
Shadowless Marvel: The Architectural Wonder of Thanjavur Brihadeeswara Temple

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Abstract: *The shadowless phenomenon of the Brihadeeswara Temple in Thanjavur is a captivating aspect of its grand architecture. The temple built during the Chola dynasty in the 11th century in the reign of king Raja Raja – I. This towering Vimana of the temple rises to a height of sixty-six meters. What makes it truly remarkable is the widely observed belief that the shadow of the Vimana does not fall on the ground at noon or appears very minimal. This unique occurrence, whether due to architectural design, precise orientation, or geographic factors, adds to the enigmatic and allure of the temple. It stands as a specimen to the sophisticated engineering and astronomical knowledge of ancient Indian architects, making the temple a symbol of cultural and scientific mastery.*

Keywords: Brihadeeswara Temple, Thanjavur, Raja Raja Chola I, Dravidian Architecture, Astronomical Knowledge, Gopuram, Nandi

Introduction

The Brihadeeswara Temple, located in Thanjavur, Tamil Nadu, is a unique architectural marvel that continues to intrigue visitors and scholars alike. The temple, built by the Chola king Raja Raja Chola I in the 11th century, is renowned for its massive *Vimana* (tower) which rises to a height of around sixty-six meters (Somasundaram1994:116). What makes the structure particularly fascinating is the widely observed phenomenon that the shadow of the *Vimana* does not fall on the ground at noon, or it appears minimal and indistinct. This phenomenon has been attributed to the engineering design of the tower, where the base is broad and the structure gradually tapers as it ascends, causing the Shadow to fall in such a way that it becomes virtually invisible during peak sunlight hours. Thus, the geographical location of the temple and its precise orientation play a significant role in this occurrence. While some consider this effect as intentional, reflecting the mastery of Chola architecture, others suggest it is a result of natural positioning. Regardless, shadowless nature of the temple remains a symbol of the scientific architectural skills and astronomical

knowledge possessed by the architects of ancient India (Pichard 2002:132). It is a shining example of the grandeur of the Chola dynasty and their deep devotion to art, architecture, and religion. The temple, which is dedicated to Lord Shiva, is now recognized as a UNESCO World Heritage Site.

Historical Significance of Brihadeewara Temple

Constructed during the reign of Raja Raja Chola I, the Brihadeeswara Temple was built to celebrate his military conquests and the glory of the Chola Empire (Figure 1). The Cholas, one of the longest-ruling dynasties in South India, were great patrons of the arts and Brihadeeswara Temple remains as an example of their contribution to temple architecture. It also holds a treasure trove of inscriptions that provide a rich record of the social, political, and cultural life during the Chola era (Sastri 1955: 213). These inscriptions give us a glimpse into the kingdom's administrative systems, taxation, Village administration, Devadasy system and the incredible patronage of the arts that characterized the Chola period (Subbarayalu 2010:102). The precision and creativity demonstrated in the design of the temple continue to inspire modern architects. It is not just a site of historical importance, but a living monument that celebrates the synthesis of religion, art, and architecture.

