 the transition arches at the east have similar relationships only. Also there are some examples of arches and vault profiles on which, no relationship could be established. These are the arch at the portal of the Shelter and the profile of the vault at the southwest of the Shelter. The vaults of the central gallery at the Shelter, the vault of Space #13 are not measured due to their

demolished status. There are 12 transition arches in the Shelter, which are also not measured. The segmental arches, flat arches, barrel vaults with segmental profiles are not discussed in this study.

4.3. Construction Technique

The construction technique analysis of Zazadin Han consists of two main parts regarding the order defined in structural system analysis. These are 'the construction techniques of the load bearing system elements' and 'the construction techniques of the arches and vaults'[10] *(Fig. 4.17)*.

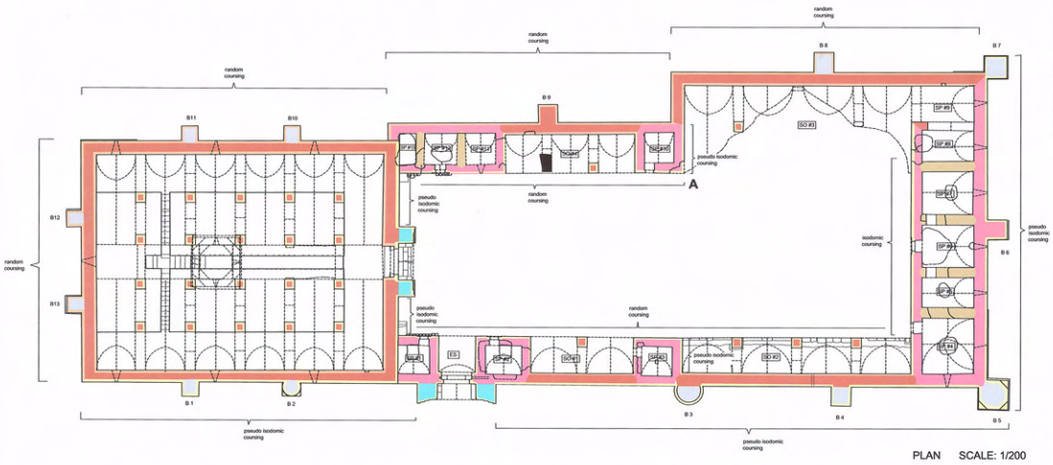
The walls of the Han consist of different combinations of cut stone and rubble stone in general. The first group consists of walls with double faces. In this group there are two layers of cut stone faces bonded with the mortared rubble infill at the middle, like most of the medieval age and ancient Roman monuments *(Fig. 4.18)*. This technique is classified as a variation of the well known 'opus caementicum' in some sources.[11] The second group comprises the walls with single faces. In this group, there is only one layer of face stone whilst the rest of the wall is rubble stone *(Fig. 4.19)*. The third group consists of rubble stone walls *(Fig. 4.20)*.

In the first two groups, the face stones are shaped for maximum adherence to the infill and the rubble stone part of the wall. The depth of the face stones seems to vary depending on the location. Especially at the pseudo-isodomic coursed parts, the stone rows with smaller heights tend to have greater depths, as what is seen from the damaged sections *(Fig. 4.21)*.

[10] The construction techniques of the arches as the transition elements and the arches as the elements of the superstructure are very similar. Therefore, the order defined in structural system analysis is not strictly applied in this section and the arches and vaults are discussed under a single title.

[11] Yavuz, A., 2002, "Anadolu Selçuklu Mimarisinin Yapı Özellikleri", Selçuklu Çağında Anadolu Sanatı (Derleyen: D. Kuban), Yapı Kredi Yayınları, Promat A.Ş., İstanbul, s.274.

CONSTRUCTION TECHNIQUE OF LOAD BEARING SYSTEM ELEMENTS



PLAN SCALE: 1/200

The walls of the han consists of different combinations of cut stone and rubble stone. In the first group there are two layers of face stones bonded with the mortared rubble infill at the middle, like most of the medieval and ancient roman monuments (opus caementicum). In the second group only there is only one layer of face stone whilst the rest is rubble stone. And finally the third group consists of rubble stone walls.
The faces -when existent- are constructed with mostly re-used cut stone and shaped for maximum adherence to the infill.
The rubble stone walls and semi-processed re-used faces are pointed smoothly for the finishing.

Wood is another important material for the cut stone faces . The wooden wedges are inserted at the joints of the cut stone faces to adjust their vertical position, for better mortar adherence and wall integrity.
The pillars and butresses are constructed similar to the walls, having cut stone faces.

WALL #1 DOUBLE FACES
WALL #2 SINGLE FACE
WALL #3 RUBBLE STONE

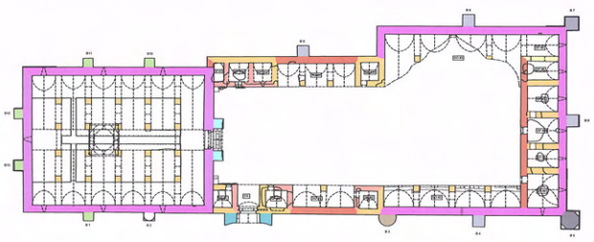
BUTRESSES & PORTALS
BUTRESSES
PORTALS

MISC.
CONCRETE SUPPORT

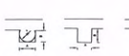
SEMI-PROCESSED RE-USED STONE FACE
CUT (INCLUDES RE-USED STONES) STONE FACE

This photo shows what a pseudo-isodomic wall looks like from its interior. Taken form the southeast corner of Space #10. Marked with letter "A" in the plan.

CLASSIFICATION OF THE LOAD BEARING SYSTEM ELEMENTS ACCORDING TO THEIR DIMENSIONS AND THEIR RELATION TO THE CONSTRUCTION TECHNIQUE



WALL THICKNESSES
0.78m.
1.00-1.11m.
1.38-1.44m.
0.88-0.98m.
1.14-1.24m.
1.59m.



BUTRESS DIMENSIONS

A	B	radius (r)	d	BUTRESSES
1.92m.	1.41m.	0.96m.	1.73m.	B2
-	-	1.45m.	2.89m.	B3
1.70 - 1.72m.	1.49 - 1.55m.	-	-	B1, B10, B11, B12, B13
2.02 - 2.06m.	1.88 - 2.06m.	-	-	B4, B6, B8, B9
2.26m.	2.30m.	-	-	B7
3.07m.	3.07m.	-	-	B5

The portals of Zazadin Han also have structural functions. the locations and the dimension features of these are therefore studied with the butresses in this analysis. (see Structural Elements analysis' for additional information.)

PORTAL DIMENSIONS

A	B	PORTALS
1.71 - 1.74m.	1.55 - 1.70m.	PORTAL OF THE SHELTER
2.06m.	1.57 - 2.04m.	ENTRANCE PORTAL

This analysis is prepared to categorize the load bearing system elements according to their dimensions and search any possible relations between the construction technique of the load bearing system elements and their dimensions. the results are as follows:

1) The maximum and minimum wall thicknesses are, 0.75m and 1.60m

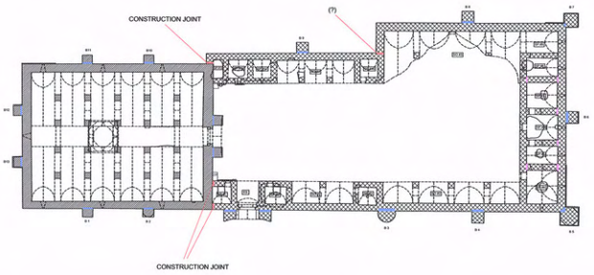
2) The dimensions of the biggest butress is 3.07m x 3.07m. and it is located at the southeast corner of the han.

3) The dimensions of the rectangular plan butresses around the shelter are all similar.

4) The dimensions of the rectangular plan butresses around the courtyard and services are all similar except the corner butresses.

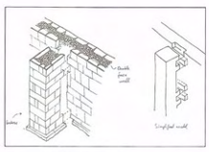
5) The construction technique of the load bearing system elements are not related to their dimensions. The different dimensions of these can only be a structural feature.

CONNECTIONS OF LOAD BEARING SYSTEM ELEMENTS

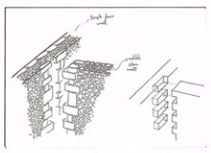


CUT STONE - CUT STONE CONNECTION
RUBBLE STONE RUBBLE STONE CONNECTION WITH CUT STONE ELEMENTS
NOT CONNECTED

COMPLETED IN 1236
COMPLETED IN 1237



The connection of wall and the butress. Sketch drawing.



The connection of rubble stone wall and the exterior wall that has single face with cut stone elements. Sketch drawing.

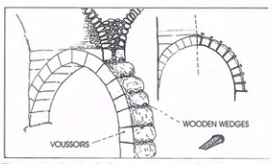
CONSTRUCTION TECHNIQUES OF VAULTS AND ARCHES

The arches of Zazadin Han are all constructed with cut stone. There are wooden vedges between the voussoirs, similar to the face stones as described above. The voussoirs are shaped for better integration to the walls and the infill. This is clearly visible at the partialy demolished semi-open space SO3.

The vaults are mostly constructed with flat rubble stones in linear order, except the vaults of the entrance space and the space at the southeast of the courtyard (Space #4).

The intradoxes of the vaults are plastered except the vault of entrance space and the cross vault of Space #4. The vault of entrance space has a smooth intradox surface which is rather unsuitable for plaster application and also there are no remains of plaster on both of these vaults.

CONSTRUCTION TECHNIQUE OF TRANSITION ARCHES & RIBBED ARCHES



The construction detail of the transition arch. Sketch drawing.

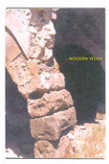
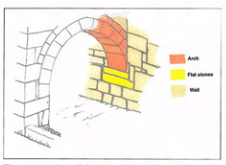


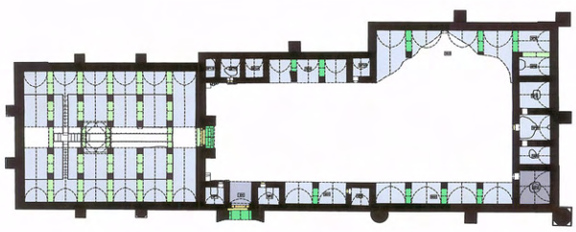
Photo of the transition arch at Semi open space #4



The connection of the transition arch and the wall at semi open space #2. Note the existence of flat stones to distribute load. No scale sketch drawing.

The construction detail of the ribbed arches is exactly similar to that of transition arches. The voussoirs of the rib arches are shaped to integrate the vault. This photo shows the ribbed arch that is a part of the superstructure of the central gallery of the shelter with the feature explained above.

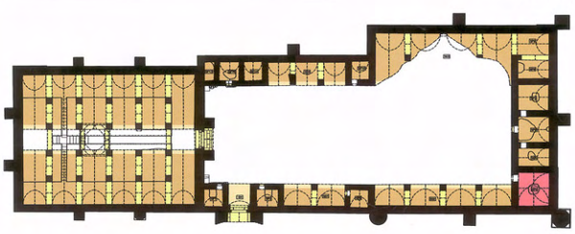
CONSTRUCTION TECHNIQUE OF VAULTS



ARCHES
FLAT ARCHES
SEGMENTAL ARCHES
TWO CENTERED POINTED ARCHES
TWO CENTERED POINTED ARCHES WITH DOUBLE ROWS OF VOUSSOIRS

VAULTS
DEPRESSED VAULTS WITH SEGMENTAL ARCH PROFILE
BARREL VAULTS WITH TWO CENTERED POINTED ARCH PROFILE
CROSS VAULTS

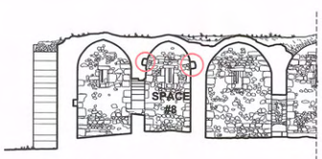
WALLS AND BUTRESSES



ARCHES
CUT STONE CONSTRUCTION

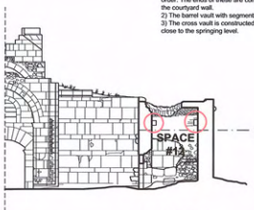
VAULTS
CUT STONE CONSTRUCTION
RUBBLE STONE CONSTRUCTION RADIAL ORDER
BRICK CONSTRUCTION

WALLS AND BUTRESSES



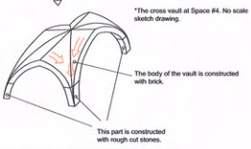
SECTION 7-7

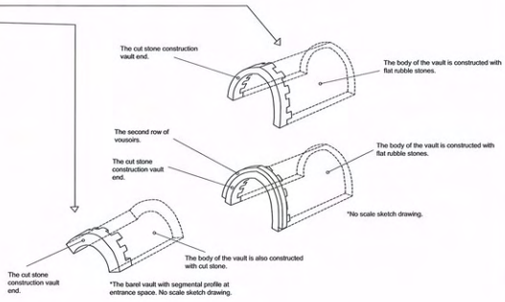
There are holes on the vaults of some spaces closer to the both ends. These are possibly the holes for mounting the moulds. The strange thing is that these holes are all located above the springing line of the vaults.



SECTION 3-3

1) The vaults with two centered pointed profiles are all constructed with flat rubble stones in linear order. The ends of these are constructed with cut stone at the semi-open spaces where they meet the courtyard wall.
2) The barrel vault with segmental profile is constructed with cut stone.
3) The cross vault is constructed with brick. But the brick construction turns into rough cut stone close to the springing level.





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CONSTRUCTION TECHNIQUE ANALYSIS

N W E

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER: 00

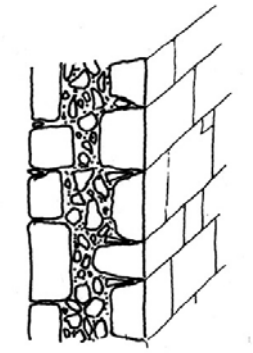

Fig. 4.18 Typical cross-section of a wall with two faces[12]

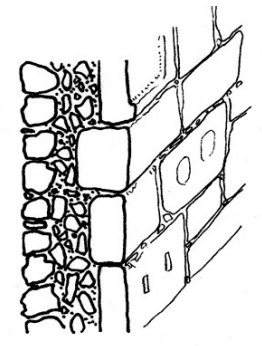

Fig. 4.19 Typical cross-section of a wall with single face

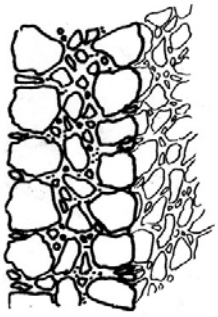

Fig. 4.20. Typical cross-section of a rubble stone wall

There are stone or wooden wedges inserted into the joints of the face stones very probably to adjust their position. These elements might have also helped the mortar adherence and wall integrity. The joints of face stones are treated refer to the workmanship. There is no pointing on the joints of scratch built cut stone and processed re-used stone faces. But the joints of semi-processed re-used face stones

[12] The drawings presented here are prepared refer to the information gathered from the damaged parts of the walls. Therefore these may not depict the exact situation precisely. There may be ties at the different parts of the walls connecting both faces.

and rubble stone walls are pointed smoothly for finishing. There are no remains of plaster on any of the walls.

Fig. 4.21. Damaged wall corner next to Semi open space #3

The construction technique of pillars and buttresses are entirely similar to that of the walls. The pillars and the buttresses are constructed with processed or semi-processed re-used cut stone. There is also lime mortar rubble stone mixture infill in these structural elements like that of the walls with double faces.

The walls of Zazadin Han are mostly coincided with the ‘double face’ type. All of the walls of Shelter have double faces. The walls of the courtyard and services part consist of a combination of all three types that vary depending on the location. The ‘wall with single face’ is the most common type amongst these. The walls of spaces #1 (except its west wall), #2, #3, and #10 are all surrounded by walls with single faces. The east and west walls of the spaces on the east of the courtyard (Spaces #4, #5, #6, #7, #8), the north and south walls of the triple space group on the northwest of the courtyard are also remarkable examples of this category which have processed re-used stone and semi-processed re-used stone faces respectively. The south walls of semi-open spaces #1, #2 and the north walls

of semi-open spaces #3, #4 are the walls with double faces. Also the walls with arched openings, which separate the galleries of all the semi-open spaces, have double faces. The rubble stone walls are only used between the spaces #4, #5, #6, #7 and #8 on the east and spaces #11, #12 and #13 at the northwest of the courtyard.

The faces of walls and butresses are arranged in three types of coursings: ‘pseudo-isodomic’, ‘isodomic’ and ‘random’. The walls of south exterior elevation, east exterior elevation and the west elevation of the courtyard are constructed in pseudo-isodomic coursing. The wall of the east elevation of the courtyard and the upper exterior walls of the transition zone of the dome are constructed in isodomic coursing. The walls of west exterior elevation, north exterior elevation, north courtyard elevation and south courtyard elevation are constructed in random coursing. The west wall of the first gallery of the Semi-open space #3 is constructed in pseudo isodomic coursing and random coursing separated with a vertical, not entirely straight joint, just like a construction joint *(Fig. 4.22)*.

Fig. 4.22. Joint on the west wall of the first gallery of Semi-open space #3

In this study, the relationship between the dimensions of load bearing system elements and the construction technique is also discussed. The walls of Zazadin Han are in varying thickness between 0.75m and 1.60m. The west and east walls

of the Shelter are 1.60m, and the north and south walls of the Shelter are 1.40m thick respectively. The thicknesses of the walls with arched openings that separate the galleries of Shelter and the semi-open spaces are 1.05m. The thickness of the exterior walls of 'courtyard and services' part varies between 1.10-1.44m. The thickness of this wall is 1.10m at the spaces #1, #2, #3, #11, #12 and #13. And about 1.24m and 1.40m at semi-open spaces #1, #4, and semi-open spaces #2, #3 respectively. Its thickness is also 1.40m at the east where it corresponds to the spaces on the east of the courtyard. The walls between the spaces and semi-open spaces are about 1.10m thick in general. The thicknesses of the walls surrounding the courtyard are all about 1.10m, except the east and west parts where it corresponds to the spaces on the east of the courtyard and the Shelter respectively. The thickness of the east wall of the courtyard is 1.24m. The walls of the top part of the dome have the smallest thickness, 0.75m. The dimensions of the rectangular plan buttresses around the shelter are approximately 1.70mx1.50m. The dimensions of the rectangular plan buttresses at the courtyard and services part are approximately 2.00mx1.90m. The biggest buttress exists at the southeast corner of the Han, the dimensions of which is 3.07mx3.07m.

The shelter and the walls of the upper part of the dome have double faces. The thicknesses of these walls are 0.75m and 1.60m (maximum) respectively. The exterior walls of the Han that corresponds to semi-open spaces #1 and #2 are 1.24m and 1.40m thick respectively. And also these both are the walls with double faces. The walls of Space #3, Space #10 and the east wall of the courtyard that corresponds to spaces #4, #5, #6, #7, #8 are the examples of the walls with single faces. However their dimensions vary between 1.10m and 1.40m. Therefore, as the results of this analysis, regarding the construction technique information presented in the previous parts, it is visible that, the dimensions of the load bearing system elements are not related to their construction techniques or the materials used on them.

The load bearing system elements of Zazadin Han are mostly connected to each other by overlapping joints of the cut stone faces at different locations. The

buttresses are connected to the exterior walls close to the ground level and below the level of demolished top finish in general *(Fig. 4.23)*. There are no apparent joints between these two locations. The projections of the portals are connected to the walls by means of a similar way. An interesting technique is used for the connections of the rubble stone walls to the rubble stone parts of the single face walls. There are cut stone elements on the rubble stone walls, which forms overlapping joints like that of the cut stone walls *(Fig. 4.24)*. On the other hand, there are five parts, which are not connected. Four of these are the construction joints separating the Shelter and the services parts at spaces #1 and #13. These can be interpreted as the evidences of different periods of construction. The remaining one is between Space #10 and Semi-open space #3; the reason of its existence is unknown *(see Fig. 4.22)*.

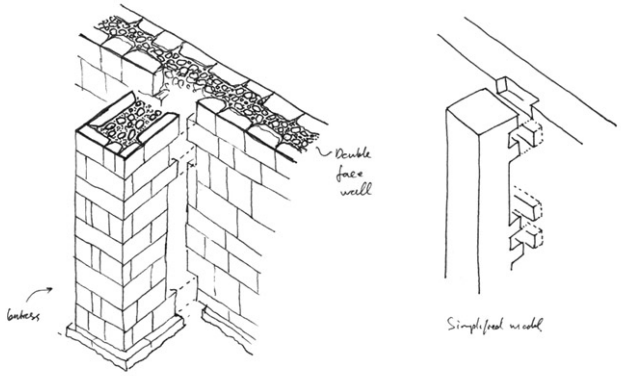

Fig. 4.23 Connection of buttresses to the exterior walls. Sketch drawing.

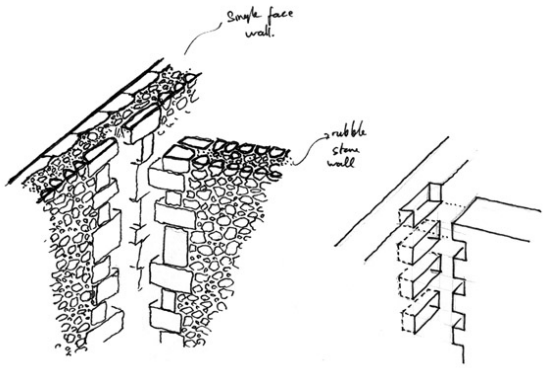

Fig. 4.24. Connection of rubble stone walls to the rubble stone parts of the single face walls.

The arches in Zazadin Han are all constructed with scratch built cut stone. There are wooden wedges between the voussoirs of the transition arches, similar to that of the cut stone faces of the walls. There are two wedges combined with the lime mortar between each voussoir[13]. The voussoirs are shaped for better integration to the walls and the infill like the faces *(Fig. 4.25)*. The transition arches rest on flat stone faces where they meet the exterior walls. The flat stones combined with the wall faces very possibly help the distribution of the load *(Fig. 4.26)*. The construction technique of rib arches and transition arches are quite similar. But at the rib arches the voussoirs are shaped to integrate the vaults instead of the walls *(Fig. 4.27)*.

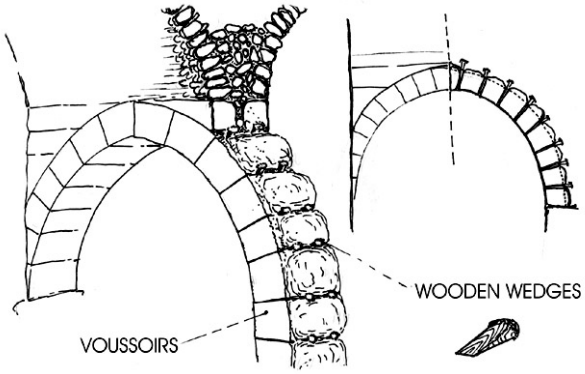

Fig. 4.25. Construction technique of a transition arch. Sketch drawing.

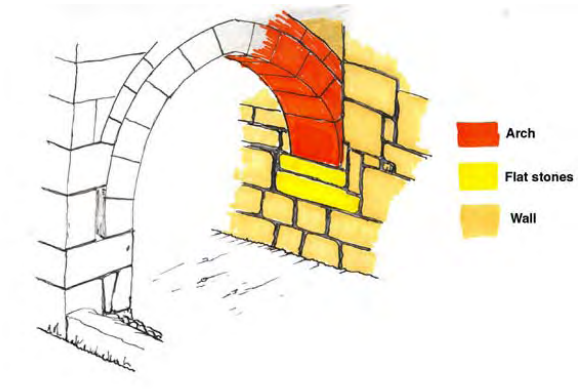

Fig. 4.26. Connection of wall and transition arch at Semi-open space #2

[13] This information is obtained from the demolished parts of Semi-open space #3 where the mentioned voussoirs and the wedges are clearly visible.

Fig. 4.27. One of the rib arches at the central gallery of the Shelter

The vaults with two centered pointed profiles are extensively constructed with flat rubble stones in linear order. The vaults covering the spaces are entirely constructed with rubble stone, but at the galleries of shelter and semi-open spaces, the ends of these are constructed with cut stone where they meet the courtyard walls or the walls of the central gallery. The cut stone ends are integrated with the rubble stone parts like the connection of rubble stone walls to the rubble stone parts of the single face walls. The barrel vault with segmental profile that covers the entrance space, is entirely constructed with cut stone. The cross vault that covers Space #4 is constructed with brick in linear order. It consists of two combined layers of brick as what is seen on the demolished part at its top *(Fig. 4.28)*. It turns into rough-cut stone close to its springing level where it meets the corners of the walls as mentioned above.

Fig. 4.28. Demolished top part of the brick construction cross vault

In most of the spaces there are holes on the vaults closer to their both ends, and in some cases at the middle. These holes are very possibly for mounting the moulds. However, the strange thing is that these holes are all located above the springing lines of the vaults.

4.4. Architectural Elements

This analysis aims to discuss the architectural elements of Zazadin Han by means of considering their locations, forms and the similarities between them.[14]

The architectural elements, comprises the openings including portals, doors, windows and oculi; the niches including the mihrab and other small niches, and the miscellaneous elements including the platforms, the stairs and the fodders.

4.4.1. Typology of Architectural Elements

The typology of architectural elements is prepared to find out the typological distinctions between the architectural elements. This is not applicable to all of them. If the number of that element is limited with two, the approach of 'typology' cannot be valid. It would not be clear, which one is the element that defines the type and which one is the member of that type. Therefore the typology can be speculative.

There is no typological distinction for portals, oculus, niches, mihrab, stairs and fodders, because there is only one oculus and one mihrab. The number of the rest of the mentioned elements is only two at each category.

There are a total number of 12 doors. Six of these (dsp #1, dsp #2, dsp #4, dsp #6, dsp #10 and dsp #11) link the spaces directly to the courtyard; two of these (dsp #3 and dsp #8) link the spaces to the semi-open spaces and four of these link the spaces to the neighbouring spaces. The plan forms of the doors that link the

[14] The locations and dimensions of the architectural elements are presented in the descriptions. Therefore these will not be repeated here unless an expression is needed.

spaces to the courtyard and semi-open spaces are similar. There are indentations on the sills of the doors on both sides (on the interior) about 8-10cm for the door wing to fit inside. The width of the opening is about 0.85m.

The exterior elevations of the doors have some differences. Doors, dsp #1, dsp #2, dsp #3, dsp #6 and dsp #11 are embellished with segmental arches at the top and a rectangular frame 30cm away from both sides of the door. The door of Space #3 (dsp #3) is different by this means and has no frame. The doors of Space #4, Space #8 and Space #10 (dsp #4, dsp #8 and dsp #10) are ended with lintels at the top. There is also a flat relieving arch at the top of the lintel of dsp #4.

The doors linking the spaces to the neighbouring spaces have a basic plan that consists of 1.05m wide opening with flat sills. There are no traces that prove the existence of door wings. Unfortunately only two of them, which link the members of the triple space group on the east of the courtyard, are intact; and the top parts of these two are demolished. The only feature that can be helpful for the typology is their plan forms and locations.

As the result, there are four types of doors. The first three types link the spaces to the courtyard and semi open spaces. And this type has an indentation for the door wing to fit inside. The first type is the door with a lintel at the top, the second type is the door with a segmental arct at the top, and the third type is the variation of the second type that has no frame. The last type link the spaces to the neighbouring spaces and very possibly had no door wings.

The windows have a total number of 19. Seven of these are located on the north, south and west exterior walls of the Shelter. Eight of these are located on the walls of the spaces. The remaining four (wd #1, wd #2, wd #3 and wd #4) are located on the east, west, north and south walls of the dome. Unfortunately wd #2 and wd #4 are heavily damaged. The top part of wd #2 and the sills of wd #4 are missing. The traces on wd #4 inform about its outlines, which was something similar to that of wd #1 or wd #3. All the windows are slit windows and their plan forms are

all similar. On the other hand, there are differences at the exterior elevations of the windows. The windows at the Shelter and the windows at the spaces have lintels at the top. However there are semicircular arches at the top of the windows at the dome.

As the result, there are two types of windows. The windows of the first type are ended with a lintel at the top and located both at the spaces and at the Shelter. The windows of the second type are located on the dome only and there are semi-circular arches at the top of them.

There are 25 water spouts remained intact. Except seven of them, these are buried into the walls or not clearly visible due to their weathered status. The shapes of these are similar to the fallen water spout at Semi-open space #3, but the dimensions of them vary depending on the location. The element has a rectangular cross-section, which gets narrower from both sides, through the end of the projecting part. Therefore, there seem to be a single type of water spout existing. The plans, elevations and the typology mentioned above are presented visually in figure 4.29.

4.5. Interpretation of the Evidence

In this analysis, the missing and additional parts of Zazadin Han are studied regarding the traces. The term “trace” is generally used for the evidences of a completely lost part of a building. In this study the term ‘trace’ is redefined with a broad content. Naturally, there are traces of the completely missing elements on the building. And in some cases some part of that element exists, but the element itself is not fully intact. The traces explained above are discussed under the title ‘in situ traces’ and divided into two subtitles as ‘in situ traces with samples’ and ‘in situ traces without samples’. There are many fallen pieces at the various different parts of the Han. These are cut stone pieces in different geometries. There are ornaments and shapes on them that are important clues for their original locations.

		ARCHITECTURAL ELEMENTS	TYPES	RESULT
OPENINGS	DOORS	SPACES TO COURTYARD dsp 1 dsp 2 dsp 4 dsp 6 dsp 10 dsp 11 SPACES TO SEMI-OPEN SPACES the elevation is not available due to the mostly buried status of this door dsp 3 dsp 8 THE SPACES ON BOTH SIDES TO SPACES AT THE MIDDLE the elevation is not available due to the mostly demolished status the elevation is not available due to the mostly demolished status dsp 5 dsp 7	① door with lintel 2a door with segmental arch 2b door with segmental arch The doors linking the spaces to the courtyard and semi-open spaces have similar plan. ③ The doors linking the triple space groups to each other have similar plan.	As the result, there are four types of doors. the first three types link the spaces to the courtyard and semi-open spaces. These have indentations on their sills for the door wing to fit inside. the first type is the door with a lintel at the top, and the third type is the variation of the second type that has no frame. The last type link the spaces to the neighbouring spaces and very possibly had no door wings.
	WINDOWS	WINDOWS OF SHELTER ws 1 ws 2 ws 3 ws 4 ws 5 ws 6 ws 7 WINDOWS OF DOME wd1 (north) wd 2 (east) wd 3 (south) no info about wd 4 due to its demolished status WINDOWS OF SPACES wsp 4B wsp 4A wsp 5 wsp 6 wsp 7 wsp 8 wsp 9 wsp 11 (*)All windows are drawn in the same scale	① slit window with semi circular arch ② slit window with lintel	There are two types of windows. the windows of the first type are located both at the spaces and at the Shelter. This type is ended with a lintel at the top. The windows of the second type are located on the dome only and there are semi-circular arches at the top of them.
	PORTALS	PORTAL OF THE SHELTER ENTRANCE PORTAL	Both portals have the similar features. They project from the facade and have, flat 'kavsara' (that has an inscription on it) (a), ornament frames (b) and no 'mihrabiye' niches. There are only two of them.	The element has no typological distinction for this building.
	OCULI		There is only one oculi.	The element has no typological distinction for this building.
NICHES	MIHRAB	ELEVATION PLAN		The element has no typological distinction for this building.
	NICHES	N8 (The niche on the south wall of the shelter) N9 (The niche on the north wall of the space #8)		The element has no typological distinction for this building.
OTHER ELEMENTS	WATER SPOUTS		① Although they are heavily weathered or buried in the walls, all water spouts seem to have similar basic forms with varying dimensions.	There seems to be a single type of water spout. This element has a rectangular cross-section, which gets narrower from both sides, through the end of the projecting part.
	STAIRS	ELEVATION PLAN STAIRS TO THE ROOF ELEVATION PLAN STAIRS TO THE MASJID ELEVATION SECTION PLAN ELEVATION SECTION PLAN	Ⓐ Ⓑ Two different forms that consists of appearently similar elements of steps.	The element has no typological distinction for this building.
	FODDERS			The element has no typological distinction for this building.
	PLATFORMS			The dimensions and forms of the platforms are varying depending on the location. therefore there is no typological distinction for them.

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FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

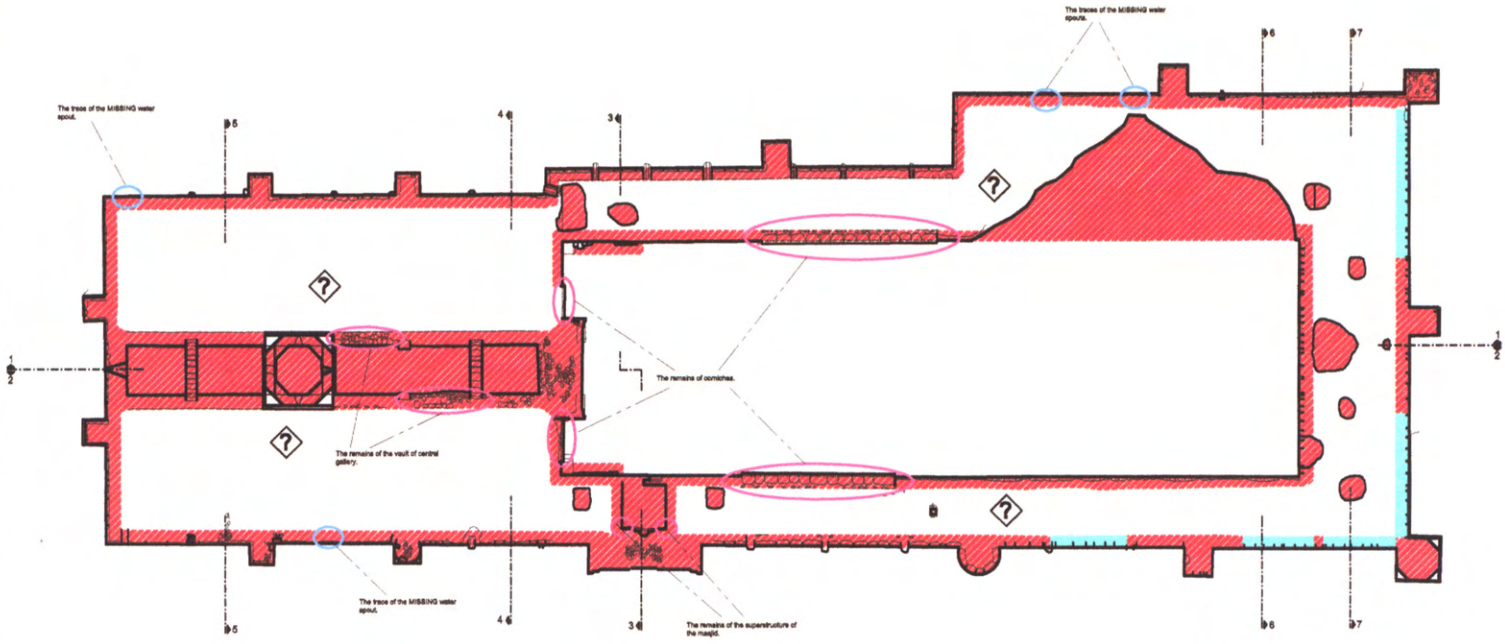
THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN

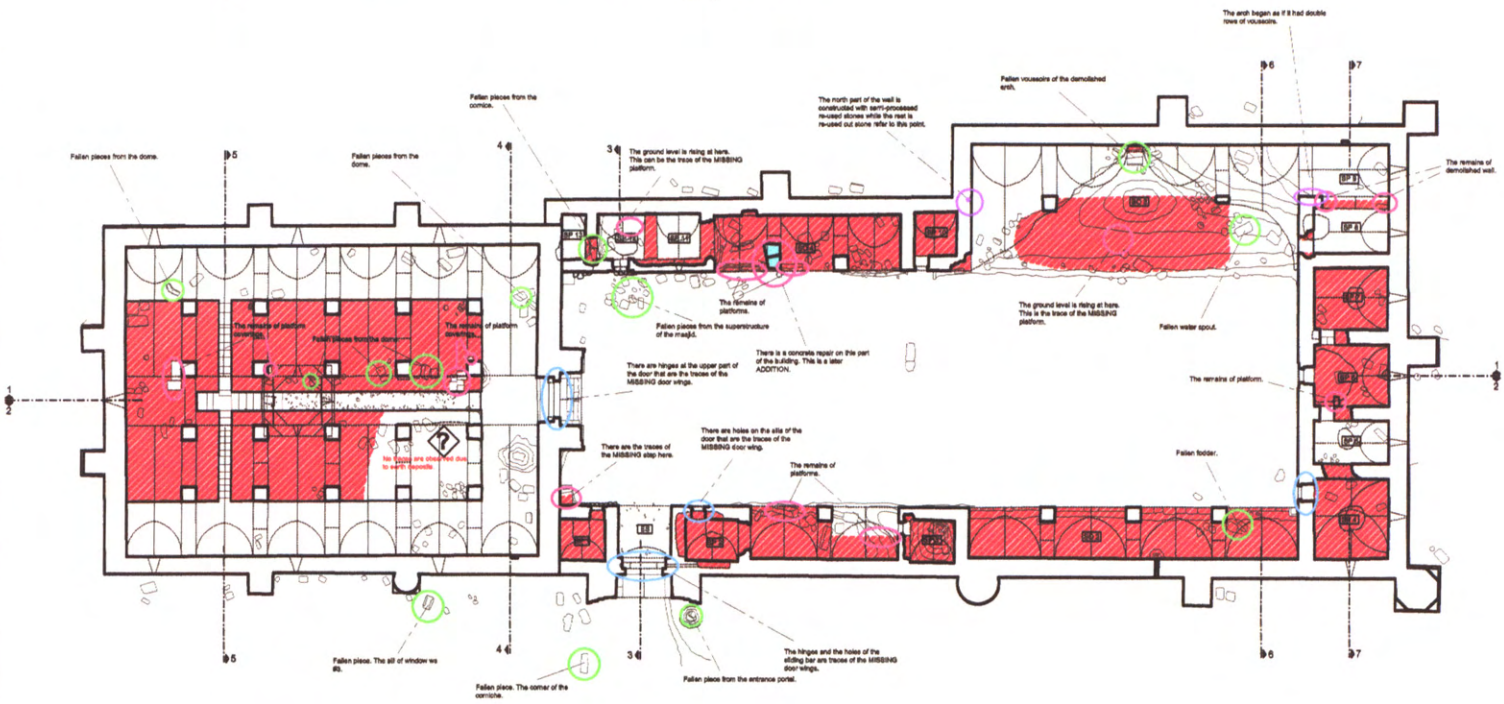
PREPARED BY: MUSTAFA ONGE

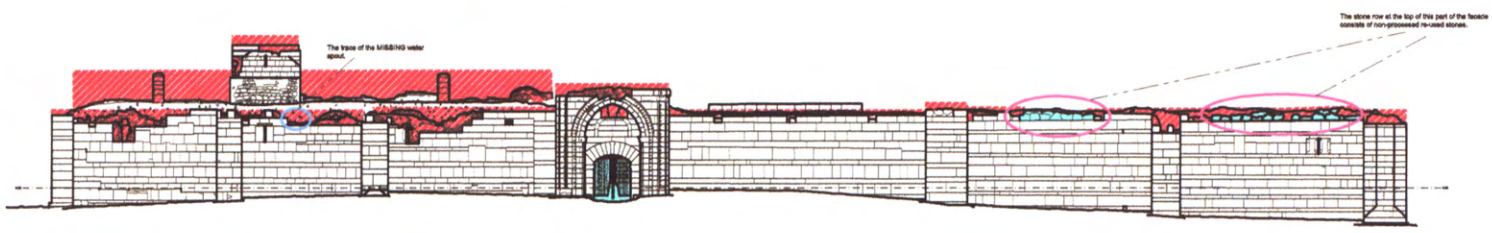
TYPOLOGY OF ARCHITECTURAL ELEMENTS

- MEASURED SURVEY
- ANALYSIS
- RESTITUTION
- RESTORATION

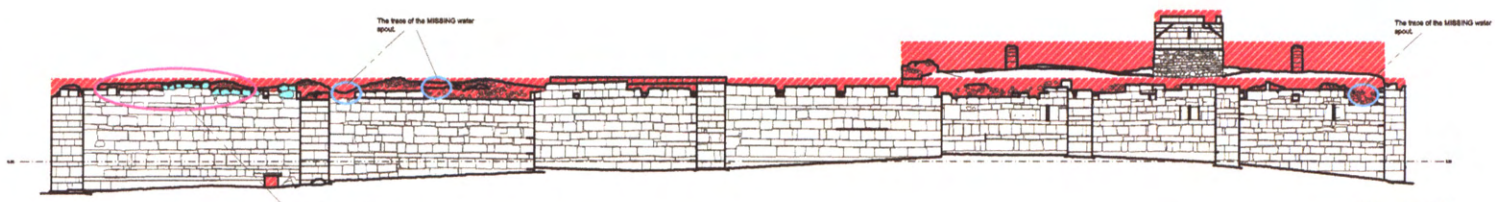
SHEET NUMBER:



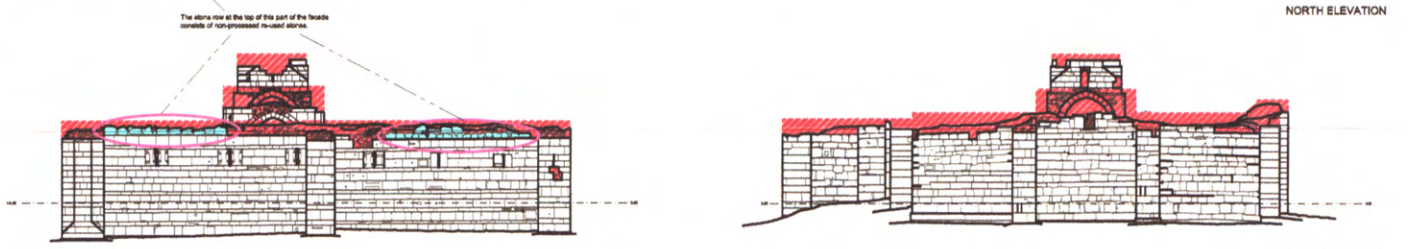




SOUTH ELEVATION

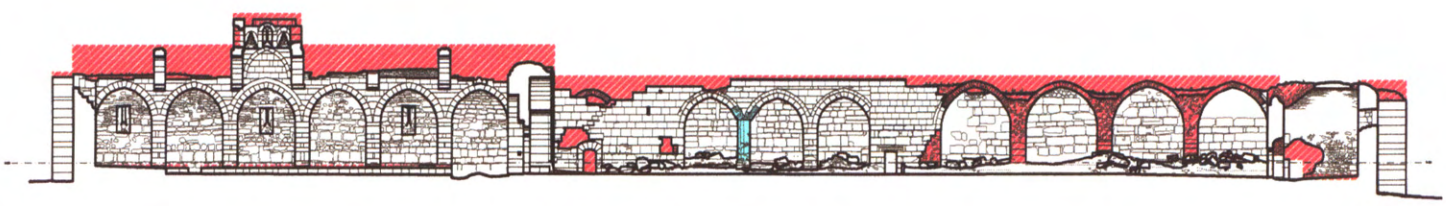


NORTH ELEVATION

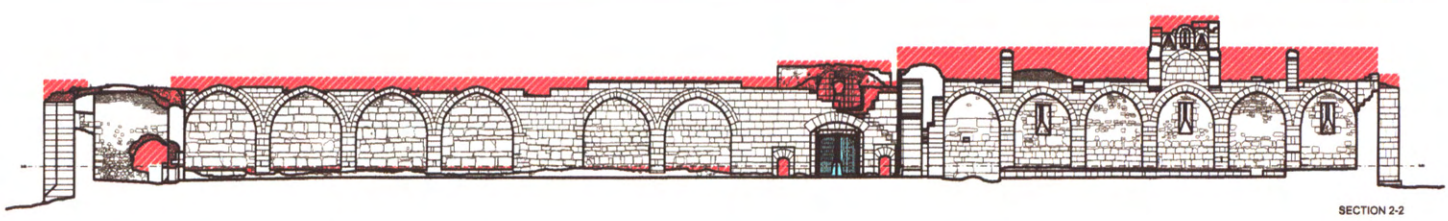


EAST ELEVATION

WEST ELEVATION



SECTION 1-1



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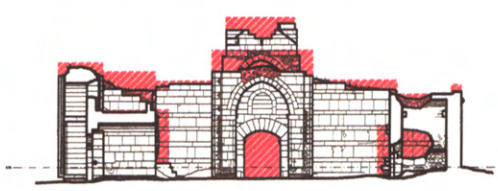

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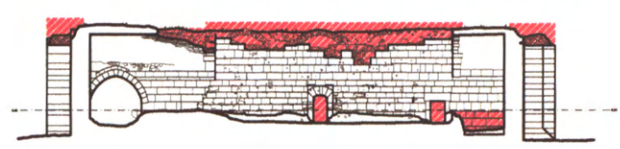

SECTION 6-6

MISSING (indicated by in situ traces with and without samples)

ADDITION

TRACES

IN SITU TRACES WITH SAMPLES

IN SITU TRACES WITHOUT SAMPLES

UNIDENTIFIED IN SITU TRACES

NOT IN SITU TRACES

NO TRACES ARE OBSERVED DUE TO EARTH DEPOSITS

M.E.T.U
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"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

INTERPRETATION OF THE EVIDENCE

UNITS IN METERS

SCALE: 1/200

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MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

The fallen pieces are not always close to their original locations; therefore these are classified as ‘not in situ traces’. In addition to these, there are some traces that can generally be described as construction irregularities. These are discussed under the title ‘unidentified in situ traces’.

