

An Example of The Design and Construction of Rock Cut Places in Cappadocia: CEC

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Abstract: In line with the tourism demands nowadays constructing rock-cut places in Cappadocia, which is the heart of Anatolia and an area defined as Asia Minor, is on-going. New places are needed where local hand workmanship and shows are exhibited and sold in addition to food and sheltering. The CEC pot production-sale workshop and restaurant is a rock-cut structure designed to meet these demands. The construction style for which hand workmanship is needed, the material, and the bearing properties of the material have shaped the stages of design and construction of this structure. It is hoped with this study that there will be an increase in the number of architectural products, especially in the Cappadocia region in Turkey, which support the continuation of rock cut architecture and construction styles, preserve the natural environment and traditional construction materials and techniques, and serve tourism.

1. Introduction

The transferring of architectural values into the future and the liveability of sites where current architectural values thrive ensure the liveability and thus sustainability of such places. For a sustainable architecture and construction style, it is important to meet the demands of future generations by protecting architecture and nature, and the consistency of new structuring in the place where it is built.

The environment has come to the forefront among the reasons why the tourists choose a place. It has become important to present tourism by finding different features and integrating them with cultural and specific values (Çubuk, 1996a). Socio-cultural resources for tourism are: the past and current culture of the region, traditions and customs (eating, entertainment, ritual, ceremony etc.), handicraft, local music and dances etc. These increase the attractiveness of the region and the country (Atay, Özyayın, 1996). Touristic development, however, is initiated by a strong investment in quality and identity (Lobo, 1996).

A structure which can integrate the historical environment, natural data and economic benefit is important for sustainable tourism (Çubuk, 1996b, Koç, 1996, Oral, Şenbük, 1996, Özek, Sirel, Akansel, 1996). Sustainable tourism is a development within which cultural integrity, ecological processes, biological diversity and systems continuing life are maintained by protecting the environment without disturbing or changing it as well as managing all resources in such a way as to meet the economic, social and aesthetical needs of tourists and people living in the region and the same needs of future generations (WTO, 1993). Social-ecological-economic-spatial-cultural sustainability is defined in sustainable tourism (Çubuk, 1996a). In the organizing a region for touristic purposes, thus in corresponding structuring, the protection of natural beauties is

regarded as essential (Çubuk, 1996a). The planning and application of land use decisions in the frame of certain environmental protection rules (procedures) are at the forefront (Oral, Şenbük, 1996). Demand and developments for touristic purposes are shaped in a way as to protect natural and historical properties in touristic regions. Instead of structures which ruin the aesthetic and are not suitable for regional patterns, environmental planning is recommended by architecture containing local motives suitable to the region (Çubuk, 1996a, Oral, Şenbük, 1996). In this respect, historical towns and villages which maintained residential patterns and historical identity have become important (Dökmeci, Kerimoğlu, 1996). The findings of the research showed that environmental properties built in consistency with the natural, historical, and social environment are preferred by individuals (Aktürk, 1996, Dökmeci, Kerimoğlu, 1996). Touristic structures can be structural forms consistent with the natural environment by using local construction techniques, materials and cultural images (Şenlier, 1996). The projects preferred in touristic regions and designed to contain traces of past architectural culture to meet the psychological needs of users have been gaining importance (Aktürk, 1996).

Whereas previously the source of income at the city of Avanos examined in this study which is located in the center of the Cappadocia region renowned worldwide as a touristic center was agriculture and handcraft intensive pottery; today it has become the sales of handcraft intensive pottery in tourism. This has brought with it the use of current structure stock and affected new housing/development. While current patterns have been repaired, making new designs suitable to the pattern has led to sustainability through the transferring of architecture values to future generations. The demand for places to meet accommodation, catering and shopping needs due to tourism has brought the reuse of traditional structures as well as the development of new ones. Therefore, in addition to the

utilization of current potential for accommodation purposes, new places are also needed for catering and shopping. Designing and constructing new places having new functions by using the current pattern, material and traditional construction techniques have been paid attention to in addition to making the historical pattern functional again via sustainable architecture. The fact that tourism functions are designed and applied in carved rock locations which are important parts of the local texture is an important proceeding of this. When designing and building a new carved rock space, it is important to know the methods of rock carving, the distances that can be traversed in carved rock spaces, the tools and machines to be used during the process as well as using this information correctly. By designing rock carvings, it is possible not only to provide the sustainability of spaces but also of the methods used. In this study, a structure designed as carved rock in the Cappadocia region which is important for Turkey has been explained by taking into account these aforementioned criteria.

This study deals with a structure which was built in Avanos, which is the centre of Cappadocia for handicraft, by the rock cutting technique through wide openings and designed for tourism purposes by using natural patterns within the current architecture. A rock-cut touristic and handicraft sale shop and restaurant was designed in part in 1995-96 and completed in the following years in line with tourism needs. In the study, the reasons for the use of rock carving architecture in Cappadocia along with its historical, geographical, climatic and geological necessities have been explained. Reasons for the increase of rock carving in Cappadocia in time have been specified. Afterwards, the examined CEC restaurant and the city where the pottery production-sale shop is located along with the Cec tumulus have been defined. The prominent features of the city in the Cappadocia region where the structure is located at along with the historical importance of the Çeç tumulus have been emphasized. The design, building and usage stages of the newly designed CEC restaurant and pottery production-sales store have been evaluated. The plans and cross-sections of these places were given particular importance during this study. Since the structure was built into a rock by carving it has no surface element in terms of architecture. Therefore, the faces were not mentioned in the study. The structure discussed in the study is considered important since it is an example of sustainable architecture in terms of tourism structures from the point of the design process and local construction techniques used. It is expected that it will act as a guide to tourism structures that will be built in the coming years with local material and techniques. The importance of the sustainability of rock carving design and methods under the tourism heading was tried to be emphasized in this study. Thus, it will be possible to see that different local material and building methods can be sustainable as well.

