Gazi University Journal of Science
GU J Sci
29(3):515-524 (2016)

The Comparison of Architectural Heritage Documentation Techniques Over Mustafa Ağa Bath 'Hamam' Located in the Commodity Center of Tokat

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Received:06/05/2016 Revised:20/06/2016 Accepted: 21/06/2016

ABSTRACT

Knowledge about the socio-cultural situation, religious and administrative decisions, construction techniques and features such as traditional and living culture of past civilizations can only be maintained via cultural heritages left to the present day. However, this important heritage has been perishing day by day without even being documented due to reasons such as indifference, ignorance, wrong policies and decisions, and financial hardships. Within the scope of this study, the advantages and disadvantages of documentation via traditional, optical and photogrammetric methods researched on Mustafa Aga bath 'hamam', located in Tokat are presented. The data obtained is presented after a comparison with regard to the necessary equipment and team, effort and time spent, the cost and precision of the final product.

Keywords: *Mustafa Aga bath 'hamam', Turkish bath, Documentation, Measured drawing, Architectural survey, Heritage recording, Architectural Photogrammetry***.**

1. INTRODUCTION

Anatolia is a special area on which many societies and civilizations have been found and many others have found settlement opportunities for a certain period of time. Important examples of cities and systems on which dozens of civilizations it has sheltered for thousands of years and monumental and civilian architectural heritage together with movable cultural assets built within these cities or individually are still present on and under the ground or water. This immense heritage brought by a deep-rooted past has a capital importance as far as reflecting the socio-cultural situation, religious and administrative decisions, building technology, traditions and culture of living of past civilizations are concerned. However, due to problems such as educational mistakes like indifference and insensitivity, false local administrative policies, unsuitable conservation and tourism development plans and insufficient finance resources, this crucially important heritage has been diminishing day by day without being able to be documented. Especially, isolated rural heritage require an urgent course of action within this context.

Thanks to the improvement of technology, methods concerning the documentation of cultural heritage have been developing in such a manner that enables obtaining more correct, detailed and faster results with lesser people. However, all of these methods used have

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advantages and disadvantages in parallel with different situations; also, it is seen that they may be slow or insufficient depending upon the sensitivity required in the final result. Within the context of this study, the disadvantages and advantages were tried to be revealed via a comparison among traditional, optical and photogrammetric methods which can be realized relatively easily and with lesser cost in our country's conditions. As the field study area, Mustafa Aga Bath 'hamam', which had been built during Seljukian era in the center of Tokat city was chosen.

2. GENERAL FEATURES OF MUSTAFA AGA BATH 'HAMAM'

Mustafa Aga Bath 'hamam' is situated in Sulu street neighborhood inside the historical commerce center of Tokat. The building is surrounded with Halit Street on the north and east directions, and attached buildings on the west and south direction. As it is in the historical commerce center, there are important buildings such as Deveci Inn 'Han', Arastalı Bedesten 'covered bazaar' , Yağıbasan Madrasah, Sultan Bath 'hamam', Takyeciler Mosque and Paşa Bath 'hamam', which are from Seljukian, Period of Principalities and Ottoman era, in its vicinity. Today, the building is in a derelict condition and it is not used.

There is no definite information about the construction date, the architect and the first owner (bani), and its inscription (kitabe) has not reached to the present day as well. Eravşar gives the information that the name of the bath 'hamam' is mentioned among the incomes of Mehmedi Muhiddin Foundation, known as Ahi Pasha in the General Directorate of Foundations, in its foundation certificate-charter dated 12 Ramadan 765 (Georgian calendar 1364) [1]. Also, in accordance with this foundation certificate-charter, construction system and the features of its materials, Aksulu and Kuntay date this building to 14th century [2,3]. Today the ownership of the building belongs to the heirs of the foundation.

The bath 'hamam' was built as a double bath 'hamam', with both men and women sections. Due to the repairs in time, the originality of the entrance halls and dressing rooms (soğukluk) were destroyed both men's and women's sections. However, the warm rooms (ılıklık) and hot rooms (sıcaklık) protect their authenticities. Aksulu states that the small marble fountains (*şadırvan)* which are found between the seclusions (halvet) in the hot room of the men's section are unique to the city as they constitute the only example among other bath 'hamam's in Tokat [3].

