A study of the 2nd diazoma of the Side Theater

Aydin Uçar
Akdeniz University, Department of Interior and Landscape Design, Antalya, Turkey

ABSTRACT: The Side Theater was built on top of a Greek theater, art so; by definition it's a Greco- Roman type. The amphitheater and the theater have the similar velum structures, if the plans are compared. For a velum structure there should be two kinds of building elements; mast holding stone ring and the base stones. These buildings elements were not found insitu on the Side Theater today. There were found for each, two different types of stones. I have reconstructed by drawings the possibility of the places of the stones and the possibility of the 2nd diazoma. As for the portico, a curved architrave was discovered and additions were made to the reconstruction plans. Mr. Gollman established that the stairs, from the 1st cavea to the 2nd cavea, these do not exist today. After reexamined I accept the knowledge and reconstructed to the drawings.

1 GENERAL ARCHITECTURAL SPECIFICS OF THE SIDE THEATER

1.1 Orchestra

The shape of the orchestra of the Side Theater (Fig. 1) - unlike the usual Roman semicircle orchestra shape- has two arcs, which have two different center points, and it resembles a horseshoe. As in the Perge Theater, the traces and installation holes in front of the first row of the orchestra provide some architectural information about a parapet. In the 3rd century A.D., the marble parapet was removed and a stone wall was built in order to use in sea war plays (navmahia) and wild animal fights (venations) which some part of it still stand today (Mansel, 1956). The pink colored water impermeable plaster on the surface of the wall confirms the use of the theater for navmahia plays. In front of this wall, there is a drainage canal for rainwater from the theater that is covered with stone. Orchestra area was not covered with a special matter, it just covered with soil. Also in the 3rd century, there was an awning that was carried by four columns in the lower part of the 1st Diazoma (Mansel, 1956). In the 5th and 6th century A.D. Side was the seat of a Bishop. In this period the theater was used as an open-air church. A part of the row near the parados and in front of both parados was used to build the chapel. It is unique for the orchestra to have two parados. The upper side of the parados is vaulted and the connection between the cavea and scaena brought the building to an architectural whole. Some discovered architectural components suggest a logeion over the parados.

