The development of successful design standards: understanding the challenges

Mariapia ANGELINO
Research Engineer at
University of Bristol and
Parsons Brinckerhoff,
Bristol, UK
ma12075@bristol.ac.uk

Jitendra AGARWAL
Senior Lecturer
University of Bristol
Bristol, UK
j.agarwal@bristol.ac.uk

Jon SHAVE
Head of Specialist Civil
Engineering Consultancy
Services at Parsons
Brinckerhoff, Bristol, UK
shavej@pbworld.com

Steve DENTON
Engineering Director at
Parsons Brinckerhoff
Bristol, UK
Visiting Professor at
University of Bath
dentons@pbworld.com

Summary
The current generation of design standards in the construction sector has reached a high level of complexity, which reflects negatively on the quality of design standards and as a result on the efficient communication of technical provisions to users. Recently, the desire to improve quality and usability of design standards has become increasingly strong; in fact, enhancing the 'ease of use' will be a major focus in the development of the next generation of the Structural Eurocodes, scheduled to be completed by 2020. In this paper the authors outline the state-of-the-art of the concepts of quality and usability applied to design standards. A basic framework to start investigating these concepts is proposed and a real case study to explore the issue of quality in design standards is presented. This research shows that several challenges need to be overcome in pursuing the above goals and that further research is needed.

Keywords: standards; standardisation; quality; usability; technical requirements; communication; systems thinking; Eurocodes

1. Introduction

Design standards are fundamental documents for the professional activity of civil and structural engineers. They contain a variety of technical provisions (*i.e.* statements, instructions, recommendations and requirements) essential for design of safe, serviceable, robust and economical structures. Generally speaking, design standards are expected to represent the state of the art and be validated through research and sufficient practical experience. They should be understandable and easy to use: these two attributes are essential, as they guarantee an effective and efficient communication of technical provisions with reduced risk of misinterpretation and human error.

Despite this clarity of intent, making standards easier to understand and to use is not a straightforward task since it requires a clear understanding of what makes a standard 'good' and 'easy to use' and how to measure its effectiveness. Although plenty of research has been done in the standardisation sector in the last 30 years as investigated by Swann [1], a specific approach to define and measure quality of design standards in the construction sector and to guide standard writers in creating easy to use standards has not been developed yet.

Over the years the current generation of design standards in the construction sector has reached a high level of complexity and has become a target for criticism by practicing structure engineers. Consequently, the desire to enhance the ease of use of technical standards in this domain, as well as to improve their quality, has become increasingly strong.

The purpose of this paper is to explore the challenges in the development of successful design standards in the construction sector and present some initial ideas and tentative conclusions. An overview of the main reasons for the complexity of the current generation of standards is provided in Section 2. The state-of-the-art in the standardisation sector, with a focus on the concepts of 'quality' and 'usability' of standards, is examined in Section 3. A case study to explore the quality

https://doi.org/10.2749/222137814814028106