

# How first and second industrial revolution help the civil engineers to grow

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# *What was the Industrial Revolution?*

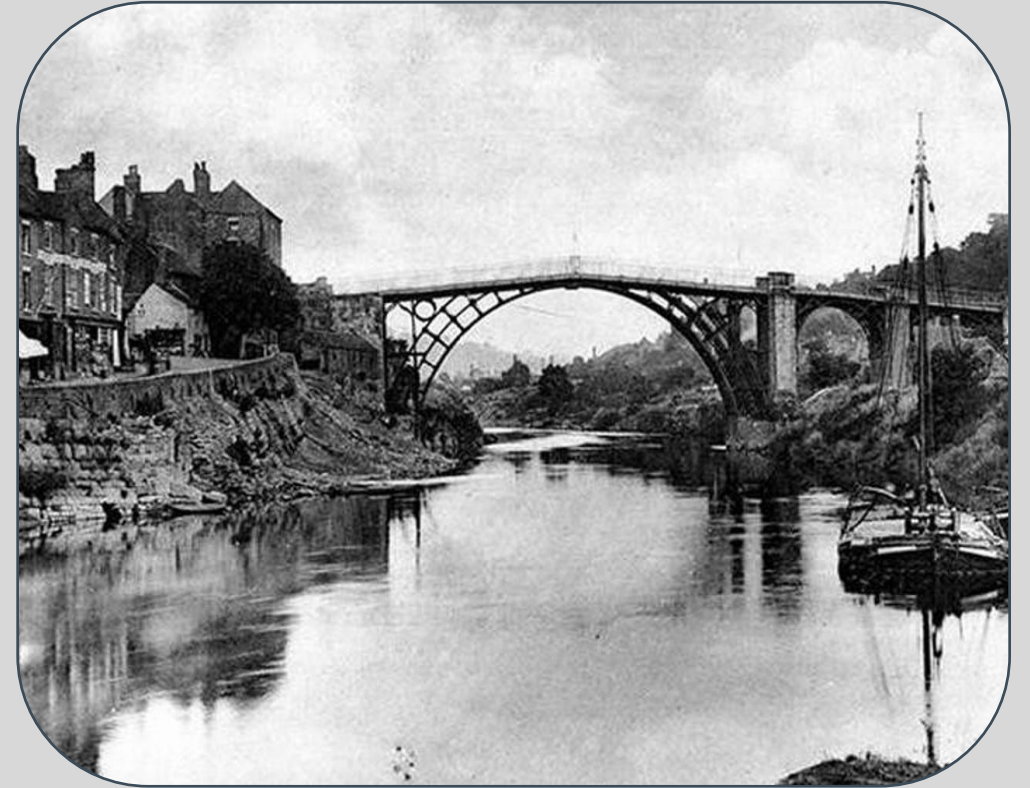
- *The Industrial Revolution was a period of significant technological, economic, and social change that began in the late 18th century and continued into the 19th century.*
- *The Industrial Revolution was a fundamental change in the way goods were produced, from human labor to machines.*
- *New energy sources were developed to power the new machinery – water, steam, electricity, oil (gas, kerosene).*

## *Impact on Civil Engineers in First Industrial Revolution.*

(1760-1830)

