

# Exploring the Concept of Microarchitecture through the Temple Chariots of Odisha

*The paper investigates the Temple Chariots of Odisha and studies them through the microarchitecture lens. The paper uses the concept of microarchitecture proposed by Francois Bucher (1976); microarchitecture is the design of smaller structures that resemble the stylistic expressions of the larger ones from which they are inspired. The Temple Chariots, also known as "Rathas, Ther, or Viman," are a vital part of the Indian cultural heritage, and it has been seen that this structure often influenced and influence the regional history, culture and architectural styles. Similarly, the temple chariots significantly impact Odisha's cultural and architectural landscape. Historically, it has been seen that these festivals concerning the temple chariots were initiated between 7<sup>th</sup>-13<sup>th</sup> CE AD, similar to the Kalinga temples and it can be observed that these temple chariots display noteworthy similarities with the temples. This research thus aims to investigate the temple chariots through the lens of microarchitecture to determine the transfer of stylistic expression from the temples to the temple chariots. This research utilizes a case-study-based and deductive approach to explore the system of making these chariots, highlighting the connection between architecture, religion and communities. The study closely observes, deduces and discusses the architectural features of the temple chariot based on the attributes of colour, structure, form, geometry, plan, proportions and symbolism to determine the temple chariots as a microarchitectural form.*

**Keywords:** Temple Chariot, Odisha, Kalinga-style, architecture, craftsmanship

## Introduction

The interlacing of architecture with society and culture has been a vessel for expressing cultures, societies, and times throughout history. In this regard, it has been seen that the places of worship have been prime examples of architecture being a way to express cultures, especially found in the temples of India. Adding to that, temples and structures related to them have been vital aspects of cultural expression. In this scene, the temple chariots come into the picture.

### *Aim of the Research*

The aim of the research is to investigate the Temple Chariots of Odisha through the lens of microarchitecture.

### *Research Questions*

The following research questions are going to be addressed in the study:

- 1 • Do the temple chariots have a distinct architectural character to be  
2 considered as a different form of architecture?
- 3 • Are the temple chariots a microarchitectural form of the concerned  
4 temples?

### 5 6 *Scope of the Study*

7  
8 The study is scoped to a regional context of Odisha, a region of India that  
9 is a part of the erstwhile Kalinga region. The study was limited to the detailed  
10 study of the Rukuna Ratha, or the temple chariot dedicated to Lord Lingaraja.  
11 The study is limited to the architectural features and system of making the  
12 chariots analysed through the lens of microarchitecture. Though the study  
13 would touch upon the structural system of the Temple chariots, it won't look  
14 into the detailed structural analysis of the Temple chariots.

15 Odisha is a state deeply rooted in its culture and the chariot festivals in the  
16 state play a vital role in shaping the culture of the state. The festivals started in  
17 the 7th-13th CE AD have established their relevance to date and continue  
18 attracting worldwide visitors. The paper aims to study the focal point of these  
19 festivals, the Temple Chariot, through the lens of microarchitecture. The  
20 method of the study would be case study-based in nature. The research would  
21 rely upon the site study and archival research. Upon the selection of the  
22 Temple Chariot based on the literature review, the documentation and site  
23 study would be conducted along with its archival research. Then, the research  
24 would focus on creating a repository of the collected data based on the temple  
25 chariot's architectural features and system of making. Further analysis of the  
26 temple chariot with respect to the temple architecture would lead to the  
27 conclusion of the study.

### 28 29 30 **Literature Review**

#### 31 32 *Microarchitecture*

33  
34 The term microarchitecture was coined by Francois Bucher in the year  
35 1976 through his journal article, 'Micro-Architecture as the 'Idea' of Gothic  
36 Theory and Style', which states that the design theory applied to small works  
37 was identical to that used for large structures (Bucher, 1976). With the  
38 understanding of having a similar theory used for the creation of works in  
39 different scales, the creation of works by translating them to other scales can be  
40 thought of, i.e., the possibility of upscaling and downscaling. The study of  
41 microarchitecture also sheds light on the collaborative efforts between  
42 architects, sculptors, and painters, highlighting their roles in the creation of  
43 small works and their influence on the overall architectural design.

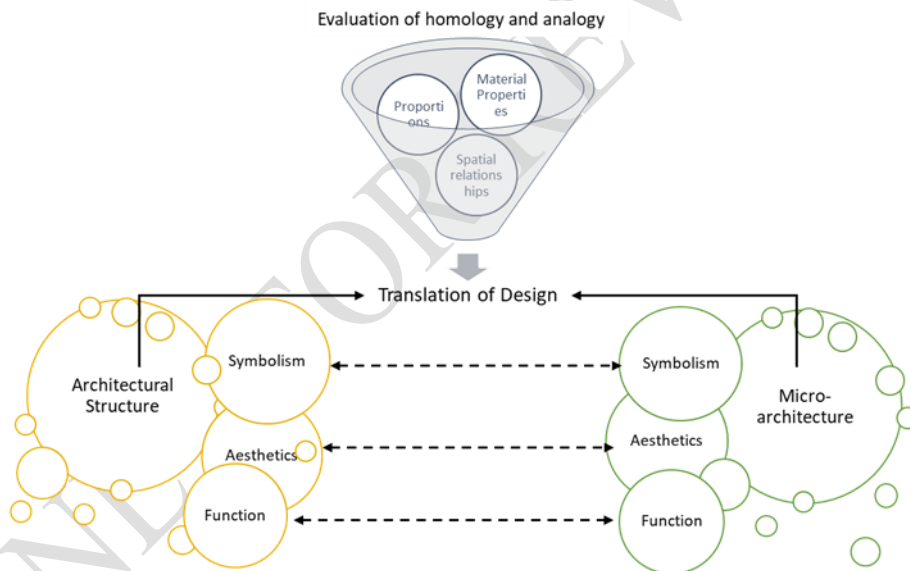
44 In the book, 'Ornaments,' Stuart Durant states, 'Indian temples are "totalities  
45 composed of a multiplicity of subsidiary forms—themselves sometimes  
46 miniature versions of the temple structure itself' (Durant, 1986). This suggests

1 that miniature forms can be clubbed together to form a larger structure or a  
 2 smaller structure can represent the structure of a larger structure. Researching  
 3 microarchitecture can contribute to a better understanding of regional  
 4 variations in architectural styles and practices, as different regions may have  
 5 unique approaches to micro-architectural elements.

6 Elizabeth Lambourn says, ‘Small models of large buildings can express  
 7 Microarchitecture’ (Lambourn, 2011). It allows for a deeper understanding of  
 8 architectural elements' aesthetic and symbolic significance, such as micro-  
 9 architectural forms.

