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## Chronicles of Kalinga temple architecture

### Ankita Chand

#### Abstract

Kalinga (core area covers present-day Odisha) is known for its distinct and impeccable temple architecture embellished with the exquisite sculptures and explicit ornamentation. It outspread from sixth to fifteenth century CE. The present paper attempts to describe the intricacies of Kalinga temple architecture including the basic structure, salient characteristics, construction techniques and phases of evolution, besides others. Based on fundamental structure, temples are broadly categorised into *Rekha deula* (tall building looking like mountain peak), *Pidha deula* (square building with pyramid-shaped roof) and *Khakhra deula* (rectangular building with truncated pyramid-shaped roof). A typical full-fledged temple has four distinct components, *Vimana* (sanctum), *Jagamohana* (hall of congregation and worship), *Nata mandira* (dancing hall) and *Bhoga Mandapa* (hall of offering). The temple elevation shows interesting resemblance with the limbs of human body. It can be divided into four parts along the vertical plane such as *Pista* (Platform on which temple stands), *Bada* (wall which is divided into horizontal sections), *Gandi* (trunk which is the tower of the temple) and *Mastaka* (head with capping elements). Hierarchy of command in temple construction are *Karta* (chief patron), *Mukhya Sthapati* (chief architect), *Sutra Grahani* (chief engineer), *Bardhanikas* (stone setters) and *Takṣaka* (the sculptor).

**Keywords:** Kalinga, temple architecture, *garbhagriha*, *jagamohan*, *natamandira*, *bhogamandapa*

#### Introduction

Kalinga is the ancient territory of east-central India. It covers most of the present-day Odisha, northern Telangana, northern Andhra Pradesh, and a portion of Chhattisgarh. Though the territorial boundaries of Kalinga have fluctuated with its rulers, the core area encompasses a large part of present Odisha and northern Andhra Pradesh [1]. In the *Mahabharat* (one of the two major Sanskrit epics of ancient India, the other being the *Ramayana*), the Kalingas have been mentioned as a major tribe. The other neighbouring tribes were the Angas (present-day Bihar), the Vangas (present-day South Bengal), the Pundras (present-day Bangladesh), and the Suhmas (present-day Bengal) [2]. Kalinga was annexed by the Mauryan emperor Ashoka in the 3<sup>rd</sup> century BCE as a result of Kalinga war. The headquarters of the Mauryan province of Kalinga was located at Tosali (perhaps present-day Dhauli, near Bhubaneswar in Odisha). After the decline of the Mauryan Empire, the region came under the control of the Mahameghavahana family, whose king Kharavela proclaimed as the 'supreme lord of Kalinga'. The Kalinga came under the control of Gupta in the 4<sup>th</sup> century CE. After the Guptas' withdrawal, it was ruled by several minor dynasties. These included the Vasishthas, the Matharas, and the Pitrbhaktas. In the 7<sup>th</sup> century, the Shailodbhava king Madhavaraja II as well as the Eastern Ganga king Indravarman claimed the title *Sakala-Kalingadhipati* (the lord of the entire Kalinga) [3]. During 8<sup>th</sup>-10<sup>th</sup> centuries, the Bhauma-Kara dynasty ruled the region, although they called their kingdom *Tosala* (derived from Tosali). The subsequent Somavamshi kings called themselves the lord of Kalinga, Kosala, and Utkala [4]. During 11<sup>th</sup>-15<sup>th</sup> century, the Eastern Gangas became the dominant power in the region. Their capital was initially located at Kalinganagara (present-day Mukhalingam in Srikakulam district of Andhra Pradesh), and was later transferred to Katak (present-day Cuttack) during the reign of Anantavarman Chodaganga in the 12<sup>th</sup> century [5]. The boundary of modern state Odisha does not always correspond to the ancient political divisions.

Etymologically the term temple is derived from the Latin word *Tempulum* which means a square or a rectangular place marked out for the purpose of worship [6]. In ancient Hindu *Sastras* (sacred text), the temple is referred as *Devagriha*, *Devalay*, *Devakula*, etc [7]. Hinduism includes not only religion, but also astronomy, astrology, grammar, mathematics,

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law, medicine, politics, diplomacy, war, love, architecture and many other branches of knowledge. Therefore, it is more than just a religion, it is a way of life. In Hinduism, the concept of Temple originated probably during the *Vedic* period with the idea of God perceived in human forms [8], such a form necessitated a habitation and a shelter that resulted in structural buildings. Therefore, temple represents all aspects of life - religious, cultural, educational and social. Apart from being a place of worship, the Hindu temple architecture, is also the cradle of knowledge, art and culture. Based on the architectural classification, Indian Hindu temple is divided into three principal styles, *i.e.* *Nagara*, *Dravida* and *Vesara* [9]. *Nagara* temple belongs to the region from the Himalaya to the Vindhya, *Vesara* from the Vindhya to the Krishna, and the *Dravida* from the Krishna to the Cape Camorin. However, an inscription of 1235 AD in the *mukhamandapa* of the Amritesvara temple at Holal in Bellary district of Karnatak speaks of a fourth style, *i.e.* Kalinga, in addition to the above three. The Kalinga has distinct form of temple architecture, known as Kalinga style of architecture, which is somewhat close to *Nagara* architecture of Northern India. It has a continuous succession, spreading from 6<sup>th</sup> to 15<sup>th</sup> century CE and flourished between 8<sup>th</sup> and 13<sup>th</sup> century CE [10].

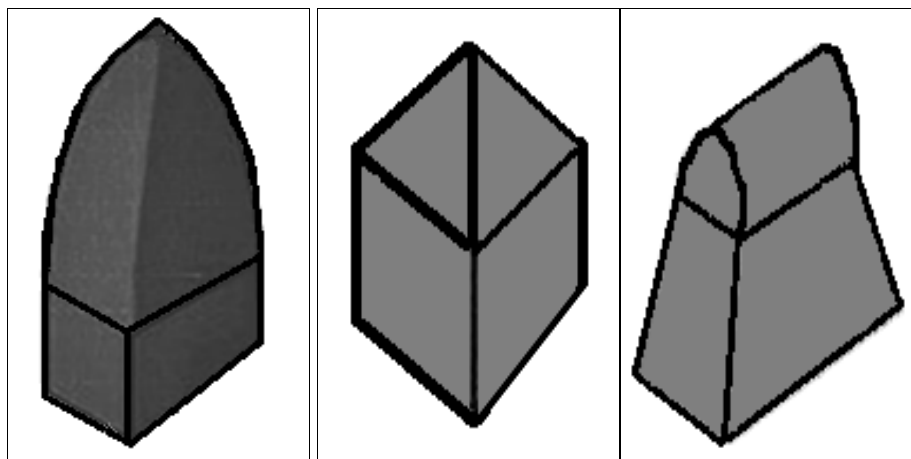
**Basic Temple Structure**

Depending on basic structure, Kalinga temples are broadly categorised into *Rekha deula*, *Pidha deula* and *Khakhra deula*. The word *deula* in Oriya language means a building structure. *Rekha* and *Pidha* type temples are essentially meant for accommodating *Visnu* and *Siva* deities. In contrast to these types, *Khakhra* type temples are few in number and usually accommodate *Sakti* deities (Goddess like *Gauri*, *Kali* etc.) [11].

