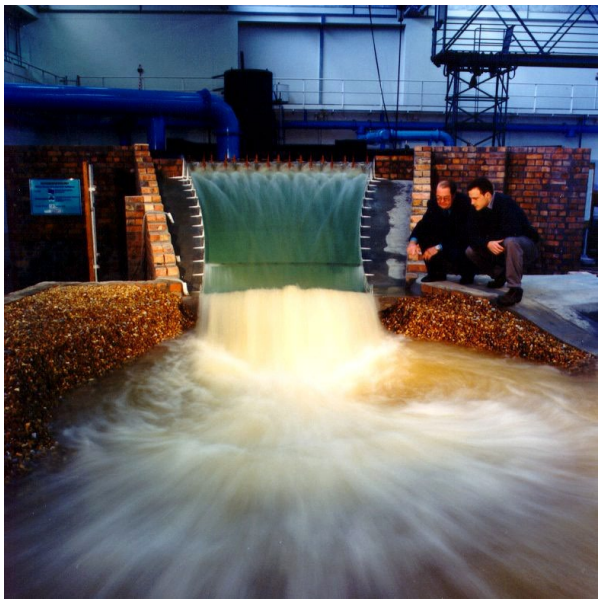
Prof Albert Rooseboom: an internationally renowned expert on dam siltation



Caption: *Prof Albert Rooseboom (left) with Dr Andre Bester (former DWS) during one of his last major model studies at the laboratory (1998–1999). The 1:60 scale model of the Maguga Dam in Swaziland featured a labyrinth spillway, designed for a discharge capacity of 11,000 m^3/s.*

In his time, the late Prof Albert Rooseboom was an internationally renowned professor of hydraulic engineering and an exceptional source of knowledge on how volumes of sediment discharged by Southern African rivers can silt up dams and damage bridges. Through applied models and designs, he addressed or mitigated the impact thereof on numerous dams. In addition, this former lecturer in civil engineering was a big advocate of the use of fish ladders to promote the movement of fish through river and dam systems. He also did work on ways to deal with the build-up of litter in the country's water reservoirs.

Prof Rooseboom, a Stellenbosch University (SU) alumnus, was born on 23 March 1941 and passed away on 13 August 2016. He completed his undergraduate studies in 1963, after which he joined the then Stellenbosch District Council as a road engineer. From 1966 onwards he spent two formative years in the Netherlands at Rijkswaterstaat (the Dutch government agency responsible for the design, construction and management of primary infrastructure), where he learnt more about water engineering at their laboratories in De Voorst in the Noordoostpolder. In 1968 he obtained a master's degree *cum laude* in coastal and river engineering from the Technical University of Delft.

Back in South Africa, appointments at the South African Fisheries Development Corporation and the company of P Serritslev followed. His career as a focused academic and valued supervisor began in 1970 with an appointment as lecturer at the University of Pretoria (UP), followed by 12 years as a professor. He received the opportunity to complete his doctoral thesis at UP in 1975, on how sediment moves through dam basins. In 1988, after almost 20 years in academia, he was appointed as a director at the consulting firm Ninham Shand.

Prof Rooseboom returned to academia in 1990 when he was appointed as professor of civil engineering by his alma mater. With this, he became the 531st professor at SU. Along with his wife Elbe and their family he moved to Stellenbosch. At the time of his appointment, *Matieland* magazine noted that he was by then already regarded as an international expert in the field of dam siltation, and that he often travelled internationally to give guest lectures.

During these years he set up a specialist consulting firm, Sigma Beta, and was invited by the American Federal Energy Regulatory Commission to give three lectures in the USA. In 1995 he was asked by the South African Minister of Water Affairs to serve as a member of the Water Research

Commission (WRC) which is responsible for the strategic planning, initiation, funding and coordination of South African water research projects. From time to time he also served as expert witness in court cases focusing on water matters.

Prof Rooseboom formally retired in 2002 due to health reasons but continued research work and was involved in the activities of his postgraduate students as an emeritus professor until 2008. One of his last MEng students thanked him in his thesis for his guidance and patience, and in particular his “willingness to teach others”.

