The Eiffiel Tower

The Eiffel Tower (French: Tour Eiffel) is a steel structure located on the Champ-de-Mars park, along the Seine River, Paris, France. Originally named the 300 meter Tower (Tour de 300 mètres), this project was designed and built by engineer Gustave Eiffel and his colleagues from 1887 to 1889 on the occasion of the 1889 World Exhibition, and It is also the 100th anniversary of the French Revolution.

History

After the reign of Napoleon III, France faced the Franco-Prussian War and then the Paris Commune that ended with the Bloody Week. In 1875, the Third Republic was born. However, political instability continues.

The benefits of science gave birth to the World Exhibitions. From the first exhibition, the Great Exhibition of the Works of Industry of All Nations, held in London in 1851, the authorities quickly saw behind the industrial bet. Technology carries the shadow of political benefits, and it would be a waste if not taken advantage of. Showcasing technological advances, the exhibition countries also demonstrate their superiority over other European countries, which occupy a large part of the world's territory.

With this in mind, France organized several World Exhibitions, in 1855, 1867 and 1878. Jules Ferry, president of the Council of State from 1883 to 1885, decided to welcome a World Exhibition. again in France. On November 8, 1884, Jules Ferry signed an official decree accepting the organization of the 1889 World Exhibition in Paris, from May 5 to October 31, 1889. The year chosen was the 100th anniversary of the Revolution. France, Paris will once again be the "center" of the world.

However, the idea of a 300-meter tower was born in the New Continent, in the United States with a young and dynamic economy. For the 1876 World's Exposition in Philadelphia, engineers Clark and Reeves envisioned a 9-meter-diameter cylindrical tower, held by metal slings, slung down a 45-meter diameter around the 1,000 feet high, or about 300 meters. Due to financial problems, The Centennial Tower - The Century Tower - was never implemented, but the project was published in France in Nature magazine. With the same idea, French engineer Sébillot came up with an iron "sun tower" that illuminates the city of Paris. To do this, Sébillot collaborated with Jules Bourdais, the architect who built the Palais du Trocadéro for the World Exhibition in 1878. Together, the two dreamed of another project, a "lighthouse tower" made of granite, 300 meters high, with many versions. The "Lighthouse Tower" once competed with Gustave Eiffel's project, but was never realized.

Project design

In June 1884, two engineers of the Eiffel company, Maurice Koechlin and Émile Nouguier, head of the research department and head of the methods department, were interested in the project of a 300 meter high metal tower. They hoped to be able to turn that work into the pinnacle of the 1889 World Exhibition.

On June 6, Maurice Koechlin sketched the structure's shape for the first time. The sketch depicts a 300 meter tower, four curved pillars meeting at the top, with five floors, dividing the tower into six 50 meter segments. Gustave Eiffel considered this proposal, although he said he was not interested, but eventually gave in to the opinions and allowed the project to be

researched. Stephen Sauvestre, chief architect of the Eiffel company, redrawn and changed most of it: adding heavily built legs, reinforcing the tower with an arc-shaped structure on the second floor, reducing the number of floors from 5 to 2, add a spire to the top of the tower.

The new design was brought to Gustave Eiffel and this time Eiffel was satisfied. On September 18, 1884, "The right to erect metal pillars and towers whose height may exceed 300 meters" was registered in the name of Eiffel with Koechlin and Nouguier. Very soon, Gustave Eiffel bought Koechlin and Nouguier to hold exclusive rights to the future tower and therefore, the building was named after Eiffel.

Build

Gustave Eiffel initially expected construction to take 12 months. But the actual time took twice as long. Construction began on January 28, 1887 and ended in March 1889, just before the official opening of the World Exhibition.

On the construction site, the number of workers never exceeds 250. The reason is that a large part works upstream, in the Eiffel company factory in Levallois-Perret. For example, 2,500,000 rivets were produced for the tower, but only 1,050,846 were driven on site, 42% of the total. The majority of the components were assembled on the ground at the workshop in Levallois-Perret, in five meter sections with temporary bolts, then replaced on site with thermal rivets. Building each part and then reassembling it took 50 engineers working for two years with 5,300 overall or detailed drawings.

