

Review Article

The Enigmatic Enclaves: Unravelling the Mysterious of Ancient Monuments

Harleen Kaur¹, Anasuya Das², Jiya³

^{1,2,3}Students, Department of Computer Science & Engineering PCTE- Institute of Engineering & Technology Ludhiana. India.

I N F O

Corresponding Author :

Harleen Kaur, Department of Computer Science & Engineering PCTE- Institute of Engineering & Technology Ludhiana.

E-mail Id:

harleen242004@gmail.com

Orcid Id:

<https://orcid.org/0009-0007-5295-784X>

How to cite this article:

Kaur H, Das A, Jiya. The Enigmatic Enclaves: Unravelling the Mysterious of Ancient Monuments. *J Adv Res Humani Social Sci* 2024; 11(2): 28-34.

Date of Submission: 2024-05-05

Date of Acceptance: 2024-06-06

A B S T R A C T

Throughout history, humanity has left behind marvels that continue to baffle modern minds. Amongst these stand enigmatic structures, defying comprehension with their sheer size, intricate design, and lack of seemingly advanced technology. This paper delves into the captivating mystery of some of such ancient wonders, a testament to the ingenuity and resourcefulness of our forebears. We embark on a journey to unravel the secrets held within the stones, exploring the cultural context, architectural innovations, and engineering feats attached to these structures. Beyond mere marvels, these buildings present a compelling opportunity to re-evaluate our understanding of ancient capabilities. By dissecting the construction methods, materials utilised, and potential astronomical or symbolic aspects, we gain a deeper appreciation for the intellectual prowess and problem-solving abilities of civilisations long gone. Understanding the principles employed in these ancient masterpieces could offer valuable insights into sustainable and resource-efficient construction practices in the modern world. By learning from the past, we may pave the way for a future that marries innovation with respect for our planet's resources.

Keywords: Enclaves, Ancient Monuments, Unravelling, Cultural

Introduction

This paper explores the fascinating architectural and engineering marvels from different eras and cultures, emphasising their intricate designs, astronomical alignments, and enigmatic construction techniques. The Kakanmath Temple, built in the 11th century by King Kirttiraja of the Kachchhapaghata dynasty, exemplifies this theme. Known for its towering pyramidal structure and precise stone interlocking, the temple reveals a profound understanding of geometry and engineering principles. In contrast, the Brihadeeswara Temple, a 1010 AD masterpiece by the Chola dynasty, showcases advanced knowledge of geometry and engineering through its shadowless tower phenomenon during equinoxes.

Furthermore, this paper delves into the mystique of the Lepakshi Temple's Hanging Pillar, Borobudur's intricate alignment with celestial bodies, and the mathematical brilliance embedded in the Konark Sun Temple's design. Similarly, the Neolithic Newgrange Tomb in Ireland, the tilted Ratneshwar Mahadev Temple in Varanasi, and the disappearing Stambheshwar Mahadev Temple in Gujarat each highlight unique aspects of ancient architecture. The Modhera Sun Temple's precise alignment with equinoxes and Mount Rushmore's monumental carving techniques further illustrate humanity's enduring quest to harmonise art, mathematics, and science. Finally, the Virupaksha Temple's use of the pinhole camera effect underscores the ancient understanding of light.¹

Kakanmath Temple

The Kakanmath Temple stands as a captivating yet enigmatic relic of the 11th century. Built by King Kirttiraja of the Kachchhapaghata dynasty, this Shiva temple boasts a unique construction style and intriguing narratives woven into its very fabric.

Dating back to the 11th century. Though partially ruined today, the temple's towering pyramidal tower exceeding 30 metres serves as a testament to the craftsmanship of its builders. Defying conventional construction methods, the temple's stones interlock perfectly without mortar or cement, showcasing remarkable engineering ingenuity. Despite weathering centuries of harsh weather and witnessing the demise of its contemporaries, Kakanmath stands resilient, adding to its aura of mystery.

The temple's design adheres to a meticulous geometric order, revealing the builders' advanced understanding of mathematical principles. Four entrances, each aligned with a cardinal direction, symbolically connect the temple to the vast cosmos (Figure 1).



