

Introduction to Engineering in Chalk: the Chalk 2018 conference

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ABSTRACT The British Geotechnical Association (BGA) has planned the Engineering in Chalk (Chalk 2018) conference to build on the success of the International Chalk Symposium (ICS 89) held almost 30 years ago in 1989 in Brighton. Chalk 2018 is intended to provide an opportunity for geotechnical engineers, engineering geologists, hydrogeologists and other geological professionals to meet and share their knowledge of the Chalk.

1 INTRODUCTION

The Chalk is an integral part of the working life of many engineers and geologists in many parts of the UK and north western Europe. Over recent decades there has been considerable engineering works designed and constructed in the Chalk, including major tunneling works (not least of which was the Channel Tunnel), major earthworks for road and rail networks, and more recently the development of foundation and piling systems for offshore windfarms. Research into the nature and properties of the Chalk has progressed alongside these projects.

In 2016, the British Geotechnical Association (BGA) recognised that the time was right to hold a major international conference on Engineering in Chalk (Chalk 2018), to share and record the progress made in our understanding of this complex and diverse stratum.

In my role as Vice Chair and then Chair of the BGA, I was given the opportunity of help plan the conference. At an early stage the Conference Organising Committee set the following objectives for the conference:

The objective of the conference is to build on the success of the International Chalk Symposium held almost 30 years ago in 1989 in Brighton, and to provide an opportunity for geotechnical engineers, engineering geologists and hydrogeologists to meet and share their knowledge of the Chalk.

The requirements for a successful conference include:

- i. Attracting papers from a wide range of disciplines, and from outside of the UK.*
- ii. Inviting keynote presentations from well known practitioners.*
- iii. Engaging with potential delegates in all stages of their careers, including younger practitioners.*
- iv. Providing a central London venue with space for parallel sessions and a technical exhibition.*
- v. Inviting sponsorship and commercial support to allow the conference to be cost-neutral to the BGA.*
- vi. Promptly publishing the papers in an appropriate form to provide a high quality technical resource on the Chalk.*

- vii. *Maximising the potential legacy from the conference to benefit future geotechnical practitioners.*

At the time of writing (May 2018) it is too early to judge how the conference has performed against these objectives, and, in any event, we on the Organising Committee are not in a position to give an objective view. However, based on the number of papers submitted and the quality and breadth of content, the signs are good so far, and we can only hope that our successors will take a positive view of this conference.

2 THE PAST

This conference and its technical content do not exist in isolation. Chalk 2018 can claim to be the third conference or symposium in an infrequent series, spread over more than 50 years, facilitated by the BGA and its predecessor body the British Geotechnical Society (BGS).

2.1 1965 Symposium

The Symposium on Chalk in Earthworks and Foundations was held at the Institution of Civil Engineers in London on 22 April 1965, with the proceedings published the following year (Institution of Civil Engineers 1966).

Higginbottom (1990) states in the 1960s the available literature on the engineering properties of chalk were very limited, and that the impetus behind the 1965 symposium came from a discussion meeting held by the BGS some three years earlier. Around this time some of the first British Motorways were under construction, some (such as the M2 and M40) involving long cuttings and embankments in the Chalk. Furthermore, a few years earlier the first modern boreholes had been drilled in the Straits of Dover by the Channel Tunnel Study Group (Bruckshaw et al. 1961).

The proceedings of the symposium contain only four papers, with a total of five authors. However, there are 55 pages of discussion from a further 29 contributors, plus the paper authors. 272 attendees are listed at the back of the proceedings.

The four papers in the proceedings cover: the engineering geology of chalk; Foundations on chalk; The properties of chalk in relation to road founda-

tions and pavements; and, Chalk in cuttings and embankments. It is interesting to note that there is little, if any, content in the proceedings on either hydrogeology or tunneling in chalk.

2.2 1989 International Chalk Symposium

The International Chalk Symposium (ICS 89) was held at Brighton Polytechnic from 4 to 7 September 1989, with Professor John Burland as the Symposium Chairman, and Dr Rory Mortimore as the Conference Secretary. The proceedings were published the following year (Burland et al. 1990).

Mortimore (2012) describes how in the intervening years since the 1965 symposium a new generation of infrastructure projects, including large scale tunneling, piling and chalk aquifer potable water supply schemes had resulted in new problems and solutions being developed for working in chalk. ICS 89 was planned to share and document multidisciplinary knowledge from all sides of industry.

Part of the profits from ICS 89 went to the Construction Industry Research and Information Association (CIRIA) to stimulate further research, resulting in two CIRIA reports *Foundations in Chalk* (Lord et al. 1994) and *Engineering in Chalk* (Lord et al. 2002). The CIRIA publications: updated the geology of the Chalk in the light of the British Geological Survey (BGS) remapping of the Chalk in the UK; introduced a new method of description and classification of chalk for engineering (the CIRIA grades, see Spink (2002)); and, provided new guidelines for chalk earthworks and foundations.

The ICS 89 proceedings contain 79 papers, plus short discussion sections at the end of each principal section. There were papers from the UK, France, Belgium, Denmark, Norway, Greece and Israel.