The top part of the whole building is partially or entirely missing in general *(Fig. 4.30)*. The missing parts comprises the top finishes of the exterior walls, top finishes of the walls of the courtyard up and below the level of cornices, the cornices theirselves, the top finishes of the buttresses and portals. The superstructure of central gallery, the dome above the transition part, the superstructure of the masjid with the upper part of its walls, the upper part of the mihrab at the masjid, the two galleries at the middle of Semi-open space #3 are entirely and the other two on both sides of them are mostly demolished.

The mentioned missing parts are mostly indicated by traces without samples. Although it is not known what the demolished parts look like there are the traces that indicate their unfinished status. There are remains of the demolished vault and the demolished rib arch (in situ traces with samples) of the central gallery at the Shelter. There are in situ traces both with and without samples on the top of dome, and also ‘not in situ’ traces around the dome. The fallen pieces that originally belong to the dome are mostly grouped on the platforms below it *(Fig. 4.31)*. These parts are mostly the members of the currently existing top stone row of the dome. There are also some fallen pieces from the dome, at the northeast and northwest of the Shelter. The pieces at the northeast of the Shelter seem to be fallen from the damaged southwest and southeast corners of the transition part of the dome *(Fig. 4.32)*. On the other hand, the pieces at the northwest of the Shelter are quite probably the parts of an ornamented ring, which had possibly been the top part of the transition zone of the dome *(Fig. 4.33)*. There are fallen pieces of corniches scattered in to the different parts of the Han. There are two pieces in Space #13, one of which is cornerstone *(Fig. 4.34)*. There are at least two pieces at the northwest of the courtyard and there is another piece combined with the concrete repair at Semi-open Space #4 *(see Fig. 4.43)*. There is another fallen piece

at Semi-open space #3 the existence of which is very important. This is a fully intact fallen water spout *(see Fig. 3.41)*. It is an important source of information for the restitution. There are also voussoirs of the demolished transition arches of the galleries at Semi-open Space #3.

Similar traces as mentioned above exist at the masjid. There are fallen parts from the superstructure of it on the floor of masjid, at the northwest of the courtyard and in front of the entrance portal. The pieces at the northwest of the courtyard seem to be fallen from the demolished star vault of the masjid[15] *(Fig. 4.35)*. The piece in front of the portal is a corner stone of the cornice that surround the courtyard wall *(Fig. 4.36)*. This piece is very possibly detached from the upper part of the north wall of the masjid, which is a part of the south façade of the courtyard. It is shown on its original location in the photograph taken by K. Erdmann in 1950's[16].

Fig. 4.31. Fallen pieces on the platforms located below the dome

[15] The photograph of the masjid taken by Prof. Dr. H. Karamağaralı in 1950's can be used as a reference. The demolished superstructure is identified as a star vault using this photo.
[16] Erdmann, K., 1961, Das Anatolische Karavansaray Des 13. Jahrhunderts, Erster Teil, Katalog, Verlag Gebrüder Mann, Berlin, Abb.180.

Fig. 4.32. Fallen pieces at the northeast of the Shelter

Fig. 4.33. Fallen pieces at the northwest of the Shelter

Fig. 4.34. One of the fallen cornerstones of the cornice currently locating at Space #13

Fig. 4.35. Fallen pieces from the star vault of the Masjid

Fig. 4.36. Fallen corner stone of the cornice in front of the Entrance Portal

The missing parts are not limited with the upper part of the caravanserai. The floor coverings of most of the spaces are missing in general. The only spaces that contain information are the platforms of the Shelter and courtyard. Although it is mostly covered with earth travertine cut stone floor coverings of it is visible at the middle of the courtyard and in front of the portal of the Shelter. At the spaces the thresholds of the doors define the existence and level of the floor coverings, but the materials of these are unknown.

The platforms of semi-open spaces #1, #3 and #4 are missing. There are borders of the platforms at semi-open spaces #1 and #4, in ruins (in situ traces with samples). These evidences show the exact shape of them. However at Semi-open space #3 there are no visible remains of the platforms. The rising ground level at the south of this semi-open space roughly defines the form of the platform. In addition to this the door of Space #8, which is buried nearly invisible at the east of

this semi-open space, is an evidence of a defined approach to the Semi-open space #3 and its original floor level. The platform coverings of the semi-open spaces mentioned above and the Shelter are missing. However unlike the platforms of semi-open spaces there are remaining pieces of (in situ traces with samples) the floor covering near the pillars at the east and west of the central gallery *(Fig. 4.37)*. There are no traces proving the existence of any floor coverings at the stables of the Shelter.

Fig. 4.37. Remains of platform floor coverings at the Shelter

There are missing parts on the walls and upper interior parts of the doors of all spaces. All original door wings of the Spaces are missing. There are in situ traces of these without samples. On the other hand there are traces like the hinges and the holes of the sliding bar at the entrance door and the door of the Shelter. The doors connecting Space #12 to spaces #11 and #13 are missing. The top parts of the doors Space #6 that links it to Space #7 and #5 are also missing.

The additional parts are, the concrete section at Semi-open space #4 and the non-processed stone rows on the exterior elevations that are mentioned above and the iron door of the Han that currently exists.

The undefined traces comprises the construction irregularity at the southwest of Space #9 near the arch and the construction joint at the west wall of Semi-open

space #3. These look like a construction error or a deliberate action of an unknown reason.

4.6. Condition of the Fabric

Condition of the fabric analysis aims to discuss the destructive factors acting on Zazadin Han and to examine the relationships between them. The problems are discussed in three main groups: 'Structural problems', 'Material problems', and 'The problems originated from loss of material'

The structural problems comprise the cracks and detachments. These are discussed into three titles. These are: 'Vertical cracks', 'Vertical detachments' and 'Horizontal detachments'. The vertical cracks are the evidences of structural damage on the rubble stone parts like the vaults. No horizontal cracks are observed in the Han. The detachments are the evidences of structural damage on the cut stone construction parts.

The material problems comprise the problems of 'dampness', 'deposits', 'soiling', 'biocolonisation', 'man made actions' and the 'loss of material occured'.

The problems of dampness are the 'rising damp' and 'rainwater penetration'. The darkening of the color of stone, as if it is wet, is the identical mark of the rising damp. It occurs due to the lack of surface drainage on the ground. Considering the harsh weather conditions and seasonal wetting and drying, the rising damp may cause severe material loss. The reason of rainwater penetration is the failure of roof drainage due to the partial or entire collusion of the superstructure. It is the cause of material loss like the rising damp and it provides nutritive factors for biocolonization and causes salination at the intradoxes of the vaults. The title 'deposits' comprises the black deposits on the stone surface. The exact origin of black deposits is unknown. It appears in varying densities at different parts of the Han. Soiling is a serious problem in this building. The earth deposits provide a good habitat for the higher plants when fed with animal droppings and water, and

also causes problems of drainage. The earth deposits also hide the traces that give information about the building.

The problem of biocolonization comprises the destructive actions of birds, their nests, the higher plants and the biofilm. Zazadin Han, like the other abandoned places, provides shelter for animals. The small gaps like cracks and the joints where the pointing mortar is lost, serve as bird nests. These are the main sources of bird droppings that include destructive materials like nitrate compounds[17]. As there are so many bird nests at the Han, only the considerable ones are marked in this analysis. The higher plants are the grass and some bushes that are the plants of the typical step fauna. These plants damage the drainage system due to the movement of their roots. The biofilm is the algae, lichen and other microorganism colonisation on the stone surface. The lichens, which are usually found with algae, form khaki-green or red-brown opaque layers or spots. The lichen colonization can hasten the decay of stone due to the expose of oxalic acids[18].

The destructive actions of human in Zazadin Han are, excavations, fire damage, shooting, faulty interventions and engravings. The excavations are the most serious destructive factor amongst all. The excavated parts obviously prove that Zazadin Han is frequently visited by treasure hunters and not only the conventional methods, but also the explosives are used for treasure hunt[19]. The local people or the visitors light fires to protect them and their animals from harsh weather conditions. The fires too close to the walls cause serious damage on the faces of the walls. The vicinity of Zazadin Han is also being used for hunting. The shots are producing outbursts and holes on the surfaces of the stones.The faulty intervention title comprises the structural consolidation constructed in 1996. It is made during the cleaning studies, using concrete in a primitive workmanship. The engravings are the dates, names, initials and other things written on the stones in a destructive manner.

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[17] Caneva, G., Salvadori, D., 1998, "Biodeterioration of Stone", *The Deterioration and Conservation of Stone*, Studies & Documents on The Cultural Heritage, 16, UNESCO.
[18] Feilden, B., 1998, *Conservation of Historic Buildings*, Reed Educational and Professional Publishing Ltd., Suffolk, U.K.
[19] Verbal information from local sources.

The loss of the material already occurred is also studied in this analysis. The categories of it are as follows:

Total material loss: It is a damage form that exceeds the material scale (a partial loss of the building).

Outbursts[20]: The outbursts are the detachment of stone in compact fragments.

Back weathering: It is the uniform loss of material following the profile of the stone surface.

Empty joints: It is the loss of pointing and jointing mortar.

Fissures & Alveolization: It can be defined as the development of holes, fractures and cracks on the stone surface and development of a texture like honeycomb.

The problems originated from the loss of material comprise 'the reducing structural cross-section'. The material losses weaken the cross sections of structural elements. Any more damage to these parts may lead to partial collapses due to structural failure.

The overall view of the condition of the fabric is as follows, considering the damage forms and parameters presented above:

The traces of structural deterioration are not very common amongst the Han. The cracks mentioned above, exist near the half demolished vaults of Semi-open space #3 and above the pillar of Semi open space #1. There is a vertical detachment on the buttress at the northeast corner of the Han (B7) *(see Fig. 3.18)* and there is a horizontal detachment at the top middle part of the east elevation of the courtyard *(Fig. 4.38)*.

The problem of rising damp only seems to exist on the east part of the Han. The dark colored areas, exist especially at the bottom parts of the east exterior elevation and the east part of the south exterior elevation. The dark colored areas

[20] Fitzner, B., Heinrichs,K., Kownatszki, R., 1992, "Classification and Mapping of Weathering Forms", 7th International Congress on Deterioration and Conservation of Stone, Vol:2, Lisbon, pp.957-968, p:966.

on the elevations extend up to 2m from the current ground level. The strange thing is that, although they are connected to the walls, there are no dark colored areas on the buttresses and the interior walls or pillars. On the other hand, the problem of rainwater penetration exists more or less every element of the superstructure. The salination and loss of plaster at the top parts of the intradoxes of vaults are the evidences of this. This problem also negatively affects the vault of entrance space due to the demolished superstructure of the masjid, which was located above it *(Fig. 4.39)*.

Fig. 4.38. Vertical detachment, bullet holes and lichen colonisation on the face stones of courtyard east elevation.

The black deposits are at the introdoxes of the vaults and at the upper parts of the walls of the central gallery at the shelter. The salination problem is only visible at the intradoxes of the spaces *(Fig. 4.40)*.

Fig. 4.39. Deterioration on the vault of Entrance Space due to the rainwater penetration

Fig. 4.40. Salination and black deposits problem on the vault of Space #9

Zazadin Han is covered with earth layers on various parts. The earth deposits exist on the roof, at the courtyard and in the shelter in varying thickness. The thickness of the earth deposits is a few centimeters on the courtyard, but it increases on the roof, close to the demolished vault of the central gallery at the Shelter.

The bird nests are located at the top parts of the intradoxes of the vaults. These are mainly located at three points. The first one is at the portal of the Shelter above the inscription panel. The dropping poured from this nest is damaging it. The second and the third ones are at the semi-open spaces #1 and #4 *(Fig. 4.41)*. The droppings poured from these locations are also damaging the face stones.

Fig. 4.41. Bird nest at the second gallery in Semi-open space #1

There are plant colonisations in Zazadin Han, which exist as carpet like layers on the earth deposits at the roof. These are damaging the superstructure with their roots and disabling the draining system by trapping rainwater. The plant colonisations also exist at the courtyard, where their destructive effects are more serious on the original floor covering. Their roots penetrate into the joints of the existing stones of flooring.

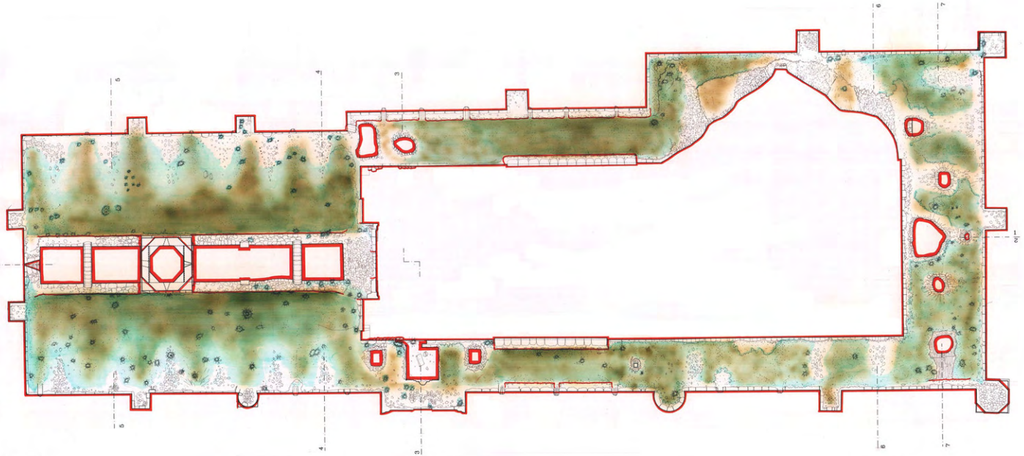
Fig. 4.42. Lichen colonisation below the water spouts on the north exterior elevation

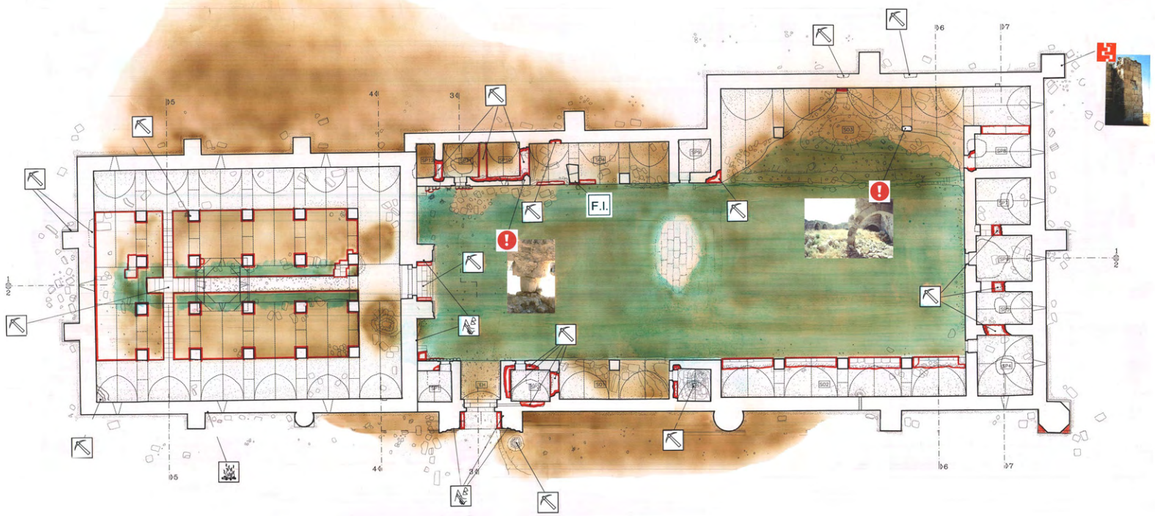
The lichen and algae colonization more or less exist on most of the exterior surfaces of the Han in varying densities depending on the location. On the whole surface of north exterior elevation, the surfaces of stones are hardly visible because of dense lichen colonisation. The density of lichen colonisation on north exterior elevation increases below the water spouts *(Fig. 4.42)*. The lichen colonisation on the west exterior elevation is also worth mentioning. It exists at the middle and upper parts of the walls and buttresses, and density increases close to the upper parts. On the other hand, on the south exterior elevation and east exterior elevation there are only a few spots at the upper rows of the stones. The south elevation of the courtyard is covered with spots and patches at different parts. The density of the lichen colonisation increases at the west part above the stairs to the masjid. The upper part of the east elevation of the courtyard is also covered with lichen colonisations. The densities of these tend to increase close to the top of the wall.

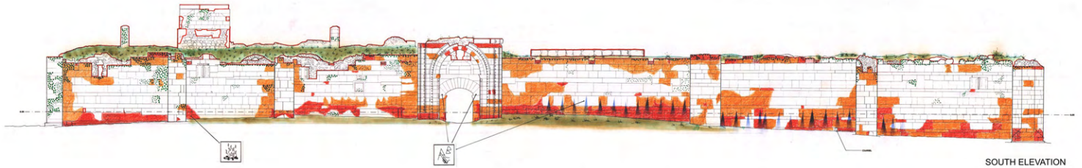
The most dangerous destructive actor amongst the man made actions is the damage of treasure hunters. The passage (at its crossroads)[21] and the west wall and the southeast corner of the shelter, the floor covering in front of the portal of the Shelter, the transition arch at the east of the second gallery of the Shelter are damaged by this means. The north wall of Semi-open space #4, the walls between triple space groups, the upper parts of the doors of the spaces from the interior are amongst the damaged parts. There are also such damaged parts at the east part of the north façade both sides of buttress B8. The floor of Space #3 is deeply excavated by treasure hunters[22]. The fire damage mentioned above is, only visible at the bottom part of the wall next to buttress B1 on the south exterior elevation. The evidences of shooting exists on the upper parts of the east elevation of the courtyard. There are many outbursts and holes on the face stones. The concrete support mentioned above exists at Semi-open space #4 on the first pillar. Some fallen pieces like the pieces of the cornice at the top of the courtyard walls are also combined with the concrete *(Fig.4.43)*. The engravings mentioned exist on and around the entrance portal and portal of the Shelter. These produce a disturbing appearance damaging the unity of the important architectural elements as well as face stones.

Fig. 4.43. Fallen piece of cornice combined with concrete repair

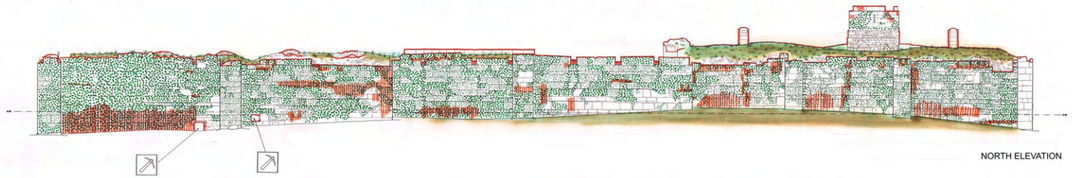
[21] The treasure hunters excavated it in July 2001, right after the first survey period.
[22] This happened in 1996 during the cleaning studies. Verbal information from Prof. Dr. H. Karpuz.



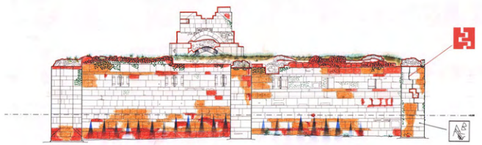




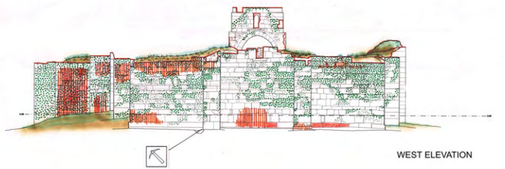
SOUTH ELEVATION



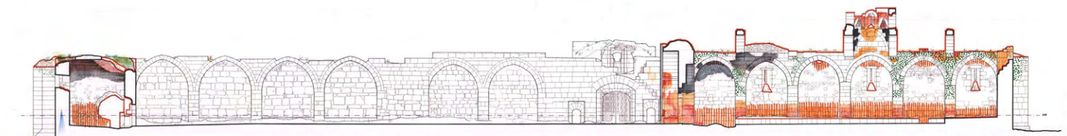
NORTH ELEVATION



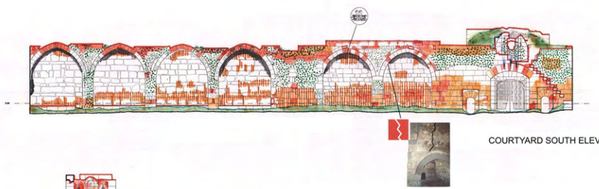
EAST ELEVATION



WEST ELEVATION

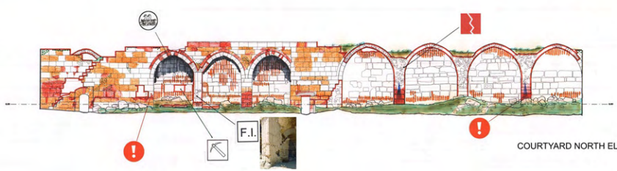


SECTION 2-2



COURTYARD SOUTH ELEVATION

SECTION 1-1



COURTYARD NORTH ELEVATION

STRUCTURAL PROBLEMS

CRACKS

VERTICAL CRACKS

DETACHMENTS

VERTICAL DETACHMENTS

HORIZONTAL DETACHMENTS

MATERIAL PROBLEMS

DAMPNESS

RISING DAMP

Water rising from the ground due to ineffective drainage. The color darkening on the faces and wet feeling are the marks of rising damp. Considering the harsh weather conditions, rising damp is the cause of severe material loss with seasonal wetting and drying. Dampness also help lichen colonisation.

RAINWATER PENETRATION

Penetration of rainwater at the upper parts of the han, due to damaged superstructure or ineffective drainage causes material loss similar to the rising damp.

DEPOSITS ON MATERIAL SURFACE

BLACK DEPOSITS

SALT DEPOSITS

SOILING

EARTH DEPOSITS

The han is covered with earth layers despite the cleaning studies in 1996. These provide a good habitat for the plants when fed with animal droppings and causes problems of drainage. The existence of earth layers on the roof must be examined carefully as it produces a dangerous additional load.

BIOCOLONIZATION

BIRDS NEST

As the abandoned places provide shelter for the animals, the small gaps like cracks and the joints where the pointing mortar is lost, serve as bird nests. These are the sources of bird droppings which include destructive materials for the stones like nitrate compounds.(1) There are many bird nests in the han. The ones marked in this analysis are the most visible ones.

HIGHER PLANTS

Typical step fauna which consists of grass and some bushes. It forms carpet-like layers on the earth deposits, especially on the roof.

HIGH DENSITY BIOFILM

Algae and lichen colonisation which covers the stone surface. It is visible as khaki-green or red-brown opaque deposit layers. Lichen colonisation can hasten the decay of stone by the production oxalic acids.(2)

LOW DENSITY BIOFILM

The khaki-green spots of algae and lichen colonisation on the stone surfaces.

MAN MADE ACTIONS

EXCAVATIONS

Zazadin Han is frequently visited by treasure hunters. From verbal sources we learn that not only conventional methods but also explosives are used for this pupose. This is the most severe and active form of damage, traces of which can be seen both inside and outside of the han.

The excavations cause total material loss and structural problems.

FIRE DAMAGE

The people of the area light fires in order to protect them and their animals from the harsh weather conditions of the area. The fires which are lit too close to the walls cause damage (material loss) on the face stones of the walls.

SHOOTING

Shooting is another cause of material decay. People do it mostly for hunting and sometimes for fun.

FAULTY INTERVENTION

The legend indicates the part of the han that is structurally reinforced with concrete at the end of the studies in 1996.

ENGRAVINGS

Many initials, names, dates etc. are engraved on the face stones both interior and exterior of the han. These produce a disturbing view.

LOSS OF MATERIAL*

TOTAL MATERIAL LOSS

The red borders indicate that some part of a building element is missing. This legend shows the loss that exceeds the material scale.

OUTBURSTS

Detachment of stone in compact fragments.(3)

BACK WEATHERING

Uniform loss of material following the profile of the stone surface

EMPTY JOINTS

Loss of pointing and jointing mortar.

FISSURES & ALVEOLIZATION

Development of holes, fractures and cracks on the stone surface.

PROBLEMS ORIGINATED FROM LOSS OF MATERIAL

REDUCING STRUCTURAL CROSS-SECTION

The excavations (see man-made actions) and especially material loss reduces the cross-section of structural elements, producing some structurally weak parts. Any damage to these parts will very possibly lead to partial collapses.

(*) Loss of material already occured.

REFERENCES:
1) CANEVA, G., SALVADORI, D., 1988, "Biodeterioration of Stone", *The Deterioration and Conservation of Ston*e, Studies & Documents on The Cultural Heritage 16, UNESCO

2) FELDEN B., 1998, Conservation of Historic Buildings, Reed Educational and Professional Publishing Ltd., ufkik, U.K.

3) FITZNER,B., HEINRICHS, K., KOWNATSZKI, R., 1992, "Classification an Mapping of Weathering Forms", th International Congress on Deterioration and Conservation of Stone, Vol. 2, Lisbon, pp.957- 968.

The losses exceeding material scale comprise the missing parts. These will not be mentioned here to avoid repetition. The outbursts and back weathering are mostly visible on the lower parts and top parts of the exterior elevations[23]. There are the evidences of material loss also on the courtyard elevations. These are at the lower and upper parts of the walls like the exterior elevations. The damage forms are mostly backweathering and alveolisation, therefore, not heavy like that of exterior elevations. There is severe material loss of back weathering on the intradoxes of the rubble stone vaults of spaces. The fissures and alveolization exist at the parts suffering from outbursts. The empty joints is a very common damage form on the interior faces of the exterior walls of Han. It is visible at the lower and top parts of the walls of Shelter, semi-open spaces and spaces. The parts where the empty joints problem partially exist are on the lower parts of north exterior elevation. The damage is especially serious on the east part.

The problems originated from the loss of material are detected on two main locations. The first one is the southeast corner of Space #11 and the second one is the transition arch at the east of Semi-open space #3. At the first location the superstructure of the space is carried by a dangerously reduced cross section of a wall corner. The walls that constitute the corner are heavily damaged by the treasure hunters *(Fig. 4.45)*. At the second location the transition arch is bearing the load of the remaining parts of the vaults of the galleries at the east of the Semi-open space #3. The cross section consists of only a singe row of voussoirs which are heavily weathered *(Fig. 4.46)*. Any structural failure at the mentioned parts will lead to partial collapses.

The condition of the fabric analysis is presented in figure 4.44.

[23] The north exterior elevation is not entirely evaluated by this means due to the dense lichen colonisation.

Fig. 4.45. Southeast corner of Space #11

Fig. 4.46. Transition arch at Semi-open Space #3

4.7. Evaluation

The information obtained from all the analysis issues shows that there are common points and relations between them. These are discussed in this part.

There are some common points in the structural system, construction material and construction technique analysis. As the result of the construction material analysis it is seen that the material used for the construction of Zazadin Han mostly have re-used origin and these are very possibly obtained from a nearby Byzantine settlement that we do not know about its existence and certain location today. On the other hand, the arrangement of the material and its use seem to be related to structural and aesthetic features of the building. At the parts where the structural cross-section gets narrower and the rigidity has the vital importance, the material

used is, always the cut stone. These are the critical locations like the connections of the rubble stone walls, the end of the vaults where they connect the courtyard walls, the voussoirs of the transition arches, the rib arches and the pillars. On the locations where the use of cut stone becomes a structural issue, the workmanship does not seem to have importance. For example: The cut stone elements that connect the rubble stone walls separating the spaces, consists of semi-processed re-used cut stone pieces, whilst the transition arches consist of scratch built cut stones. The choice of material also seems to be made in a conscious manner on the superstructure. The vault of Space #4 spans the widest opening amongst all and it is constructed in brick. It must be remembered that the brick is lighter than stone and therefore a brick construction vault produces less lateral thrust than a stone construction one and it can span bigger openings. The dimensions of the load bearing system elements, like the thicknesses of the walls are also related to the structural system. The walls, which are bearing lateral loads, are thicker than the others. The east and west walls of the Shelter, which have the biggest thickness (1.60m) also bear the lateral loads of the vaults of Shelter. The walls separating the spaces and semi open spaces have the medium thickness (1.10m), on the other hand these walls are bearing lateral loads of the vaults on both sides. These walls can be thought as in a state of ‘equilibrium’ by means of lateral forces.

When we consider the locations of the scratch built cut stone and processed re-used stone construction parts of the Han, these locations correspond to the important foreground surfaces of the monument. These are the south exterior elevation (which is also the entrance façade facing the caravan road), east elevation, the courtyard elevations and walls of the central gallery at the Shelter. The coursing of the cut stone is also important on these surfaces. The south and east exterior elevations are constructed in pseudo-isodomic coursing whilst the north and west elevations are constructed in random coursing. The west and east elevations of the courtyard is constructed in pseudo-isodomic and isodomic coursing respectively. On the other hand, all background surfaces of the Han (the north exterior elevation, the interior wall faces of the spaces, etc.) are constructed

in Semi-processed re-used stone or rubble stone. The existence of lime plaster on the vaults and the pointing on the rubble stone and semi-processed re-used stone surfaces are quite possibly the results of an aesthetic approach.

The analysis of the Interpretation of Evidence presented the account of the demolition and interventions discussing the relations of them with the traces. As discussed above the traces, whether in situ or not, are important sources of information for the missing parts. They will be the main basis for the discussions about the missing elements, if they really existed or not. The unidentified traces are providing clues about the further investigations on this building. As what we learn this analysis, apart from the damage occurred, Zazadin Han should have had at least two repairs through its history. The traces of the first one are the inharmonious non-processed re-used stone rows at the top of the east parts of the exterior elevations, which indicates to an earlier repair of possibly Ottoman times. The second one comprises the installation of the concrete support and the iron door, which indicates to a more recent operation.

The destruction process in Zazadin Han mainly has ‘man-made’ and ‘dampness’ origins. The areas of major material losses correspond to the areas that contain the traces of dampness problems both on the load bearing system elements and the elements of superstructure. Regarding the activities of treasure hunters and weather, it is visible that the destruction is still in progress. The excavations of treasure hunters play a major role in it causing partial losses of building elements. On the other hand the disabled drainage system due to the fallen parts and earth deposits, causes material losses and helps plant colonisation on the areas like the roof where there are earth deposits.

Such a basic destruction mechanism can be presumed: The destructive actors like excavations of treasure hunters and dampness problems (with seasonal wetting and drying, temperature changes) cause material loss. The material loss, weaken the structural cross sections and finally cause structural failure. The structural failures cause partial collapses. The partial collapses block the drainage system.

The blocked drainage system trap in rainwater and it causes dampness problems both on the ground level and superstructure, completing the destruction cycle. Since the building has never had any maintenance and cleaning during the centuries, the soiling has an important role in this mechanism. It is not directly acting on destruction cycle. It promotes the drainage problems by trapping the rainwater and helping plant colonisation that produce a physically destructive effect.

As the result of all these analysis mentioned above it can be said that; Zazadin Han is a non-restored, mostly intact, extensively re-used stone construction building, which contains very important traces providing information about the fully intact status of itself, the history, lifestyle and construction technique of its era.

CHAPTER 5

HISTORICAL RESEARCH

5.1. Development of Trade during Anatolian Seljuk Era

Due to the continuous state of war between Muslims and Christians during the 10th century, the trade between Europe and Muslim lands developed on the routes outside of Anatolia, which was under the rule of the Byzantine Empire at that period.

Following the conquest by the Seljuks, Anatolian lands had been a part of Islam world from the 11th century; the routes passing through Anatolia began to gain great importance. The Seljuks defeated the Byzantine Empire, resisted against the Crusades and finally they were able to stable the political conditions by the end of the 12th century, by last years of the reign of Sultan Kılıçarslan II.

The Seljukid Sultans maintained policies and directed military activities, as well as attached a special importance to the development of commercial life in their lands. They encouraged the merchants by means of providing the security of the caravan roads and increasing the number of the caravanserais; they brought a commercial insurance system and gave legal rights and opportunities to

merchants. Sultan Gıyaseddin Keyhüsrev, Sultan İzzeddin Keykavus and Sultan Alaeddin Keykubad were prominent figures who conducted these attempts.

Sultan Gıyaseddin Keyhusrev, the 6th ruler of the Anatolian Seljuks, conquered Antalya. Antalya was an important sea port for the goods from Europe to Egypt. According to the sources, the Sultan settled Muslim Turkish families in Antalya before its conquest and helped the formation of a Turkish commercial colony there.[1] Sultan Gıyaseddin Keyhusrev encouraged the merchants by indemnifying their lost goods while travelling within the boundaries of the Seljukid Empire. He exempted some of the commercial taxes for the maintenance of the commercial traffic after the conquest of Antalya.[2]

Sultan İzzeddin Keykavus maintained the commercial policy of the Seljuks. He conquered Sinop, which was another important seaport on the Black Sea coast. The sultan signed important commercial agreements with the Lusignan Kingdom of Cyprus and Venetians between 1213 and 1216. These agreements provided the merchants the right of immigration and of doing commercial activities within the boundaries of these countries. These agreements also had some articles about the decreases in taxes. What lies behind these agreements was the effort of Sultan to attract European merchants using the ports of Cyprus.[3]

The reign of Sultan Alaeddin Keykubad was a flourishing and prosperous period for the Seljuks. Sultan Alaeddin conquered the castle of "Kalonoros" at the Mediterranean coast and gave orders for the formation of a city around the castle. This place became an important sea port that was renamed as "Alaiyye" referring his name. Alaiyye became the residence of Seljukid sultans during the winters. The commercial agreements continued during the reign of Sultan Alaeddin Keykubad, too. The indemnification of the lost belongings of merchants that began in the period of Sultan Gıyaseddin Keyhusrev became in the form of a commercial insurance during the reign of Sultan Alaeddin Keykubad. The

[1] Turan, O., 1971, Selçuklular Zamanında Türkiye, Turan Neşriyat Yurdu, İstanbul, p.283
[2] Turan, op. cit. p.292.
[3] Turan, op. cit. p.302

standards of the caravan roads were greatly enhanced and splendid Seljukid caravanserais were constructed under his reign.

As a result of the efforts of the Seljukid sultans, the commercial activites in Seljukid lands increased and Anatolia became an international commercial centre for both exported and imported products[4]. Sümer informs us about the existence of an international fair in Seljukid lands, in "Yabanlu Pazarı" near Kayseri, which is called "Pazarören" today. It was a broad scale market where a great variety of products and slaves from northern countries were on sale[5]. Sivas was also an important international commercial center that was the meeting point of the merchants from Syria, Egypt, Iraq, the Italian cities like Geneva, Venice, Naples and Pisa, Byzance and Russia[6].

The reign of Sultan Gıyaseddin Keyhusrev II and the years after the battle of Kösedağ in 1242 was a period of decline, which was followed by the fall for the Seljukid Empire. The Mongols kept Seljuks under pressure during this period; the Seljuks lost their power despite the efforts of some of the statesmen..The Mongols invaded Anatolia at the beginning of the 14th century, which also brought the end of the Seljukid rule. The continuous struggles at the southeastern Anatolia affected the caravan roads to south. The lack of security and maintenance on these roads, especially after the Mongol invasion, severely damaged the economy of Anatolia.

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[4] According to Sümer, (op. cit. p.7), the products of Anatolia were minerals like iron, copper and silver, valuable stones like lapis-lasuli, inorganic and organic substances like gum tragacanth, resin gum, yellow arsenic, agricultural products like cereals and fruit, stock-breeding products like sheep and horses. Wool, leather, fish, carpets and timber were also among the products of Anatolia. Alaiyye and Antalya were the most important ports for timber export. The mines at the lands around Lake Van like borax and alum were exported to Iraq and other countries. Sümer (Yabanlu Pazarı, Türk Dünyası Araştırmaları Vakfı Yayını: 14, Afşin Matbaası, İstanbul, 1985, p. 10) gives the imported products were silk, gold and silver embroided clothes, fabrics, fur, sugar, soap, essences, chemical substances of Indian origin, metal tools, paper and arms. According to Turan (op. cit. p.396), silk was an important product. The fabrics essences and the silk of Indian and Chinese origin, were being exported from the ports of Anatolia to Europe

[5] Sümer, op. cit. p.20

[6] According to Sümer (op. cit. p.5), The Genoese and Iranian kings had commercial representatives in Sivas in 12th and 13th centuries. The Seljukids were having a remarkable income in Sivas from the sales of soap, cosmetics and horses in 13th century.

5.2. Main Caravan Routes in Anatolian Seljuk Era

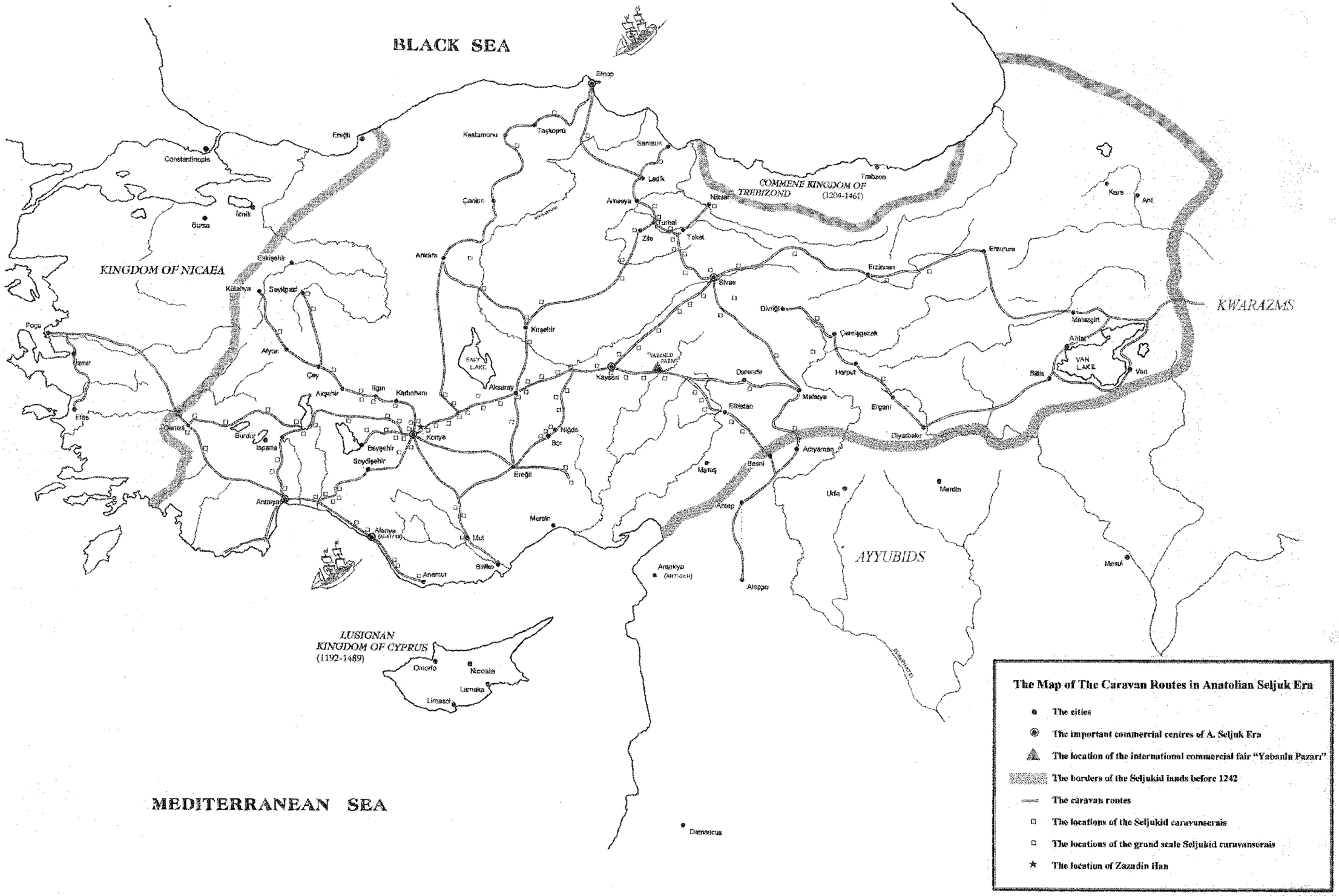
In Anatolia, there were road systems before the Anatolian Seljuks era. Hittite and Asurian commercial colony roads, Persian royal roads, Byzantine and Roman road networks were among these.