Figure 1. Kakanmath in 2015

The temple's remaining sculptures and carvings offer a glimpse into the artistic expression of its era. The enigmatic absence of a roof over the inner sanctum sparks debate, leaving historians to ponder its intended design or the potential impact of time. The temple's orientation aligns with celestial bodies, hinting at the builders' knowledge of astronomy and its potential role in their belief system. Proportions and shapes employed in the design reveal advanced knowledge of this mathematical discipline.²

Brihadeeswara Temple

Brihadeeswara Temple, also known as Peruvudaiyar Kovil, stands tall in Thanjavur, Tamil Nadu, India. Dedicated to Lord Shiva, it reigns as the largest Hindu temple in the world, showcasing the grandeur of Chola architecture. Built by King Raja Chola I in 1010 AD, this architectural marvel celebrates its 1000th anniversary in 2010. It forms part of the "Great Living Chola Temples," a UNESCO World Heritage Site.

During equinoxes, the precisely positioned tower casts no shadow at noon, highlighting the exceptional engineering skill of the Chola Dynasty. Crafted from resonant granite, these pillars produce distinct musical notes when struck, adding a unique auditory dimension to the temple experience.

The precise construction and astronomical alignments, like the shadowless phenomenon, suggest the Chola builders possessed advanced knowledge of geometry, astronomy, and engineering. A colossal Nandi bull, carved from a single stone, welcomes visitors at the entrance. The temple's towering Shikhara, or Vimana, reaches a staggering 60.96 metres (200 feet) (Figure 2).



**Figure 2. Exterior View of Brihadeeswara Temple
Lepakshi Temple's Hanging Pillar**

Nestled in Lepakshi, India and built in the 16th century, it houses a unique enigma: the Hanging Pillar, defying gravity and sparking centuries of wonder. Dedicated to Lord Shiva, the temple boasts intricate carvings and a monolithic Nandi statue. Among its 70 pillars, one stands out - the Hanging Pillar. Appearing suspended mid-air, it remains firmly in place. Unlike its grounded counterparts, this 4.5-metre pillar hangs unsupported, adorned with exquisite carvings of deities and mythical creatures. Its defiance of gravity fuels endless fascination and speculation.



Figure 3.A Scarf Under the Hanging Pillar

Hidden Support: An iron rod embedded within, connecting to the ceiling, might provide unseen support. The pillar's centre of gravity could be perfectly aligned with its base, enabling self-support. The intricate carvings act as counterweights, balancing the structure. Concealing support structures or meticulously balancing weight demonstrates remarkable ingenuity. Knowledge of gravity and its manipulation, though debated, underscores the builders' expertise (Figure 3).³

Borobudur Temple

A UNESCO marvel, this 9th-century Mahayana Buddhist monument embodies colossal scale, intricate design, and enigmatic origins. Nine stories unfold with Buddha statues and reliefs mirroring the Buddhist cosmos, captivating visitors and scholars with hidden chambers and astronomical alignments. The true builders of Borobudur remain unknown.

Towering at 115 feet, Borobudur awes with its sheer scale. Built without mortar, its interlocking stones showcase advanced engineering. A colossal, stepped pyramid mirroring the Buddhist cosmos, with nine symbolic levels representing earthly, spiritual, and enlightened realms. 2,672 relief panels narrate the Buddhist Mahayana journey, offering unparalleled visual scripture carved into volcanic stone.

Concealed chambers, possibly containing sacred relics, a whisper of deeper meanings and rituals practised within the temple walls. Precise architectural positioning aligns with astronomical events, suggesting advanced knowledge and a symbolic connection to the heavens.

A 9th-century masterpiece standing tall today, Borobudur embodies artistic brilliance, religious philosophy, and enduring cultural significance (Figure 4).



Figure 4. Aerial View of Borobudur Temple Architecture

- **Sacred Geometry:** Symmetrical layout, perfect ratios, and potential use of the golden ratio showcase mastery of geometry, imbuing harmony and balance.
- **Fractal Flourishes:** Self-similar patterns of stupas and reliefs across scales suggest an understanding of fractal geometry, adding intricate unity.
- **Modular Marvel:** A suspected modular system based on specific ratios might hold cosmological or religious significance.
- **Celestial Connections:** Precise alignment with cardinal directions and potential references to solar and lunar cycles hint at astronomical knowledge and possible calendrical or navigational purposes.⁴

The Mystical Konark Sun Temple

The Konark Sun Temple, the Sun God, boasts not just captivating beauty but also hidden mathematical codes. Its iconic 24 chariot wheels, intricately carved with 8 spokes each, whisper tales of ancient Indian ingenuity (Figure 5).

