

Digital Data for Engineering Geology: Disaster or Benefit

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are digital data for engineering
geology

a disaster or a benefit ?

Before the digital era:

- nobody had much interest in the accuracy of data interpolation and interpretation (however, strange enough, accuracy of data was always regarded as important)
- nobody had much interest in the accuracy of geological maps

consequently
for the average site
investigation in
engineering geology:

- accuracy geological model largely unknown
- accuracy of geotechnical model of the underground largely unknown

side effect:

nobody asked for the accuracy; the interpretation and modeling was done by hand and it was clear that calculating the accuracy was impossible

in the digital era:

- accuracy data interpolation and interpretation is regarded as of major importance
- consequently, the accuracy of geological maps and geological models become major topics

options to solve the accuracy problem:

more data

hence:

if modern digital modeling techniques are
used it results for the average site
investigation in more work and is
more costly

are there benefits of the more
costly approach ?

not really

site investigations do not seem to become a
lot better if made with more data in a
computer model compared to the traditional
site investigations which are largely based
on geological interpretation

side effect:
the clients (generally civil engineers)
start asking questions about
accuracy of the geological model:

answer: it looks good !!

this confirms then the existing ideas
about geo-fantasy
(and geologists in general)

hence:

either:

more work and more costly

or:

we show that geological models cannot be justified mathematically and have to admit that often they largely depend on geological expertise

result: disaster

Digital data totally useless in engineering geology ?

Digital data handling and modeling techniques can only find a place in engineering geology if:

- the results are considerably better than the traditional hand-made interpretations and hence result in better site investigations (read: smaller site investigations) and lead to cost reduction for the total project
- have other benefits over traditional hand-made interpretations

the accuracy problem:

mathematically justify geological model
and
quantify accuracy geological model

mathematically justify geological models

major task which is unlikely to be achieved
in due time

alternatively:

identify the expert knowledge which is
generally used for making a geological
model; store this in a database so that a
geological model can be referenced to a
general model rather than only the expertise
of a single geologist

quantify accuracy of geological model

if a widely accepted database exists the accuracy of the model can partly be referenced to the database (and is likely to be better accepted than just “it looks good”)