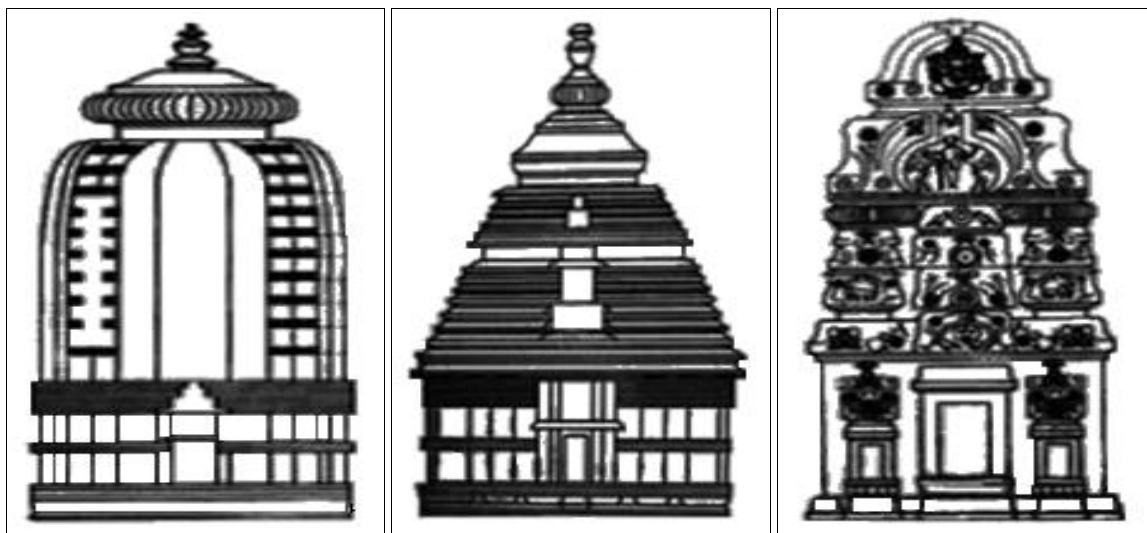
*Rekha deula* is a tall building with a shape of sugar loaf, looking like a *Shikhara* (a Sanskrit word which means mountain peak). *Rekha* in Oriya means a straight line. It covers and protects the sanctum sanctorum (*Garbhagriha*, the womb-house). The prominent example of *Rekha deula* is Lingaraj Temple of Bhubaneswar.

The *Pidha Deula* is a square building, typically with a pyramid-shaped roof. It is the mandapa where the faithful are present. The example of *Pidha Deula* is the *Jagamohana* (assembly hall) of the Konarak Sun Temple.

*Khakhra deula* is a rectangular building with a truncated pyramid-shaped roof, like the gopuras. The name comes from Oriya word *Khakharu* which means pumpkin/ gourd (a barrel shaped vegetable) because of the shape of the roof. The prominent example is Baitala Temple (dedicated to Goddesses *Chamunda*) of Bhubaneswar.



**Fig 1a:** *Rekha Deula* Basic Shape    **Fig 1b:** *Pidha Deula* Basic Shape    **Fig 1c:** *Khakhara Deula* Basic Shape



**Fig 2a:** *Rekha Deula* Sketch    **Fig 2b:** *Pidha Deula* Sketch    **Fig 2c:** *Khakhara Deula* Sketch



**Fig 3a:** Lingaraj Temple (*Rekha Deula*) **Fig 3b:** Konark Temple (*Pidha Deula*) **Fig 3c:** Baitala Temple (*Khakhara Deula*)

### Site and Material selection for Temple Construction

For selecting the suitable site for temple construction, various aspects like type of soil, location and shape of the Plot, ground water level, etc. are taken into consideration. Colour, density, composition and moisture content of the soil discriminate between the best, medium, sub-medium and worst kind of soil for temple construction. According to *Vastu Shastra* (traditional Hindu system of architecture), the world is made of 5 basic elements (*panchabhutaas*), i.e. earth, air, water, space and fire. These elements are necessary to be in harmony to enjoy health, wealth, good relationship and prosperity. The temple layout is based on the principles of *Vastu-Purusha-Mandala* of *Vastu Shastra* that ensures harmony amongst *panchabhutaas*. *Naga Bandheji* is an intricate and ancient method in *Shilpa Shastra* (traditional Hindu system of arts and crafts), by which the temples direction and the auspicious moment for beginning the sacred construction is determined. A rectangular, square, elliptical or circular plot of land is selected in order of preference for temple construction. Like the present day Geomorphology, probably this is some ancient science which guides the architect to understand natural forces and build stable massive temple structures. In many instances, such depictions are seen on walls and motifs of the temples. A square or rectangular area is dug out depending on the type and combination of temple proposed at the centre of the selected plot of land and the foundation of a temple, *pota* and *piṭha* is laid. The depth of the *Pota* (pit) is  $1/3^{\text{rd}}$  of the height of the proposed temple, from plinth level <sup>[12]</sup>. The length and width of this *Pota* is always sufficiently broader than the diameter of the proposed temple. Hard stone slabs are laid at the bottom to create a level. Then with uniformly cut hard stones, the four walls of the *Pota* are erected and the outer perimeter space between the pit wall and ground is properly filled with soil. The *Aṣṭadala Padma Chakaḍa* (eight petal lotus shaped stone slab) is then laid at the exact spot. The petals are aligned to the eight cardinal directions, i.e. north, north-east, east, southeast, south, south-west, west and north-west. The perpendicular line passing through the centre of this *Aṣṭadala Padma Chakaḍa* determines the axis (*rekha/meru*) of the temple. The traditional method of such alignment is termed as *Sanku*. Thereafter, the *Pota* is properly packed up with large pieces of stone and soil, probably pressed down by elephants. The *Pota* is levelled off at ground level with huge and thick cut theodolite stones. Theodolite is a precision tool utilised for measuring angles in the horizontal

and vertical planes. The *piṭha* (platform) is constructed with the layer of theodolite stones, corresponding to the shape and size of the ground plan. *Pitha* is the base of the temple which we see at various levels of elevation <sup>[13]</sup>.

Kalingan temples are built using stones, barring very rare cases where clay bricks are used. Certain classes of stones are considered suitable and auspicious for the construction of temples. *Shilpa Chandrika* (an ancient architecture book) listed varieties of stone as ideal and specified the types those are used for certain portions of the temple. Name of these stones are *Sahaṇa*, *Chhita Sahaṇa*, *Baḍa Paḡaḍa*, *Dhoba Kunda*, *Rasa Chiṇḍa* and *Niḷa Kusāṇa* <sup>[14]</sup>.