10 Thus, referring to the above discussion, it can be said that the study of  
 11 microarchitecture deals with the concept of translating design from a larger  
 12 structure to a smaller structure and vice-versa. It also gives the idea that a  
 13 group of microarchitectural elements can form a large, intricate structure.  
 14 These systems of different scales respond to the same design principles, and  
 15 there is a possibility of upscaling and downscaling the form of art from micro  
 16 scale to macro scale and the other way.

17  
 18 **Figure 1. Understanding Microarchitecture**



19  
 20 *Source: Author 2024.*

21  
 22 Case Examples to Understand Microarchitecture

23 The following case examples can be studied to understand the concept of  
 24 microarchitecture and further display it in this paper:

- 25  
 26 • Japanese Tea houses  
 27 • Mashrabiya  
 28 • Temple Chariots

29  
 30 *Japanese Tea Houses*

31  
 32 The Sukiya Zukuri architectural style is a subset of the Japanese tea house

1 that mimics its features on a smaller scale. Japan's sukiya-zukuri style tea  
2 houses are a beautiful blend of natural beauty and minimalist architecture.  
3 Their design relies heavily on symmetry to capture the peaceful beauty of the  
4 natural world.

5 The main characteristic of this style is emphasizing the unaltered beauty of  
6 raw, natural hardwood textures. Unpolished wood that displays its knots and  
7 textures honours the flaws found in nature. This strategy fits in with the current  
8 minimalist movement. A deliberate lack of decoration lets the natural beauty  
9 take centre stage and creates a serene environment that encourages a closer  
10 relationship with the environment.

11 The Sukiya zukuri method fosters a direct interaction with the natural  
12 surroundings. The lines between the inside and outside are blurred by  
13 translucent shoji screens, allowing nature to become part of the interior. The  
14 peaceful atmosphere is enhanced by the interaction of architecture and nature  
15 (Kumarasuriyar, 2011).

16 This relationship is best illustrated by the Japanese wabi-sabi aesthetic,  
17 which values natural materials, imperfection, and simplicity. A society's  
18 identity is reflected in the tangible artefacts that make up its material culture.  
19 Wabi-sabi strongly emphasises appreciating and accepting the inherent beauty  
20 of imperfect objects. This viewpoint is consistent with how tangible objects, or  
21 material culture, support cultural narratives.

22 Materials like wood, bamboo, and paper embody the Japanese wabi-sabi  
23 style, which honours nature's inherent qualities and values imperfections. The  
24 flaws in materials become ageless stories that connect the tangible and  
25 intangible worlds.

26 As small buildings, teahouses are the epitome of the Sukiya-Zukuri style  
27 and are examples of microarchitecture.

### 28 29 *Mashrabiya*

30  
31 The mashrabiya, a structure known for its intricately carved wooden  
32 latticework, has been a prime element of traditional Arabic and Islamic  
33 architecture since the Middle Ages. Several factors influence the design of the  
34 mashrabiya, such as the need to control light, regulate airflow, and lower  
35 temperatures.

36 In addition to improving the place's aesthetic appeal and urban design, the  
37 mashrabiya benefits the environment by offering shade and protection from the  
38 sun and rain. Moreover, it facilitates reasonable interaction with the outside by  
39 enabling communication between the residents and their house (Ashour,  
40 2018).

### 41 42 *Temple Chariots*

43  
44 Temple chariots are thought of as movable shrines that represent a diverse  
45 range of cultures and historical periods. These chariots meticulously translate  
46 every architectural detail onto wheels, creating miniature versions of hallowed

1 temple spaces (Rajarajan, 1998). They portray the spiritual essence of the temples  
2 they represent in addition to their outward likeness. During processions, these  
3 chariots, adorned with spires, sculptures, and intricate carvings, transport the  
4 blessings of the temple.

5 Temple chariots are examples of communal craftsmanship and devotion, in  
6 addition to their architectural significance. They represent tenacity over time and  
7 act as living narratives of cultural heritage. Temple chariots carry the weight of  
8 tradition and spirituality in their magnificent processions, symbolizing the  
9 harmonious blending of the sacred and the earthly (Rajukalidoss & Rajarajan,  
10 2016).

### 11 *Research Gaps*

- 14 • The study of microarchitecture looks at the aspect of the perception and  
15 understanding of designs through inspiration or translation along with  
16 understanding design choices and offers symbolic or aesthetic  
17 meanings. It deals with the evolution of forms along with their regional  
18 variations. Not only that, the concept also investigates the relation of  
19 architecture to other art forms. In is scenario, it has been found that  
20 there is a scope of further study of microarchitecture in India  
21 (Lambourn, 2011).
- 22 • Conducting a detailed study of the architectural features of temple cars  
23 (Rajukalidoss & Rajarajan, 2016). Temple cars are a subset of temple  
24 architecture and needed to be studied well from the architectural  
25 perspective symbolism of temple cars in Odisha, including the main  
26 deula, mukhasala etc. Being able to carry the essence of the temple in a  
27 microarchitectural structure makes it important to study and analyze the  
28 translation of the design (Kulke, 1979).
- 29 • The role and identity of the Vishwakarma communities involved in  
30 making rathas. the role of knowledge transfer to future generations  
31 (Mishra, 2016).
- 32 • Examining the materials and construction techniques used in making  
33 temple cars, the social and cultural significance of temple cars in the  
34 contemporary context, and how they have evolved over time  
35 (Rajukalidoss & Rajarajan, 2016).

### 36 *Need of the Study*

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38  
39 The existing research gaps highlight the critical need for a comprehensive  
40 study of the architectural features of temple chariots. Investigating the  
41 microarchitectural structure of temple chariots is essential to examine the  
42 translation of design between the temples and the chariots (Kulke, 1979).

43 The role of the communities involved in the making of the chariots  
44 requires further exploration in the present context (Mishra, 2016).

45 Additionally, addressing the research gap in comprehending the role of  
46 traditional knowledge transfer to future generations has become primary goal

to ensure the preservation of the cultural heritage (Mishra A. , 2016).

