

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY AND THE ENVIRONMENT

COMMISSION No. 1: ENGINEERING GEOLOGICAL CHARACTERISATION AND VISUALISATION

PROPOSAL FOR ACTIVITIES TO SEPTEMBER 2010

INTRODUCTION

The proposed focus of Commission No 1 for the next 3½ years will be on two primary topics: 1) Engineering geology for actuarial purposes and 2) Digital initiative in engineering geological characterisation and visualisation. The first topic is an interdisciplinary effort that includes actuarial scientists from the insurance and financial industries, and perhaps also geotechnical and structural engineers. The second topic could be an internal effort exclusively for engineering geologists, but it also could involve users of characterisation and visualisation products developed by engineering geologists.

In general, the activities of Commission No 1 will begin with identification and organisation of interested individuals who can contribute to the goals and objectives of the Commission. Communications will be primarily by electronic media (e-mail) with calendars of individual members being maintained to show planned participation at technical/professional conferences. Informal Commission meetings can occur among those individual members who happen to be at the same conference. Details of research to be undertaken and documentation of result will be compiled and updated at least semi-annually. Individuals who accept assignments will be named along with descriptions of assignment details. Literature searches should be undertaken for both primary topics, in part for the technical merits of the research results included in the literature, but also for names of individuals who may be qualified and sufficiently interested to participate in Commission activities.

Reporting of progress to the IAEG Council will be done annually in time for distribution to Council members in advance of Council meetings, as directed by the IAEG Secretary General. Reporting of progress and results to IAEG members and other engineering geologists will be done primarily by information posted to the Commission C1 page on the IAEG Web Site, occasional papers submitted to the IAEG Bulletin, and articles submitted to the IAEG Newsletter. Opportunities will be sought for organisation of special sessions at international meetings and conferences.

The proposed IAEG Commission No 1 activities serve two main purposes:

1. Contribute in a meaningful way to geoscience-based, quantitative assessment of risks related to natural hazards, and
2. Promote improvements in the ways engineering geologists document, analyse, display, and communicate quantitative technical information with examples that demonstrate basic and advanced principles (i.e., general guidance rather than performance standards).

ENGINEERING GEOLOGY FOR ACTUARIAL PURPOSES

Goal 1. Characterise geohazards in terms that can be used directly by actuarial scientists in their application of mathematical, probabilistic, and statistical methods to finance and insurance, specifically for assessing risk needed to set insurance premiums

Objective 1. Identify actuarial scientists who are knowledgeable about and interested in geohazards who can provide guidance to Commission No 1 members about geohazards characterisation.

Objective 2. Work with actuarial scientists identified in Objective 1 to develop an understanding of their general needs in assessing risks associated with geohazards for making financial decisions and setting insurance premiums.

Objective 3. Work with actuarial scientists to develop a prioritised list of geohazards for which they believe engineering geological information could be valuable.

Objective 4. Develop examples of engineering geological procedures, approaches, and results for characterisation of specified geohazards that will provide needed information for direct use by actuarial scientists.

Objective 5. Present examples developed in Objective 4 in papers suitable for publication in the IAEG Bulletin and in papers suitable for presentation at appropriate actuarial conferences.

Goal 2. Characterise physical damage caused by geohazards to transportation, municipal, civil, and residential infrastructure and buildings in systematic ways that can be used by civil and structural engineers and actuarial scientists in their evaluation of event-specific losses and determination of maximum probable loss.

Objective 6. Identify civil and structural engineers and actuarial scientists who are knowledgeable about and interested in physical damage caused by geohazards who can provide guidance to Commission No 1 members about characterising geohazards damage to transportation, municipal, civil, and residential infrastructure and buildings.

Objective 7. Work with identified in Objective 6 to develop an understanding of their general needs in assessing physical damage caused by specific geohazards events and processes for evaluating event-specific losses and determining maximum probable loss.

Objective 8. Work with actuarial scientists and civil engineers to develop a prioritised list of geohazards for which they believe engineering geological documentation of physical damage could be valuable.

Objective 9. Develop examples of engineering geological procedures, approaches, and results for characterisation of physical damage caused by specified geohazards that will provide needed information for direct use by engineers and actuarial scientists.

Objective 10. Present examples developed in Objective 9 in papers suitable for publication in the IAEG Bulletin and in papers suitable for presentation at appropriate engineering and/or actuarial conferences.

Goal 3. Characterise transient and dynamic environmental factors, such as climate, groundwater levels, and coastal processes, in systematic ways that quantify variability and uncertainty.

Objective 11. Develop a prioritised list of transient and dynamic environmental factors which are important to meeting Goals 1 and 2.

Objective 12. Develop examples of engineering geological procedures, approaches, and results for characterisation of transient and dynamic environmental factors in systematic ways that quantify variability and uncertainty.

Objective 13. Present examples developed in Objective 12 in papers suitable for publication in the IAEG Bulletin and in papers suitable for presentation at appropriate conferences.

DIGITAL INITIATIVE FOR ENGINEERING GEOLOGY

Goal 4. Monitor, review and make recommendations on good practices for effective use of information technology in engineering geological characterisation and visualisation.

Objective 14. Formulate, distribute, and analyse the results of two related questionnaires to assess the need and readiness for 3D geological/geotechnical information: One among engineering geologists and one among non-geologist users of geological information.

Objective 15. Develop a summary of available systems for digital acquisition of engineering geological field data and describe their advantages and limitations.

Objective 16. Develop examples of effective use of 3D laser scanning and terrestrial photogrammetry for virtual geological mapping and describe their advantages and limitations. Coordinate with IAEG Commission No. 19.

Objective 17. Review examples of existing database structure of basic engineering geological data and calculated parameters and describe advantages, limitations, and concerns.

Objective 18. Develop examples of visualisation and display of engineering geological data, models, and products with alternative Geographical Information System platforms and Google Earth technology.

Objective 19. Develop examples of 2D, 3D and 4D modelling of physical characteristics, environmental processes, and system responses. Work with geotechnical and structural engineers to understand how engineering geological information can be modelled for use with Load and Resistance Factor Design (LRFD) or limit-state design practices.

Objective 20. Present examples and recommendations for good practices developed in Objectives 13 – 19 in papers suitable for publication in the IAEG Bulletin and in papers suitable for presentation at appropriate conferences.