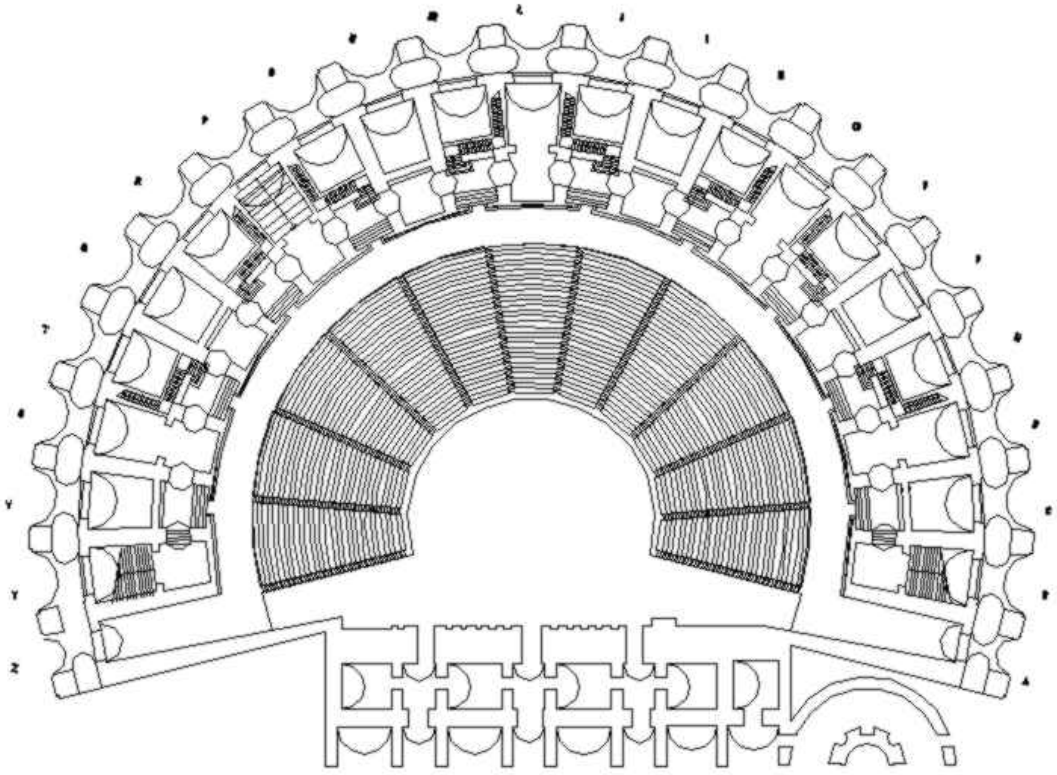


Figure 1: The plan of the Side Theater

1.2 Cavea

The cavea continues the horseshoe-shape form from the orchestra. The greater part of the first cavea is on a hillside. But much of the building is built on subtractions, it's a peculiarity of buildings in Anatolia to have this structural system, only in Rome and some African theaters are built using a similar structure system. The 2nd cavea is carried completely on an oblique vault. The 1st cavea has 29 row, 12 kerkides and 11 cunei. We discovered that the seat in the last row on either side distinguishes from the others, with its back and armlets. The place between the first cavea and the arc archway, under the second cavea called the 1st diazoma, provides the circulation between the lower and upper cavea, and leads to the rows of seats. The floor of the first diazoma is covered with stone. The 1st diazoma ends with logeions and ramps that provide access to the second diazoma. Vault entrances divide the back wall of the first diazoma. Some of the vaults are filled with walling and others provide an entrance to the diazoma. Access changed regularly. Between two entrances there are stairs, which lead to the 2nd diazoma. This wall was also faced. Behind this diazoma, there is a circulation area (ambulacrum). The entrances from outside to inside the building are from the (D, H, L, P, U) vaults (vormitoria) that are related directly to the ambulacrum. The ambulacrum has inside stairs, which lead to the second diazoma. Meanwhile, following the stairs, one arrived at a archway and from there to the 2nd diazoma. Today the 2nd cavea has 22 existing seating rows. The seating rows have good and poorly carved lion paws at either end of the row of seats. On the row, the seating place and the foot place are divided by a changing elevation. The 5 vault spaces on the outer side of the building were used as entrances to the theater, and the other spaces between the entrances did thought to have been used as shops. The arcs of the building on the outer facade are in an architectonic frame. Over the arcs there are two facials architraves, a flat frieze, and finally horizontal teeth cut geison with a strong console.

1.3 Scaena

A broad and shallow vault with the aditus maximus connects the Scaena. However the connect on is not ordinary as at the Aspendos Theater, because of the horseshoe shape of the orchestra

and the details are not solved completely, it is much more a modified form. The building with these specifics can be classified as in the Greco-Roman style. These parts of the theater have mostly been damaged. The elevation and the detail are not clear. However, the Scaena contains the building parts like Scaenafronts, proscenium. The façade of the Scaena has three doors, which opened to the orchestra and were used in different plays. The Proscenium is high, like in the Roman theater. The Scaenafrons has three stages and every stage is in a different style. They are respectively: Ionic, Composite and Corinth. The Scaena façade is divided into colonnaded frames (aedicule). There are some architectural components and traces on the backside of the scana wall, which confirm that there was a portico.

2 THE 2ND DIAZOMA OF THE SIDE THEATER

2.1 Circulation

In the Roman theater, the pulpitum and the first row of the cavea have a higher elavation from the orchestra, for that reason the aditus maximus could not be used. The (A and Z) vaults are the Aditus Maximus in Side Theater. The theater has five additional entrances, they are (D, H, L, P, V). The entrances have some steps to arrive to the 1st cavea, because the first cavea seats are on a hill and so there is an elevation difference between the entrances and the first cavea. The traces on the wall in the (K) vault confirm the existence of these steps. The elevation between the entrances and ambulacrum is 244cm; from the ambulacrum to the first diazoma is 119 cm. From the entrances to the ambulacrum, one comes opposite a wall, which gives a direction to the left or to the right side.

The left and the right vaults, next to the entrance vaults, open from the ambulacrum to the first cavea. But the system changed in (D) and its symmetrical, side (U) vaults. If one turned to the left in (D) vault or right into the (U) vault, there is an opening to the cavea from the ambulacrum in the (C) vault but in (B) there is a ramp that leads to the 2nd diazoma. There are stairs in every entrance vault in the 1st diazoma that lead to the 2nd cavea. In the ambulacrum area, opposite to the openings from the ambulacrum to the cavea, there are stairs that lead to a gallery and from there to the second diazoma. The first step is on the opposite side and it is a far distance from the entrances, so the density of the openings decreased. The steps change width respectively from larger to smaller, which provides the people with ease of access without getting jammed while moving upstairs or downstairs. There are not traces on the wall or on the stair to provide information on the balustrade by the stairs in the ambulacrum. The walls next to the stairs have traces on the two sides, about the vault, that comes from the front side where the shops were.

