Forensic Structural Engineering in education

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Abstract

Forensic Structural Engineering is the professional practice of determining the cause(s) of a structural failure, often with the aim to lay out a technical basis to identify the responsible parties for a failure.

Although Forensic Structural Engineering is given as course at several universities in USA and UK, at many institutions it is no common practice to include it in the civil engineering curricula. At TU Delft a graduate course has been initiated for building and structural engineering students, starting from September 2015. The course needs to meet a two-fold aim:

1. To understand and explain important structural failure mechanisms in various materials

2. To come up with design measures to avoid these problems

This paper describes how this course was successfully implemented in the civil engineering curriculum.

Keywords: Forensic Structural Engineering, Education, Blended learning, Failures

1 Introduction: international context

Forensic Structural Engineering (FSE) is "the professional practice of determining the cause or causes of failure of a constructed facility and of laying out the technical bases for identifying the parties responsible for that failure" [1].

Dissemination of failure knowledge and more specifically FSE in education has received attention for many years, especially in the USA [2,3]. In this country, failure cases were included by 85% of the civil engineering schools in technical courses, according to a survey in 1989 [4]. Bosela [5] identified only 12 courses at different US Universities specifically focusing on failure of engineered facilities. This limited number of forensic engineering courses can be explained by the opinion that the undergraduate curriculum already was crowded [2,6].

However, increased inclusion of forensic case histories in education can serve various aims. According to Kolb [7] learning is a process where knowledge is created by the transformation of experience. In the learning cycle he distinguishes concrete experience, reflective observation, abstract conceptualization and active experimentation.

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