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STATUE OF UNITY - A CASE STUDY

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Abstract

The Statue of Unity is a colossal statue of Indian statesman and independence activist Sardar Vallabhbhai Patel (1875–1950) who was the first Home minister of India and the chief adherent of Mahatma Gandhi during the non-violent Indian Independence movement; highly respected for his leadership in uniting the 562 princely states of India to form the single large Union of India. It is located in the state of Gujarat, India. It is the world's tallest statue with a height of 182 meters (597 ft). It is located on a river island facing the Sardar Sarovar Dam on river Narmada in Kevadiya colony, 100 kilometers (62 mi) southeast of the city of Vadodara.

Environmental law refers to rules and regulations governing human conduct likely to affect the environment. It reflects the legislative measures, and the administrative and judicial structures to protect the environment. The statue of Unity Project was first announced on 7th October, 2010 is a monument of 182 meter of Sardar Vallabhbhai Patel facing Narmada Dam, 3.2 km away on the river island Sadhu bet of Narmada river near Bharuch in Gujarat is facing trouble Around 50 environmentalists from across the country have written to the Union Environment Ministry that Chief Minister Narendra Modi's pet project, Statue of Unity, downstream of Sardar Sarovar Dam and Shoolpaneshar Sanctuary, has commenced working without environment approval. This paper investigates the environmental issues associated with this mega project as no public consultation has been conducted as regards environmental Impact assessment.

Keywords: EIA, Unity of Statue, Environmental clearance, EIA Notification, Features, Construction.

INTRODUCTION

1.1 History: Narendra Modi first announced the project to commemorate Sardar Vallabhbhai Patel on 7 October 2010 at a press conference to mark the

beginning of his 10th year as the Chief Minister of Gujarat. At the time, the project was dubbed, "Gujarat's tribute to the nation". A special purpose vehicle named the Sardar Vallabhbhai Patel

Rashtriya Ekta Trust (SVPRET) was constituted by the Government of Gujarat for executing the project.



Fig: Sardar Vallabhbhai Patel

During the recent years there has been increasing awareness of and concern about pollution all over the world and continuous efforts are made towards achieving sustainable exploitation of resources internationally. It is widely agreed that a properly developed policy framework is a key element in the sound management of pollution control. With the population approaching over 1,170 million, India ranks in second in the number of inhabitants amongst the countries of the world. Due to the liberalization processes in India, the international trade has increased. This has also led increased environmental pollution. India is a federal republic comprising of 27 states and 7 Union territories. There is a strict division of tasks between the state and federal Government. Policy areas on the state list are the exclusive responsibility of the States. Other areas are jointly administered by the two levels of Government. 'Environment' is among these 'Concurrent List' policy areas.

1.2. Architect of statue of unity: Ram V. Sutar- The nearly 600-foot-tall Statue of Unity, completed on November 1, is a bronze duplicate of India's first deputy prime minister Sardar Vallabhbhai Patel. It was designed and master planned by Michael Graves Architecture & Design (MGA) and is intended to anchor what will

eventually become a resort. The monument took eight years to design and four to build. Prime Minister Narendra Modi, at the time still the chief minister of Gujarat, first proposed the sculpture in 2010 and construction began in 2014. The statue proper, designed by Indian sculptor Ram V. Sutar, reaches nearly 50-stories tall and sits on a three-tiered base that boosts the height to its record-breaking status. The geometrically-sculpted base sits on its own riverine island and is connected to the mainland via a pedestrian and road bridge. Inside, guests are met with a visitor's center, hotel, and an exhibition hall, all of which is topped with a memorial garden.

1.3. Why India needs statue of Unity: If there is one country in the world that understands the importance of national unity, it is the United States of America. After all it fought a civil war to preserve it. That's why the first memorial to Abraham Lincoln, the man who fought to keep the country together, came up in 1868, just three years after his assassination, at the District of Columbia City Hall. But that was not enough. By the turn of the century, demand had grown for a grander memorial. With a \$300,000 budget, and after raising its height to 19 feet because 10 feet just didn't seem tall enough, it was inaugurated in 1922 remarkably, this social investment was made during the Roaring Twenties, a decade when the US economy grew by 42 per cent and mass manufacturing brought consumer goods within reach of more Americans than ever before. India is experiencing a similar rate of economic growth, but that's not the only reason why a 182-metre statue of Sardar Vallabhbhai Patel twice the height of the Statue of Liberty — seems apt right now.