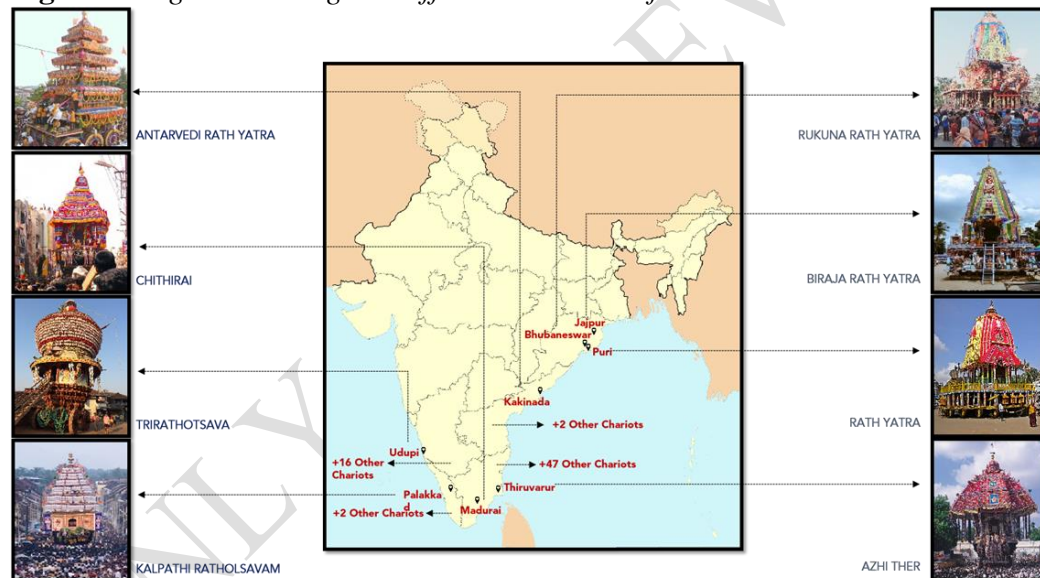
### Temple Chariots of India

India's temple chariots symbolize the country's rich cultural heritage and architecture. Each region of the country has its own distinct style and symbolism, adding to a rich culture surrounding the temple chariots that capture India's spiritual and aesthetic depths.

These temple chariots are manifestations of creative thinking and tradition, connecting communities across geographic and cultural boundaries. Beyond mere transportation of the deities, they connect the sacred and secular worlds, instilling a sense of unity and tradition in devotees.

India is home to several chariot festivals, but there are about 76 major festivals. Among these festivals, eight are especially well-known and attract huge numbers of visitors worldwide to see their amazing processions. Among these 8 chariots, this paper will describe the Temple Chariot festival dedicated to the Temple Chariot of Lord Lingaraja, Rukuna Ratha.

**Figure 2.** Figure showing the different Chariots of India



Source: Author 2024.

### Methodology

Based on the aim of the research to investigate the Temple Chariots of Odisha through the lens of microarchitecture, the following objectives were laid out to conduct this research:

- To identify various temple chariots, with a specific focus on those in Odisha.
- To document the identified temple chariots, emphasizing their architectural elements.

- 1 • To analyze the temple chariots through the perspective of microarchitecture.
- 2 • To develop a repository, inventories, and drawing portfolios highlighting
- 3 the architectural attributes of the temple chariots and their relationship to
- 4 temple architecture.

5  
6 As discussed in the earlier section regarding the Temple Chariot Festivals  
7 in India, the paper tries to initiate the investigation from a regional level,  
8 starting the investigation from the temple chariots of Odisha. Among the three  
9 major temple chariots, the temple chariot festival of Rukuna Rathayatra,  
10 dedicated to Lord Lingaraj, is considered for this study. The Lingaraj Temple  
11 and its traditions are the oldest in Odisha. Though there is no written  
12 documentation regarding the initiation of the festival, some local sources spell  
13 out that it might have started somewhere between the 5th and 7th CE AD. The  
14 tradition still persists through centuries, with the making of a new Temple  
15 Chariot every year after ages. This is the reasoning behind the identification of  
16 the precinct.

17 The next phase was to document the concerned chariots. Multiple data  
18 collection methods were implemented for the research, including Field  
19 Surveys, Interviews, Archival research and photographic documentation.  
20 During interviews with key figures involved in the Rukuna Rath's construction  
21 provided valuable details regarding the system of making the chariots. Shree  
22 Somnath Maharana, the chief Maharana for the Rukuna Rath, gave detailed  
23 descriptions of the traditions and systems of the making and design of the  
24 temple chariots. He explained the communities' involvement and their role, the  
25 traditional tools and methods employed, and the measurement systems  
26 employed in the chariot making. He also gave a detailed description of the  
27 structure and the system of making the chariot, highlighting the design  
28 elements of the temple chariot. During the telephone interview with Shree  
29 Balaram Mahapatra, a detailed description of the roof covering of the chariots,  
30 including its colour combinations and elemental features, was obtained. In  
31 addition, he spoke about his 40-year-long journey of making the chariot fabric  
32 and discussed the absence of his successors in carrying on this age-old  
33 profession.

34 Finally, after documentation, a knowledge repository was created based on  
35 the site study, interviews, archival research, etc., covered in the documentation  
36 process. Drawings and models were created to understand the chariot's  
37 architecture and design features. Further, the chariot was analysed through the  
38 lens of microarchitecture to find their relationship with the temple architecture.

39  
40

### 41 **Temple Chariot of Lord Lingaraj: Rukuna Ratha**

42

43 Rukuna Rathayatra, a major Hindu festival in Odisha, is dedicated to Lord  
44 Lingaraj. The festival includes the journey of Lord Lingaraj with his family  
45 from the Lingaraja Temple to the Rameswaram Temple in a grand, intricately  
46 decorated chariot known as Rukhna Ratha. The event centres around practices,

1 devotional music, dancing, and the chief procession, with thousands of  
2 devotees pulling chariots through Bhubaneswar's Old Town precinct. The  
3 Ratha Yatra celebrates Odisha's rich cultural heritage, promoting unity and  
4 harmony among various communities.

#### 5 6 *Historical Context*

7  
8       Lingaraja Temple in Bhubaneswar, Odisha, is an apt example of ancient  
9 architecture and religious devotion. The temple is devoted to Lord Shiva and is  
10 one of the region's most important and historic locations. The temple was built  
11 in the 11th century with support from the Eastern Ganga dynasty, and it is well  
12 known for its detailed carvings and sculptures. Lord Lingaraja is a form of  
13 Lord Shiva, also called 'Tribhubaneswara' or 'Bhubaneswar.' The term  
14 denotes the lord's supremacy over the universe and humanity. The deity is also  
15 the inspiration for the city's name, Bhubaneswar, demonstrating the cultural  
16 connection of the place. This place has been the worship centre for even longer  
17 than the temple itself. Locals believe the initiation of worship at this place to be  
18 somewhere around the 5th or 6th century AD. Even though there are no written  
19 records of the chariot festival's beginnings, it can be assumed that the festival  
20 might also have been initiated during the period. The temple chariot associated  
21 with the temple is known as Rukuna Rath. It is believed that the word  
22 "Rukma," which means "gold," is where the word "Rukuna" originates from,  
23 suggesting that the chariot was formerly known as "Rukma ratha," or the  
24 Golden Chariot. The chariot's gold components highlight its continued  
25 religious and symbolic importance.

