
The Taj Mahal And Its Construction

The Taj Mahal, built in the Agra district in Uttar Pradesh, India between 1631 AD and 1648 AD, is a massive mausoleum made from white marble. A mausoleum is an external free-standing building made as a monument containing a burial chamber of a deceased person or people, considered to be a type of tomb. The name Taj Mahal actually means “crown of palaces.” The Taj Mahal is a very important monument in India and is considered to be one of the greatest architectural achievements in Indo-Islamic architecture. This architectural style combines Hindu art, which is traditional in this region, and Islamic religion. The mixture of the two helped redefine many Hindu traditions in an Islamic form that has dominated the area since the time of the Delhi Sultanate Empire, which lasted from 1192 AD to 1451 AD. This territory, which was historically populated by non-Muslims, provided a workforce that was not used to Islamic style. The Humayun’s tomb built in 1562 AD had a major influence over the design of the Taj Mahal. The structure incorporates elements of Persian influences such as the design of the dome and arched entrances, along with inspiration from contemporary Hindu design elements.

The immense beauty of the Taj Mahal has helped it earn the titles of ‘UNESCO World Heritage Site’ and ‘One of the Seven Wonders of the World.’ It is estimated that construction of the Taj Mahal cost about 32 million Indian rupees, equivalent to over US \$1 billion at the time. The Taj Mahal has over 2 to 4 million visitors every year, with over 40 to 50 thousand visitors on one single day sometimes. The Taj Mahal has inspired people to create copycats in other countries. In 2008, a replica of the Taj Mahal was constructed in Bangladesh at a cost of US \$56 million dollars. It took five years to complete the replication with modern equipment. The Taj Arabia, a luxury hotel and shopping complex, is opening soon in Dubai. It will cost up to US \$350 million and will be four times the size of the original. Due to terrible air pollution in Agra, the white marble on the Taj Mahal is quickly turning yellow. Because of this, only electric vehicles are permitted to drive near the structure. To get to the Taj Mahal, visitors and tourists have to walk or take electric buses from the parking area. However, this isn’t the only problem affecting the Taj Mahal today. It is cracking alarmingly fast due to a lack of groundwater beneath the structure. Wooden foundations, which were once submerged, are thought to be rotting. The towers in the corner of the Taj Mahal are starting to lean more.

The Taj Mahal, which stands on a raised platform, is situated on the bank of the Yamuna River in a large garden that covers almost 17 hectares. The whole monument covers an area of 42 acres. On top of the Taj Mahal lies a very large dome. The mausoleum is surrounded on three sides by red sandstone walls, with the side facing the river left open. The main gate, also made of red sandstone, faces the Southern gate. The gateway is 46 m by 35.7 m and reaches a height of 30.5 m. It is inscribed with verses from the Koran in Arabic. The small domed pavilions

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on top are in Hindu style and signify regality. You can find a mosque, also made of red sandstone, to the left of the Taj Mahal. It is very common in Islam to build a mosque next to a tomb. Even today, the mosque is still used for Friday prayers. There are four minarets, which are tall slender towers, at each corner of the plinth. They measure 41.6 m high and each has an intentional slant outward so that in case an earthquake occurs, they will fall away from the tomb instead of on it. A double staircase facing the entrance is the only access point to the plinth and tomb. The interior comprises a tall central chamber, a crypt immediately below this and four octagonal corner rooms which were originally intended to house the graves of other royal family members. In the center are the cenotaphs of Shah Jahan and Mumtaz Mahal. There is also the garden, which contains raised red sandstone pathways that divide it into four segments. A raised square marble pool is positioned in between the Taj Mahal and the main entrance. There are many different fruit bearing trees and Cyprus trees located along the raised central pathway.

Construction for the Taj Mahal started in 1631 AD and it was finally completed and opened in 1648 AD. The mosque, the main gateway on the south, the outer courtyard, and the guest house were added and completed later in 1653 AD. It was built by Mughal Emperor Shah Jahan in memory of his wife Mumtaz Mahal, who died on June 17th, 1631 while giving birth to their 14th child. Her last wish to her husband was 'to build a tomb in her memory such as the world had never seen before.' Over 22,000 different craftsmen and artisans from all over the empire worked daily for nearly 17 years to help construct the Taj Mahal. Ustad-Ahmad Lahori was the main architect, and Amanat Khan Shirazi was the calligrapher for the Taj Mahal.

