

Paper Number: 2709

Appropriate investigation of dolomitic areas

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In a recent assessment of the geotechnical industry in South Africa, Day [1] notes that, despite a history that it can be proud of, there is a strong tendency for good practice, and even standards, to be ignored when carrying out geotechnical investigations in the present day. He offers several reasons for this happening noting that engineering services are generally regarded as a commodity. In short, it has become such a competitive environment that professionals are willing to gamble on their experience and the large database of knowledge that exists to provide cheap solutions.

Having discussed the state of the art and the reasons for the decline in the standard of investigation, Day goes on to identify three things that can be done to improve the situation; education, regulation and peer review. In his discussion of these three elements, he notes that dolomitic investigations are one of the areas in which education and regulation are well supported, highlighting in particular the standards set in SANS 1936:2012 [2] and SANS 634:2012 [3]. It should be noted that SANS 1936:2012 also provides for peer review in situations where the governing authority is in disagreement with the findings of the consultant, or vice versa.

From the above it would appear that investigations in dolomitic areas should be shining examples of efficient geotechnical investigative and reporting techniques. It is the experience of the authors that this is not necessarily the case. Two areas in particular are considered to be problematic. The first, also identified by Day as a problem, relates to the timing of design level investigations, or classifications, in housing projects. This currently occurs after the developer has sold the stand, often leaving the new home owner with an unexpected financial burden relating to investigation costs and the very nasty possibility that the stand may not even be useable for the purpose for which it was bought.

The second area of concern relates to the nature of the investigation undertaken. In most cases, and again this is very much related to the commercially competitive environment in which geotechnical professionals operate, investigations are carried out by applying the minimum requirements set out in the standards. This has resulted in proper terrain evaluation processes, which have been in use since the 1970s, being disregarded. Terrain evaluation is an iterative process which may require more than one level of investigation before a definitive geological and geotechnical model can be produced.

This paper argues that exploration of dolomitic areas requires different techniques depending on the nature of the overburden and the depth to bedrock. By applying terrain evaluation processes properly and by using appropriate techniques a far more precise evaluation of the hazard level, with respect to the potential for sinkholes and subsidences to develop, may be arrived at. These techniques may relate to variations in the spacing of the gravity survey grid, additional geophysical investigations, trenching as opposed to percussion drilling and more precise characterisation of the overburden through the use of in-situ and laboratory testing.

References:

[1] Day P (2015) SAICE Civil Engineering 23(11): 14-17

[2] SANS 1936 (2012) Development on dolomite land, Parts 1-4, SABS

[3] SANS 634 (2012) Geotechnical Investigations for township development, SABS

