

Ground investigations in Finnish and Nordic road projects

**Suggestions for development based on
NVF-questionnaire and Finnish experience**

prepared by

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Background

- Poor ground investigations are often identified and criticised as one of the main causes of failures in road projects
- Good ground investigations are essential for economical and environmentally sound solutions

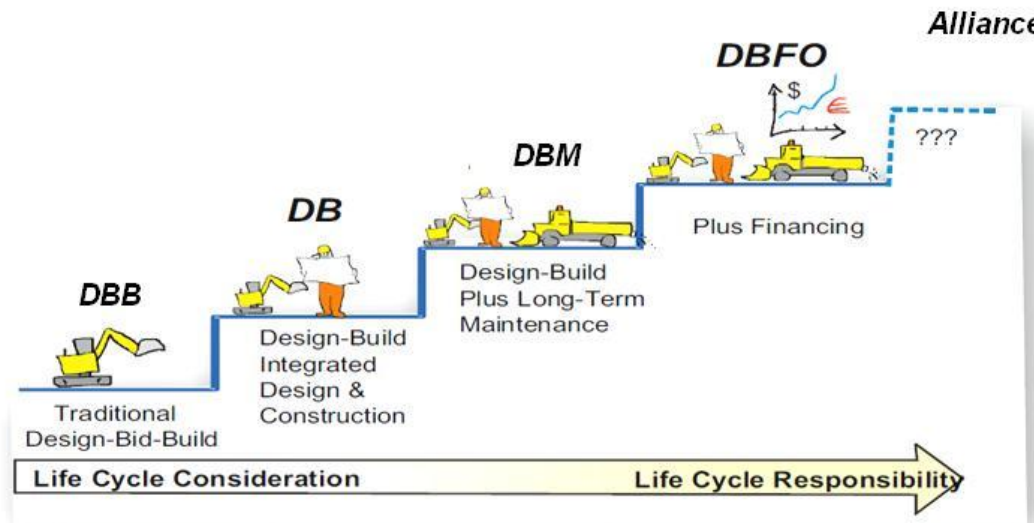
Goals

- To compare Nordic practices in conducting ground investigations in road projects
- To find common ways to improve ground investigation practices

Ground Investigations for Road projects

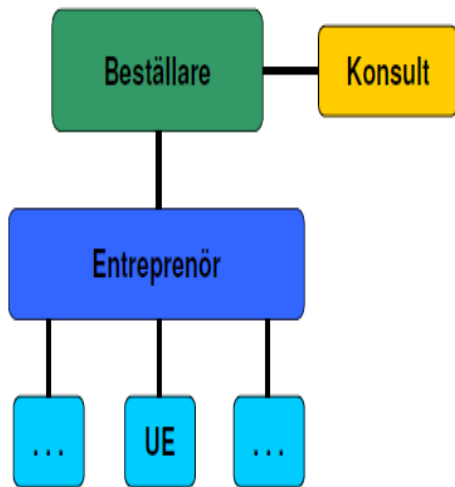
1. Introduction
2. New procurement models – new challenges on ground investigations
3. Ground investigations in Nordic road projects - current state of art (www –questionnaire)
4. Some proposals for improvement of practices
5. Conclusions

New procurement models - challenges to ground investigations



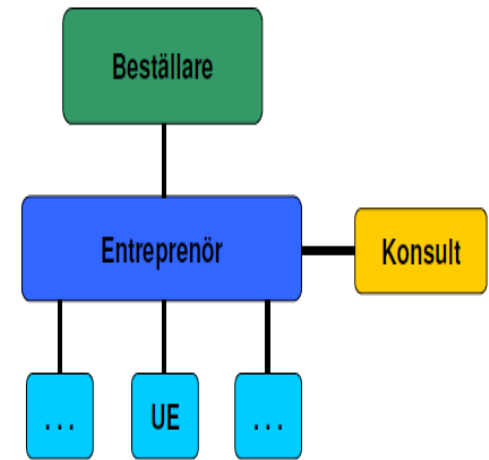
- Goals:**
- Better productivity
 - More incentives for innovations by contractors and consultants
 - Towards lifecycle responsibility
 - Better risk management

