

# The Architectural Study of Sun Temples in India: Based on Location, Construction Material and Spatial Analysis Study

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**Abstract**-Religious places are most important constructions in India in every religion. In Hindu religion, the temples have supreme importance and different god and goddesses like Vishnu, Mahadeva, et. Are being worshiped. among them we are focusing on sun temples because they are believed to be built either because of some vow or to celebrate victory. Concept behind building sun temple is sun as a celestial body in universe, earth's rotation around sun, period of completion of one rotation. elements of ornamentation are focused on the above-mentioned factors. In India the origin of the worship of the Sun is several centuries old. Sun temples are constructed in different time period by various dynasties. The study of sun temples in India is based on their location, spatial arrangement, historical background, construction material, time line, evolution and ornamentation. By comparing above mentioned parameters, we can find out over the period of time changes occurred in the construction of the sun temple in India. This study helps in the construction of contemporary sun temples.

**Index Terms** - Architectural Details, India, Light, Sun Temple, time line

## I INTRODUCTION

The history of India is very old and from historical time in India, religion, culture, festivals plays important role. In every religion existence of god, its worship, abode of god is predominant. It is said that India is a land of temples. Temples were constructed prominently in ancient and medieval India. Different dynasties constructed temples of different gods according to their believes, vows or to celebrate victory over their enemy. style of constructing temples became recognition of particular dynasty. The technique of temple construction with the passing time becomes polished and temples took grand look. These temples were of different god and goddesses like ram, Krishna, hanuman, Mahadeva, Durga sun, Shani, Navagraha etc. out of these we are focusing on sun temples in India. The Vedic scriptures of the Hindu religion refer to the sun as the store house of inexhaustible power and radiance. The Vedas are full of hymns describing the celestial body as the source and sustainer of all life on earth. The origin of the worship of the Sun in India is thus several centuries old. There are many sun temples in India constructed in different time period. Out of these only Sun Temple at Konark of Odisha and Sun Temple at Modera of Gujrat are in good condition. Some of the temples were destroyed by invaders, some ruined because of weather conditions. The study of the sun temples helps to understand the history, time line of sun temples, its proximity to basic form of temples, closeness of ancient and contemporary sun temples, orientation of sun temples, reason of construction, pattern and hierarchy, role of light in sun temples. Thus, the study includes historical background, evolution of sun temples in India. Also analysing temples on comparative basis with basic temple structure, plan forms of various sun temples, their proportions and architectural elements, construction material and methodology, timeline of sun temples, relation of sun temple with light. By comparing sun temples in India with different variables one can understand changes occurred in sun temples.

## II THE BASIC FORM OF HINDU TEMPLE

(1) The basic form of the Hindu temple has the following parts: (a) sanctum (garbhagriha), which was a small room with a single entrance and extent into a larger chamber. The garbhagriha is made to house the main deity b) the entrance to the temple which may be a portico or peristyle hall that comprise space for a large number of worshippers and is known as a mandapa; (c) freestanding temples have a mountain-like structure on top, which can take the shape of a curving shikhara in North India and a pyramidal tower, called a vimana, in South India; (d) the vahana, i.e., vehicle of the temple's main deity along with a standard pillar or dhvaj is placed axially before the sanctum. Widely two orders of temples are considered, they are— Nagara in the north and Dravida in the south. The Vesar style of temples created through the selective mixing of the Nagara and Dravid orders is mentioned by some scholars.

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### III SUN TEMPLE AT KONARK, ODISHA

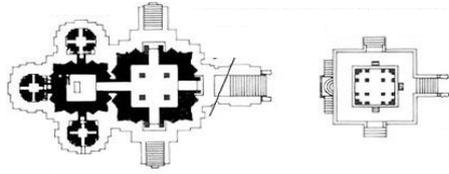


Fig 1 plan sun temple Konark



Fig 2 Sun temple Konark, Odisha, Image (Image:10)

#### 3.1 Historical background:

(5) The sun temple at Konark of Odisha was built by the great king Narsimha dev -I of East Ganga Dynasty. The word Konark is derived from the Sanskrit name Konark. Konark is a combination of two words i.e. 'Kona' which means corner and 'Arka' means Sun, when these two words are combined it holds the meaning as 'Sun of the corner'. It was built in his royal status and prestige to commemorate his victory over Muslims. The king opted this particular place for the construction of the temple is because Narasimha dev was charmed by the beauty of the Sunrise and the roaring voice of the sea at this place since his childhood. The river Chandrashekar flowing a mile distance at the north side of the temple was joining the sea.