### *Vastu-Purusha-Mandala* in Temple Architecture

In Hinduism, a temple is a place for pilgrimage (*Tirtha*). It is a sacred site whose ambience and design attempts to display and celebrate the four important principles of Hindu way of life - the pursuit of *artha* (prosperity, wealth), the pursuit of *kama* (desire), the pursuit of *dharma* (virtues, ethical life) and the pursuit of *moksha* (release, self-Knowledge). The walk around in the temple for these necessary pursuits of life (*artha*, *Kama*, *dharma* and *moksha*) is called *pradakshina* or *parikrama*. The *Vastu Purusha Mandala* is an indispensable part of *vastu shastra* and constitutes the mathematical and diagrammatic basis for generating design.

According to Hindu mythology, in the beginning *Brahma*, the creator of the Universe, experimented with a new creature. He created a large cosmic man, who grew rapidly as he began to devour everything in his path to satisfy his insatiable hunger. When he became unmanageably big so that his shadow fell on the Earth like a permanent eclipse, the gods Shiva and Vishnu begged Brahma to do something before everything was destroyed by this Creature. Brahma realised his mistake and called the *Aṣṭa Dikapalakas* (the Gods of the eight cardinal directions). Together, they overpowered the monster and held it flat against the Earth while Brahma jumped on its middle. Then the Monster cried out to Brahma, 'You created me like this. So why am I being punished?' Brahma offered him a compromise and made the Monster immortal with the boon that he would be worshiped by any mortal that builds a structure on earth. He was named *Vastu Purusha*. According to *Vastu Shastra*, the 5 basic elements (*panchabhutaas*) of world are necessary to be in harmony to enjoy health, wealth, good relationship and prosperity. A *mandala* is a spiritual and ritual symbol in Hinduism representing the universe. For the construction of



Hindu Temples, the layout is prepared based on principles of *Vastu-Purusha-Mandala*. Based on astrological calculations the border of the *vastu-purusha-mandala* is subdivided into thirty-two smaller squares called *nakshatras*. These squares are generated from a repeated division of the border of the single square. It denotes four times the eight positions in space; north, east, south, west, and their intermediate points (4x8). The thirty-two squares symbolises the recurrent cycles of time as calculated by the movements of the moon. Each of the *nakshatras* is ruled over by a *Deva*, which extends its influence to the *mandala*. Outside the *mandala* lie the four directions, symbolic of the meeting of heaven and earth and also represent the ecliptic of the sun-east to west and its rotation to the northern and southern hemispheres. The centre of the *mandala* is called the station of *Brahma*, the creator of the universe. Surrounding *Brahma* are the places of twelve other entities known as the sons of *Aditi*, who assist in the affairs of universal management. The remaining empty squares represent *Akasha* or pure space. Therefore, *vastu-purusha-mandala* forms a diagram of astrological influences that constitute the order of the universe and the destinies of human lives.

In large temples, *vastu-purusha-mandala* is often an 8x8 (64) square grid structure. The squares are called *padas*. Each *pada* is conceptually assigned to a symbolic element, sometimes in the form of a deity or to a spirit (*apasara*). In Hindu temple manuals, design plans are described with 1, 4, 9, 16, 25, 36, 49, 64, 81 up to 1024 *padas*; 1 *pada* is considered the simplest plan, as a seat for a hermit or devotee to sit and meditate on, or make offerings with Vedic fire in front. The second design of 4 *padas* has a symbolic central core at the diagonal intersection, and is also a meditative layout. The 9 *pada* design has a sacred surrounded centre, and is the template for the smallest temple. Older Hindu temple *vastu mandalas* use the 9 to 49 *pada* series, but the 64 *pada* is considered to be the most sacred geometric grid and is called *Manduka* [15].



Fig 5: Circle and squares in *Brahma Padas* of Hindu temple

In a Hindu temple's structure, each concentric layer has significance. The outermost layers, *Paisachika padas*, signify aspects of *Asuras* (devil) and evil; the next inner concentric layer is *Manusha padas* signifying human life; while *Devika padas* signify aspects of *Devas* (God) and good. The *Manusha padas* typically houses the ambulatory. The devotees walk around in clockwise fashion through *Manusha padas* to complete *Parikrama* (or *Pradakshina*), which is located between good on inner side and evil on the outer side. In smaller temples, the *Paisachika pada* is not part of the temple superstructure. The *Paisachika padas*, *Manusha padas* and *Devika padas* surround *Brahma padas*, which signifies creative energy and serves as the location for temple's primary idol for *darsana*. Finally at the very centre of *Brahma padas* is *Garbhagriha*. The spire of a Hindu temple, (called *Shikhara* or *Vimana*), is perfectly aligned above the *Brahma padas*.

**Hierarchy of Command in Temple Construction**

According to *Manusmṛti* (an ancient legal text among the many *Dharma sastras* of Hinduism) there is a specific hierarchy of Command for the people involved in temple construction [16]. The Chief patron of the temple, generally the king of the state is designated as *karta*. Hence these devotional ancient architectures often reflect various socio-cultural aspects of society of the time. The Chief Architect (*Mukhya Sthapati*) is the master of the *Shilpa Shastras*, *Vastu Shastra*, *Dharma Shastra* and mathematical calculations. Besides being a very knowledgeable person, *Mukhya Sthapati* is also a very pious man. He translates the vision of the *karta* into an architectural design based on stipulations of *Vastu-purusha-mandala*. *Sutra Grahani* is equivalent to Chief Engineer, as he is the person who translates the architecture into actual geometrical dimensions. He is equally proficient in all the required knowledge and most often is the son of the *Mukhya Sthapati*. The masons (called as *Bardhanika*) are the stone setters. The sculptor (called as *Taksaka*) is the stone artist who creates poetry in stone and does all the magnificent carvings and engravings of various forms that left us spell bound. Besides these primary set of specialists, various supportive functions are carried out by other people.

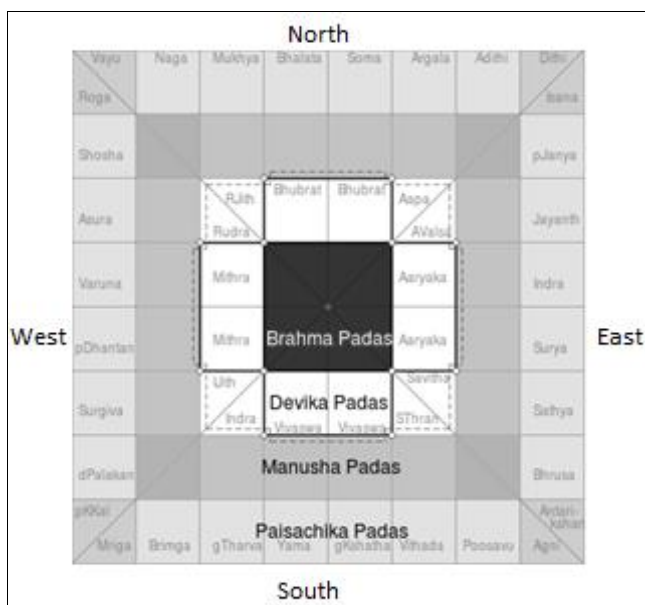
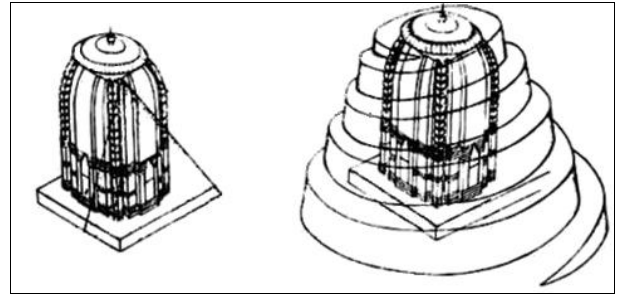