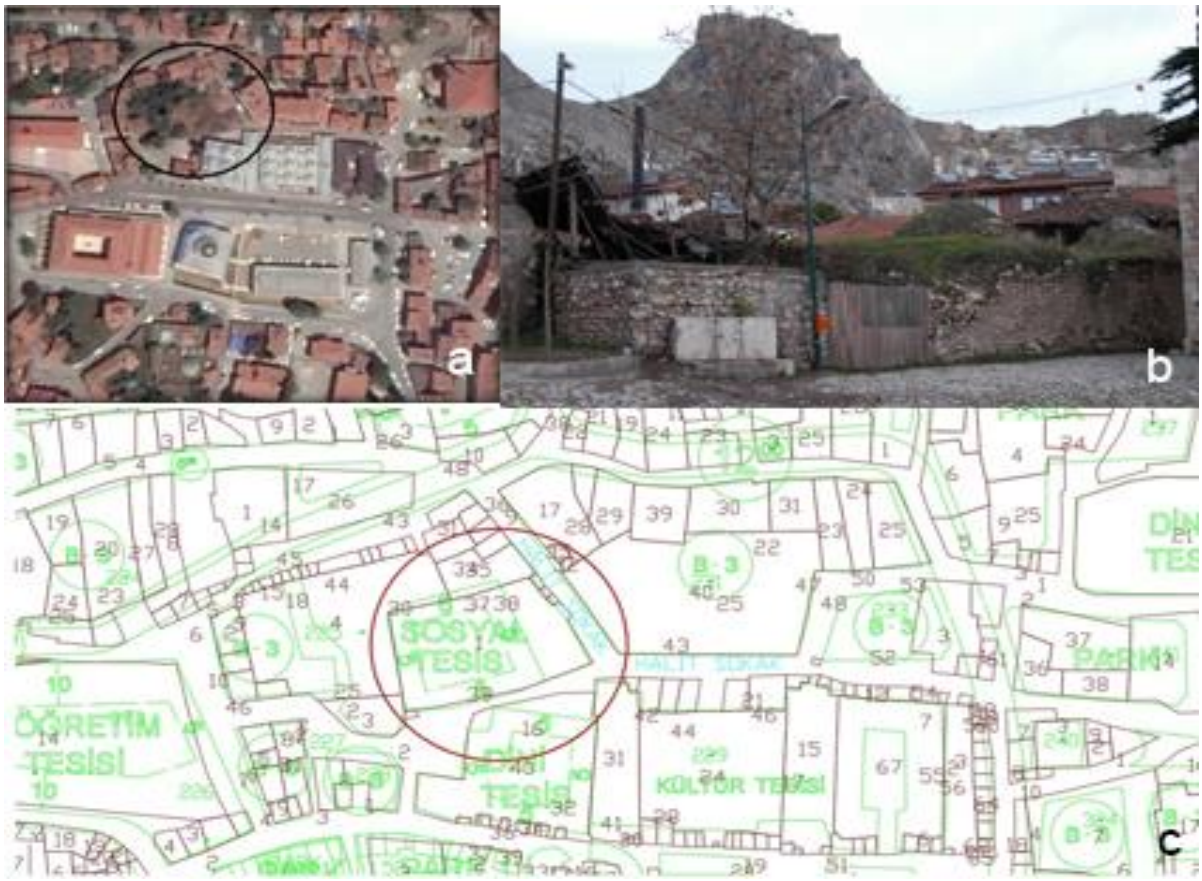


Figure 1. Location of Mustafa Aga Bath 'hamam'(a)[4], General view of the Bath 'hamam' /Southern Façade(b), Mustafa Aga Bath 'hamam' in the present plan and overlapped Master Plan(c)[7]

The dimensions of the building are 36 m x 25 m, and it is situated on east-west axis in an irregular rectangle form. The entrance of the women's section was left under the street level after the road level has been elevated in time. The gate is opened to the entrance hall (3,75 x 2,53 m) which is not original. Through the entrance hall, dressing room (soyunmalık) where you get ready for the bath- is reached (9,06 x 7,38m). The dressing room is a single space, and it was built later via timber frame structure. Through the door found in the dressing room's western façade, warm room is reached. There is a square room (3,80 x 3,30m) on the southern direction of the main space of the warm room (5,66 x 3,77m). This space in which there are benches on its 3 sides was used as warm room seclusion (ılıklık halveti) via the addition of a basin. The western door of the warm room is opened to the hot room with 4 *iwans (eyvan)* and it has 4 Seclusions (halvet) on its corners. There are marble basins with geometrical and floral ornamentations in the *iwans* and Seclusions in the hot room.

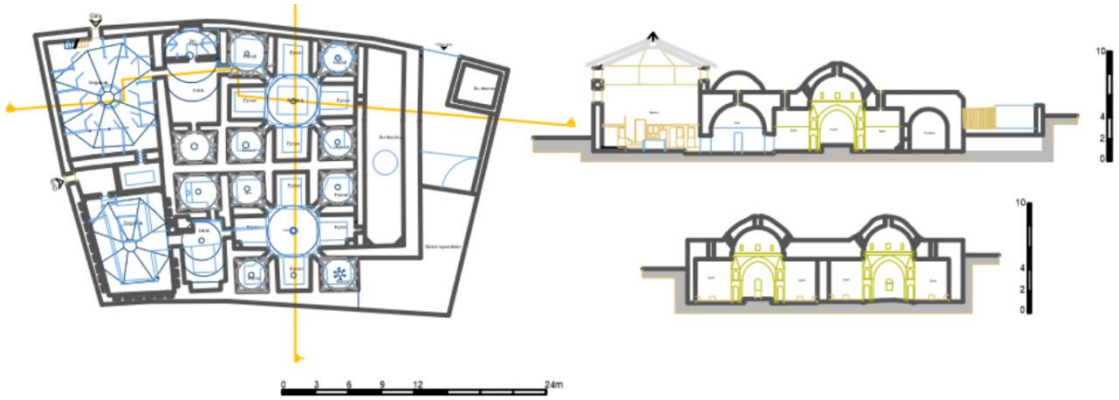


Figure 2. The architectural survey (measured drawing) of Mustafa Aga bath 'hamam'.