Construction of the Taj Mahal

Around 22,000 laborers, painters, masons, stonecutters, calligraphers, and artisans from all over India and Central Asia were employed during the period of construction. The marble used for the building was sourced from many different regions of India. Over a thousand elephants were used to transport construction materials to the site. There was a board of architects that oversaw the design elements under imperial supervision. It took 10 years to build the main tomb and 12 more years to build the other ancillary buildings. Disparities exist in completion dates due to differing opinions on completion since the complex was built in different stages. Since the Taj Mahal was built so long ago, there is still a lot unknown about the construction of it. However, we can make some inferences about how it was built.

The mausoleum is the main focus of the complex, made entirely out of white marble. Marble is one of the oldest and most widely used building materials in the entire world, having been used to create various statues, historic buildings, and more. Marble is also very durable in a wide variety of weather conditions, which explains why the Taj Mahal still looks so good today. It is also very resistant from heat and fire. The Taj Mahal is situated on a raised square plinth at a height of 50 m from the river level, which is also made of white marble. The main foundation

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was one of the biggest challenges facing the Mughal builders. The sand of the bank had to be stabilized in order to support the massive load of the mausoleum. An area of about 1.2 hectares was excavated, filled with dirt to lessen seepage, and finally levelled out at 50 m above the river. In the area around the tomb, wells were dug and filled with rubble, iron, and stone to reinforce the foundation of the tomb. Workmen constructed a giant brick scaffold that mirrored the tomb instead of using lashed bamboo. The scaffold was so huge that it was estimated by foremen that it would take several years to dismantle it. Once the construction of the terrace was finished, work was started on the rest of the complex. The trees in the garden were planted almost immediately so they had enough time to grow as work continued.

Once the foundation was completed, the walls of the mausoleum along with the mosque, guest house, and door were constructed. The base structure of the Taj Mahal is a large cube with multiple chambers and chamfered corners and is 55 m on each of the four sides. Each side of the iwan, a rectangular hall or space, is framed with a huge pishtaq, the formal gateway to the iwan. Pishtaq is a Persian term for a portal projecting from the face of a building, usually decorated with calligraphy bands, geometric designs, and glazed tilework. The designs are completely symmetrical on all sides of the building. The bricks used to construct the Taj Mahal were sealed with mortar, a material used to fill the gaps in masonry construction. To reach the highest parts of the construction, the workers used scaffolding. They most likely used bamboo as well as brick scaffolding to help the building and the construction itself. However, it is questionable that they even used brick scaffolding, so it is more likely that they used bamboo.

Abstract forms are used everywhere, including the plinth, minarets, gateway, mosque, jawab, and on the surfaces of the tomb. Elaborate geometric forms, which were worked with tracery of incised painting, can be found on the domes and vaults of the sandstone buildings. Herringbone patterns make up the space between many of the adjoining elements. Black inlays are used on the white marble and white inlays are used in the sandstone buildings. Walkways and floors contain contrasting blocks and tiles in various tessellation patterns. Mortared parts of the marble buildings have been painted or stained in a contrasting color, creating a complex array of patterns. The incrustation of these stone decorations requires a very skilled workforce. These specialists in lapidary marquetry were trained by Italian craftsmen employed at the Emperor's court.

On top of the base of the mausoleum lies the marble dome. The dome is nearly 35 m high and sits on a cylindrical drum. The dome is often referred to as an onion dome or guava dome due to its similar unique shape. It is decorated with a lotus-like design, which helps to accentuate its height. There are four smaller domed chhatris placed in the corners, which resemble the onion shape of the main dome structure. Chhatris are dome-shaped pavilions commonly used in Indian architecture. The word chhatri means 'canopy' or 'umbrella.' Their columned bases open through the roof of the mausoleum while providing light to the interior. Tall decorative spires,

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called guldastas, extend from the edges of the walls to put emphasis on the dome. The lotus design is duplicated on both the guldastas and chhatris. A gilded finial tops off the dome and chhatris, which is traditional in Persian and Hindustani architecture and design. The original finial was made of gold but was replaced in the 1800s with a copy made of gilded bronze. The minarets in each corner of the base are made up of white marble blocks cut into curves. They were connected with black stones to simulate joints. Both the main gate and the mosque are made of red sandstone. Sandstone was a very popular building material in ancient times. It has been used all around the world in constructing everything from temples to homes and other buildings. It has also been used for artistic purposes to create fountains and statues. It is somewhat soft, making it easy to carve.