At first, workers built concrete pedestals for the four pillars of the building. This helps to minimize the compression force on the ground, only 4.5 kg/cm² at the bottom of the foundation. Assembly of the precision metal components began on July 1, 1887, directed by Jean Compagnon. To a height of 30 meters,

parts are lifted by rotating cranes fixed on the elevator path. From 30 to 45 meters, 12 wooden scaffoldings were built. Passing 45 meters, new scaffolding was installed on the beams of the second floor. Then it was time to connect the cross beams to the four pillars, the location of the second floor. This assembly work was completed on December 7, 1887. The second floor was built at a height of 57 meters, temporary scaffolding was not needed. Similarly, later, from August 1888 to the third floor, 115 meters high.

In September 1888, when progress on the construction site was accelerated and construction reached the third floor, the workers organized a strike. They raised the issue of working hours (9 hours in winter and 12 hours in summer) and low wages compared to the danger involved. Gustave Eiffel pointed out that the risks were no different whether they worked at an altitude of 200 meters or 50 meters, and that workers enjoyed higher remuneration on average than those working in the same field during that period. Finally, Gustave Eiffel gave in, agreeing to raise his salary but refusing to demand a "risk that changes with altitude" index.

In March 1889, the project was completed and no fatal accidents occurred to the workers. Only one worker died, but on Sunday, that worker did not work but took his fiancée to visit the construction site and fell due to loss of balance. Construction costs of the Eiffel Tower exceeded estimates by 1.5 million francs. Construction time is also doubled compared to the original agreement.

The final task is to calculate a way to bring the public up to the fourth floor of the tower. Backmann elevators were originally planned and included in the project presented to the competition jury in May 1886, but were rejected by the jury. Gustave Eiffel had to call in three new suppliers: Roux-Combaluzier and Lepape (later to become Schindler), the American company Otis and finally Léon Edoux.

Scientific experiments and broadcasting

Aware of the risk and as planned before construction, Gustave Eiffel agreed to conduct experiments as well as set up an observation station right from the first year of the tower.

In 1889, Eleuthère Mascart, director of the French Meteorological Center, placed an observatory on the Eiffel Tower. In October 1898, Eugène Ducretet first connected the signal between the Eiffel Tower and the Panthéon, a distance of 4 km. In 1903, Captain Gustave Ferrié, sought to install a wireless telegraph network despite the lack of investment from the military, who still supported old methods. Gustave Eiffel sponsored this project and allowed an antenna to be installed on top of the tower. Since 1921, radio programs have been broadcast regularly from the Eiffel Tower and Eiffel Tower Radio - Radio Tour Eiffel was officially started on February 6, 1922.

In 1925, the Eiffel Tower was used for television, for the first time in France. With the advancement of technology, experimental broadcasts were also conducted between 1935 and 1939. Television moved from black and white to color television. In 1959, a new television broadcast mast increased the tower's height to 320.75 meters. And in 2005, digital terrestrial television was also installed on the Eiffel Tower.

Nowadays

In 1944, the Eiffel Tower escaped a deliberate fire, authorized by the German Army, and was then requisitioned for communications, first by the German Wehrmacht, then by Allied troops.

Since the 1960s, the number of international tourists has increased, directly leading to the number of people visiting the tower. The number of annual visitors has increased almost steadily since 1970 and first reached 6 million in 1998. This increase has led to the need to renew and remodel the tower. Work took place from 1980 to 1985, with three main directions:

- Lighten the structure of the building.
- Rebuild all elevators and stairs.
- Use new safety measures, appropriate to the increased number of guests.

The Eiffel Tower had 1,340 tons of excess removed, repainted and treated with anti-corrosion. The elevators were replaced and a Jules-Verne culinary restaurant was opened. Lighting measures have also been improved.

The Eiffel Tower has become a symbol of Paris and France, one of the most famous buildings in the world. Starting from the last decades of the twentieth century, Champ-de-Mars and the Eiffel Tower were the venues for the city's festivals and concerts. As of 2007, the total number of people visiting the tower has reached more than 236 million. In 2007, the Eiffel Tower welcomed 6,893,000 visitors.