- **Development of New Materials:**

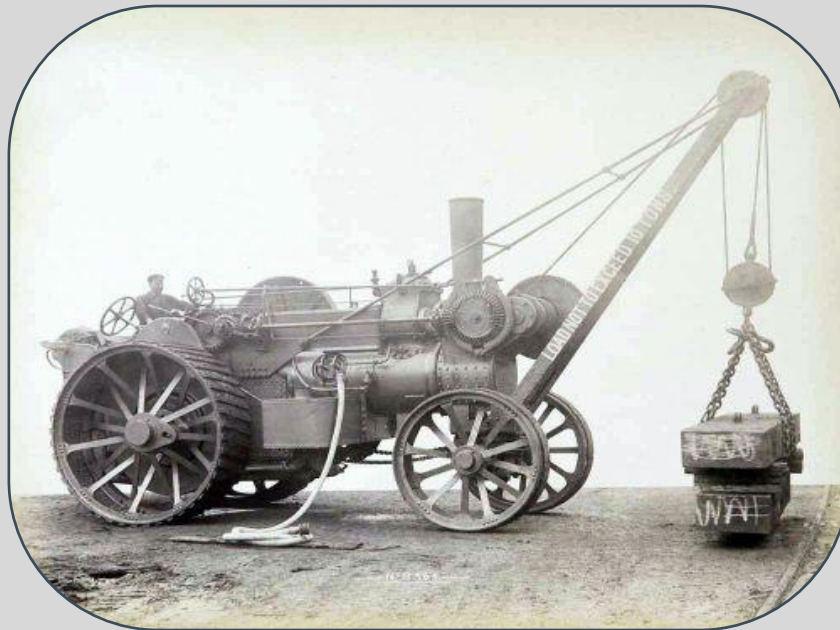
- The use of iron and steel became more widespread, revolutionizing construction techniques. For example, cast iron was used in the construction of bridges, such as the famous Iron Bridge in England (1779) and the United States Capitol Dome (1855–66)
- The production of cement and its application in construction, notably in concrete, provided a new durable material for infrastructure projects.



## Mechanization and Tools:

The introduction of steam power and machinery facilitated the construction of large-scale infrastructure projects, such as canals, railways, and roads.

Engineers began using surveying instruments and techniques, improving accuracy in design and construction.





- **Expansion of Infrastructure:**

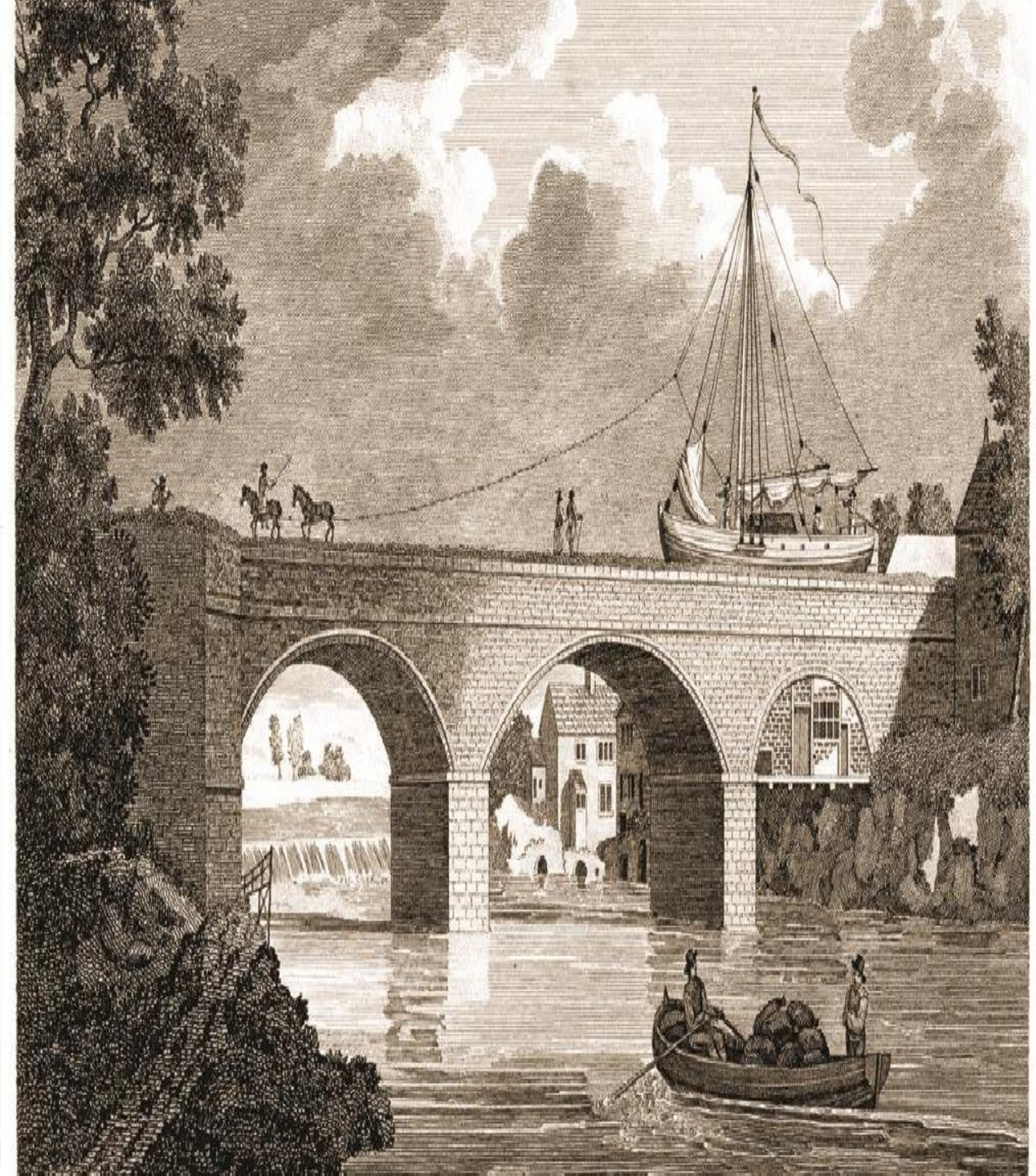
- The need for improved transportation to support industrial activities led to the expansion of roads, canals, and later, railways. This required new engineering techniques and designs, including tunneling, bridge-building, and road grading.

