Prof Peter Dunaiski: the driving force behind SANS 10160

As a youngster, Prof Peter Dunaiski avidly followed roadworks through Windhoek, Namibia, where he grew up. He, on own initiative, dug a dam in his parents' vast backyard to contain precious rainwater. In the early 1960s, that same yard served as venue for a self-styled athletics track where the avid sport enthusiast and his teenage friends held their own "Olympic Games". It therefore came as no surprise when he chose to pursue civil engineering after school. Throughout his subsequent career as academic and researcher in the Department of Civil Engineering at Stellenbosch University (SU), he made a lasting impression on the lives of three decades' worth of structural engineering students, and on construction in South Africa at large.

Prof Peter Dunaiski

At the time of his passing in 2011, aged 61 years, Prof Dunaiski was one of only a handful of Honorary Members of the Southern African Institute of Steel Construction. He was a Fellow of the South African Institute of Civil Engineering (SAICE), and of the South African Academy of Engineering (SAAE).

His research interests lay in experimental mechanics and steel construction, with a focus on design aspects of commercial and industrial structures. Prof Dunaiski completed his MEng (cum laude) in 1984 at SU by studying the response of pre-stressed concrete sleepers to torsional loading. His PhD followed in 1991, after he meticulously researched how flat slab-column connections of reinforced concrete respond to high-cycle lateral motion of low amplitude.

Prof Dunaiski is probably best remembered in industry as the first chair and "driving force" of the SABS TC 59-I Basis of structural design and actions national committee tasked with code development for the South African structural engineering practice. Prof Dunaiski oversaw the development and implementation of SANS 10160, implemented in 2010.

Colloquially known as the SA Loading Code, SANS 10160 is the standard to which structural design procedures and the work of structural engineers in South Africa is held. SANS 10160 provides the principles and design rules as well as the actions (loads) to be considered when buildings and similar industrial structures are designed and built. It sets out the ability of structures to sustain actions and maintain their integrity and robustness. This basis of design applies not only to the assessment of actions and their effects on a structure, but also to the provision of sufficient resistance in accordance with the materials-based design standards, e.g. for structural concrete, steel, timber and masonry.

The development of SANS 10160 started in 1999 after the South African National Conference on Loading (SA-NCL) in 1998 called for a major revision of SABS 0160 and the incorporation of Eurocode principles. At the time, South Africa was building according to British standards, while European Union countries were using Eurocode standards since 1989.

“Much effort was spent to marry the comprehensive nature of the Eurocode with the specific needs of a South African Loading Code. This opens the door to future cooperation and the use of parts of Eurocode in situations where there is no equivalent South African code,” Prof Dunaiski and SU colleague Prof Johan Retief explained the rationale followed, in an article in the *Concrete Beton* journal in 2011.

The revision process saw existing procedures and loads models being updated and extended, and new procedures introduced, for instance with regards to geotechnical design. Wide range supporting research, investigations and calibration were done. The mammoth task, which provided for local conditions and practice, took more than a decade to complete. All work was done voluntarily with great commitment to standards and quality by experts across South Africa (including many SU researchers), but without any real budget for experimentation provided.

An obituary in *Civil Engineering* noted that as chair, Prof Dunaiski was not only the “chief” that lead the committee developing new structural design standards, but also “cook and bottle washer”. He championed four of the eight Parts of SANS 10160: those related to self-weight and imposed loads, actions induced by cranes and machinery, thermal actions, and actions during execution.

The obituary, by Prof Retief, also remembers Prof Dunaiski for his “impeccable integrity, dedication to his responsibilities or the tasks he had set himself”, and his loyalty “to everybody in whom he had placed his trust”. These attributes were supported “by a sharp intellect, an eye for detail and an incredible capacity for work”.

Except for three years in private practice in the mid-1970s as a design engineer at Van Wyk & Louw Consulting Engineers in Pretoria and VKE Consulting Engineers in Windhoek, Prof Dunaiski dedicated his whole career to the SU Department of Civil Engineering. These links were forged when in 1970 he enrolled as a first year student, and subsequently received all his degrees from SU. After initially taking up a research assistant position in the Department in 1978, he subsequently moved through the academic ranks. In 1991 he was appointed as professor in structural engineering in the Iscor Chair of Steel Construction – an appointment that signalled his strong links with industry.

In the SU Department of Civil Engineering, his lasting contribution was the establishment and implementation the first civil engineering informatics programme in the 1980s. The German *Bauinformatik* approach was followed in introducing this fundamental mathematics and computer based sub-discipline to the undergraduate curriculum. Current SU students follow Engineering Informatics modules in their second and third year. It introduces them to the basic concepts of object-orientated programming, engineering applications of machine learning, data analytics, discrete simulations models, and how to solve issues such as boundary value and finite element object problems. They can also pursue postgraduate research in Structural Engineering and Civil Engineering Informatics.

During his years at SU, Prof Dunaiski served as chair of the Department of Civil Engineering (1998 – 2003) and as vice-dean: teaching (2009 – 2011) of the Faculty of Engineering. He was head of the Division of Structural Engineering and Informatics and director of the SU Institute of Structural Engineering (SU-ISE). He established the Centre of Development for Steel Structures (CDSS) under the SU-ISE in the late 1990s to further postgraduate scientific research and teach specialist

structural steel design. The Centre, which was closed in 2021, served as a valuable home not only for research and the furthering of scientific know how about specialised structural steel design, but also for provision of a space to train a further generation of structural engineering researchers.

Prof Dunaiski was born in Windhoek, Namibia on 8 March 1950, and passed away in Stellenbosch on 14 September 2011. He was married to Irmel and had three daughters. The youngest daughter, Prof Wibke de Villiers, followed in her father's footsteps as a professor in the SU Department of Civil Engineering.

Caption:

Prof Dunaiski enjoyed the outdoors, photography and sport. In his later years, he regularly served as umpire during the annual cricket match held between students and staff of Civil Engineering.