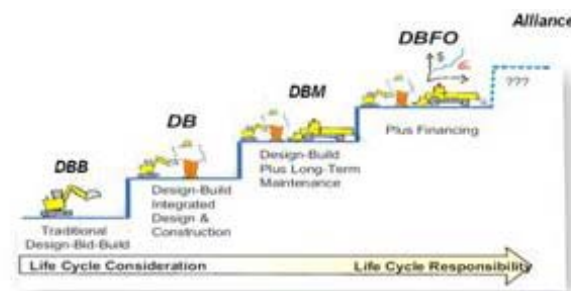


Ground Investigations for Road Projects

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1. Background

“Ground investigations for road projects” was named as one of the working areas of the NVF Technical Committee 34 Road Structures for years 2008-2012. Good ground investigations are essential for economically and environmentally sound solutions in all road projects. Poor ground investigations are often identified and criticised as one of the main causes of failures in traditional Design-Bid-Build-projects. Insufficient data causes problems in projects’ tendering and increase technical and financial risks during construction phase. For the advanced procurement models good ground investigation is necessary base line data that enable contractors’ and consultants’ innovations. Poor ground innovation limits possibilities to make innovations and they are risks for contractors, who prices them when ever possible. This is limiting to achieve benefits advanced contracts (Figure 1).



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

Figure 1. Goals of the advanced procurement model

2. Goals of the study

The goal of the study was to find common ways to improve ground investigation procurement and execution. Finnish practises were assessed and compared them with Nordic experience in road projects. In addition the benefits of quality assurance and new European standardisation on ground investigations were explored.

3. Inputs

Along discussion in NVF TC34 the present conditions were surveyed by organizing Finnish workshop on ground investigations in road projects in January 2011 with Finnish Traffic Agency. Nordic perspective was surveyed by conducting a www -questionnaire on ground investigations in March - April 2011.

According to the inquiry the ground investigation procurement, planning, execution and data management should be developed significantly (Figure 2).

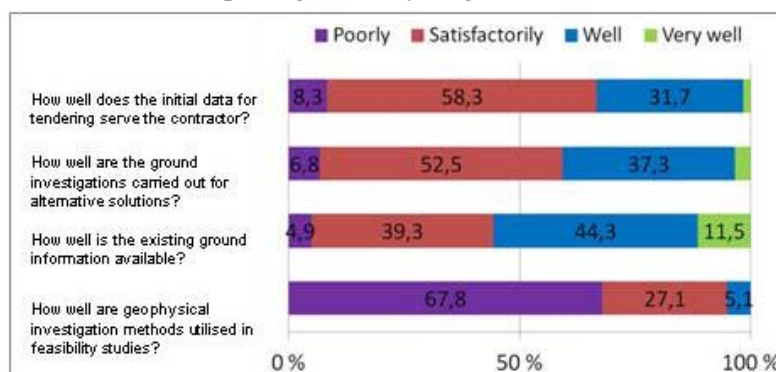


Figure 2. Nordic experts' reply on the questions of some specific issues

4. Findings and proposals

Trough the discussions and the conducted www –questionnaire, the identified problematic areas consist of several concrete items such as

- Terrain surface models are inaccurate, inconsistent and incoherent
- Not enough ground investigations or they are in wrong locations
- Ground investigation data do not provide all the necessary basic information on soil and rock layer properties
- Liabilities related to soil investigation data is not completely clear
- Tender documents do not include all gathered data due to poor documentation records

Representatives of authorities, contractors and consultants all agreed that practices are necessary to improve. It is important to analyse and identify bottlenecks that prevent reach good practise.

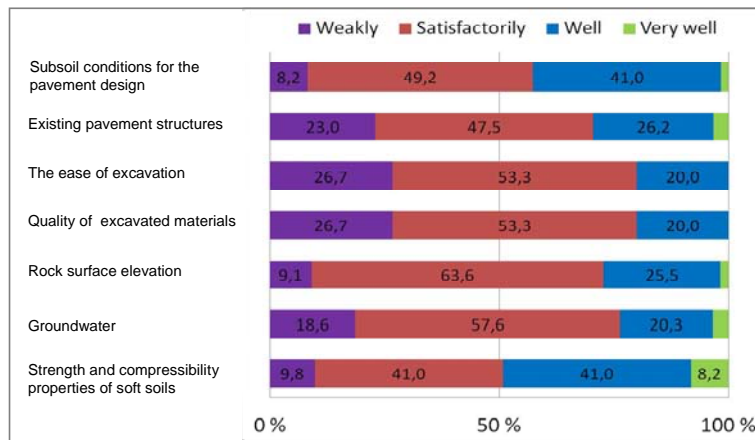


Figure 3. Quality of ground investigation of some specific properties (Nordic www-questionnaire)

