Disaster project - The Quebec Bridge Collapse

1. Extended Abstract-(Bilal)

The Quebec Bridge disaster is one of the most impactful historical disasters in Canadian history. Collapsing not once, but twice in a thirty year span really had the public looking at the board of engineers with a raised eye. It all started on August 29th, 1907 in Quebec City, when the bridge first collapsed, killing seventy five workers, and leaving eleven injured. The few major causes for the first collapse was due to the flaws in the design and errors in calculations. The biggest flaw was the poor lattice design of the compression cords. A lot of this had to do with the financial straits from when the workers first began construction. This led to an overall lack of testing of components such as the eyebars and compression members due to, once again, lack of funding. An in depth analysis of the first collapse is talked about in the first couple paragraphs under the causes heading, where diagrams are used to help understand the importance of calculations. Then, the bridge suffered a partial collapse when the middle span of the bridge fell into the St.Lawrence River. In 1916, the bridge was close to completion, with hoisting the centre span of the bridge being one of the final pieces in constructing the bridge, however, on September 11, 1916 at around 10:50 a.m, the southwest portion of the span tore away from the top of the bridge and instantly pulled off the supports and disappeared into the river, along with the thirteen workers. The board of engineers later concluded that temporary equipment used to support the span was the primary cause of it collapsing. Again, this is completely covered under the causes heading on the research paper. The collapses of the bridge not only left a significant impact economically, but emotionally too. Workers were leaving their families to work and support their families and some of them were killed. The blame was mostly laid upon Theodore Cooper, an American civil engineer primarily responsible for the construction of the Quebec bridge. This can further be looked at under the impacts heading on the research paper. Economically, the bridge failures created a much larger hole. Being so restricted on money from when the bridge began its construction in 1904, the engineers could not afford a failure in the project. One of the most underestimated impacts is the trading aspect. The St.Lawrence River was the main channel for trade during the summer. Now, because the river is not accessible in the winter, the province of Quebec was eager to bridge the St.Lawrence River as soon as possible, to be more competitive with trading. Delaying this process due to the failures really impacted its trading routes. The research paper will give a full in depth analysis of exactly everything that went wrong, what did it impact, as well as the possible recommendations from different engineers regarding the disaster.

* + Approximately 500 word summary of what the research paper will contain.
  + Brief summary of the disaster

1. Presentation: (Tejveer)
   * Description of the disaster
   * Outline project schedule
2. Research Paper
   1. Abstract
   2. Introduction and background-(Bilal)
   3. Analysis and investigation
      * Causes-(Hamza)
      * Impacts-(Adrian)
      * Ethics and professionalism-(Joaquin)
   4. Recommendations-(Bilal)
   5. Conclusion
   6. Acknowledgements
   7. References
   8. Breakdown of duties and responsibilities

* 5 W’s
* Breakdown of duties
* Talk about:
  + The Topic
  + Impact - Adrian

**Research**:

* Design: **Cantilever bridge**
  + Was chosen as it was believed to be the cheapest and most efficient plan.
* Location: Built over the **Saint Lawrence River in Quebec**
* Disaster occured: **1907** and again in **1916**

**Collapse # 1 in 1907:**

* Chief engineer: **Theodore Cooper**
* Factors which lead to the Collapse:
  + Miscalculations in load and many flaws in design
    - Bridge was overloaded
      * Cause the chords in the arms to bend with deflection growing.
  + Chief engineer Cooper **increased the Cantilever bridge span** by 60 metres, from its regular 490 to about 550 metres.
  + Lack of leadership shown by Cooper, he refused to supervise the construction on site due to ill health.
  + Important factors were ignored, and work continued.
* Result of the Disaster:
  + 75 workers were killed, 11 injured
  + It took a span of two years to clean up the debris from the Saint Lawrence River.
  + Theodore Cooper (chief engineer) quietly withdrew from his position and retired
  + The government took over the construction of the bridge following the disaster

**Collapse # 2 in 1916:**

* Chief engineer:

https://www.thecanadianencyclopedia.ca/en/article/quebec-bridge-disaster-feature

Timeline:

| Date: | Goal: |
| --- | --- |
| Oct 20, 2021 | Finish Team Contract and Duties |
| Oct 23, 2021 | Finish Research |
| Oct 24, 2021 | Finish Extended Abstract |
| 26 oct | Finish Prezi, Practice Presentation and review work. |
| 27 oct | Extended abstract and presentation |

| Date: | Goal: |
| --- | --- |
| 27 oct | Submit Extended abstract, presentation and team contract |
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