26       Rukuna Ratha Yatra, Ashokastami Yatra, is a religious festival is also  
27 known as the 'Papa Binashakari Yatra,' or the festival which eradicates all evil  
28 and sins. Ancient writings like the Ekamra Purana, Svarnadri Mahodaya, and  
29 Ekamra Chandrika, as well as more recent works like Vachaspati Misra's  
30 Kapila Samhita and Tirthachintamani, describe the festival's origins.

31       During the festival, a grand chariot procession is carried from the  
32 Lingaraja temple to the Rameswaram temple, which is approximately 2 km  
33 away, carrying deities such as Gopolini (Parvati), Kumara, Nandikesvara, and  
34 the statue of Govinda. The Utsava Vighraha (Chalanti Pratima) of Lord  
35 Lingaraja becomes part of the festival and moves with the chariot during the  
36 festival. The five to seven-day Ratha festival is marked by intricate rituals,  
37 prayers, and singing as devotees pull the enormous chariot along its holy path.  
38 Attracting thousands of devotees, this procession highlights the festival's role  
39 as a manifestation of spiritual blessings and purification by symbolizing the  
40 journey of divine grace and the triumph of righteousness. The fifth-day chariot  
41 journey illustrates the periodic nature of divine blessings and strengthens the  
42 devotees' unwavering faith in the divine presence of Lord Lingaraja.

#### 43 44 *Setting of the Festival*

45  
46       Ratha Yatra, like Shivaratri, is an important part of the Lingaraja Temple's



1 annual festivities. This festival, which takes place in the month of Chaitra on  
2 Shukla Ashtami (the 8th day of the bright fortnight), dates back to the Treta  
3 Yuga when Lord Rama stopped by Ekamra Ksetra during his 14-year exile.  
4 The temple's presiding deity, Lingaraja Mahaprabhu, greeted Lord Rama  
5 warmly and invited him to stay longer. Lord Rama's residence was known as  
6 Rameswaram, and his birthday was celebrated during this time. To honour this  
7 spiritual connection, Lingaraja Mahaprabhu, along with Devi Parvati, Ganesha,  
8 and Kartikeya, set out on a grand Ratha Yatra to visit Rameswaram Temple,  
9 initiating the Ratha Yatra festival of Lingaraja Mahaprabhu. This festival lasts  
10 five to seven days and is filled with devotion, spirituality, and the eternal  
11 connection between the divine and the devotees of the Lingaraja temple.

12

### 13 *Rukuna Ratha*

14

15 Rukuna Ratha is the Temple chariot of Lord Lingaraja. It measures a  
16 dimension of 27' x 27', with a height of 35 feet and a ground clearance of 4  
17 feet. It has four wheels and is brightly coloured in red, blue, yellow, and white.  
18 This chariot was built using 1,027 wood pieces and metal joinery with its roof  
19 covered with fabric.

20

### 21 System of Making

22

23 The process of crafting a temple chariot involves three distinct stages.  
24 These stages include sourcing raw materials required for the construction,  
25 making the chariot's individual units, and finishing the Chariot.

26

27 Key raw materials for the Bijaya Temple chariot are timber, iron, and  
28 cloth. Timbers like Mango (*Mangifera indica*), Tamarind (*Tamarindus indica*),  
29 Simili (*Bombax ceiba*), Moi (*Lannea coromodalica*) Sal (*Shorea robusta*) and  
30 Bel (*Aegle marmelos*) used as the structural parts of the chariot. Patta made out  
31 of Sal wood are used for wall cladding and flooring. The majority of these  
32 timbers are sourced from Khordha.

33

34 Iron is the preferred metal for the chariot's metal parts, usually sourced  
35 locally. These iron components are frequently crafted on-site, ensuring  
36 accuracy and a customized fit during assembly. Finally, the Darji community  
37 of makers associated with the Lingaraja temple has prepared the intricate fabric  
38 works on these chariots for generations. The chariot coverings are composed of  
39 cotton cloth sourced by the materials procuring committee of the Temple  
40 administration specified by the darji community.

41

### 42 Process of Making






43

44 The process of making the chariot is displayed in the table using the data  
45 collected and the photographic documentation conducted on the site.

46

47

1 **Table 1. Process of making of Rukuna Ratha**

Image	Description
	<p>First, the wheel of the Chariot is Constructed. The wheel is 8' high and have a thickness of about 2'. The wheel is made of timber of Mango (<i>Mangifera indica</i>). The wheel is decorated with a floral pattern. As a part of the Chariot ornamentation, which is ornamented with floral designs for Lord Lingaraj 4 wheels are prepared for the chariot and named.</p>
	<p>Then, the axle and wheel, once attached, are assembled in the order of their placement in the chariot. Castor oil is used to provide lubrication between wheel and axle.</p>
	<p>Parts stored from last year's dismantled Chariot have been taken out of storage. The condition and quality of the wood are tested and made ready for the making.</p>
	<p>The lower grid base of the chariot is getting constructed and the jalajantra is ready</p>
	<p>The start of making of the shikhara above the singhasana</p>

	<p>The making of the Shikhara at its end with the final making of the Potala. The shikhara is 3-tala in nature.</p>
	<p>Addition of the Torana at the front of the Chariot and the addition of colours and decorative elements.</p>



The final assembly of fabric around the chariot is complete and the chariot is ready for the festival.

1 Source: Author 2024.

2

3 Makers of the Chariot



4 Historically, several communities were involved in making Temple  
 5 chariots, including maharanas, who built the structures; Kamara maharana,  
 6 who worked with metal; chitrakara, who painted; and darjis, who made the  
 7 fabric. However, with the passage of time, knowledge transfers declined for  
 8 various reasons. Though chariot making is still in the hands but, the numbers  
 9 are decreasing gradually as the next generation has shifted to other professions.



