Editorial

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Editorial

In human history glass has been a key material. Obsidian, a naturally occurring volcanic glass, played a key role in the technology of many cultures. It is even argued by some historians that the easy availability of obsidian in Central America and the good properties of obsidian tools, made the Bronze Age unnecessary for the Mayans.

The development of man-made glass is a parallel development at several parts of human history. Due to the high expense it was a luxury material with an almost magic appeal. The National Museum of Antiquities in Leiden, the Netherlands has some exquisite glass pieces, which to an expert eye, still show the incredible craftsmanship of the artisans who made it two Millennia ago.

In the late medieval period the great stained glass in lead windows were a major architectural innovation. In the renaissance Louis the XIVth of France ordered the great hall of mirrors and the great orangery at Versailles as an opulous display of his wealth. In the process the production of flat glass was scaled up and the cost went down. Imitators of Louis the XIVth started to use more glass in their palaces and houses which led to further increases in production and to decreasing cost.

In the 19th century the industrial revolution led to cast iron and wrought iron structural elements which enabled the use of strong but non-obtrusive load bearing structures with large glazed areas. This culminated in the 1851 Crystal Palace in London, which was copied many times, some copies like the one in the royal garden in Madrid still exist. Several accidental fires with disastrous consequences limited the use of glass until the 1980's when Peter Rice engineered the first structural glass system for the Cite des Sciences et de l'industrie in Paris. This introduced a wave of glass innovation which is still ongoing. Many research groups started to look into structural glass in architecture. Delft University started a program in 1995 which continues to this day and has grown stronger over the years.

Recognising the slow emancipation of glass as a structural material, Prof Jan Rots edited a special issue of the Heron Journal in 2007 on structural glass. Following this in 2008 the structural glass research group organised the first structural glass conference in Delft,

Challenging Glass I, which has been a bi-annual conference since then and has developed into a major forum for distributing the results of structural glass research. Following the 6th challenging conference in 2018 it was decided to publish the present special Heron issue on structural glass. This issue has a wide range of subjects, starting with some questions from the materials science field which have a direct impact on structural glass, through the development of new types of glasses, the analysis of failure behaviour, the development of innovative structural concepts for cast glass, the story of a unique project which led to the first pedestrian bridge using a load bearing structure of bundled glass rods to a glimpse into a future where thin, flexible, glass is used in ways which even 10 years ago were considered impossible.

I hope the reader will find the complicated issue of applying glass as a structural material, after reading as transparent as the material itself.

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Guest editor, Heron issue Structural Glass 2018