



Parameter studies on the sediments in Storegga Slide area

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Physical and mechanical properties of the sediments play an important role in understanding the mechanism and consequences of submarine slides. The Storegga Slide offshore mid-Norway happened about 8000 years ago, and is one of the world's largest underwater slides. Because of the Ormen Lange gas field located in the sliding area, a significant amount of geotechnical data were obtained by industry and research institutes. This makes a thorough parameter study possible. The purpose of this study is to derive practical correlations between index properties and mechanical behaviour of the sediments, which could be used for the sediments in similar sliding areas or geological settings.

The sediments used in this study are from 18 sites in the Storegga Slide area, where the sedimentation was controlled by glacial-interglacial cycles through the Pleistocene. The main type of sediment is glacial deposits such as debris flows and tills with low water content, plasticity index and clay content, that are interlayered with marine clays with high values. The latter type formed the sliding planes. The parameters for the physical properties used in this study include water content, W_i ; liquid limit, W_L ; plastic limit, W_p ; liquid Index, Li ; plastic index, Ip ; initial void ratio, e_i ; void ratio at liquid limit, e_l ; clay content, C ; activity, Ip/C and interclay void ratio, e_i/C . The parameters defining the mechanical properties of the sediments include shear strength, S_u ; remoulded shear strength, $S_{u_{re}}$; sensitivity, St and compression index, C_c . The relationships among water content, Atterberg limits and their derivatives are discussed first, then the correlation between the physical and mechanical parameters obtained by regression analysis.

The study showed that most of the sediments in the slide surroundings classify as

inactive and normal clay. There is good correlation between compression index and physical indexes. The correlation is improved when multiple regression analysis is adopted. Good correlation exists between shear strength and water content, liquid limit and interclay void ratio. The regression equation were used for data from other sites and showed convincing fit. The analysis showed that the multiple regression equation between C_c and W_i , W_L is the best equation to estimate the C_c . The single regression equation between S_u or $S_{u_{re}}$ and the interclay void ratio is the best fit for the evaluation of the shear strength.

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