#### 3.2 Spatial organization:

The sun temple at Konark is built in 13<sup>th</sup> century placed on east west axis, temple complex spreads over the area of 26 acres of land. The temple is built in Odisha style of Architecture or Kalinga Architecture. It is oriented in such a way that the first rays of the rising Sun fall directly on the main entrance of the temple and gets reflected from the diamond that is located at the centre of the idol in the sanctum. The Konark sun temple is a highly ornamented giant chariot of sun god. the Nata mandir or dancing hall is a first spatial space. It's an intricately carved, pollard, raised platform on the eastern side of temple. from east to west comes second structure small sanctum or Jagmohan or Bhadra deul or assembly hall is standing. The dazzling smaller sanctum is survived through generations. The smaller sanctum has wall 100 feet height and ornamented with stone carving. The sanctum is decorated with artwork, themes and iconography. Its pyramidal roof with three consecutive tiers, having six piddas in each. The terraces of which ornamented with idols. The main sanctum or Bada deul or Rekha deul, which is surrounded by the other small sanctum is a last spatial space. But it's in ruined condition. its roof or shikhara or vimana is estimated to be 229 feet and was replica of Jagannath temple in Puri.

#### Moulding:

This magnificent temple is decorated as a chariot of sun. the sun is climbed on raised platform which has 24 intricately carved wheeled. Each wheel is 9'9" in diameter with 8 spokes which signifies 8 prahars of a day. (1 prahar denote 3-hour period)



Fig 3 Pravahat Surya



Fig 4 Madhyanh Surya



Fig 5 Astachala Surya

### Sun idol:

The sanctum of the temple has three images of sun god on his outer façade. They are positioned in such a way that sun rays at dawn, noon and evening fall on the idols. The morning sun, The mid-day sun, The evening sun

Pravahat Surya-Morning sun- the creator:

On the southern side wall, the idol of the sun god is called mitraas the “Pravahat Surya”. It means rising sun. the idol in south is immersed with the first sun rays as the temple is slightly make an angle with the cardinal direction.

Madhyanh Surya- Mid day sun-The destroyer:

On the western side wall, the idol of god sun riding on horse called as “Punrsani”. Is described as Madhyanh Surya.

Astachala Surya-evening sun-The preserver:

On the northern side wall the idol of the sun god is called “Haritsvai”, is described as Astachala Surya. The facial expression carved on the idol of sun god shows hard day’s work.

### 3.3 Material of construction:

The massive temple was called the "Black Pagoda" in European sailor accounts because pyramidal roof made of sandstone appeared black. The uniqueness of this temple is the massive iron beams that are placed in between every two stones. These beams are used to construct the higher floors of the temple. The other exclusivity of this place is, the peak of the main temple was created using 52 tons of magnet. The arrangements of the main magnet and the other magnets in its unique way resulted the main idol of the temple to float in air. Made up of three types of stones Chlorite, Laterite, Khond alite

## IV SUN TEMPLE AT MODERA, GUJARAT

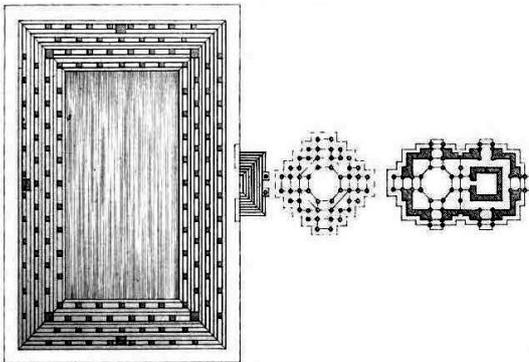


Fig6 plan, the sun temple, Modera, Gujrat



Fig6 the sun temple, Modera, Gujrat ()

### 4.1 Historical background:

(4) The sun temple at Modera of Gujrat built by King Bhima of Chalukyan Dynasty. According to mythology, Chalykyans were originated from Agni -Kund and they worshipped god sun. during 1024-25 Mohmad Ghazani of Kabul had invaded Bhima’s kingdom. So, the king vacated his capital (Arhiviad Patan) to avoid destruction and move to Modera. Where his soldiers fought with the force of 20,0000 soldiers of Mohmad Ghazani, the king defeated Ghazani. Bhima built Sun temple at Modera to commemorate this defence.