The interior chamber of the Taj Mahal contains more than just traditional decorative elements. Although only the door facing the garden to the south is used, the octagon shaped inner chamber allows for entry from each face. The walls inside reach 25 m in height and are topped by an interior dome containing a design of the sun. Eight arches encompass the space at floor level. Four of the central upper arches form balconies, with each exterior window containing an intricate screen cut from marble, also known as a jali. Light enters through the roof openings covered by chhatris at the corners, as well as from the balcony screens. The jali encompassing the royal cenotaphs is made from eight marble panels that have been inlaid with semi-precious stones. Because the use of animal or human images is strictly forbidden in Islamic culture, different decorative styles have to be used. These decorations included floral patterns and calligraphic inscriptions. The inscriptions, which are found inside and outside the mausoleum, are mostly verses from the Quran. Abd-ul-Haqq, a Persian man, created the calligraphic decorations of the Taj Mahal. The stones used form many different things like twining vines, flowers, and fruits. The lapidary inlay and refined calligraphy panels on each chamber wall resemble the design elements seen throughout the exterior of the complex. There are around 30 different types of precious and semi-precious gemstones that appear in the chamber's stonework, making the interior decoration very intricate. Inside the casket lies a number of calligraphic inscriptions.

The Taj Mahal's garden, which leads up to the tomb rather than surrounding it, is very different from most Mughal Gardens, which are rectilinear in shape and often have a tomb in the middle. This might be because the Yamuna River itself was also integrated into the design of the grounds. The garden runs north to south from the gate to the tomb. It is divided into four sections by four intersecting canals, with fountains and cypress trees lining the canals. The four canals meet in the middle at a raised lotus pond made from white marble. The surface of the pond reflects the image of the mausoleum. In the 1800s, during British rule in India, the gardens were re-landscaped in the formal English style, with manicured lawns. The original garden was embellished with several roses and daffodils.

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What if it was built today? We already know quite a lot about how the Taj Mahal would be constructed today because it has already been replicated several times all around the world. These replicas are located in Bangladesh, China, Saudi Arabia, and the United Kingdom as well as in other parts of India. The Bibi Ka Maqbara, located in Aurangabad, Maharashtra, India, was inspired by the Taj Mahal of Agra. It was built between 1651 AD and 1661 AD. Azam Shah hoped to build a monument that could rival the Taj Mahal. He lacked the treasury and skilled labor his grandfather, the creator of the Taj Mahal, had access to. This resulted in a poor copy of the Taj Mahal. It is reported that the Bibi Ka Maqbara cost Azam Shah 700,000 rupees to build, compared to the Taj Mahal, which was built at a cost of approximately 32 million rupees at that time. More recently the Taj Arabia in Dubai includes a 300-room five-star hotel, apartments, restaurants and shops. The total cost for the development was more than US \$350 million. Even the Royal Pavilion in the United Kingdom is famous for resembling the Taj Mahal. The architecture of the Royal Pavilion is inspired by the 19th century Indo-Saracenic style prevalent throughout India. There is also the Taj Mahal of Bangladesh, which was finished in 2008 by Bangladeshi filmmaker Ahsanullah Moni in the capital city of Dhaka. He was inspired after traveling to the real Taj Mahal in Agra, so he built his own replica in Bangladesh for a movie set in an attempt to draw more tourists to Dhaka. He also wanted to make it easier for the less fortunate people in Bangladesh to be able to visit the Taj Mahal without having to go all the way to India.

All of these modern-day replicas aren't exactly the same as the original. Because they were built later, they have their own special features. The Dubai replica may look very similar, but because it was built in the 21st century, it has modern features like a hotel, restaurant, and shops as well as being four times larger in size. Most of the replicas are built for tourism and to make money. The purpose behind the building of the original Taj Mahal is extremely unique because it was built out of love for Mumtaz Mahal's wife. Because of this, it can be recreated today but it won't carry the same meaning or significance that the original building has.

The actual construction of the recent replicas is still extremely expensive, due to the mass amount of materials and labor needed to construct them. However, they are able to be built much faster and easier due to the technology we have today. In the 1600s, they didn't have equipment and heavy machinery like bulldozers and cranes. While we can just use trucks to transport materials to a construction site today, they had to use elephants back then to transport materials. This makes the building process way more difficult and inefficient. To clear out and excavate the land for the original Taj Mahal, they most likely had to use basic tools like shovels. Nowadays, a bulldozer and excavator will get the same job done in way less time using less workers. The scaffolding we use today is a lot sturdier and safer for working than it was in the 1600s. We can also use cranes to reach spots higher up in the construction. The materials for the Taj Mahal might be different if you made it today because sandstone and marble aren't as common today as they were in the past. The processes for creating the intricate designs and

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patterns in the materials likely haven't changed much since the 1600s. Skilled craftsmen and artists from both back then and today would have to work on the designs by hand. The making of the garden would also most likely be similar today to how it was back then as gardening techniques probably haven't changed very much since then.

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