The commercial activities 12th century Anatolia focused on a few cities like Konya, Sinop and Sivas. During this period, the most important caravan roads were passing through Armenia and the trade was under the control of Roman and Armenian merchants. In the 13th century, Alaiyye and Antalya on the Mediterranean coast, Ayasluğ, İzmir and Foça on the Agean coast, Constantinople at the northwest, Sinop, Samsun and Trabzon on the Black Sea coast became prominent commercial centers in Anatolia, while Tabriz on the East, Baghdad in Iraq and Aleppo in Syria were important centers surrounding Anatolia.These centers were linked to other commercial centers that were Konya, Sivas, Ankara and Kayseri at the central Anatolia[7].

There were two major roads for the international commercial transport in Anatolia during the Seljukid period, the itineraries of which are marked on the map *(Figure 5.1)*:

1) The road on the route from west to east: This road was starting from Antalya, passing through Burdur, Isparta, Konya, Aksaray, Kayseri, intersecting the road from north to south at Sivas, and leading to Tabriz via Erzurum. There were two important roads starting from Kayseri. The first road was leading to Aleppo via Göksun-Maraş. The second road was passing through Malatya and Sarız or, Karakilise, Hurman, Elbistan, Akça Derbend, Göynük, and led to Aleppo via Deluk.
2) The major road on the route from north to south: This road was starting from Sinop, passing through Sivas and leading to Aleppo via Malatya.[8]

[7] Yavuz, A., T., "Alara Han'ın Tanıtılması ve Değerlendirilmesi", *Belleten*, Cilt: XXXIII, Sayı:132, TTK, Ankara, s:432.
[8] Sümer (1985), op.cit. p.4.


BLACK SEA
Sinop
Ereğli
Kastamonu
Taşköprü
Samsun
Ladik
Trabzon
COMMENE KINGDOM OF TREBIZOND (1204-1461)
Çankırı
Amasya
Niksar
Kars
Ani
Turhal
Zile
Tokat
Erzurum
Ankara
Erzincan
Eskişehir
KINGDOM OF NICAEA
Kütahya
Seyitgazi
Sivas
KWARAZMS
Divriği
Foça
Kırşehir
Cemişgezek
Malazgirt
Ahlat
İzmir
Afyon
SALT LAKE
YABANLI PAZARI
Kayseri
Darende
Harput
VAN LAKE
Bitlis
Van
Çay
Akşehir
Ilgın
Kadınhanı
Aksaray
Efes
Denizli
Burdur
Isparta
Konya
Niğde
Bor
Elbistan
Malatya
Ergani
Diyarbakır
Beyşehir
Seydişehir
Ereğli
Adıyaman
Besni
Maraş
Urfa
Mardin
Antalya
Alanya (ALAIYYA)
Mut
Mersin
Antep
Silifke
Anamur
Antakya (ANTIOCH)
AYYUBIDS
Mosul
Aleppo
LUSIGNAN KINGDOM OF CYPRUS (1192-1489)
Famagusta
Nicosia
Larnaka
Limasol
EUPHRATES
MEDITERRANEAN SEA
Damascus
The Map of The Caravan Routes in Anatolian Seljuk Era
The cities
The important commercial centres of A. Seljuk Era
The location of the international commercial fair "Yabanlı Pazarı"
The borders of the Seljukid lands before 1242
The caravan routes
The locations of the Seljukid caravanserais
The locations of the grand scale Seljukid caravanserais
The location of Zazadin Han

5.3. The Caravan Road between Konya and Kayseri

The road between Konya and Kayseri was the segment of the main caravan road from west to east, which connects the Mediterranean sea ports Alaiyye and Antalya to the Seljukid capital Konya and Kayseri. The international "Yabanlu Pazarı" was probably the most important commercial point on this road. The commercial traffic from the Black sea port Sinop met this road at Aksaray.

The existence of the grand scale caravanserais of the Seljuks, like Sultanhanı, Tuzhisar Sultanhanı, Ağzıkara Han, Karatay Han, Alaî Han and Zazadin (Sadeddin) Han, on this route can be accepted as the evidence of dense commercial traffic on this road. The caravanserais mentioned above are all located on the segment between Konya and Kayseri, except Karatay Han and Tuzhisarı Sultan Han[9].

This road was also subject to reasonable political traffic. Sultan Alaeddin Keykubad spent most of the winters during his reign in Alaiye and the summers in Kayseri. He must have very possibly used this route several times. Şeyh Şahabeddin Ömer bin Muhammed Suhreverdi, the ambassador of caliph Nasır Lidinillah, used this road to visit Sultan Alaeddin Keykubad in order to request his assistance against the Mongol invasion. According to the sources, on his way to home, caliph was accompanied by the Sultan and the emirs by Zincirlihan.[10] This road was also used by important statesmen of that time, like Mühezzibüddin Ali and Şemseddin Isfahanî, who used this road after the agreement for peace signed with the Mongols, after the War of Kösedağ in 1242.[11]

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[9] The overall areas of these caravanserais are: Sultanhanı (Aksaray) 4500 m^2, Tuzhisarı Sultanhanı 3900 m^2, Ağzıkara Han 2700 m^2, Karatay Han 2025 m^2, Alaî Han 2900 m^2, Zazadin Han 2750 m^2 approx. Erdmann,K., 1961, *Das Anatolische Karavansaray Des 13.Jahrhunderts*, teil 1, Berlin

[10] Turan, op.cit. p.330

[11] Mühezzibüddin Ali persuaded Mongol commander Baycu to make peace agreement with the Seljuks. Mubarizeddin Çavlı, who Sultan Gıyaseddin Keyhusrev II assigned to rule eastern Anatolia, requested Sultan Gıyaseddin to make Mühezzibüddin Ali vizier. This promotion is presented to another Seljukid statesman Şemseddin İsfahani at Obruk which is another important

In 1249, during the struggles after the death of Sultan Gıyaseddin Keyhüsrev, the armies of İzzeddin Keykavus and Rükneddin Kılıçarslan, who were the two sons of Sultan Gıyaseddin fought at the area around Sultanhanı near Aksaray. As te victorious of the battle, Sultan İzzeddin reached to Konya using this road.

The Seljukid caravanserais that is known on this route are Zazadin Han (1236-1237), Zincirli Hanı (?), Akbaş Hanı (?), Katrancı Hanı (?), Obruk Hanı (?), Okla Hanı (between 1156-1192, no certain date), Sultanhanı(1229), Akhan(1250-1260) between Konya and Aksaray, Ağzıkarahan(1219-1236, closed hall completed in 1240), Öresin Han(1270), Alay Han (1220-1225), Sünnetli Hanı I (?), Sünnetli Hanı II (?), Sarı Han (1238), Pervane Hanı (?), between Aksaray and Kayseri[12].

5.4. History of Caravanserais and Question of their Origin

The word caravan (*kâr-ban*) has a Persian origin. It means "the protector of the work in progress". The word caravan is used for a group of merchants travelling altogether for protection. The caravan consists of a leader, the travellers and the animals like mules, horses and camels.[13]

The oldest information about the caravanserais was given by Herodotos. He informs about the existence of "beautiful stations" in the area from Iran to the Agean sea. According to him, these buildings were safe military bases against bandit attacks as well as stations for the postal service.[14] There were also stations in the eastern states of ancient Rome for the travellers, called "*veredariorum*". These were buildings erected primarily for the use of the Roman government officials. The travellers could also use these buildings, but the accommodation

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stop on this road. Şemseddin Isfahani refused the promotion and wanted Mühezzibüddin Ali to have it because of his successful political effort. Turan, op. cit. p.447

[12] Özergin, M.,K.,1965, "Anadolu'da Selçuklu Kervansarayları", *İ.Ü.Edebiyat Fakültesi Tarih Dergisi*-II/20, İstanbul, pp.141-167.

[13] İslam Ansiklopedisi, 1955, Cilt:VI, Maarif basımevi, İstanbul, p.597.

[14] Müller, K., 1920, *Die Karawanserai im Vorderen Orient*, Der Zirkel Architektur-Verlag, Berlin, p.5 refers to, Travels of Herodotos, Book V, page 52 for this information.

was only free of charge for the officials[15]. There were stations in Byzantine Europe, which were called "*xenodochien*". These buildings that located on the roads approximately on every 50km contained some well decorated rooms, even sufficient for the accommodation of the kings. In these buildings, there were kept horses ready for the renewal of the tired horses of the couriers[16]. "*Ribat*"s were the important buildings of the Muslim defence system in Transoxiana before 10th century. They were the frontier castles of the Muslims and provide shelter to the military forces ready for "*jihad*". *Ribat*s had spaces like stables, kitchen, bath, masjid and an observation tower, which were surrounded by defence walls[17]. The income of the *Ribat*s was provided by the foundations established by the rich people or the state. The *Ribats* were not only constructed for military purposes, but also serving as safe halting places for the use of the caravans[18].

The Seljuks constructed many caravanserais in Anatolia for the requirements of their commercial policy. The construction of the earliest caravanserais of the Anatolian Seljuks are dated to the reign of Sultan Kılıçarslan II. The most important grand scale caravanserais were constructed in the prosperous times of the Seljukid Empire, during the reigns of Sultan Alaeddin Keykubad and his son Gıyaseddin Keyhusrev. The biggest and the most famous of all Seljukid caravanserais is "Sultanhanı" which was constructed in 1229 near Aksaray and was donated by Sultan Alaeddin Keykubad.

The Seljukid caravanserais in Anatolia have different plan types and different scales. Some of the grand scale caravanserais included spaces like bath, kitchen, wc, stables, masjid and special rooms that were all surrounded by fortresses for the needs of the travellers. The caravanserais of Anatolian Seljuks were financed by foundations. These foundations were established by the Seljukid sultans, their

[15] Müller, ibid.
[16] Müller, ibid.
[17] Köprülü, F., 1942, "Ribat", *Vakıflar Dergisi*, Vakıflar Umum Müdürlüğü Neşriyatı, Sayı:2, Ankara, p.268
[18] Köprülü, op. cit. 277

relatives and the state officials. The activities, the incomes and the expenditures of the caravanserais are described in detail in the foundation charters.[19]

The construction of the caravanserais continued during the decline of the Seljuks, after the Battle of Kösedağ in 1242. It is possible that this construction process might have stopped like all the other public improvements, for 10 years with the Mongol invasion in 1256[20] and ended in the following years of the death of Seljukid vizier Muineddin Pervane in 1277.[21] The total number of the Anatolian Seljukid caravanserais known so far are, about 250.[22]

There are various ideas about the origin of the caravanserais. The exact origin of the caravanserai concept is still not very clear today. Müller expresses the similarity between the central courts and corner-towers of Persian caravanserais and the Roman castrum, and accepts castrum[23] as the origin of the caravanserai[24]. Erdmann, considering the caravanserai at Kasr-el Hair-el Garb dated to 8th century A.D. as an example, tells that the caravanserai has a Sasanian origin[25]. Kuban mentioned that, the archaeological excavations and researches carried out at Central Asia has revealed that the *Ribat*s functioned both as caravanserais and as shelters for the army. Kuban states that the "*xenedion*" could be the origin of the carvanserais, but it is sensible to think of "*Ribat*" as the origin of Anatolian Seljuk caravanserais.[26]

Yavuz, stated that the caravanserai must have more than one origin, considering the different types of the building. This idea is supported by the existence of the

[19] Turan, O., 1947, "Şemseddin Altun-Aba, Vakfiyyesi ve Hayatı", *Bellten*, Cilt: XI, Sayı:42, s.207, Turan, O., "Mübarizeddin Ertokuş ve Vakfiyesi", *Belleten*, Cilt XI, Sayı 43, s.423, Turan, O., 1948, "Celaleddin Karatay, Vakıfları ve Vakfiyeleri", *Belleten*, Cilt:XII, Sayı:45, s.49

[20] Bodmer, J.P., 2001, "Selçuklular Anadolu'da", Cogito, Sayı:29, Yapı Kredi Yayınları, İstanbul, s.45

[21] Turan, O., 1971, Selçuklular Zamanında Türkiye, Turan Neşriyat Yurdu, İstanbul , s.457

[22] Yavuz, A. T., 1994, "Anadolu Kervansarayları ve Vakıflar", *XI. Vakıf Haftası Kitabı* (6-8 Aralık 1993), Vakıflar Genel Müdürlüğü, Ankara, p.40

Roman military headquarters are called "castrum". The plan types of these settlements later became the main scheme for the Roman colonial cities.

[24] Müller, K., 1920, *Die Karawanserai im Vorderen Orient*, Der Zirkel Architektur-Verlag, Berlin

[25] Erdmann, K.,

[26] Kuban, D., 1965, *Anadolu Türk Mimarisinin Kaynak ve Sorunları*, İTÜ Mimarlık Fakültesi, İstanbul, p.159

words “*han*”, “*zaviye*”, “*hankah*”, “*ribat*”, “*imaret*” which are all having similar meaning.[27] Yavuz expressed the importance of the ribats in Maveraünnehir in the 10th century, which are the most important buildings of the Muslim defence system at that period. The *ribat*s lost their military function and began to serve for mostly commercial purposes after the enlargement of the land property. Seljukids maintained this tradition and brought it from Central Asia to the Middle East, and developed it as a policy of the Seljukid state.[28]

5.5. History of Zazadin Han

There is only some limited information about the history of Zazadin Han that obtained from the inscription panels and the visual and written records, as well as from contemporary sources. There is no foundation charter giving information about Zazadin Han.

5.5.1. Inscriptions of Zazadin Han

There are two inscription panels on the Zazadin han. The first one is on the entrance portal and the second one is on the portal of the shelter.

The inscription panel on the entrance portal consists of four rows. The first two rows of the entrance portal are unreadable. The existing part is given below:

١- السلطانى
٢- فى ايام دولة السلطانى الاعظم
٣- علا الدنيا و الدين ابو الفتح كيقباد بن كيخسرو قسيم امير المؤمنين
٤- العبد الضعيف المحتاج الى رحمة الله تعالى
٥- كوبك بن محمد عمره فى شهور سنة ثلاث و ثلاثين و ستمائه

[27] Yavuz, A. T., 1969, “Alara Han’ın Tanıtılması ve Değerlendirilmesi”, *Belleten*, Cilt: XXXIII, Sayı: 132, s.43.
[28] Yavuz, ibid.

The Turkish translation is as follows:

Fazilet ve bereket çoğalıp, harekete geçip de bu durum Emir'ül Mümin'in görev verdiği milletleri yöneten büyük sultan, fetihler kazanmış olan Keykubad oğlu, dünya ve dinin sığınağı Keyhüsrev döneminin temin merhameti ve nurlu devletinin cömertliği ve ihsanı ile birleşince zayıf kul Muhammed oğlu Köpek tarafından 634 yılında bu eser yapıldı.

The English translation is:

"This building is constructed at the time, when the merit and riches increased, when these are combined with the mercifulness, the generosity and the kindness of the brilliant nation of the period of (the assistant of the great leader of the believers, the great sultan, the son of Keykubad, the shelter of the present world and Islam) Keyhusrev, by the poor Köpek son of Mohamed in 634 (1237 AD)."

The inscription panel on the portal of the shelter consists of four lines.

١- لما اشتمل الفضل و احتفل الفيض..
٢- و اتصلت به مراحم الحضرة المطهره و مكارم الدولة المنوره
٣- السلطان الاعظم مالك رقاب الامم غياث الدنيا و الدين
٤- ابو الفتح كيخسر و بن كيقباد قسيم امير المؤمنين [العبد] الضعيف
كوبك بن محمد سنة اربع ثلثين ستمائه

The Turkish translation is as follows:

Sultana ait;
Emir'ül mümin'in görev verdiği fetihler kazanmış dünya ve dini yücelten Keyhüsrev oğlu Keykubad'ın saltanat günlerinde, Allah'ın rahmetine muhtaç zayıf kul Muhammed oğlu Köpek (Allah ömürlü kılsın) tarafından 633 yılının aylarında iş bu eser yapıldı [29].

[29] Translated into Turkish by Prof.Dr. Mikail Bayram. Baş, A., 2001, "Yeni Buluntular Işığında Zazadin Hanı'nın Değerlendirilmesi", *I. Uluslararası Selçuklu Kültür ve Medeniyeti kongresi, 11-13 Ekim 2000*, Bildiriler I, S.Ü.Basımevi, Konya, s:101-109

The English translation is:

"This building is constructed at the time of the conqueror, the assistant of the great leader of believers, Keykubad son of Keyhusrev; by the poor Köpek (may God let him live long) son of Mohamed, in 633 (1236 AD)."

As it is understood from these panels, these two inscriptions give us the following information. The construction of the shelter of Zazadın Han is completed in 1236, during the reign of Sultan Alaeddin Keykubad, whereas the constructions of the courtyard and services are completed in 1237, in the reign of Sultan Gıyaseddin Keyhusrev II.[30]

5.5.2. Donor of Zazadin Han

Zazadin Han is donated by the Seljukid emir Saadeddin Köpek. The caravanserai is called with the name of its donor[31]. Saadeddin Köpek is one of the most interesting and notorious characters in the history of the Anatolian Seljuks. Saadeddin was a well-known person during the reigns of Sultan Alaeddin Keykubad and Sultan Gıyaseddin Keyhusrev. He was the negotiator, the minister of hunt, the architect and the commander of the Seljukid forces. He was the second most powerful man of the Seljukid state until his death in 1238 [32].

Saadeddin Köpek, played an important role during the reign of Sultan Alaeddin Keykubad[33]. He was the conductor of important architectural works. Sultan Alaeddin Keykubad ordered Saadeddin to construct a mansion at the place called

[30] The years 633 and 634 are the dates pertaining to the Hegira. The year 633 is the time period between October 1235 and August 1236. The year 644 is the time period between October 1236 and July 1237. Unat, F. R., 1959, *Hicri Tarihleri Miladi Tarihe Çevirme Kılavuzu*, TTK Basımevi, Ankara, s:44.

[31] Seljukid vizier.

[32] According to Koman, M. and Uğur, F. (in *Celalüddîn Karatay*, Konya Halkevi Neşriyatı, Sayı:10, Yeni Kitap Basımevi, 1940, Konya, s.11), his birthplace and date of birth is unknown. However, considering the existence of a family named "köpekoğulları" and a village, it can be thought that, Sadeddin Köpek is a member of a family from Amasya. His father's name, Mohamed, is learned from the inscription panel of Zazadin Han.

"Kubad-abad" near Beyşehir and made the drawings of the palace. As it is learnt from the sources, Saadeddin Köpek constructed kiosks, produced beautiful views and created a beautiful mansion in a very short time, as the way that the sultan wanted.[34]

Saadeddin Köpek maintained his position after the death of Sultan Alaeddin Keykubad[35]. He played an important role at the enthronement of Sultan Gıyaseddin Keyhüsrev II after the death of Alaeddin Keykubad in 1237[36]. However, as a result of his intrigues for being the Seljukid Sultan, Sadeddin was killed by the Sultan Gıyaseddin Keyhusrev in 1238.[37].

Zazadin Han was constructed in the time period between 1236 and 1237, which coincided with the most powerful years of Sadeddin. Considering its short construction period and its scale, Zazadin Han exists as the symbol of the power and personality of Sadeddin Köpek.

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[33] Turan, op.cit.p.354 gives the information that Saadettin Köpek prepared an agreement as the translator, which was signed between the Seljukid Sultan and Davud Şah, who was the new king of Mengüceks

[34] Turan, op. cit. p.397

[35] He used this power to eliminate the Seljukid statesman, the members of the Seljukid dynasty and especially important viziers. Sadeddin gave orders for the murder of Melike-î Adiliye, who was the daughter of the king of Eyyubids and the mother of İzzeddin Kılıçarslan in order to maintain the unity of power. Şemseddin Altun-Aba, Taceddin Pervane and Kemaleddin Kamyar were among the people who were also murdered. Şemseddin Altun-Aba was in service since the reign of Sultan Kılıçarslan II. Taceddin Pervane and Kemaleddin Kamyar were talented people and competent commanders.

[36] Refer to some sources, Gıyaseddin Keyhusrev was enthroned with the tricks of Saadeddin Köpek, and Gıyaseddin Keyhüsrev and Saadeddin Köpek were responsible for the death of Sultan Alaeddin Keykubad. Saadeddin Köpek is called "tyrant" in these sources. Turan, op. cit. p.456

[37]No people out of the Seljukid dynasty could rule the nation. Emir Saadeddin Köpek knew this very well and he tried to spread a fictitious story about his being a member of the Seljukid dynasty, to find a legal reason for his desires. He was also planning to eliminate Sultan Gıyaseddin. Sultan Gıyaseddin heard this, wanted help from Hüsameddin Karaca who was the mayor of Sivas, and laid a trap for Saadeddin to save the throne. The Sultan succeeded in killing Saadeddin Köpek after a banquet, in 1238.

5.5.3. Information from Contemporary and Later Sources

5.5.3.1. Information from Written Sources

Zazadin Han continued to serve after the death of its donor. There is a significant record about Zazadin Han in *Selçukname* by İbn-i Bibi. The record is like that: "After the battle of Sultanhanı in 1249, the people of Konya greeted Sultan İzzeddin Keykavus in front of Zazadin Han with cheers". According to İbn-i Bibi, the people of Konya "established kiosks" at this area as a traditional occasion[38].

Zazadin Han maintained its function during the Ottoman Era. There is an Ottoman court register giving some information about Zazadin Han. According to a record, "a merchant stopped at Zazadin han with his caravan. The merchant and his caravan headed for the next stop at the morning of the following day. Some of the camels in the caravan moved faster than the others, and separated from the caravan. This was an opportunity for the bandits and they stole some of the camels"[39].

There is no more information about Zazadin Han till the end of the 19th century, which was a time period when the interest for the cultural heritage of Anatolia emerged in the West. The earliest sources were mostly the travel records and articles in journals, which are followed by detailed researches. A Hungarian traveller, Bela Horvath, visited Zazadin Han during his travels in Anatolia in 1913. He wrote a very short description about the Han[40]. Halil Ethem published two photographs of Zazadin Han in a journal with an article about Anatolian Seljuk caravanseraies in 1918[41]. One of these photographs was showing the

[38] The word "establish" is used in the source. There is no information about what these kiosks look like or if they are elements of movable architecture or not. There can be a relationship between this information and the ruins around the caravanserai (see Öztürk, M., 1996, *İbn-i Bibi, El Evamir-ül Ala'iyye Fi'l Umuril Ala'iyye (Selçukname)*, Kültür Bakanlığı Yayınları 1000 Temel Eser, Cilt II, Ankara, s.124) It is obvious that Zazadin han became an important landmark near Konya in 12 years after its construction according to this information.
[39] Verbal information from Doç. Dr. Bayram Ürekli.
[40] Demirkan, T., 1997, *Anadolu 1913*, (Bela Horvath, Türkiye'nin Kalbinde Anadolu'da 2300 Kilometre çevirisi), Tarih Vakfı Yurt Yayınları:36, Numune Matbaası, İstanbul
[41] Halil Ethem (Eldem), 1918, "Anadolu'da Selçuki Hanları", *Türk Yurdu*, 14/106, s.183-188.

entrance portal of the Han, while the other shows its overall view. Considering the parts that are no more existent today, these two photographs are important sources for the restitution, despite their low image qualities (*Fig. 5.2, Fig. 5.3).* Richard Hartmann was another traveller, who visited Zazadin Han in 1926 and described the building in his book. Though he could not pronounce its name as 'Zazadin', he gave important information about the traces of the building and the use of it. He heard from the villagers that, Zazadin han was being used during the World War I. He gives information about an inscription carved on the west facade of the courtyard that can also be observed today[42]. According to Hartmann, the Han is not shown on the Kiepert maps or the British Military maps[43]. There is a photograph of Zazadin Han in Hartmann's book showing the entrance portal and two of the butresses on the south facade *(Fig. 5.4)* [44]. Ferit Uğur, visited the Zazadin Han in 1932 and wrote an article that was published in a local journal in Konya. He presented a detailed description of the Han and gives information about the inscriptions. Uğur also used two photographs containing information about the south facade, east facade and the portal of the shelter[45]. Yusuf Akyurt who was the director of Konya Museum, visited Zazadin Han in 1936. He took the plan measurements of the Han and photographed the east façade, south facade and both of portals. He collected these in a report in 1938 by means of giving some additional information about the Han and its donor[46]. There is some limited information about Zazadin Han in the Guide of Konya that was printed in 1944. It contains a plan and two photographs, which are quite similar to the photos taken by F.Uğur[47].

[42]This inscription consists of the name of a person and the name of a German supply convoy (transportkolonne). The inscription that Hartmann mentioned is on the west wall of the courtyard, at the south of the portal of the Shelter. It is possible to obtain some secondary information from these kind of inscriptions about the history of the han for the further studies. There are dates, names, abbreviations and initials on the entrance portal and on the south facade (see descriptions) at the east of the entrance portal. Harmann, R., 1928, *Im Neuen Anatolien*, Leipzig, p.110

[43] I checked out the copies of Kiepert maps in TTK archives and confirmed this information.

[44] Hartmann, op. cit. p.112

[45] Uğur, F., 1936, "Selçuk Kervansaraylarından Zazadın Hanı", *Konya* Mecmuası, Konya Halkevi Yayını No:1, s.35-39

[46] Akyurt, Y., 1938, *Konya Kılavuzu, İslami Mebaninin Muhtasar Rehberi*, metin, yazma, s.40-44. Akyurt,Y.,1938, *Konya Kılavuzu, İslami Mebaninin Muhtasar Rehberi*, fotograf albümü, yazma, s.23

[47] The plan has some errors. Soyman, F., Tongur, İ., 1944, *Konya Eski Eserler Kılavuzu*, Yeni Kitabevi, Konya.

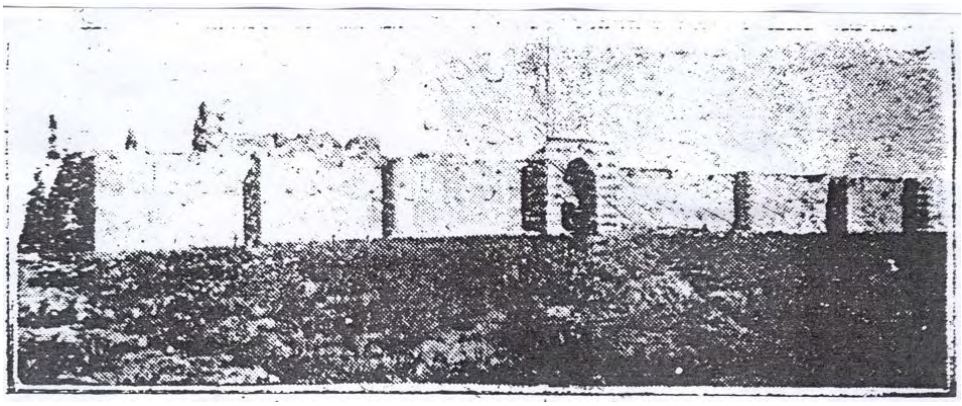


Fig. 5.2. Photograph showing the south façade of the Han, taken by Halil Ethem Bey

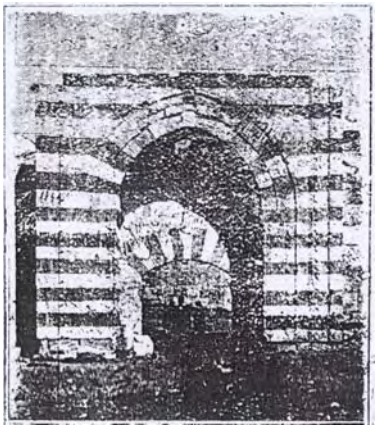


Fig. 5.3. Photograph showing the entrance portal of the Han, taken by Halil Ethem Bey

Fig. 5.4. Photograph showing the south façade of the Han, taken by R. Hartmann

Zazadin Han is visited by Clemens Holzmeister and Prof. Dr. Suut Kemal Yetkin in 1950's. Clemens Holzmeister visited the Han during his travels in Anatolia. He prepared a photograph album including the photographs taken in these travels and this was published in 1955. This album also includes the photographs of Zazadin Han showing its south facade, details from the south facade and northeast part of the building from the courtyard.[48]. Prof. Dr. Suut Kemal Yetkin visited the Han with archaeologist Haluk Karamağaralı who was his assistant at that time[49]. In his book called "*İslam Sanatı*", there are two important photographs taken by H. Karamağaralı, which shows the interior of the shelter and the masjid before the collapse of its superstructure[50]*(Fig. 5.5).* Kurt Erdmann visited Zazadin Han, with his team in 1955, while he was studying for a project on Anatolian Seljuk Caravanserais. The data that were obtained from his visit are published in 1961[51]. In this publishing, a detailed description of the caravanserai is given with the photographs and a plan[52].

Fig. 5.5. Photograph showing the Masjid, taken by H. Karamağaralı

[48] Holzmeister, C., 1955, *Bilder aus Anatolien*, Österreische Staatdruckerei Verlag, Wien
[49] Prof. Dr.
[50] Yetkin, S.K., 1959, *İslam Mimarisi*, Ankara Üniversitesi İlahiyat Fakültesi Türk ve İslam Sanatları Tarihi Enstitüsü Yayınları 2, Doğuş matbaası, Ankara, pp.231-234
[51] Erdmann, K., 1961, Das Anatolische Karavansaray Des 13.Jahrhunderts, teil 1, Berlin
[52] The plan has some errors. Erdmann, K., 1961, Das Anatolische Karavansaray Des 13.Jahrhunderts, teil:1 , abbildungen, Verlag Gebr. Mann, Berlin, tafel 14, Erdmann, K., 1961, Das Anatolische Karavansaray Des 13.Jahrhunderts, teil:1, text, Verlag Gebr. Mann, Berlin, pp.102-107.

Cengiz Bektaş and Ataman Demir visited Zazadin Han in 1980's. Ataman Demir published an article about Zazadin Han in a journal[53], while Cengiz Bektaş published a book about Anatolian Seljuk Caravanserais including Zazadin Han[54]. They both refer to K. Erdmann for the plan. There are significant photographs in both of the sources showing the semi-open space at the northeast of the Han, which is heavily damaged today.

The Department of the History of Art of Selçuk University realized a site cleaning and maintenance study in and around Zazadin Han that was conducted by Prof.Dr. Haşim Karpuz and Assoc.Prof. Dr. Ali Baş, in 1996. The report of this study, which gives information about the existence and location of some ruins around the Han for the first time with a basic scheme, is published in 2001[55].

5.5.3.2. Information from Visual Sources

Besides the visual sources that are obtained from the travellers reports or any other source, this study also consists of old aerial photographs of the Han and old maps of the area.[56].

The first image that is the aerial photograph of Zazadin Han and its vicinity was taken in 1955. Despite of its poor image quality, the vicinity of Zazadin Han is visible without the asphalt road. The situation of the land in 1955 and the ruins around the Han can also be seen in this image *(Fig. 5.6).* The second image is the aerial photograph of the same area taken in 1997 and shows the overall view of the area and the Han after the cleaning studies *(Fig. 5.7).*

[53] Demir, A., 1986, "Zazadin Hanı", *İlgi*, Yıl: 20, sayı: 44, Apa Ofset, İstanbul, s:26-31, s.28.
[54] Bektaş, C., 1999, *A Proposal Regarding The Seljuk Caravanserais, Their Protection and Use,* Yem Yayınları, İstanbul
[55]Baş, A., 2001, "Yeni Buluntular Işığında Zazadin Hanı'nın Değerlendirilmesi", I. Uluslararası Selçuklu Kültür ve Medeniyeti Kongresi Bildirileri 11-13 Ekim 2000, I.cilt, T.C. Selçuk Üniversitesi, Selçuklu Araştırmaları Merkezi Yayını, S.Ü. Basımevi, Konya , s.101-109
[56] There is visual information in many of the sources described in the previous part but the sources in this group are unpublished images without written information and they produce another category. These images are used with the courtesy of the General Command of Cartography of Turkish Armed Forces.

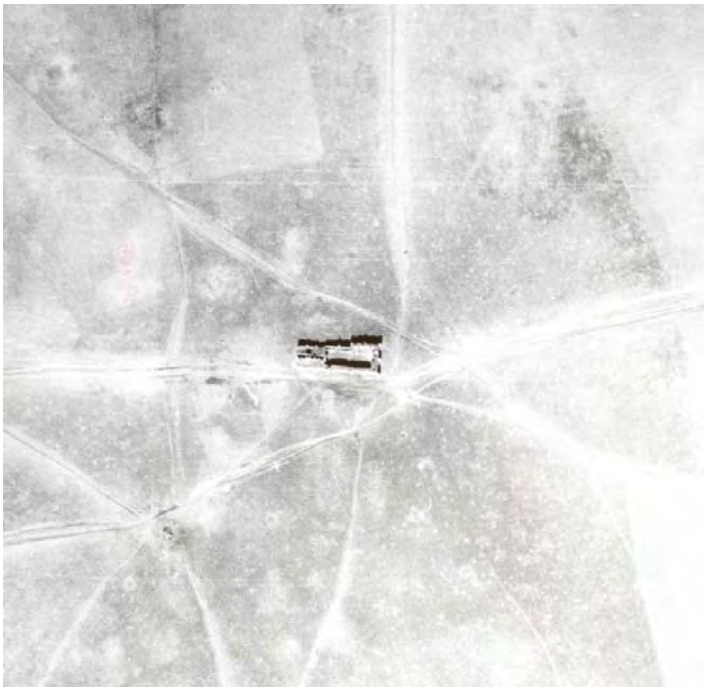


Fig. 5.6. Aerial photograph showing the vicinity of Zazadin Han, taken in 1955

Fig. 5.7. Aerial photograph showing the vicinity of Zazadin Han, taken in 1997

CHAPTER 6

COMPARATIVE STUDY

The comparative study aims to emphasize the significance of Zazadin Han amongst 24 caravanserais of similar type that consist of shelter, courtyard and services in a linear order[1]. These are: Altınapa Han, Kızılören Han, Kuruçeşme Han, Dokuzun Han, Alay Han, Kadın Han, Ertokuş Han, Aksaray Sultan Han, Çardak Han, Ağzıkara Han, Tuzhisarı (Kayseri) Sultan Han, Sarı Han, İncir Han, Hatun Han, Çinçinli Sultan Han, Karatay Han, Horozlu Han, İshaklı Han, Goncalı (Denizli) Ak Han, Durak Han, Kesikköprü Han, Çay Han, Obruk Han, Susuz Han. The comparison categories are classified as, the plan dimensions of the hans, their space organizations, structural elements, architectural elements, construction techniques and materials *(Fig. 6.1)*.

[1] According to the classification of Prof. Dr. A. Yavuz, the caravanserais are discussed regarding the spaces that they include, and their organisation. Briefly, in the first category there are two types. The first one is the caravanserais that only consist of Shelter, the second one is the caravanserais that consist of Shelter and services. The second category comprises two plan organisations: concentric and linear. Zazadin Han is a good example of the well known type, which consists of Shelter and services in linear organisation. Yavuz, A.T., 1995, "Anadolu Selçuklu Dönemi Kervansaraylarının Tipolojisi", *IV. Milli Selçuklu Kültür ve Medeniyeti Semineri Bildirileri*, 25-26 Nisan 1994, Konya, s.183-198.

6.1. Plan

In this first category, the compared plans are all adjusted to the same scale and lined up through an axis separating the shelter and the courtyard with services. This also enables to compare the base areas of the ‘shelter’s, and the ‘courtyard and services’ parts.

In terms of the plan dimensions, the biggest of all caravanserais is Aksaray Sultan Han. Tuzhisarı Sultan Han, Karatay Han are amongst the big caravanserais. Zazadin Han has roughly equal base area to Ağzıkara Han and Obruk Han. On the other hand, its base area is much more bigger than Altınapa Han, Kızılören Han, Dokuzun Derbent Han, Kadın Han, Ertokuş Han, Goncalı Ak Han, Ishaklı Han, Çinçinli Sultan Han, Durak Han, Kesikköprü Han, Hatun Han, Çay Han and Çardak Han. Therefore it can be classified as a medium size caravanserai that has the second longest façade after Aksaray Sultan Han, but the longest entrance façade amongst all caravanserais.

6.2. Date, Donor and Location

In the second category the name, construction date, donor, architect, the time period defined by the reign, and the route on which the caravanserai locates, are taken into consideration.

The earliest example that we know so far is, Altınapa Han constructed in the years of 1201-1202 and donated by Emir Şemseddin Altun Apa, during the reign of Süleyman Şah. The last example of this type is Çay Han, which is constructed in 1278. Zazadin han is the 11th caravanserai amongst the known examples regarding the chronological order. It is constructed during the years of 1236 and 1237 nearly at the same time with two big caravanserais Ağzıkara Han and Tuzhisarı Sultan Han. Similar to Zazadin Han, which was constructed during the reigns of Sultan Alaeddin Keykubad and Sultan Gıyaseddin Keyhusrev II, Aksaray Sultan Han, Tuzhisarı Sultan Han, Ağzıkara Han, Karatay Han, Çardak

Han, Sarı Han, İncir Han, Hatun Han and Çinçinli Sultan Han are also constructed during the reigns of these sultans. Zazadin Han is located on a very important route between Konya and Kayseri, where some very important caravanserais like Aksaray Sultan Han, Tuzhisarı Sultan Han, Sarı Han, Alai Han and Obruk Han exist.

6.3. Space Organization

The space organization of Zazadin Han is studied in two stages. The first stage consists of shelter, spaces and semi-open spaces, while the second consists of sub space groups located in the shelter and semi-open spaces. The sub space groups include the stables and the common accommodation spaces that are defined by platforms.

At the first stage, the spaces are classified regarding their functions or the elements included such as the masjid, the toilets, the bath and the entrance space. In addition to these there are the spaces with mezzanines[2], the interlinked space groups[3] (triple or quadruple) and some other spaces that do not contain any clues about their function.

The masjid in Zazadin Han is on its 1st floor, behind the entrance elevation, like Avanos Sarı Han, Kızılören Han and Obruk Han. There are two interlinked triple space groups in Zazadin Han, which are similar to the spaces that exist in Aksaray Sultan Han, Ağzıkara Han, Sarı Han and Karatay Han.

The platform in the shelter of Zazadin Han is located at the middle and the stables, forming a "U"shape, surround it. It is quite similar to Altınapa Han, Kızılören Han, Dokuzun Han, Ertokuş Han and Goncalı Akhan; but Zazadin Han is the only example that has a passage dividing the platform.

[2] Yavuz, A.T., 1995, "Anatolian Seljuk Caravanserais and Their Use As State Houses", 10th International Congress of Turkish Art, September 17-23, Geneva, p.757-765, page: 738.
[3] ibid.

6.4. Space Organization of the Shelter

The space organization of the shelter of Zazadin Han consists of six side galleries vertically intersecting a higher central gallery like Alai Han, Aksaray Sultan Han, Ağzıkara Han, Tuzhisarı Sultan Han, Sarı Han, İncir Han, Hatun Han, Çinçinli Sultan Han, Karatay Han, Obruk Han and Susuz Han.

6.5. Structural Elements

The structural elements of caravanserais are discussed under three main titles; that are load bearing system elements, transition elements, and the elements of the superstructure, similar to the order of the structural system analysis.

The only structural feature, related to the walls, is the wall thickness. However, the walls of the caravanserais have different thicknesses at different parts and the survey drawings are not always reliable. Therefore no comparison is made on wall thicknesses.

The buttresses and pillars of the caravanserais are compared in terms of their plan forms. The rectagonal plan buttresses of Zazadin Han are common to all caravanserais that have buttresses. In Zazadin Han, there are also circular plan buttresses as well as octagonal and rectagonal plan corner buttresses. The circular plan form more than a semicircle is not very common and only exists in Horozlu Han. There are similar octagonal corner buttresses in Tuzhisarı Sultan Han, Sarı Han and Karatay Han to that of Zazadin Han.

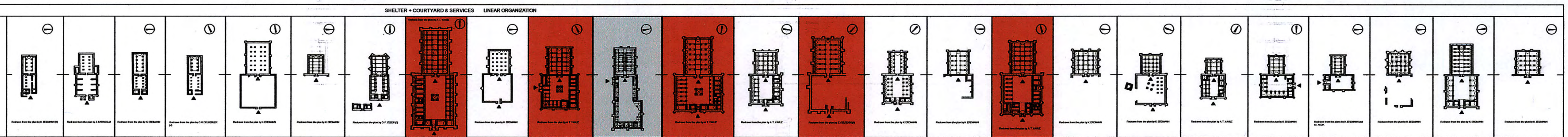
The transition elements in Zazadin Han are arches and squinches. The arches are essential parts of all caravanserais. On the other hand, squinches, as the transition elements of the domes, only exist in Aksaray Sultan Han, Ağzıkara Han and Karatay Han similar to that of Zazadin Han.

