

► NEW! YOUNG MEMBERS' PAGES



Thought Campaign

Think more. Be more.



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I'VE ALWAYS BEEN unsettled by the expression that small things amuse small minds, which casts an inherently negative and somewhat condescending light on the subject. This creates great discomfort, as it essentially imposes critical judgement on the creative process of the mind, which is not at all conducive to imaginative and innovative thinking to begin with. I'd rather like to perpetuate the idea that the greatest minds can be inspired by the smallest of things. This is indeed a much more positive perspective and one which resonates well with the contemplative nature of the engineering mind. I also find it to be a valuable trait in the South African context at large. Amidst the chaos and struggle we seem to have developed an exceptional affinity for appreciating the small and simple things in life, both in thought and action. Somehow we've managed to remain justifiably optimistic about the road ahead.

Sure, one cannot resort to naivety and exclude oneself from the clutches of reality, nor is it apt to shield one's perspective from the frightening problems we face. However, to give in to fear and anxiety is in itself a sentiment of despair and in extreme cases admitting defeat – arguably posing the greatest barrier to creative thinking and thus the pursuit of innovative solutions in order to effectively address these very problems.

In the spirit of creativity and innovation, the Young Members Panel (YMP) of SAICE would like to promote a drive – a sort of campaign, if you must – to encourage fresh ideas and new ways of approach. It is not intended that this 'campaign' be filled with fireworks and confetti, balloons and fancy speeches; it simply is one of 'thought'. It is a drive for contemplation beyond the standard norm. We'd like to remove all barriers and encourage Young Members (under 36s) to pro-

duce refreshing ways of approaching problems, on all facets of the civil engineering profession, and share them in the SAICE *Civil Engineering* magazine. We hope to see more engagement and interest in the magazine as a platform for disseminating knowledge and inciting inspiration, particularly among Young Members.

We have a rapidly ageing industry, with a great number of competent veterans in the field retiring over the next decade or two. The role of leaders in organisations of our industry would invariably become filled by the Young Members of today. Certainly this is both a daunting and exciting realisation, which is not only a reminder of the importance to embrace this responsibility, but to be the stimuli of the change we want to see in the years to come. Furthermore, it is critical to warrant that this process is carried out with sound understanding and awareness

of the changing times. The traditional nature of engineering business often requires in-depth handling of very discipline-specific problems, very easily getting one caught up in the routine of one-task-after-another, seldom moving beyond the boundary of the familiar. This has resulted in so-called knowledge silos – not only in terms of technical skills and information, but also in terms of the broader, tacit know-how within civil engineering. There is essentially a great fragmentation of the frames of reference, which are barriers to the unified pursuit of solutions – solutions which are well aligned with the interests of the variety of different viewpoints. Indeed, to regard this deeply rooted characteristic as a challenge to overcome seems overwhelming. That said, the journey must begin with one single step, and the YMP would like to start with something simple. We would like to initiate a movement termed the *Thought Campaign*. We simply strive to stimulate more mutual thinking and learning to diminish the effects of knowledge silos. Associated herewith we hope to propagate the adoption of a simple credo central to the *Thought Campaign* – to think more, to learn more, to do more, and hence become more.

We would like to encourage Young Members to submit articles, letters, memoranda, reports, etc, and share their experiences and knowledge – be it in the office or in the field, on or off the project. Perhaps there are valuable lessons learnt that are worthwhile spreading, or maybe technological innovations or prototypes in which you see value for civil engineering. There may well be relevant tacit knowledge that

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you find unobtainable through traditional means. All these make great catalysts for lateral thinking and creative reasoning, and we would like to urge more Young Members to take part in the process of the *Thought Campaign*.

For those interested in submitting material, the idea is to have an open, radical platform, one not limited to

predefined themes of the SAICE magazine. Let creativity and innovation be the point of reference. Submissions can be made as usual to the editor for perusal (verelene@saice.org.za). Watch this space over the following issues of the SAICE magazine for more fresh and exciting inputs from our Young Members! ▶ *Please turn over for more...*

▶ DID YOU KNOW?

- The first Ferris Wheel was created by Pittsburgh, Pennsylvania, engineer George W Ferris, in 1893. The wheel was supported by two 43 m steel towers and connected by a 14 m axle – the largest single piece of forged steel ever made at that time. The Ferris Wheel was considered one of the greatest engineering wonders in the world.
- Twenty-five thousand (25 000) double-decker buses would fit inside the walls and roof of the Wembley Stadium in London. A signature feature of the stadium, following on from the old Wembley's distinctive Twin Towers, is the 134 m high Wembley Arch. With a span of 317 m, this steel arch is the longest single-span roof structure in the world and, uniquely for a stadium, requires beacons for low-flying aircraft.
- Water slides primarily rely on civil engineering principles. This includes the provision of just the right amount of water to the flume. Without the right flow of water, there would be no ride. The speeds and lateral accelerations need to be balanced with the geometric design. Needless to say, this combination of parameters must accommodate a wide range of body shapes and, of course, masses moving through the flume.
- The world's largest concrete dam is the Itaipu Dam, an accomplishment of two neighbouring countries, Brazil and Paraguay, in South America. The Itaipu Dam is a hydroelectric dam on the Paraná River (located on the border between Brazil and Paraguay) with a capacity of 29 billion m³ (29 000 000 000 m³). The dam structure is 196 m in height and 7.919 m in length, and annually generates over 95 TWh (Tera Watt Hours). That's about 5% of South Africa's total annual energy production combined.

