On the Development of Structural Criticism through Case Studies

Ignacio PAYÁ-ZAFORTEZA
Assistant Professor
ICITECH, Dep. Ing, Construcción, Universidad Politécnica de Valencia, Valencia, Spain
igpaza@cst.upv.es
Visiting Professor, Dep. of Civil and Environmental Eng. Princeton University, Princeton, NJ, USA
ipaya@princeton.edu

Prof. Payá-Zaforteza received his civil engineering and doctoral degree from the Universidad Politécnica de Valencia, Spain. He has made research stays at the TU Berlin and at Princeton University. His research interests are: Structural Optimization, Fire Engineering, Construction History and Structural Art.

Summary

Traditionally, Structural Engineering education has been focused on the technical aspects of the profession and has given little attention to creativity, aesthetics and structural criticism. However, if the engineer wants to properly accomplish his/her role in society, the development of these competences among the students and the engineering profession is of major importance.

This paper focuses on the use of case studies to develop Structural Criticism and is based on the concept of Structural Art developed by D.P. Billington. The case studies presented in the paper have been used with great success by the author in a general course on building structural analysis, and abundant graphic information and references are included. In doing so, the methodology can also be used by other engineering professors and professionals interested in spreading the knowledge of Structural Criticism.

Keywords: Structural Criticism, ethics, aesthetics, Structural Art, Billington, bridge, building.

1. Introduction

Art Criticism is defined by the Encyclopedia Britannica [1] as the “analysis and evaluation of works of art”. In a similar way, Structural Criticism may be defined as the analysis and evaluation of works of Structural Engineering.

Structural Criticism is a very important topic as pointed out, e. g., by Jörg Schlaich and Bill Addis. Schlaich, in a paper presented at the IASS Conference held in Stuttgart in 1996 [2] defended that more structural competitions should be held and that their results should be published and discussed. Furthermore, he argued that structural engineers themselves should be willing to express their opinions about others’ structures and also to open-mindely accept criticism from others. In doing so, the general public would become aware that the structures of buildings and bridges are an “inseparable part of our culture and that their quality is an indication of the public interest they attract and of the dedication of the engineers entrusted with their design”. Addis [3] discussed the role of criticism and aesthetics in developing an opinion of what is good structural design and supports the idea of criticism being an important part in engineer’s formation as it is “essential in helping students form their own character and identity”. According to Addis, this formation in criticism should continue well beyond graduation.

However, and despite its importance, Structural Criticism is not always taught in Structural Engineering courses which use to be focused on the technical aspects of the profession. The main aim of this paper is to help to bridge this gap by showing several case studies that can be used in a general course on Structural Engineering to introduce the students in this fascinating topic. This “first step” should be able to awaken students’ curiosity and to encourage them to start a joyful self learning. The methodology is based on the ideas of Structural Art developed by D.P. Billington and has been applied in a course on building structural analysis taught at the graduate level at the School of Civil Engineering of the Universidad Politécnica de Valencia in Spain. To be completely

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