SHELTER + COURTYARD & SERVICES — LINEAR ORGANIZATION

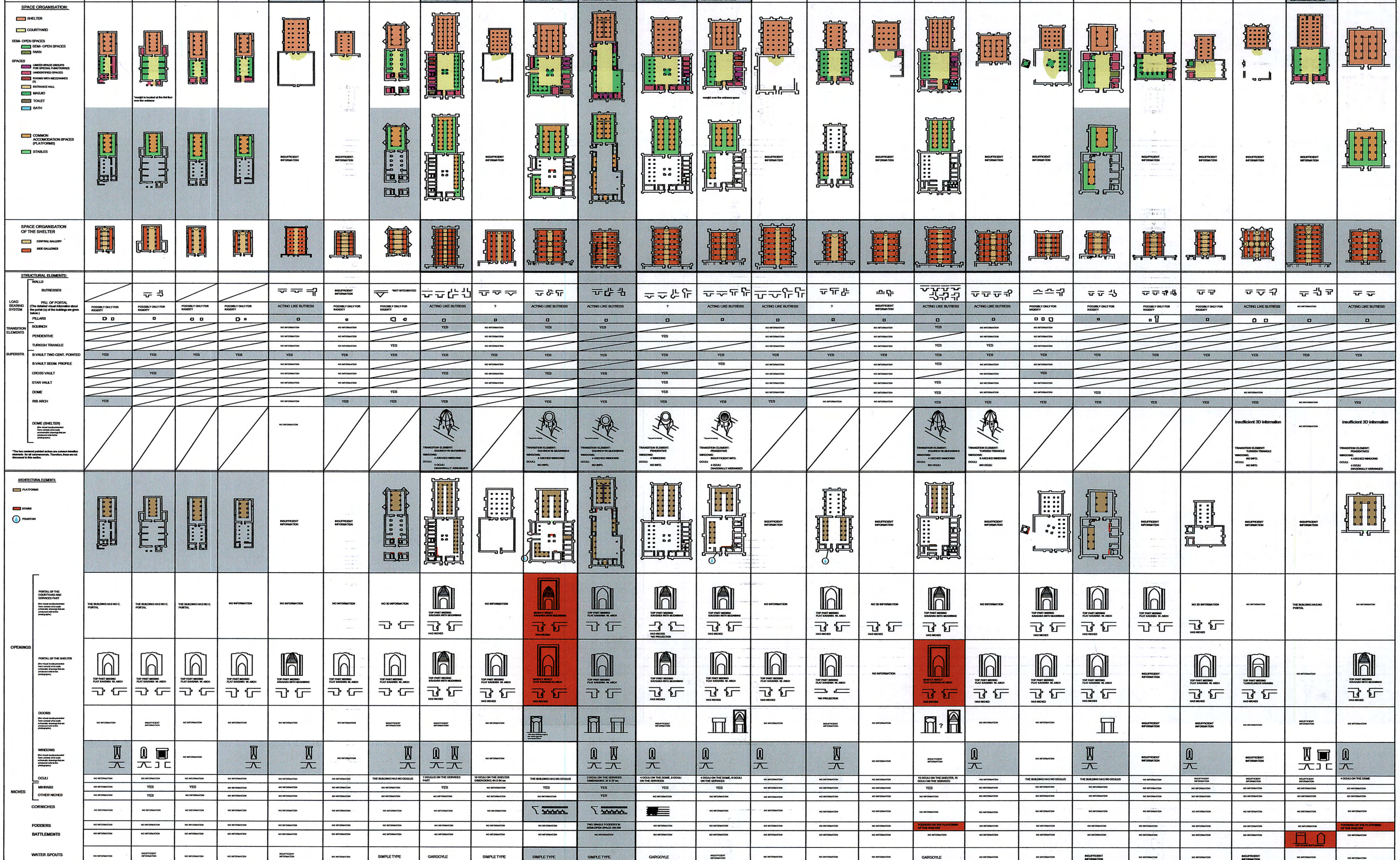
SIMILAR FEATURES (grey)

IMPORTANT FEATURES (red)

PLAN (ALL PLANS ARE REDRAWN TO THE SAME SCALE) — 0 10 20 30 40 50 meters



	Altınapa Han	Kızılören Han	Kuruçeşme Han	Dokuzun Han	Alay Han	Kadın Han	Ertokuş Han	Aksaray Sultan Han	Çardak Han	Ağzıkara Han	Zazadin (Sadeddin) Han	Sultan Han (Kayseri)	Sarı Han	İncir Han	Hatun Han	Çinçinli Sultan Han	Karatay Han	Horozlu Han	İshaklı Han	Ak Han (Goncalı)	Durak Han	Kesikköprü Han	Çay Han	Obruk Han	Susuz Han
PLAN SOURCE	Redrawn from the plan by K. ERDMANN (1)	Redrawn from the plan by Z. KARAOĞLU	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by O.N. DÜLGERLER (4)	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by O. F. ÖZEK (5)	Redrawn from the plan by A. T. YAVUZ	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by A. T. YAVUZ	[illegible]	Redrawn from the plan by A. T. YAVUZ	Redrawn from the plan by A. T. YAVUZ	Redrawn from the plan by E. GÜLTEKİN (6)	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by A. T. YAVUZ	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by A. T. YAVUZ	Redrawn from the plan by K. ERDMANN	Redrawn from the plans by K. ERDMANN and M. AKOK	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by K. ERDMANN	Redrawn from the plan by K. ERDMANN
NAME	ALTINAPA HAN	KIZILÖREN HAN	KURUÇEŞME HAN	DOKUZUN HAN	ALAY HAN	KADIN HAN	ERTOKUŞ HAN	AKSARAY SULTAN HAN	ÇARDAK HAN	AĞZIKARA HAN	ZAZADIN (SADEDDİN) HAN	SULTAN HAN (KAYSERİ)	SARI HAN	İNCİR HAN	HATUN HAN	ÇİNÇİNLİ SULTAN HAN	KARATAY HAN	HOROZLU HAN	İSHAKLI HAN	AK HAN (GONCALI)	DURAK HAN	KESİKKÖPRÜ HAN	ÇAY HAN	OBRUK HAN	SUSUZ HAN
CONSTRUCTION DATE	1201 - 1202	1206	1207 - 1208	1210	BETWEEN 1200-1215 (1)	1223	1223	1229	1230	1236-1240	1236-1237	1236	1238	1238-1239	1238 - 1239	1239	1240	1246 -1249	1249	1250	1266	1268	1278		
DONOR	EMİR ŞEMSEDDİN ALTUN ABA	KUTLUG B.MEHMED		HACI İBRAHİM			EMİR MÜBARİZÜDDİN ERTOKUŞ	Sultan ALAEDDİN KEYKUBAD	EMİR ESEDÜDDİN BİN AYAZ	MESUT İBN-İ ABDULLAH	EMİR SADEDDİN KÖPEK	Sultan ALAEDDİN KEYKUBAD			MAHPERİ HATUN (wife of Sultan I. Alaeddin)		EMİR CELALEDDİN KARATAY	EMİR CANDAR ESEDÜDDİN RUZBE	EMİR SAHİP ATA FAHRETTİN ALİ	EMİR S. KARASUNGUR BİN ABDULLAH					
ARCHITECT											EMİR SADEDDİN KÖPEK (?)										GAUHABAŞ BİN ABDULLAH				
PERIOD	SÜLEYMAN ŞAH	KILIÇARSLAN III	GIYASEDDİN KEYHUSREV I	GIYASEDDİN KEYHUSREV I	KILIÇARSLAN II or G.KEYHUSREV	ALAEDDİN KEYKUBAD	ALAEDDİN KEYKUBAD	ALAEDDİN KEYKUBAD	ALAEDDİN KEYKUBAD	A. KEYKUBAD-G. KEYHUSREV II	A. KEYKUBAD-G. KEYHUSREV II	ALAEDDİN KEYKUBAD	GIYASEDDİN KEYHUSREV II	GIYASEDDİN KEYHUSREV II	GIYASEDDİN KEYHUSREV II	GIYASEDDİN KEYHUSREV II	GIYASEDDİN KEYHUSREV II								
ROUTE					KONYA-AKSARAY-KAYSERİ			KONYA-AKSARAY-KAYSERİ		KONYA-AKSARAY-KAYSERİ	KONYA-AKSARAY-KAYSERİ	KONYA-AKSARAY-KAYSERİ	KONYA-AKSARAY-KAYSERİ											KONYA-AKSARAY-KAYSERİ	



	Altınapa Han	Kızılören Han	Kuruçeşme Han	Dokuzun Han	Alay Han	Kadın Han	Ertokuş Han	Aksaray Sultan Han	Çardak Han	Ağzıkara Han	Zazadin (Sadeddin) Han	Sultan Han (Kayseri)	Sarı Han	İncir Han	Hatun Han	Çinçinli Sultan Han	Karatay Han	Horozlu Han	İshaklı Han	Ak Han (Goncalı)	Durak Han	Kesikköprü Han	Çay Han	Obruk Han	Susuz Han
WATER SPOUTS	NO INFORMATION	INSUFFICIENT INFORMATION	NO INFORMATION	NO INFORMATION	INSUFFICIENT INFORMATION	NO INFORMATION	SIMPLE TYPE	GARGOYLE	SIMPLE TYPE	SIMPLE TYPE	SIMPLE TYPE	GARGOYLE	INSUFFICIENT INFORMATION	NO INFORMATION	NO INFORMATION	NO INFORMATION	GARGOYLE	NO INFORMATION	NO INFORMATION	INSUFFICIENT INFORMATION	NO INFORMATION	NO INFORMATION	INSUFFICIENT INFORMATION	NO INFORMATION	NO INFORMATION
CONSTRUCTION TECH & MATERIAL: LOAD BEARING SYSTEM	CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING; RUBBLE STONE	CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING	CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING; RUBBLE STONE	CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING; RUBBLE STONE	CUT STONE IN: RANDOM COURSING	CUT STONE IN: RANDOM COURSING	CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING	CUT STONE IN: RANDOM COURSING		CUT STONE IN: RANDOM COURSING	CUT STONE IN: ISODOMIC COURSING, PSEUDO-ISODOMIC COURSING, RANDOM COURSING	CUT STONE IN: RANDOM COURSING	CUT STONE IN: RANDOM COURSING	CUT STONE IN: RANDOM COURSING, ISODOMIC COURSING	CUT STONE IN: RANDOM COURSING		CUT STONE IN: RANDOM COURSING	CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING; RUBBLE STONE		CUT STONE & ROUGH CUT STONE IN: PSEUDO-ISODOMIC COURSING, RANDOM COURSING; RUBBLE STONE				CUT STONE & ROUGH CUT STONE IN: RANDOM COURSING	CUT STONE IN: RANDOM COURSING, ISODOMIC COURSING
SUPERSTRUCTURE	RUBBLE STONE	CUT STONE; RUBBLE STONE	CUT STONE; RUBBLE STONE	RUBBLE STONE	CUT STONE; RUBBLE STONE		CUT STONE; RUBBLE STONE	CUT STONE		CUT STONE; RUBBLE STONE	CUT STONE; RUBBLE STONE; BRICK	CUT STONE; RUBBLE STONE	CUT STONE	CUT STONE; RUBBLE STONE	CUT STONE		CUT STONE; RUBBLE STONE	RUBBLE STONE; BRICK		CUT STONE; RUBBLE STONE			CUT STONE; RUBBLE STONE; BRICK	CUT STONE; RUBBLE STONE	CUT STONE; RUBBLE STONE
ROOFING MATERIAL	NO INFORMATION	RAMMED EARTH	NO INFORMATION	NO INFORMATION	NO INFORMATION	NO INFORMATION	RAMMED EARTH	RAMMED EARTH	NO INFORMATION	CUT STONE (9)	NEEDS EXCAVATION !	CUT STONE (7)	NO INFORMATION	NO INFORMATION	NO INFORMATION	NO INFORMATION	CUT STONE (7)	CUT STONE (8)	RAMMED EARTH	NO INFORMATION	NO INFORMATION	NO INFORMATION	NO INFORMATION	INSUFFICIENT INFORMATION	NO INFORMATION
FLOORING MATERIAL	INSUFFICIENT INFORMATION	CUT STONE (10)	CUT STONE	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	CUT STONE	INSUFFICIENT INFORMATION	CUT STONE	CUT STONE	CUT STONE	CUT STONE	INSUFFICIENT INFORMATION	NO INFORMATION	INSUFFICIENT INFORMATION	CUT STONE	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	CUT STONE	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION	INSUFFICIENT INFORMATION

FOOTNOTES:

(1) ERDMANN, K., 1961, Das Anatolische Karavansaray Des 13. Jahrhunderts, Erster Teil, Katalog, Verlag Gebr. Mann, Berlin

(2) YAVUZ, A., 1995, "Anatolian Seljuk Caravanserais and Their use As State Houses", 10th International Congress of Turkish Art, september 17-23, Geneva, pp.757-765, page:758.

(3) Ibid.

(4) KARPUZ, H., "Konya Dokuzun Hanı Kazı ve Restorasyon Çalışmaları - 1993", offprint, pp.366

(5) ÖZBEK, Ö. F., 1976, "Eğirdir Mübarizüddin Ertokuş Kervansarayı", Vakıflar Dergisi, Sayı XI, V.G.M. Yayınları, Gaye Matbaası, Ankara, s.293-311.

(6) ÜNAL, R., H., 1996, "İncir Hanı 1993 Çalışmaları", Sanat Tarihi Dergisi VIII, s.117-129.

(7) Prof. Dr. Yılmaz Önge photo archive

(8) verbal information from Prof. Dr. Orhan C. Tunçer

(9) AKOK, M., 1969, "Kayseri'de Tuzhisarı Sultanhanı, Köşk Medrese ve Alaca Mescid Diye Tanılan Üç Selçuklu Mimari Eserin Rölöveleri", Türk Arkeoloji Dergisi, Sayı XVII-2, 1968, Türk Tarih Kurumu Basımevi, Ankara, s.5-41.

(10) DEMİR, A., 1986, "Kızılören Hanı", İlgi, Yıl: 20, Sayı: 46, Apa ofset, İstanbul, s.8-13.

The superstructure of Zazadin Han consists of barrel vaults with two centered pointed profile, barrel vaults with segmental profile and cross vaults. The barrel vaults with two centered pointed profile is common in all caravanserais. The barrel vault with segmental profile exits in Avanos Sarı Han, Karatay Han as we know so far. The cross vaults exist in Kızılören Han, Aksaray Sultan Han, Ağzıkara Han, Tuzhisarı Sultan Han and Ishaklı Han. Dome over the superstructure of the central gallery is not a very common structural element. It exists in Aksaray Sultan Han, Tuzhisarı Sultan Han, Ağzıkara Han, Sarı Han, Karatay Han, Horozlu Han, Çay Han, Susuz Han and Obruk Han. However, the mentioned elements are entirely or partly demolished, or restored. There are photographs about only three of these, which show their fully intact status; these are Aksaray Sultan Han, Karatay Han and Horozlu Han. The domes of Aksaray Sultan Han, Ağzıkara Han and Karatay han are quite similar to that of Zazadin Han.

6.6. Architectural Elements

The architectural elements are discussed in three main groups. These are the openings, the niches and the other elements. The openings comprise the entrance portal, the portal of the shelter, the doors, the windows and the oculi.

The entrance portal of Zazadin Han, projects from the façade, has ornament frames and a flat "*kavsara*"[4]. But does not have "*mihrabiye*" niches. It is not exactly similar to the entrance portal of any of the caravanserais in this study. There are examples without niches like Ertokuş Han and Durak Han; there are examples with flat *kavsara* like Hatun Han, Goncalı Ak Han and Durak Han, but none of these are similar to the entrance portal of Zazadin Han in terms of all architectural features. The portal of the shelter of Zazadin Han is very similar to its entrance portal. It is also similar to the portals of the shelter of Çardak Han, Ağzıkara Han, Sarı Han, Karatay Han, Horozlu Han, Ishaklı Han and Goncalı Ak

[4] for the term "kavsara"see: Ünal, R. H., 1982, *Osmanlı Öncesi Anadolu-Türk Mimarisinde Taçkapılar,* Ege Üniversitesi Edebiyat Fakültesi Yayınları No:14, Ticaret Matbaacılık, İzmir, s:34.

Han but it has no niches as an exception. Both of the portals of Zazadin Han are extensively constructed with dark and light stones in alternating order, which is a unique feature amongst all Seljukid caravanserais that have portals. There are mainly two types of doors in Zazadin Han[5]. The first is the door with lintel and the other with segmental arch. The information about the doors of the caravanserais is very limited due to insufficient documents. There are doors with segmental arches in Ağzıkara Han and Karatay Han[6] similar to those of Zazadin Han. The examples of doors with lintels exist in Sarı Han and Goncalı Ak Han. However these are not exactly similar to that of Zazadin Han. There are mainly two types of slit windows in Zazadin Han. The first type has a lintel at the top whilst the other has a semicircular arch. Although the sources are insufficient, the existence of both types in one building is quite rare. Aksaray Sultan Han is the only example that contains both types like Zazadin Han.

The information about niches and mihrabs are not available due to the lack of sources.

The platform in the shelter of Zazadin Han is, located at the middle as it is mentioned above. There are also platforms at the spaces and semi-open spaces. Aksaray Sultan Han, Ağzıkara Han, Sarı Han, Hatun Han and Goncalı Ak Han have platforms in their semi-open spaces. The platforms that exist in the spaces of Zazadin Han is a unique feature.

There are two stairs in Zazadin Han, one led through the masjid and the other through the roof. Both of them consist of cantilever steps attached to the courtyard walls. There are similar stairs in Aksaray Sultan Han, Sarı Han, Goncalı Ak Han and Karatay Han.

There is only a little information about the cornices. The cornices of Zazadin Han are very similar to those of Ağzıkara Han.

[5] see The Typology of Architectural Elements in Architectural Elements Analysis.
[6] The doors mentioned, in Karatay Han are restored examples. Therefore these may not be original.

The existence of fodders at the semi-open spaces of Zazadin Han is another unique feature. There are fodders in Susuz Han and Karatay Han, but these are on the sides of the platforms in their shelters. The waterspouts of Zazadin Han are simple elements. There are similar waterspouts in Ertokuş Han, Çardak Han and Ağzıkara Han.

6.7. Construction Technique and Material

In this section, the construction techniques and materials of the compared caravanserais are studied regarding their structural elements, flooring and roofing materials.

The load bearing system elements of Zazadin Han are constructed with cut stone[7] in isodomic, pseudo-isodomic and random coursing. Rubble stone is also used. Cut stone, rubble stone and brick is used for the superstructure. The load bearing system elements of all the caravanserais are constructed with cut stone or rubble stone in varying amounts. This is also common for the superstructure of the caravanserais. However the use of brick for the superstructure is quite rare. It only exists in Horozlu Han[8] and Çay Han[9]. The roof covering material of Zazadin Han is unknown. The roofing material is rammed earth in Aksaray Sultan Han[10], Ertokuş Han[11], Kızılören Han[12] and Ishaklı Han. On the other hand, in Ağzıkara Han[13], Tuzhiarı Sultan Han[14] and Horozlu Han[15], the roofing material is cut

[7] The cut stone is only mentioned as cut stone in this study. The discussion of its origin (its being re-used or not) is not made. The reason of this is the difficulty of putting the distinction, even in Zazadin Han. In addition to this, the information about the origin of the material of the other Hans is also very limited.
[8] Visited by the author in 2002.
[9] Yavuz, A. T., "2002, Anadolu Selçuklu Mimarisinin Yapı Özellikleri", *Selçuklu Çağında Anadolu Sanatı*, (Derleyen: Prof. Dr. Doğan Kuban) Yapı Kredi Yayınları-1567, Sanat-89, Promat A.Ş., İstanbul, s:285
[10] Verbal information from Assoc. Prof. Dr. Emre Madran, who was at Aksaray Sultan Han during the excavations and cleaning.
[11] Özbek, Ö., F., 1976, "Eğridir Mübarizüddin Ertokuş Kervansarayı", *Vakıflar Dergisi*, Sayı:XI, Vakıflar Genel Müdürlüğü Yayınları, Gaye Matbaası, Ankara, s.293-311, s:298.
[12] Karaoğlu, Z., 1998, *Restoration of Kızılören Han near Konya*, METU Faculty of Architecture M.S. Programme in Restoration, unpublished master thesis, Ankara
[13] There is a photograph in Prof. Dr. Yılmaz Önge archive showing the original cut stone roofing of Ağzıkara Han. It is taken during the repairs in 1960's.

stone. The flooring material of the courtyard of Zazadin Han is cut stone like Kızılören Han[16], Kuruçeşme Han, Aksaray Sultan Han, Ağzıkara Han, Tuzhisarı Sultan Han, Sarı Han, Karatay Han and Goncalı Ak Han[17].

6.8. Evaluation

The comparative study shows that, Zazadin Han is a medium scale caravanserai amongst the types that consist of Shelter and services in linear order. Its base area is not the only evidence of this. Zazadin Han does not contain so many specific spaces like kiosk masjid or bath altogether. These are only found together in the big caravanserais. Also, the variety of structural system elements is not as great as the biggest caravanserais. This is especially true for the superstructure.

Zazadin Han, has some 'unique' and 'important' features amongst the cavanserais of the similar type. As the unique features, Zazadin Han, has an unusually assymmetrical plan form amongst the others which have symmetrical plan outlines in general. In addition to this it has the longest entrance facade amongst all Seljukid caravanserais. Its portal is constructed with whitish and dark grey-brown stones in alternating order. There is a passage dividing its platform and it has two single units of fodders in a semi open space on a specified location. The important features of Zazadin han are; its construction period, its location, its donor, its having the second longest facade, its triple space groups and its being one of the few caravanserais that has partially brick superstructure. Zazadin Han is constructed in a prosperous period of Seljuks, on a very important caravan route close to the Seljukid capital Konya and donated by an important statesman of its time. The existence of triple space groups increases the importance of Zazadin Han. If the theorem about the interlinked space groups like that of

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[14] Akok, M., 1969, "Kayseri'de Tuzhisarı Sultanhanı, Köşk Medrese ve Alaca Mescit Diye Tanılan Üç Selçuklu Mimari Eserin Rölövesi", *Türk Arkeoloji Dergisi*, Sayı: XVII-2, 1968, Kültür Bakanlığı Eski Eserler ve Müzeler Genel Müdürlüğü Yayını, Türk Tarih Kurumu Basımevi, Ankara, s.5-41.
[15] Verbal information from Prof. Dr. Orhan C. Tuncer.
[16] Demir, A., 1986, "Kızılören Hanı", *İlgi*, Yıl:20, Sayı: 46, Apa Ofset, İstanbul, s: 8-13.
[17] Visited by the author in 2002.

Zazadin Han is true[18], it is built and used as something more than a caravanserai. When the building is examined from the builders point of view, the use of brick must have valid excuse. Instead of using a common material like stone that is respectively easy to obtain as re-used material, why did the builder prefer to use brick? It is very possibly because of structural reasons, but there may be some more reasons. Zazadin Han is one of the resources to obtain the answers of similar questions.

Although its aim is to understand the significance of Zazadin Han amongst the caravanserais of similar type, the comparative study also provides useful information for restitution. This is helpful for guessing the missing pieces that have in situ traces without samples or the missing pieces that have no traces. For example, the fodders similar to those in Susuz Han and Karatay Han, which are at the sides of platforms, might have been existed also in Zazadin Han, but there are no traces of such elements. Comparing the Hans brings two possible alternatives for the roof covering of Zazadin Han which is unknown today. The information about the exterior wall finishes are obtained from Obruk Han, where there are cut stone merlons. What we also learn from this study is that, in Zazadin Han, there might be cornices at the top of the portals resembling to Karatay Han and Ağzıkara Han.

[18] According to Prof. Dr. A. Yavuz, these spaces are used as the state houses or the accommodation needs of important guests. Yavuz, A.T., 1995, "Anatolian Seljuk Caravanserais and Their Use As State Houses", *10th International Congress of Turkish Art, September 17-23*, Geneva, p.757-765.

CHAPTER 7

RESTITUTION

The restitution of Zazadin Han is discussed in four steps. At the beginning the problems of restitution are studied, than the restitution proposal with alternatives and reliability degrees are discussed, and this is followed by the presentation of the final restitution. Finally, the restitution of function will be discussed.

7.1. Problems of Restitution

The study about the problems of restitution aims to focus on the restitution of missing parts. The data about the problems are grouped as; the traces of the missing parts, photographs of the missing parts, comparative study of the building elements in the Han, the comparative study about the missing parts, secondary information obtained from written documents and the architectural necessity for the existence of the missing parts.

The traces and the comparative study of building elements provide the information obtained from the building itself. The comparative study is the information obtained from the other buildings of the similar type or same era. The photographs and the secondary information from written documents (like theories of modulation and proportion) are the information obtained from the visual or written sources.

The sources of information are arranged regarding their levels of reliability and the information about each problem are listed according to this order. The ‘traces’ and the ‘photographs’ are the “very highly reliable” sources. ‘The comparative study of the building elements in Zazadin Han’ is a “highly reliable” source. ‘Comparative study’ is a source of “medium reliability”. ‘The secondary information obtained from written documents’ and ‘the architectural necessity’ are accepted as the sources having “low reliability”. The collected information is categorised regarding the following features of the missing parts: Location, form, dimensions, material and detail.

A total number of 51 problems are studied. These are listed below with their problem numbers, and visually presented in figure 7.1

1) The vault of central gallery at the Shelter (problem no: 1a).
2) The demolished rib arch that belongs to the superstructure of the central gallery at the Shelter (problem no: 1aa).
3) The upper parts of the west and east walls of central gallery (problem no: 1b and 1c).
4) The upper part of the transition zone for the dome of the Shelter (prob. no: 2a).
5) The top part of the dome at the Shelter (problem no: 2b).
6) The flooring of the platform at the Shelter (problem no: 3).
7) The door wings of the Shelter (problem no: 4).
8) The door of Space #13 (problem no: 5).
9) The door of Space #12 (problem no: 6).
10) The concrete repaired part at Semi-open space #4 (problem no: 7).
11) The platform coverings of Semi-open space #4 (problem no: 8).
12) The pillar and the transition arch at the demolished part of Semi-open space #3 (problem no: 9a).
13) The top finish of the courtyard wall at Semi-open space #3 (problem no: 9b).
14) The superstructure and the courtyard wall at Semi-open space #3 (problem no: 9c).

15) The platform at Semi-open space #3 (problem no: 9d).

16) The platform coverings of Semi-open space #3 (problem no: 9e).

17) The demolished wall between Space #8 and Space #9 (problem no: 10).

18) The sills and the upper parts of the doors of Space #5 and Space #7. (problem no: 11 and 12).

19) The platform coverings of Semi-open space #2 (problem no: 13).

20) The platforms of Semi-open space #1 (problem no: 14).

21) The platform coverings of Semi-open space #1 (problem no: 15).

22) The missing step of the stairs to the masjid (problem no: 16a).

23) The upper part of the stairs to the masjid (problem no: 16b).

24) The original flooring of the stables (problem no: 17).

25) The upper part of the entrance portal (problem no: 18a).

26) The top finish of the entrance portal (problem no: 18b).

27) The sills of window ws1 (problem no: 19).

28) The sill on the east side of window ws3 (problem no: 20).

29) The missing water spouts (problem no: 21a, 21b, …,21n).

30) The top finishes of rectagonal plan buttresses (problem no: 22a, 22d).

31) The top finishes of circular plan buttresses (problem no: 22b, 22c).

32) The top finish of octagonal plan corner buttress (problem no: 22e).

33) The top finishes of exterior walls (problem no: 23).

34) The door wings of the door of Han (problem no: 24).

35) The steps of the stairs to the roof (problem no: 25a).

36) The upper part of the stairs to the roof (problem no: 25b).

37) The superstructure of masjid (problem no: 26a).

38) The lower part of the courtyard wall that corresponds to masjid (problem no: 26b)

39) The door of masjid (problem no: 26c).

40) The top finish of the courtyard wall of Semi-open space #2 (problem no: 27).

41) The upper part of the portal of the Shelter (problem no: 28a).

42) The top finish of the entrance portal (problem no: 28b).

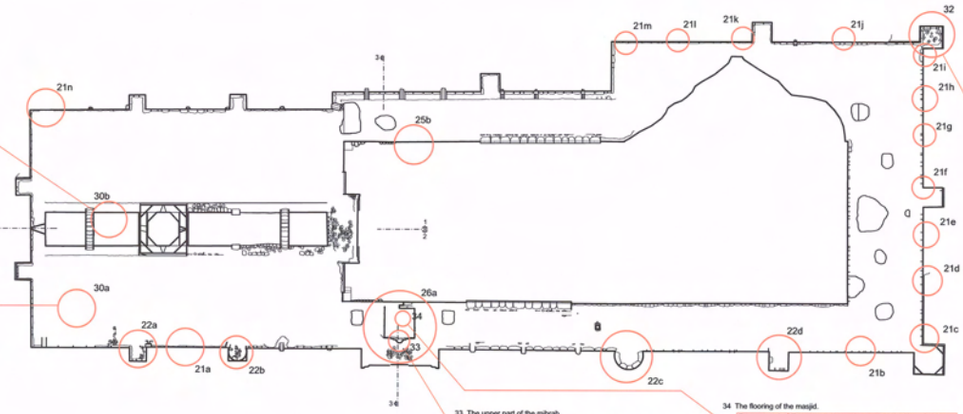
30b The roofing of the central gallery.

Traces or remains	There are some traces that give information about the LOCATION and FORM of the roofing and roof finish.
Comp. Study Information (GENERAL)	The examples of stone roofing exist in Karatay Han and Agzikara han. (MATERIAL, DIMENSION and DETAIL info.)

30a The roof covering is missing.

Comp. Study Information (GENERAL)	There are four alternatives for the roofing material: Horasan plaster (like Evdir Han and Orexin Han), rammed earth (like Ishakli Han, Aksaray Sultan Han and many others), roof tiles (like Kargi Han and Kirkgoz Han) and cut stone (like Tuzhisari Sultan Han and Agzikara Han). The information about LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL exists about each alternative.

IMPORTANT NOTE: THE EXCAVATIONS ON THE ROOF MAY PROVIDE DATA FEEDBACK !



32 The top finish of square plan corner butress.

Traces or remains	The traces give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Architectural necessity	There is not enough space for merlons on this butress. Therefore there could be a pyramidal cap at the top of this butress like the caps of the circular and polygonal buttresses.

33 The upper part of the mihrab.

Traces or remains	The traces give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Photo documents	Information about FORM, DIMENSIONS and DETAIL available (See problem 26b)
Comp. Study Information (BUILDING)	The mihrabs of other hans provide information about the FORM and DETAIL of the missing part.
Secondary info. written sources	The drawings of H. Erdmann give information about the DETAIL of the missing part.

34 The flooring of the masjid.

Traces or remains	The traces give information about the LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL of the missing part.

1c The upper part of the east wall of central gallery is missing.

Traces or remains	The information about LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL exists.

1a The vault of contral gallery is missing.

Traces or remains	The information about LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL exists, but not satisfactory.
Photo documents	 Taken in: 1950's by Prof. Dr. Haluk Karamagaralı

1aa The rib arch is missing.

Traces or remains	The information about LOCATION, FORM, DIMENSIONS and MATERIAL exists, but not satisfactory.
Photo documents	 Taken in: 1950's by Prof. Dr. Haluk Karamagaralı

1b The upper part of the west wall of central gallery is missing.

Traces or remains	The information about LOCATION, FORM, DIMENSIONS and MATERIAL exists, but not satisfactory.
Photo documents	 Taken in: 1930's by M. Fuat Uğur

2a The upper part of the transition zone is missing.

Traces or remains	There are traces of the missing parts, and there are some fallen stone pieces.
Photo documents	 Taken in: 1950's by Prof. Dr. Haluk Karamagaralı

2b The top of the dome is missing.

Traces or remains	The traces give information about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	

THE DOME	BUILDING	THE EXTERIOR FORM	TRANSITION ELEMENT	WINDOWS	DOOR
ZAZADIN (SADEDDIN) HAN		SQUINCH WITH MUQARNAS	4 windows with arches, 4 windows with arches		?
AKSARAY SULTAN HAN		SQUINCH WITH MUQARNAS	4 windows with arches		4 DOOR WITH ARCHES
KARATAY HAN		SQUINCH WITH MUQARNAS	4 windows with arches		4 DOOR
SARI HAN		PENDENTIVE	RUINED		4 DOOR (Originally arched)
AZIZKARA HAN		SQUINCH WITH MUQARNAS	4 windows with arches		?
SUSUZ HAN	ruin	PENDENTIVE	4 windows with arches		4 DOOR (Originally arched)
TUZHISARI SULTAN HAN		PENDENTIVE	4 windows		?
HOROZLU HAN		TURKISH TRIANGLE	4 windows with arches		4 DOOR
ÇAY HAN	above ruin level	TURKISH TRIANGLE	?		?

25a The steps of the stairs are missing.

Traces or remains	The traces give information about LOCATION and FORM of the missing parts.
Comp. Study Information (BUILDING)	There are remaining steps which can give FORM, DIMENSIONS, MATERIAL and DETAIL information.

25b The upper part of the stairs to the roof is missing.

Traces or remains	The traces give information about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	The detail of the stairs of the masjid of Sari Han is the only source of information. (See problem 16b) (Information about the FORM and MATERIAL of the missing part)
Architectural necessity	There must be a cantilever landing for the access to the roof and this must be higher than the finished roof level. (DETAIL)

7 There is a repair, original parts are missing.

Traces or remains	The information about the LOCATION, FORM, DIMENSIONS and MATERIAL exists.
Comp. Study Information (BUILDING)	The DETAILS should be similar to that of the intact parts.

9b The top finish of the wall of semi-open space #3 is missing.

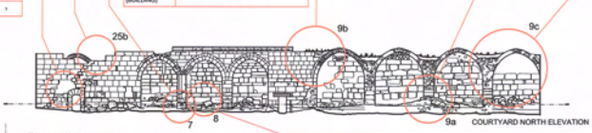
Traces or remains	The information about the LOCATION of the missing part exists.
Comp. Study Information (BUILDING)	The courtyard walls are ending with cornice at the top in general. (The information about FORM, DIMENSIONS, MATERIAL and DETAIL exist)
Architectural necessity	There must be cornice at this part, which should be harmonious to the rest. The level of the cornices must be raised above the top level of the vaults using a similar corner detail to that of the masjid's. (additional information on DETAIL and LOCATION)

9a The pillar and the transition arch at Semi-open space #3 is missing.

Traces or remains	The remains inform about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Photo	 Taken in: 1930's by Prof. Dr. Haluk Karamagaralı

9c The superstructure and the courtyard wall of semi-open space #3 are missing.

Traces or remains	The remains inform about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Comp. Study Information (BUILDING)	The details of the missing part should be similar to that of the intact semi-open spaces.



8 The platform coverings of semi-open space #4 are missing.

Traces or remains	Give information about the LOCATION, FORM and DIMENSIONS.
Comp. Study Information (BUILDING)	Should be stone covered like the platforms of the shelter. (MATERIAL, DETAIL)

4 The door of Shelter is missing.

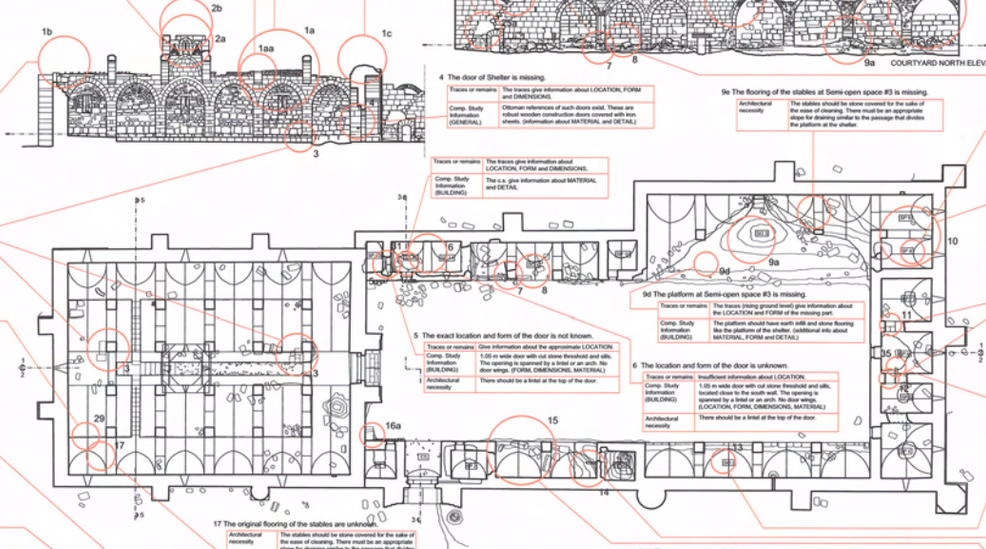
Traces or remains	The traces give information about LOCATION, FORM and DIMENSIONS.
Comp. Study Information (GENERAL)	Ottoman references of such doors exist. These are robust wooden construction doors covered with iron sheets. (information about MATERIAL and DETAIL)

9e The flooring of the stables at Semi-open space #3 is missing.

Architectural necessity	The stables should be stone covered for the sake of the ease of cleaning. There must be an appropriate slope for draining similar to the passage that divides the platform at the shelter.

36 The original flooring of the spaces are missing.

Architectural necessity	The spaces should be stone or brick covered.



10 There is a demolished wall between the spaces SP #8 and SP #9. This wall is integrated with an arch which looks very strange.

Traces or remains	There are traces and remains that give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Architectural estimation	It is very possibly an unusually big niche which is not very deep.

11 & 12 The sills and the upper part of the door is missing.

Traces or remains	The remains give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Comp. Study Information (BUILDING)	The opening is spanned by a lintel or an arch. (additional info. about the FORM of element)
Architectural estimation	The lower part of the door gives an idea about the plan form. There seems to be no door wing and no hinges. (DETAIL)

9d The platform at Semi-open space #3 is missing.

Traces or remains	The traces (rising ground level) give information about the LOCATION and FORM of the missing part.
Comp. Study Information (BUILDING)	The platform should have earth infill and stone flooring like the platform of the shelter. (additional info about MATERIAL, FORM and DETAIL)

35 The platform at Space #6 is missing.

Traces or remains	The remains give information about the LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL of the missing part.
Comp. Study Information (BUILDING)	The platform should have earth infill and stone flooring like the platform of the shelter. (additional info about MATERIAL, FORM and DETAIL)

5 The exact location and form of the door is not known.

Traces or remains	Give information about the approximate LOCATION
Comp. Study Information (BUILDING)	1.05 m wide door with cut stone threshold and sills. The opening is spanned by a lintel or an arch. No door wings. (FORM, DIMENSIONS, MATERIAL)
Architectural necessity	There should be a lintel at the top of the door.

6 The location and form of the door is unknown.

Traces or remains	Insufficient information about LOCATION.
Comp. Study Information (BUILDING)	1.05 m wide door with cut stone threshold and sills, located close to the south wall. The opening is spanned by a lintel or an arch. No door wings. (LOCATION, FORM, DIMENSIONS, MATERIAL)
Architectural necessity	There should be a lintel at the top of the door.

13 The platform coverings of semi-open space #2 are missing.

Traces or remains	The remains give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Comp. Study Information (BUILDING)	Should be stone covered like the platforms of the shelter. (MATERIAL, DETAIL)

14 The platforms of semi-open space #1 are missing.

Traces or remains	There are remains give information about the LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL of the missing part.

3 The flooring of the platform is missing

Traces or remains	There are remains of the flooring at the different parts of the platform. This is the obvious evidence of the platform covering that fully covers the surface. The remains also give information about the size of the stone pieces. The information about LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL exists.

29 Can we expect fodders on the sides of the platform?

Comp. Study Information (GENERAL)	There are cut stone fodders on the sides of the platforms of Sonrel Han, Kargi Han and Karatay Han. The c.s. provides no alternative information.

17 The original flooring of the stables are unknown.

Architectural necessity	The stables should be stone covered for the sake of the ease of cleaning. There must be an appropriate slope for draining similar to the passage that divides the platform.

21 (a,b,c,d,e,f,g,h,i,j,k,l,m,n) The water spouts are missing.

Traces or remains	The traces inform about the LOCATION of the missing element. Form and dimension informations are obtained from the other gutters.
Comp. Study Information (BUILDING)	The FORM, DIMENSIONS, MATERIAL and DETAIL of the missing water spout must be similar to the others.

21b The water spout is missing.

Traces or remains	The traces give information about the LOCATION of the missing part.
Comp. Study Information (BUILDING)	The information about FORM, DIMENSIONS, MATERIAL and DETAIL can be obtained from the other water spouts.

22a & 22d The top finish of the rectagonal plan buttress is missing.

Traces or remains	The traces only inform about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	There are battlements on the buttresses of Alara Han, Kirkgöz Han and Sarıağıl Han. the c.s. provides no alternative information. (information about FORM, DIMENSIONS, MATERIAL and DETAIL exists)

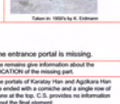
19 The stones on both sides of the window are missing.

Traces or remains	The traces inform us about the LOCATION, FORM and DIMENSIONS of the missing part.
Comp. Study Information (BUILDING)	The FORM and DETAILS of the missing window should be similar to the others.

22b & 22c The top finishes of the circular plan buttresses are missing.

Traces or remains	The traces give information about the LOCATION and FORM of the missing part.
Comp. Study Information (GENERAL)	There are examples of conical caps, but except one these are mostly madrasah buildings. Tercan Mama Hatun Caravanserai, Caca Bey Madrasah, Erzurum Hatuniye Medresah are the examples. The only example with crenellations is Huand Hatun Madrasah in Kayseri. Tercan Mama Hatun Caravanserai Plan Elevation Huand Hatun Madrasah

22e The top finish of the octagonal plan corner buttress is missing.

Traces or remains	The traces only inform about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	There is a similar buttress in Tuzhisari Sultan Han, ending with a curved pyramidal cap. Should be stone covered like the platforms of the shelter. (information about the FORM, DIMENSIONS and DETAIL)  Taken in: 1950's by H. Erdmann

20 The stone on east side of the window is missing.

Traces or remains	The part mentioned exists amongst the fallen pieces. the information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part exists.
Photographs	 Taken in: 1950's by Osmanlı Nizamiden

18a The top part of the entrance portal is missing.

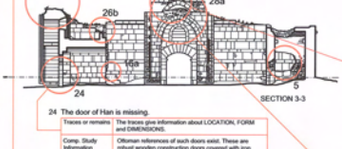
Traces or remains	The remains give some insufficient information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Photographs	 information about the FORM, DIMENSIONS and DETAIL. Taken in: 1910's by Halil Ethem (Eldem) Bey
Comp. Study Information (GENERAL)	The ornament frames must continue at the top of the portal similar to that of Karatay Han and Agzikara Han (additioual info. of FORM)
Secondary. info. written sources	There is a proportion between the width and height of the portal. It is 2/3 or 3/4 in different examples. (additional info about DIMENSIONS)

18b The top finish of the entrance portal is missing.

Traces or remains	The remains give information about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	The portals of Karatay Han and Agzikara Han are ended with a cornicho and a single row of stone at the top. C.S. provides no information about the final element. In madrasah buildings like Gökmedrese, there are richly ornamented merlons at the top finishes of the portals. (information about FORM)

28b The top finish of the entrance portal is missing.