### 4.2 Spatial organization:

At Modera, the sun temple is placed on east-west axis at 23.6 degrees latitude on the tropic of cancer. The orientation is such that on the days of equinoxes the first ray of morning sun falls on the idol placed in garbhagriha or sanctum and during summer soloistic the sun shines directly on the top of the temple casting no shadows. The temple has been constructed of Maru-Gurjara style of architecture and consisted of three main parts namely the sanctum (garbhagriha)and hall (gudhamandapa), The mandapa (sabhamandapa or rangamandapa). The kunda (ramakunda or suryakunda) a body of water right in front of the mandapa. The rectangular surya kund or water body is placed longer axis being perpendicular to the central axis. The kund gradually proceed downwards from ground level towards water level with varied size terraces and step. Water tank has many small shrines in the niches of different god and goddesses. The steps of kund lead towards the Sabha mandapa, entrance of which being decorated with Torana. Torana being the multi pillared structure decorated with ornamentation. Sabha mandap is placed on the raised platform. The jagat of which is ornamented with inverted lotus, with thick walls and central pillars. Roof of Sabha mandapa rest on an octagonal nave with the support central eight columns. Inner walls have been broken which was once decorated by idols of surya. The next built up area being Gudha mandapa divided in to two parts, first being small hall called Prasad and second is rectangular Garbhagriha where once idol of surya being kept on raised platform. The thick walls of the Garbhagriha encloses parikrama marg. Like other temples garbhagriha is the darkest volume of the temple.

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### 4.3 Material of construction

#### V BIRLA SUN TEMPLE, GWALIOR, MADHYA PRADESH



Fig 6 Birla Sun Temple, Gwalior, Madhya Pradesh(Image:14)

#### 5.1 Historical background:

(8) The sun temple at Gwalior is a recent temple dedicated to god sun and constructed in the year 1988 by famous industrialist G.D. Birla. This eye-catching temple is built by taking inspiration from Sun temple at Konark, Odisha.

#### 5.2 Spatial organization:

The temple is also called *Vivaswan (other name of sun god)*. Spread over an area of 20,500 square feet, placed on east west axis. It is built in the middle on a high raised platform. The temple has three structures. There are three entrances to the sanctum, one main at front and two at sides. Each entrance door has idols of the nine planetary gods (the navgrahas). Beautiful marble steps that lead the way into sanctum. It is *built as the horse chariot of the sun god, with seven horses drawing the chariot* and the reins in the hands of Sun god. There are *24 wheels of the chariot*, 12 on each side. Each wheel has 16 spokes, 8 thick and 8 thin spokes. Every minute architectural detail has a significance associated with it. The *7 horses depict the days of the week, 24 wheels depicting no of 15 days duration in a year*. Each year can be divided into 24 groups of 15 days each. The dome over the sanctum is a high mounted roof that has 4 small windows on each of the 4 walls. The *idol of Sun god in the sanctum gets illuminated by sunrays coming from all directions through these 4 slit windows on each wall*.

#### 5.3 Material of construction:

In this beautiful temple blend of red sandstone and pearly white marble perfectly done. Red sand stone is used on outer surface and for internal look pearly white marble is used.

#### VI COMPARATIVE ANALYSIS OF PARAMETERS

parameters	Sun temple Konark	Sun Temple at Modera	Martand Sun Temple	Suryanar Kovil temple	Katarmal Sun temple
location	Konark, Odisha	Modera, Gujrat	Anantnag, Kashmir	Kumbakonam, Tamil Nadu	Alomora, ttarakhand
GPS coordinates	19° 53' 27" N, 86° 6' 1" E	23°35'1.7"N 72°7'57.67"E	33°44'44"N 75°13'13"E	11°1'47"N 79°28'40"E	29.55°N 79.69°E

Historical background:	to commemorate victory over Muslims	To celebrate Defeated over Ghazani	No specific reason	To worship sun god	To worship sun god
Spatial organization:	placed on east west axis. small sanctum, main sanctum, Nat mandap	placed on east west axis, on tropic of cancer. Garbhagriha, Gudhamandapa, Sabhamandapa, Kunda	placed on east west axis, Ardha mandapa Antara Garbhagriha	Garbhagriha and Ardhamandapa	placed on east west axis. Consist of Rekha deul, antara and two mandapa, Surya- Kunda
Position of sun god	First ray of sun shines directly on sun god	On equinox- first ray on sun god and on summer solstice day sun shines above temple	No specific	Sun god centrally placed amongst navgrah	First ray falls on the temple
Material of construction	Made up of three types of stones Chlorite, Laterite, Khondalite	Sand stone	lime stone.	The Sanctum and Ardhamandapa are built in stone while other construction in brick work.	local greyish-brown stone
ornamentation	Chariot with seven horses, 24 wheels	Decorated with different mouldings	84 peristyle shrine covers compound wall	Decorated with god and goddesses	No specific, regular temple elements
image					

Image: (9)

Image: (12)

Image: (10)

Image: (13)

Image: (11)

