

Significance of humic acid's structural variety on utilization of dredged soils

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Dredged soils from harbour and dam have occasionally been utilized for construction materials after mixing with steel slag. Some mixtures exhibit weak strength development as a result of insufficient secondary phases formation, which is caused by diverse components of dredged soils, limiting their utilization. In this study, humic acids (HA), a group of soil organic matter, were characterized to investigate their effect to the strength development of dredged soils-steel slag mixtures.

Eight dredged soil samples were collected from various areas in Japan and characterized for HA content, their C bonding state, elemental composition, and fragment structure. Each sample was mixed with a steel slag to test uniaxial compressive strength (UCS). Whereas the UCS of six mixtures increased as a function of time, other two mixtures was at as-mixed softness. The strength was not clearly related to their HA amount. However, because the two soils without hardening showed comparatively high S contents in HA, HA that bears disulphide and sulfonate functional groups may inhibit secondary phases formation contributing to the strength development. Synthetic experiments of secondary phases with and without these functional groups also support the inhibition effect. Yet the mechanism needs to be clarified for quantitative understanding of the inhibition.