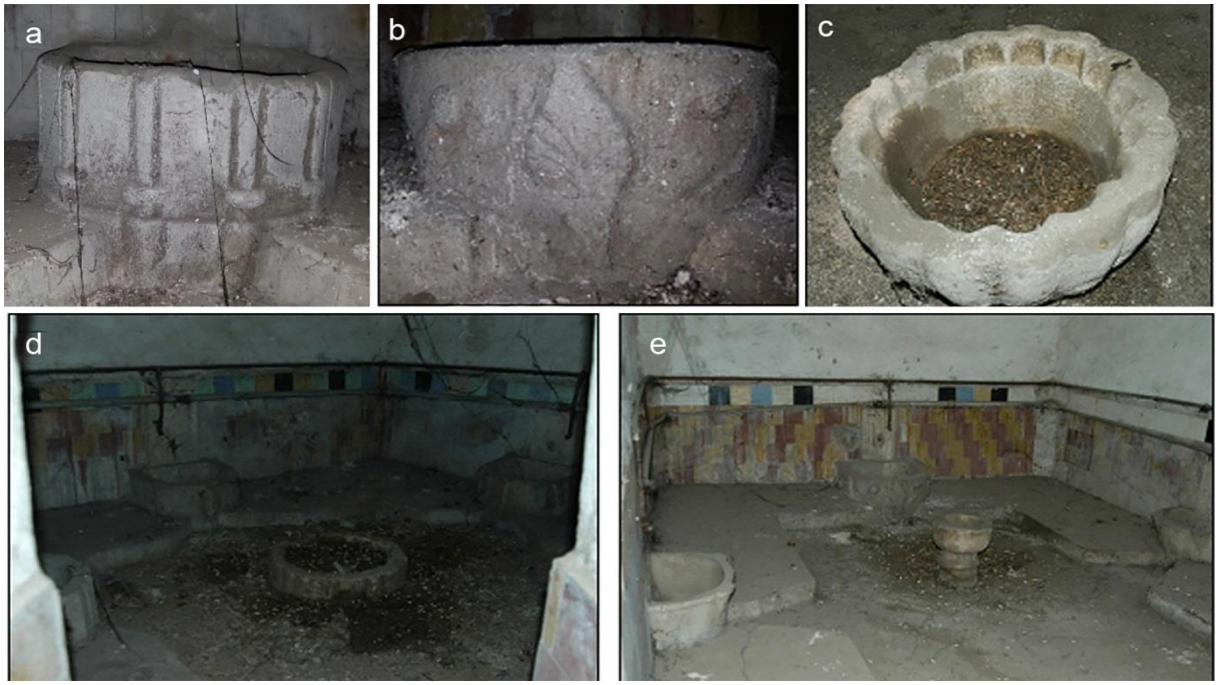


Figure3. Geometric and floral ornamented bath basins (a,b) and unique pool (c),Examples of Seclusions in hot room of male section(d) and *iwan* (e)

The entrance of the Men's section is on the southern façade. Dressing room (soğukluk) dimensions of which is 10x9 m is a single space, and it is built later on via timber frame structure as the dressing room of the Women's section. There is an entrance to the warm room through the dressing room door that opens on its west façade. There is a square shaped room of 3,60x 2,80 m on the north direction of the main space of the warm room which is 5,66 x 3,77 m, and there are toilet and shaving sections of 4,96 x 2,38 m on the south direction. The entrance to the hot room through the door on the west direction of the warm room and its southeast corner Seclusion. Hot room which is designed with 4 *iwans* and 4 corner Seclusion is symmetrical. There are geometrical and floral ornamented marble basins in the *iwans* and seclusions just as it is in the Women's section. Marble

fountains (şadırvan) in the middle of the iwans and seclusions are unique to Mustafa Aga Bath 'hamam'. The boiler room (külhan) constitutes a large part of the west façade of the bath 'hamam'. The top cover of which is an arched vault in 2,50x1,50 m dimensions. On the north of the boiler room (külhan) which was built with brick furring system, there is a part that cannot be reached as a wall was put up in its place.

The building was built via roughhewn stone furring system. Thickness of the walls range between 75 and 100 cm. The original veneering of the ground is unknown, but today it is covered with concrete tessellation. The top cover of the dressing room, which is not original, is an octagonal timber dovetail dome from the inside, and it is still present today. Wooden dome framework is covered with hipped roof. Top of the warm and hot rooms are covered with a dome and a vaulted roof. The roof is covered with alaturka tile today.

3.FIELD STUDY AND OTHER PROCEDURES

3.1. Field study

In order to achieve architectural survey by different methods, field study was carried out on 15 to 16 September 2015, via a three person team which is composed of an architect and map technicians. Within the scope of the study, southern and eastern façades of Mustafa Aga Bath 'hamam' were studied, and in this context sketches were prepared. After the preparation of the sketches, the necessary preparations (moving present vehicles and movable city furniture away) were made for taking photographs and measurements and the area was made ready for the study.

Traditional method–conventional system: The traditional method is the oldest method which comprises of documenting the present situation, plan, cross-section and details of the historical building via simple measurement tools. Documentation of the South and east façades of Mustafa Aga Bath 'hamam' via transparent water hose, water gauge and tape measure in traditional method lasts 1 day (10 hours) with a 3 people team. The respective processes are designating 0,00 level via transparent water hose (45 minutes), taking the main measures in parallel with 0,00 level in positive and negative planes (60 min.) and imprinting the designated part of the roughhewn stone wall on the sketch where each member of the team starts from a different point.

Optical method: The method in which architectural survey is attained via equipment such as nivo (levelling instrument), theodolite or a simple total station. For the measurement of Mustafa Aga Bath 'hamam' via optical method, Topcon GPT6005 total station which has a 1mm error margin in 3-25 meters was used, and the procedure lasted 4 hours. The processes conducted includes designating polygon points (4) and creating a plane by reading on the sketch (210 min.) respectively. The whole of the rough hewn stone wall was measured via total station; the measurement was made on the previously determined part, and for the drawing of these Stones, the photographs that were taken in the field were used.