Fig 4: 8x8 (64) grid of *Vastu-purusha-mandala* for Hindu Temple Floor Plan

### Construction Techniques of Temples

The available information of temple construction are collected from stone slabs, metal plates, palm leaves and manuscripts. The construction of temple was a long and tremendous process which sometimes used to last for years. The temple architecture portrayed the advancement of ancient Indian building sciences. One of the chief factors which provided these temples considerable degree of earthquake resistance was their configuration. The selection of symmetrical plans and layouts was important in seismic design. Symmetrical forms were always preferred from earthquake resistance as asymmetrical forms produces eccentricity between the centre of mass and centre of rigidity which results in the torsion and tends to stress the concentration. The square is selected as the basic unit and of triangle as the principle controlling the layout which concluded in strictly symmetrical plans. The layout was done on the basis of Indian Circle Method and with the help of instrument known as 'Shanku yantra'. The nature of main deity played a major role in determining the orientation of temple. The stone which was to be used for construction must have some quality features such as even colour, hard and perfect and pleasing to touch. The second stage was the carving of different parts of the temples according to the drawings and specification. The cutting and carving the stone was done according to pre defined shape. The joining was also pre decided and rough joinery was created while cutting. The tools required such as hammers, chisel were locally made and sharpened regularly. The sketching was done either by charcoal piece or sharpened bamboo pieces. The polishing was done using stone bars. The third and the final stage consisted of assembling of the parts which consisted of the actual construction of the temple. Ramps were constructed for the easy placement of heavy materials. The major joinery system used during the assembling of temple were mortise and tenon joint (peg is fixed between the two mortise cut out in two different stones and was used primarily used between two courses of masonry to avoid movement due to lateral forces) and lap joint. The usual thickness of stone used for wall varied from 800 mm to 1200 mm. The columns and beams were monolithic structure. The column consisted of 5 parts as two parts of base, one part as shaft and two as the capital of column.

Innovative techniques were used in temple construction. Generally *Rekha* temples are curvilinear, *Pidha* temples are pyramidal and *Khakhara* temples are noted for semi-cylindrical roof. The interior ground plan of *rekha* and *pidha* temples are generally square and exterior is embellished with vertical projections, while that of *khakhra* temples, it is rectangular (some with stellar or circular plans). Irrespective of styles, all the temples are remarkable for abundance of sculptures. The construction techniques are based on 'corbelling' principles (tying the walls with ceilings and stones held together by a system of counterpoise through balance and equilibrium) without mortar<sup>[17]</sup>. Required stones are quarried and carried to the temple site through the river or by the land routes. The temple is buried with earth or sand as it progresses in height. An inclined plane is made through which the stones are dragged to the required heights. On completion of the temple, the earth and/or sand is removed from the site<sup>[18]</sup>.



**Fig 6:** Sketch of Solid mud ramps/sand filling design used to carry stone slabs for temple construction

### Intricacies of Temple Architecture

The typical Kalinga style temples normally consist of two distinct components *i.e.* first the main temple or the sanctum (*Vimana*) which is of *rekha* order and the second temple is the *Jagamohana* or the *mukhamandapa/mukhasala* which is usually of *Pidha* order. Whereas the *Garbhagriha* is meant for accommodating the deity and performing the rituals associated with the deity, the *Jagamohana* is used by the devotees for congregation, worship and *darshan* of the deity. In course of time with the gradual evolution and also to meet the growing need of the rituals of the prime deities, two more *pidha* structures such as *Nata mandira* (dancing hall) and *Bhoga Mandapa* (hall of offering) were added to the temple structures. Though all four structures (*garbhagriha*, *jagamohan*, *natamandira* and *bhogamandapa*) were completely independent from each other, they were beautifully integrated to form a harmonious and compact entity<sup>[19]</sup>. These were placed mostly in same axial alignment and the general view of the structures from a distance gives an impression of a mountain range. Generally the temple complexes were enclosed by frontier walls but devoid of *Gopurams* (entrance tower), which are common in South Indian temples.

The constructive peculiarities of Kalinga temple is marked by uniqueness. The architects perceived the temple in the form of a human male figure or *Purusha*. Like human physical divisions of leg, thigh, waist, chest, neck and head, the temple had similar shapes and structures. Therefore, the elevation of Kalinga temple shows striking resemblance to that of the limbs of human body. Each vertical part of the temple has specific name corresponding to the body limbs. The main temple is always of *Rekha* designs with these special features such as- Pavement or *Talapattana*, Plinth or *Pitha*, Cube or *Bada*, Curvilinear Tower or *Rekha* or *Rathaka*. From the ground *Vimana* rises vertically to a height than is a curvilinear design up to the neck. From the base to the *Gandi* or trunk portion the rise is perpendicular and then the temple slowly inclines inward in a critical manner till the four reclining walls join together at the *Beki* or neck. Denticulated blocks of stone above the *Beki* are called *Amalaka Sila*. Above the *Beki* is the portion called *Mastaka* or crown which consists of the *Amlaka* (inverted *Kalasa*). On the top the *Kalasa*, comes the weapon of the deity (*Ayudha*) - trident or *trishul* in case of a *Siva* temple and disk-like weapon or *Chakra* in case of a *Vishnu* temple. Over that a flag (*Dhvaja*) is placed as auspicious mark. Thus a temple is represented as a *Purusha*. For *Pidha* type of temple, curvilinear *Vimana* is not there. The *Gandi* or trunk

rises from the ground perpendicularly upto a point and then the pyramidal roof is constructed on the four walls that looks much alike the shape of a thatched house from a distance.