The Lincoln memorials were built to remind a once deeply divided country about the man who brought it together. It is worth remembering that they were built by people worrying about a country where people spoke one primary language and

followed one principal faith — two of the most potent reasons that break nations apart. There was, of course, no such uniformity of language or religion in India that more than five hundred princely states could be merged — without, as Soviet premier Nikolai Bulganin noted, eliminating the princes. That no royal head rolled during the integration of princely states with British India to create the modern nation state was almost entirely due to Vallabhbhai Patel. Moreover, as Patel biographer P. N. Chopra noted, “Sardar’s India was greater in size than that of Samudragupta, Asoka and Akbar, and the writ of the Centre wielded an authority and respect never dreamt of by these great rulers.” This is why it is apt that the statue of Patel is called the “Statue of Unity”. There are at least 15 statues of Jawaharlal Nehru around India, including by Ram Vanji Sutar, who has designed the Statue of Unity. There are statues of M K Gandhi in nearly 70 countries, one of the most recent being the one that came up in 2015 at London’s Parliament Square, after a well-publicised campaign led by economist-politician Meghnad Desai. True, Patel also had a couple of statues to his name, but none that recognized his contribution to the national movement on par — as it undoubtedly was — with Gandhi and Nehru. That is why, when Rajmohan Gandhi wrote his book on Patel more than two decades ago, he complained that while praise given to Gandhi was dutiful, and to Nehru fulsome, it was niggardly about Patel. This concern is supported by a couple of telling examples. Nehru got a Bharat Ratna as a sitting prime minister in 1955, while Patel’s award had to wait till 1991. Gandhi and Nehru even got their own adjectives — Gandhian and Nehruvian — but there is no ‘Patelian’. This is so because Patel’s contribution has barely been recognised in the way Indian history is learnt. Most Indians do not understand that the map that they have been taught to call India would not exist, or would look very different,

without Vallabhbhai Patel. But perhaps the most important void that the Statue of Unity might fill is that of the trio that led India’s struggle for freedom only Patel never told his story. Both Gandhi and Nehru wrote voluminously about the saga as they saw it. But Patel, when asked by his daughter why he didn’t write his version, famously said that some write history and others create it. But this statue might just fill the gap.

1.4. The Tallest statue in the World: The ‘Statue of Unity’ (SOU) is dedicated to the Iron Man of India, Sardar Vallabhbhai Patel. Sardar Patel is widely considered to be the architect of modern India. The SoU will stand tall as an inspiration to future generations, a reminder of Sardar Patel’s sterling contribution. At 182 meters from the road entry and 208.5 meters from the river entry, the SoU will be the tallest statue in the world; taller than the 153 m tall Spring Temple Buddha in China and almost twice as tall as the world famous Statue of Liberty in New York. For a sense of its height, the statue is 100 times larger than a man of average height of about 5 to 5 and a half feet!



Fig: Comparing the Height of Sardar Patal Statue with Others.

1.5. Features of Sardar Patel Statue

- An exhibition centre at its base showcasing the life and achievements of Sardar Patel
- A 320 m long designer bridge connecting Sadhu Hill to the mainland
- A memorial and visitors’ centre
- 4-lane approach road

- An administrative complex, 3-star hotel and conference centre
- A 40-m suspended fabric roof structure for the visitors' centre

1.6 Engineering Challenges: Wind, Earthquakes: Natural factors like wind and earthquakes posed stiff challenges. Situated right in the middle of the river Narmada, the statue is exposed to the tunnel effect of winds blowing down the river. Studies of wind patterns over the years revealed wind speeds of 39 m per second (roughly translated into 130 km/hr.) could buffet the statue in a worst-case scenario. The statue has been engineered to withstand wind speeds of up to 50 m per second (almost 180 km/hr.). The challenge is not only of the wind blowing against the statue but the succession effect it creates at the back of the statue that had to be considered in the structural design.

1.7. Walking pose of the Sardar: The Sardar's legs are clad in a dhoti, his feet in chappals and in a walking pose that means that the statue is most slender at the base. The walking pose also opened up a gap of 6.4 meters between the two feet which then had to be tested to withstand wind velocity.

1.8. The Face: Another challenge came in the form of the look of the statue. Since Patel's face was an important aspect, special care was taken in casting the facial features that had to be as close as possible to the Sardar's face. The statue is also supposed to appear as if it is walking on water, towards the Sardar Sarovar dam, with its left leg slightly forward. The actual features of the Sardar were decided through a participative exercise involving thousands of people. A mock-up was created and exhibited for people to see and comment on it.