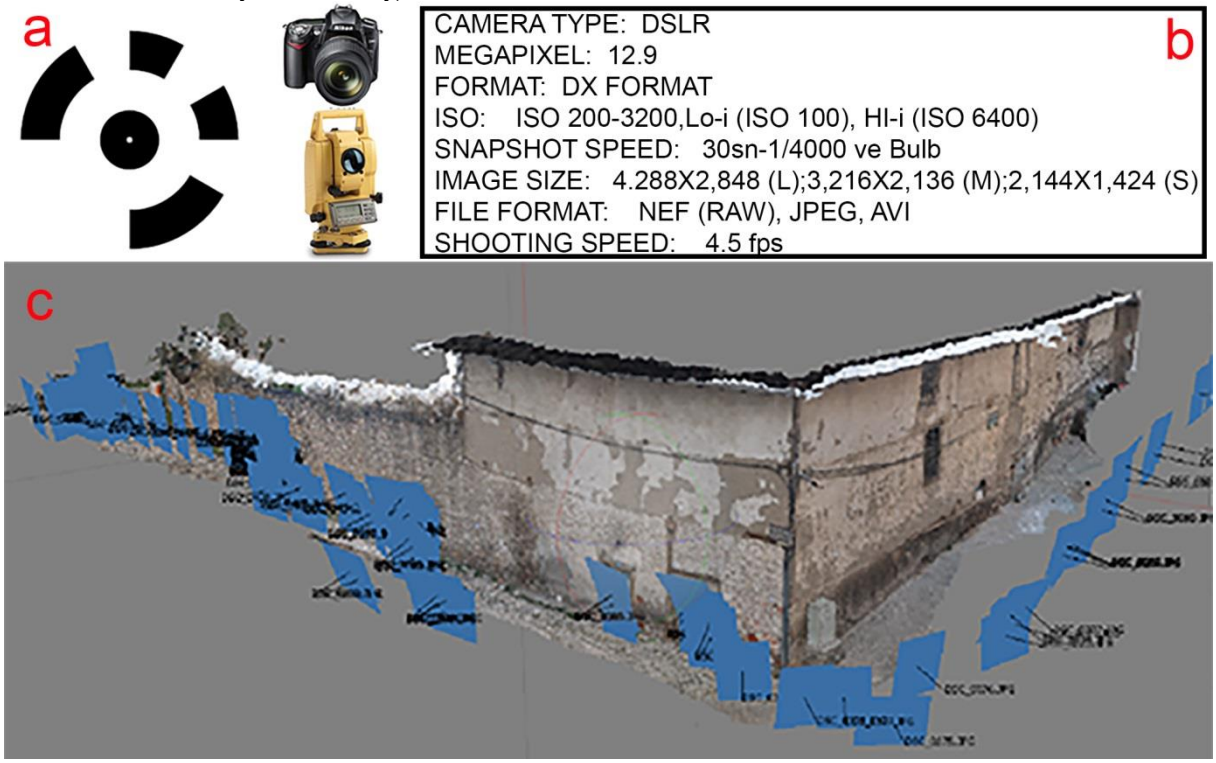


Figure 4. Target point indicator (a), Nikon D90 camera, its features and Topcon GPT 6005 total station (b), Model showing the number of shootings and their alignment (c).

Photogrammetric method: Photogrammetric method comprises of attaining corrected 2 or 3 dimensional models made of technically shot overlapped photographs, and includes the creation of a architectural survey through this models after technical process [5]. During the photogrammetric documentation of Mustafa Aga Bath 'hamam', Nikon D90 DSLR camera and for the evaluation of photographs, Agisoft Photoscan software were used. Before the photograph shootings, shooting plan was sketched and paper indicators were taped in every 3-4 meters as not to harm the building. Photograph shootings were made via wide angle objective by fixing the focus distance of the camera to 12 mm. By this way, photographs with 4288x2848 pixel dimensions were attained. Noontime when the reflection and shadows are lesser was preferred for the shootings, thus clear photographs were attained. To be able to attain a high percentage (80 %) of overlap, many number of photographs were taken from different distances (Figure 4c).

3.2. Processing data–steps of the process

After the field study, all the data had been carried to office, and they were evaluated there. After transferring the coordinates obtained from total station, the architectural survey which had been maintained both by traditional and optical methods was drawn via using Autocad software in computer environment. The time spent for each of the methods for drawing is approximately one day each. In order to obtain a model via photogrammetric method, several steps of the processes have to be completed. The completed steps of processes and the data obtained during these steps are as follows.

Camera calibration: Calibration process is used for enhancing the focus distance for photogrammetric triangulation process as well as finding the data such as the necessary primary point lapses and image corner coordinates. Agisoft Photoscan Software includes "Agisoft lens" which is its own calibration module. In order to complete the calibration, the ‘chessboard template’ inside the software was used, 11 photographs of the template from different angles were shot without changing the parameters of the camera used in the field and uploaded to the system, and the calibration was completed (Figure 5).

PARAMETER	VALUE	STANDARD ERROR
IMAGE WIDTH	4288	
IMAGE HEIGHT	2848	
FOCAL LENGHT (x)	2087.34	38.6058
FOCAL LENGHT (y)	2094.09	37.8502
PRINCIPAL POINT (x)	2092.16	4.45082
PRINCIPAL POINT (y)	1338.69	10.8853
SKEW	3.70809	0.403089

PARAMETER	VALUE	STANDARD ERROR
RADIAL (K1)	-0.0585243	0.00385419
RADIAL (K2)	0.00303561	0.00793231
RADIAL (K3)	0.0102398	0.00796597
RADIAL (K4)	-0.00452136	7.66255e -06
TANGENTIAL (P1)	0.00168731	0.000209318
TANGENTIAL (P2)	0.00164243	0.000120995

Figure 5. Calibration Values

Creating a new project: After creating a new project, the photographs shot in the field were added and the previously created calibration parameters were uploaded.