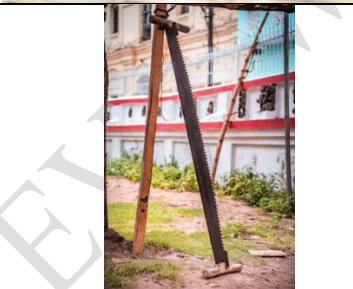


10

11 Tools involved in the making

12 Several Traditional tools are used in the making of the Temple Chariot. As  
 13 per the traditions, the chariots' making uses these tools compared to the modern  
 14 instruments. These are the following tools:

15

Tool	Use	Image
Mugura	A large hammer	
Koramunda	It means scooped-out head. A type of small mammer	

Cheni	These are used by the carpenters for chiselling of the wood.	
Bindhani	Indigenous hand drill.	
Hatakarata	This is the hand saw operated by two people from either side at one time.	
Purana	A large divider	
Barishi	A type of froe	

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Rituals involved in the making of the Rukuna Ratha

- Day 1: Basanta Panchami: Lingaraja Mahaprabhu travels in a procession to Badatota to mark the mango tree used to build the Ratha. The chosen mango tree is identified by a small weapon cut on its trunk.
- Day 3: Magha Saptami: Chalanti Pratima of Lingaraja Mahaprabhu visits the Bhaskaresvara Temple to collect the specifications of the Ratha.
- Day 10: Magha Purnima: The day symbolizes the initiation of the festive season and the initiation of the Chariot Building.
- Day 25: Nimakoli Amabasya: Chaka-akha lagi. The connection of wheels to the axle.
- Day 60: Nahaka Puja: All the work for constructing the Chariots is

- 1 complete.
- 2 • Day 61: Ashokastami: The Chariot Festival begins. Lord Lingaraja rides  
 3 on his Chariot to visit Rameshwar Temple.
- 4 • Day 65: Dwadasi: Bahuda yatra. Lord L ingaraja returns to the Lingaraj  
 5 Temple, and the Chariot Festival ends

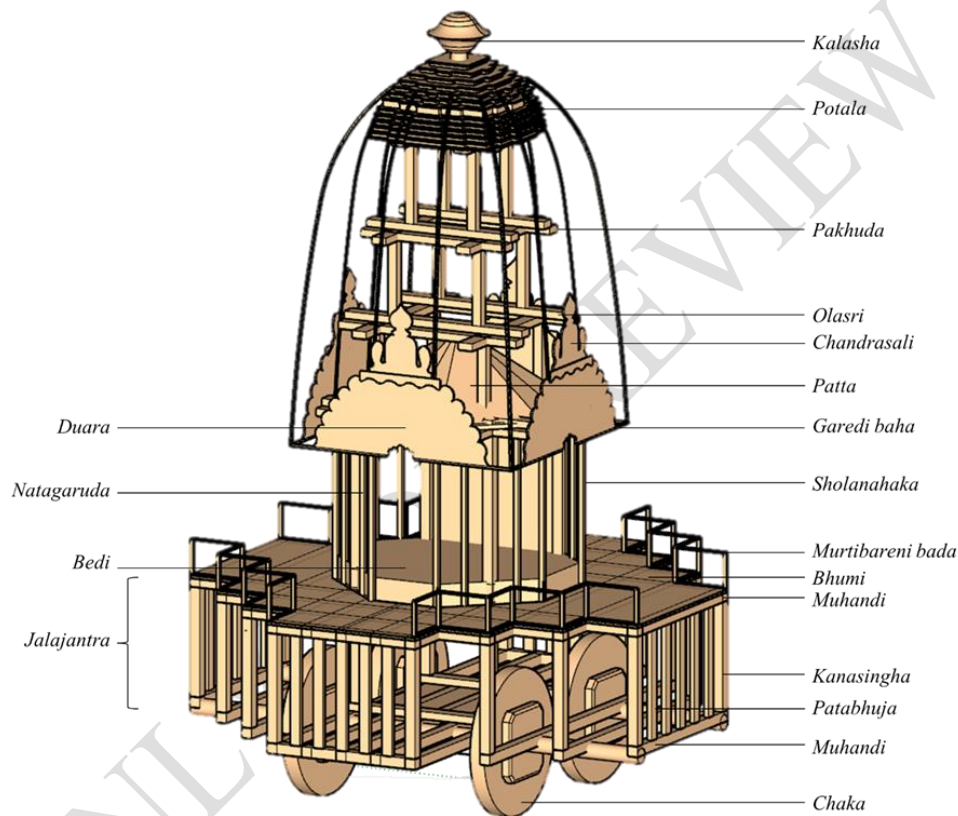
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7 Structure of the Temple Chariot

8 The structure of a chariot is divided into various parts.

9

10 **Figure 3.** *Structure of the Chariot*



11

12 *Source:* Author 2024.

13

14 The Chaka (wheel) and Akha (axle) form the chariot's foundation, bearing  
 15 the entire structure load and allowing it to move. These vital parts support the  
 16 chariot and allow it to move.

17 The wheel and axle support a grid frame structure, which also serves as the  
 18 superstructure foundation. The grid framework on which the columns are  
 19 placed to support the pedestal. Columns are placed over the grid points.  
 20 Exterior columns are known as bhuja, and interior columns are stambha. In this  
 21 case, the interior columns are limited and restricted to the columns that go  
 22 ahead to support the space that houses the deity overhead. Further, this part  
 23 culminates with a grid timber frame that supports the Bhumi. The whole  
 24 system is known as Jalajantra.

1 Above the pedestal is the Bhumi. The Bedi situated over the Bhumi or the  
 2 pedestal, with the Bedi having an octagonal plan, houses the deity. A  
 3 pyramidal structure known as Munduli stands above the bedi, protecting it  
 4 from environmental elements such as rain and dust from the top. The Prava is  
 5 the back wall of the deva pitha, giving support and coverage from behind.

6 The nahakas, or sholanahakas, are columns that support the devapitha and  
 7 mukharatha.

8 The superstructure consists of a 3-tala shikhara above the bedi in the form  
 9 of a viman as in Rekha deul. The shikhara is adorned with Potala, Kumbha  
 10 (kalasa), and dhwaja (flag) elements, which add to the chariot's architectural  
 11 grandeur.