2. General Information

2.1. ROCK-CUT ARCHITECTURE IN CAPPADOCIA

Cave-houses formed by carving rocks or ground are seen everywhere in the world. They are present nowadays particularly in Cappadocia-Turkey and in places such as the clayish and sandy plateaus of Huang He-China (Yellow river basin), the Andalucia region in Spain, Matmata located in the east of Tunisia and Matera in Italy (Murakami, 2008). When considered from an environmental point of view, the houses in the shape of caves have been created by the people of regions where the difference in temperature is significant and the architectural material and technique is not suitable for protecting themselves

against natural disasters. It has been said that the people survived in fixed thermal environments by utilizing the temperature of the soil in summers and winters (Murakami, 2008).

The reason for building cave-houses and underground cities in Cappadocia is mainly due to the need of Christians to defend themselves against the persecution of non-Christian and other ethnical groups and the lack of building material due to reasons such as the fineness of soil formed by the accumulation of tuff as a result of the continental climate of Cappadocia region. Yet another reason was ease of excavation due to the tuff-filled ground (Murakami, 2008).

Early Christians, by carving the rocks, built places for worship and living purposes which contained all the social and physical facilities that could not be seen from the outside. The Muslim community which had migrated here and used the available places throughout history built different places by carving rocks according to their needs. The part of houses built by carving the walls of rocks and the part constructed by manmade materials constitute the houses that combine vernacular and modern architecture. The natural material is constituted by rock walls formed by tuff as well as manmade material (Murakami, 2008). Even the houses built 100 years ago are still in use (Murakami, 2008). These overlapping and side-by-side settlements which are consistent with the natural mass structure continued to be built up until 20 years ago. Nowadays, the houses carved in rocks are not built. However, even less in number are the people still living in traditional cave-houses (Murakami, 2008). The designs made by the rock-cutting technique for tourism purposes are important for sustainable architecture and the tourism of Cappadocia. Moreover, local carving and stone workers and masters can survive by the utilization of the rock cutting building system in designs.

The climate of Cappadocia is a continental climate in which the difference in temperature is high (Murakami, 2008). In Cappadocia people started to live in houses built by excavating the rocks and the ground. In such houses there are some concerns due to difficulties with ventilation and lighting. However, it is known that the effect of difference in outside temperature on the temperature of the house is low due to the heating property of soil and that the inside temperature is almost constant in summers and winters in which differences in daily temperature are low (Murakami, 2008). The traditional houses of Cappadocia are classified into two as cave-shaped houses and underground cities. Cave-houses reveal semi-underground shapes formed in mountains or hills (Murakami, 2008). Since these houses use the heat absorbing property of soil, the temperature of wall surfaces is important (Murakami, 2008). When day-time temperatures in places carved into rocks are compared to those from midnight to morning it was confirmed that the difference is hardly noticeable whereas the inside temperature is constant when compared to outside temperatures (Murakami, 2008). In new tourism structures carved into the rocks today, ventilation and temperature control are employed as a solution to this problem.

There are 36 confirmed underground cities nowadays (Fig. 1, Fig. 2, Fig. 3). In order to provide air circulation in underground cities, air doors have been constructed. It is known that some methods have been developed in houses built deep underground to prevent poor ventilation. All facilities such as kitchens, places for food preservation, wineries and even churches have been provided for people to sustain life for a very long time. These facilities are obtained by carving the rocks in the tourism structures built today.



Fig. 1 Plan of Derinkuyu underground city (Haritalar, 2011)

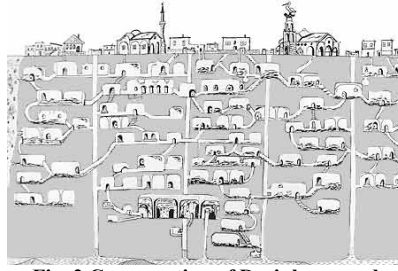


Fig. 2 Cross-section of Derinkuyu underground city (avanos evi, 2011)



Fig. 3 Zelve Outdoor Museum (Fotoğraflı gezi rehberi, 2011)

Fairy chimneys and local surface structures were formed as a result of erosion, by meteorological factors like rain and wind, and of tuff and tuff-derived soft rocks formed as a result of Erciyes, Hasandag and Gulludag volcanisms. The underground structures built in the region are within such rocks. When these units are locally examined it is seen that they are heterogeneous in narrow regions and homogenous in broad regions. These tuffs also have swelling properties (Yolveren et al., 2011). Thus these rock properties are taken into account in building new and interconnected places carved into rocks. Therefore, the properties of the material determine the system of construction.