Figure 2: Stair traces in 1st Diazoma (left), The seating places with armlet and back

The elevation differences about the stair in the(M) vault changed by the following values; from the start point, upstairs to the first landing 247 cm, from the first landing to the second landing 173 cm, from the second landing to the third landing 230 cm. The third landing could be described as a large step. From the third landing, the stairs in (K) and (M) vaults opened together at the same elevation, with a passage to a space on the (L) vault. The same situation can

be seen on the (P) vault too, where the stairs from (O) and the(R) vault opened on to it. However it is not sure that the stairs in (G) and the (I) vault have got an opening to the (H) vault, as is the case with the other two. It is most probable that this part is the same as the other.

There is an insitu archway between the (B), the (L) vault on the entrance elevation. The insitu stones and their traces on the pillars that formed the arc in the (G), the (H) vault, confirm the same archway between the entrance elevation and 2nd diazoma. From these spaces that are formed by the (H, L, P) vault people were able to walk along the theater. The space that is formed by the (L) vault is distinct from the other two that the opening has a relationship with the 2nd cavea. That was not a simple collapse event, because the kerkides on the cavea are orderly split into two parts, next to this opening area, which collapsed. After two steps they join together again and it leads as one kerkides to the 2nd diazoma. On the third step where they're joined again, there are metal clamp holes. The balustrades, which were mounted on these holes, surround the three sides of the opening. If we try to apply a staircase to this section view, in the space that led to the 2nd cavea, then the height between the steps and the oblique vault is variable between 280 to 202cm. The semicircle step and the face stone next to the step suggest the possibility of the stairs. The height of the face stone increased with the cavea slope; meanwhile it also prepared the base of the balustrade. This kind of detail does not exist on the spaces in the (H, P) vault. The parapets from this archway that surround the building rise from the architrave and gaison. The stairs continued from this space to the 2nd diazoma. The elevation from the third landing to the fourth landing is 763cm and this landing is parallel to the pillar. The stair changes its direction again parallel to the external wall; finally it arrives at the 2nd diazoma. The kerkides reach from the 2nd diazoma to the cavea.

2.2 1st Diazoma

The 1st diazoma show the relationship between the inside and the outside, and between the 1st cavea and the 2nd cavea. The situation of the diazoma with its surviving insitu architectural components can provide evidence for ideas and opinions about this relationship. Particularly the seat with its back and armlet on the (S) cuneia shows the ending of the 1st cavea. The floor of the 1st diazoma is covered with limestone and the elevation of this floor is12.08m higher from the orchestra area. 12 kerkides lead from the 1st cavea to the 1st diazoma, and 21 arcs surround the diazoma. The building material of the arc and the building too is conglomerate. The limestone front on the (U, V, Y) vault shows that the wall façade by it. The traces and the holes on the floor stones in front of the vault assign another row of facing stone. The stones between the two face stones in front of the (O, R, T, V) vault, fix the location of the stairs that lead from the 1st diazoma to the 2nd cavea. In front of the (V) vault there were found the face stone and stones with plaster by the stair. These stairs arrive at the 2nd cavea and its kerkidesfrom the 1st diazoma. There are openings, which lead the ambulacrum (C, E, G, J, K, M, O, R, T, V) to the diazoma. Four steps in the ambulacrum lead to the 1st diazoma, due to the elevation difference. The passage that opened from the ambulacrum to the 1st diazoma is of rectangular shape and it is covered with plaster. Also the facing stone that surround the diazoma ended with a plastered stone. If the ground floor of the diazoma is defined, that the distance from the floor to the bottom of the vault is 231cm and to the bottom of the first row is 316cm. The distance between the wall (without facing stone) and the last seat row measure 450cm. This distance altered to 292cm by the addition of the facing stone and the original seat with back and armlet (Fig. 2)

2.3 2nd Diazoma

The Side Theater has not any insitu components of the 2nd diazoma. The 2nd cavea collapsed between the 18th and 22nd row. The Side Theater had a 2nd diazoma, like the similar Roman theaters as Aspendos and Perge. Only the Nimes amphitheater ended with a seating row. The openings to the archway on the (L, P) vault and the continuation of the oblique vault on top of the stairs show that the row of the cavea continued after the 22nd row. The insitu arc stones on the pillar (C, E) vault on the archway show a vault at that elevation. The top of the archway is closed with a vault in a portico system, as in the ground floor passage. The façade of the vault continued the profile detail from the ground floor. Also the fascia that is carried from the architrave and geison on the first story continued on the 2nd story. The stronges are proof that

the fascia detail carried on the 2nd story is the mast bases stone that have similar profile details to the fascia. The height of the arcs on the 1st archway is shorter than the height of the ground floor archway. The height of the arc on the archway is 638cm and on the ground floor it is 870cm. The floor elevation of the archway ended with the top of the architrave, the architrave and gaison were made together to support the parapet of this archway.

