The role of the German railway engineer Wilhelm von Pressel in European Railroad bridge design

1. **Why a research on Wilhelm von Pressel?**

The influence between the U.S. and European technical knowledge and the adoption of bridge structural typologies patented in the United States from 1840s onwards lead my research to the Brenner Railroad, designed and built between 1863 and 1867. This is one of the first European railroad that adopted Howe bridge typology. The Brenner railroad was designed by Carl von Etzel and by a group of collaborators (Wilhelm von Pressel among them). The relationship between Etzel and his collaborators is not completely clear, many times he published drawings and projects under his name even he was not the designer so the names and the role of his collaborators were not widely known.

When Etzel died, Wilhelm von Pressel was appointed director of the Brenner Railroad; unfortunately the figure of Wilhelm von Pressel is currently almost unknown and his role in the history of European Railroad history in the second half of the 19th century it is not completely clear yet.

Which was the role of Wilhel von Pressel in Brenner Railroad design? How was the relationship between Carl Etzel and Pressel? And between Etzel and his collaborators? What happened when Etzel died?

He was involved in many other projects in Europe, but likely his most significant contribution is in design and construction of the Turkish Railroad, taking part in all the steps of the project.

This research aims at finding an answer to these questions.

2. **Historical and technological context.**

The second half of the 19th century is a period of great change in terms of the technical and theoretical knowledge and a period of great development of infrastructure. Great importance is given to the exchange of theoretical and practical knowledge, both within Europe and between Europe and the United States. In these years many German, French and Austrian engineers made study tours to France and England, and to the United States as well. (Carl von Ghega and Karl Culmann made a tour to France, England and the United States; Carl von Etzel and Wilhelm von Pressel went to France and England in the late ‘30s). These study trips are essential for the scientific and technological knowledge spread; it is through the reports made by Carl von Ghega and Karl Culmann that the “American” structural typology of bridges (first of wood, then of iron) patented in
the United States and widely used for railway lines, spread throughout Europe. Thanks to these study trips new ideas could be transferred and the theoretical basis of structural mechanics, developed in France in the early 19th century, was spread in the West Point Military Academy that adopted the French books of the engineers of the Ecole des Ponts et Chaussées.

In a few decades the bridge structural layout was widely spread in Europe (in Austrian Empire and in Prussian one in particular) and in Russia as well.

3. **What types of documents can be found?**

The documents by Wilhelm von Pressel kept in the archive of the Deutsches Museum are an essential source to outline his life and activity. The forty boxes of documents include notes, sketches, drawings, plans or writings concerning his activities and they have not been studied in detail yet. These documents are supplementary to the drawings of iron and wooden bridges that I found in the Italian Railway Library that constitute an absolute novelty in engineering history and need to be studied a little more.

This documentation should be integrated with the documents kept in the Wien Staatsarchive for a more detailed outline of his life and activity.

For a more detailed knowledge of the period and of the geo-political area it could be useful to consider also some bridge models kept at the Technische Museum in Wien, although they are not attributed to Wilhelm von Pressel: they are wooden railway bridge models, designed according to the layout patented in the United States by William Howe in 1840. One of this model dates back to 1868, it was made for a bridge to be built on the Rudolf Railroad. The construction of railway bridges across the Austrian and the Austro-Hungarian Empire is largely based on the Howe structural typology.

In this perspective it would be interesting to map the bridges built according to this structural layout that have been made on several Prussian and Austrian railway lines.

4. **Which additional documents could help to sketch the role and the figure of Wilhelm von Pressel within the European context (and not only)?**

A first quick overview of the documents on Wilhelm von Pressel kept at the Deutsches Museum Archive was useful to detect the different fields which he dedicated to. His activity involved different topics: he studied both technical details (design of different track profiles) and checked the technical feasibility of the Railroad as well, he looked for the Turkish railway funding, up to the sociological study of the Turkish people.
Other documents concerning Wilhelm von Pressel can likely be found in a Swiss Archive or in a Turkish one. As far as my research is I cannot guess exactly where but may be this will be a further step of this research.

5. Research methodology.

A first identification and a list of the different topics to which Wilhelm von Pressel worked about is definitely necessary as a preliminary step of the research. Then the documents need to be sorted: drawings, personal notes, letters, travel reports, written texts.

One of the most important aspects in Pressel’s activity is the standardization of bridge design, of wooden ones in particular. I have never found so many drawings and directions on wooden bridges and I think that this aspect has to be highlighted in the history of railway engineering.

Moreover the link between the Gouin Company (probably the biggest European bridge company in mid 19th century) deserves to be studied more in depth (in the Archive there are some letters addressed to Wilhelm von Pressel from the Gouin company) and the relationship between Carl Etzel and his collaborators (Achilles Thommen, Julius Lott, Wilhelm Hellwag, Gaspard Dollfus…)?

6. Research schedule.

The research schedule points out some critical points due to the huge amount of material on Wilhelm von Pressel and due to his considerable activity. A first research step (about two weeks long) might affect the classification of the documents, then an outline of the activities and of the interests of Pressel could be sketched. A further three-four week period will be useful to study more in detail the topics previously identified. On the base of the quick overview of the Archive documents I made few months ago, several steps may be pointed out:

1. Role and activities in the design of bridges in the Austrian railways (Brenner Railroad);

2. Feasibility design of the Turkish Railways (economic feasibility, sociological study of Turkish people, research funding for the project, the design of the tracks shape and the construction details (1870 – 1902);

3. Relationship between Pressel and Gouin;

4. Design and standardization of railway bridges made of wood and iron;

5. Relationship between Pressel and Etzel’s collaborators (Thommen, Lott, Hellwag, Dollfus..);
7. Deutsches Museum Archive resources (objects, archivial collections) to be consulted during the fellowship.

The archive of the Deutsches Museum contains a huge amount of documents about Wilhelm von Pressel. The Wien Staatsarchive holds materials about Wilhelm von Pressel too. I did not consult it yet but those documents should definitely be integrated with the Deutsches Museum Archive ones. Pressel’s bibliographical production is not negligible (see attached bibliography): in particular the drawings on wooden bridges are really meaningful among the technical literature of the period. This is in fact a pretty uncommon publication on temporary bridges and dimensional specifications (standardization of the design, wooden bridges usually were built without directions or construction details (especially about the joints).

8. Research result and publication.

The outcome of this research is of great interest: for this reason it would be desirable that the research work will be published as a short book or as a paper in an international journal. Springer is interested in the publication of the research although the proposal should be previously approved by the Springer board. The research will be certainly welcome also by an engineering or history of cultural heritage journals (Construction history, International Journal of Cultural Heritage, International Journal of Architectural Heritage, Engineering Heritage…).

9. Bibliography


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