Since the water absorption capacity of the material that forms the mountain is 25%, swelling is encountered accordingly. Partial surface deformations occur in the outer surface of the material as a result of seasonal temperature changes and cracks are seen due to a freeze-thaw effect ranging from micro scale to macro scale (Yolveren et al., 2011). This brings about partial deformations. However, it occurs only on the outer surface and local parts of the area which are exposed to meteorological effects. Such negative effects are not observed in the underground rock structures, which were opened for any purpose and whose connection to the outdoor environment was cut (Yolveren et al., 2011). Thus, the answer to the question of how much the material properties, bearing in particular, of the proposed structure are affected by the outdoor environment is "it has no effect". However, surface deformation can be encountered due to rain, erosion, solar effects and temperature differences. In order to prevent these, to some extent, drainage precautions around the structure are required.

2.2. AVANOS and CEC TUMULUS

The history of Avanos, which is a part of Cappadocia having Hittite, Phrygian, Roman, Byzantine, Seljuk and Ottoman traces, dates back 4000 years. According to the findings obtained from the excavation performed by Italians in Topakli Mound it is said that the history of Avanos goes back to Hittites. Hittites, Medes, Phrygians, Assyrians, Persians, Celts, the Cappadocia Kingdom and Ottomans have appeared in different periods in the history of Avanos. It is one of the most important tourism centres of the region having various handicraft and tourism values, such as pottery making, a carpet business and souvenir manufacturing. (Avanos kaymakamlığı, 2011, Kadınlar için, 2011) Pottery making and sales in Avanos have come to the forefront through tourism. The reason that this art has developed in Avanos is again geographical location, as Avanos is located on the north bank of the longest river of Turkey, Kizilirmak, which took its name from its red colour and divides Cappadocia into two (Avanos Belediyesi, 2011, Wikipedia, 2011, Derinkuyu Belediyesi, 2011). The banks are named new and old Avanos. Old Avanos is under protection by the Ministry of Culture of Turkey and is constituted by old Avanos houses which are carved into the rocks and made up of stone. (Avanos Belediyesi,

2011) The old houses of Avanos have been built over the caves carved into rocks by older civilizations for sheltering purposes (Kadınlar için, 2011). Avanos with its historical, cultural and architectural properties is where the first tourism facilities were founded. Economical investments have shifted towards tourism by tourism activities in the town which had formerly dealt in agricultural and stockbreeding. This rapid change created a problematic, artificial environment in terms of sustainable architecture and tourism. However, some entrepreneurs have been successful in sustaining the use of the new places with old materials and workmanship by identifying the demands of tourists visiting the region. Today, sustainable architecture by increasing the consciousness of local people is regarded as crucial for sustainable tourism.

3. CEC Pottery Making-Sale Shop and Restaurant

Starting from the initiation of civil engineering, building houses by creating spaces in the soil via architectural techniques are regarded as one of the simplest methods (Murakami, 2008). Rock carving, hand-workmanship, and a labour intensive construction technique have shown physical and technical developments in accordance with advancing technology. By technological advances, short scale places formerly carved into rock by hand (1–600 m²) have become bigger structures where even cars can be used (Yolveren et al., 2011). In addition to the number of historical examples in Cappadocia, rock cutting was utilized in the place discussed in this study. The rocks formerly cut by hand are cut by machines which today can extract bigger masses. Having finished cutting by machines, the hammers of local masters were also needed. Sustainability of handicrafts and labour-intensive building techniques were maintained by the participation of these masters in the construction of CEC buildings. Uncontrolled use of machines causing high vibrations during the building stage can create problems in the texture. This also causes cracks or other structural problems in natural coverings and bearing systems. Geophysics, geological or civil engineers are needed in building stage. The applications that may cause vibration must be avoided during the building of rock-cut places. Furthermore, fractures, cracks, discontinuity and loose structures can be encountered. This is an important issue both for labour safety in the building stage and user safety in the utilization stage. In this case, consultancy by expert engineers is needed. The size of the rock-cut place, where, and at which level to build it are separate problems. So, the issues were worked on with survey engineers during the construction stage to build a structure suitable for plan and ownership status and to determine the coordinates.

The data about material and building style shaped the design of the structure examined and determined the building stage. Main rock masses were extracted via machines by taking the above mentioned criteria into account (Fig.4, Fig.5). Then smaller places and fixed furniture which cannot be processed by



Fig. 4 The texture formed after the extraction of big rock masses via machines



Fig. 5 The texture formed after the extraction of the big rock masses via machines



Fig. 6 The natural pattern formed due to hammer marks on walls done by hand workmanship

machines were prepared by hand workmanship. In order to provide visual integrity, hand workmanship was needed over the cutting process made via machines. Thus, hammer marks together with a wall and ceiling texture were formed (Fig.6). Moreover, the negative look of electrical circuitry and plumbing inside the cut rock which could not be done by opening channels inside the rock, as in usual structures, were covered by a mixture of rock dust and cement of a colour and pattern close to that of the rock.

In the project, in addition to the rock material and rock cutting technique the initial data of the design was presented as field structure, spatial function expectations, and customer identity. For a designer, these data differ from certain ordinary inputs. The main approach of the design has been to provide sustainability of the structure and to utilize a traditional construction technique and material in accordance with modern requirements. Therefore, the effort of solving different functions together according to the rock-cutting technique in the design and building stages have come to the forefront. Sometimes, the rock-cutting technique has even affected the design more than the other data.