1.9. Movement of Men and Material: The statue is located amidst remote, mountainous terrain, which posed enormous difficulties in delivery of materials. A temporary Bailey's bridge connected the hill to the mainland. The

statue base also stands above the highest flood level recorded over a 100-year period of the nearby Narmada dam. A detailed hydrological study was conducted by a specialist consultant to ascertain the river level and flow during various conditions. Altogether, the statue is divided into five zones. Up to its shin is the first zone, comprising three levels, including an exhibit floor, mezzanine and roof. It will contain a Memorial Garden and a large museum. Zone 2 extends up to the statue's thighs at 149 meters, while Zone 3 goes up to the viewing gallery at 153 meters. Zone 4 and Zone 5 would be out of reach of visitors, with Zone 4 comprising the maintenance area and Zone 5 the head and shoulders.

2. METHODOLOGY

2.1. Structural Design: Part of the statue enclosed inside the 8mm bronze cladding is a two-layered structure. The innermost layer has two 127-metre-high towers made of reinforced cement concrete. These towers rise up to the chest area. The steel frame between the towers and the cladding forms the second layer. There were multiple engineering challenges too. One, unlike the Statue of Liberty and Christ the Redeemer, the Statue of Unity does not have a wider base.

A wider base is required to make a structure stable. As Patel wore a dhoti, the statue is thicker towards the top and thinner at the bottom. This challenge was overcome by keeping the slenderness ratio between the width of the statue and its height to 16:19 — significantly higher than the 8:14 ratio rule that is followed in the construction of high-rise structures. Two, the base of the statue, below the dhoti-clad legs, is about 25 metres high, equivalent to an eight-storey building. This part of the structure houses two massive lifts, which can carry over 25 people to a 135-metre high gallery in just above half a minute.

Fitting these vibration-causing machines inside the statue's two vertical

cores, the first of its three layers, was a challenge for the engineers.

Three, engineers had to factor in the speed of wind, and the possibility of earthquakes and flood. Being built on an island in the middle of Narmada, the statue will have to face the tunnel effect of winds blowing down the river. The walking pose of the statue opened up a gap of 6.4 metres between the two feet. To deal with these issues, the cladding used in the statue has overlapping panels, which allow it to move vertically and horizontally, to resist earthquake and wind forces. Two 250-tonne mass dampers, which are installed in structures to reduce the amplitude of vibrations, have been used.

As a result, the statue is capable of withstanding wind blowing at almost 220 km per hour and surviving earthquakes measuring up to 6.5 on the Richter scale. Four, the statue's location amidst remote, mountainous terrain made transportation of equipment and material difficult. To make the movement to the island easier, the engineers banked on the fact that the island remains accessible from one side of the river via land for at least eight months post monsoon as water in the channel recedes. A rock bridge was built over shallow water and a temporary Bailey bridge was constructed for the monsoon, when there is more water in the river. Over 210,000 cubic metres of cement concrete, 18,500 tonnes of reinforced steel, 6,500 tonnes of structural steel, 1,700 tonnes of bronze, and around 1,850 tonnes of bronze cladding, made up of some 565 macro and 6,000 micro panels, were used to build the statue. Most of this material was moved using the two bridges.

3. CONSTRUCTION

A Consortium comprising Turner Construction, Michael Graves and Associates and the Meinhardt Group supervised the project. It took 56 months to complete – 15 months for planning, 40 months for construction and two months for handing over by the consortium. The total cost of the project

was estimated to be about 20.63 billion (US\$290 million) by the government. The tender bids for the first phase were invited in October 2013 and were closed in November 2013. Narendra Modi, then serving as Chief Minister of Gujarat, laid the statue's foundation stone on 31 October 2013, the 138th anniversary of Patel's birth.

