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## Original Research Article

# A case study on “Statue of Unity”, Gujarat, India

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### ABSTRACT

This paper examines the "Statue of Unity" in Gujarat, India, as a case study in architectural design. The Statue of Unity's history, design, construction, characteristics, and tourism are all examined in this paper. Senior Sardar Sarovar Narmada Nigam Limited (SSNL) officials claim that the Gujarat government originally employed an American consultant, who then gave Joseph Menna the task of producing the Statue of Unity's first digital proof-of-concept model. However, after realising that Ram Sutar's statue of Patel at Ahmedabad Airport was the inspiration for Menna's design, the government instructed L&T to use Sutar's services.

## 1. Introduction

With a height of 182 metres (597 feet), the Statue of Unity is the tallest statue in the world and is situated close to Kevadia in Gujarat, India [1-3]. It features the statesman and freedom leader Vallabhbhai Patel (1875–1951), a supporter of Mahatma Gandhi who served as India's first deputy prime minister and home minister after independence. Patel is well-known for taking the initiative to bring the 562 Indian princely states together to form the Union of India. The statue is situated 100 kilometres (62 miles) southeast of the city of Vadodara [4] in Gujarat, on the Narmada River in the Kevadiya colony, facing the Sardar Sarovar Dam.

Construction on the project, which Indian company Larsen & Toubro first announced in 2010 and cost 27 billion (US\$422 million) to complete, began in October 2013 [5]. On October 31, 2018, the 143rd anniversary of Patel's birth, Indian sculptor Ram V. Sutar's creation was unveiled, and Prime Minister of India Narendra Modi served as the ceremonial master of ceremonies [6].

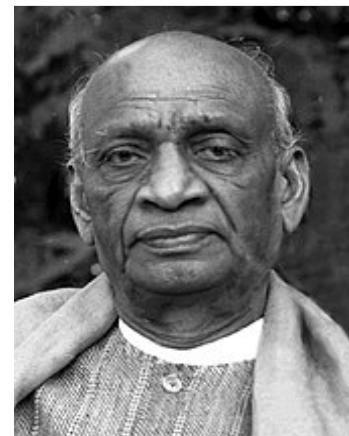
## 2. History

On October 7, 2013, to start his tenth year as Gujarat's chief minister, Narendra Modi unveiled the initiative [7]. Under the direction of the Gujarat Chief Minister, a society called the Sardar Vallabhbhai Patel Rashtriya Ekta Trust (SVPRET) was established to carry out the project [7, 8].

The project of Unity Movement was created in 2013 to persuade farmers to donate their old farming equipment in order to raise the iron needed for the project [9]. By 2016, 135 metric tonnes of scrap iron had been gathered, of which 109 tonnes were processed and utilised to create the statue's base [10]. On December 15, 2013, Surat and Vadodara hosted the Run For Unity marathon in support of the initiative [11].

**Table 1:** Some important features of Statue of Unity

Location	Narmada Valley Kevadiya, Narmada, Gujarat, India
Designer	Ram V. Sutar
Type	Statue
Material	Steel framing, reinforced by concrete and brass coating, bronze cladding[1]
Height	182 meters (597 ft)
Visitors	2.8 million[2] (in 2018-19)
Beginning date	31 October 2013
Completion date	30 October 2018
Opening date	31 October 2018
Dedicated to	Vallabhbhai Patel



**Picture 1:** One of the most famous figures in the Indian independence movement, Vallabhbhai Patel was in the role of bringing together 562 princely republics to create the country's current political borders [12].