Rising in the 13th century under King Narasimhadeva I, the Konark Sun Temple embodied a colossal chariot dedicated to Surya, the Sun God. Over 12,000 artisans meticulously crafted intricate sculptures and vast wheels from granite, symbolising the sun's celestial journey. Though centuries of neglect and natural disasters led to its decline, the temple's rediscovery in the 20th century sparked restoration efforts, bringing back to light a monument whispering tales of artistic brilliance and enduring cultural significance.

There are 8 minor spokes as well. Each minor spoke runs exactly in the middle of 2 major spokes. This means that the minor spoke divides the 3 hours in half, so the time between a major spoke and a minor spoke is an hour and a half or 90 minutes. The edge of the wheel has a lot of beads. There are 30 beads between a minor and a major spoke. So, the 90 minutes are further divided by 30 beads. This means that each bead carries a value of 3 minutes.



Figure 5. The sundial has 8 major spokes that divide 24 hours into 8 equal parts, which means that the time between two major spokes is 3 hours

The beads are large enough, so you can also see if the shadow falls in the centre of the bead or on one of the ends of the bead. This way we can further calculate time accurately to the minute.

- **Timekeeping:** Each wheel, carved with 8 spokes and intricate designs, functions as a sundial. Expand more the spokes cast shadows on the wheel rim, marking the passage of time with remarkable accuracy. Exclamation This intricate design allows for timekeeping to the minute, showcasing advanced knowledge of solar movement and timekeeping practices.

- **Calendar Representation:** The 24 wheels, combined with the 8 spokes on each, total 192, corresponding to the number of days in a lunar calendar cycle. This suggests a deeper understanding of astronomical cycles and their integration into the temple's design.
- **Golden Ratio:** Evidence suggests the presence of the Golden Ratio, a significant mathematical proportion found in nature and art, in the temple's proportions and carvings. Expand more This harmonious ratio adds to the aesthetic appeal and reflects the pursuit of mathematical perfection in its construction.
- **Symmetry and Geometry:** The temple's overall layout exhibits exceptional symmetry, utilising geometric shapes like circles, squares, and triangles in a cohesive and aesthetically pleasing manner. Expand more This adherence to geometric principles contributes to the structure's stability and visual harmony.^{5,6}

Newgrange Tomb Ireland

Rising majestically on the Irish landscape, Newgrange stands as a captivating relic of the Neolithic era, predating even the Egyptian pyramids. This passage tomb, estimated to be over 5,200 years old, enthralled archaeologists and visitors alike with its intricate construction, enigmatic purpose, and potential connection to celestial phenomena. Its construction likely began around 3200 BC, marking a period of remarkable advancements during the Neolithic period. After centuries of neglect, the tomb was rediscovered in the 17th century (figure 6).

Sunrise Surprise! On the shortest day of the year, sunlight shines through the tomb.



Figure 6. Moment During the Winter Solstice when Sunlight Shines through the Passage of Newgrange, Illuminating the Chamber with an Ethereal Glow



Figure 7. A Close-Up Image of the Intricate Carvings on the Walls and Stones within Newgrange

Secret Symbols: The walls and stones are covered in cool carvings, like messages from the past. Newgrange’s imposing mound, composed of massive stones and reaching over 40 metres, testifies to its builders’ remarkable prowess. A long passage leads to a cruciform chamber, its corbelled roof an engineering marvel for its time. Newgrange reveals a fascinating connection to astronomy. The passage aligns precisely with the winter solstice sunrise, illuminating the chamber with an ethereal glow for a brief period each year (Figure 7). This alignment and other features suggest the builders possessed remarkable knowledge of geometry and celestial movements. Some theories even propose the tomb functioned as a sophisticated calendar or observatory, reflecting their deep understanding of the cosmos.⁷

Ratneshwar Mahadev Temple

Standing tall yet curiously tilted, the Ratneshwar Mahadev Temple, OR Kashi Karvat, in Varanasi, India, this Shiva temple offers a unique blend of spirituality, resilience, and scientific intrigue. Constructed in the mid-19th century. The most striking feature of this temple is its nine-degree tilt towards the northwest. This tilt, caused by erosion from the nearby Ganges River, adds to its mystique and resilience. During high tides, part of the temple submerges, creating a captivating spectacle.

Built in the Nagara style, the temple boasts intricate carvings and a distinct square-shaped sanctum (Figure 8).