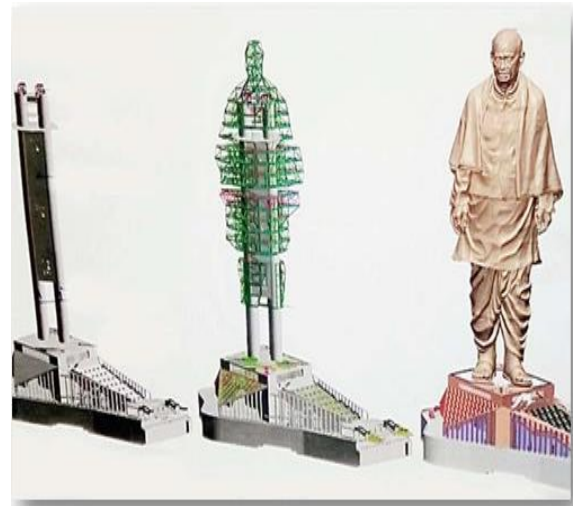


Fig: Constructional Phase of Statue

Indian infrastructure company Larsen & Toubro won the contract on 27 October 2014 for its lowest bid of 29.89 billion (US\$420 million) for the design, construction and maintenance. They commenced the construction on 31 October 2014. In the first phase of the project, 13.47 billion were for the main statue, 2.35 billion for the exhibition hall and convention centre, 830 million for the bridge connecting the memorial to the mainland and 6.57 billion for the maintenance of the structure for 15 years after its completion. The Sadhu Bet hillock was flattened from 70 to 55 metres to lay the foundation. L&T employed over 3000 workers and 250 engineers in the statue's construction. The core of the statue utilised 210,000 cubic metres (7,400,000 cu ft) of cement concrete, 6500 tonnes of structural steel, and 18500 tonnes of reinforced steel. The outer façade is made up of 1700 tonnes of bronze plates and 1850 tonnes of bronze cladding which in turn comprise 565 macro and 6000 micro panels. The

bronze panels were cast in Jiangxi Tongqing Metal Handicrafts Co. Ltd (the TQ Art foundry) in China as suitable facilities were unavailable in India. The bronze panels were transported over sea and then by road to the workshop near the construction site where they were assembled.

Local tribals belonging to the Tadvi tribe opposed land acquisition for the development of tourism infrastructure around the statue. They have been offered cash and land compensation, and have been provided jobs. People of Kevadia, Kothi, Waghodia, Limbdi, Navagam, and Gora villages opposed the construction of the statue and demanded the restitution of the land rights over 375 hectares (927 acres) of land acquired earlier for the dam as well as the formation of new Garudeshwar subdistrict. They also opposed the formation of Kevadia Area Development Authority (KADA) and the construction of Garudeshwar weir-cum-causeway project. The government of Gujarat accepted their demands. Construction of the monument was completed in mid-October 2018; and the inaugural ceremony was held on 31 October 2018, presided over by Prime Minister Narendra Modi. The statue has been described as a tribute to Indian engineering skills.

3.1. Environmental clearance: In the Constitution of India it is clearly stated that it is the duty of the state to 'protect and improve the environment and to safeguard the forests and wildlife of the country'. It imposes a duty on every citizen 'to protect and improve the Natural environment including forests, lakes, rivers, and wildlife'. Reference to the environment has also been made in the Directive Principles of State Policy as well as the Fundamental Rights. The Department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests in 1985.

The constitutional provisions are backed by a number of laws — Acts, Rules, and Notifications. The Environment Protection Act, 1986 came into force soon after the Bhopal Gas Tragedy and is considered an umbrella legislation as it fills many gaps in the existing laws. Thereafter a large number of laws came into existence as the problems began arising, for example, Handling and Management of Hazardous Waste Rules in 1989. The Environment (Protection) Act, 1986 authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds. 1986 - The Environment (Protection) Rules lay down procedures for setting standards of emission or discharge of environmental pollutants. The environmental Protection Act, 1986 is an 'Umbrella' Act enacted by the national parliament. This Act empowers the Government to take all necessary measures to protect control and abate environmental pollution. The Act identifies the MoEF, Government of India as the apex nodal agency to deal with environmental problems of nation so that an integrated and holistic policy can be implemented with regard to the environment. The scope of this Act is very broad covering water, Air, Land and human beings and other living creatures. The main functions of MoEF are:

- Coordination of the activities of various central and state authorities established under the previous Acts;
- Laying down emission/ effluent standard for various industrial activities;
- Powers to get information about the industrial process and to inspect the plant, premises, records and other necessary materials including seizure of the documents;
- Giving direction for closure, prohibition or regulation of industrial processes as necessary and

• Stoppage or regulation of the supply of water and electricity or any other services to industries violating pollution standards. Environmental planning and coordination was set up under the 4th five year plan (1969- 1978). Till 1980, the subjects of environment and forests were the concern of the Dept of Science and Technology and Ministry of Agriculture respectively. Later, the issues were formally attended by the Dept of Environment which was established in 1980. This was then upgraded to the Ministry of Environment & Forest in 1985. In 1980, clearance of large projects from the environmental angle became an administrative requirement to the extent that the planning commission and the central investment board sought proof of such clearance before according financial sanction.

