

## CONSTRUCTIONAL METHODOLOGY

---

Architectural Texts give an almost identical description of constructional methodology for the buildings and the houses of Gods. These methods are orthodox in character and are based on long experience. The procedures to be followed in the construction of a temple are elaborately described in the Texts. Yet, one may find certain procedural differences between the Texts. This may be due to the omissions and additions, misinterpretations or misreading and also due to interpolations that occur while making fresh copies of the existing Texts.

Kāśyapaśilpa gives a clear and coherent account of the procedure to be followed in the construction of temples.<sup>1</sup> Therefore, in this study the description given in Kāśyapaśilpa is considered.

The first procedure to be followed in the construction of the temple is fixing the orientation of the building. For this, gnomon has to be fixed first, to mark the cardinal points on the ground. Fixing of the gnomon always should be done at the time of sunrise. On the prescribed auspicious day, in the morning, the gnomon should be erected. The gnomon should be erected always on a perfectly leveled ground. The ground should be at least four cubits (6 feet) wide and flat on all its sides. The gnomon fixed thus on the ground, should remain at that place till the evening. The shadow of the gnomon that falls on the ground during different times of the day should be marked till the evening. Through this, the east and the west directions of the area get exactly marked. The line drawn perpendicular to the east west line will show the north-south directions.

Before beginning the construction, the examination of the soil should be done. The soil, according to the Texts, is of two types – *snigdha* (hard) and *asnigdha* (soft). If the soil is hard, the foundation trench has to be at least three feet deep. If

the soil is soft, the trench has to be dug, till hard soil is reached. The foundation trench should be dug for the entire area that the structure occupies. The area of the trench should be six feet bigger on all the sides of the foundation to be laid. However, this prescription is not generally followed by the architects. They generally dig trench to a depth of six feet irrespective of the type of soil on which the temple is proposed to be built.

After digging the foundation pit, a thick course of sand should be filled to a height of about one foot. It should be properly beaten with rammers and leveled to look like the surface of a mirror. Above this surface of sand, six important contour lines of the building drawing should be marked. These contour lines are concentric in nature and are called by the name, “*sūtras* □ *atka*”, - the six lines. They are :-

1. *Mānasūtra* – the line that corresponds to the line of the wall above .
2. *Vinyāsasūtra* – the line that corresponds to the projection of the upper most line of the plinth
3. *Adhis* □ *t* □ *hānasūtra* – the line that corresponds to the projection of the lowest moulding of the plinth
4. *Upapīt* □ *hasūtra* – the line that corresponds to the upper most and the lowest projections of the plinth
5. *Hōmasūtra* – the line that corresponds to the outer line of the bed slab below the *upapīt* □ *ha*
6. *Prativājanasūtra* – the line of the trench.

Over the ground, marked with lines, a layer of bricks should be laid (Fig.-1). This course of brick is called by the name *prathamēs* □ *taka*. This brick course should extend over the entire area of the building including the outer line of the *vinyāsasūtra*. This brick course should be raised, layer by layer, like a hand-wall all round the building, thus making two clear cut divisions in the foundation pit. The outer portion of the brick wall should be filled compactly with boulders of

different sizes. The bigger boulders should be placed at the bottom, while the sizes of the boulders get reduced gradually as it reaches the upper level of the pit. The inner part of the brick wall is to be filled by sand or similar other material.<sup>2</sup> Before filling the inner portion of the brick wall, exact location of the pillars are to be marked in the interior. In these marked places, the *nikhātastambhas* should (Pl.-1) be erected. *Nikhātastambhas* are hidden or buried stone shafts which stand as support for the free standing pillars found in the hall or pavilions. The height of the *nikhātastambhas* will be upto the bottom level of the stone pavement of the floor of the hall. The surrounding places of the *nikhātastambha* should be filled by sand or similar type of material.

*ADHIS□T□HĀNA* / PLINTH - *Adhis□t□hāna* is the plinth, the foundation. Depending upon the medium used for the construction of the building, the medium for building the *adhis□t□hāna* is also chosen. Brick and stone *adhis□t□hānas* are noticed for the temples in the region of our study. As a first procedure a bed slab (*janman*) is to be placed on the brick podium constructed in the foundation pit. Above the *janman* brick or stone *adhis□t□hānas* may be raised. In brick *adhis□t□hānas*, courses of brick are laid to suit the shape and size of the *adhis□t□hāna*. The mouldings of bricks are not carved but, bricks are designed and moulded in such a way that their courses give the suitable shape to the moulding, when laid.

