

Prediction of Sludge Generation in Mine Drainage Treatment Plan with Lime Dosing¹

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Abstract: In Korea, some acid mine drainages are treated with semi-active treatment. The semi-active treatment facilities consist of a neutralizing reaction tank, a rectangular concrete settling pond, and an aerobic wetland. The size of the rectangular pond is designed large enough to settle the sludge for as long as possible. The size of the pond is determined by the prediction of the amount of sludge and the theoretical formula is usually used. However, earlier than expected, the sludge fills the settling ponds and is released to the waterways. This study was carried out to understand why sludge fills up faster than expected. In this study, sludge generation was calculated using the existing USEPA (1983) and MIRECO (2017) formulas and the sludge generation calculated was compared with sludge amount from an experimental result. Two theoretical formulas showed similar sludge generation to 966g and 981g, respectively, when neutralizing the 1m³ of mine drainage. When converted into volume, there was a five-fold difference in sludge volume, assuming the moisture content was 95 % and 99 %. After neutralizing 1m³ with 20% lime slurry, the amount of sludge was similar to the volume, assuming 99%. When calculating the sludge volume, the moisture content was shown as a very important variable. One of the reasons why the settling pond's life has been reduced was that it has been assumed that water content in sludge is low when calculating the volume of sludge.

Additional Key Words: Semi-active treatment, settling pond, sludge, water content

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3. Work reported here was conducted near 35°30'91"N, 129°22'41"W.