## VII TIME LINE OF SUN TEMPLES IN INDIA

Sequence of Sun temples of India as per their construction period

Temple	Period	Dynasty	Location
The Martand Sun Temple	7 <sup>th</sup> -8 <sup>th</sup> century	king Lalitaditya Muktapida of Karakota dynasty.	Anantnag, J&K
Sun Temple at Modera,	11 <sup>th</sup> century	Chalukyan Dyanasty	Gujarat
Navlakha sun Temple	11 <sup>th</sup> century	Jethwa rulers in Solanki style	Ghumli, Gujrat
Suryanar Kovil temple	11 <sup>th</sup> century	King kulothunga chola in Dravidian style	Suryanarkoil, Tanjavar district, Tamilnadu
The sun temple Konark	12 <sup>th</sup> century	king Narsimhdeva -I of east ganga dynasty	Konark, Odisha
The sun temple at Katarmal	13 <sup>th</sup> century	Katuri king Katarmadevta	Alomora, Uttarakhand
Birla sun Temple	1988	G. D. Birla	Gwalior, Madhya Pradesh

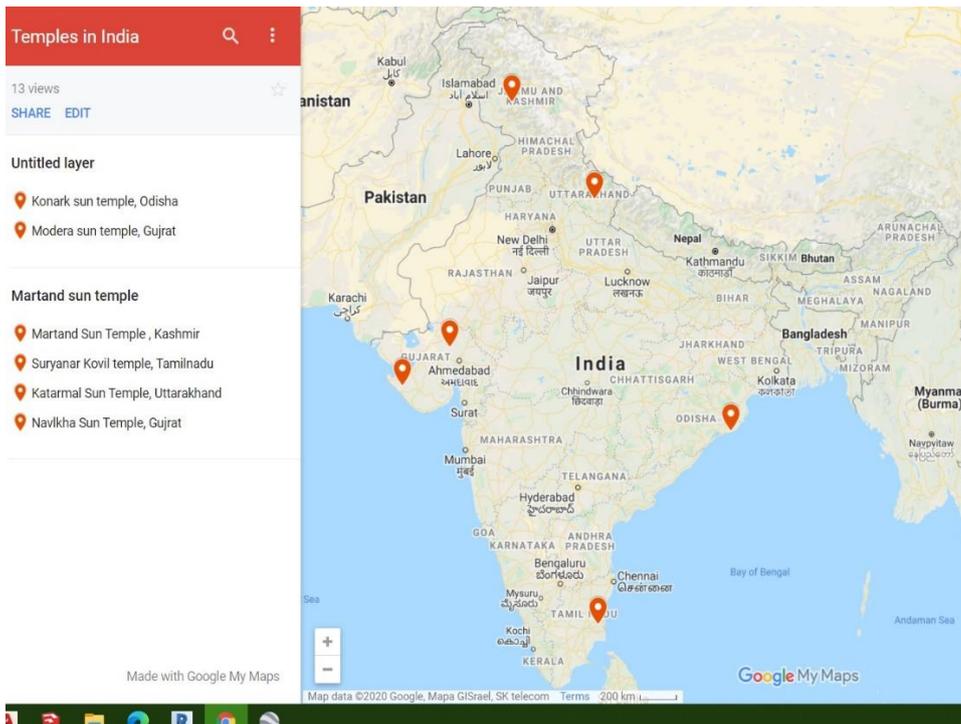


Fig 15 Indian map showing Sun Temples in India

### VIII ROLE OF LIGHT IN SUN TEMPLE

(2) Sun temples are always associated with light. Position of deity is always correlated with light. Sun temple of Modera, Gujrat or Sun temple of Konark, Orissa are the temples where sun light direct falls on the deity. The Sun temple of Modera has three different types of spaces where light create different effect. The foremost space is a kund or waterbody. The kund (water tank) is a stepwell with varied sized steps. Steps are arranged like inverted pyramid and are decorated with numerous designs. When light fall on these steps, it casts beautiful shadow pattern. The other type of space is semi open mandapa. Due to the openings, the amount of light entering, its intensity is comparatively more than other spaces in the temple. The prasad is an enclosed space, as its covered with thick stone wall. So, amount of light entering is only through two small openings in the wall, which cast dim light but sufficient enough to. create dramatic effect of contrast light and shadow effect and highlight texture of stone walls. The ambulatory path or pradkshina path surrounding sanctum has sufficient light due to three windows of side walls and provide adequate light to the dark, closely place deity in sanctum.

### CONCLUSION

Sun temples in India are connected with the celestial body sun, it's rotation around earth, sun path. Time line shows that there is no particular region or not particular period of construction of sun temples. Geographical position shows that sun temples are randomly constructed in all over India, no path followed for construction. In Sun temples light plays an important role in position of deity and facing of sun temple. Decorative features or elements used for enhancing external appearance of sun temples and are associated with the rotation of sun around earth. Newly constructed sun temple in Gwalior is just a replica of Konark sun temple, it's not adding remarkable element. All the sun temples in India follow basic form of temples practised in India from decades. No specific material used in construction, in fact locally available material is used. Sun temple at Konark, Odisha and Sun temple at Modera, Gujrat are famous compared to other sun temples in India it may be because they are in good condition compared to other sun temples in India.

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