The most important question about the 2nd diazoma is, how many more rows continued on the collapsed cavea area. Most of the Roman theaters that still survive today have not any insitu 2nd diazoma area, due in part of the substruction structure. However most of the research on this theme provides us with different opinions. But these opinions are generally formed from the façade; few of them examined the structural system and its section detail. Some examples of them are the Nimes amphitheater, which ended completely with seating rows and there is no diazoma or like Sabratha Theater where the diazoma elevation is at the same elevation with the second story arcs or like the Colleseum and Marcellus where there are seats in the portico area continuing the diazoma. The stairs on the (K, M) vault, which came from the ambulacrum, must come from a point on the 2nd diazoma. Because of the oblique vault over the stairs, they must

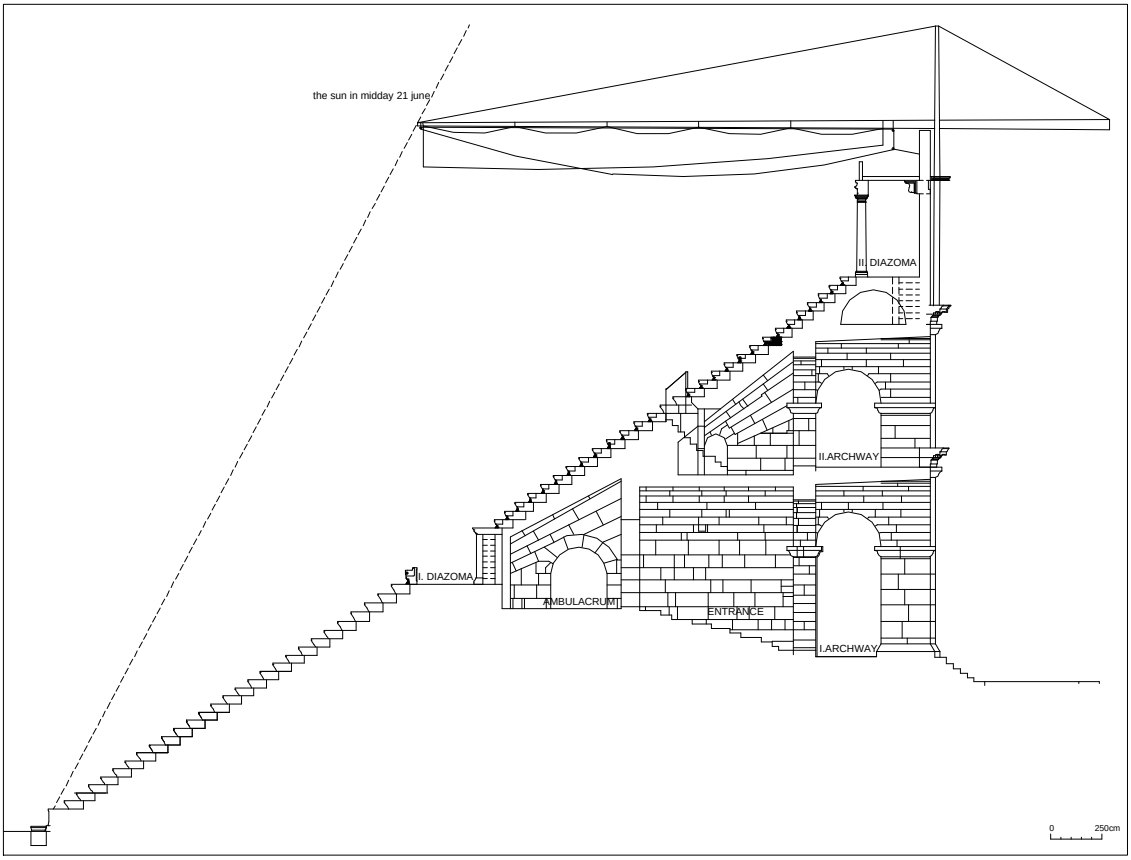


Figure 3: Reconstruction Section of the Side Theater

in the same direction as the vault. The vault must lead to a passage or landing in order to change its direction. A passage is not possible at this height after the 22nd row because of the narrow distance between the column and the wall. Due to this reason it is not possible, to have an ending detail as at the Nimes amphitheater. But a detail like at Sabratha could be possible, which ended with the second arc elevation. From a reconstruction experiment of what stood on the Sabratha theater bases, the following value results were obtained. The 2nd cavea prepared from 24 seating row. On the 2nd diazoma the distance between the parapet and the last seat is 570cm. The distance between the last step of the stair that came outfrom the ambulacrum and the parapet is 256cm. In this situation there will more space between the parapet and the last row and it comes to mind that it may have been like Colleseum. Also it can carry 5 more seating rows after the 2nd diazoma, that were joined on a wooden structure. Then the width of the 2nd diazoma would be 279cm. The advantage of this system is that, there is not additional load on the building structure. After some research, the following will describe the portico that the Side

