

# Capping of Contaminated Seabed in Norway – Lessons Learned

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**Introduction:** The Norwegian Environment Agency has summarized the experiences from capping of contaminated sediments with clean soil in a report that was released in 2016 [1]. The work has been done by DNV GL and NGI (Norwegian Geotechnical Institute). Experiences from different capping projects in Norway over 25 years have been gathered. Experiences from capping projects outside Norway have also been included. A difference between Norway and most other countries is that basically all capping of contaminated sediments in Norway has been done in marine sediments, basically in fjord and harbour areas. In other countries capping has also been done in freshwater (rivers and lakes).

**Methods:** A large amount of data from capping projects that have been performed were collected. The focus was on finding information on which factors that affect the durability of the cap, how the cap functions over a longer time, how do different type of caps stop leaching of contaminants and how long does recolonization of the biota take after the cap has been placed. Finally a summary of which factors that are the most important for a successful capping of contaminated sediments are presented in the report.

**Results:** The results and lessons learned from the reviewed capping projects are mainly positive. This means that also several years after the capping was done the cap is still intact and functioning as intended. In a few projects, the cap has locally been eroded by propellers from ships. This has for example been registered when large ships are manoeuvring close to quays in relatively shallow waters. There are also examples of poor soil conditions which have led to damages in the cap due to slope failures or large settlements. Recontamination of the seabed after capping caused by supply of new contaminated material has been found in several cases. Such recontamination may be due to contamination from land, either from point sources or from diffuse sources such as runoff from contaminated land, landfills and/or from impervious surfaces via surface water. Sufficient control of the diffuse sources is important to reduce the negative effect of such recontamination. Recontamination may also be due to the spreading from adjacent seabed where no remediation of contaminated sediments has

taken place. Such recontamination can be substantial if the adjacent contaminated areas are exposed to strong currents, prop wash, dredging or other operations that are done on the seabed.

**Discussion:** Finding information and data from capping projects was more challenging than expected. It is recommended that national and international databases are established where information from capping projects are gathered.

**References:** [1] Summary of contaminated seabed capping experiences (2016). *Norwegian Environment Agency, Report no. M-502. (In Norwegian)*