In the stone *adhis□t□hānas*, long stone slabs of suitable thickness are laid in horizontal courses. These slabs are designed or dressed suitably to suit the shape of the mouldings of the *adhis□t□hāna*. The slabs are dressed and shaped always before they are assembled in their place. All the major mouldings will invariably have small fillet-like (*kampa*) minor mouldings at their bottom and top (Pl.-2). This fillet (*kampa*) is a very important minor moulding in the construction as the *kampas* help the mason to maintain the vertical norm of the plinth. It is a known

fact that the front portions of the major mouldings of the plinth are faceted in various ways and designed. Hence, the front line of the plinth cannot be taken as a standard to determine the plumb line. Therefore *kampa* is provided at the top and bottom of each of the major mouldings. *Kampa*, in fact, is the one which also determines the contour-line of the plan of the building.

In the construction of the plinth, it is already stated that long horizontal slabs are used, which are designed like heavy and ornate mouldings. In the carving of these mouldings nowhere two horizontal slabs are used to carve one moulding. Each moulding including its sub-mouldings, are carved in one slab. No mixing of two major mouldings in one slab is noticed. Stone slabs are placed one above the other without the use of any cementing material. They stand in their position by gravity.

Above the podium raised in the foundation pit, the bed slab (*janman*) of the *adhis*□*t*□*hāna* is placed. This slab covers the area between the inner line of the *mānasūtra* and the outer line of the *hōmasūtra*.

If the area selected for the construction of the temple is on a sheet of bed rock, foundation pit is not dug. The upper surface of the sheet rock itself is leveled and above this surface, the *janman* or the *upāna* is placed according to the contour line of the building plan (PI -3).

**BHADRAKA STAMBHA / ENGAGED PILLAR-** The *bhadraka stambhas* are the engaged columns partly hidden and partly exposed from the wall surface. They stand on the uppermost slab of the plinth. *Bhadraka stambhas* take the load of the architraves. *Bhadraka stambha* shafts are monolithic in nature. Occasionally, the shaft may be made of two pieces of stone shafts placed one above the other (PI-4).<sup>3</sup> In case the plinth is built out of brick, *nikhatha stambhas* are provided for the *bhadraka stambhas* also.<sup>4</sup>

*BHITTI* / WALL- The temple walls (*bhitti*) of south India are built in a particular method which looks quite unusual in the light of the modern building technology. The Texts mention that the temple walls should be constructed using stone or wooden slabs (*phalaka*). Texts do not mention that they should be built out of stone blocks. The common method followed in the building of temple walls consists of keeping two parallel layers of heavy stone planks in horizontal courses, maintaining a required thickness. The thickness of the wall is more in the part of *garbhagrāha*, because this portion is meant to support a heavy and tall tower above.

The rest of the portions of the wall are also quite thick in their form. The inner face of the wall is generally plain, simple and non ornate. It consists of horizontal courses of thick stone slabs neatly dressed on its face as well as on the sides. The back portion of this slab will be generally uneven and also undressed. These slabs are generally long enough to cover the interspaces between the two *bhadra* pillars. They are kept horizontally one above the other with no gap in between and without any cementing material.

Occasionally, walls are also constructed out of single layer of slabs (Pl.-5).<sup>5</sup> In such cases, the interspaces of the *bhadra stambhas* are covered by horizontal stone slabs like a screen. These slabs are dressed on all the sides. Such slabs are devoid of any ornamentation and are plain. This type of a wall is built for structures to economise on cost and labour. They are more common during the post Vijayanagara period. Inside the *garbhagrāha*, shelf slabs are often found placed at a convenient level on the inner face of the wall. This is a tradition found in the temples built after about 1000 A.D. The Ganga temples built before this period do not have the provision of shelf slabs inside the *garbhagrāha* and the

*antarāla*. It is a feature noticed in the Chola, Hoysala and later temples in Karnataka.