Alignment of the photographs: This is a step of the process necessary for the designation of the locations of the areas that the photographs shot in the field cover in parallel with each other. The software matches the similar pixels in the photographs with each other and realizes this process over the common pixels via special algorithmic calculation.

Designating target points: The software matches the target point indicators on the photographs automatically recognizing them. In this step of the process, the target point indicators which were automatically designated were checked, wrongly designated points were cancelled and the points which were determined to have lapsed were corrected.

Scaling the project: The system allows data input in two different manners for the scaling process. In the first one, the entry of x, y and z coordinates which had been measured via total station, was realized, and it provided a more precise measurement. In the second one, the result which had been attained via the measurement of the designated two points by tape measure was entered to the system. In this way, the fastest documentation possibility was able to be researched without many equipment.

Obtaining point cloud, mesh(trianglesurface model) and texture: In this step of the process, firstly attaining the point cloud the density of which had been calibrated was completed. After the point cloud, the model was created, and scaled orthophotos were attained via arraying the photographs as texture model.

Creating Architectural Survey (Measured Drawing): The result model attained can be recorded in .obj format and opened in any CAD software. In this step, Autocad software was used in order to draw and the architectural survey was attained.

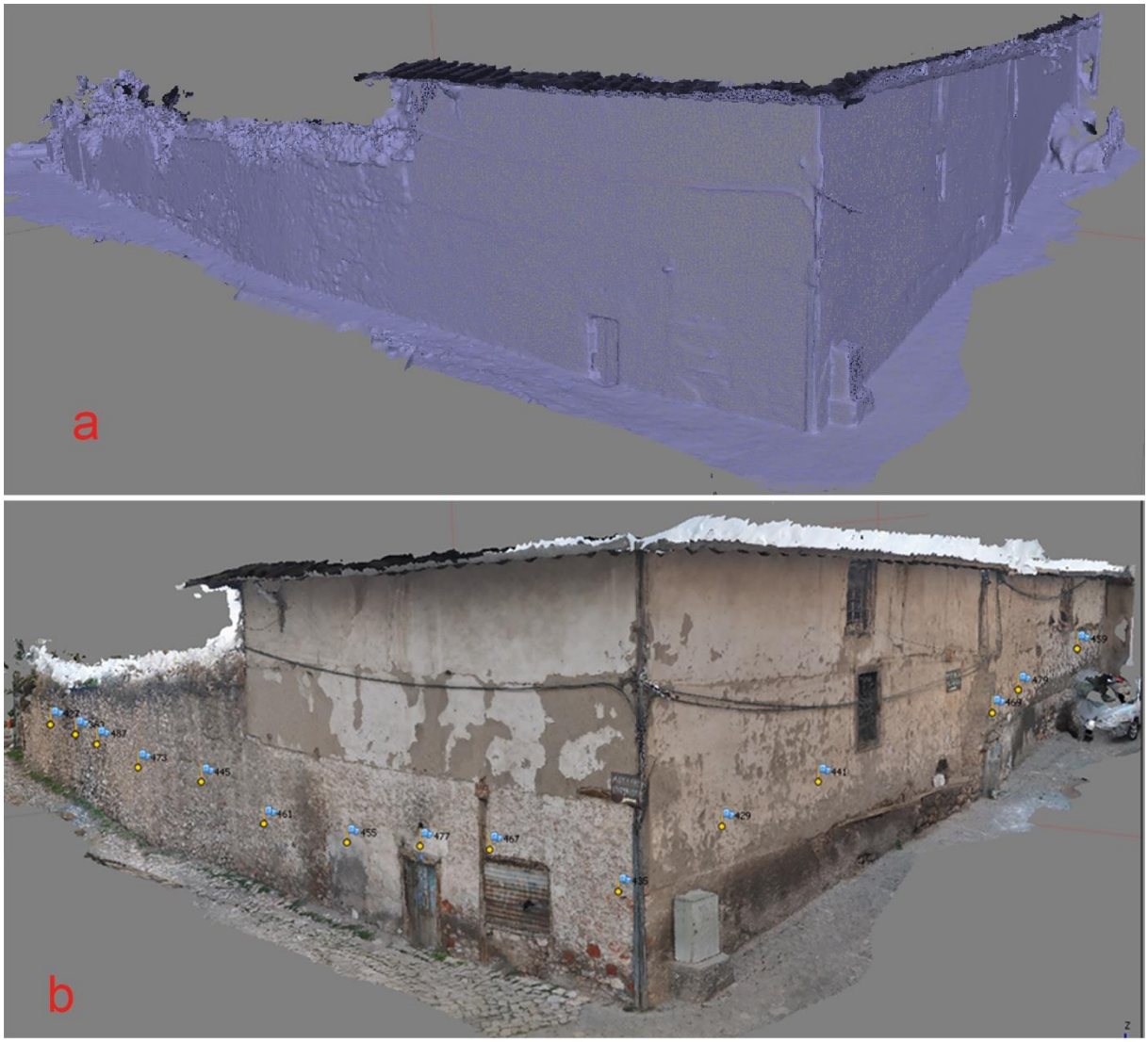


Figure 6. Model attained via point cloud (a) and the result model (b)

4.COMPARISON OF THE METHODS

4.1. Comparison with regard to time, effort and cost spent

Methods used in the documentation of Mustafa Aga Bath 'hamam' were especially compared in terms of documentation speed, cost of the equipment used, number of team members, total cost and data obtained in the resulting output (Table 1).

