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Editorial

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The last three months have been eventful for the journal. One of the best outcomes for a journal is when a prize paper is selected to form the subject of an ICE prestige lecture. 'Widening engineering horizons: addressing the complexity of sustainable development' by Fenner, Ainger, Cruickshank and Guthrie¹ was awarded the George Stephenson Medal and duly selected for oral presentation at an ICE evening meeting on 24 September 2008. The event was a huge success, with all tickets issued and latecomers unable to attend, the Telford lecture theatre full and a live broadcast (notably to a large group of students and engineers at Queen's University, Belfast) reaching far more people. There was a full presentation followed by a lively panel discussion session which would have been sustained long into the night were it not for a strict cut-off two hours after the start. The paper was targeted at the heart of what a civil engineer's role and responsibilities truly are: in short how broad should our thinking be and how far should we go in seeking to draw attention to this thinking? If you have yet to read the paper I recommend you do so at your earliest opportunity; if you have read it, then I recommend that you revisit it and perhaps reproduce the tables so that you can add your own ideas to them. The article is truly thought-provoking. The fact that there was such a lively debate with many questions unanswered led to subsequent dialogue with ICE on how new web technology might be used for this purpose and, perhaps not unsurprisingly, how we might capture such discussion in the journal. We are keen to do this and have acknowledged the fact in the revised aims and scope and in the guidelines for publication presented on page 239. Indeed I would like to see this outstanding contribution to the literature as the catalyst for a strong sequence of discussion articles in the journal: this is your responsibility.

The publication guidelines also make clear how each type of contribution is handled by the editorial advisory panel (EAP). We are aware that writing articles for the journal can seem to be a daunting task and it is important that authors recognise how they will be treated. Briefing notes are shorter contributions which are rapidly reviewed by two EAP members, the intention being that these ideas are introduced with the minimum of delay. There is an excellent example of an authoritative and inspiring briefing in this issue of the journal. Papers are reviewed by two independent experts in the field, in every case chosen to be appropriate to the article in question, and assessed by a member of the EAP. Theoretical or experimental papers, and those reporting technical developments, will be expected to be properly

founded in the literature and fully justified and referenced, whereas papers dealing with current best practice and case histories are unlikely to have exhaustive literature surveys and suchlike activity to back them up. This is recognised by the EAP, as is the fact that it makes the work no less valuable to the profession. Again there is an excellent example of such a paper on the Cockermonth School Eco Centre in this issue. Discussion articles are referred to above and are strongly to be encouraged; they provide extensions of arguments, add points of clarification and add value to what is written. It is the intention in future to prompt such discussion by raising questions in the editorial; however this artifice should not be necessary and we would welcome contributions of whatever length and whatever their take on the matter in hand.

This issue of *Engineering Sustainability* illustrates just how broad the topic of sustainability is. The briefing reports the findings of a research project that aims to understand why we do not conform to sustainability principles as a matter of course in our engineering work. The underlying thesis here is that sustainability should cease to be a topic that is the subject of exemplars and should become the norm. The default situation is one borne out of ignorance and this can be addressed by securing information flows – the right knowledge at the right time will remove one of the biggest barriers to 'implementing sustainability'. This is a gem of an article and conveys a great deal in a small space. It is a privilege to be in a position to offer a forum for such well-crafted material. The first paper is what might be called a good practice paper. It is a paper that presents ideas on the 'how to' aspect of sustainability, that is, it is all very well to have high ideals, but what might they look like in practice? This paper takes the reader from conception through to the finished article and explains the thinking at each stage. Promoting sustainability is about applying intelligence and knowledge to a series of decisions and choices that allows us to face up to our responsibilities. It is easy to hide behind ignorance or lack of experience – claiming not to know 'how to' bring about improvements. Papers such as this provide a wealth of information that should encourage us to follow its lead and give confidence in so doing.

The second paper deals with stabilised clay soils as an alternative to fired clays. The debate on alternative materials is an important one and must be advanced. It has been well rehearsed in terms of chemical stabilisation of soft, weak clay subgrades that would