The outer face of the wall is generally made of thicker slabs. They are also placed in horizontal courses and occasionally vertically also.<sup>6</sup> The slabs of the outer wall are dressed like inner wall slabs with undressed surface on their back side. Two parallel rows of stone slabs, for inner and outer faces of the wall are kept leaving some empty space in between. This space was filled compactly by a mixed material (*samkīrnā*) like mud, sand, lime mortar or any other type of filling. To prevent the separation of the two layers of wall, at required places like doorway opening, niche opening, etc., stone slabs extending up to both the faces of the wall were placed as lockings. This lock-slab held the inner and outer layers of wall together firmly (Pl.-6).<sup>7</sup>

After building the wall to the required height, ceiling slabs were kept above. These slabs extend from the architrave on one end to the wall on the other end. This ceiling slab is called a “*pracchādāna*” slab. The exposed faces of the ceiling slabs, particularly their ends, are undressed and not uniform in their thickness. Therefore, to make that portion uniform and presentable to the exterior, another piece of stone is kept all round the structure. This slab is called by the name “*pracchādānāśya*”. *Āśya* means face, i.e. the face of the ceiling slab. This slab is called by the name *vājana* in the Texts. *Vājana* is a slab above the *kapōta* and its face generally consists of the relief of a row of *vyālas*, etc., in dravidian architecture.

In the construction of the outer layer of the wall, it is stated that thicker slabs are used. This is done with the intention of carving architectural and sculptural decorations on the outer wall surface. Architectural decoration such as *bhittipādas*, *tōranās*, frames of the *kōśās*, sculptures, *kumbha* and *stambhapañjaras*, etc., were all relieved on the surface after the wall was built. Depending upon the

thickness of the wall slabs, the depth of the reliefs was also decided. In the decoration of the outer wall with architectural motifs, every detail of a regular building were imitated or copied with considerable precision. But no architectural motif carved on the wall is functional in nature. This includes even the architraves. Carving of the architraves is just for the appearance. In these structures, architraves do not extend from one pillar top to that of the other in one piece. Instead, it is made of two or more pieces of stone. Sometimes they are part of the stone in which the wall or the corbels are carved, but the form of the architrave is clearly represented.

Above the wall, the *kapōta* or the dripstone is placed projecting forward prominently from the plumb line of the wall. *Kapōta* is carved out of a thick stone slab, the upper part of which is rounded and sloped. The soffit of the *kapōta*, sometimes, is made hollow. *Kapōta* consists of a unique type of decoration throughout the dravidian architecture. This decoration is called as '*nāsi*'. *Nāsis* are carved on the *kapōta* at regular intervals. The *nāsi* is also called by the popular name *kūd□u* (Tamil). *Kūd□u* is a decorative design, the origin of which can be traced to the *chaithya* arch. It is also referred to by names such as dormer window, horse-shoe window, semi-circular window, etc. The *kūd□us* or the *nāsis* of the dravida *kapōta* contain a horse-shoe shaped or semi-circular arch. The central part of the arch is either flat or sometimes deeply recessed. This portion is called by the name *gād□ha* or *kukshi*. Temples built upto about 1000 AD have *gād□has*, which are often deeply recessed, while the *kūd□us* carved after 1000 AD generally possess only a flat surface with or without a relief. The decoration of the *kūd□us* consists of a flat band on its two sides and at the top. At the apex of the band, a *kīrtimukha* is carved in relief. Sometimes, in the carving of the *kapōta*, additional pieces of stone are also found fixed to the upper portion of the body of the *kapōta*. This additional piece is fixed to carve the tall apex of the *nāsis* in the form of the *kīrtimukhas*. To economize on material and labour, thinner slabs are

used for carving the *kapōta* and to carve the tall apex of the *kapōta*, additional pieces of stone are fixed above (Pl.-7 and 8).