The context of the work in the design of the rock-cut structure, which can be defined as designing its own limit within limitlessness, is a pottery making, sale and exhibition place and a restaurant. The employer's rock-cut restaurant within the mountain and the pottery sale workshop in the city centre have started to not be able to meet the rising tourism demand. Moreover, since the employer is a world-wide pottery artist (Fig. 7) he needs a place he can use for the production, exhibition and sale of the products. The field currently available is located on a hill where CEC Tumulus (Fig.8) also resides. It is thought that CEC tumulus located in the immediate vicinity of Avanos, which has the most uncertain (Kapadokya gezi, 2011) story among many tumuluses located between Urgup-Avanos and Ozkonak and which has a height of 32 m, is a king's tomb, like Gordion, Mount Nemrut and Karakus (Adiyaman). However, since no excavation has been done, limited information is available about the tumulus (Avanos evi, 2011, Kapadokya gezi, 2011). Scientific studies show that the place may either be a king's tomb or a sacred place. It is understood that the tumulus does not belong to the Phrygia or Lydia civilizations, which are famous for their tumuluses (Kapadokya gezi, 2011). Since CEC tumulus is available at the same place, the construction site has also been given the same name and access to the site is via two way road. There is no intensive housing around the site but a small number of touristic facilities are available.

The rock-cut places can be built by taking the bearing capacity of the rock and approaching the ownership boundaries at a distance of no more than 5 m according to the regulations regarding rock-cut places. Although there is no housing in the area or in the immediate vicinity, the size of the place was realized by utilizing only the necessary areas. Building a structure in this area of historical value, in accordance with the current regulations is also important in terms of the sustainability of historical and natural environment. The only data given to the designer is a hill. So a design for a place which the designer has not seen in an area which will not be seen is required. This brings a freedom and a limitation to the design. The design draws its own limits in limitlessness.



Fig. 7 The Place Owner at the Bench



Fig. 8 CEC Tumulus (Avanos evi, 2011)

The customer had a small restaurant in the current area. However, it could not meet the demand of visiting tourists. Thus, a bigger and newly designed restaurant was needed. The boundary of the land that the customer owns was known. Furthermore, common use of the kitchens of the current and the new restaurant by widening the current one was also desired. A

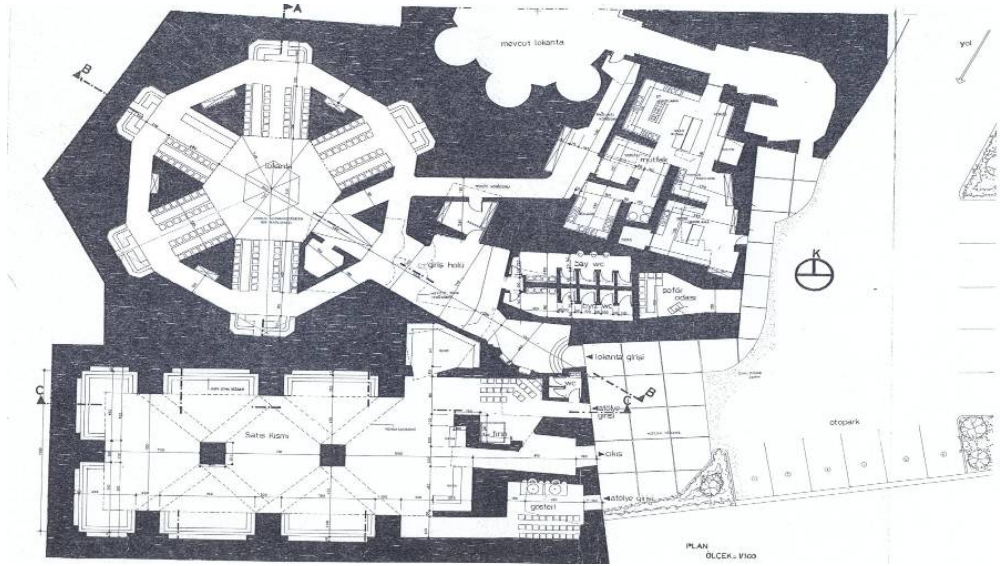


Fig. 9. Plan of CEC

design including the use of both the old and new places was drawn up for this purpose. The kitchen of the old restaurant was widened for use by the new restaurant. Public service areas such as the WC were designed for common use by both of the restaurants as well. In the design of necessary storage areas, the needs of drivers of tour busses and guides as well as the needs of teams arriving for folk dance shows were taken into account. Due to the field structure and current state of the roads the service entrance to the kitchens of the restaurants was designed over the same transport axis which customers would use to enter the restaurant. A visual solution was employed to create a difference between customer entrance and service entrance. This was provided by cutting the mountain (hill) into steps. Thus, attempts were made to separate the functions in the design. The customer entrance to the restaurant was provided by a wide transition and a corridor with a low ceiling. The feel and visual impressiveness of the main space of the restaurant was increased by creating different sizes in plan and cross section planes between the corridor and the main lunch/dining space. The main space of the restaurant was comprised of a show area, private lodges, lodges and corridors. The design in terms of the interconnection of private lodges and lodges has become the first example around the region. The main space of the restaurant is reached through a small, arched entrance (Fig. 9).