In the full-fledged temples, the *Rekha* and *Pidha* (*Vimana* and *Jagamohan*) structures reveal interesting features. Both the *Vimana* and *Jagamohan* are divided into four parts along with the vertical plane such as *Pista* (Platform on which temple stands), *Bada* (wall which is divided into one or more horizontal sections), *Gandi* (trunk which is the tower or spire of the temple) and *Mastaka* (head with capping elements of *Amalaka* and *Kalasha* from bottom to top). In the early temples, the *Bada* is of three elements viz. *Pabhaga* (foot), *Jangha* (thigh), and *Baranda* (waist). Later on as the temples gained much height, the *Bada* became

higher. The *Jangha* portion got divided into *Tala jangha* (lower thigh) and *Uppara jangha* (upper thigh), with set of moulding called as *Bandhana*. *Pabhaga*, denoting the bottom part of the wall section is distinctly composed of five mouldings called as *Khura*, *Kumbha*, *Pata*, *Kani* and *Basanta*. These five mouldings are jointly called as *Panchakarma*. However, in the formative stage of architecture, the *Pabhaga* was consisting of either three or four moulding. *Pista* (Platform) is the plinth section of the main structure. In earlier period, *Pista* was not a general feature of temple architecture which got appearance during the period of Ganga dynasty. In *Bhuvapradeep* (a canonical text), there is reference to eight numbers of *Pisthas*. These are *Padma Pistha*, *Simhapistha*, *Bhadra Pistha*, *Vedipistha*, *Khura Pistha*, *Kumbha pistha* and *Parjangha Pistha*.

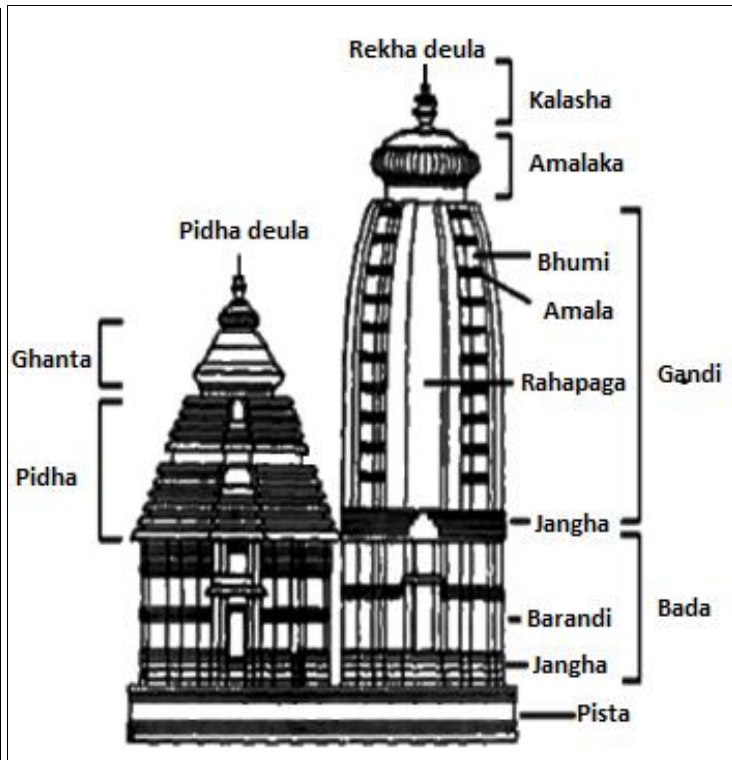
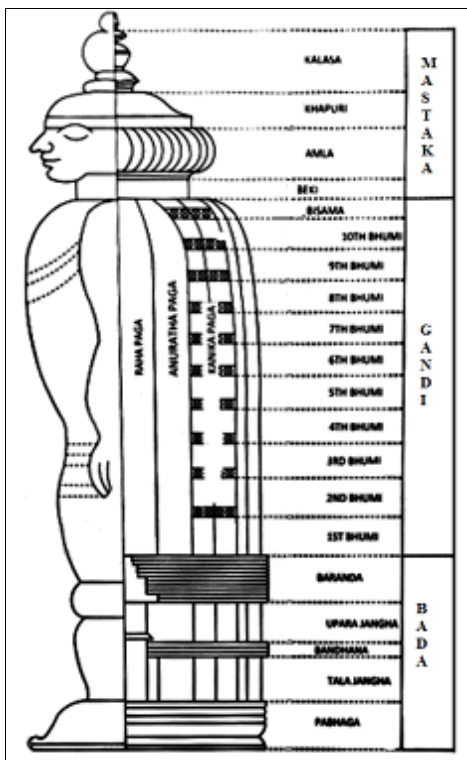