Design – Build method in Finland



Traditional DBB

Contractual relationships

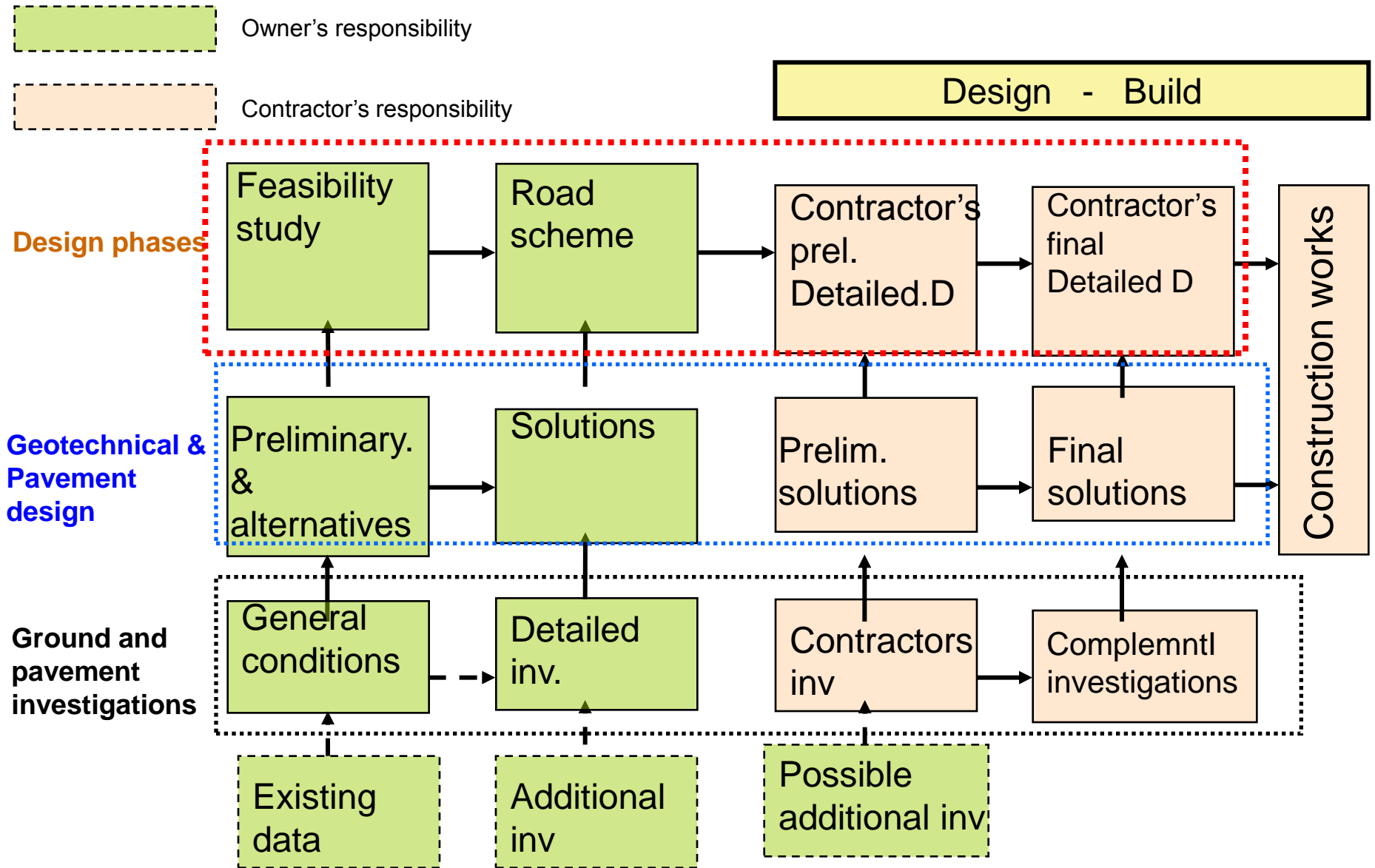


Design & Build

Key elements of the successful DB -project

- Innovative contractor and his innovative consultant
- Attractive incentives for innovations (bonuses etc.)
- Excellent ground investigations
- Well planned performance specifications and outcome criteria

