

Solids Suspension at Low Liquid Level Mixing

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Abstract

Typically top entry agitators with turbine type high efficiency impellers are used to suspend and re-suspend limestone slurry to continuously feed the FGD absorber tower. The turbine impeller used by most agitator suppliers is an axial flow device pumping down to sweep the bottom of the tank and push solids up the side to maintain the suspension. While the axial flow impeller is currently the most efficient device to accomplish the task, the impeller requires a minimum distance off the tank bottom in order to perform, plus a minimum amount of slurry coverage above the impeller to establish impeller pumping. The resultant minimum slurry height in the tank can be as much as 30 percent of the tank diameter, potentially rendering 30% of the tank volume as unusable because the slurry suspension cannot be maintained for pumping. To compound the issue, if the level gets too close or at the impeller, excessive hydraulic load will develop leading to mechanical failures. In the event of a limestone ball mill outage, the extra 30% volume availability could mean the difference for keeping the SO₂ scrubber and plant on line or off line. PMSL is introducing an innovative impeller design that varies the pumping rate depending on the level in the tank, eliminating excessive hydraulic loads during draw down, and will pump fluid at tank levels as low as 12% of the tank diameter. This presentation will present the problem and solution with calculations and video taped laboratory demonstrations.