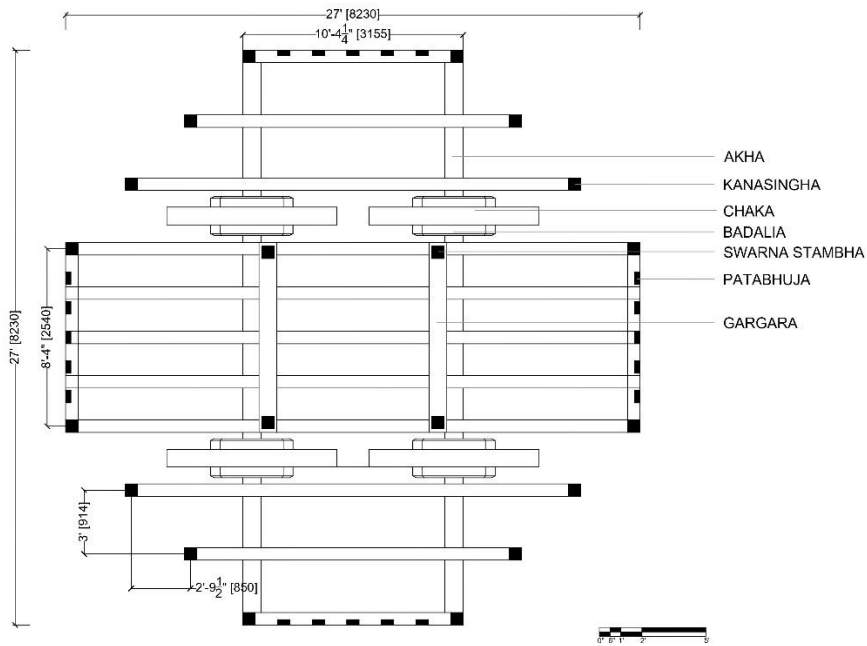
12  
 13 **Figure 4.** *Fabric-cover of the Chariot*



14  
 15 *Source:* Author 2024.

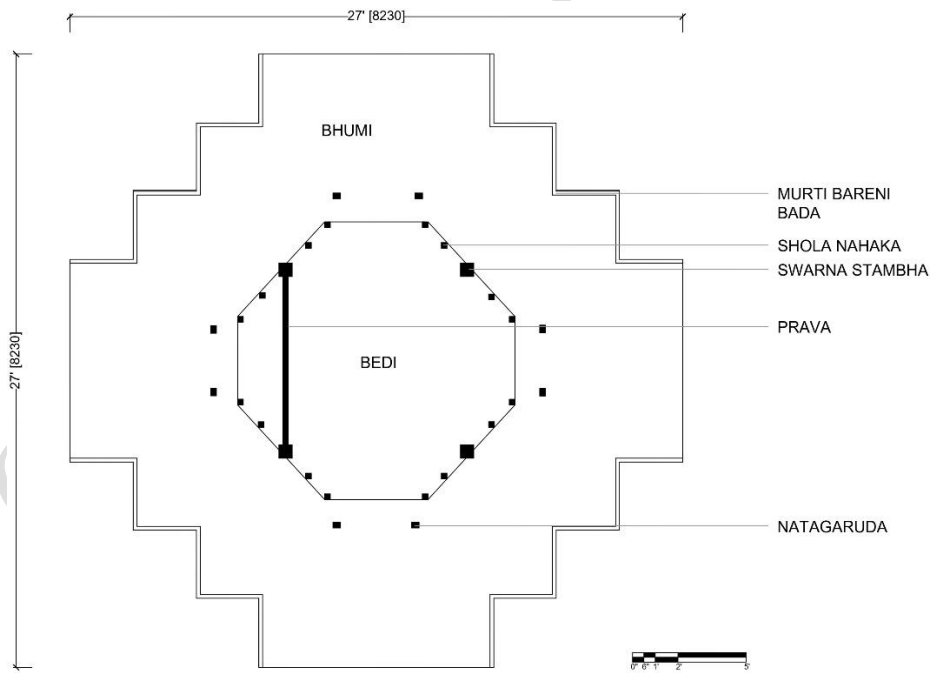
16  
 17 The most attractive part of the Chariot is its roof cover. It is composed of  
 18 the fabric. The reason of opting fabric is its lightweight, to suggest temporality  
 19 and options of vibrancy and reflection of culture. The chariot fabric is  
 20 composed of red, blue, green and yellow colour. The most attractive element of  
 21 fabric work is seen on the Torana or the entrance gate with ornamental works.  
 22 The chariot fabric cover comprises parts like Tala Ghera, Duara, Chandrasali,  
 23 Rathaghera and Uparaghera.

1 **Figure 5. Base level plan of the chariot**



2  
3 Source: Author 2024.

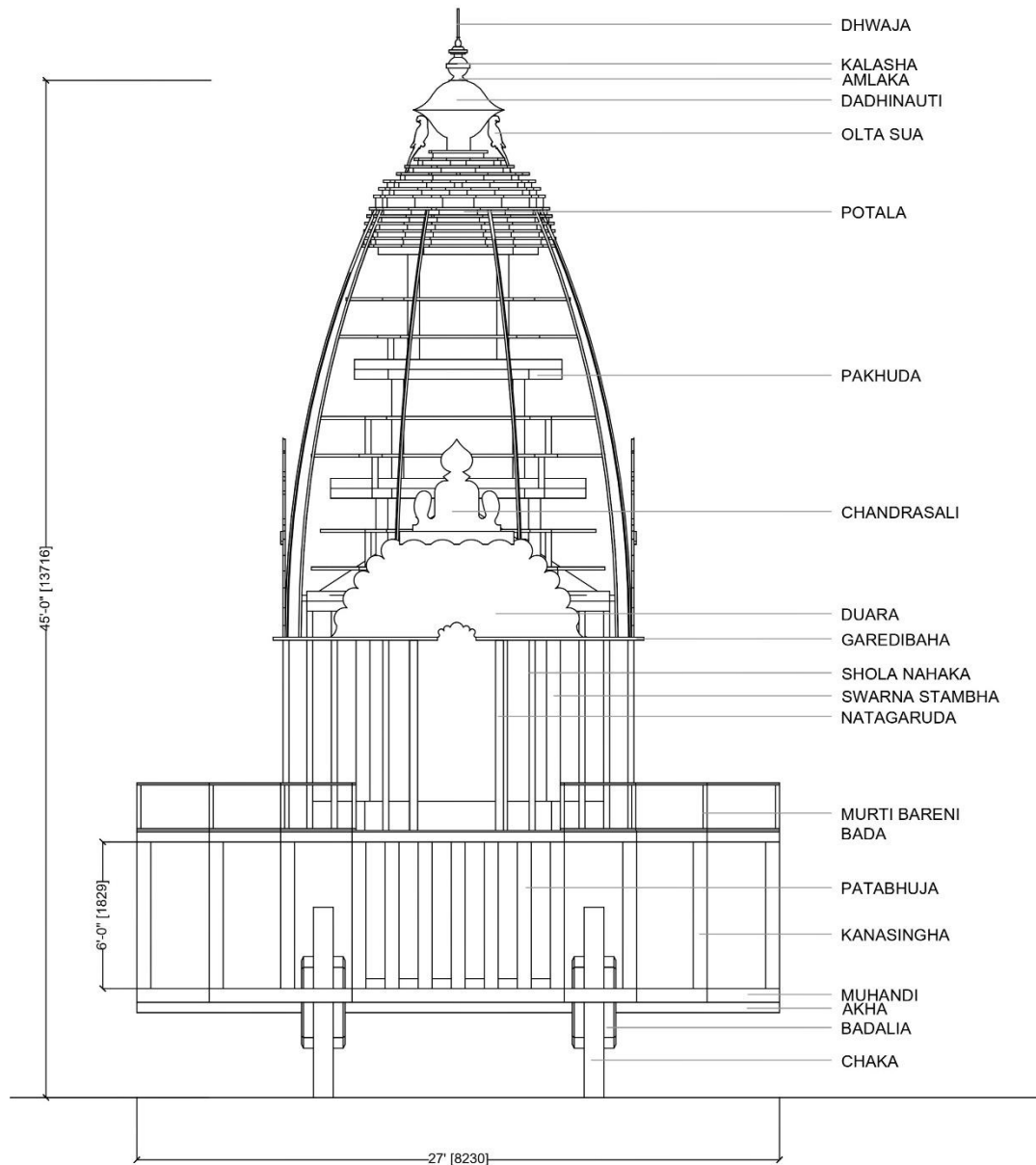
4  
5 **Figure 6. Plinth level plan of the Chariot**