During the Vijayanagara period a new trend in the decoration of the interior wall surface is noticed. As mentioned above, the interiors of the temple had plain non-ornate wall surface. But in the Vijayanagara period, besides keeping the stone wall in the said method, sometimes, the plastering of the interior stone wall surface is also noticed. Because the joints of the stone slabs used in the construction of the wall contains many cavities and crevices, to make the wall neat and clean, it was plastered with lime mortar. The *bhadra* pillars attached to the wall were also plastered. Traces of lime stucco sculptures and other decorations are noticed in some of the ruined temples of Hampi.<sup>8</sup>

While constructing the wall (interior as well as exterior), to make the structure of the wall strong and durable, the horizontal courses of the wall were kept in such a way, that they get locked with each other at the projecting and receding corners of the line. For doing this, a method called by the name *swastika* was used, and this is a very popular method, commonly used in most of the structures. The *swastika* pattern is one, where the slabs at the corner are laid in such a way, that the end of a slab on one side is kept against the side portion of the slab of another side. This joinery is always made in clock wise direction. (Pl.-9 )

*VITĀNA* / CEILING - The ceiling of the temple and pavilions are constructed in varied manner and techniques. Generally, stone slabs are used for the construction of ceiling. Stone slabs are dressed at the bottom and upto a certain portion on all its four sides, so that the joints between the two slabs are neat and close. The upper parts of the slabs are undressed and rough. The upper portion of the ceiling, made of slabs is covered by thick layer of lime, mortar to make it water proof. The early method of construction of roof, as seen in the Ladkan temple at Aihole, is not noticed anywhere in the region of our study.

Another type of ceiling construction very popular in dravidian architecture is the *nābhichchanda* method (Pl.-10). It is similar to the European lantern roof method. *Nābhichchanda* roof is constructed generally over square cellas and bays. In the construction of this type of roof, stone slabs of smaller length are placed at the corners, diagonally to the lower square of architraves, so that, the slab kept covers a portion of the corner of the lower square. Layer by layer, the opening of the lower square is covered. Finally, the central portion is covered by a coping which, sometimes, is shaped like a pivot in the centre. This suspended pivot is carved variedly to suit the carvings of the surroundings.

During the Vijayanagara period, the use of brick and mortar along with stone became popular, even in the construction of temple. Brick and mortar, was liberally used by the architects. While the part of the temple building, upto the roof was constructed out of dressed stone, the superstructures, like the *hāra*, *vimāna-prāsāda*, and *gōpura-prāsāda*, were all constructed using brick and mortar. The versatility of the soft medium was such that they were used in the construction of the *nābhichchanda* roof also (Pl.-11). A few ruined temples at Hampi have evidence for the use of stone and lime mortar. For the construction of the *nābhichchanda* roof, for the two lower courses, stone slabs are used while the final central slab is moulded in brick and mortar. In this, the load of the *prāsāda* above is borne by the stone *nābhichchanda* (Pl-12) part and the slab made of lime mortar serves just as a coping for the central aperture of the *nābhichchanda* roof (Pl.-13).

Another type of roofing, generally referred to by the name *bhuvanēśwari* is also noticed. This type of a roof occurs in Kalyana Chalukya and Hoysala temples of Karnataka. As the region of our study was not a part of the heartland of the Hoysala Kingdom, *bhuvanēśwaris*, are not noticed in the temples of the region of our study. This is an improved version of the *nābhichchanda* roof. In the

construction of *bhuvanēśwaris*, the diagonal slabs cover the central portion bit by bit. Therefore, the courses are also more in number. This results in a big domical void in the bay, at the same time, the roof of that portion swells up on the top.

The domical interior of the surface is neatly finished according to the design of the artist with varieties of delicate carvings. This type of roof was necessary for the structures built out of soap stone. As the medium used is soft, the beams used cannot bear heavy load. Therefore, smaller beams projecting very little from the lower courses are designed in the construction of the *bhuvanēśwaris*.

There is one more method of constructing *bhuvanēśwaris* by the Hoysala artists, but not noticed in the region of our study. As the method adopted is quite unique and ingenious, it deserves to be mentioned here. In this method, rib-like stone pieces, broad at the base and pointed at the top are arranged side by side to form a hemisphere. The outer portion is covered by lime mortar to make it water proof. The inner portion is carved with varieties of designs and decorations. This type of construction is noticed in the Amruteshwara temple at Amruthapura.