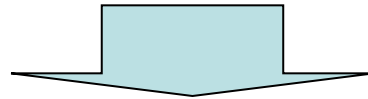
Responsibilities in DB projects



Finnish Workshop 2011: Challenges for ground investigations in DB, DBM

Owners investigations should be comprehensive and made in detail

- Tight time schedule of bidding – no time for any additional investigations
- Innovations and economical solutions require detailed data
- Contractor's risk premiums can be very high without reliable data
- All relevant solutions should be able to design
- Existing structures condition
- Old investigations usability should be evaluated by owner



Conducting GI in phases is not possible

All information available

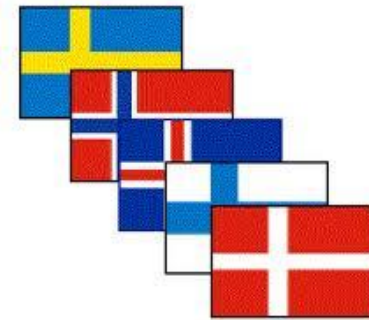
- proper documentation and presentation

Ground investigations in Nordic road projects - current state of art

www – questionnaire carried out in March - April 2011

Finland	48	(79 % of all)
Sweden	6	
Iceland	3	
Denmark	3	
Norway	1	

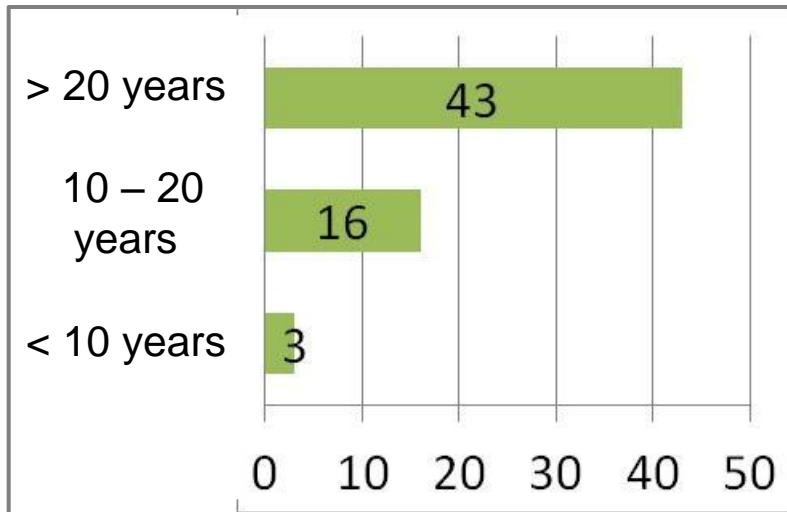
61 replies in total



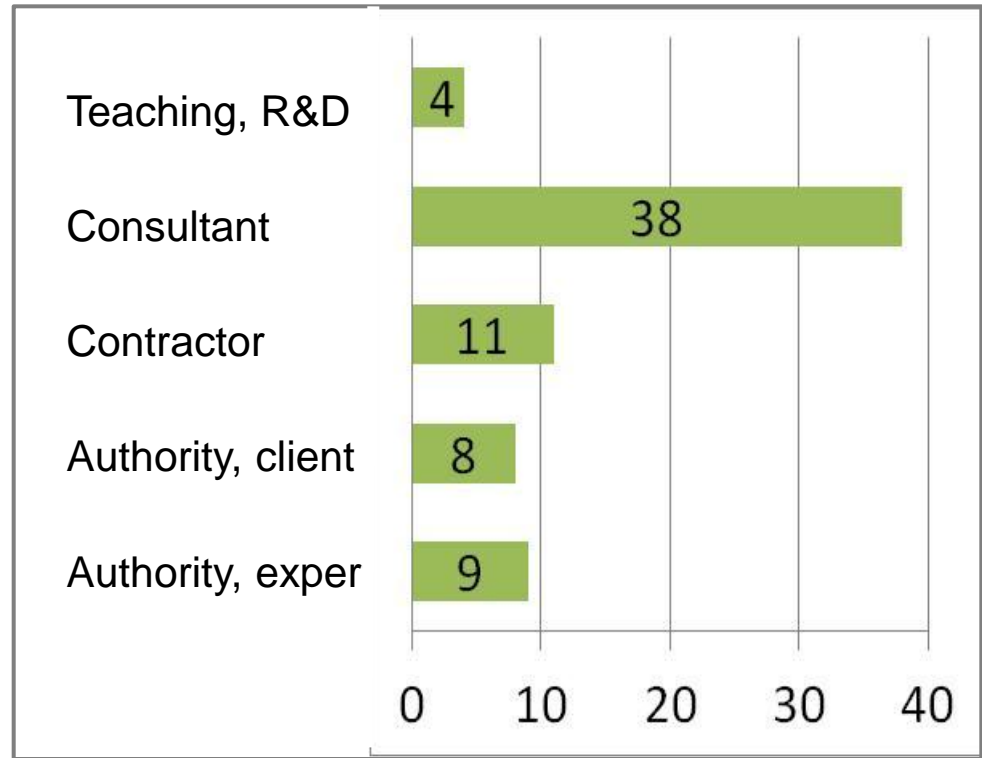
Questionnaire only revealed small differences in opinions between Finnish and other Nordic colleagues.