Table 1. Comparison in terms of documentation speed, cost of the equipment used, the number of team members, total cost and the data obtained in the resulting output

		TRADITIONAL METHOD	OPTICAL METHOD	PHOTOGRAMMETRIC METHOD
GENERAL INFO	STUDY FIELD	Sulusokak Neighborhood, Mustafa Aga Bath 'hamam'		
	DATE	August, 2015		
	WEATHER CONDITION	Clear - Sunny		
NUMBER OF TEAM MEMBERS		3	2	1
EQUIPMENT USED		Transparent water hose, plummet, sketch, tape measure	Totalstation, range staff, tape measure	Photographic apparatus, tape measure
DOCUMENTATION SPEED	FIELD	10 hours	4 hours	15 min.
	OFFICE	9 hours	9 hours	1 hour for photogrammetric process+ drawing via CAD software
OBTAINED DATA		Architectural survey	Architectural survey, point coordinates	Architectural survey, 3D data (point cloud, coordinate of the desired point) orthophotograph
COST	EQUIPMENT (TL)	20	5000	10900
	OTHER (TL) (Transportation, accommodation etc.)	180	120	60

The data obtained as a result of the comparison show that field study can be conducted with one person in the photogrammetric method. With one advancement of the technology, photograph shootings via compact cameras and even mobile phone cameras are enough for attaining satisfactory results [5]. The removal of using Stereo, Metric and/or SLR cameras as an obligation, eased the method due to photographs shot by light and easy-to-access cameras and obtaining a few control measurement. In the optical method, two people are necessary, one of whom is for using the measurement equipment and the other is for imprinting the measured points to the sketch. The second person is also necessary for using reflector during connecting polygons. In the traditional method, three people are necessary, two of whom are for measurement purposes and the third is for imprinting the measurements on the sketch.

According to the evaluation of the measurements in the field, it is seen that the photogrammetric method is advantageous as it does not require any equipment installation or carrying any equipment at all; every equipment necessary for the system fits in a small bag and it is easy to carry. Total station used for the optical system is quite a heavy equipment, and it holds a wide space with its reflector. Carrying the equipment of the optical method's equipment requires a great deal of muscle power if there is no way to carry them by a vehicle. The equipment used for the traditional method, though not heavy, holds a wide space and for the water hose, water must be carried or found. This situation may cause problems from time to time.

As for the time spent in the field, it is seen that photogrammetric method takes the least time as it requires a few photograph shootings and control measurements. The documentation of the study field which was limited to the two façades of Mustafa Aga Bath 'hamam' was completed in 15 minutes via the photogrammetric method; this period lasted 4 hours in the optical method and 10 hours in the traditional method. After the study in the field, studies in the office for creating the architectural survey from the attained data were completed. The time spent in order to create the architectural survey of the façade obtained via the traditional and optical documentation methods is approximately one day for each method. During the field study via these methods, the photographs shot in the field were benefited for the drawing of the roughhewn stone furring wall which could not be fully measured or imprinted to the sketch. In case there are no photographs, it is inevitable for the field study and office work to take longer time. The creation of point clouds and scaled orthophotographs via the photogrammetric method took approximately 1 hour. Although scaled orthophotographs are enough for documentation purposes, the drawing of the architectural survey is necessary to create a detailed documentation with regard to the restoration's framework. This step can be realized via any CAD software when necessary. Drawing of the architectural survey was not considered necessary in this study context in which the methods are examined.

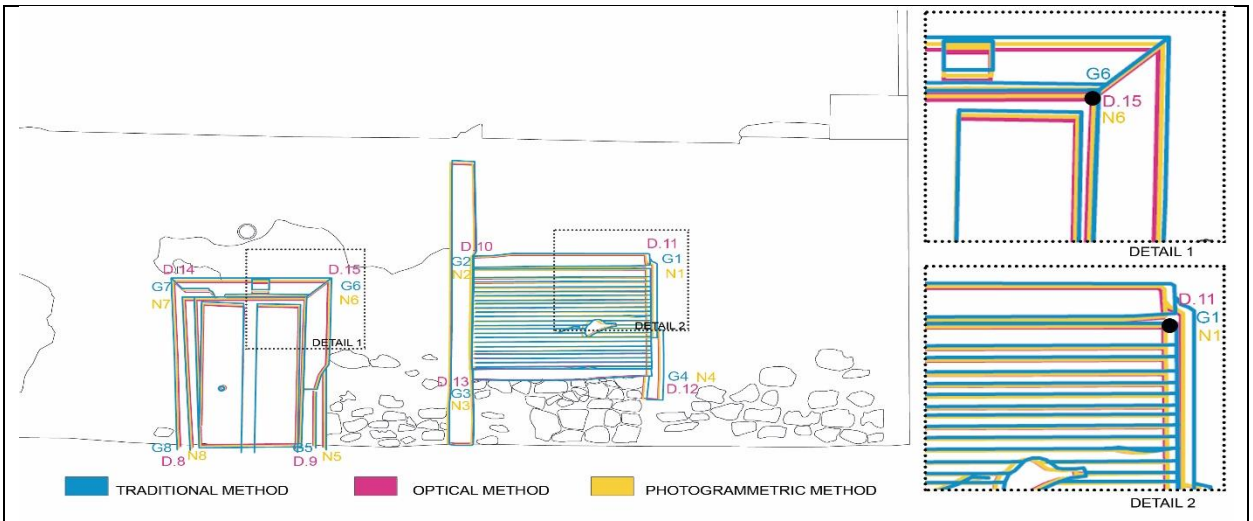
When the cost of the field study is examined, it is seen that the equipment (photograph apparatus and software)

required for the photogrammetric method is quite expensive. Also, total station used for the optical method is expensive. However, the short time required for the study decreases other expenses such as accommodation and food. In addition to this, although starting cost is high, as the equipment necessary for both the optical and the photogrammetric methods will be bought once, this cost is for one time only and it will not be repeated.