Its sturdy construction with interlocking stones, devoid of mortar, demonstrates remarkable engineering skills. Despite its tilt and exposure to the elements, the temple’s structure remains relatively intact. The square sanctum and symmetrical design suggest the use of geometric principles for stability and aesthetics (Figure 8).



Figure 8. Ratneshwar Mahadev Temple Exterior View showing the tilted structure

While unconfirmed, some theories propose potential alignments with celestial bodies, hinting at an understanding of astronomy. The tilt, while unintended, showcases the temple’s resilience against shifting river currents and harsh weather conditions.⁸

Stambheshwar Mahadev Temple

Nestled on India’s west coast, the Stambheshwar Mahadev Temple in Kavi Kamboi, Gujarat, boasts an age-old legacy and captivating features. Dedicated to Lord Shiva. Built using dry masonry, the interlocking stones showcase remarkable engineering, enhancing stability and earthquake resistance. Double walls with air gaps create a natural cooling system, while intricate water channels demonstrate efficient water management practices. The temple’s submergence twice a day is its most captivating feature. Attributing spiritual significance to the rhythmic disappearance and reappearance (Figure 9).



Figure 9. Stambheshwar Mahadev Temple Exterior

The Shivalinga aligns with the sun on specific days, possibly reflecting early sun worship practises. Whispers travel across the sanctum, possibly due to deliberate wall positioning, enhancing the meditative atmosphere.

Modhera Sun Temple

Gujarat's heart throbs with the architectural beauty of the Modhera Sun Temple, the Sun God. Built in the 11th century under King Bhimdev I, the temple showcases the Solanki dynasty's architectural prowess. Designed in the Maru-Gurjara style, it boasts a three-tiered structure: the Sabha Mandap (assembly hall), the Guda Mandap (sanctum sanctorum), and the Kund (tank). The temple's alignment with the sun during equinoxes reflects its profound astronomical knowledge crafted from sandstone (Figure 10).



Figure 10. Lotus Motifs in the Central Shrine

Architecture

- **Central Shrine:** Housing the Garbhagriha and Gudamandapa, it features lotus motifs symbolising the sun's influence.
- **Sabha Mandapa:** The most intricate structure, its exterior and interior walls boast beautiful sculptures. Fifty-two pillars, signifying the year's weeks, narrate scenes from epics and depict elements of nature.
- **Surya Kund:** Precise orientation ensures the sun illuminates the deity during equinoxes, demonstrating knowledge of celestial movements. During the summer solstice, the sun shines on the temple's top without casting a shadow, hinting at sophisticated solar understanding. No plaster or limestone unites the temple stones, relying on structural equilibrium, signifying advanced engineering knowledge.⁹

Mount Rushmore

Mount Rushmore, carved into the granite face of South Dakota's Black Hills, stands as an iconic landmark and testament to American history. Mount Rushmore, carved into the granite face of South Dakota's Black Hills, stands as an iconic landmark and testament to American

history. Featuring the visages of four U.S. presidents at a monumental scale, the monument inspires awe and curiosity in visitors worldwide. Conceptualised in the early 20th century, Mount Rushmore's sculpture took over a decade to complete, utilising innovative techniques and meticulous craftsmanship. The monument nightly comes alive with a 2-hour light display, adding a dramatic touch to the already impressive sight.

Conceptualised in the early 20th century, Mount Rushmore's sculpture took over a decade to complete, utilising innovative techniques and meticulous craftsmanship. The monument nightly comes alive with a 2-hour light display, adding a dramatic touch to the already impressive sight.

Each president's head measures 60 feet tall. Miniature, 1:12 scale models guided the carving process, ensuring accuracy and proportion. 90% of the mountain was removed using dynamite, showcasing the project's immense scale and engineering efforts. Interlocking stonework, devoid of mortar, contributes to the monument's resilience and longevity. A system of axes and planes ensured the harmonious arrangement of the sculptures within the landscape.

Virupaksha Temple

Nestled amidst the ruins of Hampi, the Virupaksha Temple stands as a testament to India's rich history and architectural prowess. Dedicated to Lord Shiva, it boasts intricate carvings, towering gopurams, and a unique connection to mathematics and science. Dating back to the 7th century, the temple witnessed continuous development through various dynasties. The Vijayanagara Empire significantly expanded the complex, and inscriptions reveal patronage from renowned kings like Krishnadevaraya. Even amidst Hampi's destruction, the temple remained intact, a symbol of its enduring resilience. The main gopuram casts an inverted shadow on a wall, a phenomenon explained by the pinhole camera effect, showcasing an ancient understanding of light (Figure 11).