Traces or remains	The remains give information about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	The portals of Karatay Han and Agzikara Han are ended with a cornicho and a single row of stone at the top. C.S. provides no information about the final element. In madrasah buildings like Gökmedrese, there are richly ornamented merlons at the top finishes of the portals. (information about FORM, DIMENSIONS, MATERIAL and DETAIL)

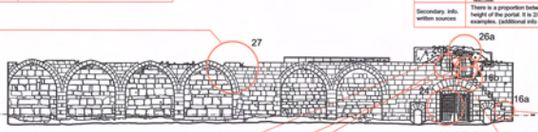


27 The top finish of the wall of semi-open space #3 is missing.

Traces or remains	The information about the LOCATION of the missing part exists.
Comp. Study Information (BUILDING)	The courtyard walls are ending with cornicho at the top in general. (The information about FORM, DIMENSIONS, MATERIAL and DETAIL exist)
Architectural necessity	There must be cornicho at this part, which should be harmonious to the rest. The level of the cornices must be raised above the top level of the vaults using a similar corner detail to that of the masjid's. (additional information on DETAIL and LOCATION)

24 The door of Han is missing.

Traces or remains	The traces give information about LOCATION, FORM and DIMENSIONS.
Comp. Study Information (GENERAL)	Ottoman references of such doors exist. These are robust wooden construction doors covered with iron sheets. (information about MATERIAL and DETAIL)



16a There is a missing step.

Traces or remains	There are traces defining the LOCATION, FORM, DIMENSIONS, MATERIAL and DETAIL of the missing part.

26a The superstructure of the masjid is missing.

Traces or remains	The traces and remains give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Photographs	 (information about the FORM, DIMENSIONS and DETAIL) Taken in: 1950's by Prof. Dr. Haluk Karamagaralı

16b The upper part of the stairs to the masjid is missing.

Traces or remains	The traces give information about the LOCATION, FORM and MATERIAL of the missing parts.
Comp. Study Information (GENERAL)	Similar stairs with similar detail exist in Avanos Sarı Han.  Taken in: 1950's by H. Erdmann

23 The top finishes of the exterior walls are missing.

Traces or remains	The traces give information about the LOCATION of the missing part.
Comp. Study Information (GENERAL)	All of the examples of top finishes in comp. study are with crenellations. The size and form of merlons are different depending on the building.

MASJID	MASJID'S DOOR	WINDOW	DOOR
ALARA HAN		All exterior facades	
KIRKGÖZ HAN	Dimensions: 0.70 m/ 0.90 m/ 0.20 m / 0.10 m. Ruble stone construction.	All exterior facades	
DERLEK HAN	Dimensions: ? Ruble stone construction.	Exterior facade only	
KARICI HAN			
SARAYÇA HAN	Dimensions: ? Ruble stone construction.	All exterior facades	
ALAEDİN KEYKUBAT I	Dimensions: 1.90 m / 0.90 m / 0.40 cm/ 0.60 m. Ruble stone construction. (Ablution)		
ALAEDİN CANDIR	Dimensions: 1.90 m / 0.90 m / Lost. Ruble stone construction. (Ablution)	All exterior facades in RUINS	
HUAND HATUN MADRASAHSI	Dimensions: 1.90 m / 0.90 m / Lost Ruble stone construction.	All exterior facades in RUINS	
SİVAS GÖK MADRASAH	Dimensions: 0.60 m/ 0.40 m / ? Ashlar stone construction. (Ablution)	Exterior facade only	
BURUCİYE MADRASAH	Dimensions: 0.60 m/0.40 m / ? Ashlar stone construction. (Ablution)	Exterior facade only	
İZMİRTOĞLU MOSQUE	Dimensions: 0.60 m/ 0.40 m / ? Ashlar stone construction. (Ablution)	Exterior facade only	

26b The lower part of the courtyard wall which corresponds to masjid.

Traces or remains	The traces and remains give information about the LOCATION and MATERIAL of the missing part.
Photographs	 (information about the FORM, DIMENSIONS and DETAIL) Taken in: 1950's by Prof. Dr. Haluk Karamagaralı

26c The door of the masjid is missing.

Traces or remains	The traces and remains give information about the LOCATION, FORM, DIMENSIONS and MATERIAL of the missing part.
Photographs	See problem 26b.
Comp. Study Information (GENERAL)	Three alternatives are possible: It can be a door with muqarnas and ornament frame like Avanos Sarı Han (1), or a door with a segmental arch at the top like the door of kösk masjid of Aşzikara Han (2). The third alternative is a basic door with a lintel at the top. 1 2 3
Arch. Necessity	Regarding the thickness of the wall the second and third alternatives are more possible.

M.E.T.U
FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN
PREPARED BY: MUSTAFA ONGE

PROBLEMS OF RESTITUTION

SCALE: 1/200

UNITS IN METERS

N

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

43) The fodders in the Shelter (problem no: 29).

44) The roof covering (problem no: 30a).

45) The roof covering of central gallery (problem no: 30b).

46) The platform at Space #12 (problem no: 31).

47) The top finish of square plan corner buttress (problem no: 32).

48) The upper part of the mihrab (problem no: 33).

49) The flooring of the masjid (problem no: 34).

50) The platform at Space #6 (problem no: 35).

51) The floorings of spaces (problem no: 36).

Among these problems, six problems (1a, 1aa, 1b, 1c, 2a and 2b) are related to the superstructure of the central gallery at the shelter. There are traces that provide data about the location, form, dimensions, material and detail of the vaults of central gallery; but the photographs taken by H. Karamağaralı and F. Uğur are important sources to obtain complete information *(Fig. 7.2., Fig. 7.3., Fig. 7.4)*. The location, form, dimension and detail information about the missing part of the dome (problems 2a and 2b) is obtained from the 'not in situ traces' and photos, up to the top of the transition zone[1]. For the part above the transition zone, the traces only provide data about the location. The rest of the information is obtained from the comparative study.

Fig. 7.2. Photograph of the vaults of central gallery from south direction, taken by H. Karamağaralı

[1] see Chapter 4.6. Interpretation of the Evidence Analysis

Fig. 7.3. Photograph of the vaults of central gallery from roof, taken by H. Karamağaralı

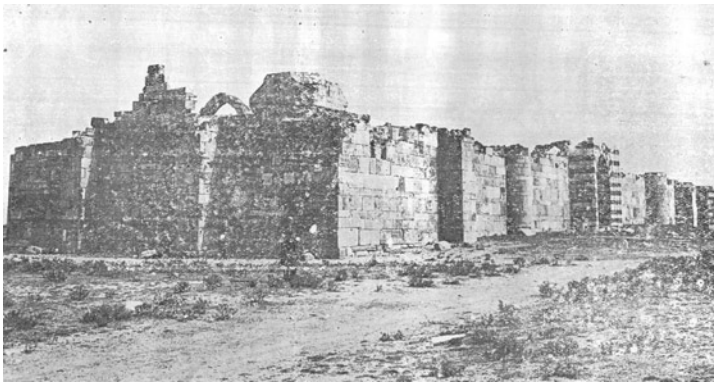


Fig. 7.4. Photograph of the west façade, taken by F. Uğur

The location data about the missing waterspouts (problem no: 21a, 21b, 21c, 21d, 21e, 21f, 21g, 21h, 21i, 21j, 21k, 21l, 21m and 21n) is provided from the traces and the rest is provided from the comparative study of building elements. The entire data about the platform coverings of the shelter (problem no:3) exists as in situ traces with samples. The data about the missing or partially demolished doors of triple spaces (problem no: 5, 6, 11,12) are obtained from traces, comparative study of building elements and architectural necessities. The data of location about the doors of Space #10 and Space #13 (problems 5 and 6), is obtained from the traces and the rest is obtained from the comparative study of the building elements. The traces provide data about the location, form, dimensions and material about the missing parts of the doors of Space #5 and Space #7 (problems 11 an 12) and the rest is obtained from the comparative study of building

elements and architectural necessity. At the concrete repaired part (problem 7) all information exists as in situ traces without samples except the details. These are obtained from the comparative study of building elements. The missing platforms and platform coverings of semi open spaces (problems 8, 9d, 9e, 13, 14, 15) are similar problems. The traces provide data about the location, form and dimensions of the missing parts. The additional data about form, and the data about detail are obtained from the comparative study of building elements. The information about the missing door wings of the Han and the shelter (problems 4 and 24) is obtained from the traces and comparative study. The location, form and dimensions are obtained from the traces and the rest is obtained from comparative study. The information about the missing floorings of stables, spaces and masjid (problems 17, 34, 36) is obtained from traces and architectural necessity. The data of all categories for the floorings of the stables and the spaces is obtained from the architectural necessity. All the data about the flooring of the masjid exists in traces. The information about the stairs to the masjid (problems 16a and 16b) is obtained from the traces and the comparative study. All the data required for the missing step (16a) exists in traces. The data of location, form and material about the upper part is obtained from the traces and the rest is obtained from the comparative study. The information about the missing upper parts of both portals is obtained from the traces, photographs, comparative study, secondary information from written sources and architectural necessity. For the upper parts of portals (problems 18a and 28a) the data of location, form, dimensions and material come from the traces and the rest is obtained from the photographs taken by Halil Ethem Bey[2], comparative study, secondary information from written sources and architectural necessity. The data of location is obtained from the traces about the top finishes of the portals (problems 18b and 28b). While the rest is obtained from the comparative study and architectural necessity. The information about the missing top finishes of the exterior walls and the buttresses (problems 22a, 22d, 22b, 22c, 22d, 22e, 23 and 32) come from the traces and comparative study. For all of them the traces only give information about the location, and the rest is obtained from comparative study.

[2] See Chapter 5 Historical Research, fig.5.2, fig.5.3.

The information about the missing platforms of spaces (problems 31 and 35) is obtained from the traces and comparative study of building elements. The traces provide data about location form and dimensions. The required data in the other categories is obtained from the comparative study of building elements. The entire information about the damaged windows (problems 19 and 20) on the south elevation is obtained from the traces, photographs *(Fig. 7.5)* and comparative study of building elements. The information about the demolished part of Semi-open space #3 (problems 9a, 9b and 9c) come from the traces, photographs, comparative study of building elements and architectural necessity. The data on the location, form, dimensions and material of the pillar, the transition arch and the courtyard wall (problems 9a and 9c) are obtained from the traces. The rest come from photographs taken by Prof. Dr. H. Karamağaralı *(Fig. 7.6),* C. Bektaş[3] *(Fig. 7.7)* and comparative study of building elements. The traces only provide data about the location of the top finish of the courtyard wall (problem 9b). The information about form, dimension, material and detail is obtained from the comparative study of building elements and the architectural necessity give additional data about the detail and location of the missing part.

Fig. 7.5. Photograph of window ws3, taken by C. Holzmeister

[3] Bektaş, C., 1999, *A Proposal Regarding The Seljuk Caravanserais, Their Protection and Use*, Yem Yayınları, İstanbul, s: 93.

Fig. 7.6. Photograph showing Semi-open space #3, taken by H.Karamağaralı

Fig. 7.7. Photograph showing the interior of Semi-open space #3, taken by C.Bektaş

The entire information of all categories about the roofing material (problem 30a and 30b) is obtained from traces and comparative study. The data on location and form about the roofing of the central gallery (problem 30b) is obtained from the traces and the rest come from the comparative study. All the information about the roofing material of the Han (problem 30a) is obtained from the comparative study. The information about the stairs to the roof (problem 25a and 25b) is obtained from the traces, comparative study of building elements, comparative study and architectural necessity. The data of location and form about the missing steps are obtained from the traces and the rest, from the comparative study of building elements. The data of location about the upper part of the stairs is obtained from traces (in situ traces without samples). Form, material and detail data is obtained from the comparative study and architectural necessity. The information about the demolished parts of the masjid (problem 26a, 26b, 26c and

33) comes from traces, photographs[4], comparative study and architectural necessity. The location, form, dimension and material data about superstructure (problem 26a) is obtained from traces, the additional information about form, dimensions and detail come from the photographs. The data about the demolished courtyard wall (problem 26b) is obtained from traces and photographs similar to the superstructure. The data on location, form, dimension and material about the door of masjid (problem 26c) come from the traces and the information about forrm dimension and material is obtained from comparative study. The data of location, form dimension and material about the upper part of the mihrab (problem 33) is obtained from the traces. The rest is obtained from photographs, comparative study and secondary information from written sources. Although there are no evidences, there could be fodders on the sides of the platform at the shelter (problem 29) like some other caravanserais. All categories of information about this are obtained from the comparative study.

7.2. Restitution Proposal with Alternatives

The description of restitution proposal will not be presented here regularly like the descriptions. The reason of this is the random distribution of the damaged or demolished parts on the building. Therefore the restitution proposal is discussed from up to down, from general to detail, by means of focusing on the similar problems and the locations where there are a few problems at the same place.

The superstructure of central gallery was obviously consisted of two barrel vaults with two centered pointed profiles and rib arches connected to them regarding the traces and photos. The demolished top part of the dome must have a semi-spherical form at the interior and an octagonal pyramid form at the exterior that is separated from the outer walls of the dome with a cornice like that of Aksaray Sultan Han and Karatay Han. The roofing material may be cut stone or rammed earth. Rammed earth roofing is very common amongst the caravanserais and even exists in Aksaray Sultan Han. On the other hand the roofing material can also be

[4] See Chapter 5 Historical Research, fig.5.5.

cut stone like Ağzıkara Han and Tuzhisarı Sultan Han, which were constructed approximately at the same time with Zazadin Han. As the roof is covered with earth deposits except the top part of the extradoxes of vaults, no information could be obtained from the traces except the location. There are two alternatives for the roof covering and both of them are possible.

The top finishes of the walls must very possibly be crenellated as no other examples of finishes exist amongst the caravanserais. The merlons of Zazadin Han (if they exist) should be either cut stone like that of Obruk Han or rubble stone like that of Kargı Han, Alara Han and Şarafza Han. There must be conical caps at the top finishes of the circular plan buttresses like Mama Hatun Caravanserai and Caca Bey Madrasah or crenellations with pointed merlons like Huand Hatun Madrasah *(Fig. 7.8)*. However the buttresses with circular plans are not equal in dimensions, therefore a single type of merlon may not fit them. Therefore the first choice is more likely to happen. There was very possibly a pyramidal cap on top of the octagonal corner buttress like that of Tuzhisarı Sultan Han *(Fig. 7.9)*. The rectagonal corner buttress must have had a crenellated or pyramidal top finish. Regarding its relation to the exterior walls the second alternative is more likely to happen.

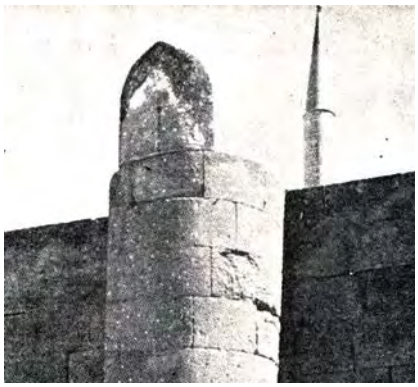


Fig. 7.8. Merlon on the buttress of Huand Hatun Madrasah[5]

[5] Binan, M., 1952, *Türk Saçak ve Kornişleri*, İTÜ Mimarlık Fakültesi Yayınları, Pulhan Matbaası, İstanbul.

Fig. 7.9. Top finish of corner buttress at Tuzhisarı Sultan Han[6]

The restitution of the upper parts and the top finishes of both portals are related to the height of them. According to some theories, the portals may have 2/3 or 3/4 width to height proportions[7]. There is a corniche at the top of intact examples[8]. Another feature regarding the height of the portal is, its covering the space behind it. The 3/4 ratio is enough for covering the space behind, in Zazadin Han. But it does not of course mean that the portal cannot be any higher. There are ornamented cut stone merlons at the top of the portals of some madrasahs, but there is no intact example of this in caravanserais.

The traces show us that there were cornices at the top of the courtyard walls. However these are not the final elements. There must have been another stone row or a finishing element at the top of them. The cornices must be common for all the courtyard walls including that of Semi-open space #2 and semi-open space #3. But these must be raised not to intercept the vaults of these spaces.

The masjid was covered with a star vault with an oculi at the center. There was a window with a lintel at the top and a door, at the courtyard wall of the masjid.

[6] Erdmann, K., 1961, *Das Anatolische Karavansaray Des 13.Jahrhunderts*, teil 1, katalog, Berlin, abb.159.
[7] Tunçer, O. C., 1982, "Birkaç Selçuklu Taçkapısında Geometrik Araştırmalar", *Vakıflar Dergisi*, Cilt XVI, Ankara, s: 61-76., Bayburtluoğlu, Z., 1976, "Anadolu Seçuklu Devri Büyük Programlı Yapılarında Önyüz Düzeni", *Vakıflar Dergisi*, Sayı:XI, Vakıflar Genel Müdürlüğü Yayınları, Gaye Matbaası, Ankara, s.67-106.
[8] see Chapter 6 Comparative Study.

The door of the masjid probably had a lintel or a segmental arch at the top. The roof covering of the masjid was possibly somewhat similar to that of the Han.

The damaged slit windows on the south elevation (ws1 and ws3) were very possibly similar to the others. The demolished 2 galleries of the semi-open space #3 were very possibly similar to the other galleries of semi-open spaces in terms of their all features.

The stairs to the roof and the stairs to the masjid were mostly consist of cantilever steps proecting approximately 90cm from the courtyard wall, as it is understood from the traces, and they have muqarnas like ornaments under each step. From the traces we find out that there were two types of ornamented steps, which are arranged in alternating order. At the top, where they meet the roof or masjid level, there were very possibly cantilever landings like that of Sarı Han *(Fig. 7.10)*.

Fig. 7.10. Cantilever landing and steps of the stairs in Sarı Han[9]

The door wings of Han and that of Shelter were very possibly wooden construction elements covered with sheets of iron and they had wooden sliding bars, which were used to lock them. The doors of triple spaces were very possibly basic openings with lintels at the top, and there were no door wings.

[9] Erdmann, K., 1961, *Das Anatolische Karavansaray Des 13.Jahrhunderts*, teil 1, katalog, Berlin, abb.255.

The flooring of the masjid were cut stone; the floorings of the spaces were possibly cut stone although there are no traces. The stables might be stone paved but, again, there are no traces. The platforms of semi-open spaces were very possibly similar to the platforms of the shelter with all features including the platform coverings. The restitution alternatives with reliability degrees are presented in figure 7.12.

7.3. Reliability Degrees

The reliability degrees are set regarding the amount of information obtained from the sources with different reliabilities. Therefore the information obtained from the sources is grouped regarding an order from the highest reliability to the lowest *(Fig. 7.11)*. If the information about one category is sufficiently provided from a high reliability source, the sources of lower reliability are not taken into consideration. The information about the location of the missing part is very important. The traces providing information of location about the missing part, comprises the main distinction about the existence and non-existence of it. The reliability degrees and their relations to the reliability of the sources are as follows:

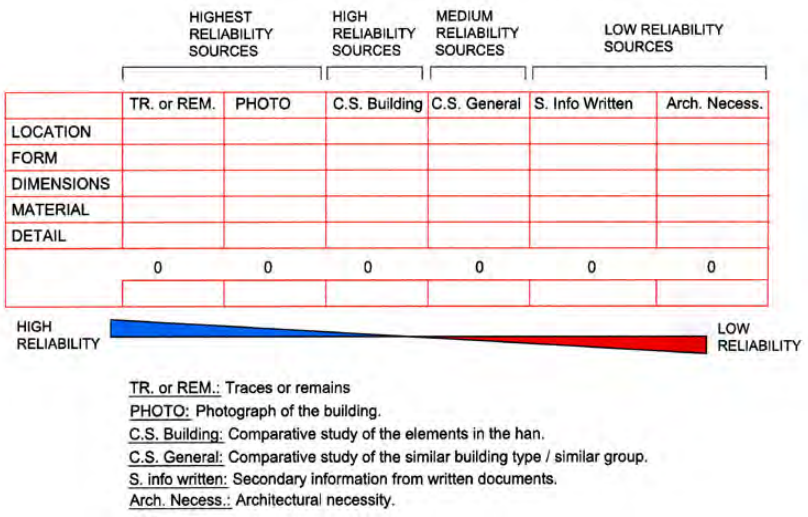


Fig. 7.11. Table for setting the reliability degrees

1st degree of reliability: The information of all categories about the missing parts in this group is obtained from the 'very highly reliable' sources. The problem areas in this group are given below:

a) The vault of central gallery in the shelter (problem 1a)
b) The rib arch at central gallery (problem 1aa)
c) The upper part of the west wall of central gallery (problem 1b)
d) The upper part of the east wall of central gallery (problem 1c)
e) The upper part of the transition zone (problem 2a)
f) The flooring of the platform in the shelter (problem 3)
g) The pillar and the transition arch at semi-open space #3. (problem 9a)
h) The platforms at Semi-open space #1 (problem 14)
i) The missing step of the stairs to the masjid. (problem 16a)
j) The window ws3 (problem 20)
k) The superstructure of masjid. (problem 26 a)
l) The lower part of the courtyard wall that corresponds to masjid (problem 26b)
m) The flooring of masjid (problem 34)

2nd degree of reliability: The information of all categories about the missing parts in this group is obtained from the 'very highly reliable' and 'highly reliable' sources. The problem areas in this group are given below:

a) The concrete repaired part (problem 7)
b) The platform coverings of semi-open space #4 (problem 8)
c) The courtyard wall of Semi-open space #3 (problem 9a)
d) The platform coverings of Semi-open space #2 (problem 13)
e) The platform coverings of Semi-open space #1 (problem 1)
f) The window ws1 (problem 19)
g) The missing water spouts (problem 21)
h) The platform at Space #6 (problem 35)
i) The steps of the stairs to the roof (problem 25a)

THE CLASSIFICATION OF THE INFORMATION TYPES REGARDING THEIR SOURCES

- Traces or remains / Comparative study of the elements in the han. → THE INFORMATION OBTAINED FROM THE THE BUILDING ITSELF
- Comparative study of the similar building type / similar group. → THE INFORMATION OBTAINED FROM OTHER BUILDINGS OF THE SAME TYPE OR SAME ERA
- Photographs of the building. / Secondary information from written documents, like theories of modulation and proportion. → THE INFORMATION OBTAINED FROM VISUAL AND WRITTEN DOCUMENTS ON ZAZADIN HAN OR THE BUILDINGS OF SAME ERA.
- Architectural necessity. → THE INFORMATION BASED ON NECESSITIES, ARCHITECTURAL SENSE AND COMMENTS DUE TO THE LACK OF INFORMATION FROM OTHER SOURCES.

	HIGHEST RELIABILITY SOURCES	HIGH RELIABILITY SOURCES	MEDIUM RELIABILITY SOURCES	LOW RELIABILITY SOURCES		
	TR. or REM.	PHOTO	C.S. Building	C.S. General	S. Info Written	Arch. Necess.
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
	0	0	0	0	0	0

HIGH RELIABILITY → LOW RELIABILITY

TR. or REM.: Traces or remains
PHOTO: Photograph of the building.
C.S. Building: Comparative study of the elements in the han.
C.S. General: Comparative study of the similar building type / similar group.
S. Info written: Secondary information from written documents.
Arch. Necess.: Architectural necessity.

THE RELIABILITY DEGREES

The reliability degrees are set regarding the amount of information obtained from the sources with different reliabilities. The reliability degrees and their relations to the reliability of the sources are as follows:

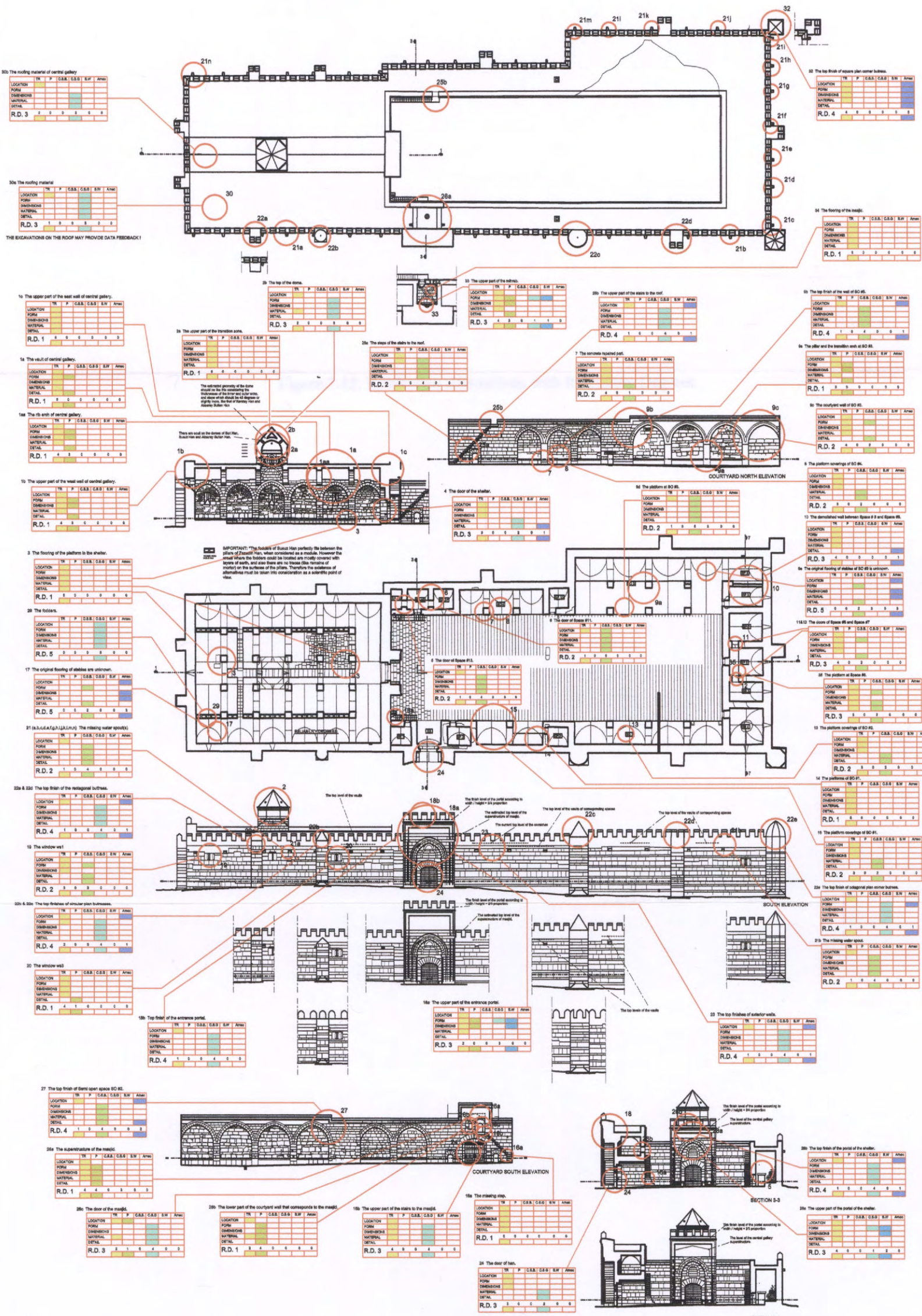
1st DEGREE:
All information is obtained from HIGHEST RELIABILITY SOURCES. (Traces, Remains and Photographs)
The exact location of the missing part is known.

2nd. DEGREE:
All information is obtained from HIGHEST RELIABILITY SOURCES and HIGH RELIABILITY SOURCES (Traces, Remains, Photographs and Comp. Study Building).
The exact location of the missing part is known.

3rd DEGREE:
Most of the information is obtained from HIGHEST RELIABILITY SOURCES, HIGH RELIABILITY SOURCES and MEDIUM RELIABILITY SOURCES.
The exact location of the missing part is known.

4th DEGREE:
Most of the information is obtained from MEDIUM and LOW RELIABILITY SOURCES.
The missing part were existing in original situation but the exact location of it is not known.

5th DEGREE:
Most of the information is obtained from MEDIUM and LOW RELIABILITY SOURCES.
The existense of the mentioned parts are not known.



30b The roofing material of central gallery

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	2	0	0	3	0	0

30a The roofing material

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	1	0	0	5	0	0

THE EXCAVATIONS ON THE ROOF MAY PROVIDE DATA FEEDBACK !

32 The top finish of square plan corner buttress.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	4	0	0	0	0	0

34 The flooring of the masjid.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	5	0	0	0	0	0

2b The top of the dome.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	2	0	0	3	0	0

33 The upper part of the mihrab.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	4	3	0	1	1	0

28b The upper part of the stairs to the roof.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	0	4	5	1

1c The upper part of the east wall of central gallery.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	6	0	0	0	0	0

2a The upper part of the transition zone.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	5	0	0	0	0	0

28a The steps of the stairs to the roof.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	3	0	4	0	0	0

7 The concrete repaired part.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	4	0	1	0	0	0

1a The vault of central gallery.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	5	0	0	0	0	0

The estimated geometry of the dome should be like this considering the thicknesses of the inner and outer ones, and above which should be 45 degrees or slightly more. like that of Karatay Han and Alaaddin Bulten Han

1aa The rib arch of central gallery.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	4	3	0	0	0	0

There are scull on the domes of Sivri Han, Susuz Han and Alaaddin Bulten Han.

1b The upper part of the west wall of central gallery.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	4	3	0	0	0	0

4 The door of the shelter.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	2	0	0	3	0	1

9d The platform at SO #9.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	1	0	5	3	0	0

9b The top finish of the wall of SO #9.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	4	0	0	1

9e The pillar and the transition arch at SO #9.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	3	5	0	0	0	0

9c The courtyard wall of SO #9.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	4	0	2	0	0	0

9 The platform coverings of SO #4.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	3	0	2	0	0	0

10 The demolished wall between Space # 8 and Space #9.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	4	0	0	5	0	1

9e The original flooring of stables of SO #9 is unknown.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 5	0	0	2	0	0	3

3 The flooring of the platform in the shelter.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	5	0	0	0	0	0

IMPORTANT: "The footers of Susuz Han perfectly fits between the pillars of Zazadin Han, when considered as a module. However the areas where the footers could be located are mostly covered with layers of earth, and also there are no traces (like remains of mortar) on the surfaces of the pillars. Therefore the existence of alternatives must be taken into consideration as a scientific point of view.

29 The footers.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 5	0	0	0	0	0	0

17 The original flooring of stables are unknown.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 5	0	0	2	0	0	3

21 (a,b,c,d,e,f,g,h,i,j,k,l,m,n) The missing water spout(s)

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	1	0	4	0	0	0

6 The door of Space #11.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	1	0	0	0	0	0

6 The door of Space #13.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	1	0	4	0	0	0

11&12 The doors of Space #6 and Space #7

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	4	0	2	0	0	0

35 The platform at Space #6.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	3	0	2	0	0	0

13 The platform coverings of SO #2.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	3	0	3	0	0	0

14 The platforms of SO #1.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	5	0	0	0	0	0

15 The platform coverings of SO #1.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	3	0	2	0	0	0

22a The top finish of octagonal plan corner buttress.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	0	4	0	1

21b The missing water spout.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	1	0	4	0	0	0

22a & 22d The top finish of the rectagonal buttress.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	0	4	0	1

19 The window ws1

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 2	3	0	3	0	0	0

22b & 22c The top finishes of simular plan buttresses.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	2	0	0	4	0	1

20 The window ws3

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	4	1	0	0	0	0

18b Top finish of the entrance portal.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	0	4	0	0

18a The upper part of the entrance portal.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	2	0	0	3	0	0

23 The top finishes of exterior walls.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	0	4	0	1

27 The top finish of Semi open space SO #2.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	4	0	0	0

26a The superstructure of the masjid.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	4	4	0	3	0	0

26b The door of the masjid.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	3	1	0	4	0	0

26b The lower part of the courtyard wall that corresponds to the masjid.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	3	4	0	0	0	0

16b The upper part of the stairs to the masjid.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	4	0	0	4	0	0

16a The missing step.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 1	0	0	0	0	0	0

24 The door of han.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	3	0	0	2	0	0

28b The top finish of the portal of the shelter.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 4	1	0	0	4	0	1

28a The upper part of the portal of the shelter.

	TR	P	C.S.S.	C.S.G	S.W	Amec
LOCATION						
FORM						
DIMENSIONS						
MATERIAL						
DETAIL						
R.D. 3	4	0	0	1	2	0

M.E.T.U
FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN
PREPARED BY: MUSTAFA ONGE

RESTITUTION PROPOSALS & RELIABILITY DEGREES

SCALE: 1/200

0 1 2 4 6 10
UNITS IN METERS

N

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION
SHEET NUMBER

3rd degree of reliability: The information about the missing parts are mostly obtained from ‘highly reliable’ or ‘medium reliability’ sources. The data on the location of the missing part is obtained from traces. The problem areas in this group are:

a) The door wings of the Shelter (problem 4)
b) The door of Space #5 and Space #7 (problems 11 and 12)
c) The demolished wall between Space #8 and Space #9 (problem 10)
d) The upper part of the stairs to the masjid (problem 16b)
e) The upper part of the entrance portal (problem 18a)
f) The door of Han (problem 24)
g) The door of masjid (problem 26b)
h) The top part of the portal of the Shelter (problem 28a)
i) The upper part of the mihrab (problem 33)
j) The roofing material (problem 30a)
k) The roof covering of central gallery at the shelter (problem 30b)
l) The doors of Space #11 and Space #12 (problems 5 and 6)
m) The flooring of spaces (problem 51)

4th degree of reliability: The information about the missing parts is mostly obtained from ‘medium reliability’ and ‘low reliability’ sources. The exact location of the missing part is not known. The problem areas in this group are:

a) The top finish of the courtyard wall of semi-open space #3 (problem 9b)
b) The top finish of the entrance portal (problem 18b)
c) The top finishes of circular plan buttresses (problem 22b and 22c)
d) The top finishes of rectangular plan buttresses (problems 22a and 22d)
e) The top finishes of exterior walls (problem 23)
f) The upper part of the stairs to the roof (problem 25b)
g) The top finish of the courtyard wall of semi-open space #2 (problem 27)

h) The top finish of the portal of the shelter (problem 28b)
i) The top finish of the square plan corner buttress (problem 32)

5th degree of reliability: The information about the missing parts are entirely obtained from 'medium reliability' and 'low reliability' sources. There are no traces that confirm the existence of the missing part. The problem areas in this group are:

a) The original flooring of the stables at the shelter (problem 17)
b) The fodders at the sides of the platforms of the shelter (prob. 29)

7.4. Final Restitution Proposal

Considering the validity of all alternatives Zazadin Han is presumed to be a building with such features:

The roof of Zazadin Han was earth covered except the roof of central gallery of the Shelter, which was cut stone covered. The dome had a cut stone pyramidal cap and it was separated with a cornice from its side walls. At the interior the dome had a semi-spherical form. It was resting on a ring with the similar profile and ornaments like that of the cornices. There were four windows on the walls of the transition zone of the dome between the squinches. These were slit windows with semi-circular arches at the top. The vaults of the central gallery are the barrel vaults with two centered pointed profiles, which was very similar to that of the rib arches. The portal of the Shelter and the west wall of the central gallery extend upwards and get connected to these vaults. There was a window at the west wall of the central gallery[10], which has a lintel at the top. The exterior walls and the top parts of the rectangular plan buttresses have crenellated finishes. The merlons of these were rubble stone construction and their dimensions are (0.9x0.75x1.10m) similar to that of Alara Han. The top finishes of the octagonal and circular plan buttresses were in the forms of pyramidal and conical caps respectively. The top finishes of the courtyard walls had caps all over the cornices

[10] Window ws7, the top part of this window, is currently missing.

of them. The roof of the masjid was covered with earth like the rest of the roof. The superstructure of the masjid consisted of a star vault, which had an oculus at the middle. The stairs to the roof and the masjid were consisted of cantilever steps 0.9m projecting from the courtyard wall. These steps are ended at the top with massive stone cantilever landings. There were platforms in all semi-open spaces as well as the platform at the Shelter. The platform at semi-open space #3 extends at the south of the three galleries from west to east. The remaining area was the stable. There are also platforms at the spaces #6 and #12, which are at the center of the triple space groups. All the platforms mentioned above were covered with cut stone like the platforms of the Shelter[11]. The north and south sides of the platform at the Shelter were embellished with fodders with similar dimensions like that of Susuz Han (5 modules of fodders, between the pillars of each gallery except the passage, with dimensions of 0.6x0.44m. The distances between them are 0.11m). The floor coverings of all spaces and the courtyard are cut stone. There are no floor coverings at the stables of the Shelter and Semi-open Space #3. The doors of the Han and the Shelter were wooden construction doors with double wings, which were covered with iron sheets. There were wooden sliding bars behind the door wings to lock them. The doors of all spaces except Space #5, Space #7, Space #11 and Space #13 had wooden construction doors. The doors of the spaces mentioned above had no door wings. They consisted of simple openings approx. 1.60m high from the ground level, which have lintels at the top.

The drawings of the final restitution and the reliability degrees of the restituted parts are presented in figure 7.13.

[11] Prof. Dr. Haşim Karpuz informs the existence of hexagonal brick floorings at the northwest of the platform of the Shelter. (Karpuz, H., 1998, "Selçuk Üniversitesi Selçuklu Araştırmaları Merkezi Tarafından Konya'da Yapılan Kazı ve Restorasyon Çalışmaları", *1.Ortaçağ ve Türk Dönemi Kazıları Sempozyumu 9-11 Nisan 1997, Sanat Tarihi Dergisi IX*, İzmir, s:43-57, s.55.) However the author has not found any traces indicating to such floorings.

7.5. Restitution of Function

This study is prepared to better understand the original functions of the spaces in Zazadin Han. The spaces are classified into four groups regarding the information available about them *(Fig. 7.14)*.

The fist group comprises the spaces original function of which is precisely known. The second group comprises the spaces, original function of which is presumed. The third group comprises the spaces original function of which is estimated. The last group comprises the spaces original function of which is hypothesized.

The Shelter, courtyard, entrance space and Semi-open Space 3 are amongst the spaces that we precisely know about their function. Although the Shelter is a space itself, there are two sub-spaces in the Shelter defined by its function. These are the platforms and the Shelter. The platforms were the common accommodation spaces[12] for the people in the caravan, on which they can sleep with their belongings[13]. The stables were the places for animals where they are fed[14] and kept close to their owners. Semi-open Space #3 has similar sub-spaces and functions like that of Shelter[15]. On the other hand Semi-open space #3 must have a seasonal use, when the weather is good.

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[12] *"…birinci nedeni, her nekadar Selçuklu kervansarayının özgün işlevi konaklama ise de Selçuklu döneminin konaklaması kollektif bir olgudur. Herkes sekilerin üzerinde birlikte yatıyordu. .."*, Yavuz, A.T., 1994, "Anadolu Selçuklu Kervansarayları ve Vakıflar", XI. Vakıf Haftası Kitabı, Vakıf Kültür Varlığının Korunması, Yaşatılması ve Bu Amaçla Mali Kaynak Sağlanması Semineri, 6-8 Aralık 1993, Ankara, V.G.M. Yayınları, Ankara, s.39-46, s: 40.

[13] *"…birinci şerit zemin kotundadır ve burada hayvanlar ve dolaşım alanı yeralır. İkinci şerit ise yerden 0.9-1.3m yüksekliğinde bir seki olarak şekillenir… Bazı barınaklarda yük ve insan sekisinin kısmen de olsa ayrılmış olabileceği görülmektedir. Sadeddin Han'da seki, arka ucunda yatay bir koridor şeridi ile ikiye ayrılmaktadır…"*, Yavuz, A.T., 1995, "Anadolu Selçuklu Dönemi Kervansaraylarının Tipolojisi", IV. Milli Selçuklu Kültür ve Medeniyeti Semineri Bildirileri, 25-26 Nisan 1994, Konya, s.183-187, s:184.

[14] *"…bazı kervansaraylarda (Susuz, Kargı, Kuruçeşme) seki ile ahır şeridi arasında sekinin üstünde suluk-yemlik işlevini yüklenen bir dizi taş çanağın sıralandığı görülmektedir…"*, Yavuz, A.T., ibid.

[15] *"…Birçok kervansarayda bulunan yarı açık galeriler, barınak kısmındaki düzenin tekrarı niteliğindedir ve büyük olasılıkla daha uygun mevsimde kullanılan bir seçenek durumundadır. Bu galerilerde ahır şeridi dış duvara koşut, seki şeridi ise avluya bakar biçimde konumlanmıştır…"*, Yavuz, A.T., op. cit. p.185.

The semi-open spaces #2 and #4 are the spaces that we presume their function. The function of these spaces should be somewhat like that of the platforms in the Shelter or semi-open space #3. Semi-open space #2 was very probably used for open air accommodation in good weather or the open-air storage for the loads of the caravan. The fodders at the east may be related to the function of neighbouring Space #4, considering their location. However when a horse uses the fodder on the east it completely closes the entrance of Space #4. The appropriateness of this use is subject of discussion. Semi-open space #4 should have a similar function to that of Semi-open space #3.

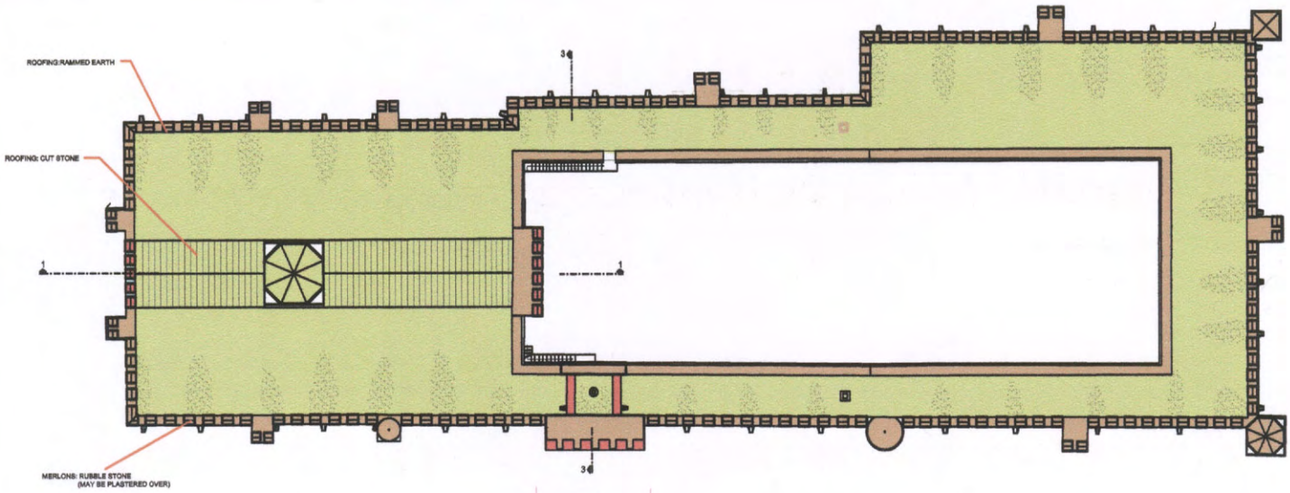
Space #1, space #2, Space #5, Space #6, Space #7, Space #10, Space #11, Space #12 and Space #13 are the spaces the function of which is estimated. Spaces #1 and #2 are located close to the entrance and there are no openings at these spaces except their doors. Space #10 has similar features to that of space #10. There seems to be a few alternatives for the original functions of these spaces. These could have been used as the storage for valuable material, administrational offices[16] or the rooms for caravanserai personnel. The triple space group that consist of Spaces #5, #6, #7 and Spaces #11, #12, #13 were probably suit rooms for sultans and emirs. These spaces were possibly similar to the present day hotel suits. One of the spaces on both sides was probably for the master and the other one is for the servant or being used as the toilet[17].