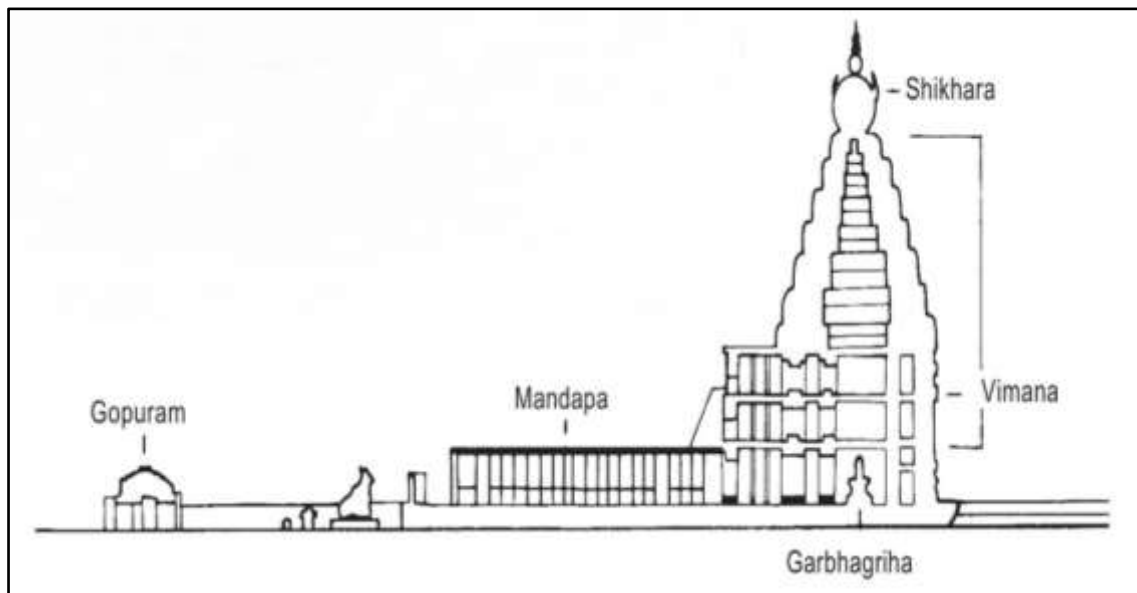


Figure 1: Brihadeeswara Temple – An Outline

The Architectural Edifice

Brihadeeswara Temple is dedicated to Lord Shiva and is one of the finest examples of Dravidian architecture. The temple's *Vimana* is made from granite. At the very top of the *Vimana* rests a huge stone weighing about eighty tons, which was placed there using an ancient and ingenious ramp system (Ganapathi 2005:167). It unravels the precision and craftsmanship of the Chola dynasty. The structure's alignment, symmetry, and sculptural details have drawn admiration from architects and historians alike.

One of the temple's most stunning features is the Nandi (the sacred bull and the mount of Lord Shiva), which is housed in the Nandi Mandapa near the entrance. The Nandi is carved out of a single stone and stands at sixteen feet long and thirteen feet high, making it one of the largest monolithic Nandi statues in India. The temple's sanctum sanctorum houses a gigantic Shiva Lingam, which is the primary deity worshipped here.



Figure 2: The Pyramidal Tower (*Vimana*) of Brihadeeswara Temple

The outer walls of the temple are adorned with intricate carvings and inscriptions that depict scenes from Hindu mythology, as well as detailed accounts of Raja Raja Chola's reign. This temple reveals the grandeur and sophistication of South Indian temple architecture. Some key features of its architectural style mentioned given below:

Vimana (Tower over the Sanctum): The temple is crowned with a massive *Vimana* (Pyramidal tower) that rises to a height of around sixty-six meters (216 feet). It is one of

the tallest in South Indian temple architecture (Figure 2). This towering structure is an architectural prodigy of the Chola dynasty and is renowned for its height, intricate design, and engineering brilliance (Murti 1978:94). Its scale and symmetry make it a focal point of the temple, drawing attention to the sanctum (garbhagriha) where the deity resides, which is the primary purpose of the *Vimana* in traditional Dravidian temple architecture. It is pyramidal in shape, tapering upwards with multiple tiers (storeys), each progressively smaller than the one below. This tapering design is a common feature in South Indian temple architecture, meant to represent Mount Meru, the mythical mountain in Hindu mythology (Pichard 2002:139)



Figure 3: Fitting of massive Dome on the top of *Vimana* – An artist's Imagination

The *Vimana* features a range of detailed carvings and sculptures of deities, *Monks*, and mythical creatures that reflect the rich cultural and religious heritage of the Cholas. It replicates the cosmos, with each tier representing different layers of the universe. It also symbolizes the connection between the earthly realm and the divine, guiding worshippers' eyes from the ground upward toward the heavens (Somasundaram 1994: 119). It signifies the power and authority of the Chola rulers, particularly Raja Raja Chola I, who built the temple. The scale and grandeur of the *Vimana* were intended to reflect the emperor's divine right to rule and his dedication to Lord Shiva. The base of the *Vimana* is adorned with sculptures of divine guardians and mythological scenes, all with a remarkable degree of precision and depth that testifies to the architectural and engineering mastery of the Cholas.