### 3. Design and construction

A group of historians, artists, and scholars looked at Patel statues all around the nation before selecting Ram V. Sutar's concept [1]. A statue of the statesman that was erected at Ahmedabad International Airport is replicated in scale in The Statue of Unity. The attitude, posture, and pose of the design, according to Ram Sutar's son Anil Sutar, "justify the dignity, confidence, iron will, and kindness that his personality exudes." The man's hands are by his sides and his head is up, as if he were about to walk. The design was first constructed as three versions, each measuring 3 feet (0.91 m), 18 feet (5.5 m), and 30 feet (9.1 m). After the largest model's design was accepted, a thorough 3D scan was created, which served as the foundation for the bronze cladding that was made at a Chinese foundry [13, 14].

The solidity of the design was hampered by Patel's dhoti-clad legs and sandals, which made the base thinner than the top. This was countered by keeping a slenderness ratio of 16:19 as opposed to other tall buildings' typical 8:14 ratio [10]. The statue is designed to withstand winds up to 180 km/h (110 mph) and earthquakes registering 6.5 on the Richter scale that occur within 12 km of the statue and at a depth of 10 km [10]. Two tuned mass dampers totaling 250 tonnes are used to ensure maximum stability, which helps with this [15, 16]. Figures 2-6 display the Statue of Unity from different surrounding locations.



Picture 2: Statue of Unity, as dedicated on 31 October 2018



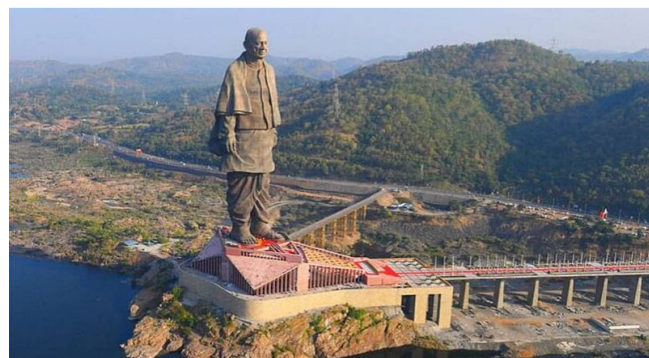
Picture 3: Statue of Unity, as seen from the highway



Picture 4: Statue of Unity, as seen across the lawns



Picture 5: View from the opposite bank or river Narmada



Picture 6: Skyline of Statue of Unity

With a base height of 58 metres (190 feet) and a statue height of 182 metres (597 feet), the structure has a total height of 240 metres (790 feet). The 182 metre height was chosen on purpose to correspond with the number of seats in the Gujarat Legislative Assembly [10].

A Public Private Partnership was used to construct the Statue of Unity, with the Government of Gujarat providing the majority of the funding. In its budget from 2012 to 2015 [17, 18], the Gujarat state government allocated 500 crore (equivalent to 641 crore or US\$80 million in 2020) for the project. The statue's construction was funded with 200 crore (equivalent to 272 crore or US\$34 million in 2020) from the 2014–15 Union Budget [19–21]. Public sector organisations also made a financial contribution as part of the CSR programme [22].

The project was managed by a group that included Turner Construction, Michael Graves and Associates, and the Meinhardt Group. The project was finished in 57 months: 15 months for planning, 40 months for building, and 2 months for consortium handover [23]. The Government [17] projected the project's overall cost to be around 2,063 crore (equivalent to 28 billion or US\$350 million in 2020). The first phase's solicitation for tender bids began in October 2013 and ended in November 2013 [24]. On October 31, 2013, the 138th anniversary of Sardar Patel's birth, Narendra Modi, who was Gujarat's Chief Minister at the time, lay the statue's foundation stone [25, 26].

For the design, erection, and upkeep of the statue, Indian infrastructure giant Larsen & Toubro was awarded the contract on October 27, 2014, at a price of 2,989 crore (about US\$510 million in 2020; 41 billion). The construction was started by L&T on October 31, 2014. 1,347 crores were set aside in the project's first phase for the main statue, 235 crores for the exhibition hall and convention centre, 83 crores for the bridge that connects the memorial to the mainland, and 657 crores for the building's maintenance for 15 years after it is finished. To build the statue's foundation, the Sadhu Bet hilltop was reduced from 70 metres to 55 metres in height.

