

C25 Glossary

C25 has concluded that important distinctions need to be drawn between the models that engineering geologists use and has differentiated the following types of model:

- The *Conceptual Engineering Geological Model*. These are typically the first model type generated in a project and are developed from pre-existing information based on geological concepts within a general context of civil engineering. They potentially involve a relatively high degree of uncertainty which is directly related to the type and amount of existing data and the knowledge and experience of those involved. However, when such models are proficiently developed they provide an extremely powerful tool for appreciating and communicating what is known about a site, what is conjectured and where significant uncertainties may remain. Conceptual models should be established as soon as practical at the beginning of a project. Depending on the type and scale of the project multiple conceptual models may be generated to evaluate specific engineering geological issues. They should be refined as site-specific data becomes available and additional models may well be required as new data is acquired. The success of this approach is strongly dependant on the knowledge and experience of those involved in creating the models
- The *Observational Engineering Geological Model*. These are typically created from information generated during the site-specific ground investigation and are constrained by observational and measured data and should present geological information in space or time. They should verify or refine the conceptual engineering geological model. In particular, they should focus on potential engineering issues identified in the conceptual engineering geological model but about which little or nothing is known for the specific site. Observational engineering geological models are particularly relevant at the engineering design stage. Later stage verification and refinement of the observational engineering geological model should take place during construction. If observational models are developed initially using high quality conceptual models, the uncertainties associated with observational models should be reduced. However, the derivation of an

appropriate observational model is still dependent upon the knowledge and experience of those involved.

- The *Analytical Model*. This model is used to interpret how the ground is likely to behave when it is impacted by the engineered project during the construction process. Analytical models are likely to vary considerably depending upon the nature of the ground, itself, and the particular engineering process being applied. Engineering geological parameters such as shear strength, hydraulic conductivity, and deformation modulus have to be understood and provided in a suitably simplified but realistic framework for analysis, i.e. in terms of their distribution within the observational models.