Figure 11. Virupaksha Temple's main gopuram Exterior

The temple's architecture incorporates fractal patterns, suggesting the use of advanced mathematical concepts centuries before their formal discovery. Striking specific pillars produces musical notes, adding a unique sensory experience to the temple's atmosphere.

The temple complex comprises a sanctum, pillared halls, courtyards, and smaller shrines. Intricate carvings adorn the walls, narrating mythological stories. The towering gopurams stand as majestic gateways, with the eastern one reaching 50 metres. The construction exhibits remarkable craftsmanship, utilising interlocking stones and complex calculations.

Repetitive patterns throughout the structure depict fractal concepts, highlighting an awareness of geometric principles. The gopuram's design potentially reflects the Fibonacci sequence, suggesting early knowledge of this numerical progression. The inverted shadow phenomenon demonstrates an understanding of light physics, employed on a monumental scale.¹⁰

Conclusion

In conclusion, the architectural marvels examined in this paper illustrate the profound ingenuity and advanced knowledge of their builders. These structures not only reflect the aesthetic and spiritual aspirations of their respective cultures but also reveal a sophisticated grasp of mathematics, geometry, and astronomy. From the Kakanmath Temple's precise interlocking stones to the astronomical alignments of Borobudur and the timekeeping mechanisms of the Konark Sun Temple, these monuments testify to the remarkable engineering and artistic capabilities of ancient civilisations. As a first-time researcher, this exploration deepens our appreciation for these historical wonders and underscores the importance of preserving such knowledge for future generations.

Conflict of Interest: None

References

1. Sengar R. Leaning Temple of Varanasi beats the Leaning Tower of Pisa, this is how [Internet]. Times of India; 2020 Aug 14 [cited 2024 May 28]. Available from: <https://timesofindia.indiatimes.com/travel/destinations/leaning-temple-of-varanasi-beats-the-leaning-tower-of-pisa-this-is-how/articleshow/77548716.cms>
2. Chandaraju A. The hanging pillar and other wonders of Lepakshi [Internet]. The Hindu; 2021 Nov 17 [cited 2024 May 16]. Available from: <https://www.thehindu.com/features/metropolis/travel/The-hanging-pillar-and-other-wonders-of-Lepakshi/article13383179.ece> <https://whc.unesco.org/en/list/592/>
3. UNESCO World Heritage Convention [Internet]. Borobudur temple compounds; [cited 2024 May 15]. Available from: <https://whc.unesco.org/en/list/592/#:~:text=The%20Borobudur%20Temple%20Compounds%20is,r eign%20of%20the%20Syailendra%20Dynasty>
4. Times of India [Internet]. This Shiva temple was supposedly built by ghosts overnight!; 2023 Sep 6 [cited 2024 Apr 14]. Available from: <https://timesofindia.indiatimes.com/travel/travel-news/this-shiva-temple-was-supposedly-built-by-ghosts-overnight/articleshow/103435431.cms>
5. Kevin Standage: All Indian Travel Photography Blog [Internet]. Kakanmath Temple – defying the laws of gravity; 2019 Apr 23 [cited 2024 May 19]. Available from: <https://kevinstandagephotography.wordpress.com/2019/04/23/kakanmath-temple-defying-the-laws-of-gravity/>
6. Ministry of Culture, Government of India [Internet]. Archaeological Survey of India; [cited 2024 May 20]. Available from: <https://asi.nic.in/en/konarak-sun-temple-main-temple/>
7. UNESCO World Heritage Convention [Internet]. Sun Temple, Konârak; [cited 2024 May 23]. Available from: <https://whc.unesco.org/en/list/246/documents/>
8. Banerjee K. Konark Sun Temple, the definitive 4k 360 degrees VR experience [Internet]. YouTube; 2024 Feb 7 [cited 2024 May 21]. Available from: <https://www.youtube.com/watch?v=PKBzx9noRew>
9. Black Hills & Badlands [Internet]. Mount Rushmore National Memorial; [cited 2024 May 21]. Available from: <https://www.blackhillsbadlands.com/parks-monuments/mount-rushmore-national-memorial>
10. Rogers LR. Sculpture: principles of design [Internet]. Encyclopedia Britannica; [cited 2024 May 20]. Available from: <https://www.britannica.com/art/sculpture/Principles-of-design>