

## **ABSTRACT**

### **3D Eulerian-Eulerian (Solid-Liquid) Numeric Study on Stirring Tanks: Effect of Grain Size**

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Multiphase flow is a simultaneous flow of several phases in the form of gas, liquid or solid. The two different phases can be a combination of liquid-liquid, gas-solid, solid-liquid or gas-liquid which move together in a flow. The performance of solid-liquid mixing that takes place in a stirred tank with concentration needs to be studied further because the flow of fluid in a stirred tank is very complex. Therefore, this stirred tank often become the topic for several studies both experimentally and simulation.

This study has analyzed the effect of the size of grain on the flow distribution in a stirred tank for solid-liquid. The system studied in this study is a cylinder tank with a flat base of 0.4446 m in diameter which is equipped with stirred and mounted in a vertical direction. With a diameter of 0.1728 m. the stirred distance from the bottom of the tank is set at 0.0864 m. stirred rotational speed (N) uses constant speed. That system is used for mixing liquid and sand grains measuring (A) 0.000111 m, (B) 0.000222 m, (C) 0.000666 m, (D) 0.000888 m, (E) 0.00111 m with simulation time of 90s. The mixing work will be studied by Computational Fluid Dynamics (CFD) method using a multiphase mixing model.

From the results of the simulation, it was found that the flow patterns that occur have different speeds in each variant, the largest flow velocity value is in the area near the impeller, which can be caused by the influence of density and pressure difference in the stirred tank.

***Kata kunci*** – *Stirred tank, CFD, Multifasa, impeller.*