It should be mentioned that the architectural design and construction criteria of the structure has its own characteristic properties. The expectation of the employer from the design was to show pottery making to the tourists and to encourage tourists to buy potteries. The place of exhibition for this purpose in the design was chosen as the place where tourists are welcomed and the exhibition takes place (Fig.10). This place is accessed via a small, narrow door and has a capacity to serve for a tourist group. The direction of the light that shines on the pottery artist's bench and the design of the area where tourists can watch the exhibition are the factors that shaped the place. This place was kept as small as possible so that the spatial size of the next place the customers passed to could be emphasized. Customers who watch the pottery making pass to the main sales space via a narrow corridor (Fig 11, Fig. 12, Fig. 13, Fig 14). After the exhibition place and narrow corridor, the customers are suddenly directed to a large place – the sales area. The columns carved into the rocks are support columns of the main sales area, which is comprised of three parts (Fig. 15, Fig. 16, Fig. 17). These parts are also connected to smaller size places where the potteries are exhibited (Fig. 18). Service places for storing and firing potteries had to be considered. Moreover, collection pieces had to be exhibited in a separate place and even safety precautions had to be taken. Therefore, by a divided plan solution, safety requirements were met in such a way that the desired part of the structure could be closed when necessary (Fig. 19, Fig. 20).



Fig.10 Sitting Benches for Watching Pottery Making



Fig.11 Narrow corridors connecting the pottery making area to the sales area.



Fig. 12 Arched entrance in sales area



Fig. 13 Narrow corridors connecting pottery making area to large sales area.



Fig. 14 The case made up of stone.



Fig.15 Support columns carved into rock



Fig. 16 Images from inside



Fig. 17 Images from inside



Fig. 18 Support columns and side rooms



Fig. 19 Small exhibition rooms



Fig. 20 Transition to collection areas

Structures and facilities such as a watchman's hut can be built on the surface on the condition that $E:0.05$, h_{max} does not exceed 6.50m and providing that no harm is given to the rock mass bearing. Since all places in the design were built by cutting the rock building, more of such places were not needed. Moreover, the plants taking roots were not used in the landscape of the structure since they can cause fractures and cracks. Low roof heights of current pottery workshops serving tourism in Avanos were eliminated by increasing the roof elevation by cutting the roof (Fig. 21, Fig 22). Another benefit of a high roof is that it is a rational solution to the humidity problem encountered in places carved into rock. Since the utilization of natural ventilation elements, windows for example, is not possible, additional ventilation tunnels were needed (Fig. 23, Fig. 24). Air tunnels were built between the natural ground and the place where the tourism facility was designed. The length and the end of these tunnels depend on the slope and land surface at different elevations. The lengths of the tunnels were different at different points. The advantage of rock carving was the attempt to utilize the interior. Large and small niches were designed to exhibit the products in every section.