- **Professionalization of Engineering:**

- The growing demand for infrastructure created a need for more formal training and education for engineers. This led to the establishment of engineering societies and schools, laying the foundation for civil engineering as a distinct profession.





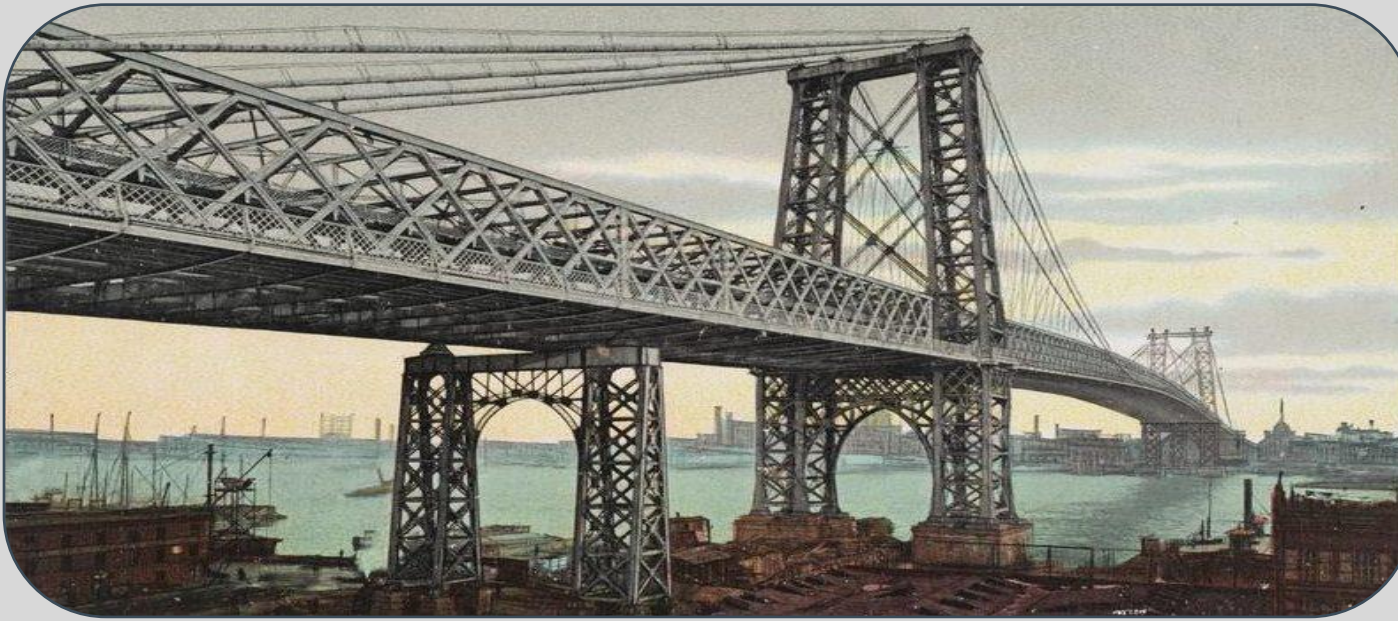




## *Impact on Civil Engineers in Second Industrial Revolution (1870 – 1914)*

- **Advancements in Materials:**

- The mass production of steel and the introduction of reinforced concrete revolutionized construction. These materials allowed for the creation of taller buildings (skyscrapers) and longer bridges (suspension bridges).
- Innovations in building materials and methods led to more durable and resilient structures.