Engineering Manifestation of Granite Construction: The temple is made entirely of granite, an impressive feat given the limited technology at the time and the size of the

stones used. The *Vimana* is made entirely of granite, even though the region around Thanjavur does not have significant granite deposits. This means that the granite had to be transported from distant locations, showcasing the engineering prowess and resources of the Chola Empire. Accuracy in cutting, shaping, and assembling such heavy stone blocks without modern machinery reflects to the architectural genius of that time (Dhaky 2020: 310). The *Vimana* is capped with a massive dome, known as the *Kumbam*, which is a bulbous structure at the top (Figure 3). This dome is carved out of a single block of granite and weighs approximately eighty tons. The process of placing this dome at top of the tower was a significant engineering feat for its time. The placement of the dome is particularly impressive, and Historians mentioned that the use of a long-inclined ramp extending over approximate six kilometres to slowly hoist the heavy stone to the top of the *Vimana*, demonstrating the engineering skills of the Chola architects. (Ganapathi 2005: 170). This would have required a massive workforce and remarkable coordination. Although close to the Kaveri River, the temple's precise location and layout, with slightly raised foundations, protect it from potential flooding. The raised layout was strategically planned to ensure that the structure could withstand seasonal changes and monsoonal rains. The precision in construction has allowed the *Vimana* to stand for over a thousand years, surviving earthquakes and natural wear and tear.



Figure 4: Fresco painting on the temple ceilings

Sculptural Detailing and Chola Frescoes: The pillars, walls, and ceilings of Brihadeeswara Temple are adorned with detailed carvings, each narrating mythological stories, royal conquests, and celestial beings. These carvings are incredibly fine and display scenes from Hindu pantheon, particularly stories related to Lord Shiva, the temple's primary deity. The temple features numerous sculptures of

Hindu gods and goddesses, each represented with distinct attributes and gestures. The most significant figure is that of Nataraja, a form of Shiva performing the cosmic dance, beautifully captured with precision and dynamism. Other deities like Parvati, Ganesha, and Vishnu are also represented in various forms around the temple. The walls display a series of dancing figures and warriors in dynamic postures, each with distinct body language and facial expressions. These figures not only showcase artistic excellence but also provide insight into the cultural life and aesthetics of the Chola period. Inside, the walls are adorned with frescoes and murals that depict various scenes from Hindu mythology and historical events, highlighting the artistic contributions of the Cholas (Figure 4). The temple is adorned with carvings and sculptures of deities, mythological figures, and motifs, indicating the advanced craftsmanship of the Chola period.



Figure 5: Gateway (*Gopuram*) of the Temple

Massive Gopurams (Gateways): Although the *Vimana* is the most prominent structure, the temple complex also includes elaborately decorated Gopurams at the entrance. The Gopurams at Brihadeeswara temple serve both aesthetic and symbolic functions (Figure 5). The main Gopuram at the entrance is smaller than the *Vimana*, which is unusual compared to other South Indian temples where Gopurams are typically the tallest structures. This design directs focus towards the *Vimana*, which is the highlight of the temple's architecture. This Gopuram is adorned with complex carvings,

featuring scenes from Vedic mythology, images of deities, and floral designs, typical of Chola artistry. The temple has an additional inner Gopuram that leads further into the complex. This second gateway enhances the sense of entering progressively sacred spaces within the temple. Like the main Gopuram, the inner gateway also features detailed carvings of fictitious scenes, including stories associated with Lord Shiva, as well as images of protective deities and decorative motifs. These sculptures reflect the artistic expertise of the Chola period. The Gopurams at Brihadeeswara Temple, especially the outermost ones, show influences from later additions and renovations (Ganapathi 2005:173). Although originally built by Raja Raja Chola I, some parts of the temple were expanded or refurbished by subsequent dynasties like the Nayaks and Marathas, who added to the sculptural detailing and decorations.

