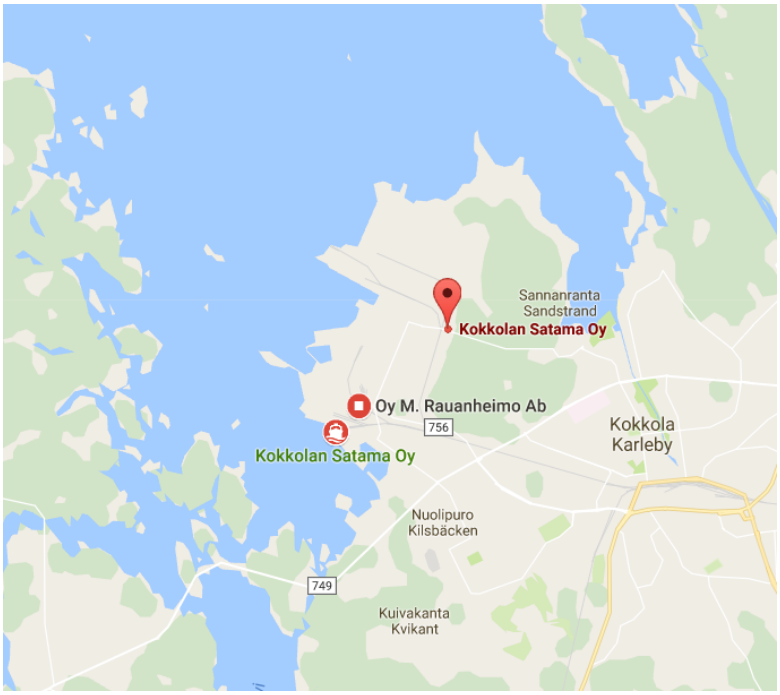
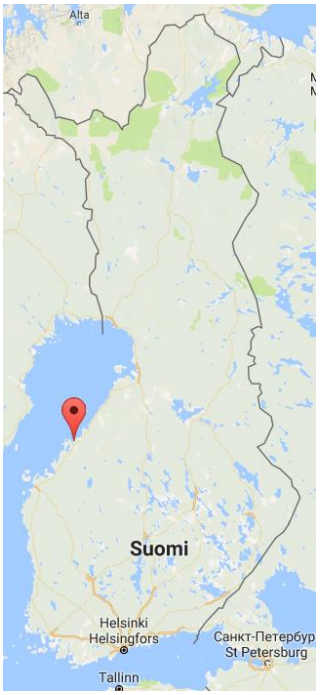
CASE PORT OF KOKKOLA

PORT OF KOKKOLA Kokkola, Finland Port expansion	Key words: Contaminated dredged sediments, port expansion

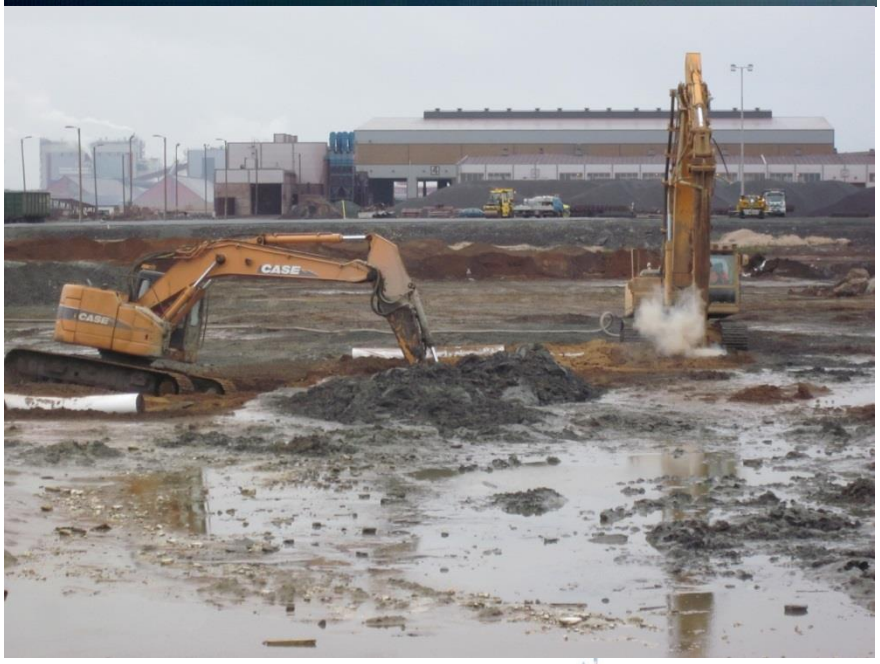
General information	Case Port of Kokkola was a pilot project which included the dredging and stabilization of contaminated sediments. The project was done in Silverstone (Hopeakivi) Port area, where a new quay will be built. The port is expanding to sea and the building of harbour areas demands filling of millions of cubic meters. With dredged sediments, the requirements for filling can be reached quite fast. The pilot was part of the SMOCS project.
Advantages of stabilization	The contaminated sediments can be utilized in the port extension. The results from the dredging and stabilization will be used in future handling of the sediments from dredging of fairways. Stabilized masses fulfilled the requirements for construction of harbour areas. The obtained results will be exploited in the future expansion of the port.
Project timetable	Dredging and mass stabilization in 2011.
Volumes and dimensions	≈ 12 500 m^3
Geology and stabilized material	The soil type of the dredging mass varied between silt - sandy silt – sand. Average index properties w=20 %, ρ = 2023 kg/m^3, LoI = 0.7 %, pH=6.6
Target strength of the stabilized material	Shear strength ~50 kPa
Binder(s)	Rapid cement 0-30 kg/m^3, fly ash 100-200 kg/m^3
Laboratory and field tests	Testing included geotechnical properties of stabilized material, strength, development of strength along time, water permeability and environmental suitability. During and after stabilisation quality control and quality assurance were conducted.
Other	The stabilization started with 30 kg/m^3 cement + 100 kg/m^3 fly ash. The obtained shear strength was at some points very high and therefore fly ash (without cement) was used 150-200 kg/m^3 as such for the rest of the stabilization.
Long-term follow-up and lessons learned	Quality drillings after one year in 2012. The shear strength was clearly over the target value.
Sources	Autiola, *et al.* (2012), *Field test in Port of Kokkola, SMOCS (Sustainable Management of Contaminated Sediments)*, final report. Available: http://www.smocs.eu/guideline/kokkola.pdf; Forsman, J., Marjamäki, T., Jyrävä, H., Lindroos, N. & Autiola, M. 2016. *Applications of mass stabilization at Baltic Sea region.* 13th Baltic Geotechnical Conference, 21.-24.9.2016.
Stabilization contractor	Biomaa Oy





Dredging and dumping areas

Ongoing mass stabilization



Test pit for technical quality control