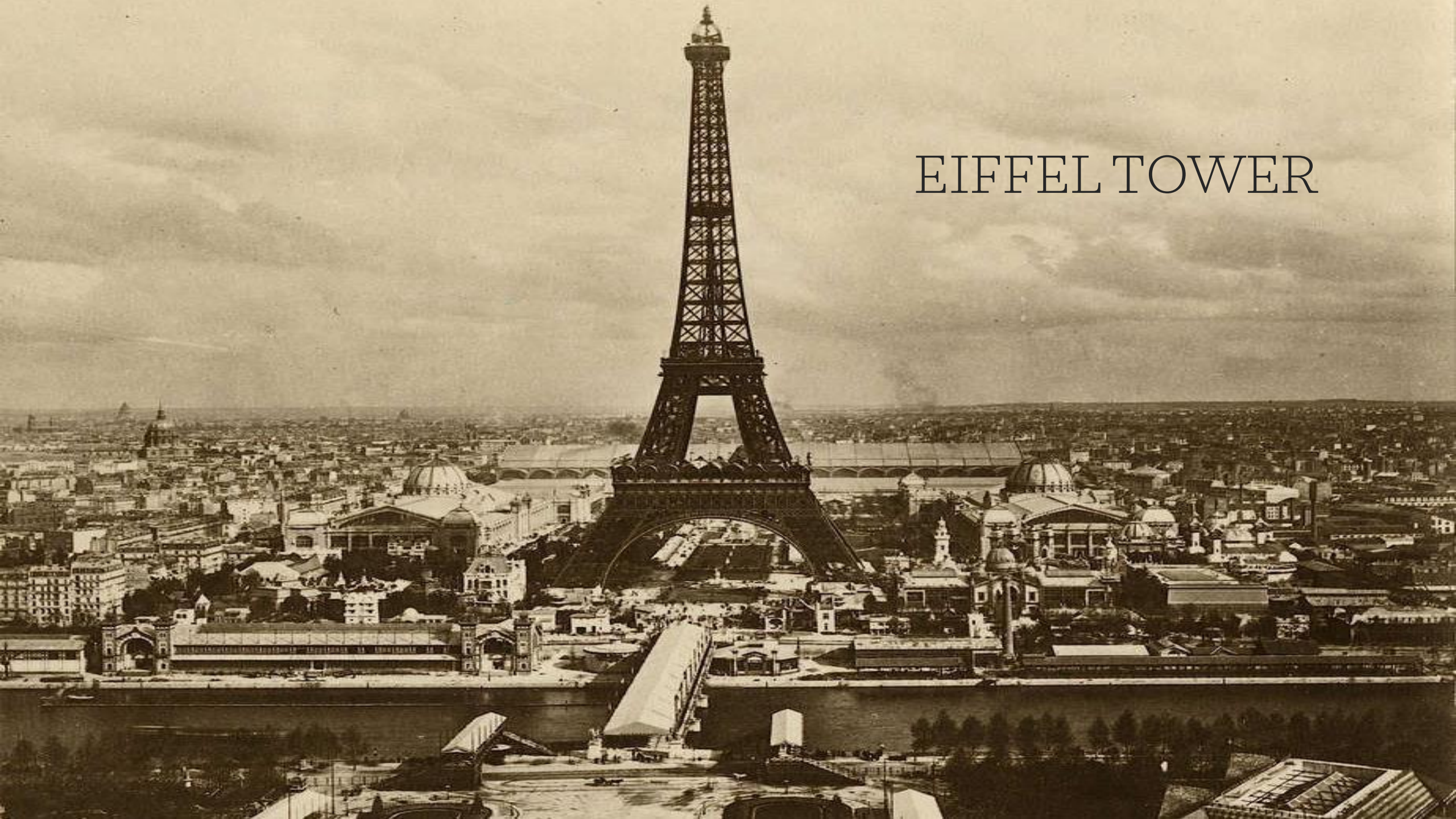
Williamsburg Bridge, New York  
1903



Flatiron building, New York  
1902



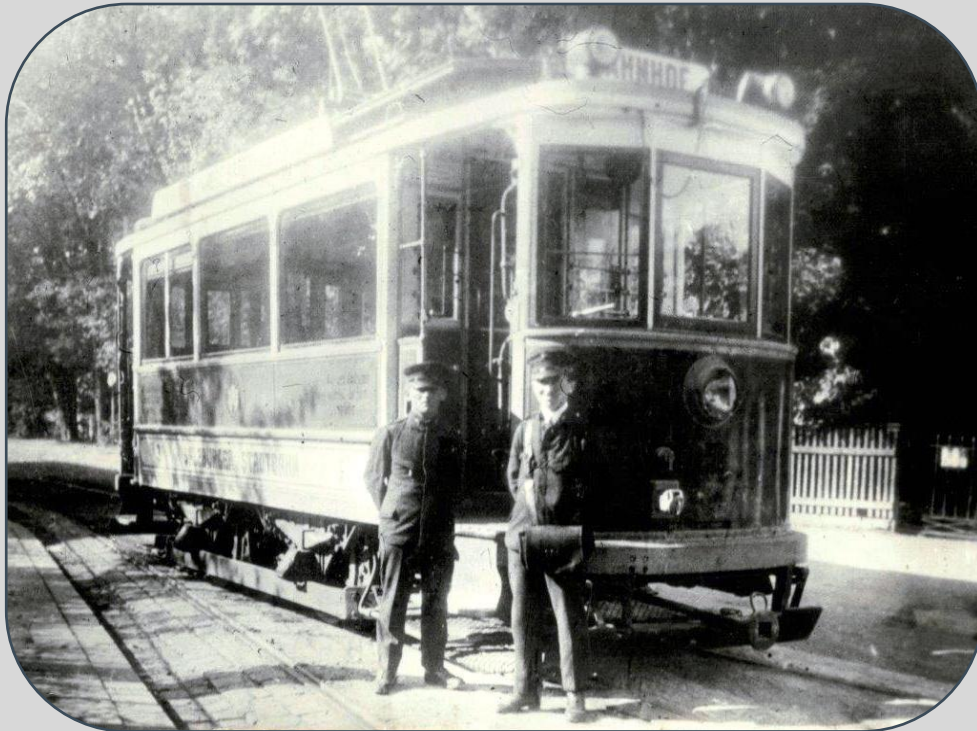
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- **Urbanization and Infrastructure Growth:**

- Rapid urbanization required the construction of extensive infrastructure, including water supply systems, sewage networks, and public transportation systems. Civil engineers played a crucial role in designing and implementing these projects.
- The expansion of railways and the development of tramways and subways transformed urban mobility.



- **Technological Innovations:**

- The introduction of electricity and advances in communication technologies (like the telegraph) impacted civil engineering projects, enabling better project management and coordination.
- The invention of new construction machinery (e.g., steam shovels, cranes) improved efficiency and scale in construction projects.





# Challenges faced during first and second industrial revolution.

- **Limited Technology and Resources** - *One of the primary challenges faced by civil engineers during the first and second industrial revolutions was the limited availability of advanced technology and resources.*
- **Labor Conditions** - *The construction industry during the industrial revolutions often relied on cheap labor, leading to poor working conditions and low wages for workers. Civil engineers had to navigate these labor challenges to ensure that construction projects were completed on time and within budget.*
- **Structural Engineering** - *Understanding the principles of structural engineering and designing safe and sound buildings was a significant challenge for civil engineers.*

THANK YOU