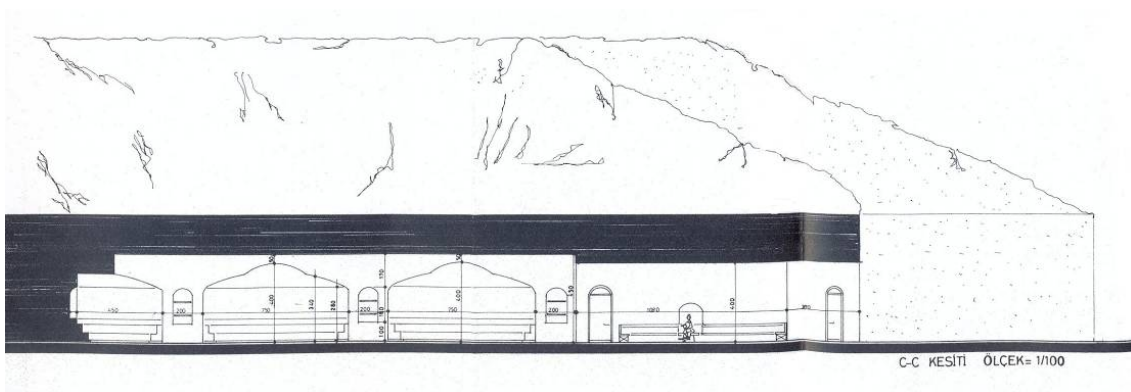


Fig. 21 The section of CEC pottery and exhibition space

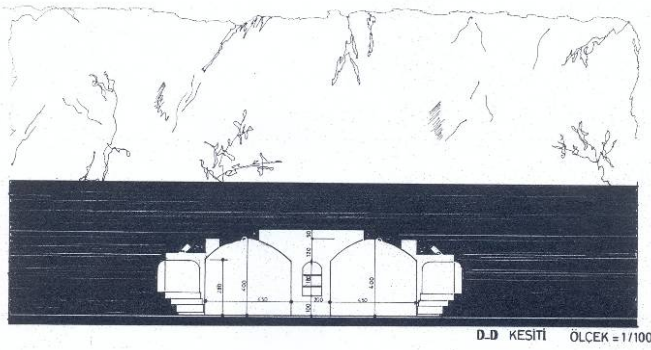


Fig. 22 The section of CEC pottery sales and show area



Fig. 23 Natural ventilation tunnel



Fig. 24 Natural ventilation tunnel

The show area at the centre of the place is almost a 9 m-space. This space was formed by cutting the rock in the shape of a dome (Fig 25). Huge columns support the main dome. The large sizes of the columns contributed to the separation of the centre of the restaurant from the corridors. The height of the main dome is about 6 m. The height of the corridors is 2.5 m. (Fig. 26) which emphasizes the dimension of the main dome. Since the corridors will be used for service they were designed as transition places and thus their dimensions were kept at a minimum. The private lodges and the lodges were constructed in stages so that folk dance shows to be performed in the main centre can be seen by all customers. The private lodges stand at the highest place, and the interconnection and the lodges were connected to the centre by an inclined section (Fig. 26). The heights of these places were 2 and 2.8 m, respectively. The lodges were designed to accommodate a tourist group. For small groups and private reservations, private lodges were designed (Fig. 25, Fig 26). Service cabinets were carved into columns at the corridors. Tables and some of the sitting benches in the private lodges were also designed as cut rock. Ventilation was again important for these places. The ventilation system utilized in the place where pottery making, sales and exhibitions were made was also used in the restaurant. Natural ventilation and light receiving (such as windows) opportunities were not possible due to the distance from a natural surface of the mountain.

Niches were built in the interior walls which constituted the pottery making, sales and exhibition place were built via the utilization of the rock carving technique. These niches were used as interior decoration elements by lighting the exhibitions of potteries and ceramic products sold (Fig. 27, Fig 28). Thus, the rock in which the place designed is located was also used in the exhibition. The owner had shelves built from natural wood inside some of the niches (Fig. 27, Fig. 28).

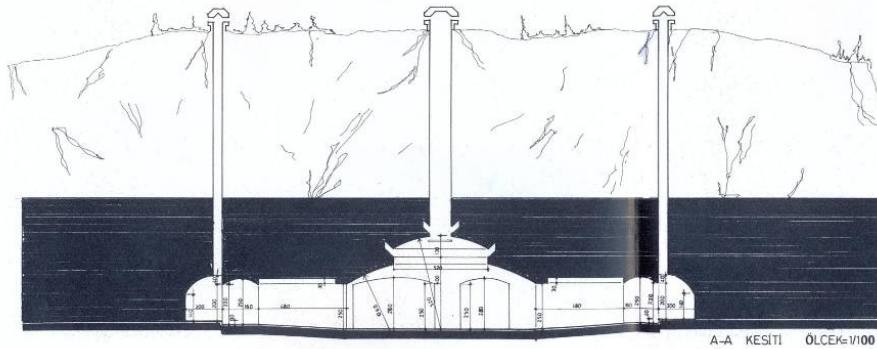


Fig. 25 The section of CEC restaurant

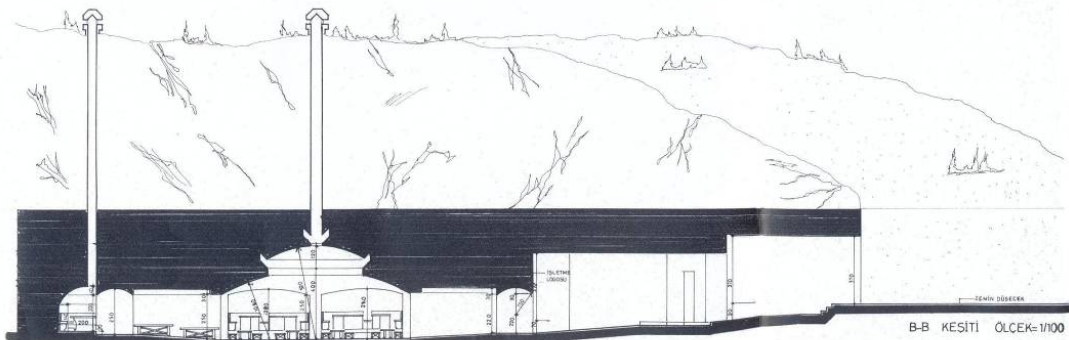


Fig. 26 The section of CEC restaurant and restaurant entrance



Fig. 27 Wall niche and lighting



Fig. 28 Wooden shelf in wall niche

It was thought that the exhibiting indoor rock carving hand workmanship might attract the visitors. Hence, hammer marks formed due to hand workmanship used in the rock carving technique in the walls, roofs and floors intentionally not being removed (Fig. 29). However, since horizontal circulation would be high, especially in transition spaces, earthenware products and marble, which is another natural product, were used to cover the floor, in consideration of the fact that the natural texture of the rock would be worn away by time (Fig. 30, Fig. 31). In this way, abrasion due to circulation was avoided. When the building stage of the place was finished, waste rock masses formed as a result of using the rock cutting technique. These rocks were fragmented and then used in the details designed where needed (Fig. 32, Fig. 33). Thus, recycling of waste rocks was provided.



