

**The Practice of Forensic Structural Engineering in IABSE Member Countries
preliminary review of survey 2022**

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The Practice of Forensic Structural Engineering in IABSE Member Countries: preliminary review of survey 2022

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Abstract

The IABSE Task Group 5.1 on Forensic Structural Engineering aims to examine and to mitigate structural failures by sharing knowledge of technical, human, and organizational causes of failures, in addition to methods and techniques in forensic investigation processes. The expertise of Forensic Engineering is yet to be worldwide recognised as a specific domain of civil engineering practice and this article amends previously published technical reports in 2012, 2014 and 2015 by former IABSE Working Group 8 following a new survey carried out in 2020-2022.

This new survey has been developed with the lessons learnt from the previous survey in 2013-2014.

A panel composed of the authors of this article (all of them members of TG 5.1) was activated to develop the new questionnaire together with a procedure composed of three stages. The main aim of this stepwise approach was to significantly improve the questions on the basis of the results of the previous step in order to avoid, at the final step, unclear responses and to limit subjectiveness as much as possible.

In the article a preliminary analysis of some sections of the third stage questionnaire is presented.

This questionnaire is composed of 36 questions divided into the following sections:

- PP: Professional Practice (6 questions);
- RG: Role of Government (9 questions);
- LI: Legal Issues/Considerations (8 questions);
- CA: Contractual Arrangements (1 question);
- HA: Hazard Assessment (1 question);



- FS: Failure Statistics (3 questions);
- CC: Causes of Collapses (2 questions);
- FU: Follow-up on collapses (1 question);
- IM: Improvements to professional practice (4 questions);
- AC: Additional Comments (1 question).

All questions except for the last one (i.e. AC) include multiple-choice answers but only for 5 of them the respondent can choose more than one answer among those indicated. Moreover, each question includes an 'additional comment' section where the respondent is free to add further information useful to either clarify his/her response or to provide further details, if needed. This option provided relevant additional information.

TG 5.1 was able to identify and select national experts representative of 36 out of 68 IABSE Member countries but only 22 accepted the invitation and completed the questionnaire.

In the article the major issues arisen from the preliminary analysis of sections PP, HA, CC, FU, IM are highlighted and discussed.

It appeared that forensic engineering is known in various countries, but it is not well established in the majority of countries. Professional organizations are lacking, and limited examples of university courses or lifelong learning initiatives are known. Often no formal requirements related to the expertise of experts and no protocols regarding the investigation process are issued.

As still there are several structural failures, ranging from minor cracks to full collapses, it is of importance that lessons can be learnt from earlier collapses to prevent future failures. Furthermore, many failures are caused by natural hazards, where forensic analyses can provide information regarding vulnerability of specific structures. Finally, large failures come with large costs. Therefore, investigations are needed that lead to reliable outcomes regarding causes of failure and parties responsible. Therefore, knowledgeable experts and a trustworthy investigation process is of utmost importance.

IABSE's TG5.1 will continue its efforts to learn from past failures and to improve forensic investigation processes.

Keywords: forensic structural engineering; survey; structural failure; structural collapse.