DO YOU KNOW?!

A young engineering student joined a big multi-national company as a trainee. On his first day he dialled the pantry and shouted into the phone, "Get me a coffee quickly!" The voice from the other side responded in appalled surprise, "What! You idiot, you've dialled the wrong extension! Do you know who you're talking to?" "No," replied the trainee. "I am the Managing Director of the company!" The trainee paused briefly, then shouted back with even greater fervour, "And do you have any idea who you are talking to?!" "Uh ... no," replied the Managing Director. "Good!" replied the trainee and abruptly put the phone down.



The Civil Engineer and the next Revolution



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THE AGRICULTURAL REVOLUTION was the world's first economic revolution. This occurred about 7 500 years ago, when *homo sapiens* switched from gatherers-hunters to farmers. This change led to a sense of place and ownership. Then the industrial revolution started in England in the mid-1700s and it spread to parts of Europe and North America. The revolution suddenly meant that people had to go to machines to work, instead of farming. The machines made processes more efficient and quicker, while ensuring better quality. Both the revolutions empowered man to produce goods and services more efficiently than their predecessors.

In the current technological era, information and data have become readily available at one's finger tips. Tablets and smart phones have revolutionised the way we communicate, make decisions and do business. The smart phones of yesterday have given way to smarter devices that have a much higher processing power and intelligence. A leading cell phone manufacturer refers to their recently launched smart phone as a 'life companion' rather than a smart phone. The plethora of applications that are available on the market simplifies life one step further. But how does all this affect a civil engineer?

Engineers rely substantially on good data. On a project one starts by collecting information, then analysing it, identifying trends, and then finally recommending measures to address the problem. Surveys that were traditionally conducted using paper and pen are now being conducted using tablets. For example, at a leading consulting firm, in-house applications are developed for android-based tablets.

Traffic counts, household surveys and other surveys are conducted using tablets. The data is wirelessly transferred in real time to the server. In case the tablet is lost or damaged, the data would still be safe. The Bluetooth technology is also often used to identify travel patterns within an area or neighbourhood. Bluetooth receivers are strategically located at different parts of the study area. The Bluetooth receiver identifies the unique MAC addresses of all the devices that are within a close range, along with a time stamp. The information collected over a period of time, at various locations, can be compiled to understand travel patterns and congestion levels in a specific area.

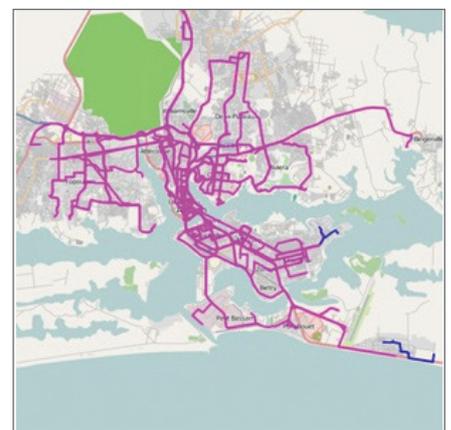
IBM collected cell phone movement data in Abidjan, Cote d'Ivoire in West Africa. The data collected was used to decipher information regarding the existing public transport routes (pink in the illustration alongside). The study proposed changes to the public transportation system to optimise the use of existing infrastructure, thereby reducing the travel time by 10%. Similarly, by tracking cell phone data, one could reveal maps of poverty, movement of sports fans and ethnic divides.

Design guidelines and code books are becoming available in electronic format that can be accessed on a tablet or smart phone. Design software such as AutoCAD and Civil 3D are also available for iPads and other tablets. Although all the functionalities of the original software might not be available on the tablet version, one can view and make quick changes to a drawing, without having to go back to the office.

Technology is playing a large role in making our lives simpler and more efficient. The concept of Smart Cities relies on connecting the city electronically to the world, having smart innovations in service delivery, e-governance and public administration. The large quantum of information col-

lected can be used to optimise the system, improve the quality of life and thereby make cities smarter. The information shared could include school test scores, crime statistics, foot and vehicular traffic, revenues, tax information, library usage, import and export statistics, airport passenger flow information, weather conditions, air pollution levels, etc.

The development of the human psyche has changed through the ages. The way we perceive ourselves today and, in turn the way we perceive the world around us, has taken shape over centuries past, and is indeed still in a constant state of flux. Much of this shift in thinking and perception is a result of scientific discoveries and technological innovations. The role that technology plays in human life is undeniable, let alone in that of an engineer. Let us as engineers therefore empower ourselves with new ways of thinking, and thus new ways of doing. Such a desire and thirst for the cutting edge is what SAICE, and particularly the Young Members Panel, would like to incite in our readers. ■



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