It was not possible to make a meaningful comparison between countries.

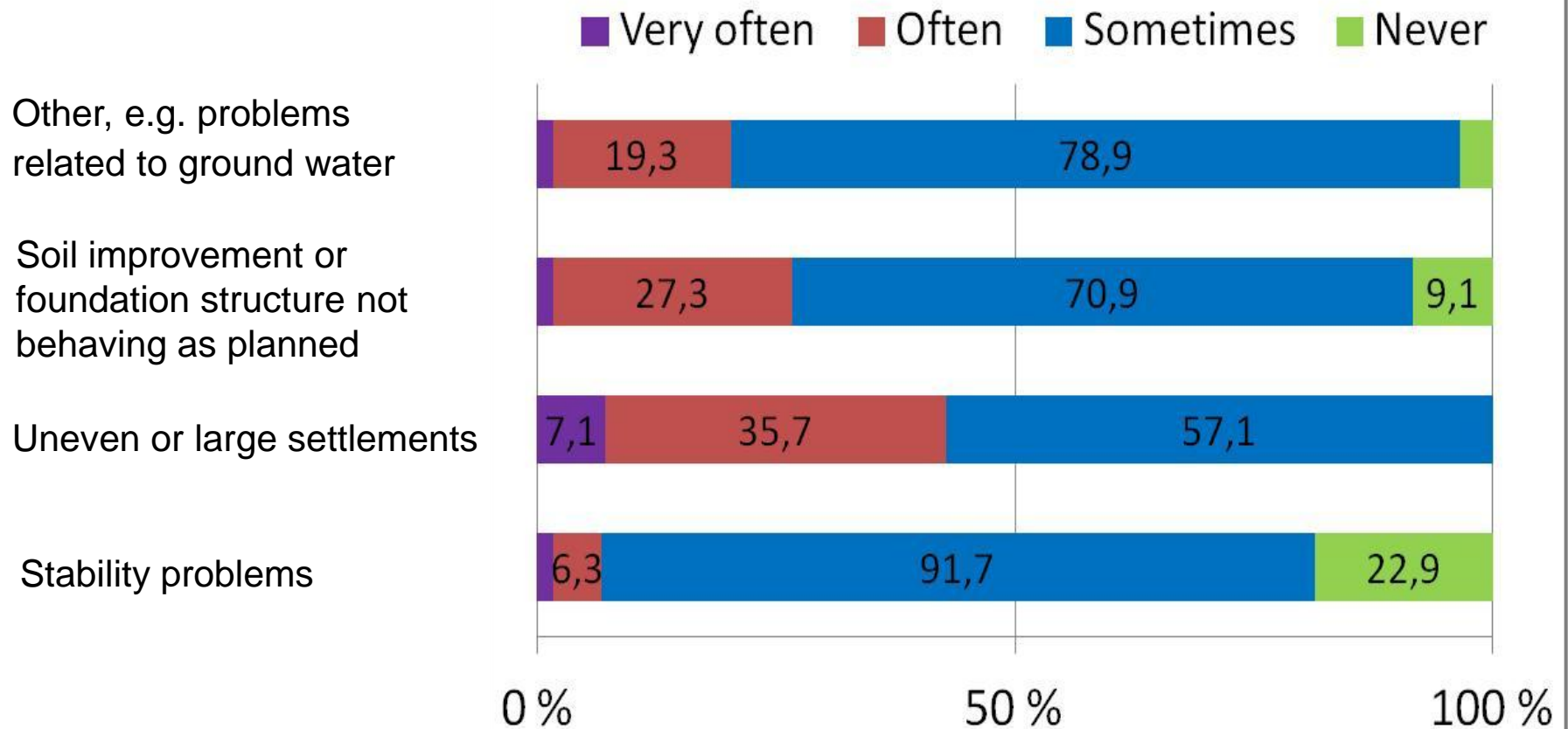
Professional experience



