

# Eurocode 7 – A Croatian approach to EC 7-1 and to the National Annex

Vlasta & Antun Szavits-Nossan  
University of Zagreb, Croatia

PRAŽSKÉ GEOTECHNICKÉ DNY 2006, Workshop on EC 7-1  
Praha, 22 – 23 May 2006

# Overview

- ▶ Introduction
- ▶ Present status of Eurocodes (ENV “Concrete” Package)
- ▶ Status of Eurocode 7 (EN not yet implemented)
- ▶ EC 7 in practice
  - Marginal penetration into practice
  - Designers
  - Soil-structure interaction and Design approaches
- ▶ Conclusions

# Introduction

- ▶ Implementation of Eurocode 7
  - Various seminars on Eurocodes started in mid nineties, recently with increasing rate;
  - Initiative mostly came from academia with lukewarm response from designers despite their strong dissatisfaction with existing Croatian building codes;
  - National standards body offered limited administrative support (no financial means for analysis, translation, editing);
  - Government overtook the initiative only recently and with limited success.

# Present status of Eurocodes

- ▶ The package of EC related to concrete structures became available as a Croatian pre-standard in 2005:
  - ENV 1991, ENV 1992, ENV 1997, ENV 1998;
  - The main cause for delay: determination of local conditions on wind and seismic loading;
  - A building regulation will enforce the use of the package from July 2006 although in EU countries ENV-s have been replaced by EN-s!

# Status of Eurocode 7

- ▶ Published as a Croatian pre-standard in December 2001 as the first in the series of Eurocodes:
  - HRN ENV 1997-1, HRN ENV 1997-2, HRN ENV 1997-3;
  - Adopted bracketed values of partial factors from the original ENV 1997-1;
  - Published in English (Croatian translation was on the way);
  - Could not be implemented until 2005 when the whole package for concrete structures became accepted as Croatian pre-standard;
  - Supporting standards (Execution of special geotechnical work) have not yet become Croatian standards.
  - Discussion on National Annex for EN 1997-1 did not yet seriously start.

# EC 7 in practice

- ▶ Marginal penetration among designers:
  - Geotechnical engineers are used to rely more on judgment than on codes;
  - No translation of the Code available and no supporting literature;
  - Implementation of EC-s, particularly EC 7, requires a considerable effort by designers;
  - The situation may soon change when the use of EC-s becomes mandatory;
  - Many questions arise.

# Designers

- ▶ Geotechnical and structural design vs. geotechnical and structural engineers
  - Many different geotechnical structures with different design approaches and abundance of partial factors require increased design effort and expertise (and may divert attention from real geotechnical problems); practicing geotechnical engineers would need some help or guidance;
  - In many small companies structural engineers design foundations; they would need assistance and guidance to proceed with their business;

# Soil-structure interaction vs. design approach

- ▶ Anchored retaining walls with nearby structures, pile raft foundations, underground structures in urban areas, etc: Which design approach is most appropriate?
- ▶ Should a country decide on a single design approach for a class of geotechnical structures?
  - Should the same design approach accommodate conventional as well as nonlinear soil-structure-FEM calculation models?
  - Which design approach to use (DA-1, DA-2 or DA-3)?  
Is DA-3 theoretically the most correct approach?;
  - Problem of adoption of existing computer programs?

## Examples from Designers' Guide to EN 1997-1 (Frank et al. 2004): Design approach vs. conservatism

Type of structure	DA-1	DA-2	DA-3
Pad foundation, pile	1	2	2
Gravity wall	2	1	2
Embedded sheet pile wall (dependent on the calculation model)	1	2	1
Overall (slope) stability	1	2	1

1 – less conservative; 2 – more conservative

- ▶ Conservatism (risk?) of a Design approach depends on:
  - type of structure or part of structure, type of calculation model, type of limit state, type of ultimate limit state (GEO, STR,...), ...;

# Conclusions

- ▶ Implementation of Eurocodes in Croatia is in its infancy;
- ▶ Croatian engineers would certainly benefit from a modern international structural code in the long run, but in the meantime they would need as much guidance and support as they can get;
- ▶ Experience from other countries would be most helpful.