Five year later, the Dept of Environment and Forests, Government of India had issued guidelines for Environmental Assessment of river valley projects. These guidelines require various studies such as impacts on forests and wild life in the submergence zone, water logging potential, upstream and downstream aquatic ecosystems and fisheries, water related diseases, climatic changes and seismicity.

A major legislative measures for the purpose of environmental clearance was in 1994 when specific notification was issued under section 3 and rule 5 of the environment protection Act , 1986 called the “Environment impact Assessment Notification 1994”.

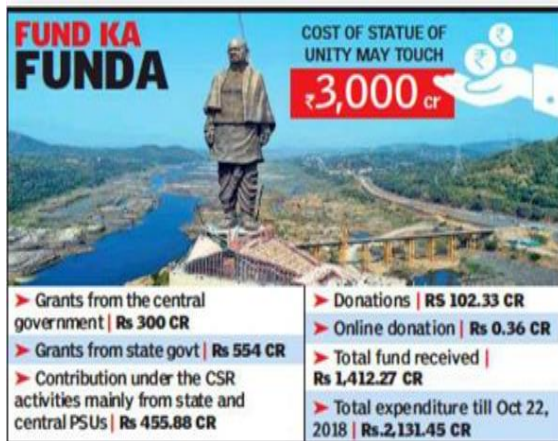
The first step in seeking environmental clearance for a development project is to determine what statutory legislations apply to the particular project. The MOEF has brought out several notifications restricting the development of industries in specified ecologically sensitive areas. In addition there are also draft rules framed for the siting of industries. Environmental clearance for development projects can be obtained either at the state level or at the central

level depending on certain criteria concerning the characteristics of the project. However (regardless of where the final environmental clearance is obtained from), for most projects the consent must first be taken from the state pollution control board or pollution control committees in the case of union territories.

3.2. Environmental Impact Assessment Notification 2006: The Environmental Impact Assessment has been used as a management tool to minimize adverse impacts of the developmental projects on the environment and to achieve sustainable development through timely, adequate, corrective and protective mitigation measures. The Ministry of Environment and Forests (MoEF) has used Environmental Impact Assessment Notification 2006 as a major tool to regulate rapid industrial development of the country for minimizing the adverse impact on environment and reversing the trends which may lead to climate change in long run. Environmental Ministry has said that they are looking into the issue. In a couple of days, ministry will decide whether to send an inquiry team to Gujarat or issue a notice to the State Government. A 10 member delegation headed by Shri Ganpatsinh Vasava, Minister of Gujarat Forest & Environment will meet Governor SC Jamir and Chief Minister Naveen Patnaik and seek their support for the project.

4. RESULTS AND DISCUSSIONS

4.1. Funding: The statue was built by Public Private Partnership model, with most of the money raised by the Government of Gujarat. The Gujarat state government had allotted 6 billion (US\$83 million) for the project in the budget from 2012 to 2015. In the 2014–15 Union Budget, 2 billion (US\$28 million) were allocated for the construction of the statue. Funds were also contributed by Public Sector Undertakings under Corporate Social Responsibility scheme



4.2. Tourism: Over 128,000 tourists visited it in 11 days since it was opened to the public on 1 November 2018. Buses take tourists from the parking lot to the statue, as the area around the statue is a "no private vehicle" zone. Elevators run from 3 to 5 pm to take tourists with tickets up to the observation deck at the top. The statue remains closed every Monday for maintenance.

4.3. Future Plans: As of November 2018, construction was still in progress around the statue for various aspects of the project. As per the government, there are plans to introduce alternate means of transport to improve accessibility to the memorial, including a boat service. An amphibian bus from Kevadiya is also planned as is a jetty service from the site of the Sardar Sarovar dam and a ropeway.

5. CONCLUSION

The project requires environmental clearance from the competent authority. As has been done in recent cases of Adani in SEZ Kutch, the work should be immediately stopped and recommenced after getting environmental clearance. State government has no right to violate the EIA Notification. Statue of Unity is truly an engineering marvel. It is a tribute to Indian engineering skills. Our skilled labourers, architects and engineers have received immense appreciation for constructing this intricately designed enormous piece of art. We are proud to have the tallest statue of the world in our country.

Statue of Unity is a symbol of unity and strength. It reflects the true personality of Sardar Patel who was strong and robust. The initiative taken by PM Modi has been supported and appreciated by people in power as well as the general public. PM Modi sees this statue as an inspiration for the people of our country.

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