Another interesting but unique method of construction of the roof built during the late Vijayanagara period, is noticed in the huge temple halls built under the royal patronage at Hampi. These temples, of course, do not come under the purview of our study, but because that this study covers the architecture of the Vijayanagara style also, the technology of construction of that type of a roof deserves mention here. These roofs are provided for the *kalyānamanāpā* of the Achyutaraya temple - (1550 A.D.) and the *mahāmanāpā* of the Pattabhirama temple of 16<sup>th</sup> century A.D. at Hampi (Pl.-14). In the construction of the roof, for the broad central nave of these two *manāpās*, this method is used (Pl.15). In the construction of the roof, huge, lengthy beams have been used to cover the space across the nave. The interspaces of these beams are covered by smaller stone slabs. But the effect is such, that the whole ceiling is flat and devoid

of any bays. The entire surface was probably plastered with lime mortar and paintings were made for decoration.

In the construction of this roof, a method which has not been noticed anywhere in the temples of Vijayanagara period is adopted. In this method the two colonnades that flank the broad nave, support huge stone beams placed across the nave, above the opposite pillars. These stone beams are very heavy, massive and sectioned like the inverted English letter T. The two lower flanges of the parallelly running beams act as support for the short stone slabs placed perpendicularly in between the two beams. To maintain a uniform flat surface for the ceiling, the stone slabs are sectioned in the shape of the English letter T. The projecting flanges of the slabs sit on correspondingly shaped flanges of the beams and the thickness at the suspended part of the slab is maintained in such a way that it suits the lower level of the T beams. The upper surface of the roof was made waterproof by using lime mortar and the lower part was plastered and even possibly painted with frescoes.

This method of construction of roofs is ideal for spacing the wide naves of the temple halls. This method is nowhere noticed in the Texts on Hindu architecture, and the precedent to the use of this method is not found anywhere during the pre-Vijayanagara days. Even the huge halls of Vijaya Vittala temple and the Krishna temple at Hampi do not have halls with ceilings built in this method.

The date of construction of the Achyutaraya and Patabhirama temples is the middle of 16<sup>th</sup> century. By this time, the Vijayanagara Empire had established contacts with the West, through European travellers. It is possible that this technology might have come from the West, where, building technology was in a more advanced state. If the surmise is proved right, it is to be appreciated that, the Hindu architects were quite open minded to receive good ideas, whatever be the source of their origin.

While mentioning the spanning of the spaces in Hindu architecture, it is necessary to give another method of spanning the gap followed in Hindu architecture. It has been clearly established that Hindu architecture, with rare exceptions, is basically, trabeate in character. In this method, all the spans between the two verticals were covered with the help of a horizontally running beam. During the period of Islamic rule in India, method of spanning the gaps between the two verticals of the structure totally changed to accurate system. In this method the gaps between the pillars, piers and the walls were spanned with the help of arches and domes (Pl.-16).

Construction of arch is as ancient as the Roman period. In Indian architecture, occasionally, the use of true arch is made. But traditional Hindus preferred to have corbelled arch, to span the gaps.

In the architecture of the Vijayanagara period, due to the influence of Islamic architecture, the use of arches and domes was introduced in the construction of secular buildings. It was believed that the traditional Hindus did not make use of the arches in the construction of the religious edifices. But it is observed that even arches were used in the construction of the temples of Vijayanagara period. The highly mutilated eastern *gōpura* of the Vittala temple at Hampi has *jālavātāyanas* provided for the different storeys of the *prāsāda* of the *gōpura*. Here, the use of both the stone lintel as well as a shallow brick arch above it for additional support is made. Likewise, the *vātayana* of the second *tala* of the same *gōpura* has a true arch also. From this it becomes clear that the Hindu religious architecture was also influenced by Islamic architectural technology during the Vijayanagara period.

*HĀRA* / PARAPET - Parapet of the temple may be built out of stone or brick and mortar. As is known, parapet of the dravidian temple consists of a design which looks like a chain or garland (*hāra*) of miniature pavilions having *śāla*, *kūtā* and *pañjara* types of canopies. These pavilions may be carved out of a single block of

stone and arranged in a row, or they may be even masonry in nature. Architectural, sculptural and decorative details found on a regular pavilion are all carved on these pavilions, in an abridged scale. If the *hāra* is of brick and mortar it is completely plastered with lime mortar, and the sculptures and decorations on it are moulded on them. The interspaces of the pavilions of the parapet are filled by a handwall called *hārānthara* and the interspaces are generally covered by a coping. The outer surface of the handwall is sometimes decorated with *vr̥ttasput̥itas*, *nāsis*, etc.