The findings were worked out as proposals to improve procurement practices. The concrete actions could be such as:

- Consider ground investigations as necessary initial data and prepare the project timetable accordingly
- Prepare a proper plan and specification for a project phase ground investigations
- Apply quality control procedures to ground investigations
- Report ground investigations according to the Eurocode
- Adopt ground investigations as a part of Road Agencies procurement systematic development

Traffic/Road Agencies, as owners and clients, are in key role in improvements, because they set the terms on the service provider competition. In addition it is necessary that the contractors and the consultants, as service providers, support the client's attempts effectively. Finnish Traffic Agency has analysed the findings of this study and it has adopted them in the procurement development.

5. Conclusions

Current state of art in ground investigations is not satisfactory: the initial data given to contractors is too often inaccurate, inconsistent and incoherent. The new procurement methods applied in road construction can improve the productivity significantly and a contractor's innovative solutions are needed for productivity improvement. The project tendering phase creates conditions where innovations are the most demanded. Relevant ground information and other initial data are necessities for these innovations.

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

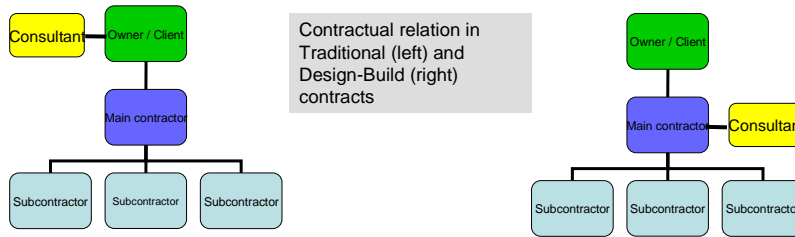


Figure 5. Key elements of Finnish DB-model

Development of procurement practices for ground investigations is the key to improved ground investigations. Development needs exist from procurement practises, site program preparation to data transfer (Figure 6). European standards application was found to have gradual improved the quality of ground investigations.

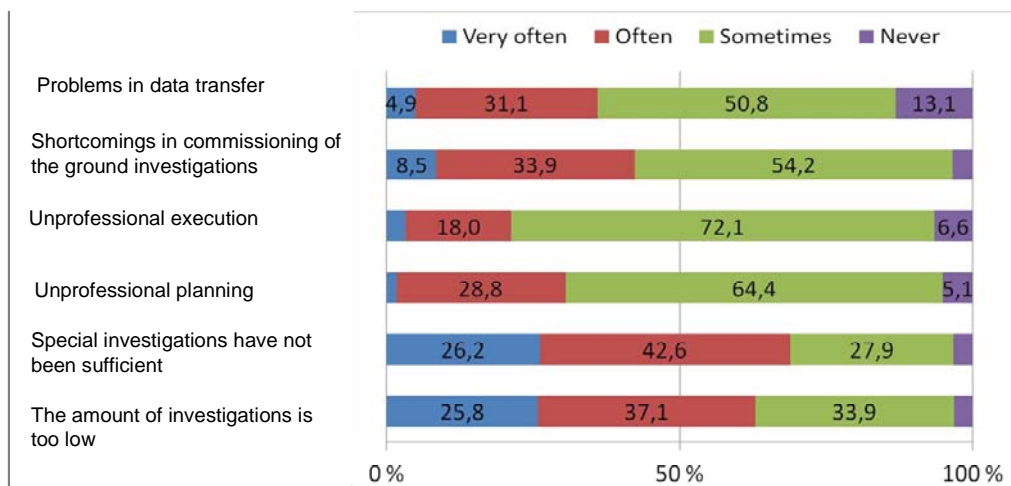


Figure 6. Reasons for short comings in ground investigations according to Nordic www-questionnaire

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