3D Cadastre in the Case of Engineering Objects, such as Bridges and Road Viaducts

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Introduction

- **Last discussion topic** in the group of authors:
  Dealing with subways – different solutions in different countries
- **Findings**: mainly modelled in 2D, superficies solo cedit, sometimes large disadvantages for land owners, case of Sweden shows one solution
- Solutions seems to be unsolved in cities ➔ How about bridges and viaducts?

Why bridges

- Already discussed in the past (e.g., Yu et al., 2012)

Bridge connecting Hong Kong with the China mainland
(Photo: G. Navratil)

- Typical problem around the world (navigation networks)

Bridge crossing the Blue Nile in Ethiopia
(Photo: G. Navratil)

Approach

- Collect information from all countries represented by the authors

- Compare the situation in the different countries (in alphabetical order)
  - Austria
  - Bulgaria
  - Czech Republic
  - Croatia
  - Greece
  - Greece
  - Slovenia
  - Sweden

Austria

- Bridges not shown as cadastral parcels, only land use
- Easement in land register

Europabrücke
left: (Von Mnolf - Eigenes Werk, CC BY-SA 3.0, 2013)
right: (Source: BEV)

Bulgaria

- Bridges are no cadastral objects – may or may not be depicted

Luvov most and Orlov most in Sofia
(Source: www.isofmap.bg)

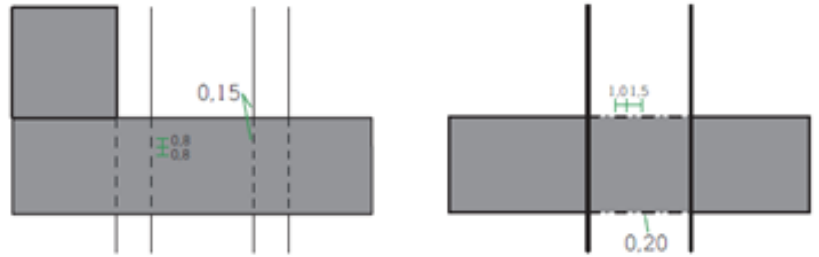
Czech Republic

- Some 3D objects schematically displayed on cadastral map, not officially registered
- Bridges typically not shown

Highway bridge near Pilsen
(Source: Czech Office for Surveying, Mapping and Cadastre)

Croatia

- Topographic signs showing 3D situations
- Pelješac bridge connecting a peninsula with the mainland not registered



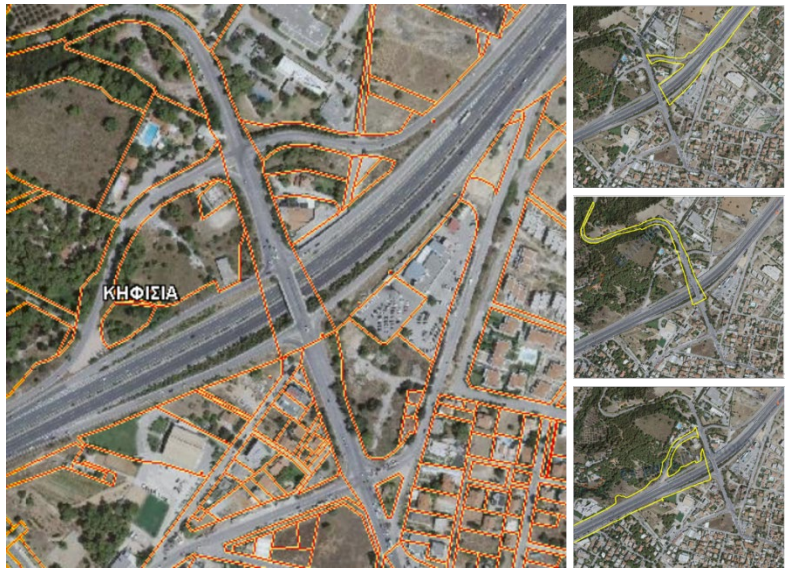
Passage under the building

Building over the road

(Source: euronews.com)

Greece

- Land owner obliged to provide land for bridges (with compensation)
- Bridges and viaducts public space



Viaduct in the region of Attiki in Greece
Left: Represnetation in cadastre
Right: Real property units
(Source: Hellenic cadastre)

Poland

- Bridges documented in database of topographic objects
- Bridges not registered in real estate cadaster

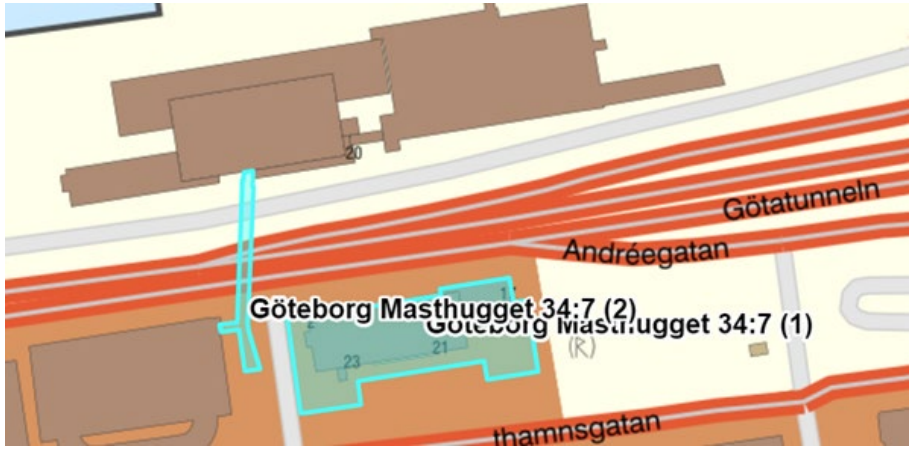
Slovenia

- Bridge and land below bridge have the same owner(s)
- Legal challenge not solved yet

Land parcel structure for the case of bridge:
Green: Land parcel boundaries
Red: Boundaries of cadastral municipalities
(Source: Surveying and Mapping Agency of the Republic of Slovenia)

Sweden

- 3D property objects possible since 2004
- For each 3D property unit, the type of space is indicated (e.g., bridge)
- 15 bridges registered (Sept. 2021) – however, no pure 3D objects



3D real property consisting of two parts:
Left, no 34:7 (2): Bridge
Extract from the Swedish Digital Index Map.
Lantmäteriet

Lessons Learned

- Out of the 8 countries only Sweden has registration of 3D property
- Various approaches in other countries
  - Legal connection (easement)
  - Separate parcels
  - Distinction by land use
  - Separate topographical objects
  - Documentation outside of the cadastre
  - Ignorance
- All approaches seem to work

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Thank you!