Theater had. In this first reconstruction, the span between the outer wall and the last row is rather large that will not allowed to close with a portico structure system. In the second offer, the starting point of the adding rows intersects with the last step of the stairs that coming from the ambulacrum, meanwhile it prevents the circulation area.

At the other reconstruction added 7 rows and the total of the row on the 2nd cavea reach to 29 (Fig. 3). The distance between the parapet wall and the last row is 308cm. This width is enough for the 2nd diazoma circulation area. The stair that comes up from the ambulacrum prepared a landing on the pillar. The elevation of landing is the end of the oblique vault that the 2nd cavea seats on; the stair changed its direction on this landing to parallel to the external wall. There will at least loose area on the 2nd diazoma for the circulation area. It's an opinion that on the same elevation built a vault under the 2nd diazoma for decrease the load on the building. Maybe the vault was not built in originality and the high-density pressure of the load was one of the reasons about the building collapsed, or it was built, but in this situation it could not fellows the same systematically structure system of the vault below it and outer strength like a earthquake can changed the statical balance of the building. The width of the 2nd diazoma, between the last row and the stairs decreases to 235cm. If it is accepted that the general circulation of the people to the to the 2nd cavea had been made from the 1st diazoma, then the width is enough.

2.4 Portico

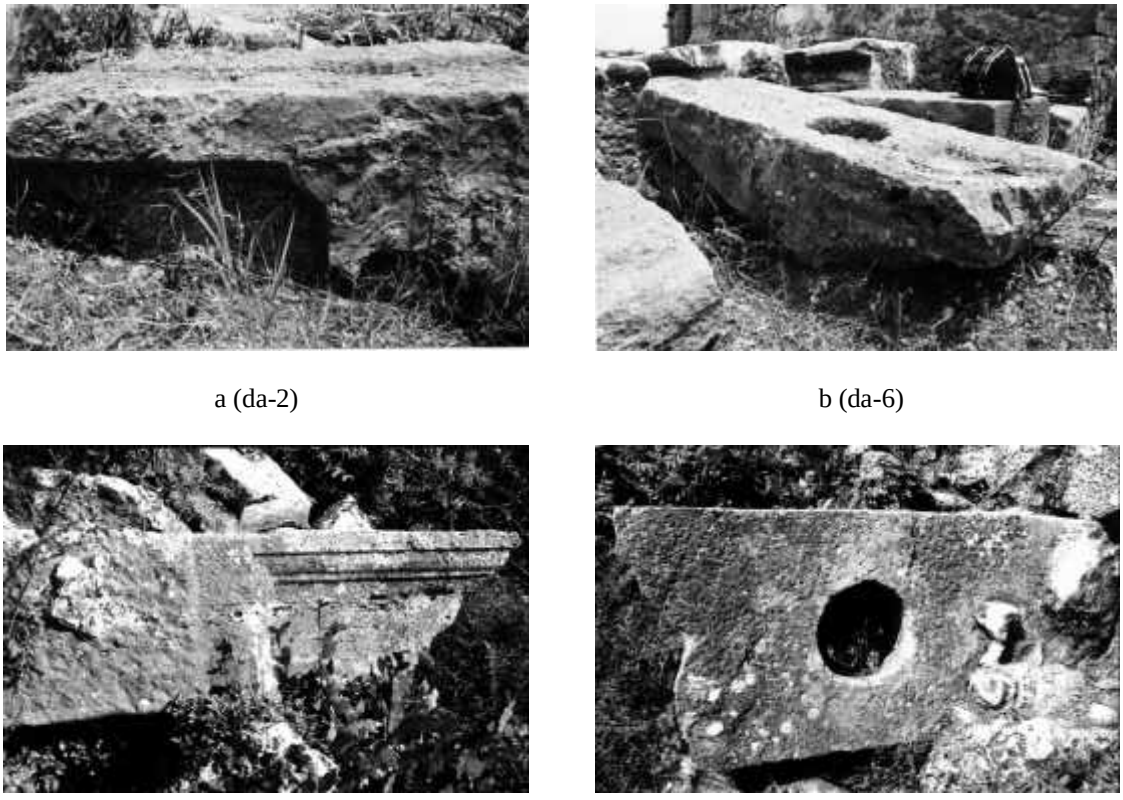
The other architectural part of the 2nd diazoma is the portico. Vitrivius described the portico as a characteristic part of the Roman theater. Even of the Roman theaters have not got insitu porticos today, but researches determinate this. There are two kinds of the portico styles, one of that is with columns and it closed with flat floor like in Dugga, Bosra, Orange, Pompei, the other one closed with vault like in Aspendos or Perge. Because the Side Theater collapsed to the outer side of the building, the architectural component scattered to a large area and the component mixed with the other buildings' components that are nearby the theater. This is difficulty in classification of them. But the ruins front of the (R to Z) area is more preserved, because the