4.2. Comparison with regard to precision

The evaluation of the precision obtained from the architectural surveys after the field study was made with regard to the gate and the window which was closed later on the southern façade. The comparison was realized in 2 different manners. The first one of them includes the comparison of the corner points of the doors and windows, which were measured via total station to the coordinate of the same points on the orthophotographs obtained via photogrammetric methods and the traditional system. In this step, the corner coordinates were evaluated on X, Y and Z axis separately (Table 2). In the second step, the distances between the designated points were evaluated by superposing the architectural surveys on each other obtained via each method (Table 3).

Table 2. Coordinate values of the designated points on X,Y and Z planes



	OPTİCAL METHOD				PHOTOGRAMMETRIC METHOD				TRADITIONAL METHOD		
	X(cm)	Y(cm)	Z(cm)		X(cm)	Y(cm)	Z(cm)		X(cm)	Y(cm)	Z(cm)
D.14	297,5679	1,4591	-99,9910	**N7**	297.5541	1,4589	-100,0019	**G7**	297.5448	1,4817	-100
D.15	298,4606	1,4501	-99,9910	**N6**	298.4741	1,4629	-99,9779	**G6**	298.4872	1,4853	-100
D.8	297,6010	-0,0420	-99,9910	**N8**	297.5858	-0,0571	-100,0049	**G8**	297.5858	-0,0571	-100
D.9	298,4240	-0,0220	-99,9630	**N5**	298.4429	-0,0479	-100,0049	**G5**	298.4429	-0.0339	-100
D.10	299,8790	1,7450	-99,9830	**N2**	299.8621	1,7707	-99,9819	**G2**	299.8893	1,7689	-99
D.11	301,3270	1,7500	-100,9990	**N1**	301.3590	1,7728	-99,9819	**G1**	301.3490	1,7728	-99
D.13	299,8640	0,7538	-100,0820	**N3**	299.8443	0,7329	-99,9689	**G3**	299.8687	0,7329	-99
D.12	299,8640	0,7538	-100,0820	**N4**	301.3439	0,7292	-99,9819	**G4**	301.3654	0,7292	-99

As it is seen in Table 2, the results of the superposing of the designated points with each other on X, Y and Z planes shows that a difference of 0.42cm (Det9 - N5) to 1.39 cm (Det12- N4) exists between the data obtained on X-Y plane via optical and photogrammetric methods. This difference is in millimeters in plane Z. The designated difference on X-Y plane between the data obtained from the architectural survey via the traditional system and the data from the total station vary between values 0.47 cm (D13-G3) and 2.2 cm (D11-G1).

With regard to the distance measurements between points, the difference between the measurements taken via optical and photogrammetric methods vary from 3 cm– points (Det12(N4)-Det13(N3)) and (D.15 (N6=G6)-D.14 (N7=G7)) - to 1 cm - points (D.8(N8) - D.9(N5)) and (D.14(N7=G7) -D.8 (N8=G8)). In the traditional

method, the maximum difference determined (According to Total station data) is 5 cm between points (D.11(N1=G1)-D. 12 (N4=G4))and (D.15 ((N6=G6)).

Table 3. Values of distance measured between designated points

	Traditional method(m)	Optical method (m)	Photogrammetric method (m)
BETWEEN D.14(N7=G7) and D.8 (N8=G8)	1,53	1,49	1,50
BETWEEN D.15 (N6=G6) and D.14 (N7=G7)	0,94	0,89	0,92
BETWEEN D.8 (N8=G8) and D.9 (N5=G5)	0,83	0,82	0,83
BETWEEN D.9 (N5=G5) and D. 15(N6=G6)	1,51	1,47	1,49
BETWEEN D.10 (N2=G2) and D. 11 (D1=G1)	1,47	1,44	1,46
BETWEEN D.11(N1=G1) and D. 12 (N4=G4)	1,04	0,99	1,01
BETWEEN D.12(N4=G4) and D.13 (N3=G3)	1,49	1,46	1,49
BETWEEN D.10 (N2=G2) and D.13(N3=G3)	1,03	0,99	1,01

5. EVALUATION

In the comparison of the precisions of architectural survey obtaining techniques, precision values issued in 1981 by CIPA (International Committee For Architectural Photogrammetry), the sub-working group of ICOMOS were regarded as the usability criteria [6]. The issued criteria below designate the maximum error that is allowed:

- 1 to 2 cm for a whole building, where the scale is 1/50
- 0.5 to 1 cm for architectural details, where the scale is 1/10 and 1/20
- 3 to 5 cm for surveys on a scale of 1/100, where this scale is adopted either because of the particular purpose for which the survey is made
- In the latter there will always be a tolerance on "drawing accuracy" as in any line drawing, which it is reasonable to estimate at between 0.2 to 0.3 mm.