The temple's entrance and main sanctum area feature *Yali* sculptures—mythical creatures that are part lion, part elephant. These sculptures serve both decorative and protective purposes, representing the temple's defense from negative forces. The *Yalis* are finely carved, showing an impressive attention to detail, including textured skin and expressive facial features. The sculptural details at Brihadeeswara Temple are aesthetically remarkable and serve as a repository of cultural, historical, and religious symbolism, embodying the grandeur and spiritual devotion of the Chola rulers.



Figure 6: Nandi Sculpture facing the Temple

The Nandi Sculpture: One of the most iconic sculptures at Brihadeeswara Temple is the massive monolithic Nandi (the sacred bull and vehicle of Shiva) seated at the entrance (Figure 6). Carved from a single stone, this Nandi statue is approximately six meters in length and 3.7 meters in height, making it an architectural splendour in India. This Nandi faces the sanctum, creating a visual alignment that enhances the temple's sacred geometry.

Shadowless Phenomenon and Its Interpretations

The *Vimana* of the Brihadeeswara Temple never casts a shadow on the ground at noon. The engineering behind the temple is as remarkable as its artistic accomplishments. Despite the massive scale of the structure, the temple's design ensures that the *Vimana* casts no shadow on the ground at noon (Sastri 1955: 216). This has amazed visitors for centuries, with many questioning whether it is an optical illusion, an engineering marvel, or a result of astronomical calculations. There are many reasons for this phenomenon.

Architectural Design and Tapering Structure of the *Vimana*

The temple's design and the precise angle of the *Vimana* may be such that the shadow falls directly below the structure at noon, effectively making it 'shadowless' to an external observer. The temple follows a highly symmetrical and axial plan, with the main sanctum (*garbhagriha*) at the centre. Each section, from the outer walls to the inner sanctum, is carefully measured and proportioned, which reflects an advanced understanding of geometry and architecture (Dhaky 2020: 319). The design focuses on verticality, leading the eye upward to the towering *vimana*. the design of the *Vimana* is such that during certain times of the day, particularly at noon, its shadow does not fall outside the temple's base.

The Chola architects who designed the temple were highly skilled in understanding geometry and celestial patterns. They likely incorporated their knowledge of how the sun's rays fall at different times of the day and year into the temple's design to create this unique effect. This unique architectural feature adds to its fascinate and grandeur. This architectural feature causes the shadow to shrink as the sun reaches its zenith (Ganapathi 2005: 172). When the sun is directly overhead, especially around noon, the shadow of the tower falls within the base of the temple itself, making it less noticeable or 'shadowless. The *Vimana* tapers inward as it ascends, potentially dispersing sunlight in a way that minimizes the shadow visible on the ground. This clever use of geometry could contribute to the illusion of shadow lessness.

Geographical Location and Position of Sun

Another reason that the temple's location and its alignment with the cardinal directions play a crucial role. The temple is positioned near the Tropic of Cancer, which could lead to specific times during the year when the sun is directly overhead, thus reducing the shadow of the central tower. Thereby, the temple also situated 1200 Kilometre far from the equator (at approximately 10.8° N latitude), means that the sun can be nearly

directly overhead at certain times of the year, especially during the equinoxes. When this happens, the shadow of the temple's tower falls directly beneath it or becomes minimal. So, this unique occurrence is one of the temple's most captivating features and is also directly linked to its geographical location (Ganapathi 2005: 174).

Conclusion

The Brihadeeswara Temple is an engineering marvel that stands as a best specimen of architectural manifestation of the Chola period connecting the cultural heritage of India to its past. With its unique granite construction, monumental Vimana, and sacred ambiance, the temple continues to wonder all who visit. It is a tribute to the genuine interest of the of the Chola rulers and remains one of the remarkable examples of temple architecture in India. While modern science may offer explanations regarding the alignment of the sun and the temple's design, the Brihadeeswara Temple's no-shadow phenomenon remains a point of fascination for pilgrims, tourists, and scholars alike. Whether it is a stroke of architectural mastery or a quirk of geography, the temple continues to inspire awe with its blend of art, religion, and science. The shadowless phenomenon at the Brihadeeswara Temple is not mystical but rather the result of careful planning, precise architectural design, and an understanding of how natural phenomenon with respect to the massive structure of the temple.

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