In his time Prof Rooseboom was a member of the South African Academy of Engineers and executive committee member of the South African Institute of Civil Engineers (SAICE). He was a member and later also chair of the committee on reservoir sedimentation of ICOLD, the international committee on large dams, which was established in 1929 as a forum for the expansion of knowledge and experience in dam engineering. Prof Rooseboom often attended related ICOLD congresses and meetings overseas. In addition, he was also a valued and active member of SANCOLD, the South African branch of ICOLD.

One of Prof Rooseboom’s greatest contributions was the development of a mapping system on the sediment yield of South African rivers. “A sediment yield map of Southern Africa” was published in 1992. He was also one of four experts from either the Institute for Water and Environmental Engineering (IWESU) of the SU Department of Civil Engineering or the Agricultural Research Council (ARC) who worked on *Sediment Yield Prediction for South Africa: 2010 edition* between 2007 and 2010, on behalf of the WRC.

The four experts wrote as such about the need for an updated version: “Continuous improvement of sediment yield prediction methods is necessary in the wake of changing environments, more data, increased experience and current technological advancements in the sedimentation field. Improved sediment yield prediction methods are essential for sound land and water resources management decision making with respect to dam development and environmental management in the wake of current population increases that are putting a strain on available land and water resources.”

Prof Rooseboom was a practice-oriented researcher who completed dozens of studies on sediment accumulation in specific reservoirs and river erosion, and devised designs on how to limit scour and erosion in numerous rivers, estuaries and harbours. He conceived stormwater systems and determined the flood lines of more than 20 rivers, conducted calibration studies for existing and new flow measurement structures in South Africa, Lesotho and Namibia, and completed projects along the local coastline and in the Netherlands.

He had a hand in the design of various South African dams and water systems, including the hydraulic design of hydro-dams in the Mtata River and the canal system, structural and hydraulic design of the Leeuw River Dam and hydro-dams. He was also involved in designing the Bafokeng stormwater outlet system. Another of his focus areas was the upgrading of measuring weirs.

During his career, Prof Rooseboom prepared a manual for the then Department of Transport on specific hydraulic aspects important to the hydraulic design of bridges and the drainage of roads. In addition, he also assisted a government committee concerned with the management of roads on

the hydraulic design and maintenance of river crossings. Much of this information was later included in a manual on drainage designs for the South African Roads Agency, SANRAL.

He completed modelling studies for dozens of bridges over rivers. This allowed for the drawing up of design guidelines with which to limit erosion at bridges over rivers such as the Zwartkops, Mfolosi, Mhloti, Mtambinyoni and Illovo along the East Coast. Fixed and movable riverbed hydraulic model studies applicable to, for example, the Tugela, Gouritz, Mvoti and Mzimkulu rivers were also completed.

Some of the very last projects in which Prof. Rooseboom was involved were the design of a special measuring chute to limit the continuous silting of weirs, and the modelling and design of a labyrinth-type spillway and ski jump for the 800 000 cubic metre Maguga Dam in Swaziland. The latter was funded by the World Bank.

He did not only contribute research articles to professional journals, but also until well into his retirement years shared his practical knowledge with a wider audience through regular contributions to the WRC's *Water Wheel* magazine. Some of the last articles on which he collaborated for this publication appeared in the late 2000s. These focused on ways to limit the build-up of debris in stormwater systems and streams, and the impact of floods on the biodiversity of Western Cape rivers with rocky bottoms.

In 2009, Prof Rooseboom was one of 25 experts to receive special centenary medals from the South African Academy of Science and Arts (also known as the "Suid-Afrikaanse Akademie vir Wetenskap en Kuns") in recognition of their outstanding local and international work over 30 years or more. The commendation read out during the presentation ceremony praised him, among other things, for the more than 30 physical model studies he carried out in the laboratory with which to predict and better design sediment profiles of dams and their outlets. It also referred to his work with fish ladders: "He was also involved in writing a manual on the planning, design and operation of fish ladders at dam outlets. Such ladders enable fish to move upstream past a dam outlet".

Prof Rooseboom also received a honorary award from the Institute of Civil Engineering (SAICE) in 1994, and was named Researcher of the Year in the 1990s by the SU Faculty of Engineering. In 2011 he was one of four local experts who received SANCOLD's first special awards for their exceptional contribution to the organisation and the South African dam industry.