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Investigation of erosion behavior in different pipe-fitting using Eulerian-Lagrangian approach HARSHWARDHAN KULKARNI, HRUSHIKESH KHADAMKAR, CHANNAMALLIKARJUN MATHPATI, Institute of Chemical Technology, Matunga, Mumbai — Erosion is a wear mechanism of piping system in which wall thinning occurs because of turbulent flow along with along with impact of solid particle on the pipe wall, because of this pipe ruptures causes costly repair of plant and personal injuries. In this study two way coupled Eulerian-Lagrangian approach is used to solve the liquid solid (water-ferrous suspension) flow in the different pipe fitting namely elbow, t-junction, reducer, orifice and 50% open gate valve. Simulations carried out using incompressible transient solver in OpenFOAM for different Reynolds's number(10k, 25k,50k) and using WenYu drag model to find out possible higher erosion region in pipe fitting. Used transient solver is a hybrid in nature which is combination of Lagrangian library and pimpleFoam. Result obtained from simulation shows that exit region of elbow specially downstream of straight, extrados of the bend section more affected by erosion. Centrifugal force on solid particle at bend affect the erosion behavior. In case of t-junction erosion occurs below the locus of the projection of branch pipe on the wall. For the case of reducer, orifice and a gate valve reduction area as well as downstream is getting more affected by erosion because of increase in velocities.

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