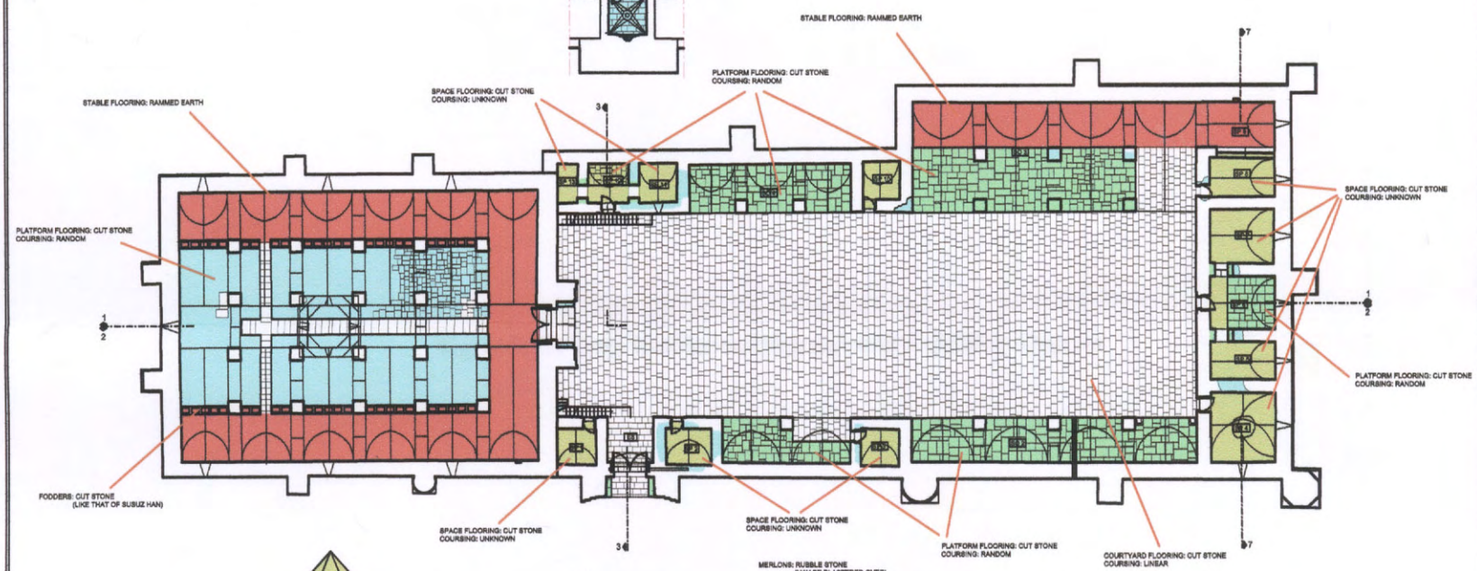
Semi-open space #1, Space #3, Space #4, Space #8 and Space #9 are the spaces functions of which are hypotesized. Space #3 opens to Semi-open space #1. regarding this relationship between them, the discussion of function restitution

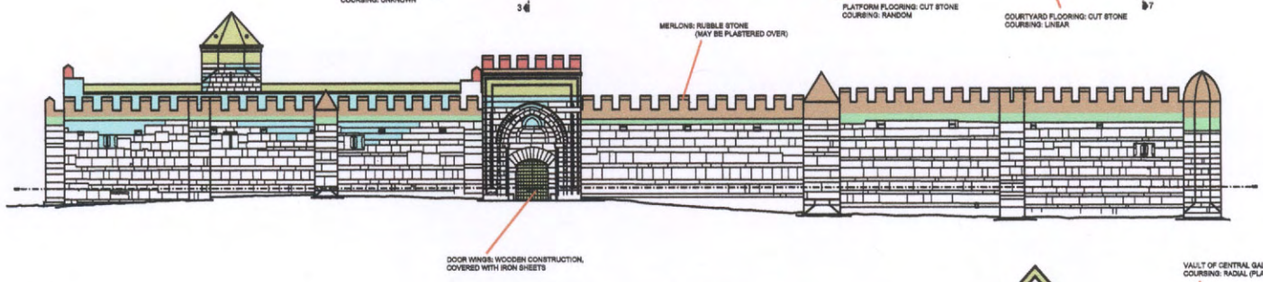
[16] *"…Kervansarayın girişine yakın ve bir kısmı biribirine bağlantılı, büyük boyutlu odalar herhalde kervansarayın idaresi veya depo olarak kullanılmıştır. Birçoğunun dışarıya penceresi yoktur. Bu mekanlar ile yaşam birimi olarak kullanılan odaların boyut ve nitelikleri farklıdır…"* Yavuz, A.T., ibid.

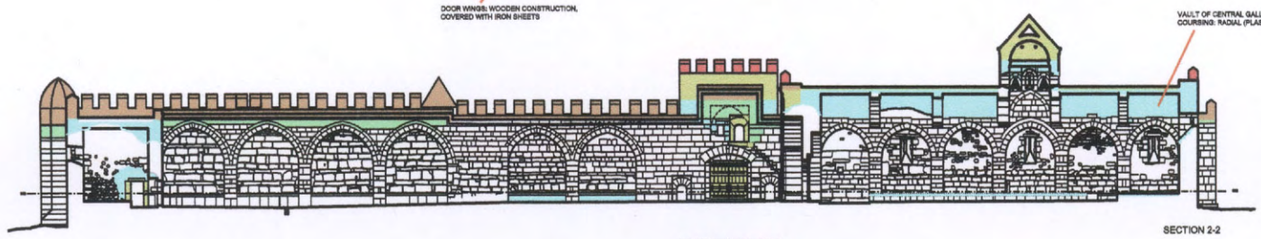
[17] *"…In all these examples, the central space is too large to be meant for access only. It is possible to interpret these as as room associated with the provision of facilities connected with water. This hypothesis is even more suitable for the group in Avanos Sarı Han, which has two large spaces. The arrangements of the space bring to mind the present day hotel suites with a hall, a toilet, a bath and a wardrobe. If we let our imagination go a little further, we can even assume that the larger of the smaller spaces was used for storage or as servants room…"*, Yavuz, A.T., 1995, "Anatolian Seljuk Caravanserais and Their Use as State Houses", 10th International Congress of Turkish Art, September 17-23, Geneva, pp. 757-765, page 758.

will be helpful, if they are discussed together. There are some architectural elements at these spaces which are the clues for the original function. There is an oculus at the top of space #3 and there are remains of platform at Semi-open space #1, which is shaped to provide access to Space #3. These spaces might have been used as the blacksmith or the kitchen, regarding their relationships and the architectural elements they contain. Space #4 has some extraordinary features. It has two windows. It is the second biggest closed space except the Shelter and covered with a brick construction cross vault. Also the probability of of the existence of an oculus at the top center of this cross vault must be taken into consideration. This space must be something more than a private accommodation space. It might have been a vip room, a meeting room or another private space for sultans or emirs. Space #8 and Space #9 are entered from Semi-open space #3 from a door and with an arched opening respectively. There are slit windows on their east walls. And also there is an unusual arched opening on the wall between these spaces. The functions of these spaces might have been related to each other. Space #8 might have been a room for the workers of the han or a single accommodation unit. Space #9 looks like the continuation of the stables at semi-open space #3. It might have been the blacksmith.

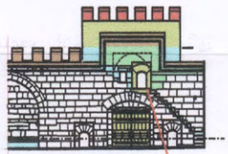


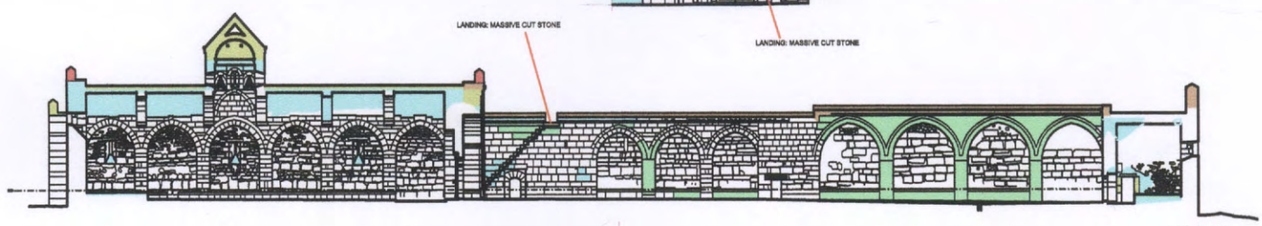




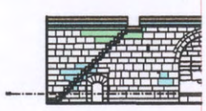


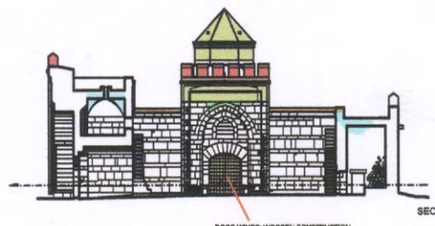
SECTION 2-2





SECTION 1-1





SECTION 3-3

1st DEGREE RELIABILITY
2nd DEGREE RELIABILITY
3rd DEGREE RELIABILITY
4th DEGREE RELIABILITY
5th DEGREE RELIABILITY

M.E.T.U
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THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY: MUSTAFA ONGE

RESTITUTION PROPOSAL & RELIABILITY DEGREES

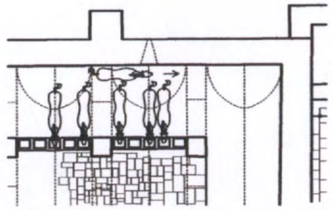
SCALE: 1/200

0 1 2 3 4 5 10 15
UNITS IN METERS

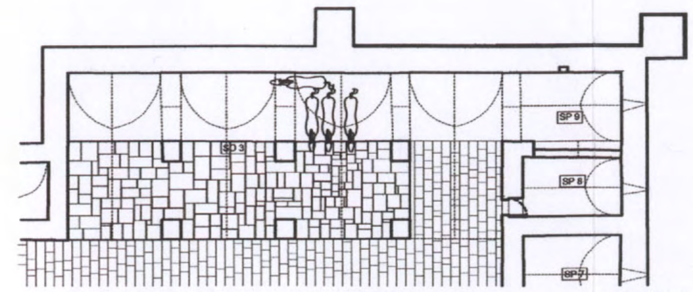
N

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:



RESTITUTION PLAN



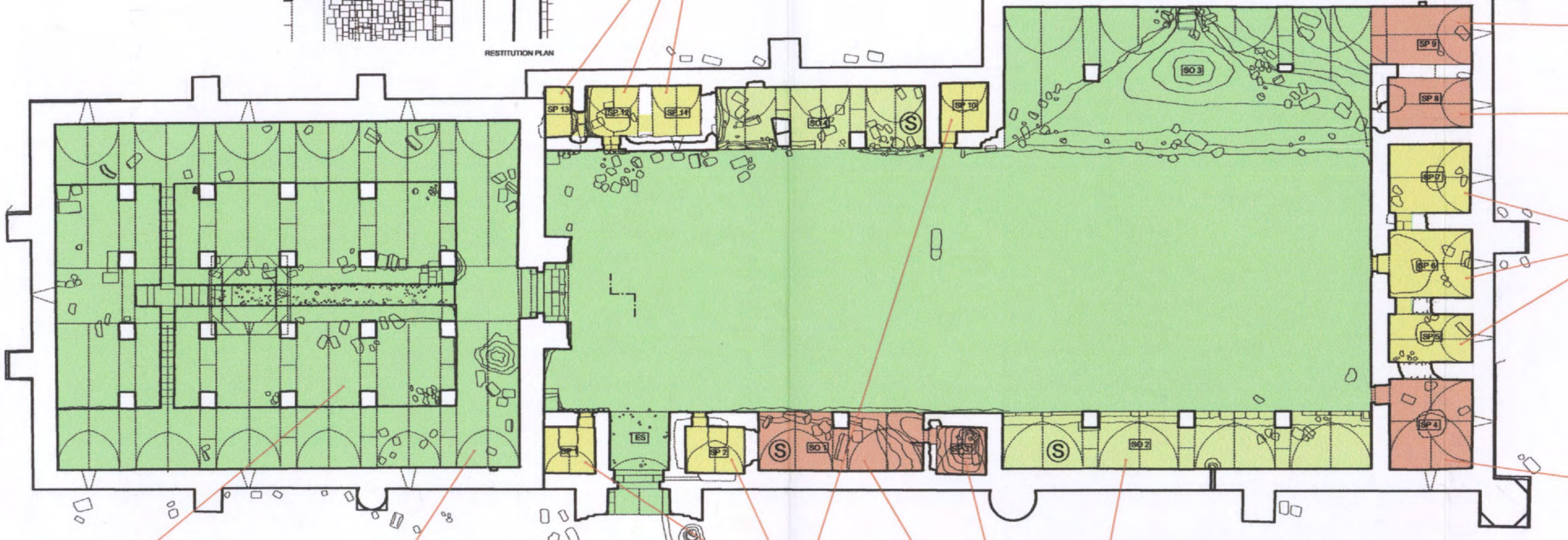
RESTITUTION PLAN

	THE ORIGINAL FUNCTION OF SPACE IS PRECISELY KNOWN
	THE ORIGINAL FUNCTION OF SPACE IS PRESUMED General outlines of the function are known, but some features of use are subject of discussion.
	THE ORIGINAL FUNCTION OF SPACE IS ESTIMATED There are theories about the original function of these spaces
	THE ORIGINAL FUNCTION OF SPACE IS HYPOTESIZED The only source of information about the functions of these spaces are the architectural elements.
(S)	SPACES WITH SIMILAR GENERAL OUTLINES

Triple space group that consists of Space #11, Space #12 and Space #13

Info. build.	The space at the center is directly linked to the courtyard with an arched door that has an outer frame (see 'The Typology of Architectural Elements'), and the spaces on both sides are accessed through the doors that are not intact currently. The rising ground level at Space #12 is a trace indicating to a platform.
Info. other build.	There are similar space groups in Aksaray Sultan Han, Tuzhisari Sultan Han and Karatay Han.
Info. written.	This spaces were similar to present day hotel suits for the governmental purposes. One of the spaces on both sides is, probably for the master and the other is for the servant or being used as toilet.

RESULT: This space group was probably a suit room for Sultan or Emirs.



Space #9

Info. build.	Space #9 is entered from Semi-open Space #3 through an arched opening. There is a slit window on its east wall.

RESULT: This space group might have been a room for the blacksmith.

Space #8

Info. build.	Space #8 is entered from Semi-open Space #3 through a door with a lintel. There is a window on its east wall and there is an unusual arched opening on the north wall of this space to Space #9.

RESULT: This space might have been a room for the workers of the Han or a single accommodation unit.

Triple space group that consists of Space #5, Space #6 and Space #7

Info. build.	The space at the center is directly linked to the courtyard with an arched door that has an outer frame (see 'The Typology of Architectural Elements'), and the spaces on both sides are accessed through the doors that seems to have no door wings. There is a trace indicating to a platform next to the door on the south.
Info. other build.	There are similar space groups in Aksaray Sultan Han, Tuzhisari Sultan Han and Karatay Han.
Info. written.	This spaces were similar to present day hotel suits for the governmental purposes. One of the spaces on both sides is, probably for the master and the other is for the servant or being used as toilet (5).

RESULT: This space group was probably a suit room for Sultan or Emirs.

Space #4

Info. build.	Space #4 has some extraordinary features; it has two windows, It is the second biggest closed space except the shelter and covered with a cross vault constructed in brick masonry. The probability of the existence of an oculus at the top center of the cross vault must be taken into consideration.

RESULT: Space #4 must be something more than a private accomodation space. It might have been a vip room., a meeting room or a private space for Sultan or emirs. The existence of fodders close to Space #4 are evidences of an extraordinary use.

PLATFORMS IN THE SHELTER

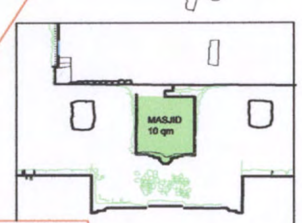
Info. build.	The existence of floor coverings and paved passage are the evidences of some special use. This space is at the top position of the space hierarchy in the shelter.
Info. other build.	There are more intact platforms in some other Hans. These spaces also have floor coverings like that of Karatay Han and Susuz Han.
Info. written.	The platforms are common accommodation spaces for the people in the caravan on which they can sleep with their belongings in safety. (1) (2)

RESULT: The platforms were are the common accommodation spaces for the people in the caravan on which they can sleep with their belongings.

STABLES

Info. build.	There are no traces of floor coverings at here and this space is at the lowest level of the space hierarchy at the 'shelter'.
Info. other build.	There are fodders at the sides of the platforms of Karatay Han and Susuz Han close to the stables.
Info. written.	The stables are the spaces in which the animals (horses,donkeys etc.) in the caravan are kept and fed. (3)

RESULT: The stables were very possibly the places for animals where they are fed and kept close to their owners.



PLAN OF MASJID
(extracted from roof plan)

Space #1, Space #2 and Space #10

Info. build.	These spaces are located close to the door and there are no openings at these spaces except their doors. These doors are the arched type with frames (see The Typology of Architectural Elements)
Info. written.	These spaces must very probably have been used as the administrational offices or storage. (4)

RESULT: There seems to be a few alternatives for the original functions of these spaces. These could have been used as the storage for valuable material or rooms for caravanseral personnel.

Semi-open Space #2

Info. build.	There are remains of platforms here. also there are two separate fodders on both sides of the last gallery on the east.

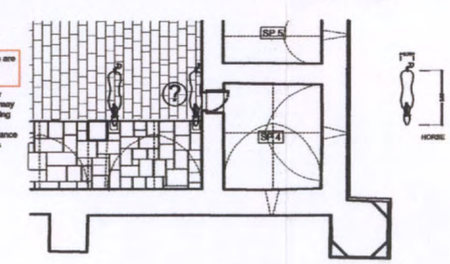
RESULT: This space was very probably used for open air accommodation in good weather. The fodders may be related to the function of Space #4 considering their location. However when a horse uses the fodder on the east it completely closes the entrance of Space #4. The appropriateness of this use is subject of discussion.

Semi-open space #1 and Space #3(*)

(*)Space #3 opens to the Semi-open space #1. The function restitution will be helpful if discussed together for both.

Info. build.	There is an oculus at the top of this space, which is an element of ventilation. The door of space #3 opens to semi-open space #1 and it is the arched type without frame. There are remains of platforms at semi-open space #1 and these are shaped to provide access to Space #3.

RESULT: This spaces might have been used as the blacksmith or the kitchen, regarding their relationships with the platform and the existence of oculus.



RESTITUTION PLAN

(1) "...birinci nedeni, her nekadar Selçuklu kervansarayinin özgün islevi konaklama ise de Selçuklu döneminin konaklamasi kollektif bir olgudur. Herkes sekilerin üzerinde birlikde yatiyordu..", YAVUZ, A.T., 1994, "Anadolu Selçuklu Kervansaraylari ve Vakiflar", XI. Vakif Haftasi Kitabi, Vakif Kültür Varliginin Korunmasi, Yasatilmasi ve Bu Amaçla Mali Kaynak Saglanmasi Semineri, 6-8 Aralik 1993 Ankara, V.G.M. Yayinlari, Ankara, s. 39-46, sayfa: 40.

(2) "..birinci serit zemin kotundadir ve burada hayvanlar ve dolasim alani yeralir. Ikinci serit ise yerden 0.9-1.3m yüksekliginde bir seki olarak sekillenir... Bazi barinaklarda yük ve insan seklsinin kismen de olsa ayrilmis olabilecegi görülmektedir. Sadeddin Han'da seki, arka ucunda yatay bir koridor seridi ile ikiye ayrilmaktadir...", YAVUZ, A.T., 1995, "Anadolu Selçuklu Dönemi Kervansaraylarinin Tipolojisi", IV. Milli Selçuklu Kültür ve Medeniyeti Semineri Bildirileri, 25-26 Nisan 1994, Konya, s.183-187, sayfa 184.

(3) "..Bazi kervansaraylarda (Susuz, Kargi, Karucesme) seki ile ahir seridi arasinda sekinin üstünde suluk-yemlik islevini yüklenen bir dizi tas canagin siralandigi görülmektedir...", YAVUZ, A.T., ibid.

(4) "...Kervansarayin girisine yakin ve bir kismi birbirine baglantili, büyük boyutlu odalar herhalde kervansarayin idaresi veya depo olarak kullanilmistir. Bircogunun disariya penceresi yoktur. Bu mekanlar ile yasam birimi olarak kullanilan odalarin boyut ve nitelikleri farklidir...", YAVUZ, A.T., op. cit p.185

(5) "...In all these examples, the central space is too large to be meant for access only. It is possible to interpret these as rooms associated with the provision of facilities connected with water. This hypothesis is even more suitable for the group in Avanos Sari Han, which has two large spaces. The arrangement of the space brings to mind the present day hotel suites with a hall, a toilet, a bath and a wardrobe. If we let our imagination go a little further, we can even assume that the larger of the smaller spaces was used for storage or as servants room ...", YAVUZ, A.T., 1995, "Anatolian Seljuk Caravanserais and Their Use as State Houses", 10th International Congress of Turkish Art, September 17-23, Geneva, pp.757-765, page: 758

M.E.T.U
FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR:
ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY:
MUSTAFA ONGE

RESTITUTION OF FUNCTION

SCALE: 1/100

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MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

CHAPTER 8

RESTORATION

8.1. Values and Problems of Zazadin Han and Surrounding Area

As well as the results of the analysis and the information obtained from historical research and comparative study, the problems and values of Zazadin Han and the surrounding area should be taken into consideration for effective solutions that will form the main criteria of the restoration project. The problems of Zazadin Han is discussed in Chapter 4, therefore it will not be examined in this chapter in order to avoid repetition.

8.1.1. Values of Zazadin Han

According to B. Feilden and J. Jokhilehto[1] the values of cultural heritage can be discussed under two main titles. These are; the cultural values and the contemporary socio-economic values.

The cultural values can be classified in a number of ways[2]. The most important of them are; 'the identity value', 'relative artistic or technical value' and 'rarity value'. *The identity value is based on the recognition of the cultural heritage. It is*

[1] Feilden, B., Jokilehto, J., 1993, *Management Guidelines for World Cultural Heritage Sites*, ICCROM, R.D.E. Editrice s.r.l., Rome.
[2] Feilden, B., Jokilehto, J., op. cit. p.17.

related to the emotional ties of society to specific objects or sites.[3] It can include the features like age, tradition, continuity, legendary, spiritual, religious, symbolic, nationalistic,etc. *These values can be promoted through education and training.*[4] *The relative artistic or technical value is based on research.*[5] This group of values is based on scientific and critical historical evaluations and assessments of importance of the design of heritage resource, and the significance of its technical, structural and functional concept and workmanship. These values result from the research carried out by professionals, with the intention of demonstrating the relative significance of the resource in relation to its own time, to other periods and the present. *The rarity value is based on statistics. This group of values relates the resource to other constructions of the same type, style, builder, period, region or some combinations of these. They define the resources rarity, representativeness or uniqueness.*[6]

The socio economic values comprise the 'economic value', 'functional value', 'educational value', 'social value' and 'political value'. The economic value is not the financial value of the object itself, as it is understood. *It is the value generated by the heritage resource or by conservation action.*[7] The economic values have four potential sources of revenue. These are tourism, commerce, use and amenities. The careful management of these sources has a vital importance for the survival of the monument. *The functional value involves the continuity of the original type of function, or the initiation of a compatible use of a building or an area*[8]. The original function of the building may be lost, but a new one can be found like the activities of visual and performing acts etc. It is related to the economic value by means of management. *The educational value of a heritage resource includes its potential for cultural tourism, and the awareness of culture and history.*[9] Such values, brings out historical objects to present day life. For the professionals dealing with history and conservation issues, the educational value

[3] op. cit. p.18
[4] ibid.
[5] ibid.
[6] op. cit. p.19
[7] ibid.
[8] ibid.
[9] ibid.

can be renamed as ‘documentary value’ considering the importance of the cultural heritage object as the highly valuable source of scientific information. *The social value of a heritage resource is related to traditional social activities and to compatible present-day use*.[10] *The political value is related to specific events in the history of the heritage resource with respect to its region or the country*.[11] The political significance of a monument or site may assist in raising funds and drawing attention of the general public to safeguarding and protection.

Although Feilden and Jokilehto do not discuss it, historical value is an important parameter. The ‘historical value’ of the cultural heritage objects, includes the historical features and historical relations of them. The historical features of the cultural heritage object, comprises the place of it, in the social, economical, cultural and military life of the nation. The historical relations of the cultural heritage object comprise the relation of the monument to an important event or person.

In addition to the values mentioned above there are some abstract features for the detection of the value of a cultural heritage object. It may have ‘visual and aestethic values’, and ‘ritual or symbolic values’.

When Zazadin Han is evaluated by means of the cultural values defined above, it is seen that the building has a great significance by means of identity value, relative artistic or technical value and rarity value. In Turkey, the religious and nationalistic features are especially important by means of identity value. Though its donor is a legendary but a notorious character in Seljukid history, Zazadin Han is an important example of Islamic architecture. It is one of the evidences of the existence and commercial activities of Turks in Anatolian lands. On the other hand the local people and the visitors know only a little about the monument[12], its history or its donor, due to the lack of education or training focused on the

[10] ibid.
[11] op. cit. p:20
[12] There are no information signs close to the monument. However, the visitors occasionally know what a caravanserai is, what the name of the building is; but they do not know the date, period or donor of the building.

building. The identity value of Zazadin Han can be promoted; presenting the information by means of education, which will define the monument as the cultural heritage and settle the monument to a location on the time line in the collective memory. The information about the significance of the Han by means of 'relative artistic or technical value' is widely discussed in Analysis[13] and Comparative Study[14]chapters. Briefly it can be said that; Zazadin Han is one of the few mostly intact Seljukid caravanserais that survived, and it presents information about itself (like what its fully intact status is), the lifestyle in its period, its construction technique and material. And it is one of the medium scale caravanserais of its type, which contain some important spaces and architectural elements. The rarity value of Zazadin Han, by means of its uniqueness is also discussed in the Comparative Study. The result can be summarized as follows: Zazadin Han has some unique features but it is not the only example of its kind. On the other hand, it is one of the most intact Seljukid caravanserais that survived.

Zazadin Han can also be discussed by means of socio economical values. It is a frequently visited popular place even in its current non-restored situation. Also considering its location and scale, Zazadin Han is a suitable place for the application of management plans by means of proposing and promoting commercial activities. The type and scale of the activities can be defined after the space potential analysis. Therefore, it can be thought that, Zazadin Han has a significant economic value, which can be promoted by the application of conservation processes. The term functional value is not valid as it is described above, since the original function is lost. However the potential of the space still exist for new function proposals. The application of conservation processes will also promote the functional value of the Han. Zazadin Han seems to have a great educational value. The monument is occasionally being visited by groups of tourists, university students and professionals from the faculties of architecture

[13] See Chapter 4
[14] See Chapter 6

and departments of history of art, every year[15], whenever the climatic conditions are suitable. Zazadin Han is a document, which provides valuable information about the construction features, space vision and life style about its era. In addition to this, the re-used materials provide information about Byzantine Era. Also the surrounding area of the Han (and the Han itself) is a reserve archaeological area[16]. The social value of Zazadin Han, considering the parameters described above is a subject of discussion. There are no traditional social activities related to the Han. Zazadin Han seems to be worthless by means of political values. However the changing political tendencies and the probability of use of cultural heritage like Zazadin Han for political discussions may effect this status.

Zazadin Han has a significant historical value by means of both its historical features and historical relations. It is one of the elements that provide the security of the trade routes like all other caravanserais, and an important part of the economical and cultural life. There are also historical relations of Zazadin Han. First of all, it is donated by Emir Sadeddin Köpek, who was an important statesman of its time. Another historical relation of Zazadin Han is that; The Han and its surrounding area had been the scene where the people of Konya met the new Seljukid Sultan, as it is told in Selçukname by İbn-i Bibi[17]. Regarding the spaces it contained and its location, it can be presumed that Zazadin Han had been used for the Seljukid Sultans and important visitors, several times. However there are no records of these.

The visual and aestethic values of Zazadin Han are worth mentioning. It is an important landmark on the unoccupied landscape. Its maximum height of 12m from the ground level helps the perception of it from four kilometers away. Its

[15] Zazadin Han is visited by the students from Faculty of Architecture of Middle East Technical University in every summer for the in situ examination of structure, building details of the monuments of Seljukid Era, within the course schedule of ARCH 222 History of Art and Architecture conducted by Prof. Dr. Jale Erzen and Assoc. Prof. Dr. A. Uzay Peker.
[16] See Chapter 3.1 Location and Surroundings
[17] See Chapter 5

long entrance façade defines the area in front of it, and presents a colorful background view.

According to Prof. Dr. Semra Ögel, Zazadin Han contains some elements, which have symbolic or ritual meanings. She compares the number of butresses that exist in Zazadin han and other medium scale and big caravanserais and discusses the relationships between them and the rank of the donors[18].

8.1.2. Values of Surrounding Area

The surrounding area has some physical values in addition to the defined values of Zazadin Han. These are discussed in three groups; 'the areas with good vista', 'the areas with archaeological potential' and 'the water sources'.

The areas at the south, west and east of the Han provide good vista towards it. The area in front of the south elevation of the Han is the most important of all. The road branching from Konya-Aksaray motorway leading to the Han has the approach with good vista.

There are areas with archaeological potential at the north and northwest of the Han. There are shards and ruins at these areas, which are the identical marks of it. The information about the locations of these is given in the descriptions[19].

The water sources are also amongst the potentials of the area. There is an active water source at the southeast of the Han near the road. This well is frequently used to provide water for the animals. There are also some old wells at the south and southwest of the Han, which are not being used at all. Although they do not have distant historical backgrounds, they have cultural value as the symbols of the way of life in the steps.

[18] Ögel, S., 1994, *Anadolu'nun Selçuklu Çehresi*, Akbank Kültür ve Sanat Kitapları, No:58, Tayf Basın, Istanbul, s.74.
[19] See Chapter 3

The visual information about the Values of Surrounding Area is presented in figure 8.1

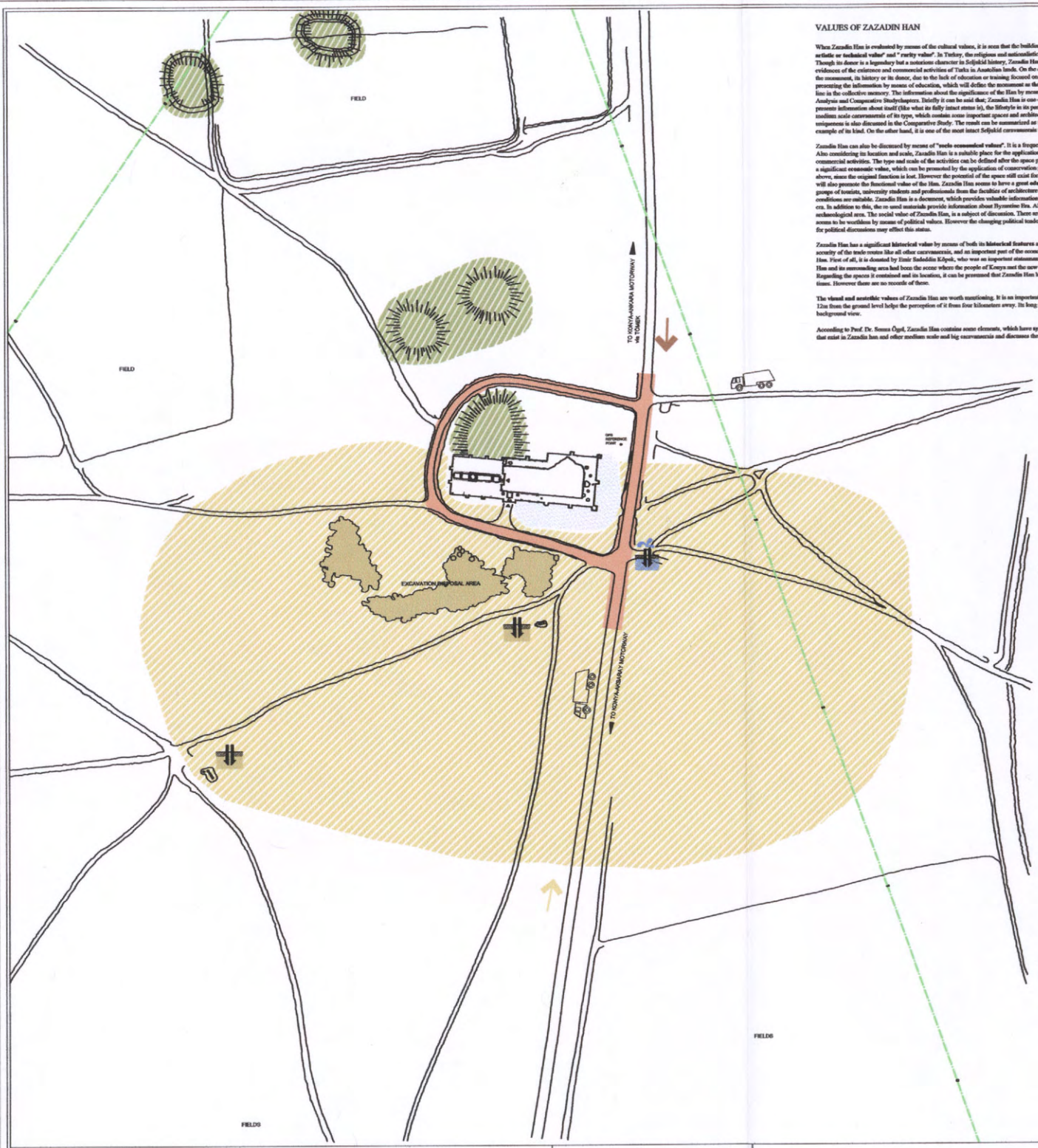
8.1.3. Problems of the Surrounding Area

The problems of the site can be discussed in three groups. These are: 'The problems of accessibility', 'the problems of infrastructure' and the other problems

The problems of accessibility comprise the problem of undefined and uncontrolled accesses to the area and the roads around the Han, which had been constructed in 1990's. These are also the sources of some other problems. Although there are two ways to access Zazadin Han, the building and its close surroundings are mostly accessed from Ankara- Konya motorway via Tömek. On the other hand the entrance façade of the Han is on the opposite direction, oriented to south. This two-way traffic also causes the problems of controlling the access. The accesses to the area must be kept under control regarding the activities of the illegal hunters and the treasure hunters. The road on the east of the Han lets heavy vehicle traffic get closer to the building, which produces a destructive vibration effect. This road and its extension that forms a ring around the Han cause surface drainage problems.

The problems of infrastructure are lack of drainage system, lack of piping lines, lack of savage system and lack of electricity lines. The lack of drainage system is the most serious problem. The surface drainage is ineffective because of the road mentioned above that blocks the escape route of the water. The traces on the land show that the water is trapped at the east of the building, although there is a tunnel under the road close to the southeast corner of the Han. And the rising damp problem is very possibly related to this drainage failure[20].

[20] see Chapter 4.5. Condition of the Fabric



VALUES OF ZAZADIN HAN

When Zazadin Han is evaluated by means of the cultural values, it is seen that the building has a great significance by means of "identity value", " relative artistic or technical value" and " rarity value". In Turkey, the religious and nationalistic features are especially important by means of identity value. Though its donor is a legendary but a notorious character in Seljukid history, Zazadin Han is an important example of Islamic architecture. It is one of the evidences of the existence and commercial activities of Turks in Anatolian lands. On the other hand the local people and the visitors know only a little about the monument, its history or its donor, due to the lack of education or training focused on the building. The identity value of Zazadin Han can be promoted, presenting the information by means of education, which will define the monument as the cultural heritage and settle the monument to a location on the time line in the collective memory. The information about the significance of the Han by means of "relative artistic or technical value' is widely discussed in Analysis and Comparative Study chapters. Briefly it can be said that; Zazadin Han is one of the few mostly intact Seljukid caravanserais that survived, and it presents information about itself (like what its fully intact status is), the lifestyle in its period, its construction technique and material. And it is one of the medium scale caravanserais of its type, which contain some important spaces and architectural elements. The rarity value of Zazadin Han, by means of its uniqueness is also discussed in the Comparative Study. The result can be summarized as follows: Zazadin Han has some unique features but it is not the only example of its kind. On the other hand, it is one of the most intact Seljukid caravanserais that survived.

Zazadin Han can also be discussed by means of **"socio economical values"**. It is a frequently visited popular place even in its current non-restored situation. Also considering its location and scale, Zazadin Han is a suitable place for the application of management plans by means of proposing and promoting commercial activities. The type and scale of the activities can be defined after the space potential analysis. Therefore, it can be thought that, Zazadin Han has a significant **economic value**, which can be promoted by the application of conservation processes. The term **functional value** is not valid as it is described above, since the original function is lost. However the potential of the space still exist for new function proposals. The application of conservation processes will also promote the functional value of the Han. Zazadin Han seems to have a great **educational value**. The monument is occasionally being visited by groups of tourists, university students and professionals from the faculties of architecture and departments of history of art, every year, whenever the climatic conditions are suitable. Zazadin Han is a document, which provides valuable information about the construction features, space vision and life style about its era. In addition to this, the re used materials provide information about Byzantine Era. Also the surrounding area of the Han (and the Han itself) is a reserve archaeological area. The social value of Zazadin Han, is a subject of discussion. There are no traditional social activities related to the Han. Zazadin Han seems to be worthless by means of political values. However the changing political tendencies and the probability of use of cultural heritage like Zazadin Han for political discussions may effect this status.

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The **visual and aesthetic values** of Zazadin Han are worth mentioning. It is an important landmark on the unoccupied landscape. Its maximum height of 12m from the ground level helps the perception of it from four kilometers away. Its long entrance façade defines the area in front of it, and presents a colorful background view.

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PROBLEMS of SURROUNDING AREA

PROBLEMS OF ACCESIBILITY

ROAD TOO CLOSE TO THE HAN
This road lets heavy vehicle traffic get closer to the han with its destructive shudder effect. And also the road indicated, causes surface drainage problems with its elevated structure.

THE ROADS WITH HEAVY VEHICLE TRAFFIC

ACCESS WITH BAD VISTA

PROBLEMS OF INFRASTRUCTURE

INEFFECTIVE SURFACE DRAINAGE

And also there are the following problems of infrastructure as well that cannot be shown with legend:
1) There is no line to provide electricity to the han.
2) There is no savage system installed around the han.
3) There are no piping lines in and around the han.

HIGH VOLTAGE ELECTRICITY LINE
The electricity lines on concrete posts are producing difficulties for the future interventions.

OTHER PROBLEMS

DISPOSED EARTH DUMPS
These earth dumps contain lots of small shards like pieces of brick and terracotta. The removal of these are essential for the design of the area.

VALUES of SURROUNDING AREA

AREA WITH GOOD VISTA

ACCESS WITH GOOD VISTA

AREAS THAT CONTAIN SHARDS AND RUINS
There are ruins and some shards at these areas that must be excavated to get more information about the surroundings.

WATER SOURCES

WELLS (IN USE)

WELLS (NOT IN USE)
Although they are not in use they depict the life of the area.

M.E.T.U
FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY: MUSTAFA ONGE

PROBLEMS & VALUES

SCALE: 1/1000

0 10 20 30 40 50 100 150 meters

N W E

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

The lack of piping lines, the lack of savage system and the lack of electricity lines are the problems for the development of future projects. Although there is no electricity line for the Han, there are two high voltage electricity lines passing quite close to it. The concrete posts and sagging lines of these produce a disturbing view and problems for the restoration project proposal.

There are some other problems of the surrounding area that cannot be discussed under the given titles. The earth dumps at the south of the han is one of these. These are disposed earth dumps contain lots of small shards. The existence of these dumps is a problem to use the potential of the area.

The area around the monument was registered as 1st degree site in 1996[21]. The site is described as 'the area around the Han up to 500m in all directions'. However, the boundaries of site are not clearly defined here and this situation produces some difficulties for the effective use of the area.

The lack of information signs is another serious problem. There is nothing around the monument to inform the people about the values of the Han and its location. The locals and the visitors do not have the basic information about the monument and even do not know that the building is a caravanserai.

8.2. Aim of Restoration Process

Zazadin Han is a 13th century Seljukid caravanserai, which has identity, relative artistic, relative technical, rarity, economic, functional and education values, which are discussed above in detail. However, Zazadin Han is facing the danger of destruction. The destructive factors of nature and human is causing degradation day by day, and in addition to this, Zazadin Han is located on the development zone of the industrial area[22], which will very possibly increase the

[21] Zazadin Han and the ruins around are registered in 26.12.1996, by Council of The Preservation of Cultural and National Heritage in Konya (Konya Kültür ve Tabiat Varlıklarını Koruma Kurulu), meeting no: 284, document no: 2791.
[22] Verbal information from Prof. Dr. Haşim Karpuz

damage, if no precautions are taken. The surrounding area of the Han, which defines the Han with its physical values, must be freed from destructive factors and preserved like the Han itself as well. The method of this is to promote the economical and functional value of the monument and to increase its popularity with a new function, whilst promoting identity and historic values. As a result, the aim of the restoration process is to propose solutions for the current problems and settle a maintenance process, which will maintain the preservation of Zazadin Han and its surrounding area, for the future generations as cultural heritage.