Fig 7: Comparison between a human body and a temple structure

Fig 8: Comparison between Rekha and Pidha order of temples

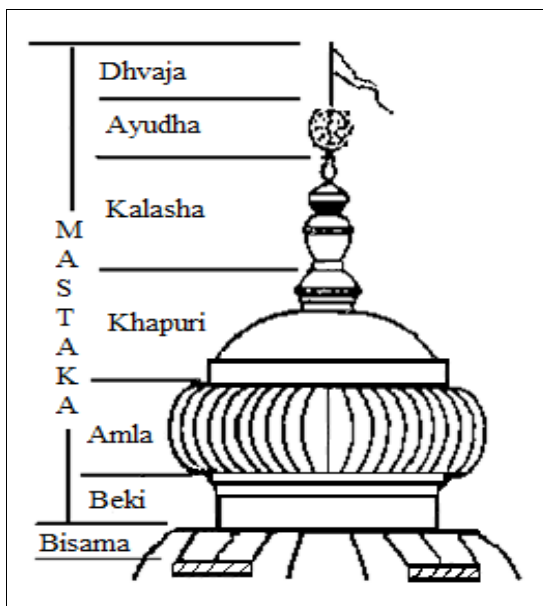


Fig 9: Detail of Mastaka

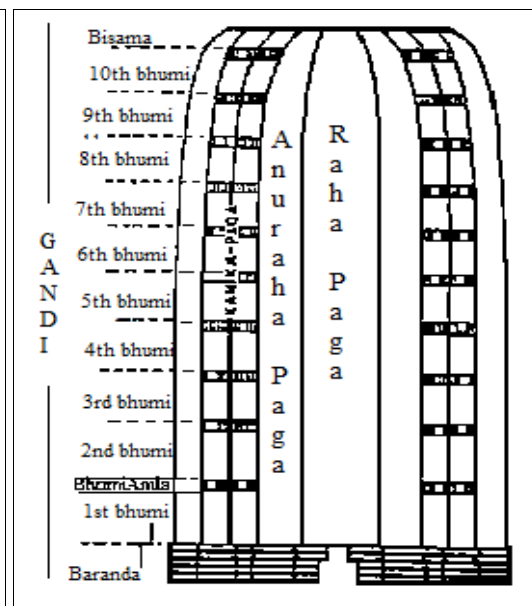


Fig 10: Detail of Gandi



The *Rekha* and *Pidha* order of temples display variations only in the nature of *Gandi* and *Mastaka*. The *Gandi* of the *Rekha* temples is characterised by a curvilinear outline and is usually inclined inward in a convex curve being pronounced clearly towards the top. This part underwent several changes in the course of its evolution. During the formative stage, the *Sikhara* was characterised by simple form, which assumed a soaring quality in the most representative specimens of the full-fledged Kalinga style [20]. In the temples of the mature phase it is found to have been more pronounced towards the top. The central projection of the *Sikhara* called as *Raha Paga* is normally relieved with *Chaitya* (window) designs. In the temples of Somavansi and Ganga period, the *Raha* is decorated with lion motif projecting in to the air. Another significant feature is the decoration of the *Gandi* with *Angasikharas* (cluster of miniature *sikharas*). This typical feature is borrowed from the chandella temples of Khajuraho (in Madhya Pradesh State and famous for *Nagara* style temples with erotic sculptures). This was experimented in the Raja Rani temple of Bhubaneswar. This was undoubtedly a clear-cut departure from the Kalinga style. The clustering of *Anagasikharas* affected the broad contours of the *Sikhara* and the grandeur of the temple as a whole. So this clustering was abandoned thereafter, but the use of *Angasikharas* as decorative elements continued with differential treatments. The *Mastaka* (top section of the temple) consists of six elements, i.e. *beki*, *amla*, *khapuri*, *kalasa*, *ayudha* and *dhvaja*. The *beki* is the separating element from the *gandi* to the circular crowning element. It is the recessed cylindrical portion above the *Visama* and also known as *Kantha* (neck). Above this is placed the *amla* or *amlakasila* whose outer sides are ribbed and shaped like *amla* (*amalaki* fruit, scientific name *Emblic myrebalan*) or cutting shapes of the churning stick used for churning the curd. Above the *amla* is *Khapuri* which literally means skull. This is flattish and bell-shaped. The *khapuri* is mounted by the *kalasa* (the water pot), the most auspicious element of the temple. Sometimes the auspicious *kalasa* was made of gold. The crowning element of the *mastaka* section is the *ayudha* (the

sacred weapon of the deity to whom the temple is dedicated). The *Dhvaja* (flag) is placed at the pinnacle of the temple, above the *Ayudha*. Whereas most of the Siva temples are mounted by trident (*trisul*), Visnu temples are mounted by wheel (*chakra*) as *Ayudha*.

The *gandi* section of the *pidha* temples is characterised by its pyramidal shape. It is made up of a number of *pidhas*, which diminish in a pyramidal shape in ascending order till the topmost *pidha* is reduced to half of the lowest one. The *pidhas* of the later temples are normally grouped into several tiers' called as *Potalas*, which are separated from one another by recessed Vertical walls called *Kanti*. The *Pidha* temples are divided into five distinct types viz. *Dui chalia*, *Nahachalia*, *Kathachalia*, *Ghantasrimohan* and *Nadumohan*.

The Kalinga temples are remarkable for their plan and elevation. The temples are distinguished by vertical projections called *rathas* (on plane) or *pagas* (on elevation). The *Gandi* of *Rekha deula* is divided into several vertical projections (*pagas* or *rathas*). Depending on the numbers of projection, the Kalinga temples were called as *Ekaratha*, *Triratha*, *Pancharatha*, *Saptaratha* and *Navaratha*. The corner *pagas* (known as *kanika pagas*) are further subdivided into horizontal sections known as *bhumi* by miniature *amlas* (ribbed disc resembling *amla* fruit). The central *paga* is known as *rahapaga* and the next two as *kanika paga* and *anu-raha paga*. *Ekaratha* temples have square outer and inner plans. *Triratha* temples have one *raha paga* on the front and two *kanika paga*; while *pancharatha* temples have one *raha*, two *anuratha* and two *kanika pag*; the *Saptaratha* temples have two more *kanika paga*. The *Navaratha* temples have one *raha paga*, four *anuratha paga* and four *kanika paga* including two *parikanika paga*. Canonical texts associate the *rathaka* divisions of the temples with social divisions. The *Navaratha*, *Saptaratha*, *Pancharatha* and *Triratha* temples are provided with *Brahmanical*, *Kshyatriya*, *Vaisya* and *sudra* status in the religious and architectural fabric of the Kalinga state [21].

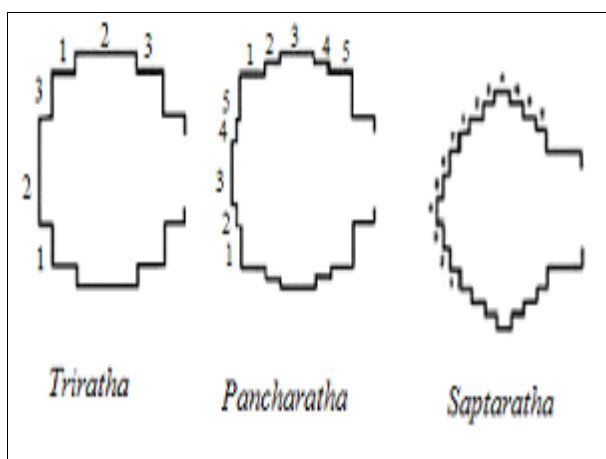
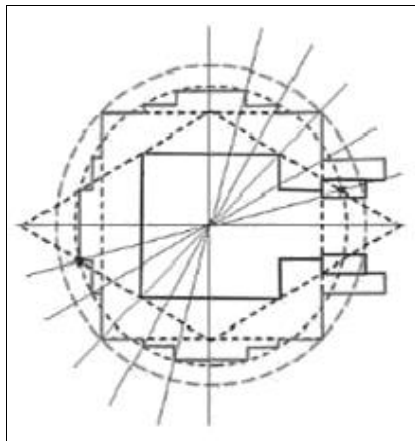


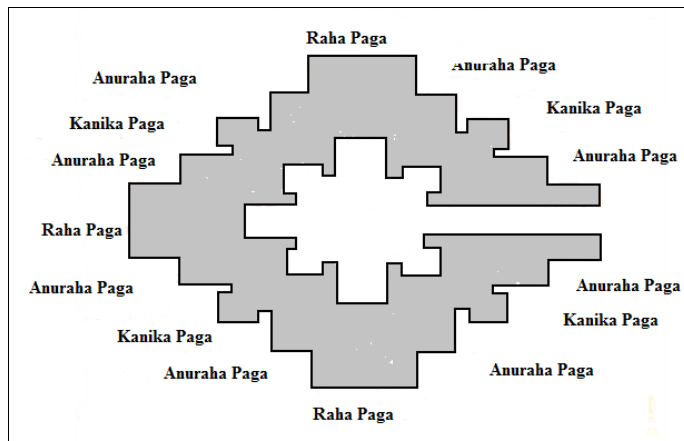
Fig 11: Ground plan sketch of Triratha, Pancharatha and Saptaratha Temples



Fig 12: Projections of a Pancharath Temple



**Fig 13:** Geometric Plane of Pancharath



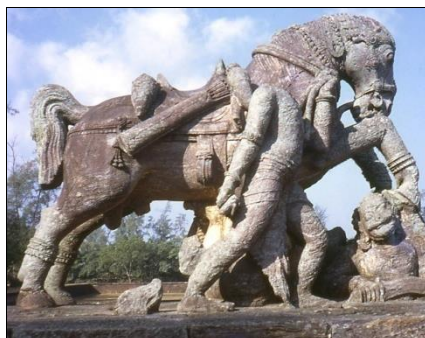
**Fig 14:** Ground plan of Pancharath Temple

With regard to the orientation of temples, there are no fixed rules. Although in most cases the temples face towards the east, but there are examples of temples facing towards north, south and west [22]. The other significant aspect about the temple building activity was that it had remained essentially an urban affair. Temples were built mostly in the centres of political and economic activity. Some of the important centres of Kalinga temples were Bhubaneswar, Jajpur, Khitching, Sonepur, Baud-Phulbani etc.

