



**NUMERICAL INVESTIGATION OF UPSTREAM SWIRLING
MOTION ON FLOW OF CONCENTRATED SLURRY IN
HORIZONTAL PIPES**

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by

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Certificate by the Examiners

This is to certify that the project work entitled "NUMERICAL INVESTIGATION OF UPSTREAM SWIRLING MOTION ON FLOW OF CONCENTRATED SLURRY IN HORIZONTAL PIPES "

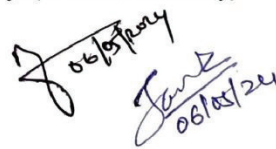
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Abstract

The transportation of concentrated slurries through horizontal pipelines presents a complex fluid dynamics scenario. This report presents a comprehensive numerical investigation aimed at understanding the effects of upstream swirling motion on the flow behavior of concentrated slurries within horizontal pipes subjected to swirling motion. We compared the CFD results and experimental[#] results for normal cross section pipe of diameter 0.103m. To introduce the swirling-motion in the pipeline of diameter 0.103m we attached a swirling section having 'pitch to diameter ratio' 6 and number of lobes are 3,4 &5. For all the three different lobes, study is carried out for volume fraction 19%, 29% & 33% at the two different inlet velocity 3m/s and 5 m/s having two different sand particle size 90 microns and 290 microns. Concentration of sand before the swirling motion and after the swirling motion is major focus of study. Swirl intensity or swirl number which is rapidly declining but after 10.3m from the swirl section its small effect can be seen for 3,4 &5 lobe. Pressure gradient for all the cases is calculated and comparison is made between 3,4 & 5lobe and how it varies with the volume fraction and particle size.

Keywords: Numerical investigation, CFD, Swirling motion, volume fraction, pressure gradient & swirl number



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