Over 3000 workmen and 250 engineers were employed by L&T to build the statue. 6,500 tonnes of structural steel, 18,500 tonnes of reinforced steel, and 210,000 cubic metres (7,400,000 cu ft) of cement and concrete went into the statue's core. The 1,850 tonnes of bronze cladding and 1,700 tonnes of bronze plates that make up the exterior façade are divided between 565 large and 6000 micro panels. Because there were no facilities in India large enough for such casting, the bronze panels were cast in Jiangxi Tongqing Metal Handicrafts Co. Ltd. in China (the TQ Art foundry) [29, 30]. The bronze panels were brought to a workshop close to the construction site by sea, then by road, where they were put together.

The Tadvi tribe's local tribal members resisted buying land for the construction of a tourism infrastructure near the statue [31]. Prior to the statue's presentation, some 300 activists were detained [32]. The residents of Kevadia, Kothi, Waghodia, Limbdi, Navagam, and Gora villages protested the statue's erection and called for the creation of a new Garudeshwar subdistrict as well as the restoration of the land rights over 375 hectares (927 acres) of land that had been taken in the past for the dam. Additionally, they were against the creation of the Kevadia Area Development Authority (KADA) and the project

to build the Garudeshwar weir-cum-causeway. Most of their demands were granted by the Gujarati government [33].

The monument's construction was finished in the middle of October 2018, and Prime Minister Narendra Modi officiated at the inaugural event on October 31—Vallabhbhai Patel's 143rd birthday [34, 35]. According to one description, the statue honours Indian engineering prowess.

#### **4. Features**

At 182 metres (597 feet), the Statue of Unity is the tallest statue in the world. It stands 54 metres (177 feet) taller than the Spring Temple Buddha in China's Henan province, which held the previous record. The 41 m (135 ft) tall statue of Lord Hanuman at the Paritala Anjaneya Temple outside of Vijayawada in the state of Andhra Pradesh was the previous highest statue in India. Within a 7 kilometre (4.3 mi) circle, you may see the statue [10].

The monument is located on Sadhu Bet, a river island that is 3.2 kilometres (2.0 miles) from and faces the Narmada Dam in the distance. The statue and its surroundings cover more than 2 hectares (4.9 acres), and a 12-kilometer-long (7.5-mile) artificial lake that was created by the Garudeshwar weir on the Narmada river downstream surrounds the entire area.

Only three of the five zones that make up the statue's division are open to the general public. The first zone, which has three floors and comprises the exhibition area, mezzanine, and roof, extends from its base to the level of Patel's shins. There is a museum and a memorial garden in the first zone as well. The second zone extends to Patel's thighs, while the third zone rises 153 metres to the viewing gallery. The maintenance area is located in the fourth zone, while the statue's head and shoulders are located in the final zone.

The first zone's museum has a biography of Sardar Patel and a list of his accomplishments. The state's tribal culture is also covered in a 15-minute presentation on Patel in the adjacent audio-visual gallery. Each of the two lifts found in the concrete towers that make up the statue's legs. In slightly over 30 seconds, each elevator can transport 26 people to the viewing gallery at once. Up to 200 people can be accommodated in the gallery, which is situated at a height of 153 metres (502 feet).

#### **5. Tourism**

The statue attracted more than 128,000 visitors in the 11 days after its public debut on November 1st, 2018. In comparison to the Statue of Liberty, which typically draws about 10,000 daily visitors, the Statue of Unity saw daily average tourist foot traffic of 15,036 in November 2019. It is one of the "8 Wonders of SCO" according to the Shanghai Cooperation Organisation. The Statue of Unity attracted 2,900,000 visitors during its first year of operation and generated 82 crore (US\$11.64 million) in ticket sales. The venue had received 5,000,000 visitors on March 15, 2021. By November 2022, 10 million individuals had been there.

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