

DOI: 10.24904/footbridge2017.09511

THE FUTURE OF THE FOOTBRIDGE ENGINEER IN THE PURPOSE ECONOMY

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1. Introduction

The time period we live in generates a context in which the bridge engineer does its job. His basic role is to design safe, reliable, economical and durable structures for people and goods to cross roads, rivers and valleys. The context of the time period in which we do our job matters, for example in the industrial Age the bridge engineer was at the forefront leading the big transformation in transportation that were essential for quick national and international trade and economic growth. The Industrial Age experienced big innovations in materials like wrought iron and later steel as well as reinforced concrete, and new technologies like engines and machines. This new context paved the ground for bridge engineers to design and build bigger and longer bridges. Some nice examples are the Clifton Suspension Bridge in Bristol, wrought iron chains, the Brooklyn Bridge in New York, a hybrid cable stayed bridge and suspension bridge with steel wires and the Salginatobel Bridge in Switzerland, a reinforced concrete box girder.



Fig. 1a) Clifton Suspension bridge, b) Isambard Brunel; Brooklyn bridge, c) John Roebling; Salginatobel Bridge, Robert Maillart (all photo's © Edwin Thie)

The following and current Information Age characterises itself due to new digital technological innovations. Bridge engineers have embraced the new design and build tools which made it much easier to process large amounts of data than before. This resulted in a huge optimisation in material qualities, construction methods, analysing methods of forces and forms and cost. This can be seen in footbridges like shown below.



Fig. 2a) Puente de la Mujer, b) S. Calatrava; Millennium bridge, c) Fosters/Arup; The Helix, COX/Arup (2a © Edwin Thie, b/c) © Arup)

But automation, standardisation and the new technologies also changed the role of the engineer from leader to enabler. The digitalisation of our economy will further continue to revolutionise our profession.

2. Purpose Economy

Today we are seeing a slow shift of the Information economy towards a Purpose economy. The Purpose economy is one in which employees and customers are driven by their sense of social purpose, more so than by personal financial and status gain. Value is placed on serving needs greater than their own, enabling personal growth of others and building community. This movement towards a Purpose economy will also transform the footbridge industry, changing needs of footbridge owners and engineers, shifting social responsibilities, technological progress and new regulations. There is evidence in almost every industry and throughout the Western World culture that this shift is already underway. For example in the retail business with Etsy and Patagonia or Tony's Chocolonely in the Food industry and Fair Phone in communications.

Public bridge clients align themselves with global and national goals, like the UN Sustainability Development Goals and the Paris Climate Agreement, to set the future context for bridge designers to find the best fitting solutions. New goals are introduced to value what is a fitting solution for a footbridge.



Fig. 3 Relevant UNSDG for footbridges

A footbridge will contribute positively to healthy mobility. It encourages communities to walk and cycle more, without effecting the air quality in the area. It empowers communities to good access to education, health care, food and work stimulating well-being. A footbridge will further contribute to well-being when attention paid to accessibility, aesthetics, comfort and social safety. Designing a footbridge is all about responsible use of materials. The materials used to build bridges have an environmental impact on the planet (pollution and climate change) and therefore it important to start understanding the materials and production supply chain better to select the best materials.

In addition to our job there is also a noticeable shift at corporate level of larger Engineering companies and contractors with an increased sense of their social responsibilities (CSR). Many companies now a days have internal programs with fund available to donate to good and relevant causes and support staff to do Pro Bono work. There are a few NGO's aiming to help isolated communities and create access to essential health care, education and economic opportunities by building footbridges over impassable rivers. Two good examples are the American NGO Bridges to Prosperity and the Swiss Helvetas. They offer a direct experience to do socially useful work outside your normal job.

In the purpose economy the new engineer will be looking for a purpose greater than their own. The current pool of young engineers grew up in a digital globalised world. In their young years they have in general been more exposed to the negative effects of globalisation, refugee crisis, financial crisis, war on terrorism, climate change and environmental pollutions than the senior staff. These Millennials are attracted to employers value that they admire as consumers, they focus much more on social impact as before. And they will look for job opportunities that will combine Learn, Earn and Return in one.

3. Conclusion

One of the most valuable qualities of an engineer is his or her curiosity and creativity to find the best solution to a given challenge within a given context. As bridge engineers in the emerging Purpose economy with new goals and values placed, we have an opportunity to lead again in finding the best fitted solutions, in addition to proving the solutions, for the betterment of society.