*PRANĀLA* / WATER DRAIN - *Pranālas* are provided to the structures at required places. These are often conventional. Sometimes, artistically decorated *pranālas* are fixed into the parapet of the building to drain out the rain water. They are monolithic in nature having a deep-cut groove, on its top. Sometimes, the tip of the *pranāla* is carved like the face of a lion. Solitary instance of a sculpture of a lady, sitting on the drain, easing herself is also noticed. This is a good example to the freedom the artist enjoyed, even to represent their idiosyncrasies in temple art.<sup>9</sup>

*Pranāla* to a temple may be placed at any direction. But the west, with rare exception, is avoided. In case the west cannot be avoided, it is slightly oriented to the north west. (eg: Bhogandeswara temple at Bhagamandala, Coorg)

*PRĀSĀDA* / TOWER - *Prāsāda* is the multistoreyed tower built above the sanctum. It is the superstructure built above the groundfloor, *ādi-tala*, of the sanctum of the temple. In the *s̥ad̥varga*, the *prāsāda* is not included. *Preside*, in this context, consists of tiers built above the sanctum. It extends up to the *grīva* of the *vimāna*. The dravidian *vimāna* is often built in multiple tiers. These tiers may be built solid or hollow inside, depending upon the choice of the architect. The medium of construction for the *vimāna* also depends upon the architect's choice. In the construction of the *prāsāda*, two methods are followed. The first one

is the *prāsāda* having cellas in the *talas*. The second is the hollow *prāsāda*, like a chimney.

The *talas* are built one above the other on a reducing scale. Each *tala* is a replica of the *tala* of its base and all the *talas* possess a cella inside. A good example to this type is the Vaikunthaperumal temple at Kanchi. Here, three *talas* of reducing sizes are built, one above the other and all the tiers have a cella inside. Likewise, the Meguti Jinalaya at Aihole (634 A.D.), the Jinalaya at Pattadakal (Cir. 900), the Chavundavarya Basadi at Shravanabelagola (Cir. 1000) and the Brahma Jinalaya at Lakkundi, all have a cella in the first floor. All these examples are from Karnataka and they are all Jaina in creed. No temple of the Hindu creed, having cellas in the first and succeeding floors is found. Therefore, it may be said that, the practice of having multiple *talas* was a norm of the early days in Tamilnadu. It reached Karnataka also, but it was practiced by the Jains and not by the Hindus. Even in Tamilnadu, after 9<sup>th</sup> century, this practice was totally dispensed with. Also, after about 900 A.D., the tradition of constructing the entire *prāsāda* hollow came in to vogue.

In the second variety, the interior of the sanctum is like a big and tall void throughout. There will be no roof for the sanctum, immediately above the wall, the final coping above the *prāsāda* caps the hollow of the sanctum. In the construction of this type of *prāsāda*, generally, corbel arch method was used. The use of true arch for the coping is also noticed in temples of the Vijayanagara period. The *grīva* of the *prāsāda* may sometimes have *vātāyanas*.<sup>10</sup> There are also hollow *prāsādas* without the *vātāyana*.<sup>11</sup> Example of this type of hollow tower is not found in the region of our study.

There is one more variety in the hollow *prāsāda*. In this method, a *nabhichchanda* or a flat roof is provided to the sanctum, immediately above the *bhitti*. Above this ceiling, the *prāsāda* is built completely hollow upto the *śikhara*.

This is done with the intention of keeping the sanctum clean and safe. If it is hollow throughout, the big void of the *prāsāda* becomes an ideal nest for the spiders, bats and other nocturnal creatures. Generally most of the *prāsādas* constructed in this method are of brick and mortar, and they will be hollow in nature. Number of *vimāna prāsādas* constructed out of brick and mortar, are found in the region, but none of them are accessible for examination of their interiors.

Above the *prāsāda*, a suitable *vēdi* is constructed for placing the *grīva* and *śikhara*. The *vēdi* is also constructed either in stone or in brick and mortar. *Vēdi* is a platform. It supports the *grīva*. Corners of the *vēdi* are decorated often with the sculptures of the *vāhanadēvatas* or the *ganās*. *Vēdi*, on plan, corresponds to the plan of the *grīva* and *śikhara* above.

