'Civil engineering – a profession in crisis' (or something similar) is an all-too-often-heard cry of the past decades, and is always noteworthy in the crushing silence of the response it engenders. There is no question that the profession has spun itself into a parlous position in South Africa: public perception has never been lower, university applications are seldom from the top or even the second drawer, and too often our best graduates are speedily sucked away via the MBA or MBL route into non-engineering roles. And it is all self-inflicted: we have been so busy 'harnessing and controlling the forces of nature', so drawn into the magnificent challenges of our profession that most of the responsibilities that once gave us stature have been hijacked by the managers and bean-counters. It is ironic that these two extremes have come together – civil engineers (in particular) and engineers (in general) create more wealth and add more value to civilisation than all other professions put together, and yet they have been relegated to service-provider status by the professions that create no added value whatsoever!

Rubbish!

The way out of this predicament is clear – only the vision, will and resources are in short supply. A Catch 22 syndrome is often quoted: 'to earn more money, we must have more prestige; to have more prestige, we must earn more money'. Rubbish! If the profession would only focus on the root causes of the problem, and less on not rocking the boat in what will certainly prove to be the vain hope of keeping it afloat, a solution can be achieved. The profession has no choice in this matter: working towards higher educational standards (in the broadest sense), a close-knit fraternity of professionals could create a structure impervious to the attacks of the inept and covetous from without and the self-seeking and corrupt from within. Consider the strength of the medical profession. Without a PhD in sight, they are called 'Doctor' and are held in extremely high regard by the public: this is surely due primarily to the intense loyalty (and protectionist legislation) that are well-known to the rest of us. Do medical practitioners indulge in fee competition? Do they allow the execution of their technical skills to be circumscribed by unqualified outsiders? Do universities lower standards in order to attract first-year students? Absolutely not!

So it is interesting that in both the USA and UK moves are afoot to bring the basic qualification required for registration to the level of MEng or MSc. Such a move in South Africa could enable more focus to be given to the structure of our profession, the disarray of which probably contributes to a small measure to the sad state of affairs described above. For too long too many civil engineers have been produced when it was clear that technologists and technicians were the required product. 'Fewer but better' should have been the watchword applied to the university production of civil engineers, not 'pile them high and sell them cheap'! A good working balance between engineers, technologists and technicians is essential for a healthy profession, and only such a structure will enable civil engineers (as managers) to reclaim and develop the field within which civil engineers (as professionals) can exercise their creative skills in co-operation with their technological and technical colleagues.

It is also noteworthy that this will bring the UK qualification to four years; given the extra school year for A-level GCSEs, this is the equivalent of a five-year South African degree, and implementation would enable local qualifications to restructure sufficiently to satisfy the current admission criteria for the Washington Accord. At a time when other South African qualifications are being downgraded in terms of international recognition (the medical profession lost its AAA rating some three years ago), the full international recognition of local engineering qualifications could be 'one (significant) small step' in the necessary procedure. Not only would the Washington Accord criteria be satisfied; the government, too, is keen to see a wider, more socially aware, emphasis in the engineering curricula. And, more importantly, this is at a time when all curricula should be undergoing a comprehensive overhaul and restructuring to meet the requirements of outcomes-based education. Finally, expansion and restructuring as described could also enable a clear-cut determination of the interrelationship of engineer, technologist and technician. Between the first two, there is an educational blurring that does not help – it is all too easy for a poorly taught university course to assume the profile of the highly practical technikon parallel course. This is most undesirable in a profession where the recognition and mutual respect of roles is essential.

Education, education, education

Of course, education in the formal sector is only the start of an engineer's professional life, and it is in continuing professional development (CPD) that another important aspect of profile enhancement can be achieved. The advances in the theoretical foundations of civil engineering in the past decade may be less breathtaking than those in electronics, for example, but those advances are none the less of relevance to the civil engineer, as are management tools, business economics, natural sciences and a host of peripheral but complementary disciplines. Proficiency in some or all of these would greatly enhance the ability of the engineer to take (perhaps retake) control of his profession, his career and his destiny. Fortunately, the concept of 'courses' of varying kinds has always been popular within the engineering fraternity, and it is probably more the effect of the economic downturn and the unfortunate crime statistics, rather than a paradigm shift, that has been signalled by falling interest levels over the past few years. CPD is currently focused on young engineers and their requirements during the training period.

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Montecasino project bursts out of the ground

Lilliecap Crutchfield's R145 million structural work for Tsogo Sun's Montecasino at Fourways north-west of Sandton is challenging from any number of aspects.

Both casino and adjacent retail mall will be enclosed in a 34 000 m² steel 'shed', the height of which is 15 m at the eaves and, due to the 5° roof pitch, more than 21 m at the apex. The shed is a portal frame in one direction and braced with diagonal bracing in the other. The complex will be built up to ground-floor level before the shed is put over it. The shed must immediately be stable on its own, and the construction of the buildings on and above ground floor will then start. The roof is double pitched and hipped, with parallel cored trusses. It will be drained with a Geberit Pluvia system.

Geology of the site, which slopes down to the north, is typical for the area: hillwash over residual granites and granite bedrock. For much of the development, piles to good founding material are required because of the wide range of loads called for by the designs. The covered parkade for 2 500 cars will be at the southern end of the site, where grading will reveal the bedrock and no piling will be needed. Progressing northwards, piles will be up to 12 m deep, because of the high terraces that will be created with backfill. Bearing capacities under the parkade are from 700 kPa to 1 000 kPa.

The concrete slab on which the Tuscan-themed retail area will be built will bear up to 3 500 kg/m², which means double-story buildings can be built on it with load-bearing brickwork or steel-frames with Bond-dek floors. The slab is 670 mm thick with 525 mm coffers. For the casino area, the slab is much lighter at 450 mm thick with 325 mm coffers.

The major issue is the facade around the outer limits of the shed; it has to be Tuscan in appearance, and it soars more than 34 m, hiding the roof of the shed. A permanent internal wall will be built to allow the facade itself to be removed and re-erected at a later stage without affecting the workings of the casino, should expansion be called for. The facade steps back at parapet level and supports more 'Tuscan' structures on a strip of reinforced-concrete floor or Bond-dek slabs varying from 1 m to 6 m in width. Designs for structures on top of the strip include a tower feature that is in itself 15 m in height.

For the 16 cinemas, reinforced concrete frames will be built before the roof is erected. For the cinema floors, the stepped slab will depend on a sur-

Educating civil engineers
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but from the point of view of development as well as morale, if all engineers began logging CPD days and hours, and all organisers issued certificates for courses attended, a different paradigm shift could well occur, one that would contribute significantly to the enhancement of the profession.

Civil engineering and its practitioners have played a leading role in the development of South Africa during this century, creating an infrastructure that is the envy of the continent, but this role is not confined to that period. In the preceding two and a half centuries consider the work done by military engineers - roads, bridges, water distribution systems and fortifications. And before them, for thousands of years, man and his predecessors have always had rivers to cross, water to extract, caves to protect. There are those who at their various levels of civilisation, education and training have always shared one unique talent: the envisionment of the outcome of their efforts. It is this ability to look into the future, to foresee the culmination of the design, that has set engineers apart, civil engineers in particular. In providing a home for the entire civil engineering profession, engineers, technologists and technicians alike, SAICE has become the custodian of this legacy, this talent, this vision, and the membership is the Institution. 'The profession is in crisis' - if this crisis should prove to be terminal, it is OUR responsibility, collective and individual. WE ALONE will have allowed it to happen.