In the study, it was understood that although the architectural survey obtained via the traditional method has lower precision values when compared to the architectural survey obtained via the photogrammetric and optical methods, all 3 methods attain the usable precision levels.

The study made via the traditional method brings along negative conditions such as requiring more team members, lasting longer time, accommodation and the increase of other expenses such as food or accommodation. However, the equipment it requires are easy to acquire by everyone, cost-free and easy to use. No extra training is necessary to use the equipment. Also, it is the only method to be used in case there is an obstacle in front of the surface which is to be measured for the architectural survey and neither via photograph nor total station point designation cannot be made.

The optical method, as it requires heavy equipment, it brings along negative conditions such as not being able to use laser under heavy atmospheric conditions (dense rain, snow or direct sunlight), and demanding an electric connection to charge the equipment. However, designating points and uploading the acquired data to computer does not require training and experience. Also, it requires long working hours as it takes more and qualified point designation especially for densely detailed areas. But the precision values of the acquired data are very high, and the error ratio is very low in the final output.

Photogrammetric method cannot be used if correct and continuous photographs shots are not possible. It is not possible to draw from the scaled and corrected photographs obtained in the parts where sunlight or shadow are dense, so 3D models cannot be created via these photographs. Also, the superposing of all the interior surfaces together with floors and ceilings create problem especially in narrow spaces. For the photogrammetric software needed for the creation of the architectural survey, training and experience are required. However, being method that eases and shortens the attaining of the architectural survey of surfaces with dense detail (like roughhewn stone furring wall) at a maximum level and offering the possibility of drawing of the scaled and corrected photographs (orthophotos) to the restoration expert are among its important values.

The possibility of colored orthophotos create an important difference in the imprinting of the determined changes and deteriorations. Its other positive properties includes not requiring a team for attaining the architectural survey, ensuring a usable result even via mobile phone camera due to the advancement of technology and being useful in 3D processing softwares which have or do not have any connections with a databank such as a model created via 3D point cloud and photographs and information system.

6. CONCLUSION

Within the context of this study, the realization of the documentation of immovable cultural assets fully and correctly in the shortest time and with a minimal cost is examined. All the results attained in the study realized in Mustafa Aga Bath 'hamam', which had been chosen as the field of study, are within the precision limits designated via ICOMOS (CIPA), and they are acceptable for use. In case there are obstacles or the conditions are not available, not being able to shoot photograph or designate point coordinates require the use of the traditional method, and the lack of team, time or financial resources requires the photogrammetric method. Also, negative situations which can be come across in the documentation of every immovable cultural asset requires the use of different techniques together. The result obtained in this context is determined as the application of all the methods (optical, traditional and photogrammetric methods) is advantageous when they are used according to the requirements and advantages.

Other than the methods used and evaluated within this study, there are various methods which can make measurement in a shorter time and more precisely, which have started to being used in the recent years with the advancement of technology. Among these methods, laser scanning method the use of which increases day by day is important. However, due to its quite expensive equipment and software, requirement of a qualified expert during the designation and evaluation steps, it is disadvantageous regarding the common use of it and the use of it in every cultural asset.

As Anatolia has become home to many civilizations since the beginning of history, it contains the immovable cultural assets which carry the traces of these civilizations under and over the ground. Most of the immovable cultural assets were designated and registered and protected increasingly after the foundation of the Republic. However, still myriads of which belong to especially rural architecture have not been able to be designated and registered. One of the most important reasons of this includes understanding the value of rural architectural heritage just recently. Being registered or not, most of the immovable cultural assets found in our land have been left to deteriorate day by day due foremost to the lack of financial resources, then ignorance, insensitivity, wrong policies and decisions. Although the conservation development plans and/or restorations of all these assets are not possible, it is at least important to document them before they diminish. Likewise these assets carry the most important potential in the name of obtaining knowledge about the socio-cultural situations, religious and administrative decisions, construction techniques, traditions and living cultures of the past civilizations.

Within this context, photogrammetric method which can be completed with one person's photo shootings and making a few control measurements carries the utmost importance in the name of documenting as many immovable cultural assets in a very short time as possible. All of the immovable cultural assets in our country, which have not been documented yet require urgent documentation before they deteriorate. For this purpose, this planning of the work by ministries and universities will constitute an important step, because such a work will ensure the obtaining of accumulation of knowledge which comprises of centuries with a lesser cost and number of people in our country, and this will enlighten scientific discoveries and innovations.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

REFERENCES

[1] Eravşar, O., Tokat Tarihi Su Yapıları, Arkeoloji ve Sanat Yayınları ,Konya, (2004).

[2] Aksulu, I., Kuntay, O., Kimlikli Kent Tokat, Hazar Reklam San., Ankara, (2013).

[3] Aksulu, I., "Pre-ottoman buildings and monuments of Tokat", PHd Thesis, Gazi University Graduate School of Natural and Applied Sciences, Ankara, (1994).

[4]The Google earth website. Available: https://www.google.com/earth/,(March, 2016).

[5] Sağıroğlu, Ö., "Application And Evaluation of The Measured Drawing Technique of Close Range Photogrammetry on the Case of Ömer Duruk House" , MSc Thesis, Gazi University Graduate School of Natural and Applied Sciences, Ankara, (2004).

[6] Internet:
Advice and Suggestions for the furtherance of Optimum Practice in Architectural Photogrammetry Surveys Online, in ICOMOS-CIPA, (April,2016).

URL:
http://unesdoc.unesco.org/images/0004/000481/048147Mb.pdf

[7] Master and Present plan of Tokat, Tokat Municipality Urban planning directorate, Tokat, (2016)