Professional background

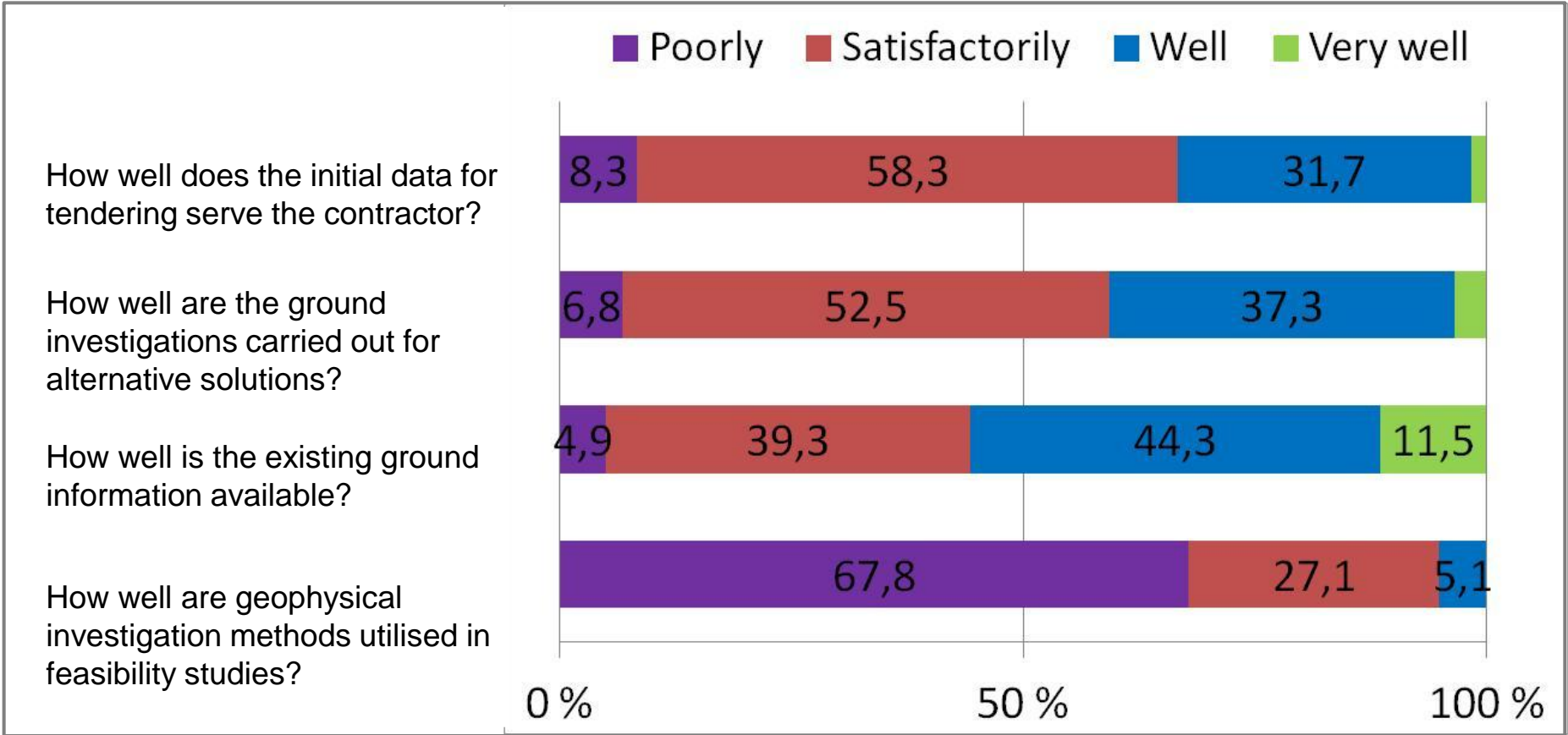


What type of foundation engineering problems occur?