Fig. 29 Natural Floor Texture



Fig. 30 Natural stone floor cover



Fig. 31 Earthenware floor cover



Fig. 32 Texture combination of rock-cut and stone part



Fig. 33 Stone combination detail at a rock-cut wall

Since CEC Tumulus has a historical value, authorities do not permit artificial housing around the field. Attention was paid not to have any artificial structure in the faces of CEC pottery sales and the restaurant since it is located in the field where the tumulus resides. Moreover, a solution was considered in which only the entrances of the main and auxiliary places are seen at the face of the design made by the effect of land structure. The entrances were designed as stone cover, which is consistent with the natural structure and look (Fig. 34). Service entrances were small and formed by surficial shaping of the rock (Fig. 35). At the face, ventilation tunnels supposed to be seen at the surface and needed for inside were considered to consistent with the natural structure, therefore not creating visual pollution.

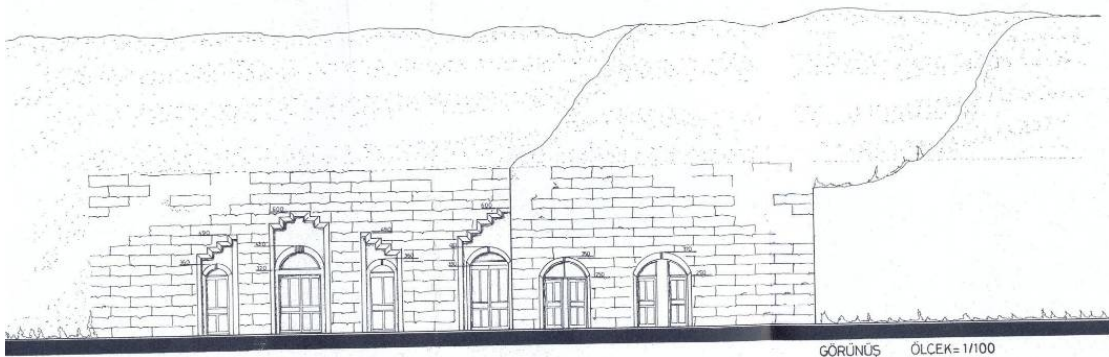


Fig. 34 CEC elevation



Fig. 35 Service Entrance Door



Fig. 36 The lean-to roof added to the entrance by the owner

Today, some additions made by the owner are seen at the face of the structure. By the owner's desire and construction, a corridor was added which has a lean-to roof which it was assumed would emphasize the entrance (Fig. 36). This was not done by a professional approach. It was rather the owner's own solution for making the place stand out. However, no permission to build a permanent structure on the surface was given due to the historical value of CEC Tumulus. Thus, the owner generated a temporary solution. This is also thought of as a problem since the modification was done without consulting the project owner.

4. Discussion and Result

Tourism plays an important role in providing sustainability in architecture. The architectural features of a location along with its current use are of importance for the selection of that region by tourists. It is important not only to open old buildings for new uses but also to design new structures in accordance with the local features of the region. Thus, it will be possible to transfer local architecture, material and building methods to posterity. From this perspective, Cappadocia is an important example regarding the applications in Turkey. Cappadocia is important for Turkey as well as the world for its unique environmental structure, its historical diversity and architecture brought about by these. New architectural designs for this region should contribute to the sustainability of the unique architecture of the region. Handcraft intensive pottery production intended for tourism at Cappadocia-Avanos should be supported for selling to tourists in carved rock spaces. Hence, with the building of new carved rock spaces, the sustainability of the architecture of the region, building methods and handcraft intensive structure building will have been ensured.

The structure subject of this study is an important application to ensure sustainability at Cappadocia. The CEC pottery building-sales and restaurant structure realized in Cappadocia –Avanos has been designed in line with tourism needs using the current natural texture and local architecture. The history of the location of the CEC pottery building-sales and restaurant was taken into consideration while making the design in accordance with current regulations. It is considered that the structure discussed in this study is important for providing sustainability in Cappadocia. It is hoped that CEC structures built by the rock-cutting technique and using traditional and local material will contribute to the design of quality and liveable places in which to exhibit handicrafts. By the use of local and handcraft-intensive building techniques the disappearance of this workmanship will be prevented and improved at the same time. Promotions towards the building of rock-cut structure designs by such workmanship will also contribute to the training

of new skilled people. In this way, the structures built by the rock-cutting technique will not only provide architectural sustainability but also help developing the economy of the country and the region as well as increasing job opportunities.

The history and geography of the location should be very important for new designs. The CEC pottery making-sales store and restaurant has been built in the Avanos Çeç tumulus. It is obligatory that the designs do not harm historical areas and the environment and that they are respectful to history. The CEC pottery making-sale store built by giving importance to the Çeç tumulus and without making any façade formation contributes to the environment with this property. Also CEC pottery sales and restaurant is distinctive in terms of reflecting the supports and material properties in the interior. The place has differences compared to the other rock-cut places in the region in ways that big rock columns were used and main space and smaller places are connected via corridors in the design. In the design of the restaurant, staged transitions, from main space to lodges and from lodges to private lodges, were made using cuttability of rocks. It is also the only structural example in which spectator chambers are linked to the general chambers by narrow cut corridors. The flow of spaces to one another in interior planning and the fact that all areas open to the stage is important. The Restaurant, which allows visitors to see the visual shows, is the first example of its kind. The other pottery making and sale atelier in the design also has unique fetures that set it apart from the other ateliers in the region. There are many pottery production and sales workshops in Avanos. A low height and cellular structure are seen in the roofs of the available rock-cut workshops. Wider and higher places were obtained using the maximum bearing capacity of the rock in the place designed as a pottery workshop in CEC. The passage from small areas to larger areas in the pottery atelier increase the grandiosity perception of sales locations. High ceilings also contribute to this aspect. This allowed the visitors to tour the place in a comfortable manner and let the owner of the place exhibit the products in a spacious place.