**Temple Sculpture**

The Kalinga temples are not only known for their architecture, but equally famous for sculptures with elaborate decoration which are meticulously crafted to perfection. The sculptures are of three types: constructive, representative and purely ornamental. These designs are governed by specifications laid down by *Silpasastra*. The vertical projections (*Pagas*) are designed as miniature

shrines with niches which contain different sculptures to beautify the temple. The canons of architecture contain details of designs and placement of icons and decorative motifs. In these temples, the sculptural art finds its supreme expression represented by the sculptures pertaining to various sects of Hinduism, the *Saivism*, *Vaishnavism* and *Shaktism* [23]. A wide range of sculptures adorn the temples which included *yakshas* and *yakhis* (the male and female deities associated with ancient fertility cults), heavenly musicians, cult icons, human poses and expressions, erotic motifs, soldiers, animal figures including mythical and composite figures and decorative designs like variety of scrolls and architectural motifs. The day-to-day themes like hunting, dancing, games, family life, etc. also got depicted through exquisite sculptures [24]. After 13th century there was a perceptible decline in the artistic merit of the decorative programmes of architecture.



**Fig 15:** Warrior and horse of Sun temple, Konark, also figured in Odisha State emblem



**Fig. 16:** Erotic sculptures of Sun temple, Konark



**Fig. 17:** Chariot wheel of Sun temple, Konark



**Fig 18:** Wall carvings in Jagannath temple, Puri



**Fig 19:** Sculptured griffin on main spire of Lingaraj temple, Bhubaneswar



**Fig 20:** Brahmeswar temple, Bhubaneswar



### Phases of Evolution of Kalinga Temple Style

The Kalinga temples exhibit a systematic and a methodical way of evolution of plan forms through different phases of architecture. P S Mishra in 2012, in his research paper, 'Shape and geometrical study of fractal cosmology through Orissan Temple Architecture' has analysed the temple based on Plan area ratio, relation between height & time of construction, present slenderness ratio and the relationship between width & length of the local build and how all these factors have lead to the evolution of the Kalinga temple architecture. In brief, the temples of Kalinga portray an organic evolution from Parasuramesvara to Lingaraja through Mukteswara and Vaital, which ultimately culminated in Puri Jagannath temple and the Sun temple of Konark<sup>[25]</sup>. The scholars have categorised the evolution of Kalinga Temple style into 4 phases; the formative phase (6<sup>th</sup> century CE to 9<sup>th</sup> century CE), the medieval phase (9<sup>th</sup> century CE to 11<sup>th</sup> century CE), the mature phase (11<sup>th</sup> century CE to 13<sup>th</sup> century CE) and the decadence phase (14<sup>th</sup>-16<sup>th</sup> century CE)<sup>[26]</sup>. Most of the temples of formative phase (7<sup>th</sup>-9<sup>th</sup> century CE) were built by the Shailodbhavas and the Bhaumakaras. Among the early group of temples belonging to Sailodbhava period are Bharateswar, Lakshmanesar and Satruganeswara temples situated on the left side of the road leading to the Lingaraj temple. The presuramesvara temple and Svaranajalesvara temple of Bhubaneswar; Gokarneswar, Yudhistira and Bhima temples on the top of Mahendragiri mountain near parlakhemundi and the Nilakantheswar temple on the top of the Jagamanda hill near the village Padmapur in Gunupur are other representative specimens of the temples belonging to the early phase of temple building activity. Among all these, Parsurameswar Temple of Bhubaneswar is the best-preserved specimen of the formative phase<sup>[27]</sup>. It was built by the Shailodbhavas in the first half of the 7<sup>th</sup> century CE. The most striking feature of the structure is the *Jagamohana*. It does not have the usual stepped pyramid roof like the other temples of Kalinga. Instead, it is rectangular in shape with the terraced roof supported by rows of pillars. This style of early Kalinga architecture is unique as it is not found in any other surviving temple. Only in the later period, the *Jagamohanas* started having the *Pidha* type roofs.

The temples of medieval phase (9<sup>th</sup>-11<sup>th</sup> century CE) were constructed by the later Bhaumakaras and Somavamshis. Rajarani Temple of Bhubaneswar is the well known representative of medieval phase. Creativity was seen not only in style but also in elevation. New features were introduced. Besides the building activity was widespread all over the nook and corners of Orissa. The representative specimens were the Sisireswara temple, the Markandeswar temple, the Vaital temple and the Mohini temple of Bhubaneswar, the temples of Nilamadhava and Siddheswar at Gandharadi near Baud in Phulbani district; the Bhringeswar temples at Bajrakot near Kaniha in Dhenkanal district, the Kanakeswar temple at Kualo in Dhenkanal district, the Manikeswara Siva temple in the village Suklesvara in Cuttack district etc. During this period Khiching, the ancient capital of Bhanja Kingdom of Mayurbhanj became a great center of temple architecture in northern Orissa. Although majority of the temples were ruined, but some of them were repaired and provided with

original forms. The temple is built in the *pancharatha* style on a raised platform with two structures; a central shrine called the *vimana* (sanctum) with a *bada* (curvilinear spire) over its and a viewing hall called *jagamohana* with a pyramidal roof. The notable feature of the period was the introduction of rampant erotic sculptures due to the influence of *Vajrayana* philosophy (a fusion of *Mahayanic* and *Tantric* elements). Mukteswar temple at Bhubaneswar, which is considered as the gem of Kalinga architecture, was the last monument of the period.

The temples of mature phase (11<sup>th</sup>-13<sup>th</sup> century CE) were constructed by the later Somavamshis and the Gangas. During that period that the temple architecture reached the final stage and high watermark of glory was achieved. Almost all the component parts of the temples such as the *Deula* and *Jagamohana* became standardised. *Jagamohana* became an inseparable element of the temple structures. The *Sikhara* was treated with utmost grace, beauty, lightness and rhythm. The *gandi* was now embellished with angasikharas of different forms and sizes taking into account the peakness of the temples. The *amlakasila* supported by *deula charinis*, dopichha lions at the corners and seated divinities added beauty to the *mastaka* of the temples. The sculptures revealed excellence in modelling. In the iconography of the cult deities new elements were introduced. The addition of *Ketu* to the list of planets became permanent and the *Nawagraha* slab became an indispensable feature in later times. The reasons behind the emergence of new features in the temples were due the fact that the Somavamshis were ardent patrons of Saivism. They were originally the people from central India and had intimate knowledge about the temple architecture of Khajuraho. Ananta Vasudeva Temple and Ligaraj Temple of Bhubaneswar, Jagannath Temple of Puri are the classical examples of mature phase.<sup>28</sup> All these temples have *Vimana*, *Jagamohana*, *Nata Mandir* and *Bhoga Mandir*; everything that is required for a mature phase Kalinga temple architecture. Where the *Vimana* is *rekha* type, all others (*Jagamohana*, *Nata Mandir* and *Bhoga Mandir*) have the pyramidal roof. The temple is built in the *pancharatha* style on a raised platform with two structures: a central shrine called the *vimana* (sanctum) with a *bada* (curvilinear spire) over its and a viewing hall called *jagamohana* with a pyramidal roof. Gangas were the most famous rulers of Kalinga. Their dynasty, which began its rule in the mid 11<sup>th</sup> century CE, sometimes competed with and sometimes allied itself with the Chalukyas<sup>[29]</sup>.