"If the geotechnical design of a road foundation is based on adequate ground investigation and the foundation is built according to that design problems rarely arise,

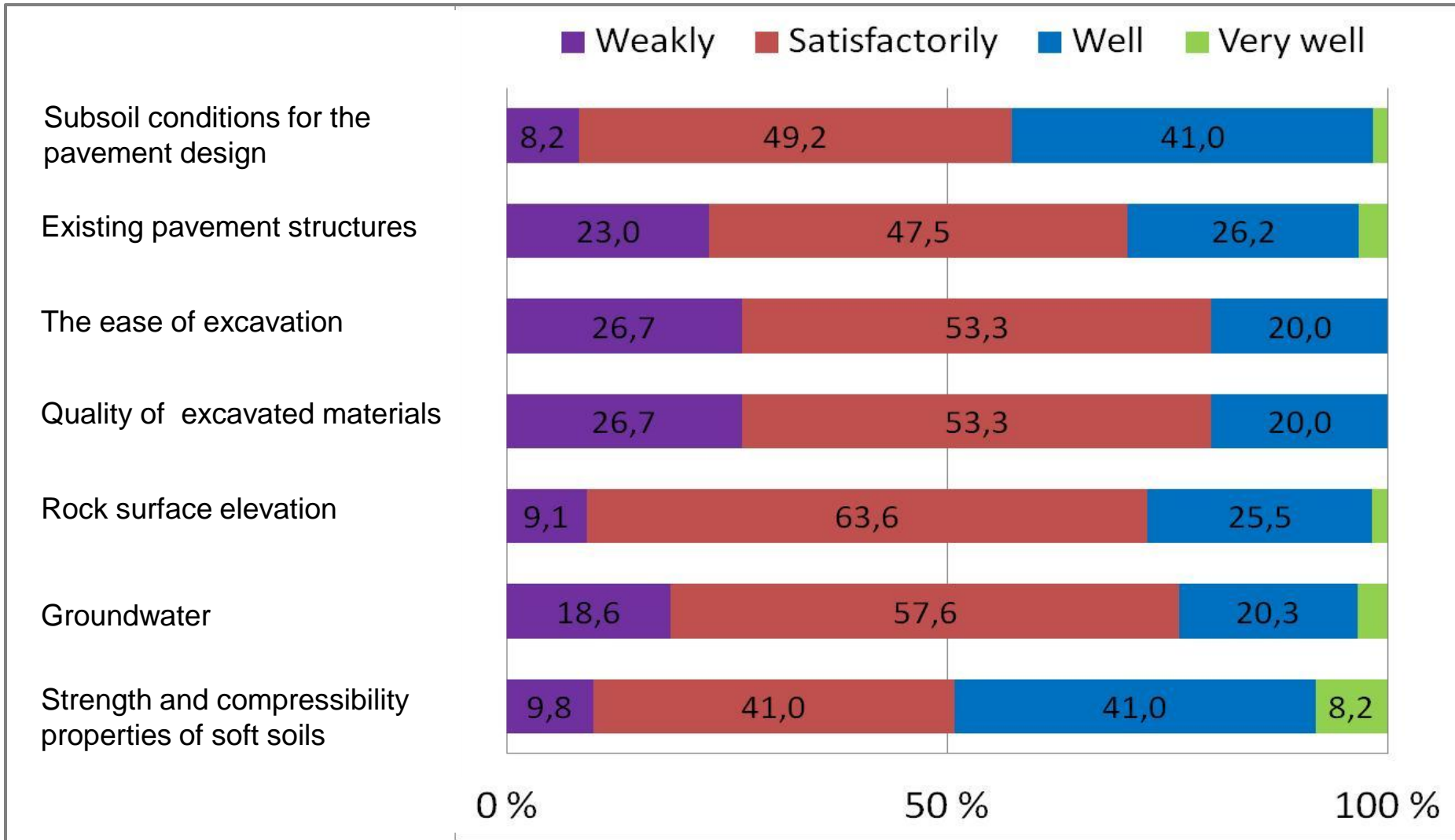
Specific issues – “Serviceability” of Initial Data



