

Vrije Universiteit Brussel

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NOMINATION



Vrije
Universiteit
Brussel

The Vrije Universiteit Brussel is a dynamic and modern university with two parkland campuses in the Brussels Capital Region: the main campus in Etterbeek is home to seven faculties. In Jette you can find the medical campus and the University Hospital.

High quality education and research are central issues. Our research teams are internationally recognised in many disciplines of fundamental and applied research.

The Vrije Universiteit Brussel is the largest Dutch-speaking employer in the Brussels Region. Centrally situated in the capital of Europe, our university takes up its role as an ambassador for Flanders and Brussels, in a spirit of active pluralism and open mindedness.

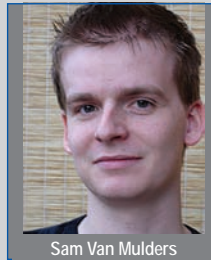
We offer a quality education to more than 9000 students. Add to that the almost 4500 students of our partner, the Erasmus Hogeschool Brussels; the 400 students at the English-speaking Vesalius College; the 5000 students at the Centre for Adult Education that shares our campus, and the more than 150 research teams working on both our campuses, and you get one of the biggest centres of knowledge in the capital of Europe. Thanks to this expertise and its strategic location, the Vrije Universiteit Brussel is your ideal

partner for prestigious research and education with an outlook on Europe and the world.

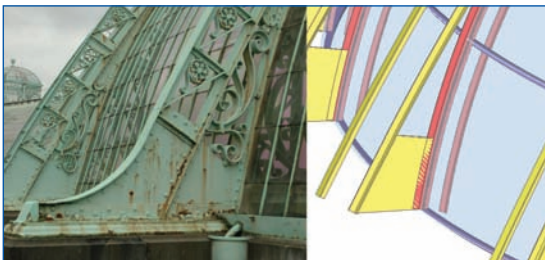
In the Department of 'Mechanics of Materials and Constructions' (MEMC) fundamental and applied research is developed on the following themes:

1. Durability - Reliability of polymer based composite systems;
2. Mixed numerical-experimental techniques or inverse methods;
3. Mineral polymers and their composites;
4. Damage mechanics on material and structural levels;
5. Non-destructive testing and experimental mechanics;
6. Design and analysis of constructions;
7. Renovation of buildings and civil engineering constructions.

Software and hardware is available for the research on these themes. In the applications, international relations and interactions with industry are a permanent incentive for future developments.



Sam Van Mulders



Restoration study Winter Garden of Royal Greenhouses, Brussels.

Thesis of Sam Van Mulders,
Promotor: Prof Dr S. Adriaenssens, Begeleiders: ir.arch L. Lauriks & ir; arch. m De Bouw.

The project concerns a structural restoration study of the Winter Garden of the Royal Greenhouses of Laeken, Belgium. The Winter Garden was built between 1874 and 1876 under the authority of de Belgian King Leopold II. This greenhouse has a high cultural and historical value due to its importance in the development of structural steelwork in Belgium and Europe. In this student thesis a 3-dimensional computational structural analysis is carried out which allows verification of the current structural state. The study includes the identification of the geometrical and material parameters of the structure, the determination of the symmetrical and asymmetrical load cases and the evaluation of efficiency under all load combinations. The complete analysis is carried out according to the actual European standards: Euro codes EN1990, EN1991 and EN1993. Based upon the results of the structural analysis, different possibilities for the restoration of the construction of the Winter Garden are presented.

Short Description

Project Information

Owner: Belgian State
Architect: Alphonse Balat
General Contractor: n/a
Engineering Office: n/a

Construction Start: 1874
Construction End: 1876
Location: Laeken Belgium



The project concerns a structural restoration study of the Winter Garden of the Royal Greenhouses of Laeken, Belgium. The Winter Garden was built between 1874 and 1876 under the authority of Belgium king Leopold II. This greenhouse has a high cultural and historical value due to its importance in development of structural steelwork in Belgium and Europe.

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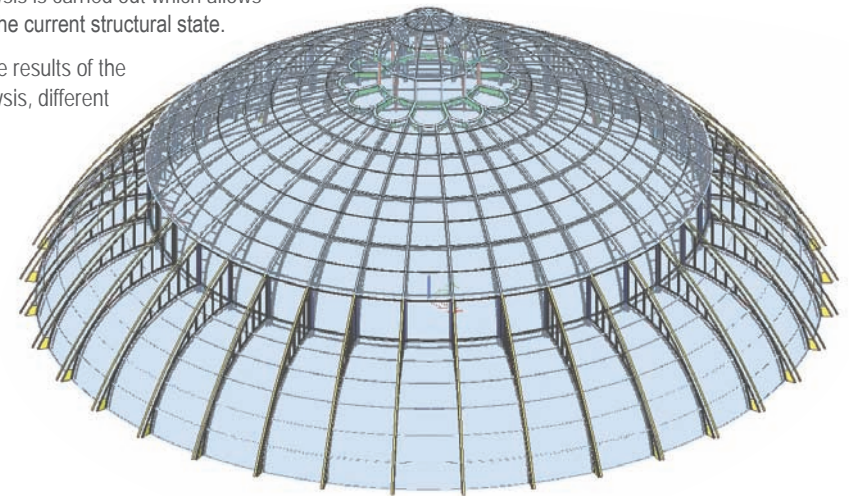
Based upon the results of the structural analysis, different

restoration possibilities of the Winter Garden structure are presented.

General information of the project

The Winter Garden was built between 1874 and 1876.

Architect: Alphonse Balat
Location: Laeken, Brussels, Belgium



Structural concept

The Winter Garden is a glass and steel dome construction. The main construction contains 36 identical arches radiantly from a central point. The structure can be divided in three parts: the walk-round, the main dome and the small dome. The total height of the construction is 25 m, the diameter is 57 m.

Project approach

The study includes the identification of the geometrical and iron parameters of the structure, the determination of the symmetrical and asymmetrical load cases and combinations and the evaluation of the structural elements.

Loading scheme

Euro code 1 determines the permanent loads:

- Self weight of iron main structure
- Self weight of the secondary structure
- Self weight of the glazing
- External permanent loads

Euro code 1 was used to determine variable loads:

- Snow
- Wind
- Thermal loading
- Service loads

The complete analysis is carried out according to the actual European standards: the Euro codes EN1990, EN1991 and EN1993.



Restoration study Winter Garden of Royal Greenhouses, Brussels