**GRIVA / NECK** - *Grīva* is the part between the *vēdi* and the *śikhara*. It is a prominently recessed, tall portion. Its plan corresponds to the plan of the *śikhara*. The *grīva* consists of *grīvakōśās*, in which, often, the sculptures of *grīvadēvatas* are installed.

**ŚIKHARA / COPING** - *Śikhara* is the coping for the entire *vimāna*. It may be monolithic or masonry in nature. The bottom of the *śikhara*, on plan, may be round, octagonal, square or rectangular or even apsidal. But the top of the *śikhara* is always made rounded. The central part of the coping on the top contains a mortised hole. It is called by the name *brahmarandhra*. Into this socket, a pivoted *stūpi* is fixed. *Stūpi* is always globular. It is fixed to the top of the *śikhara* with the help of a tenon of stone or metal. *Stūpi* may also be in the form of a pot (*kalaśa*). At the mouth of the pot, a lotus bud (*mukula*) is kept with its tip pointed upwards.

**GŌPURA / GATEWAY TOWER** - *Gōpura* is the tower constructed above the entrance gate of the *prākāra* of the temple. *Gōpura* consists of two parts. The vertical base constructed out of stone and tall tapering super structure above,

generally built out of soft media. The method of construction of *gōpura* is similar to the method followed in the construction of the *vimāna prāsādas*. The vertical base of the *gōpura* also consists of *upapītāha*, *adhistaḥāna*, *bhitti*, *prastara*, and *hāra*, constructed on a common or adjacent plinth. Two identical plinths are built with a central broad opening to serve as a path. The two parts together will have a common roof covering the central path also. The two basal units of the *gōpuras* are not totally solid in nature. They are provided with thick solid walls with a cella, opening to the central passage or the gateway. The base of the *gōpura* may be constructed in one or two storeys. Above this solid base of stone, the *prāsāda* of the *gōpura* is constructed in multiple tiers. Normally, these tiers will be in odd numbers. The tiers of the *gōpura* are constructed in the same method as that followed in the construction of the tiers of the *vimāna*. That is to say, externally, they are also built having all the details of *bhitti*, *prastara*, but on a reducing scale, as they go up. The tiers of the *gōpura* are always built hollow. Each tier is separated from the other through a ceiling and flooring. The ceiling is supported with the help of wooden beams and planks. Provision of *sōpānas* or a ladder of wood is always made to connect the different *talas*. Each *tala* is provided with a *vātāyana* in the central part of the front and backsides. The exterior portions of each of the *talas* are often decorated with architectural and sculptural decorations made of lime stucco. They are also painted with different colours. After reaching the required height, the *vēdi* above the *gōpura-prāsāda* is constructed. Like the base, the *vēdi* is also rectangular. Above the *vēdi*, separated by the *grīva*, the coping of the *gōpura* is built. As the coping is oblong, it looks like a wagon-vaulted roof, with semi-circular gables at the two ends. The gables are designed like huge *kūdās* (*māhanāsi*) with a *kīrtimukha* cresting. Adjacent to the *kīrtimukhas* on their back, big cow-horn-like crestings are placed. In the interspace of the two cow-horn crestings, on the ridge, *kalaśas* are placed. These *kalaśas* may range in number from one to eleven or even more. But they will always be in odd numbers. But the Texts say that they may be in even numbers also.<sup>12</sup>

*PRĀKĀRA* / ENCLOSURE WALL - *Prākāra* is the enclosure wall built all-round the courtyard of the temple, not only to fix the boundary of the temple but also to provide safety and security to the temple. *Prākara* of different forms and dimensions are found. *Prākāras* were sometimes used as defence walls in the case of enemy invasions. *Prākāra* wall, like the temple wall, is also constructed in two parallel layers, the interspace of which is filled with lime mortar or debris. The section of the wall is slightly battered. The *prākāra* is finally covered by a suitable coping. Instances of construction of *prākāra* solidly with blocks of stone are also noticed<sup>13</sup>.