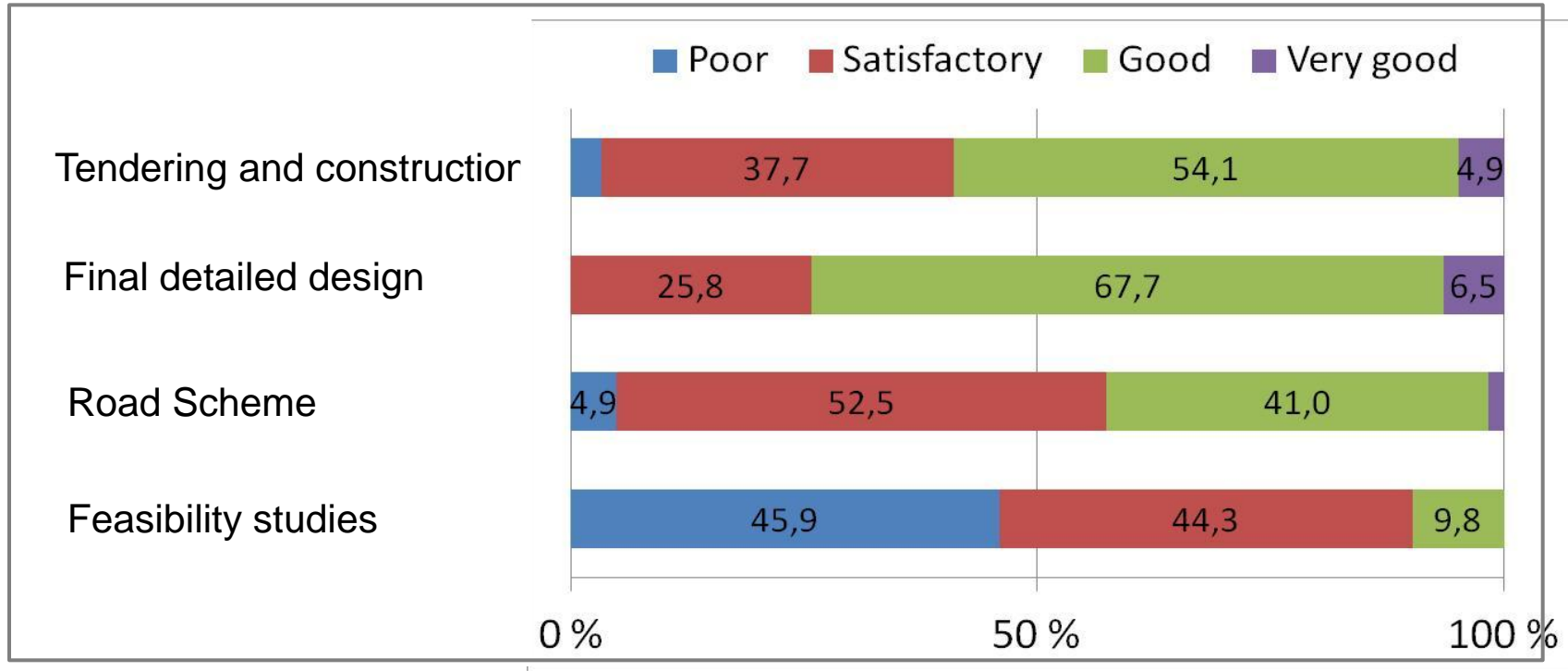
Geophysics are very limited applied in Nordic road projects

Ground investigations should serve better the contractors to search for innovations

How well various ground properties are investigated?



Sufficiency and reliability of ground information in various phases of the project



There was more criticism on ground investigations in Finland than in other Nordic countries

"Typically the investigation are generally at level satisfactory, but in many case there are several critical structures or subsections where all necessary data is missing."

"There is also surprisingly big indifference between the projects"

Impacts of European standards

Which standards are generally followed in your current projects?



Requirements on the personnel?

"EN and ISO is being used more and more.. but still local standards specifications / handbooks are used"

"Clients are not ready to invest on investigations as required in the Eurocodes. Investigations are always bargained."