Figure 4: Architrave (ag-1) (left), Portico column (s-3) (right)

area was not excavated before. The components that found in this area, confirm a portico on this theater. The found components such as column (Fig. 4), column base give some idea about the length, diameter and their style that they could have. The longest column fragment that found is 290cm. The diameter about the column is between 42 and 44cm. These columns have antacids. The architrave (Fig. 4) that found front of the (K) vault has a curve width 1.3cm. The optimal curve width for this architrave is 1.6cm, but the value reach to surround the cavea with an arc formed. It found very few and damaged parts of the columns basis. The fragment gives enough knowledge about the height and its profile ornament. There were not found a column capital in the environment that related with the portico column. In the (G) vault on the 2nd cavea found a console, its dimensions, material characteristics and the finding place show that could take place in the 2nd diazoma wall. There were not any architectural components that give any knowledge about the upper side of the 2nd diazoma external wall and the entablature, roof construction that prepared the portico. By the reconstruction applied about the portico, the column capital support from the found basis that in Roman Doric style is. In the reconstruction drawings that supported by the knowledge, the height between the 2nd diazoma floors to the portico ceiling is 420cm. The distance between the columns are 220cm, this span allowed the

architrave to seat 20cm on the column capital. In the majority of theaters, as Marcellus, Pompeii, Colleseum, Aspendos, Perge there are windows in the wall back of the portico. From this knowledge in the reconstruction drawing, windows were opened in the same vertical line with the vault. The openings decrease the load of the wall. The portico is not only architectonic; meanwhile it has an acoustic function. The researches from Izenour about the acoustic of the classical theater, suggest the lost voice up to 1st diazoma in Aspendos is 30- 40%. The existences of the portico persevered the acceptable voice strength to the upper levels.

2.5 Velum



a (da-2) b (da-6)

c (db-1) d (db-1)

Figure 5: Mast base stones

Most of the Roman theater have got insitu structure component that shows the velum system. These are amphitheaters as Nimes, Colloseum or theaters as Tries, Orange, Aspendos. The theater of Side has not got any building components of the velum system insitu. By the researches around the area, there were found some part of the building component that can relate directly or that may have a possibility in the velum system. The researchers about the velum structure have got two theses. One of them is; a ring that made from metal put to the center and it stretch with ropes, the velum will roll over the ropes. In the other one, the wooden log used as a beam and the velum hanged of them. The similarity of the two systems, without the tensile system is the wooden masts placed out of the theater wall. For the mast to have the carrying function they must fixed, for that it's required at least a mast base stone where the mast can stand. The length of the mast changed by the force and the load expose. From a length to prevent the mast from turning, it is required a mast holding stone ring. Each one of the stone takes place on the wall as console. Except the Nimes amphitheater, all the other that applied velum system has the both building component. In the Nimes amphitheater the masts fixed directly on the last row, to the two side of the parapet. The two masts joined with metal clamp and wooden structural element.

There are three different shapes of stones discovered related with the velum. The most found one is named as (da) (Fig. 5). The found places of the stones are as the following, (da-1) in the

