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## **Wonders Of The Industrial Revolution: Brooklyn Bridge, Panama Canal And The Eiffel Tower**

The Industrial Revolution was one of the main revolutions that has transformed the modern world. There were many defining features of the Industrial Revolution, notably the Seven Wonders. Others include the Eiffel Tower and the steam engine. Some of the biggest defining structures of the Industrial Revolution were the Brooklyn Bridge, Panama Canal and the Eiffel Tower, all of which will be discussed later. Calling something a grand idea may seem bold and perhaps exaggerative, but in the case of the Industrial Revolution and the structures built in it, this is not the case. A grand idea is simply something that is called absurd, impossible or ludicrous by the people of the day. In the case of the Industrial Revolution, nearly everything within it amazed the public.

Built in 1883, the Brooklyn Bridge is one of the Seven Wonders of the Industrial Revolution. It is a bridge that spans an impressive 1825m over the East River of New York. It was built to connect the at the time separate cities of Brooklyn and New York, modern-day Manhattan. Designed by the German John Roebling, construction on the bridge lasted 14 years and is made nearly exclusively out of steel. This design choice confused many people at the time. The Brooklyn Bridge allowed the newly risen cities it connected to thrive economically with people being able to live in New York and work in Brooklyn. In this way, it solved the modern problem of transport and connectivity. It is also a grand idea to build a 1.8km bridge completely out of steel. As such the Brooklyn Bridge, a defining factor of the Industrial Revolution, was a grand idea built to solve a modern problem.

The Panama Canal was the first canal between the Atlantic and the Pacific and is one of the Seven Wonders of the Industrial Revolution. The idea of a canal connecting the Atlantic and Pacific oceans first arose in c. 1500 when King Charles I of Spain ordered a survey of the Charges River. The first attempt came in the 1880's when a French team attempted to build a sea-level canal across the isthmus of Panama. It was unsuccessful and funding was pulled in 1888 after many construction deaths, and the project running at a much more expensive rate than expected. The American attempt, led by President Theodore Roosevelt, began in 1904 with a planned 50-mile sea-level canal. Less than a year after construction began the lead engineer resigned and a new engineer, John Stevens, changed the plan to involve a lock canal. Construction sped up immediately. Progress, however, was slowed again by Stevens unexpected resignation in early 1906. He was replaced with military engineer, Lt. Col. George Washington Goethals. The canal was finally opened in August 1914 after over 5000 deaths, nearly 10% of the workforce. This canal was undoubtedly one of humanities greatest achievements at the time and provided a huge economic asset to the US. Not only did the US have a way to transport goods from the Atlantic to Pacific without having to sail over 8000 miles, but also a very profitable canal to charge tolls on. Europe found this canal very desirable as it was a shortcut to eastern Asia and the major trading centres in Thailand and Vietnam. The Panama Canal is the busiest man-made waterway in the world with the one-millionth ship passing through in 2010. The grandiose of the Panama Canal comes from it's length, construction deaths and construction time. The Panama Canal is evidently a grand idea which helped solve the modern problem of intercontinental trade.

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The world-renowned Eiffel Tower was built in 1889 measuring 1024ft(312m) at time of construction and amazed all. The man who's name the tower bears, Gustave Eiffel, was not the man who designed the monument. He was an entrepreneur who owned the company which designed the tower, while Maurice Koechlin and Emile Nouguier designed the tower. An external architect named Stephen Sauvestre was hired to add some extravagance to the monument for public approval. Koechlin and Nouguier designed the monument for the world fair of 1889 and construction of the entirely metal structure began in 1887 and took 22 months. Over 25,000,000 rivets were used in the construction of the tower each one installed by 4 men. The tower was originally meant to be torn down after 20 years but due to the public adoration, it remained. Perhaps the best quote about the tower comes from Eiffel himself, "I ought to be jealous of the tower. She is more famous than I am.". The modern problem that the Eiffel tower was built to solve was perhaps the most modern of all, proving France's engineering ability on a political stage. The tower was simply built to show the rest of the world that France housed some fantastic engineers and rivalled America and Britain in engineering prowess. As not calling the Eiffel Tower a grand idea is perhaps impossible, it is clear that the Eiffel Tower is a grand idea built to solve a modern problem.

Many grand ideas that arose during the Industrial Revolution, from bridges to canals to monuments. All of these were designed to solve a modern problem as can be seen by the lack of intercontinental trade which the Panama Canal helped to combat. The Eiffel Tower was built to show France's engineering prowess and the Brooklyn Bridge to connect New York to Brooklyn. These ideas were defining aspects of the Industrial Revolution. As such the Industrial Revolution was defined by grand ideas to solve modern problems.