Handcrafting has extensively been used in the building of the CEC pottery making-store and restaurant. Large parts were built by machines to speed up the process and handcarving was continued afterwards. Thus, the negativities that could be caused by the vibration of the machines have been prevented. Fixed decoration elements have also been carved in stone. As in each part of the structure, the rock carving handwork has not been changed. In addition, scrap rocks have been reprocessed and used for decorative purposes. Thus, scraps have also been used.

It is regarded as important to pay attention to material properties, the bearing of the rock, and available joints within the rock while making rock-cut designs. The construction stage is thought important considering the destruction of the rock by machines. Thus, it is recommended that engineers work together to find a solution. Furthermore, it is considered as important that necessary drainage and indoor ventilation precautions should be taken for rock-cut designs and no design should be made for heavy-structures in the field. Natural ventilation in the aforementioned structure has been provided by way of air ducts that go all the way up to the surface of the rock. No damage has occurred on the surface of the rock while building these ducts and the natural landscape has been left untouched. Despite the efforts to protect the natural environment on the façade, several additions have been made in time by the owner of the building. In addition, protection from exterior weather conditions is provided at rock carved spaces due to the property of rocks to store heat. When the CEC pottery making-store is considered from an environmental perspective, the inside temperature can be kept constant using the property of earth to store heat. Thus, the ventilation and temperature control of the area has been handled naturally.

It is expected that CEC pottery production-sales and restaurant design discussed in this study will be a model for future designs and constructions. With this study, it is hoped that architectural products that give importance to natural environment along with traditional building materials and methods while ensuring the sustainability of rock carving architecture and building method especially in the Cappadocia region of Turkey will be formed.

References

- Aktürk, D., (1996), "turizm alanları tasarımına, halk katılımını sağlayacak ekolojik bir yaklaşım", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Atay, F., Özyayın, G., (1996), "Turizm amaçlı kullanımlar doğal ve yapay alanları nasıl tüketiyor?", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Avanos Belediyesi, (2011), http://www.avanos.bel.tr/avanos/Sayfa_Modul.asp?nedir=sayfa&id=2
- Avanos Evi, (2011), <http://www.avanosevi.com/tr/avanos1.html> -yeralti-sehri.html
- Avanos Kaymakamlığı, (2011), http://www.avanos.gov.tr/default_B0.aspx?content=199
- Çubuk, M., (1996a), "sürdürülebilir turizm planlamasına ekolojik yaklaşım", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul.
- Çubuk, M., (1996b), "Sonuç bildirgesi: sürdürülebilir turizm ve turizm planlamasına ekolojik yaklaşım kolokyum ve panel tartışmalarının sonuçları", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Derinkuyu Belediyesi, (2011), <http://derinkuyu.orgfree.com/nevsehir/avanos.html>
- Dökmeçi, V., Kerimoğlu, E., (1996), "Küçük şehirlerde turizm potansiyeli ve Asos örneği", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Fotoğraflı Gezi Rehberi, (2011), fotografizegezi.com/v/200707_motor_gezi...
- Haritalar, (2011), http://www.haritalar.web.tr/kapadokya_haritalari.html
- Kadınlar için, (2011), <http://www.kadinlaricin.net/tatil/avanosta-gezilecek-yerler.htm>
- Kapadokya Gezi, (2011), http://kapadokyagezi.com/Nevsehir_Antik_Yerlesimleri_Cec.htm
- Koç, H., (1996), "Herkes için turizm", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Lobo, M. D. C., (1996), "Turizm planlaması ne şekilde ele alınmalı", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul.
- 村上周三, 2008, "トルコの洞窟型住居", ヴァナキユラー建築の住居環境性能, 慶応義塾大学出版会, C A S B E E 評価によりサステナブル建築の原点を探る, 33-53
- Oral, S., Şenbük, U., (1996), "Turistik alanların Sürdürülebilir turizm açısından değerlendirilmesi", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Özek, V., Sirel, A., Akansel, S., (1996), "Turizm araç mı, amaç mı?", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Şenlier, N., (1996), "Sürdürülebilir turizm gelişimi için alternatif turizm çözüm mü?", sustainable tourism:ecological approach to tourism planning, 19 th. Colloquium of world town planning days in Turkey, 7-9 kasım 1995, Mimar Sinan Üniversitesi mimarlık fakültesi şehir bölge planlama bölümü, İstanbul
- Wikipedia, (2011), <http://tr.wikipedia.org/wiki/Avanos>
- WTO (the world tourism organisation), (1993), "tourism in the year 2100"
- Yolveren, Ö. F., Ergül, U., Erdoğan, A., (2011), "Kaya Oyma Tarımsal-Turistik-TicariYapılara Ait Bilgilendirme Ve Öneri Raporu" Nevşehir