second city wall, (da-2) (da-3) in front of the (C) vault, (da-4) (da-5) in front of the (J) vault, (da-6) (da-7) in front of the second city wall. The building element in (da) groups carried the traces from the (g-1) gaison, but it continued from the traces to front with its own profile style. Also it confirms that the both used together on the second level entablature. The (da) group stones have a hole for the mast and other small hole for the rainwater. The second group is the (db) (Fig. 5) and the found places of the stones are following, (db-1) in front of the (R) vault and on the first story level, (db-2) (db-3) in front of the (I) vault line on the side area of the colonnaded street. The profile on the two side of these mast stone have not got any relation with the other geison that take place on the building entablature. On the building it does not show a similar profile detail as this and it has flat joining traces on the sides. The section view of these stone profile have a similarity with the (da) group stone. Because of the similarity, probably they have been used together. By the reconstruction drawing they are used together but the elevation (db) is higher than (da) stones and (db) followed after two (da). (dc-1) found in front of the (H) vault, it's proper to use as mast base stone. Because of its narrow thickness, small diameter it could not has a function as carrying. But it's suitable to use as flag post base. (dd-1) that found in front of the (O) vault and the archway that opened to the harbor have differences from the other, with its profile, thickness and material. It has a second small hole after the first big hole. The wooden post becomes narrow to pass through this hole. Because of its inadequate thickness it is not suitable to be used as carrying component. Depending on the place where it is found, it could be thought that it is place was on the archway. There made two reconstruction about the stones that not insitu found. In the first drawing the structure system prepared from the (da) as mast base stone and (b-1) (Fig. 6) as mast holding stone ring. Both of them used twice between the pillars with equal distances. The distances between the centers of the stones are 507cm. In the second reconstruction the system prepared with the (da), (db) and the (b-1) (Fig. 7). In this drawing the (da) stones take place between the pillars, the (db) stones take place on the same line with pillars but a little over the second level entablature. The distances between the centers of the stones on horizontal is 339cm, the vertical distances between the mast base stone and mast holding stone ring is 557cm. The vertical distance is valid for each drawing. To look to the other similar theaters as the Aspendos; 20x20 wood mast arrange in 412cm in horizontal and the span is 32m. In the Orange Theater; the mast diameter is 31cm and it arrange in horizontal 237cm. The vertical distance between the stones are, in Aspendos 300cm and in Orange 729cm these comparatives shown the possibility of the two reconstructions. The mast confirm about the found architectural components.

The other question is how had the velum closed the theater. On the way of the early researches that I gave before, I applied these on my reconstruction drawing. In one of this, the structure used with the wooden beams that they stretch from the mast and the velum carried over it. In the other, a ring that made from metal stretch with ropes and than the velum put over it. In these reconstructions the position of the sun is in the midday of 21st June, this experiment show that a distance until the end of the 1st cavea is enough to prevent the theater from the sun. The knowledge out of the researches about the Roman amphitheater that they have a suspension structure system brings to mind that the Roman theaters have got the similar structure. The symmetrical plans of the amphitheaters have got an advantage to apply this structure around the building. But unlikely the amphitheaters the theaters have got a different and non-symmetrical shape. Because of this, it brings negative and complex solutions for applying. Such structure system like these requires the same stone for the masts back of the scaene building. Around the Scaene building in the Side Theater, there were not found any of the mast base stone or the mast holding stone ring that related with this structure. The knowledge does not support this solution for this theater.

Figure 6: Gaison (g-2) (left), Mast holding stone ring (b-1) (right)