After a preface and two introductory papers, the ICS 89 proceedings has sections on: Overviews and field logging (17 papers); Mechanical properties (10 papers); Foundations (12 papers); Earthworks (6 papers); Underground excavations and slope stability (13 papers); Hydrogeology (10 papers); Petroleum (7 papers); and Planning (1 paper). Surprisingly, there are no papers specifically on tunneling in chalk.

Hard copies (Figure 1) of this great resource of knowledge of the Chalk are hard to come by in 2018, but the papers are all available to purchase on line from the publisher's website – The ICE Virtual Li-

brary. This vastly increases their accessibility to an international audience, and this means of knowledge sharing could scarcely have been imagined by the authors and conference committee in 1989.



Figure 1. Proceedings of the International Chalk Symposium (ICS 89).

It is an interesting exercise to look at the continuity of expertise and knowledge over the 24 years between the 1965 and 1989 meetings. There were only five authors in 1965, but one of them – Ian Higginbottom – authored papers at the 1989 event. Among the wider pool of the delegates in 1965, two members of the 1989 Organising Committee and Advisory Committee had attended the 1965 symposium, as had a further handful of the 1989 authors. It is reasonable to claim there is continuity between the two events.

3 THE PRESENT

The Chalk 2018 Conference Organising Committee were clear that we wanted continuity with, and to build on, the success and value of ICS 89. Two

members of the Conference Organising Committee and Technical Theme Leaders Group had authored papers at, and attended, ICS 89. Two of the Chalk 2018 keynote speakers – Professor Rory Mortimore and Dr Clive Edmonds – had been authors at ICS 89; Rory Mortimore was notably also the Conference Secretary for ICS 89.

The Chalk 2018 proceedings contain 94 papers, including papers from the UK, France, Denmark, Norway, Greece, Iraq and Israel.

After this introduction, and the three Keynote papers, there are sections on:

- Earthworks in chalk;
- Foundations and piling in chalk;
- Future engineering issues in chalk;
- Geological hazards in chalk;
- Offshore engineering in chalk;
- Site investigation/characterization in chalk;
- Testing in chalk – in situ and laboratory;
- Tunnelling in chalk;
- Water and the environment.

Four of the Chalk 2018 paper authors were also authors and co-authors at ICS 89. This represents a significant continuity of expertise across the intervening 29 years.

The principal changes in technical scope of the conference between ICS 89 and Chalk 2018 are:

- The inclusion of tunnelling in chalk as a key theme, reflecting with large amount of tunnelling carried out in recent decades (including the Jubilee Line Extension, HS1, Crossrail), and planned for the future (HS2, Crossrail 2).
- The inclusion in the conference of several papers on offshore wind energy infrastructure – an industry that did not exist in 1989.

A key difference in the planned dissemination of the expertise between ICS 89 and Chalk 2018 is that electronic publication was planned from the start, with all conference delegates given the papers on a USB storage device, rather than being given a hard

copy. Electronic publication means the hard copy of the proceedings now has less importance; however, due to advances in the publishing process, the Chalk 2018 hard copy conference proceedings will be available to purchase at the conference itself, rather than waiting until the following year, as happened in 1965 and 1989. The BGA plans to ultimately make the Chalk 2018 papers available free to download by BGA members, via the BGA website.

4 THE FUTURE

Predicting the future is a risky, and potentially fruitless exercise. It is interesting to wonder whether any delegates at ICS 89 could have predicted the details of the Chalk 2018 conference, with its website, electronic dissemination of papers, and some of its subject matter (such as offshore wind energy infrastructure, almost unknown at a commercial scale in 1989).

What we can predict with confidence, is that understanding and working with chalk will remain relevant to geotechnical professionals in the coming decades. New problems and challenges will emerge, to meet the needs of future infrastructure projects, and research and practice will need to adapt in response. It is reasonable to conclude that in the next two or three decades there will be the demand and need for another conference or symposium on chalk to remind the industry of the lessons of the past and to plan for the challenges of the future.

We can be less confident of predicting what form such an event will take, a few decades hence. Perhaps telepresence technology will be more used then, and the physical event will be less important. We can even imagine a time when younger colleagues at a future chalk conference will ask older colleagues why we talk about ‘papers’ when all the technical submissions exist virtually!

The final thing we can predict, based on past experience, is that the engineers and geologists who will be responsible for organizing the next conference on the Chalk will be attending Chalk 2018 as delegates.

To them, the Chalk 2018 Conference Organising Committee wishes good luck!

5 CONCLUSION

The Chalk 2018 Conference Organising Committee hopes that the acts of producing the papers and them bringing together multi-disciplinary professionals at Imperial College, London in September 2018 represents a step forward in engineering in chalk and leaves behind a legacy of improved practice and stimuli for future research.

Finally, I would like to thank the Conference Organising Committee and the Technical Theme Leaders for their hard work and commitment in developing and developing this conference. In particular, I would like to thank the Conference Organising Secretary, Dr James Lawrence of Imperial College for his drive and energy in making this conference a reality.

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