8.3. Restoration Criteria

The protection of the monument and its environment from the destructive factors of the nature and human is the main criteria of the restoration project in order to stop the destruction process. The installations or contemporary additions to the Han or its surrounding area, must not destroy the unity of the Han, by means of this rule.

8.3.1. Restoration Criteria for Zazadin Han

The repair process will not begin until the pre-liminary actions are completed. These are the gaining of control of the accesses to the Han and surrounding area, the removal of earth deposits in and around the caravanserai, the categorisation and numbering of the fallen parts (evaluation of the existing and obtained not in situ traces, for anastylosis and re-construction) and the partial re-surveying of the caravanserai[23]. The pre-liminary actions are not limited with the mentioned ones. The need for the additional analysis and structural tests may emerge[24]. A ‘data feedback’ process must be established during the restoration. This process must evaluate the information obtained during the pre-liminary actions and make the necessary changes on the restoration project.

[23] The roof and the courtyard must be re-surveyed after the removal of earth deposits.
[24] There may be needs for the consolidation of some sections, before the major repairs. Also the cleaning of the deposits may be preferred. These are all the decisions that will be given by the experts.

Zazadin Han should be repaired to promote its visual, aesthetic and educational values. These repairs should not be in a speculative manner. Therefore, the basis of the decision of repairs is the reliability degrees. The repairs will be done on the missing parts of 1st, 2nd and 3rd degrees of reliability. The missing parts of 4th and 5th degrees of reliability will not be re-constructed or repaired by any means. The missing parts of 1st and 2nd degrees of reliability will be reconstructed. In the 1st degree of reliability the details of the missing parts will be applied on the reconstructions with the original material. However the repairs will be done without expressing the details on the parts categorised as 2nd degree of reliability. The original material use will be dependent on the location, related to the desired expression of the missing part[25]. On the other hand, the contemporary material will not be used on these parts. The repair of the parts categorised in 3rd degree of reliability will only be limited to the expression of that part. If the form of the object is not known or presumable, the repair will express the unfinished status of that element. If it is presumable, the repair will express its presumed form. The material that will be used for this process may not be the original construction material. Contemporary material will be preferred. In order to give the appropriate expression, the use of the finishes different from that of the original, is essential. The finishing textures of these will be in matt or semi-gloss colors of an appropriate chroma.

The additional parts mentioned in the analyses, will be preserved or removed considering their aesthetic and physical inputs to the Han. The additions that cause structural problems, the additions that seriously damage the visual quality of the building and all the temporary repairs will be removed. The repairs that cause drainage problems will also be removed.

In order to promote economical and functional value of Zazadin Han a new function, which includes cultural and commercial activities that support it, must be proposed. The preservation of the monument is a criterion of priority;

[25] The expression of detail at the moulded parts may be misleading when the aging effect of time is also taken into consideration.

therefore, these commercial activities should be well balanced in order to prevent damage to the Han. Considering the location of the Han in a rural area, the financial benefits of the village inhabitants must be taken into consideration.

The needs for the sanitary spaces will arise as the natural results of the function proposals. Some of these may have destructive natures like toilets. These will be placed outside of the Han. The spaces like kitchen, which will be needed for the function proposals of gastronomy, requires specific detailing and precautions. These will be designed and built in an easily removable manner.

8.3.2. Restoration Criteria for Surrounding Area

The land around the Han will be scanned for more ruins and shards, and the areas that have archaeological potential must be excavated. After the excavations, the site area should be redefined[26], however, the general outlines of the site should be maintained to safeguard the perception of the monument. The surrounding area of Zazadin Han has a great importance by means of visual and aesthetic values. To preserve its status as a landmark the area around the caravanserai must be kept unoccupied, or any additions to this area must be constructed beyond vision[27]. Here, the possible needs related to the new function of the Han like the parking area should be evaluated.

8.4. Intervention Proposals to Zazadin Han and Surrounding Area

8.4.1. Intervention Proposals to Zazadin Han

The intervention proposals to Zazadin Han can be discussed in seven groups. These are: repair, consolidation, cleaning, excavation, documentation, liberation and contemporary additions of infrastructure.

[26] The data feedback process explained above will also be valid for the interventions to the surrounding area.
[27] Under the ground level.

The removal of earth deposits is a pre-liminary action and an intervention of priority. The roof, the courtyard and the platforms of shelter will be freed from earth deposits. The cleaning of the roof is very important. There may be the traces or remains of the original roofing material under the earth layers.

The excavations are essential to begin the repair process like cleaning. The sections that will be excavated are; the area in front of the north exterior elevation, the area at the southwest of the entrance portal and the area at the demolished part of Semi-open space #3.

After cleaning and excavations new fallen stones will very probably appear and the hidden parts of the monument will become visible. In order to make a correct and proper restoration, the documentation of these parts is essential. Therefore, as another pre-liminary action, new or old, all the fallen pieces will be given numbers and photographed. Then these will be moved to another location where they will be arranged according to both their in situ and original locations. Also the village and the buildings in the village will be scanned for stone pieces taken from the Han.

The Han will be surveyed and photographed in detail. The information collected from here will be transferred to the feedback process, and these will effect the restoration project.

In order to understand the structural durability of Zazadin Han, material analysis and structural tests will be done. The information obtained from these analyses will also be transferred to the feedback process. The sections to be consolidated will be detected. The appropriate mortar composition for the repairs will be prepared considering the results of the analysis.

The interventions of consolidation can be discussed into two main groups: Structural consolidation and material consolidation. The structural consolidation of weak sections in Zazadin Han is an intervention of priority. It will be

temporarily applied to the partially demolished Semi-open space #3 during the repairs and Semi-open space #4 during the removal process of concrete support. The needs for material consolidation may appear related to the changing strength of the materials due to the weathering. But these will be applied regarding the results of the engineering data feedback processes.

Liberation is commonly known as the removal of all additions regardless of its period. However the only additions that will be removed in this study are the contemporary additions that damage the visual quality of the building. These are the concrete support at Semi-open space #4 and the iron door of the Han that currently exists.

There will be mainly two types of repairs in progress. The first one comprises the repairs of element basis and the second one is the repairs of material basis. Repairs of element basis include the repairs of all the building elements (structural or architectural) in the Han[28]. The repairs of material basis are the interventions in material scale like the repairs of fallen pointing and jointing mortars, detached stone pieces, the holes on the stone surface that trap the rainwater in, and the broken corners of the face stones that provide shelter for the birds. This is a common repair for all locations. There is also another type of repair, which does not fit into any of these groups. This is the anastylosis of fallen parts. In this case we both have the fallen part intact and we certainly know its original place. The fodder at Semi-open space #2, the fallen face stone at the north wall of Semi-open space #4 will be subject to this type of repair. And also the stone pieces obtained from the village will be placed on their original locations if available.

In all repairs regarding its type, lime mortars of different aggregate combinations will be used. The best lime available will be used and this will be prepared before the application of the restoration project.

[28] These will be done regarding the restoration criteria explained above.

The contemporary additions of infrastructure are the electricity, sewage, piping and communication lines that are essential for any settlement today. There should be new draining system lines constructed in the Han in order to solve the dampness and dampness related problems. These will be installed in channels under the ground level. The important thing is not to damage the original flooring whilst doing this. Therefore, the original floor coverings will be numbered and detached before the installation against destruction, and then, they will be put back into their original location.

The visual information about intervention proposals is presented in figure 8.2.

8.4.2. Intervention Proposals to Surrounding Area of Zazadin Han

The following interventions should be in progress to solve the problems mentioned above.

1. The motor vehicle traffic around the Han will be restricted. The heavy vehicles will not be allowed to use the road around the Han. In order to solve the drainage and vibration problems the current course of the road at the east will be altered. The old problematic road will be removed and a new course must be defined that is at least 150m away from the caravanserai.

2. For controlling the access, both the Han and its surrounding area will be surrounded by fences with barbed wire and a security unit will be settled on a location close to the road and the entrance of the Han.

3. The electricity lines, piping lines, telecommunication lines and sewage system lines will be installed in the vicinity of Zazadin Han. All lines will run through underground channels. There will be absolutely nothing related to the installations above the ground level. These lines will be connected to the main lines, which are parallel and very close to the new

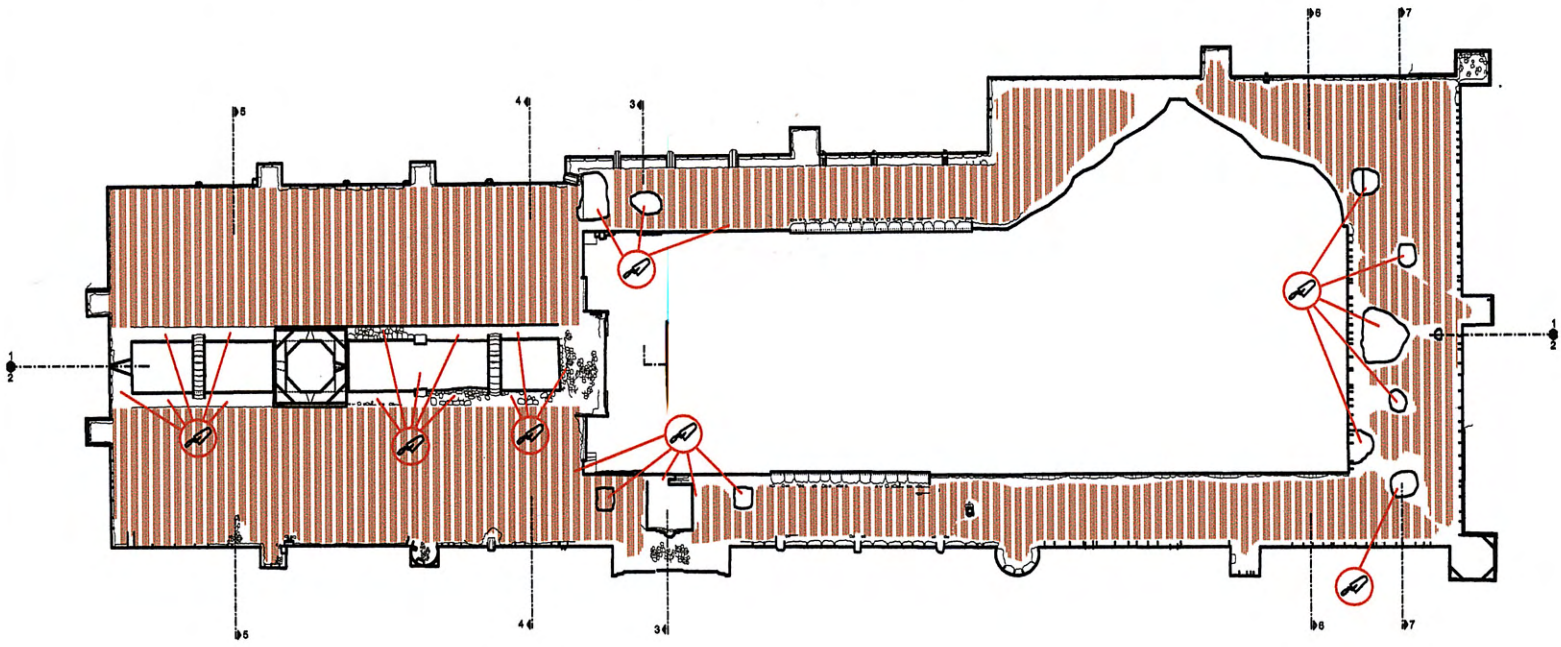
course of the road. The other end of these lines will be close to the north façade of the han where the vista is not good. Also in order to clear the vision around the monument the courses of the two electricity lines, mentioned above, will be altered.

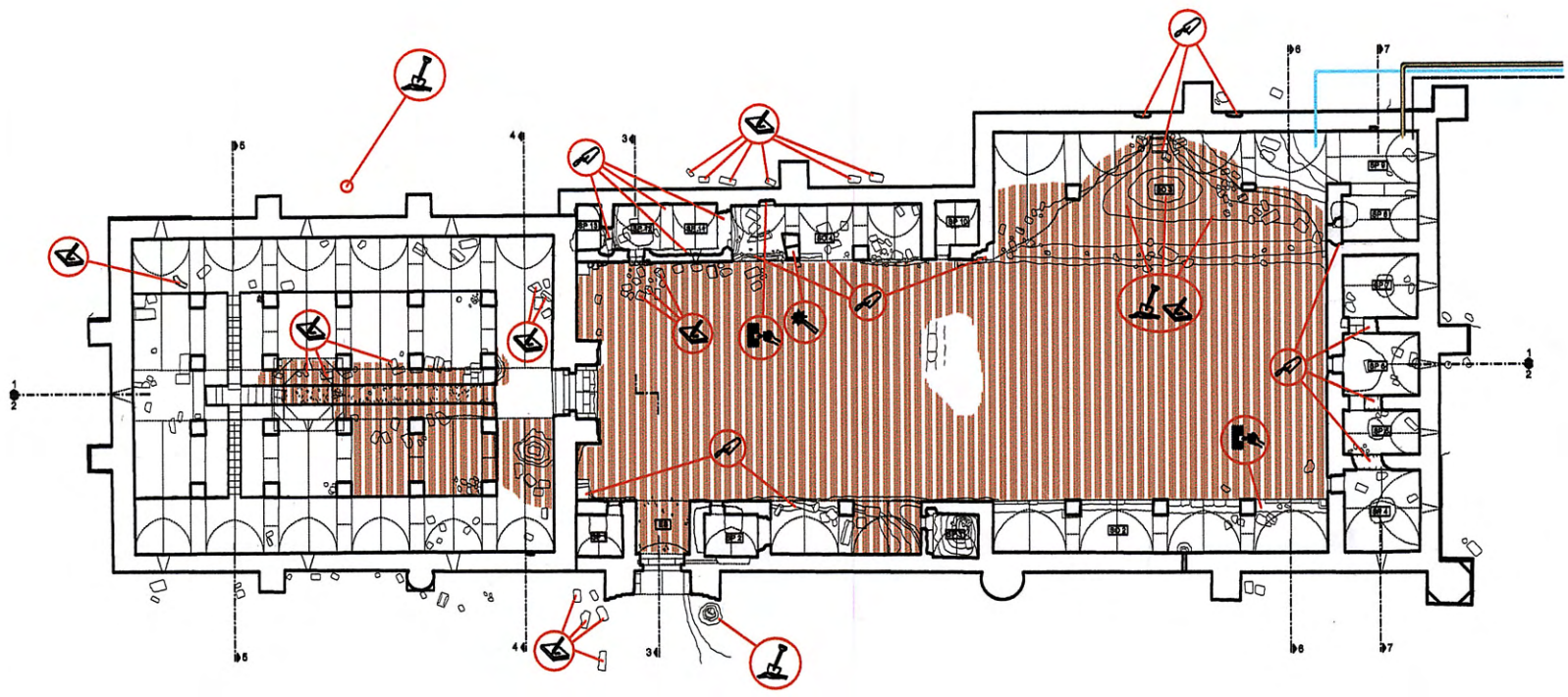
4. A carefully designed drainage system will be installed around the monument to solve the problems of dampness related to the ineffective surface drainage.

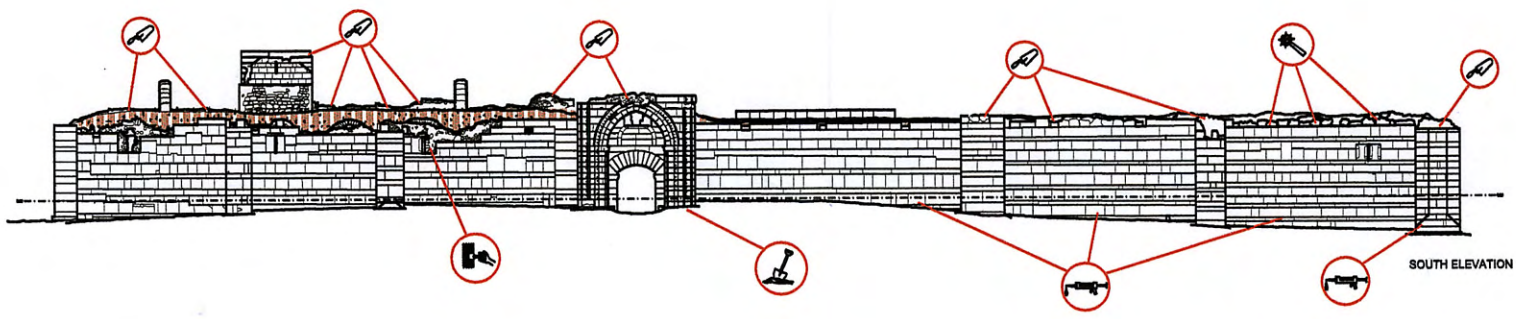
5. The areas that contain shards and ruins will be taken into consideration as the sources of new information about Zazadin Han and its vicinity. Therefore, the disposed heaps of excavated earth will be scanned for shards then moved away. The areas at the north of the Han that contain ruins and shards will be excavated for further information. The area around the Han will be scanned for more ruins or shards. Regarding the information obtained from the mentioned actions, the site borders and degree will be redefined.

6. Both of the old wells at the south of the Han will be repaired and became available for the use of villagers if possible. The water source at 75m southeast of the han near the road, will be rehabilitated for the use of both villagers and other users of the Han.

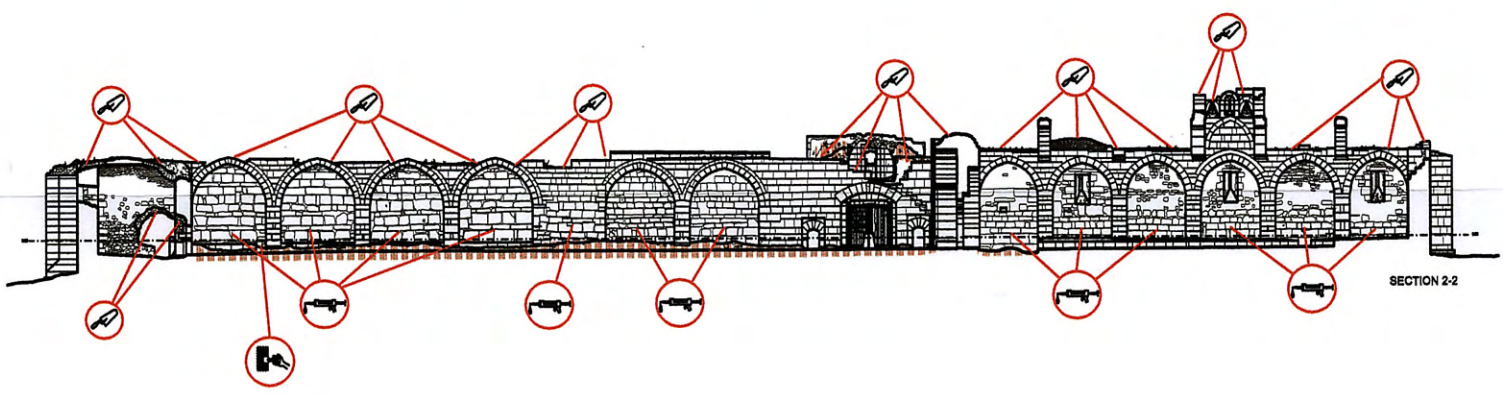
The visual information about intervention proposals is presented in Fig. 8.3



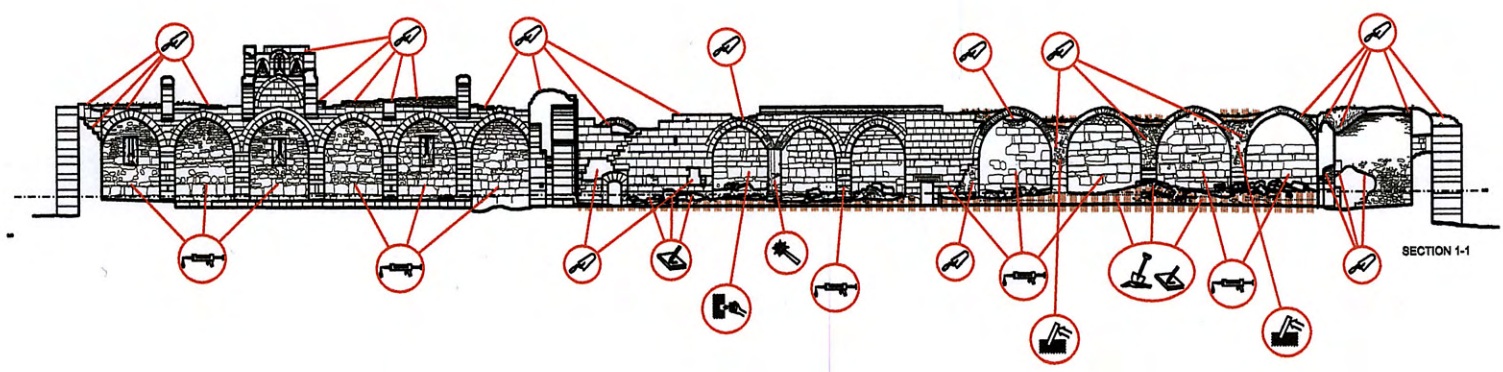




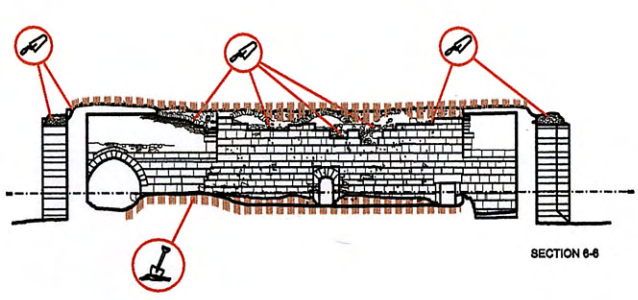
SOUTH ELEVATION



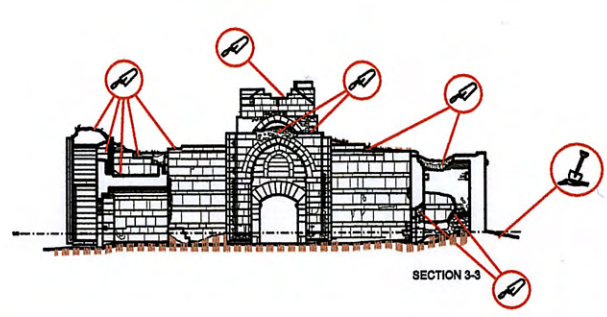
SECTION 2-2



SECTION 1-1



SECTION 6-6



SECTION 3-3

REPAIR

- REPAIRS OF ELEMENTS BASIS
- PLACEMENT OF FALLEN PARTS
- MATERIAL SCALE REPAIRS

CONSOLIDATION

- STRUCTURAL CONSOLIDATION

CLEANING

- REMOVAL OF EARTH DEPOSITS

DOCUMENTATION

- DOCUMENTATION AND NUMBERING OF FALLEN PARTS

All fallen pieces will be numbered and photographed. Then these will be moved to another location where they will be arranged according to both their in situ and original locations

Also the village and the buildings in the village will be scanned for stone pieces taken from the Han.

EXCAVATIONS

- EXCAVATIONS

LIBERATION

- REMOVAL OF ADDITIONS

CONTEMPORARY ADDITIONS OF INFRASTRUCTURE

- DRAINING SYSTEM LINES
- UNDERGROUND ELECTRICITY LINE FOR HAN
- SAWAGE SYSTEM LINES
- PIPING LINES
- COMMUNICATION LINES

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"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN
PREPARED BY: MUSTAFA ONGE

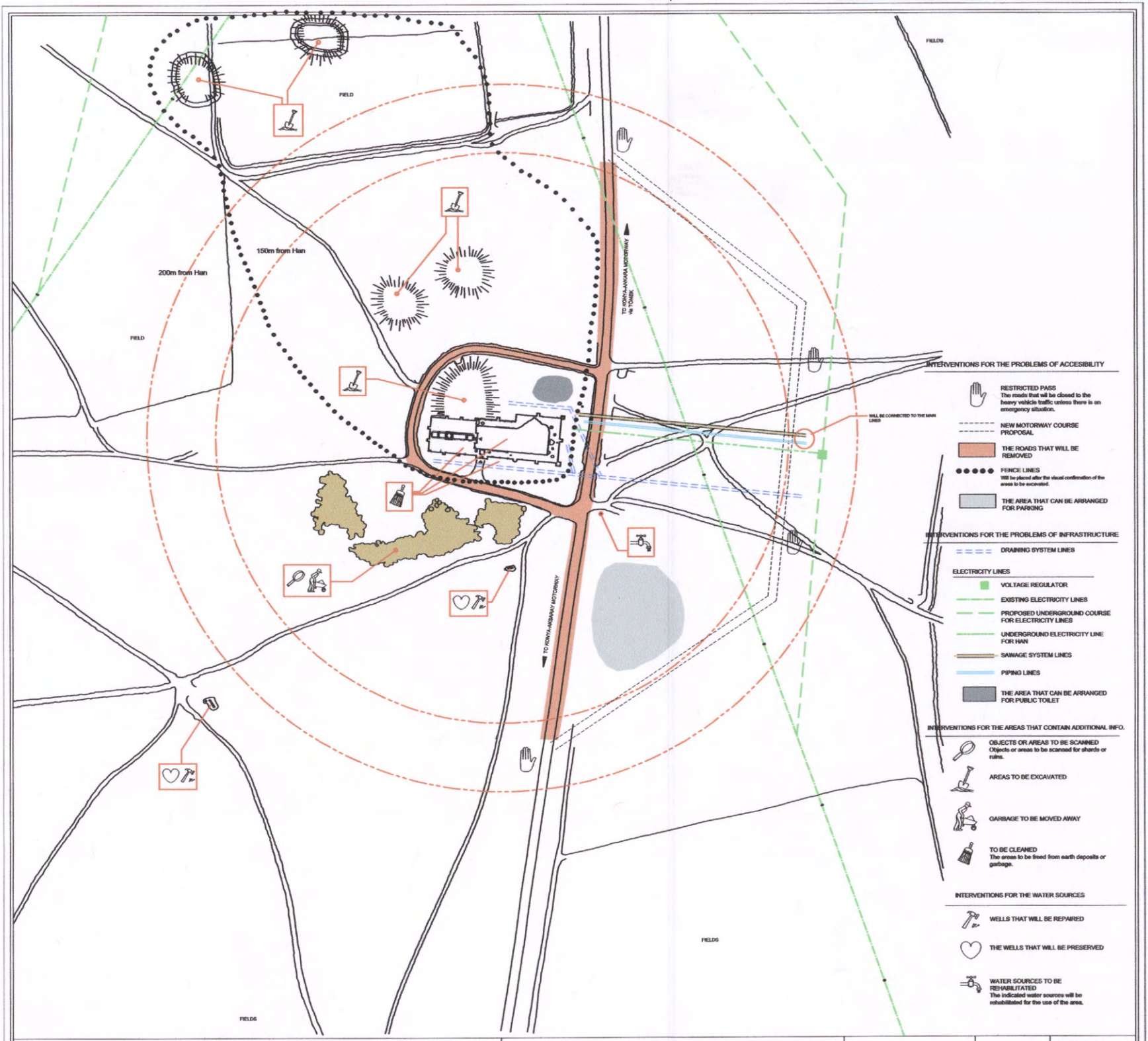
INTERVENTIONS ON ZAZADIN HAN

SCALE: 1/200

UNITS IN METERS

- MEASURED SURVEY
- ANALYSIS
- RESTITUTION
- RESTORATION

SHEET NUMBER:



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"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY: MUSTAFA ONGE

INTERVENTIONS TO SURROUNDING AREA OF ZAZADIN HAN

SCALE: 1/1000

0 10 20 30 40 50 100 150 meters

N W E

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

8.5. Restoration Project Proposal

Zazadin Han should be restored and in order to maintain its preserved status, it must be given a new function. The main goal of the new function proposal is to exhibit the building and make it live regarding its mentioned values. Zazadin Han must be presented as an interesting place to visit where the entertainment and the education mission of a museum are combined. In order to understand the potential of the Han and its spaces by means of such a function, analyses are made.

8.5.1. Space Potential Analysis

The space potential analysis is made to understand the potentials for the new function proposal. There are three measures of this potential. The first one is the dimensions of the space, the second one is the architectural quality of the space that is defined by the lighting and the third one is the relationships of the spaces.

8.5.1.1. Space Types Analysis

In this analysis the spaces are classified regarding their unity and their being open or closed. The closed spaces are discussed in two groups. These are divide closed spaces and single closed spaces. Similar distinction is made for the semi-open spaces. These are categorised as divided semi-open spaces and single semi-open spaces. There are also some other spaces that are categorised under the titles of open spaces and closed passages. The divided spaces limit the activity in the space with structural elements walls etc. On the other hand, in single spaces, the activity is in one single space that has its unity. There are no structural elements at the middle of the space that may interrupt or limit the function.

There is only one divided closed space in Zazadin Han, and that is the Shelter. It consists of galleries and there are walls with arched openings separating the galleries that may produce difficulties for the new function proposal. The

category of single closed spaces comprises all the Spaces and the masjid. Semi-open Space #3 is the only divided semi-open space of the Han. It has the similar problematic features like that of the Shelter. the single semi-open spaces are Semi open space #1, Semi-open space #2 and Semi-open space #4. The courtyard is the only open space of the Han. The closed passages are the Entrance space and the portals.

8.5.1.2. Space Dimensions Analysis

The spaces are discussed regarding two parameters in this analysis. The first one is the base area and the second one is the height.

The biggest space is the courtyard with its 908m^2 base area. It is followed by the Shelter, Semi-open space #3, Semi-open space #2, Semi-open space #4, Semi-open Space #1 and Space #4 with the base areas of 669m^2, 215m^2, 86m^2, 54m^2, 40m^2 and 30.7 m^2 respectively. Space #6 and Space #7 are 24m^2 each. Space #9 has 20.7m^2 base area. Space #5 and Space #8 have 17m^2 base areas. The base area of the Entrance space is 14m^2. The base areas of Spaces #1, #2, #3, #10, #12 and the masjid are all about 9-11m^2. The smallest space is Space #13, which is 5.6m^2.

The highest space in the Han is the central gallery of the Shelter and it is expected to have an average height of 9m after the restoration. The highest space is the part of the gallery under the dome, which is about 11m up to the existing part. The heights of the side galleries of the Shelter vary between 6.4-6.7m, and it decreases to 5.7-6.14m due to the elevated platforms. The arched openings between the galleries are about 3m. The heights of the spaces at the east of the courtyard (Spaces #4, #5, #6, #7, #8 and #9) vary between 6.4-6.7m. The heights of the Spaces #1, #2, #3, #11, #12 and very possibly[29] Space #13; the Semi-open Spaces #1 and #4 are all between 4.85-5.15m. The height of the Entrance space is

[29] The vault of this space is not measured due to its demolished status, however its springing line was higher than the others.

3.9m. The heights of semi-open Space #2 and Space #10 are about 5.5-5.6m. The heights of the vaults of Semi-open space #3 vary between 5.7-6.14m.

The visual information about Space Types and Space Dimensions analysis are presented in figure 8.4.

8.5.1.3. Lighting Conditions

The lighting conditions analysis is prepared with respect to some visual parameters[30]. The areas are categorised and mapped regarding the lighting levels. The mapping is done considering the lighting status of spaces after the primary repairs on the superstructure. The categories are: the poor light, dimly lit, sufficient light and good light. In the poor lit areas the objects are hardly visible. In the dimly lit areas the details of the objects are hardly visible. The sufficiently lit areas have the appropriate lighting conditions for visual comfort. The good light is the direct exposure of sunlight, which is undesirable for some cases.

Spaces #1, #2, #3, #10 and #13 are the areas mostly suffering from poor lighting. The only source of natural light is the doors when they are open. The dimly lit spaces are the Shelter, Spaces #4, #5, #6, #7, #8, #11, #12 and the masjid. The sufficiently lit areas are at the semi-open spaces and at the south of the courtyard. The courtyard and the south parts of the Semi-open space #4 and Semi-open Space #3 are exposed to direct sunlight.

8.5.1.4. Accessibility Analysis

The spaces are categorised regarding their accesses from the courtyard, their distances from the entrance and the relations between them by means of access. These accesses are being direct or indirect, from narrow or wide openings (from doors or arched openings). In some cases an architectural element play an important role for it like the stairs. These accesses may be blocked due to the

[30] This analysis should be re-prepared before the application of the new function, with the measurements taken with a lux-meter device.

current damaged status of the Han. In some spaces the circulation is defined by some architectural elements. The routes of these are also discussed in this analysis.

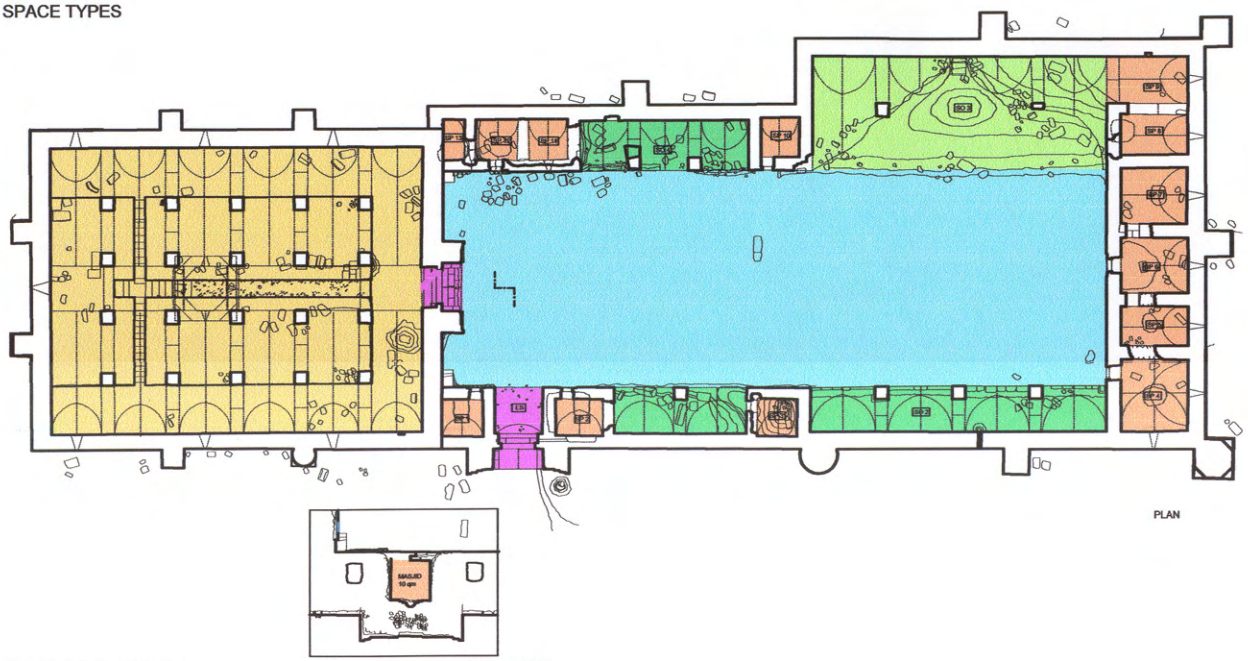
The Spaces #1, #2, #4, #6, #10, #11 and the Shelter are directly accessed from the courtyard. These are accessed from narrow openings. The Spaces #3, #5, #7, #8, #9, #11 and #13 have indirect accesses. These are also from the narrow openings except Space #9. Space #3 is accessed from semi-open Space #1; Spaces #5 and #7 are accessed from Space #6; Spaces #8 and #9 are accessed from Semi-open Space #3; and Spaces #11 and #13 are accessed from Space #12. The masjid is accessed from the courtyard via stairs. This access is blocked due to the damage status of the stairs to the masjid. The Spaces #1, #2, Shelter, Semi-open space #1 are the spaces, which are close to the entrance. Space #1 and Space #2 are only a few meters away from the entrance space. The spaces at the east of the courtyard are all far away from the entrance. The distance from the Entrance Space increases up to 55m at Space #9. The Shelter has also another important feature. The passages at the platforms of the Shelter define the circulation scheme in it. According to this scheme two circulation routes are defined *(Fig. 8.5)*.

The visual information about Lighting Conditions and Accessibility analysis are presented in figure 8.5.

8.5.1.5. Evaluation

Shelter is the biggest divided closed space that has varying maximum space heights and a defined circulation route. It is also located close to the entrance. The Shelter has its own circulation scheme, which is an important input. Considering its large base area and the existence of the circulation scheme this space can be used for indoor exhibition purposes. The shelter needs artificial lighting during night and day.

SPACE TYPES



PLAN

PLAN OF MASJID
(extracted from roof plan)

SPACE TYPES

CLOSED SPACES

DIVIDED CLOSED SPACE
There is no unity of vision and activity in these spaces.

SINGLE CLOSED SPACE
These spaces are perceived easily with the unity of vision and activity.

SEMI-OPEN SPACES

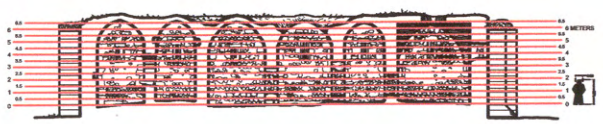
DIVIDED SEMI-OPEN SPACE
There is no unity of vision and activity in these spaces.

SINGLE SEMI-OPEN SPACE
These spaces are perceived easily and contain no barriers for the circulation.

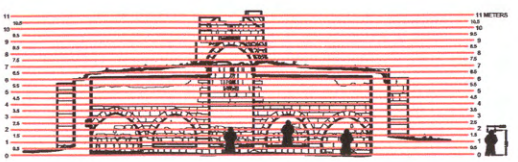
OPEN SPACES

CLOSED PASSAGES

SPACE DIMENSIONS



SECTION 7-7



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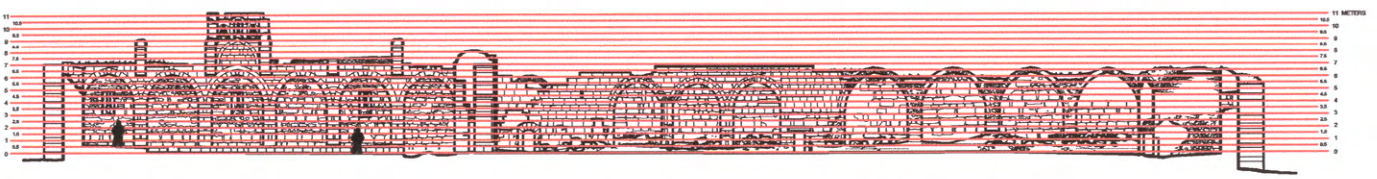
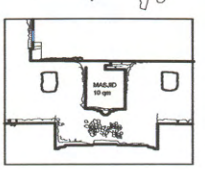


SECTION 1-1

PLAN



PLAN OF MASJID
(extracted from roof plan)

THE MAXIMUM HEIGHTS OF SPACES

h: The height of the space from the ground level to the top of the vault or arch.

- h = 11m.
- h = 7.10 - 7.00m.
- h = 6.40m - 6.70m
- h = 5.70m - 6.14m
- h = 5.50 - 5.63m
- h = 4.85m - 5.15m
- h = 3.91m
- h = 2.50 - 3.00m
- h less than 2.50m

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THESIS SUPERVISOR:
ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY:
MUSTAFA ONGE

SPACE POTENTIAL ANALYSIS 1

SCALE: 1/200

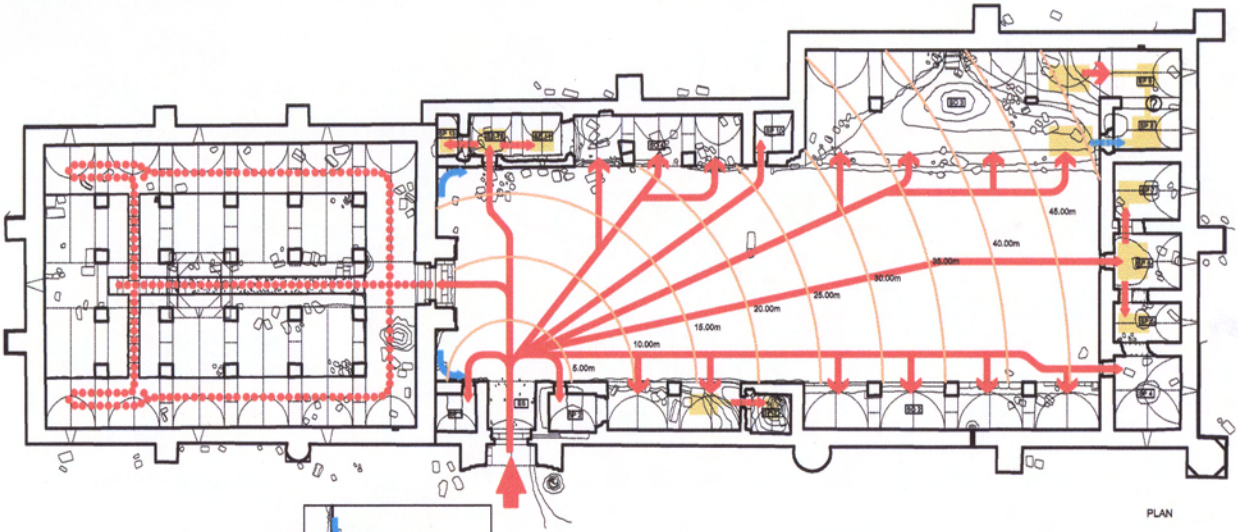
UNITS IN METERS

N

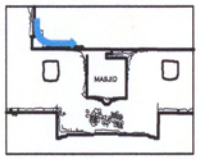
- MEASURED SURVEY
- ANALYSIS
- RESTITUTION
- RESTORATION

SHEET NUMBER:

ACCESSIBILITY



PLAN

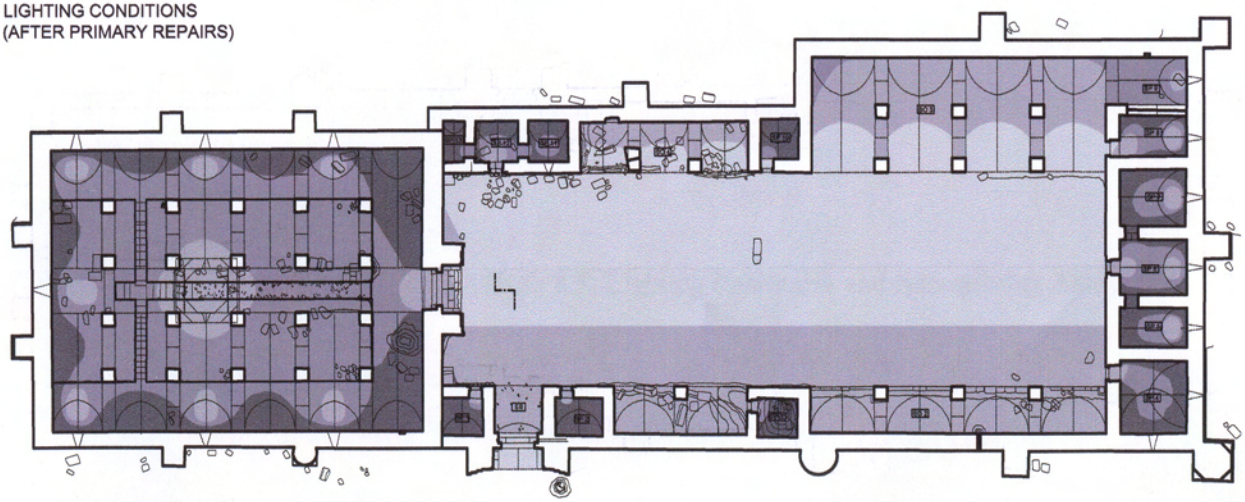


PLAN OF MASJID
(extracted from roof plan)

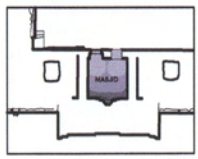
ACCESSIBILITY

- MAIN ENTRANCE
- DIRECT ACCESS FROM COURTYARD THROUGH NARROW OPENING (DOOR)
- DIRECT ACCESS FROM COURTYARD THROUGH WIDE (ARCHED) OPENING
- INDIRECT ACCESS FROM COURTYARD
- INDIRECT ACCESS FROM COURTYARD THROUGH WIDE (ARCHED) OPENING
- BLOCKED INDIRECT ACCESS FROM COURTYARD THROUGH NARROW OPENING (DOOR)
- BLOCKED ACCESS FROM COURTYARD VIA STAIRS
- ORIGINAL CIRCULATION ROUTE OF THE SHELTER
- LINKED SPACES

LIGHTING CONDITIONS
(AFTER PRIMARY REPAIRS)



PLAN



PLAN OF MASJID
(extracted from roof plan)

LIGHTING

- POOR LIGHT
  The objects are hardly visible.
- DIMLY LIT AREAS
  The details of the object are hardly visible.
- SUFFICIENT LIGHT
- GOOD LIGHT
  Direct sunlight exposure

The classification presented above is made with respect to the visual parameters.