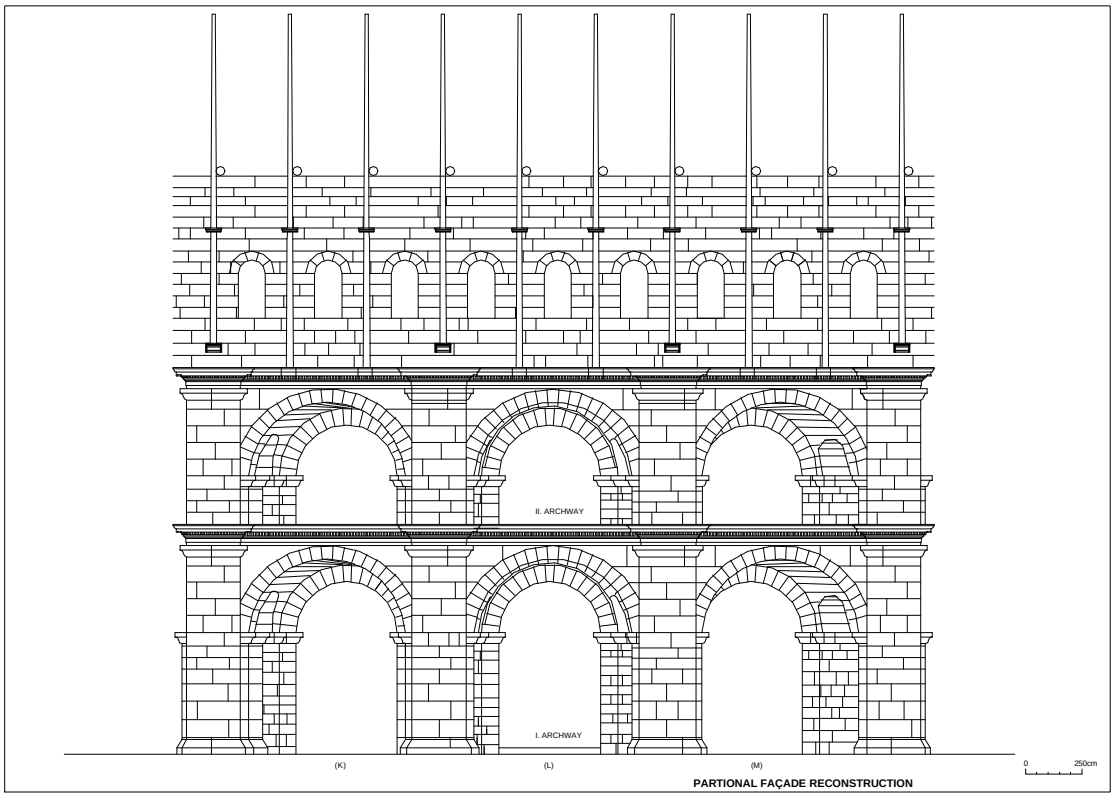


Figure 7: Partional Façade Reconstruction

The second drawing prepared depends on the using the log as beam that hang from the mast. From the researches about this history when the theater was built, the region was known with its rich forests and it was the wood center of the empire for its wood requirements. The pines that growth in this historical period in this area, their length reached to 40m and their diameter reached to 70cm (Meiggs, 1982). These values confirm the possibility of the log beam. In this reconstruction used 33.90m total length in horizontal, from the mast it is 25.40m. It's possible not to use the console part of the beam of the result the statical calculation. The diameter of the mast is related with the mast stone as 28- 30cm. To controlling the velum to open and close it is prepared by a system from pulley and rings. The system is similar that the sailor used in that history. The structure system has very less influence from the weather and so it can stay continuous on the building, only the velum collected by the windy weather.

3 CONCLUSIONS

Resemblance of the two types of Roman theater, which was build on a substructure or on a hill is, they have 2nd diazoma if they have two cavea. The architectural view of the structure and the measure facts about the collapse part the Side Theater gives an opportunity of the 2nd diazoma. The found architrave, frieze, column parts confirm the portico and approve the 2nd diazoma. One of the other characteristics of the Roman theaters is the use of the velum. The mast base stone verify that the theater have a velum structure. The width of the mast hole on the base stone is enough for a mast that used in this structure. There were found two types of the mast base stone and one of this is certain that it take place on the second story entablature. It is difficult to say the similar to the other base stone, because of its profile and the traces on its sides, probably its takes a few higher from the other. From the researches; the most difficult question was the mast holding stone that related with the mast base stone. Because, it was not found any well built about it and the found stone was not seemed like with its dimensions, profile as the similar stones in the theaters. But the mast holding stone ring is enough for the mast can pass through from it. The vertical mast is certain in a velum structure. There are two theses about the velum structure. These are; the suspension system with rope or the tensile systems with log beams. The reasons why I accept that the Side Theater had the wooden beam structure, are first the structure is similar as the sailing in this century, than it provide an easy move in the bad weather. Second Side was close to the wood center and the sizes of the trees were suitable for this structure. I examined the determination of Mr. Gollmann about the stairs, which leads from the 1st diazoma to the 2nd cavea on the real place, I confirm it and reconstructed to my drawing. The collapsed part of the (K) vault in the 2nd cavea accepted as an upstairs from the archway to the 2nd cavea. The reason was the found face stone and the step on the passage, the insitu divide of the kerkides on the 2nd cavea.

REFERENCES

Ferrero, D. B., 1990, Bati Anadolu Eski Çag Tiyatrolari (Trans., E. Özbayoglu) , Italyan Kültür Heyeti Arkeoloji Arastirmalari, Ankara.

Graefe, R., 1979, Vela Erunt, Philipp von Zabern, Meinz am Rhein.

Izenour, G. C., 1992, Roofed Theaters of Classical Antiquity, Yale University Press, London

Mansel, A. M., Bosch, E. and Inan, J., 1951, 1947 Senesi Side Kazilarina Dair Ön Rapor, Türk Tarih Kurumu, Ankara.

Mansel, A. M.; Inan, J. and Bean, G. E., 1956, Side Agorasi ve Çevresindeki Binalar, Türk Tarih Kurumu Yayinlari, Ankara.

Mansel, A. M., 1963, Die Ruinen von Side, Walter De Gruyter & Co., Berlin

Mansel, A. M., 1978, Side, Türk Tarih Kurumu, Ankara.

Vitruvius, 1990, Mimarlik Üzerine On Kitap (Trans., S. Güven), Sevki Vanli Mimarlik Yayinlari, Ankara.