" Requirements are addressed on the execution of the works - not directly on the personnel"

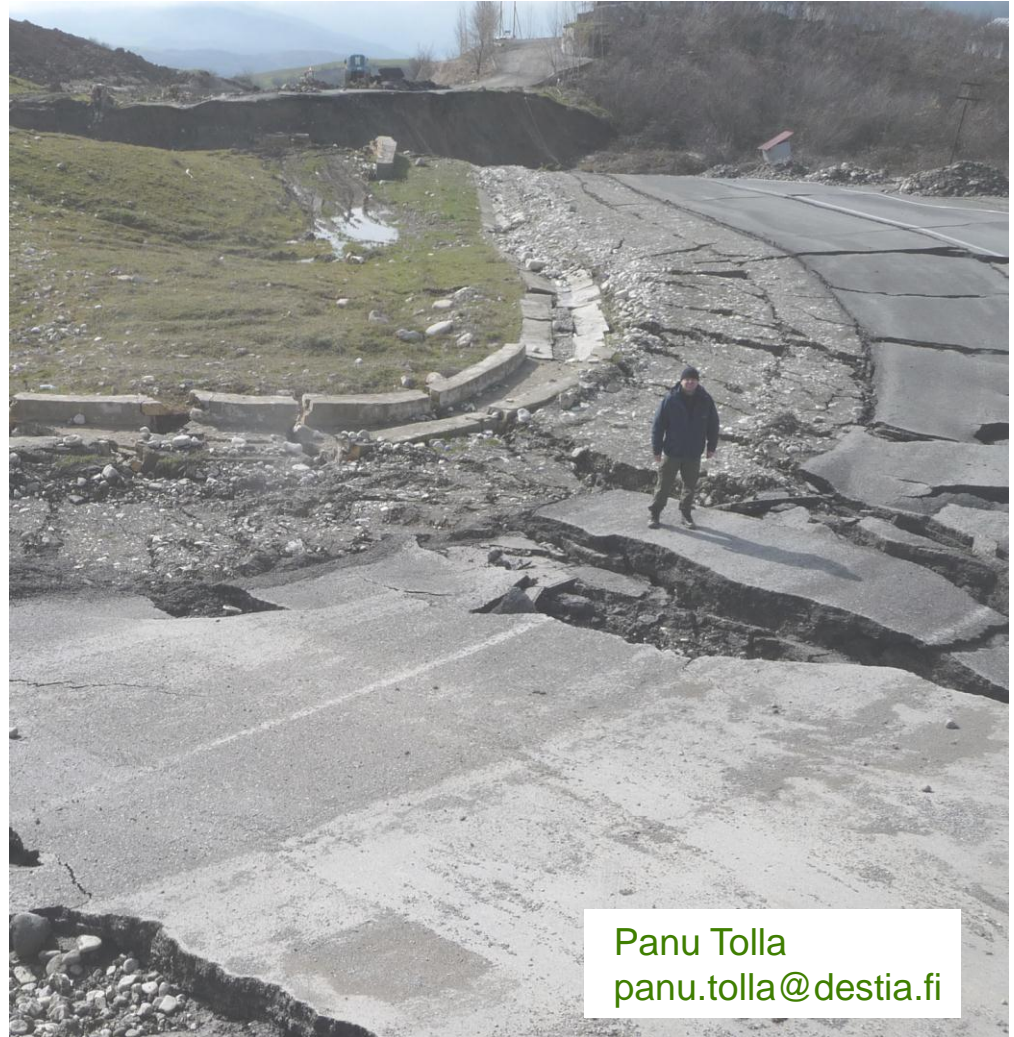
Conclusions

- New procurement method can improve the productivity in road projects
 - when based on contractors innovative solutions
 - relevant and reliable initial data are necessities
- Current state of art in GI is not satisfactory
 - >> procurement practices of GI must be developed
- The situation is relatively similar in all Nordic countries
- EN & ISO standards are gradually having a positive effect on the quality of ground investigations

Proposals for the improvement ground investigations

1. Consider GI as necessary initial data
2. and prepare the project timetable accordingly
3. Prepare a proper site plan for ground investigations
4. Apply quality control procedures to GI
5. Develop procurement practices systematically

**Thank you for
your attention!**



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Any questions?