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PREPARED BY: MUSTAFA ONGE

SPACE POTENTIAL ANALYSIS 2

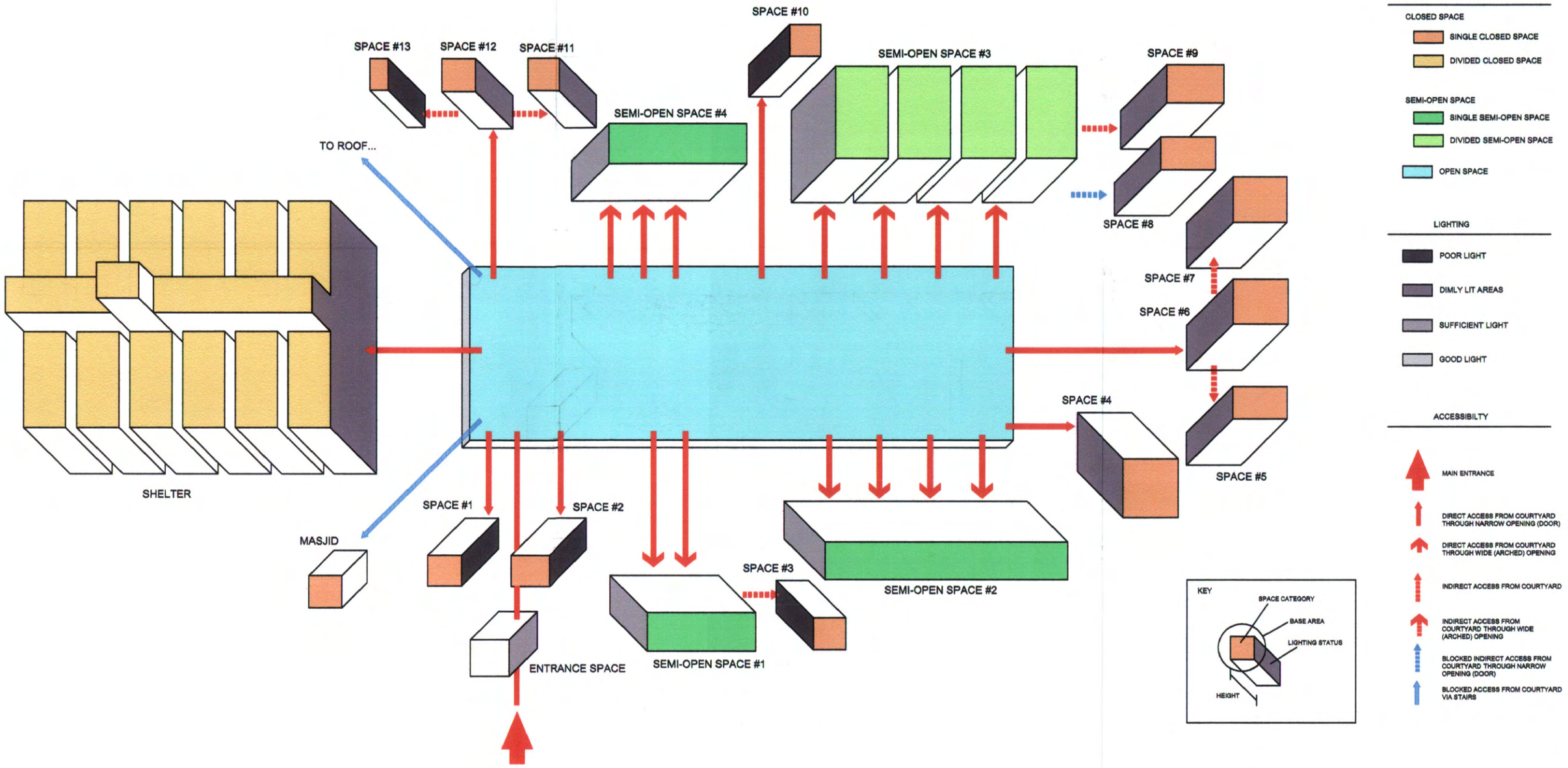
SCALE: 1/200

0 1 2 4 8 10 15
UNITS IN METERS

N

- MEASURED SURVEY
- ANALYSIS
- RESTITUTION
- RESTORATION

SHEET NUMBER:



	SPACE CATEGORY	MAX. HEIGHT(S)	BASE AREA	ACCESS	CIRCULATION SCHEME	LOCATION REFER TO THE ENTRANCE	LIGHTING CONDITIONS	RESULT	FUNCTION PROPOSAL	BASIC REQUIREMENTS for NEW FUNCTION
SHELTER	DIVIDED CLOSED SPACE	11m at DOME 5-70-6.40m in galleries 2.50-3.00m at arched openings	669 qm	DIRECT access from courtyard.	YES	CLOSE TO THE ENTRANCE	DIMLY LIT	Shelter is the biggest divided closed space that has varying maximum space heights and a defined circulation route. It is also close to the entrance.	Can be used for exhibition purposes. Its having a defined circulation route is an important input.	Needs appropriate artifical lighting, day and night.
Space #1	SINGLE CLOSED SPACE	4.85-5.15m group	9 qm	DIRECT access from courtyard.	NONE	NEAREST SPACE	POOR	SP #1 is a single closed space located next to the entrance. It has a poor lighting due to the lack of windows.	Can be used as security office or storage, regarding its location.	Needs artifical lighting, night and day.
Entrance Space	CLOSED PASSAGE	3.90m	14 qm		NONE		SUFFICIENT		This space can maintain its original function.	Needs artifical lighting, for night only.
Space #2	SINGLE CLOSED SPACE	4.85-5.15m group	11 qm	DIRECT access from courtyard.	NONE	NEAREST SPACE	POOR	SP #1 is another single closed space located next to the entrance like SP #2. It has a poor lighting due to the lack of windows.	Can be used as security office or storage, regarding its location.	Needs artifical lighting, night and day.
Semi-open Space #1	SINGLE SEMI-OPEN SPACE	4.85-5.15m group	40 qm	DIRECT access from courtyard, wide opening.	NONE	CLOSE TO THE ENTRANCE	SUFFICIENT	SO #1 is a single semi-open space directly accessed from the courtyard. It is the closest semi-open space to the entrance and it has sufficient daylight.	These spaces can be used together as sales unit with semi-open exhibition area.	Needs artifical lighting, for night only.
Space #3	SINGLE CLOSED SPACE	4.85-5.15m group	10 qm	INDIRECT access from Semi-open space #1.	NONE	NOT CLOSE	POOR	SP #3 is a single closed space accessed from SO #1. It has a poor lighting due to the lack of windows.		Needs artifical lighting, night and day.
Semi-open Space #2	SINGLE SEMI-OPEN SPACE	5.50-5.63m group	86 qm	DIRECT access from courtyard, wide opening.	NONE	NOT CLOSE	SUFFICIENT	SO #2 is a single semi-open space directly accessed from the courtyard. It has sufficient daylight like SO #1.	Semi-open Space #2 can be used as a covered space supporting open air activities like a sales unit or a semi-open exhibition area.	Needs artifical lighting, for night only.
Space #4	SINGLE CLOSED SPACE	6.40-6.70m group	30.7 qm	DIRECT access from courtyard.	NONE	FAR AWAY	DIMLY LIT	SP #4 is a single closed space dirctly accessed from courtyard. It is the biggest single closed space and its is dimly lit.	This space can be used for small meetings or exhibition purposes.	Needs artifical lighting, night and day.
Space #5	SINGLE CLOSED SPACE	6.40-6.70m group	17 qm	INDIRECT access from Space #6.	NONE	FAR AWAY	DIMLY LIT	SP #5 is a single closed space accessed from Space #6. It is a dimly lit space far away from the entrance.	The new function proposal for these three spaces must be discussed together. These spaces can be used for many purposes regarding their size. these can be used as offices or exhibition areas or even the function rooms for small meetings. The existence of the platform at Space #6 must be taken into consideration.	Needs artifical lighting, night and day.
Space #6	SINGLE CLOSED SPACE	6.40-6.70m group	24 qm	DIRECT access from courtyard.	NONE	FAR AWAY	DIMLY LIT	SP #6 is a single closed space directly accessed from courtyard. It is a dimly lit space far away from the entrance.		Needs artifical lighting, night and day.
Space #7	SINGLE CLOSED SPACE	6.40-6.70m group	24 qm	INDIRECT access from Space #6.	NONE	FAR AWAY	DIMLY LIT	SP #7 is a single closed space accessed from Space #6. It is a dimly lit space far away from the entrance.		Needs artifical lighting, night and day.
Space #8	SINGLE CLOSED SPACE	6.40-6.70m group	17 qm	INDIRECT access from Semi-open space #3.	NONE	FAR AWAY	DIMLY LIT	SP #8 is a single closed space accessed from SO #3. It is a dimly lit space far away from the entrance.	This space can have seasonal use for a function of gastronomy or an exhibition area. Its relation with Spaces 8 and 9 must be taken into consideration. they cannot be discussed seperately by means of refunctioning. For example Space 8 can be used as the kitchen.	Needs artifical lighting, night and day.
Space #9	SINGLE CLOSED SPACE	6.40-6.70m group	20.7 qm	INDIRECT access from Semi-open space #3, wide opening.	NONE	FAR AWAY	DIMLY LIT	SP #9 is a single closed space accessed from SO #3 through an arched opening. It is a dimly lit space far away from the entrance.		Needs artifical lighting, night and day.
Semi-open Space #3	DIVIDED SEMI-OPEN SPACE	5.70-6.14m group	215 qm	DIRECT access from courtyard, wide opening.	NONE	FAR AWAY	SUFFICIENT	SO #3 is the biggest divided semi-open space that has varying maximum space heights and a defined circulation route. It is far away from the entrance and its lighting status is sufficient in general.		Needs artifical lighting, for night only. Needs sanitary installations for gastronomy function.
Space #10	SINGLE CLOSED SPACE	5.50-5.63m group	9.5 qm	DIRECT access from courtyard.	NONE	NOT CLOSE	POOR	SP #10 is a single closed space. It has a poor lighting due to the lack of windows.	This space can be used for storage or personnel room regarding its small size.	Needs artifical lighting, night and day.
Semi-open Space #4	SINGLE SEMI-OPEN SPACE	4.85-5.15m group	54 qm	DIRECT access from courtyard, wide opening.	NONE	NOT CLOSE	SUFFICIENT	SO #4 is a single semi-open space directly accessed from courtyard. It is partially subject to direct sunlight exposure but generally have sufficient lighting.	It can be used as a covered space supporting open air activities like a sales unit or a semi-open exhibition area.	Needs artifical lighting, for night only.
Space #11	SINGLE CLOSED SPACE	4.85-5.15m group	10.3 qm	INDIRECT access from Space #12.	NONE	NOT CLOSE	DIMLY LIT	SP #11 is accessed from SP #12. It is a dimly lit place.	the new function proposal for these three spaces must be discussed together. These spaces can be used for many purposes even for accommodation. But Space #13 is more likely to be used for the storage regarding its size.	Needs artifical lighting, night and day.
Space #12	SINGLE CLOSED SPACE	4.85-5.15m group	11 qm	DIRECT access from courtyard.	NONE	NOT CLOSE	DIMLY LIT	SP #12 is dirctly accessed from courtyard. It is a dimly lit place.		Needs artifical lighting, night and day.
Space #13	SINGLE CLOSED SPACE	4.85-5.15m group	5.6 qm	INDIRECT access from Space #12.	NONE	NOT CLOSE	POOR	SP #13 is the smallest closed space that is accessed from SP #12. Its lighting status is poor.		Needs artifical lighting, night and day.
Masjid	SINGLE CLOSED SPACE		10 qm	DIRECT access from courtyard via stairs.	NONE	CLOSE TO THE ENTRANCE	DIMLY LIT	The masjid is a single closed space directly accessed from the courtyard via stairs.	This space can maintain its original function.	Needs artifical lighting, night and day.
Courtyard	OPEN SPACE		908 qm	DIRECT access from Entrance Space.	NONE		GOOD	The courtyard is the only open space and the biggest space of the Han. It provides access to all the spaces.	This space can be used for open-air activities like concerts in addition to its original function. the exposure of direct sunlight must be taken into consideration.	Needs artifical lighting, for night only.

M.E.T.U
FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR: ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY: MUSTAFA ONGE

RESULTS OF SPACE POTENTIAL ANALYSIS

SCALE: 1/200

0 1 2 3 4 5 10 15
UNITS IN METERS

N
W E

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

Space #1 and Space #2 are single closed spaces located next to the entrance. They have small base areas and poor lighting due to the lack of windows. For the new function these spaces can be used for the storage or as the security office.

Semi-open space #1 is a single semi-open space directly accessed from the courtyard. It is the closest semi-open space to the entrance and it has sufficient daylight. Space #3 is a single closed space accessed from Semi-open space #1. Although there is an oculus at the top of its vault, it has a poor lighting. These are linked spaces and they should be used together in a function like a sales unit with an exhibition area.

Space #4 is is a single closed space directly accessed from the courtyard. It is the biggest single closed space and it is dimly lit. This space can be used for small meetings or exhibition purposes. There must be artificial lighting at this space for the new function.

Space #5, Space #6 and Space #7 are single closed spaces. Space #6 is directly accessed from the courtyard and spaces #7 and #5 are accessed from Space #6. these are dimly lit spaces far away from the entrance. The new function for these spaces must be discussed together regarding their accesses. These spaces can be used for many purposes regarding their sizes. These can be used as offices or exhibition areas or even the function rooms for small meetings. The existence of the platform at Space #6 must be taken into consideration.

Space #8 and Space #9 are single closed spaces accessed from Semi-open space #3. They both are dimly lit spaces away from the entrance. Semi-open space #3 is the biggest semi-open space far away from the entrance. It has a sufficient overall lighting status. Semi-open space #3 can have a seasonal use for a function of gastronomy or an exhibition area. Its relations with Space #8 and Space #9 must be taken into consideration. For example these two spaces can be used as the kitchen and its storage area.

Space #10 is a single closed space accessed directly from the courtyard. ıt has a small base area and a poor lighting due to the lack of windows. This space can be used for storage or personnel room regarding its small size.

Semi-open space #4 is a single semi-open space directly accessed from the courtyard. It is partially subject to direct sunlight exposure but the overall lighting status is sufficient. It can be used as a covered space that may support open air activities on the courtyard, like a sales unit or another semi-open exhibition area.

Space #11, Space #12 and Space #13 are single closed spaces. Space #12 is directly accessed from the courtyard; Space #11 and Space #13 are accessed from Space #12. Space #11 and Space #12 are dimly lit spaces, whilst the lighting status of Space #13 is poor. The new function for these spaces must be discussed together. These spaces can be used for many purposes. But whatever the function of other two are, Space #13 is more likely to be used for the storage, regarding its size.

The masjid is a single closed space directly accessed from courtyard via stairs. This space can maintain its original function.

The courtyard is the biggest space and the only open space of the Han. It provides access to all spaces. This space can be used for open-air activities like concerts. The exposure of direct sunlight must be taken into consideration.

The visual information about the evaluation of space potential analysis is presented in figure 8.6.

8.5.2. New Function Proposal

8.5.2.1. Target Population and Stakeholders

The activities of three social groups are taken into consideration during the refunctioning process of Zazadin Han. These are the tourists, the local visitors and inhabitants of Tömek.

The tourists access the touristic areas mostly by coaches in the control of tourist guides and they collect any information that they are presented. Therefore the content of the presentation is especially important for this group.

The local visitors consist of the people of Konya and neighbouring settlements. They access the area mostly by car looking around in curiosity and hoping to see something interesting. These are generally uneducated people. The content of the presented information is different from that of the tourists. It must be something clear and familiar, or a bit extraordinary.

The inhabitants of Tömek are the most important people for the preservation of Zazadin Han. They seem to like it, but they have no idea about the reason of its existence and they do not know what to do with it. The inhabitants of the village mostly move to Konya in autumn and come back in summer. The refunctioning proposal must include some opportunities, which should make them understand that Zazadin Han is a valuable cultural object and it can be preserved and used for making money. In order to do this the villagers must be presented job opportunities. Some spaces of the Han must be seasonally hired to them to sell food and other products.

8.5.2.2. Management Plan Proposal

Zazadin Han will be hired from the General Directorate of Pious Foundations in the concept of “yap, işlet, devret” management model for 50 years. The

application of the restoration project and the management of the building will be done by the corporation of Selçuk University and Municipality of Konya. Basically, the academics will provide the technical support and control, and the municipality will provide financial support for the project. Then the income will be shared.

The students of architecture and other construction related diciplines and volunteers will work in the project. The students can take place on the different levels of the project as the summer practice. From a different point of view, the project will be a good opportunity for the academics to improve theirselves by means of application. As well as the financial support, the Municipality of Konya will be responsible for the installations of infrastructure. Also it may play an important role for the transportation of tourists to the area, by establishings transportation companies. The commercial activities and sanitary conditions of the new establisments, will be inspected by both the municipality and the related departments of the university. The university will also be responsible for the training of the local people about Zazadin Han, its surrounding area and tourism. In order to maintain the restoration process in desired way, the author of this thesis will be one of the advisors of the whole project.

The villagers take part in all processes. During the pre-repair and repair processes they will be given job opportunities. And after the repairs the available spaces in the Han will be seasonally hired to them.

8.5.2.3. New Function

The focus of the new function proposal will be the center of Tömek. Therefore the center of the village, which is approximately 1km away from the Han, will be rehabilitated for the application of touristic purposes. The major commercial activities (restaurants, souvenir shops etc.) will be placed in this center. Therefore the area around the Han will be kept away from speculation.

The new function proposal will include such features, related to Zazadin Han:

1. The Shelter, the biggest space of Zazadin Han, will be arranged for the exhibition of architectural model collections[31]. The architectural models of Seljukid Era buildings will be presented here with photographs and multivision shows to the visitors.

2. A café for the use of the visitors is an essential need. The Semi-open space #3, Space #9 and Space #8 will be used for this purpose. The café will have a seasonal use and present traditional foods to the visitors.

3. The spaces except the space groups will have the functions of security office, management office, storage, personnel room and souvenir shop. Space #2 will be used as the security office, Space #1 will be used for storage and Space #10 will be the personnel room. Space #3 will be used for souvenir shop with semi-open space #1.

4. The semi-open spaces #4 and #2 will be used for open-air exhibitions or will be hired to the people of the village who want to sell traditional goods.

5. The triple space groups will be used as special function rooms for the tourists, exhibition areas giving information about Zazadin Han and its donor or the winter rooms of the café. The final decision about these will be given after the cost analysis. It is also related to the availability of the material to be exhibited.

6. The courtyard will be used for open-air activities like small concerts and shows.

[31] The large model exhibition areas are one of the most popular ways of cultural activation. The places like “Miniaturk” in İstanbul, “Model Village” in Ramsgate England, “Legoland” in Denmark are the examples of this.

7. The lavatories will be placed outside of the caravanserai under the ground level, far away from the areas of good vista.

8. For all spaces and functions, any destructive additions such as the sound systems and additional decorative elements will not be permitted. The information signs will never be bigger than 0.25 m^2. All the lighting elements and lines will be placed out of sight.[32]

8.5.3. Project Proposal

The project proposal has the following features *(Fig. 8.7)*:

The roof and the top parts of the walls, up to the repaired parts will be covered with aluminium sheets. These sheets will be painted in an appropriate color with a matt finish, regarding the restoration criteria. If the remains of the original roofing material are found at the roof, it will be preserved in situ. Since the application of cut stone roofing is not an effective method to stop rainwater penetration, the remains will also be covered with aluminium sheet roofing. The location of the original roofing remains will be marked with a strip of different colored aluminium, on the roofing material.

The dome is an important part of the sources of visual and aesthetic value of the Han. It will be reconstructed up to the top of the transition zone with the help of the information from the in situ traces. The dome is also an important element for ventilation and lighting of the Shelter. Therefore whilst expressing its form, it should be brought to life by using transparent material covered on a light construction structure. This construction will be done using grey colored glass with matt finish[33].

[32] The drawings of technical details and the list of materials are presented with the departmental copy of this thesis.
[33] This proposal will be applied after a series of material and structural tests. There may be a need for the consolidation of this part before the repair process.

The upper parts of the portals will be reconstructed regarding the traces and the visual documents. The first stone rows of the missing parts and the missing parts of the arches will be constructed with original material. The areas above the well known parts will be constructed with brick and lime plaster. The top parts of the portals will be constructed producing a gradation. Therefore the lack of information about the original finish will be expressed with an apparently unfinished feeling[34].

The star vault and north wall of the masjid will be reconstructed using the information obtained from the traces and photographs. The north wall of the masjid is constructed with travertine except its upper part and the door. These parts will be constructed with brick and plastered over with lime plaster, due to the lack of information about the exact details. The door will be repaired here giving the expression of a basic opening. The north wall of the masjid will be extended upwards above the level of its superstructure. The flooring of the masjid will be reconstructed referring the existing parts.

The steps of the stairs to the masjid and the roof will be reconstructed with original material regarding the information on the existing steps. The ends of the steps are unknown therefore the unfinished status of these will be expressed. However the landing of the stairs to the roof is missing. A steel construction landing will be placed to the approximate location of the original. As the information about the landing of the stairs to the masjid is sufficient by means of traces and very similar examples it will be constructed in pre-cast white concrete

[34] Although the upper parts of the portal and the dome are both in the group of 3rd degree of reliability the forms of repair are different. According to the information obtained from the comparative study the domes all have similar outlines (especially the domes of Aksaray Sultan Han and Karatay Han). In addition to this the form of the transition part helps us to presume the form with geometric approximations. However the exact dimensions are unknown. The problem is a bit different at the portals. There are only two examples of intact portals that survived today. But the heights of them are different. The information about the heights of the portals are obtained from the theories which may be speculative. And also there might have been some other elements at the top of the portals like rosettes etc.

without details and placed to its original location[35]. The unfinished expression like that of the steps will also be applied at the end of this element.

The upper parts of the walls and buttresses of exterior elevations and walls of the courtyard will be repaired in a similar way. The exterior walls and walls of the courtyard will be extended 0.7m above the top levels of the superstructure[36] that will be enough to hide the metal roof.

The pillars, walls and transition arches of Semi-open space #3 will be repaired with original material (travertine). Whilst doing this, the photographs and the fallen pieces will be used. For these new constructed parts the new stones will be used in a constant modular length and height. This will produce a regular pattern, that can easily be identified as a new addition.

The intradoxes of all vaults will be plastered. Whilst doing this the old plaster will be preserved wherever it is possible. The meeting line of the new and old plasters will be expressed, with a light colored flush joint.

The damaged or partially demolished vaults of the spaces will be repaired with its original material. Whilst doing this the existing parts of the vaults will be preserved if possible. The repairs will be indicated by colored flush joints of the plaster on the interior.

The water spouts which are the new additions, will be constructed with precast concrete elements, made of white concrete. Travertine water spouts that are carved in basic forms may also be used instead of these. However the exact locations of the water spouts are not well known. The new additions must give the feeling of difference and approximation.

[35] The weights of the concrete and stone will be compared and the most appropriate choice will be applied.
[36] The mentioned parts are 2nd degree of reliability.

The repair of the flooring materials is an important problem for the repairs. At the courtyard the flooring material is mostly visible. The results of cleaning studies may also effect the repairs on the flooring materials. In the worst case there will only be the remains of the flooring material in front of the portal of the Shelter and at the middle of the courtyard. The existing parts will be preserved by means of consolidation, and the missing parts will be repaired with travertine (which is the original material of the courtyard floor covering) slabs laid over compacted sand. The new flooring elements will be arranged in grid coursing and the courses will be filled with sand. Such flooring will not case problems for the activities at the courtyard. the sand will help the drainage and the grid arrangement will differentiate the new flooring form the old one. There are remains of the original flooring o the platforms of the Shelter. ıf the remains of original flooring except the existing ones are found at the end of the cleaning studies, the platforms will be covered with the stone, similar type of the original flooring material, in gridal arrangement like that of the courtyard. However the platforms will be used for the exhibition of the models of the monuments of Seljukid era. Therefore the stone covering will be unnecessary. Instead lime, crushed stone and clay mixture will be applied to these surfaces. And a metal grid with adjustable height will be used. The upper surface of this grid will be covered with fibreboard plates. The models will be placed on this elevated platform. The electricity lines for the lighting of the models will be mounted under the grid. The sides of this metal and fibreboard structure will be open, and the original flooring will be visible. The locations of these will also be expressed by means of illumination. The flooring of the stables are unknown. But these areas cannot be used with its earth coverage. Lime, clay and crushed stone mixture will be the most suitable and the removable choice here. The same material will be applied to the floors of the spaces unless any remains of original floorings are found. If this happened, the flooring of that space will be repaired with a similar way to that of the courtyard. The same method will be applied for the platforms of semi-open spaces.

There will be some specific arrangements on the floors of the spaces as the requirements of the function. Space #8 will be used as the kitchen. Therefore a

hygienic flooring is required. The floor of this space will be elevated on a steel deck and the required covering material will be applied over this. The same removable covering will be applied to the walls. The function of kitchen requires ventilation equipment. This will be placed on the west wall of this space and the outputs will be placed on the repaired part of the vault. Therefore the original section of the vault will be preserved.

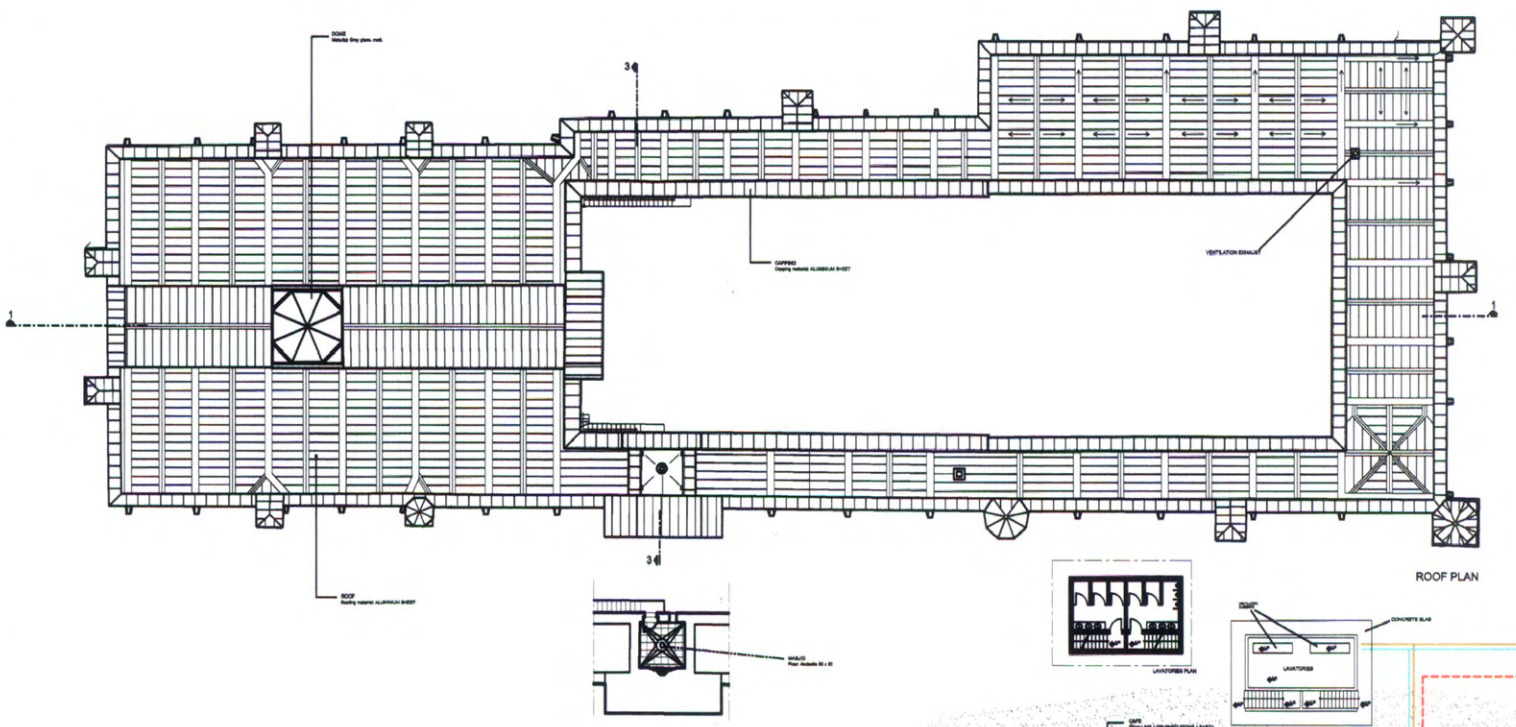
The floors of Spaces #4, #5, #6 and #7 will be used as the closed spaces of the café (or for exhibition purposes) and these will be covered with wood planks mounted on wood laths resting on the compacted lime, crushed stone and clay mixture.

The demolished or heavily damaged doors between the triple space groups will be reconstructed. As the information about them are very limited. These are expressed as basic opening avoiding detail. Therefore the walls between these spaces will be reconstructed with rubble stone and the new constructed parts will be plastered over.

The door wings of the spaces, Shelter and the entrance door of the Han will be constructed with massive wood, and it will be impregnated against decay. As the finishing the doors will be painted in matt or semi-gloss black. The aim is to express the opening by means of using the contrast. The black painted door will give a void feeling and erase itself.

The toilets will be located outside of the Han, close to the northeast corner. And these will be constructed below the ground level. The capacity of these will be enough for a small group of tourists.

The defined project proposal and the interventions may be altered by the author, regarding the information transferred to data feedback processes.



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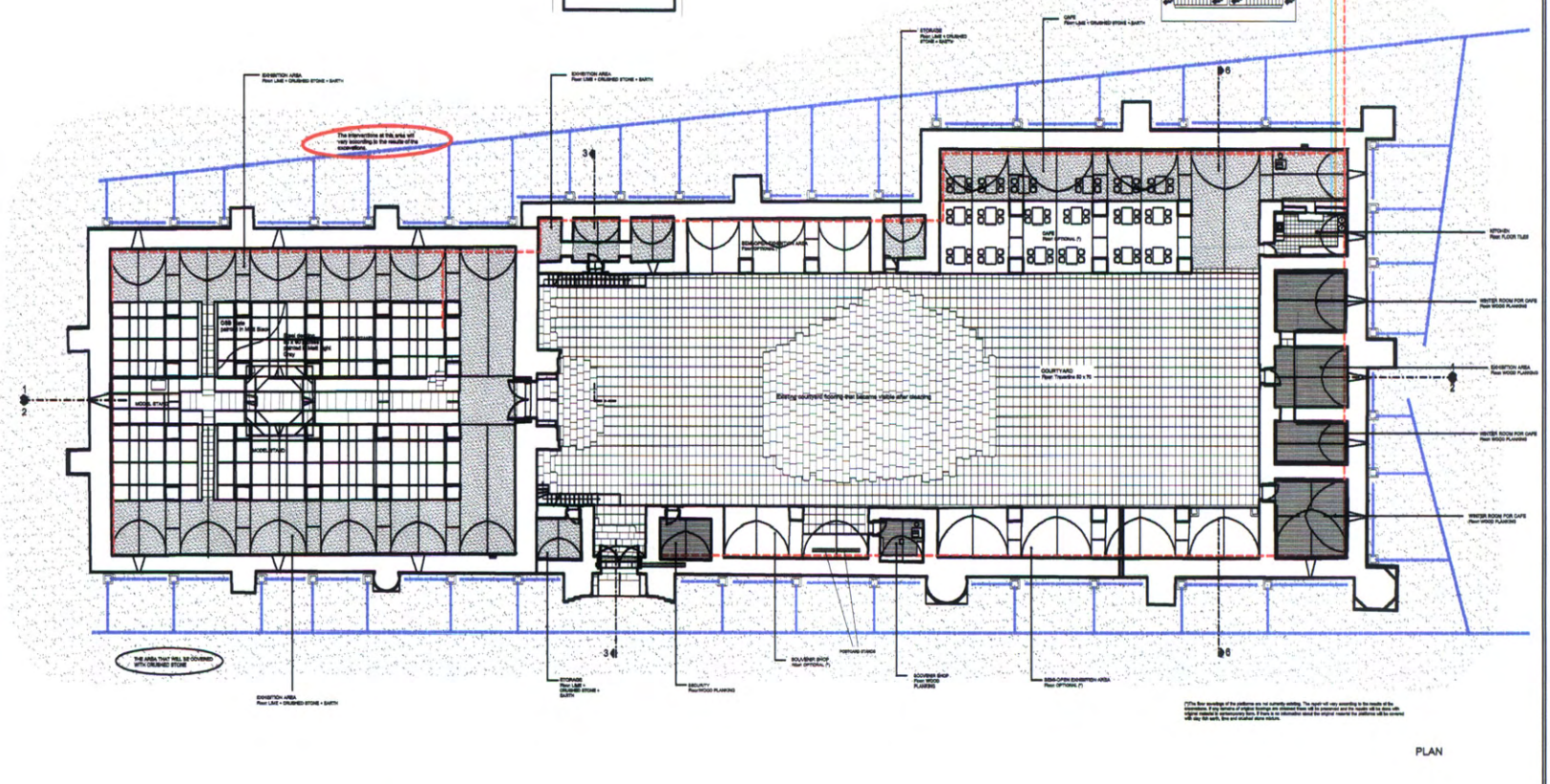

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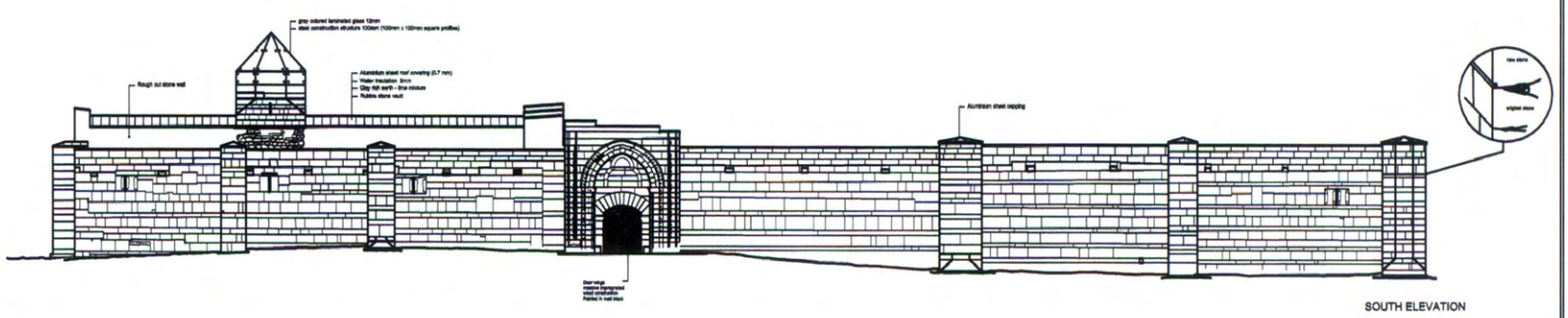
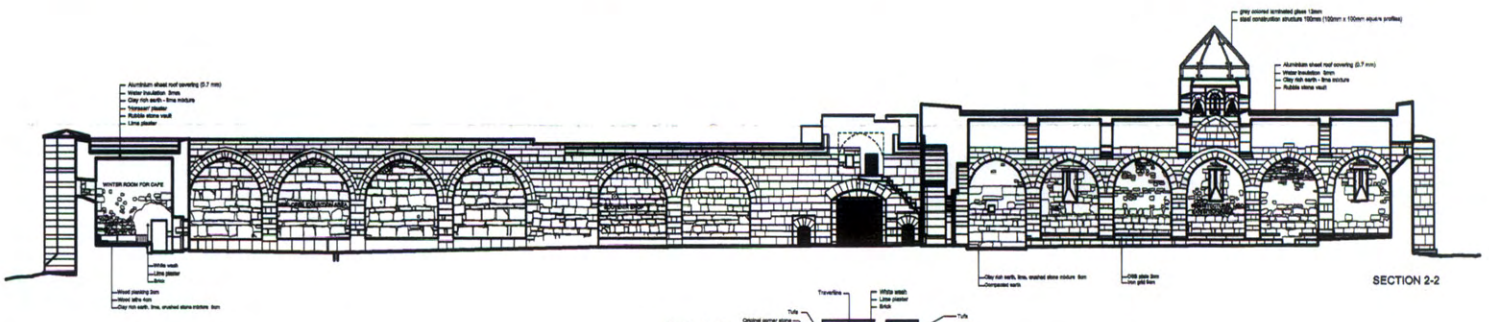
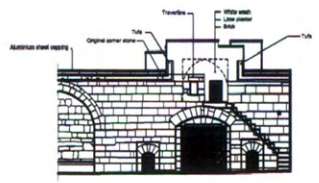
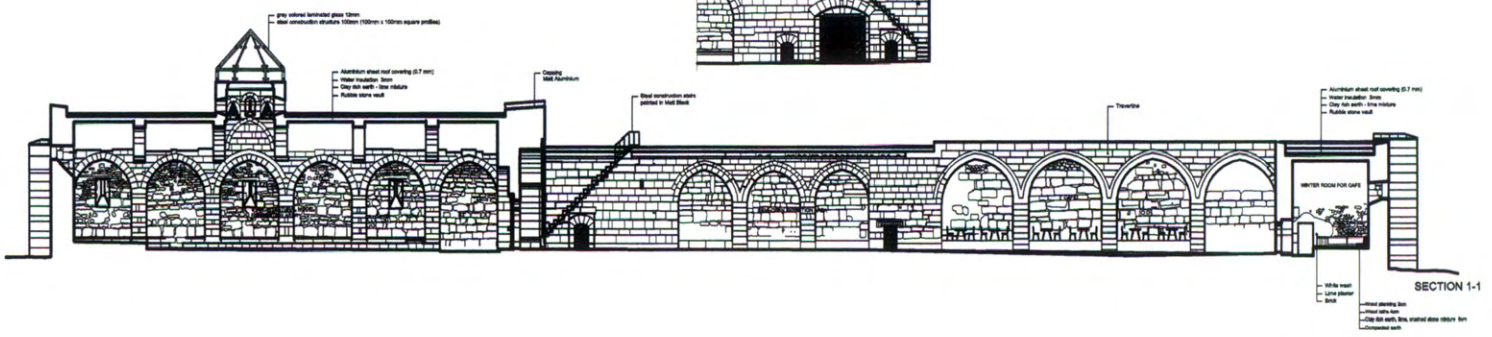


SOUTH ELEVATION



SECTION 2-2





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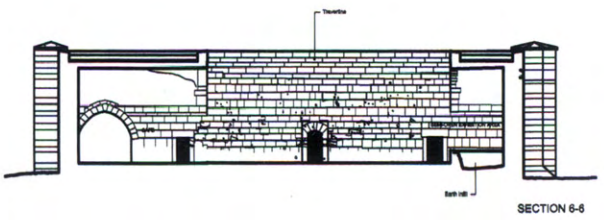
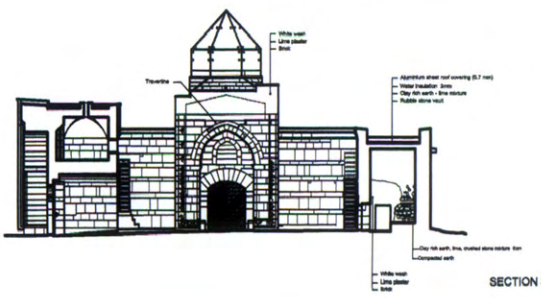


SECTION 6-6



SECTION 3-3

M.E.T.U
FACULTY OF ARCHITECTURE M.S. PROGRAMME IN RESTORATION

"RESTORATION OF ZAZADIN HAN A 13th CENTURY SELJUKID CARAVANSERAI NEAR KONYA"

THESIS SUPERVISOR:
ASSOC.PROF.DR.EMRE MADRAN

PREPARED BY:
MUSTAFA ONGE

RESTORATION PROJECT PROPOSAL

SCALE: 1/150

UNITS IN METERS

N

MEASURED SURVEY
ANALYSIS
RESTITUTION
RESTORATION

SHEET NUMBER:

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