*JĀLAVĀTĀYANAS* / PERFORATED WINDOWS - *Jālavātāyanas* are perforated windows fixed into the wall of the temple for allowing dim light into the interiors of the temple. They are also called by the name *jālakas*, *gavaksas*, etc. No constructional methodology or the method of carving of the *jālakas* is given in the Texts. But the Texts describe different types of the *jālakas* based on the type of decoration they contain. The details of the types of *jālavātāyanas* are discussed in the chapter on *Bhitti*. *Jālakas* are fixed into the openings made specifically for them in the wall. They are generally square or rectangular openings, though circular ones are also noticed. This opening is built common to both the inner and the outer layers of the wall. The core of the wall is also neatly covered with dressed stone. Into the openings made in the wall, *jālakas* normally carved out of a single slab of stone is firmly fixed. As a foreground to the *jālakas*, the *tōranas* are also found carved on the surface of the wall. Architectural designs such as a pair of pilasters supporting an *uttara*, *kapōta*, *makaratōranas*, etc., are commonly noticed. Sometimes, even without the architectural foreground *jālakas* are directly fixed in to the openings.

The Nolamba artists were adept in the carving of the *jālakas*. Inspired by the Badami Chalukyan *jālakas*, the Nolambas also carved the *jālakas* of their temples,

but the *jālakas* of the Nolamba school are superior in every respect to those of the preceding Rashtrakuta and Badami Chalukya schools. Rajendra Chola, a great lover of art, took away as war trophies several of the Nolamba *jālavātāyanas* from Nolambavadi and one of them is still found in the premises of the Brihadishwara temple at Tanjore.<sup>14</sup>

The Nolambha *jālavātāyanas* contain generally two types of decorations. The first is predominantly floral in theme and the second, figural. The slab of the *jālavātāyanas* contain, within, all the details of an architectural niche like two pilasters supporting an architrave and *kapōta* above. The bottom of the pilaster may also sometimes contain the reliefs of the *nidhis*. In the centre of this framework, the design of a vigorous, undulating, creeper scroll with *patra*, *pusāhpa*, *phala* motifs and also tiny figures of musicians playing on musical instruments, dancers, *ganās*, etc., are carved. Quality of this type of *jālavātāyanas* is seldom seen in any school of south Indian art. The other type of *jālavātāyanas* consists of a similar architectural representation with a divine figure in *sthānaka* position. The sculptures are very neat and simple in execution. *Mithuna* sculptures were also the theme of the Nolamba *jālavātāyanas*. Without the architectural set up, just with a tastefully bordered frame, *jālakas* are also prepared. In the carving of the *jālakas*, the Nolamba artists chose a different stone medium than the one used for the construction of the building, and this was useful for intricate carving and also takes good polish.

The *jālakas* of the Ganga, Chola, Hoysala and Vijayanagara schools of art are available. But they are not of superior quality. However, the subject matters of these *jālakas* are varied and also interesting.

- 
- <sup>1</sup> Śrī Kāśyapaśilpa Sastra 1<sup>st</sup> edition Ch-4, page – 141- 189.
  - <sup>2</sup> From here onwards the constructional methodology, unless and otherwise provided with textual references, is all based on the facts obtained from the existing temple models found at different places.
  - <sup>3</sup> Ammanshrine, dilapidated Śiva temple at Tonnur.
  - <sup>4</sup> Jinalaya at Manne, Nelamangala taluk, Kolar dist.
  - <sup>5</sup> Ammanshrine, dilapidated Śiva temple at Tonnur, Mysore.
  - <sup>6</sup> In the Raganathaswamy temple at Rangasthala, Chikkaballapura taluk, Kolar district, vertical courses of slabs are noticed.
  - <sup>7</sup> Dilapidated Śiva temple near Someshwara temple complex Kurudumale, Mulubagilu taluk, Kolar dist.
  - <sup>8</sup> Temple opposite to the Hazara Ramaswamy temple at Hampi, Hospet, Karnataka.
  - <sup>9</sup> Bhoganandishwara temple complex at Nandi, Chikkaballapura taluk, Kolar dist.
  - <sup>10</sup> Ananthashayanagudi – 1524 A,D, at Ananthashayana, Hampi, Hospet, Karnataka .
  - <sup>11</sup> Brihadishwara temple at Tanjore, Tamil Nadu.
  - <sup>12</sup> Mānasāra Ch-XXXIII, Ślōka – 536 -564.
  - <sup>13</sup> Gangadhareshwara temple at Teruhalli, Kolar dist.
  - <sup>14</sup> Sivaramamurthy C : Nolamba Sculptures in the Madras Government Museum, Madras – 1964, page 3.