Lastly in the Phase of decadence (14<sup>th</sup> – 16<sup>th</sup> century CE), the temple building activity came to a halt. Lack of royal patronage and decline of Hindu power resulted in the decline. Between 1238 and 1305, the Gangas successfully withstood Muslim infiltration from the north, but the dynasty collapsed when the sultan of Delhi penetrated Kalinga from the south in 1324. Subsequent Suryavamsi Gajapati rulers who contributed significantly to Oriya language and literature and to the strengthening of the bonds of unity among the Oriyas were apathetic to temple building. They successfully diverted the attention of the people to the Jagannath temple at Puri and thus demoted the position of others deities and temples to subordinate positions. Of the few temples being constructed during this phase, the temples at Kapileswara at Bhubaneswar belonged to this period<sup>[30]</sup>.



**Fig 21:** Bharateswar Temple, Bhubaneswar, 6<sup>th</sup> Century CE



**Fig 22:** Parsurameswar Temple, Bhubaneswar, 7<sup>th</sup> Century CE



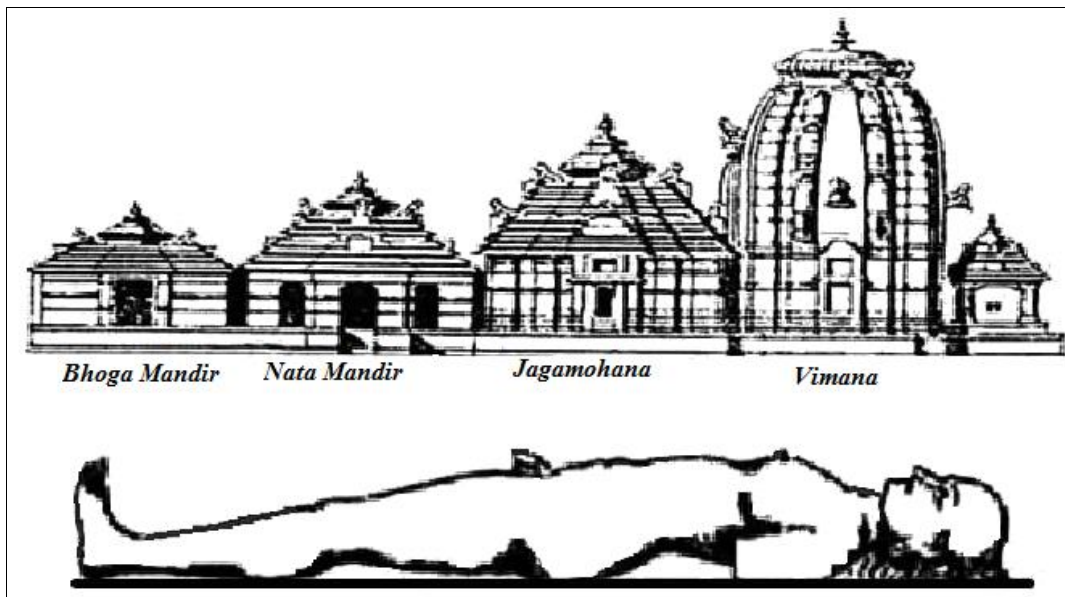
**Fig 23:** Rajarani Temple, Bhubaneswar, 11<sup>th</sup> Century CE

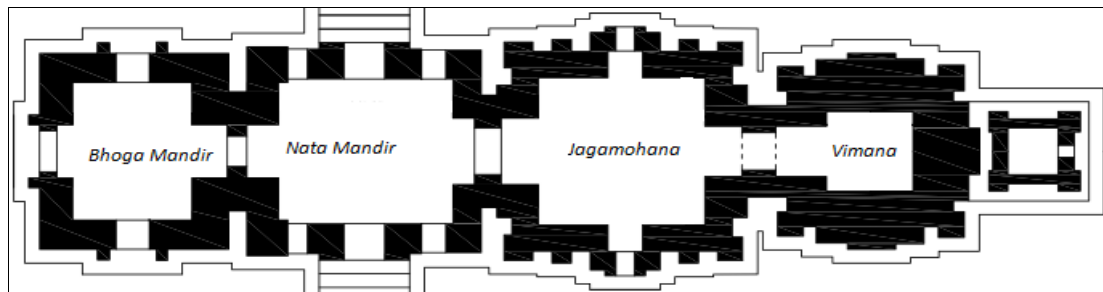


**Fig 24:** Ananta Vasudeva Temple, Bhubaneswar, 13<sup>th</sup> Century CE

From close study of temple plans, it is evident that the basic form of the temple has evolved out of a simple square [31]. These squares were scaled, subtracted or added one after another resulting into the geometrical evolution of the final

plan following a step wise generation. This actually could have been the reason for the distinctive features or a commonality in the plans of Kalinga temples [32].





**Fig 25:** Floor plan of a typical Kalinga temple of mature phase and horizontal comparison with human body



**Fig 26:** Lord Lingaraj Temple of Bhubaneswar

### Conclusion

Temples of Kalinga are not merely the religious sites. They have significant historical connotations and associated with traditions, customs and legends. The Temple Architecture holds an appeal that is magnetic and almost stupefying in its extravagance and mobility. The activities of temple construction flourished between 8<sup>th</sup> and 13<sup>th</sup> century CE without being disrupted with the changes of ruling dynasties and their affiliations. They are the architectural marvels, magnificent monuments and testimonies of bygone era. The towering, heavily sculptured spires of the temples are quite astounding. It is mind-boggling imagining the quality of work that went into creating them and their exquisitely carved bases. Described as 'poetry in stone' by Nobel Laureate Rabindranath Tagore, it shows the skill with which the local craftsmen created such splendid structures. Although centuries of neglect and vandalism have destroyed some of these temples, many of them are still in their original forms. Not only the list of the temples, even the architectural features and the technical intricacies of Kalinga temples are endless. These temples are the symbols of Odisha's cultural heritage and remain an eye-opener even today. In this article, only glimpse of important aspects along with some representative temples are discussed. There is a huge scope for further in-depth study to know, understand and appreciate the Kalinga temple architecture.

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