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Time dependent behavior of impact angle in turbulkent pipe flows experience erosion.[1] AMADOR GUZMAN, Pontificia Universidad Catolica de Chile, DIEGO OYARZUN[2], Universidad de Santiago de Chile, MAGDALENA WALCZAK[3], JAVIERA AGUIRRE[4], Pontificia Universidad Catolica de Chile — Erosion-corrosion in pipe systems transporting slurry turbulent flows is of a great importance in industrial and mining applications, where large volumes of suspended solids are sent up to hundreds of kilometers, to be further processed. The slurry is typically sent over large diameter steel pipes, which not always have an anti-abrasion coating. During the transport, the thickness of the pipe diminishes and eventually leaks and breaks, due to the combined effects of wear and corrosion. The processes of pipe degradation are further enhanced by the content of the slurry electrolytes that might switch from neutral to aggressive. The understanding of these processes in terms of operational parameters is critical for anticipating and mitigating a catastrophic outcome. This paper describes turbulent flow numerical simulations in a slurry transporting steel pipe with an emphasis on the correlation between the time dependent impact angle in the vicinity of the steel pipe and the rate of material loss. Full numerical simulations in a 3D long domain by using an Eulerian –Eulerian two phase flow approach coupled to a κ-epsilon turbulent model are performed for different solid particle concentration and flow velocity and compared to existing experimental and numerical results for validation with and without gravity. Time-dependent axisymmetric turbulent flow simulations are performed for determining both the time dependent behavior of the axial and radial velocities near the pipe wall and the impact angle.

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