otherwise have to be excavated and disposed of (nowadays as landscaping material rather than to landfills), while replacement materials, albeit lower grade crushed rock or recycled asphalt planings, are imported to make up the levels. One lorry load of chemical stabiliser delivers the same benefits as very many lorry loads of delivery and removal for the dig-and-dump approach. For many years the benefits have been stated qualitatively – I remember doing so as far back as the 1980s in the preamble to my papers on the subject – but now we are able straightforwardly to quantify them in terms of embodied energy, or carbon dioxide emissions, or indeed other metrics. I can state this with confidence since it is an area in which I am currently researching. The arguments when applied to the factory creation of building materials are less automatic, however, since there is a large shift in the elements of the transport equation, for a start. What is being equated here is broadly the energy involved in firing the clay at high temperatures to create bricks with the energy required to create the stabilisers, and I am not sure that it would prove favourable, for example, for Portland cement-stabilised clays using the high dosages postulated in the paper as necessary. The paper rightly looks also at lime and ground granulated blast-furnace slag (GGBFS) as stabilisers, the latter being a by-product of another industrial process and hence a potentially good use of a waste material. The credentials of these materials need careful scrutiny, however, before the 'sustainable engineering case' is made: considerable energy is used in the grinding processes in preparing the GGBFS for use here. There is an interesting study to be done to question the claims in the paper that the approach is more sustainable, and perhaps this could be put forward as the basis of a discussion article.

There is a second debate to be had on the issues raised by this paper. The authors start with the premise that a brick has certain size (this is implied), strength, durability and suchlike characteristics and alternative processes are put forward for turning the base clay material into an element of equivalent properties. It is one way forward, but not necessarily the best. It brings to mind the cast iron bridge that the industrial revolution gave us in the eponymous Ironbridge gorge. It was created as an arch (good in compression) to replace the stone (good in compression) by a strong material *that did not need to be used in compression*. This paper sits between the concepts of rammed earth and fired clay, both of which create materials in different forms and employed in different ways. Should we not be thinking that chemically-stabilised soils could be used to create structural units of lower strength, or rather different engineering properties, using smaller amounts of additive and then use these elements in a different manner to create the desired outcome? This could then turn into a well thought through, engineered solution, in which locally-won materials are treated locally to create the building blocks of sufficient strength and durability for the ultimate purpose. We might end up with thicker walls, but this in turn might have other advantages in energy efficiency of the building. It is what is done, in fact, in many countries around the world out of necessity. The underlying question is whether the approach adopted in the paper is sound (creating bricks by an alternative means, but with some uncertainty about durability since they are not the traditionally fired type of brick) or whether the target should be to create a new building unit and engineer it in accordance with its different properties. I suggest the latter is more likely to produce a more sustainable solution. This is the

outline of my discussion contribution on the topic; what do you think?

The third paper provides a most interesting contribution that raises the issue of participants' values which, 'being human-determined, are grounded in culture'. It points out that the 'green' performance of buildings is a step, but only a small step, towards the achievement of sustainability. While we might take issue with the term sustainability as an absolute, we cannot take issue with the premise. The paper thus delves into a matter of considerable importance for those involved in the construction industry. One of the resonances for me is the often-referred-to fourth pillar of sustainability; we agree in general that economy, society and the environment provide the basis for three pillars of sustainability, yet a fourth pillar is commonly introduced. Arup in developing the sustainable project appraisal routine (SPeAR) model used 'natural resources' as a fourth segment in its circular representation, while 'governance' is often quoted. In a recent meeting with researchers from New Zealand it was inherently understood by them that 'culture' was the fourth pillar and almost a surprise that it might be challenged. It is considered necessary in that part of the world as a result of how society has developed and I have no problem with this – our research in Birmingham Eastside has emphasised that what is sustainable is determined locally: local conditions set local priorities. While the term 'culture' appears to be used in a subtly different way in this paper, this aspect of sustainability is greatly to be welcomed. Once more this opens up possibilities for discussion.

The final paper moves into a different arena altogether to provide a very different form of dissemination of the ideas of sustainability, and yet one that might prove to have the greatest impact of all. Introducing the concepts of tensions and trade-offs that are central to the sustainability debate to primary school children is an excellent idea. Just as with civil engineering degree courses, in which sustainability is required by the UK joint board of moderators to be a cross-cutting theme (or 'thread') throughout professionally accredited civil engineering courses, sustainable development features as a cross-curriculum dimension in the UK national curriculum for schools. The underlying question is: can it really be done, effectively, with children of this age? Read the paper, and be inspired to take the message out. Not only does it raise the issues of sustainable development, it places the civil engineer at the centre of its delivery and raises awareness of civil engineering as a profession. This is perhaps the most effective means that I have heard of yet to achieve the oft-stated aim of the professional institutions to raise awareness among children at a point before they choose their specialist subjects. Once again I come away with the feeling that this issue of *Engineering Sustainability* is of enormous value and that the journal is truly a success if it can deliver such messages. The authors are to be congratulated.

REFERENCE

1. FENNER R. A., AINGER C. M., CRUICKSHANK H. J. and GUTHRIE P. Widening engineering horizons: addressing the complexity of sustainable development. *Proceedings of the Institution of Civil Engineers, Engineering Sustainability*, 2006, 159, No. 4, 145–154.