COST-BENEFIT ANALYSIS FOR COMPARING REMEDIAL ACTIONS AT CONTAMINATED SITES

Lars Rosén[1, 2], Tore Söderqvist[4], Pär-Erik Back[3], Åsa Soutukorva[4], Patrik Brodd[3], Lars Grahn[2]

[1] FRIST, Chalmers University of Technology, 412 96 Göteborg, Sweden
[2] SWECO VIAK AB, 403 14 Göteborg, Sweden
[3] SWECO VIAK AB, 100 26 Stockholm, Sweden
[4] Enveco Miljöteknik, 127 48, Skärholmen, Sweden
E-mail: lars.rosen@chalmers.se

Background

Remediation of contaminated land is associated with high costs, both to the problem owner and to society. Governmental resources for environmental actions are, however, limited and it is therefore necessary to use the available resources in an efficient way. One way to prioritize between sites or remediation alternatives is to measure the effect of the remediation on public welfare. A standard method for public welfare calculations is Cost-Benefit Analysis (CBA), which is widely used in various types of governmental projects. However, concerning remediation of contaminated land the method is not yet commonly applied in Sweden.

Aim

The aim of the project was to evaluate the possibilities of using CBA for estimating the effects on public welfare from different remediation alternatives. The specific purposes were (1) to describe a generic CBA model for remedial actions, and (2) to test and evaluate the usefulness of the method by two real-world applications.

Project

The CBA model for remediation of contaminated sites consists of a four steps. Step 1 is to define the possible alternative remediation techniques and the target function where the costs and benefits are included. In Step 2, all identified costs and benefits are summarised, and the importance of each factor is evaluated in qualitative terms. In Step 3 the value of each cost and benefit is calculated in quantitative monetary terms, starting with the factors assessed to be the most important in the precedent step. If monetary values are inaccessible within reasonable effort, the qualitative evaluation from Step 2 is maintained. In Step 4 all costs and benefits are summed up and

eventually it is interpreted whether the total effect on public welfare is positive or negative. Sensitivity analysis, i.e. how the result changes with small changes in input data, and distribution analysis, are also performed in order to show if certain groups or people are affected more by the outcome than others.

Conclusions

The CBA methodology was applied on two example cases, one in the Stockholm area and one in the north of Sweden. Results indicate that the methodology can be successfully applied as a decision support tool by identifying cost-efficient remediation alternatives. It is also shown how the CBA can be integrated into a Multi-Criteria Analysis (MCA) for evaluating the sustainability of remedial alternatives. The MCA approach is presented in a separate paper.