6  
7 Source: Author 2024



1 **Figure 7.** *Elevation of the temple chariot*

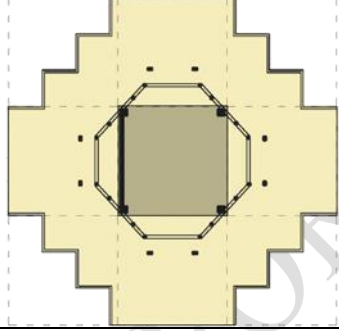
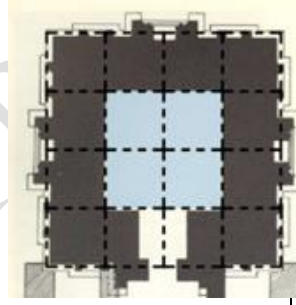
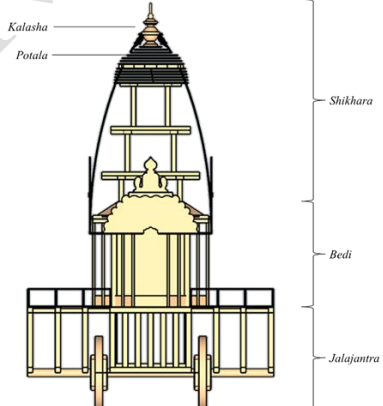
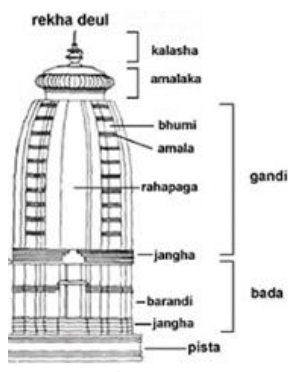



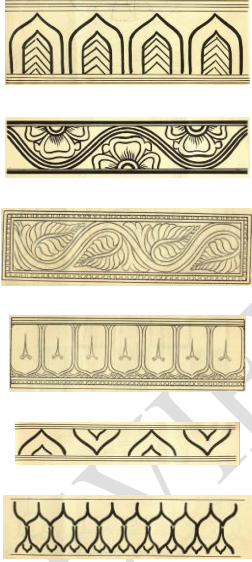


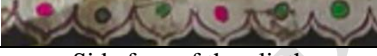

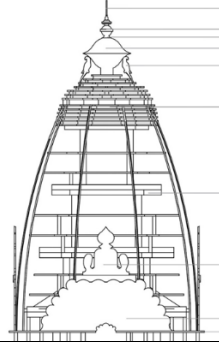
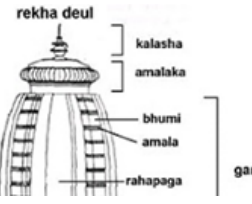
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3 *Source:* Author 2024

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5 *Analysis*

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7 The following analyses highlight the temple chariot's architectural features  
8 and design elements.

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Character	Rukuna Ratha	Temple architecture	Observations
Colour	Yellow/golden		Owing to the name, 'Rukma ratha' or the golden chariot.
Material	Timber, iron and fabric	Stone	The mobile nature of temple chariots needs lightweight materials. Structural styles differ between masonry and framed structures.
Structure	The structure is trabeated in nature. Horizontal and vertical members make up the frame of the structure.	The structure is load-bearing in nature with stone masonry, and the shikhara is balanced with a heavy keystone.	
Plan and plan proportion			The plan follows the Kalingaka-Dravida style plan form like the temple architecture and also follows the proportion prescribed by the mandala system used in the temple plan-making.
	Kalingaka-Dravida type plan; Tripada mandala.	Kalingaka type plan form; chatuspada mandala. <i>Parsurameswar temple</i> (Bose, 1932)	
Form		 (Ranjan, 2021)	Just as temples consist of three main parts - pista, bada, and shikhara with elements like Gandi, amlaka, and kalasha-chariots follow a similar form.

<p style="text-align: center;">Ornamentation</p>	 <p>The bead alias are decorated with beads like structures The outer part is decorated with floral patterns derived from the lotus petals</p>	 <p style="text-align: center;">Reference from the Kalinga style Temple architecture (Gosh, Bose, Sharma, &amp; Goswami, 1950)</p>	<p>The ornamentation in the temple chariot draws its inspiration from the carvings in the temples under the Kalinga style of architecture.</p>
	<p style="text-align: center;">Wheel ornamentation</p>		
			
	<p style="text-align: center;">Muhandi: Ornamentation with flowers and leaves</p>		
	 <p><i>Kanasingha</i> Corner column carved with lion figure.</p> <p><i>Patabhuja</i> Ornamented in the form of baluster column</p>		
	<p>Square columns. One of them is the carving of lion figures, and the other is shaped like a baluster column.</p>		
			
