A Review of Attitudes towards Sharing Geotechnical Data and the use of Geospatial Data Portals in Hong Kong and the UK: Lessons for Europe

Patton, A.M.

1. Introduction

Reusing subsurface data cuts time & financial costs of site investigations & reduces uncertainty about ground conditions that can result in delays & overspend.

Hong Kong has a data sharing culture. Consultants deposit GI data with GEO who make this & other datasets publically available for desk studies. Existing knowledge about an area prior to site-specific works provides for preliminary conceptual ground models & allows targeted GI.

The UK has recently seen a rise in data sharing. BGS holds donated GI data & makes boreholes available online. Establishing ASK networks has increased collaboration but reticence still exists.

2. The Geotechnical Engineering Office (GEO)

GEO, part of the Civil Engineering Development Department (CEDD), was formed in 1977 as a regulatory body concerned with planning, construction & maintenance of slopes (Ho & Lau, 2008) & responsible for geotechnical engineering activities related to development & land use.

3. Data Availability

The Civil Engineering Library at GEO contains >164,000 items including periodicals, books, manuals, standards, codes of practice, geotechnical reports, maps, & public/private development documents. The Geotechnical Information Unit houses geotechnical data from GIS carried out for public/private developments. GEO's Aerial Photograph Library contains >310,000 black & white, colour & infrared images dating back to 1924, with annual coverage from 1972 (CEDD, 2014).

4. Online Portal

Geotechnical Information Infrastructure (Ginfis) is GEO's online spatial data portal. A GIS-based system, it is searchable by data type & geographical area, & provides users with existing data about their sites.

5. Available Datasets

- Ground investigation (GI) reports
- Borehole logs
- AGS data
- Geophysical surveys
- Laboratory test data
- Piezometric monitoring data
- Landslip record cards
- Natural Terrain Landslide Inventory
- Historical Landslide Catchments
- Boulder field inventory
- As built & engineered slope records
- Engineers' slope maintenance records
- LIDAR data
- Aerial photographs
- Geology maps
- 3D Geological Models & their Hydrogeological Applications: Supporting Urban Development: a Case Study in Glasgow Clyde (Clyde 3D superficial model (Campbell, et al., 2010))
- GSPEC front page for data deposition (http://afar.bgs.ac.uk/gspec)
- Integration of geotechnical data & models within BIM
- Users can influence outputs from the models, improving usability
- Establishes a standardised data transfer to a GIS for integration & interpretation of data with access to raw data & interpretation. It is used to create thematic maps & geosphere models & identify geohealth hazards. (CEDD, 2014)

6. Geological Modelling System

A GIS for integration & interpretation of data with access to raw data & interpretation. It is used to create thematic maps & geosphere models & identify geohealth hazards. (CEDD, 2014)

7. The British Geological Survey (BGS)

Unlike GEO, BGS is not a regulator but provides the UK with impartial expertise about geoscientific data deposited by public & private sectors (usually voluntarily) & where possible makes these available to a range of users. Some datasets are accessible through the Geology of Britain Viewer (Fig. 3) & BGS apps.

8. Accessing Subsurface Knowledge (ASK) Networks

- ASK Networks are free, regional partnerships between BGS, local authorities & industry providing a platform for subsurface knowledge exchange between partners
- BSG was the first area of the UK to have an ASK Network. Cardiff followed in 2015
- ASK Networks facilitate data deposition, flow & re-use between member organisations
- Signed up members who deposit data have access to data deposited by others
- Establishes a standardised data transfer to a central repository (GSPEC), based on AGS
- Updated, attributed BGS 3D geological models visible to member organisations
- Users can influence outputs from the models, improving usability
- Integration of geotechnical data & models within BIM

9. BGS 3D Geological Models

- 3D models show geological units
- Attributable with material properties
- Cross sections & slices drawn across models
- Predictive boreholes made from the data

10. Data Sharing in Europe & Beyond

- City regions exist throughout Europe
- 38 COST countries - European framework cooperation of researchers, linking science & policy INSPIRE/PSI Directive - EU spatial data infrastructure for public sector data
- OneGeology - aims: supply global geoscience data, increase geology profile & skills exchange
- OneGeologyEurope - Aims by 2020 to make geological data from European geological surveys accessible & sharable through a common European Geological Knowledge Base EGDI - a structure for harmonising & utilising data from European geological surveys for policy, industry & public stakeholders, including raw & interpreted data
- Many countries have their own local data sharing initiatives/portals

11. Volunteered Geographic Information (VGI)

VGI is the use of the Internet to collect & disseminate geographic information supplied by users voluntarily (Goodchild, 2007). A form of citizen science, demonstrated by OpenStreetMap, contributors supply georeferenced data & suggest interpretations, made visible to other users.

12. Conclusions

- Reuse reduces time, cost & unforeseen ground conditions whilst increasing knowledge
- Land pressures & landslide risk in Hong Kong have required subsurface knowledge of good quality & quantity to be readily available. 40 years of data make it an example of best practice
- BGS working to get subsurface data recognised in national planning & procurement processes
- Work with Scottish Government to develop the UK's first subsurface planning guidance
- Montreal, Helsinki & Singapore have subsurface planning but there has been no national adoption of planning approaches & data use so reservations are still present
- EU is working well to develop data sharing but it is sometimes focused on public sector only
- Reluctance to share data comes from issues surrounding confidentiality, competition & time
- Hong Kong realises denoting data provides access to much more data from others
- Some countries are better than others but a combined approach may yield best results
- Developing data hubs is 'an endeavour to change institutional culture' & some might be sceptical in sharing data in the past, are more willing to share their data &...