

## High Gradient Magnetic Separation Using Superconducting Magnet

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High gradient magnetic separation (HGMS) is a powerful technique which is used to separate widely dispersed contaminants from a host material. This technology can separate magnetic solids from other solids, liquids and gases. HGMS separators usually consist of a high-field solenoid magnet, the bore of which contains a fine structured, ferromagnetic matrix material. The matrix material locally distorts the magnetic field and creates large field gradients in the vicinity of the matrix elements. These elements then become trapping sites for magnetic particles and are the basis for the magnetic separation. It is needed several large reservoirs and long time in order to remove suspended solid like steel fines and iron oxide at steel making factory. If removing rate of suspended solid in rolling coolant is improved, the productivity of working process can be increased and the area of reservoir can be reduced. Pretreatment to add extra magnetization of suspended solid was studied. Iron hydroxide and electrolytic dissociation were used for pretreatment. High gradient magnetic separation system was used for removing of magnetized suspended solid. Removing ratio showed over than 99% in the coolant containing magnetic fines. Magnetic properties of suspended solid were investigated after mixed with  $Al_2(SO_4)_3$  and organic flocculant by using electrochemical treatment.

Keywords : HGMS, superconducting magnet, liquid waste treatment

This research was supported by a grant from Korea Institute of Environmental Science and Technology funded by the Ministry of Environment, Republic of Korea.