<p style="text-align: center;">Side face of the plinth</p>			
 <p><i>Kirtimukha</i> Counterparts of Rahu Mythical creatures</p> <p><i>Garede bahu</i> Holding the mukara at the end</p> <p><i>Natagaruda</i></p> <p style="text-align: center;">Multifoil arch at the top Kirtimukha at the Entrance</p>			
<p style="text-align: center;">Shikhara (Roof)</p>	 <p>DHWAJA KALASHA AMLAKA DADHINAUTI OLTA SUA POTALA PAKHUDA CHANDRASALI DUARA GAREDEBAHA</p>	 <p>rekha deul kalasha amalaka bhumi amala rahapaga gandi</p>	<p>The shikhara of the temple chariot share a similar form and elements with variation in nomenclature and alteration in geometry to facilitate the change in</p>
	<p>The shikhara of the chariot is in the form of a rekhadeul supported by the trabeated form and shaped by the hathialamala.</p>		

			structure and material.
Roof (Covering)		Composed of Stone and carvings ornamented throughout the surface. Addition of religious figures on the duara.	The chariot possesses different levels of ornamentation on the roof covering
	<p>Division of components in fabrique works.</p> <p>No ornamentations in any part but elaborate work on the durabedha.</p> <p>Addition of religious figures on the duara.</p>		

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### Findings and Discussion

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#### *Style of Chariot making: an Architecture of its own*

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Based on the findings gathered from the analysis, it was observed that when the deity, Lord Lingaraja and his family, come out from their respective temples for the festival, the Rukuna Ratha temporarily houses them. The gods stay on the chariots for several days and use them for transportation. In this sense, it can be claimed that the Rukuna Ratha serves as a temporary temple during festivals and as a vehicle for the gods. The chariot is an intricately constructed structure of different parts and patterns. The results that demonstrate the unique architectural style of the Rukuna Ratha will be covered in the following section.

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The trabeated structure composed of timber, Rukuna Ratha has an Adhara (grid base), several Bhara(s) (columns), and an Upadhara (grid of plinth beams) arranged in a grid frame with Bhara(s) at the nodes. The Singhasana, or Asthana, houses the deity. It is supported by four main columns (Swarna stambhas) and smaller columns (Nahaka), which are supported on a layer above Adhara, known as Gargara. The Shikhara's primary structure is a staggered pyramidal form, yet its shape resembles a Vimana. These consistent structural elements highlight the Rukuna Ratha's distinct features.

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Regarding the chariot's components, the spaces it may occupy include the area beneath the plinth in the between of the grid between the columns, the chariot's core space, and the remainder of the plinth. The space below the plinth is generally open on all sides and contains the braking mechanism. The core space of the chariot is located within the Swarna Stambha(s) and the Nahakas. The rear face of this space is frequently covered with a feature known as the Prava. Ratha Ghera further enclosed the core space with fabric on three

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1 sides, leaving only the front side open. This space functions similarly to a  
2 temple's Garbhagriha. The Nahakas are the guardians of the deities. Apart from  
3 this, the remainder of the plinth is frequently left open for the Parikrama.

4 Finally, investigating the architectural features and ornamentations of the  
5 Rukuna Ratha highlight various elements. The Muhandi, the Adhara's bottom  
6 ornamented layer, is usually decorated with floral patterns. The outer Bhara(s)  
7 are adorned with lion figures, while the interior columns are plain. The  
8 Upadhara face is similarly decorated, with floral work inspired from lotus. The  
9 Torana, or structure above the entrance, is richly decorated with symbols such  
10 as Chandra and Makara. Kirtimukha, mythical creatures, and floral motifs are  
11 among the additional ornaments. The Prava is structured as a storyline. The  
12 Kalasha at the top is usually gold, emphasizing the Ratha's architectural style.

### 13 14 *Parallel to Temple Architecture*

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16 The Temple chariot exhibits significant similarities to the Kalinga style, yet  
17 the two types of structures display strong dissimilarities, too. Both temples and  
18 chariots have a trabeated structure, with elements like Pista, Bada, Shikhara,  
19 Potala, Kalasha, and Dadhinauti. The similarities in the form of the structures  
20 highlight a cohesive design approach that combines spiritual symbolism and  
21 architectural aesthetics.

22 The Rukuna Ratha is designed similarly to Kalinga temples, although with  
23 different nomenclature for elements. The ornamentations found on the elements  
24 draw inspiration from the carvings from the regional temples, like those found on  
25 the *Adhara* (base), *muhandi* (cornice), *bhara* (columns), *Duara* (entrance  
26 gateway) and *bhumi* (plinth).

27 The shikhara, a key component in both architectural forms, follows similar  
28 scriptural guidelines. But Chariots are built with lightweight materials to  
29 accommodate their mobility, as opposed to temples, which use permanent  
30 materials. Though there is a similarity in shape and form between the temples and  
31 the chariot, their structures vary.

32 In conclusion, this study highlights the strong similarities between the Kalinga  
33 region's temple architecture and chariot designs, revealing deep cultural, symbolic,  
34 and artistic connections which might contribute to the chariot being the  
35 microarchitectural form of the temple.

### 36 37 38 **Conclusion**

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40 The Temple Chariot of Lord Lingaraj, also known as the Rukuna Ratha,  
41 serves as a vehicle for deities and a temporary temple. Its design and form  
42 reflect distinct similarities that these structures share with the temple  
43 architecture of the Kalinga region. But the trabeated timber structures point  
44 towards the dissimilarities between the two types of structures. The system of  
45 making the chariots shows a systematic use of traditional materials and  
46 techniques crafted by specific communities with tools and knowledge passed

1 down through generations. The spatial organisation of the chariot illustrates the  
 2 quality and functional set-up found in the garbhagriha of a Kalinga-style temple.  
 3 The chariots' ornamentation and carvings on various architectural elements are  
 4 inspired by Kalinga temple architecture, demonstrating a continuity of artistic  
 5 expression and cultural heritage.

6 Although the temple chariot has a distinct architectural style and several  
 7 design elements in common with Kalinga temple architecture, implying that they  
 8 could be considered microarchitectural forms of temples, significant differences in  
 9 structure and function suggest a different result. Furthermore, given the size of the  
 10 temple chariots, the term "microarchitecture" may not be entirely appropriate. In  
 11 conclusion, while temple chariots have some microarchitectural features with  
 12 respect to the Kalinga temple architecture, they may not be considered entirely  
 13 as microarchitectural for the temples. Further research can be conducted using  
 14 more temple chariots to obtain a more profound understanding of the concept and  
 15 its use in the Temple Chariots. Also, it could include a comparative analysis of  
 16 temple chariots from various regions of India to identify distinct and common  
 17 architectural practices.  
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