



Institution of Engineers (India) Student
chapter GGV brings you a webinar on

MODELLING OF GAS-SOLID BUBBLING AND CIRCULATING FLUIDISED BED REACTORS

By

DR. MUKESH UPADHYAY

(Postdoctoral Researcher)

Department of Chemical Science,
University of Limerick, Ireland,

5 May 2023

Friday

3:30 Pm



<https://meet.google.com/oau-pkwy-xoh>

Dr. R.S. Thakur

Head of department

Department of Chemical
Engineering

Organized
by

Dr. S. Dharmadhikari

Faculty advisor

IE (I) students chapter

Mr. P. Shrivastava

Convenor

IE (I) students chapter

IE (I) Student's Chapter Department of Chemical Engineering,
School Of Studies Of Engineering BY And Technology Guru
Ghasidas Vishwavidyalaya (A central university) Bilaspur (C.G.)



A REPORT ON

Webinar On

“Modelling of Gas-Solid Bubbling and Circulating Fluidised Bed Reactors”

Dated 5TH MAY 2023

by

Department of Chemical Engineering, School of Studies (Engineering & Technology)

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Date: - 05.05.2023	Timing-3pm to 5pm	
Venue: -Online Session (Through Google Meet)	Department of Chemical Engineering, School of Studies Engineering and Technology	For:- All the members of IEI Student Chapter and Respected Faculty of Chemical Engineering Department
Faculty Advisor and Coordinator: Dr. Sandeep Dharmadhikari, Assistant Professor, Dept. of Chemical Engg. Convener: - Parag Shrivastava, IE(I) Student's Chapter, Department of Chemical Engineering, GGV, Bilaspur (C.G.)		
Co-conveners: Utkarsh, Rahul Kumar, Komal Mishra, Aryan Yadav, Shashwat Tiwari, IE(I) Student's Chapter, Department of Chemical Engineering, GGV, Bilaspur (C.G.)		

Objective:-

The objective of One Day Webinar on Modelling of Gas-Solid Bubbling and Circulating Fluidised Bed Reactors to understand advanced topic such as predicting fluidization behaviour, gas solids flow patterns, scale-up and design optimization .

Overall, the objective of modelling gas-solid bubbling and CFB reactors is to provide a deeper understanding of the fundamental processes occurring within these systems and to enable the design, optimization, and scale-up of these reactors for various industrial applications, including combustion, gasification, chemical synthesis, and particle coating.

Event Description:

The Department of Chemical Engineering, School of Studies of Engineering and Technology has successfully conducted a Webinar On “Modelling of Gas-Solid Bubbling and Circulating Fluidised Bed Reactors” dated 5th May 2023 from 3:30pm to 5pm all the segment of the event was carefully planned, coordinated, and presented under the guidance of our faculty advisor and coordinator Dr. Sandeep Dharmadhikari. All the members including the faculty coordinator sir were privileged with the presence of our Head, Dr. Raghavendra Singh Thakur, who started the event by sharing his thoughts and ideas regarding this event and sharing his valuable points along with his prolonged experience in this field. The talk was very fruitful for all the students of both the second-year and third-year students including students of the final year who are dedicatedly focused towards their career. The session continued further under the guidance of our well-known Guest Dr. Mukesh Upadhyay currently postdoctoral researcher Department of Chemical Science, University of Limerick, Ireland. Sir Explained to predict the behaviour and performance of these systems. By developing mathematical models and simulation tools, researchers and engineers can gain insights into the complex fluid dynamics, heat and mass transfer, and chemical reactions that occur within these reactors Very Well and answered all the questions of the students regarding their Doubts in better way which helps to give a clear concept of CBR Reactors. sir also guided the students in the field of academics and reminded them of the importance of chemical reaction engineering they are studying, with this the session came to an ending part with Vote of Thanks delivered to every individual present at the meeting by the Convenor of IEI student chapter-Parag Shrivastava and wished abundance of success to everyone who was directly or indirectly associated with this event.

Mukesh Upadhyay

Aryan M Yadav

shashwat

PARAG SHRIVASTAVA

Shivam Kumar

Abhishek Singh

Amit Chaudhary

30 others

You

4:29 PM | Modelling of Gas-Solid Bubbling and C...

Mukesh Upadhyay is presenting

Experimental data acquisition

Operating condition

- Air - 1.225 kg/m³ , 1.79x10⁻⁵ Pa s
- Sand - 2525 kg/m³ , 147 μm $d_p^* = 6.3$
- U_0 - 2m/s $U^* = 3$
- G_0 - 39.14kg/m²s , 51.04 kg/m²s, 73.21 kg/m²s

$U^* = u \left[\frac{\rho_s}{\mu (\rho_s - \rho_g)} \right]$

$d_p^* = d_p \left[\frac{\rho_s (\rho_s - \rho_g) g}{\mu^2} \right]^{1/3}$

Experimental Results

Height (m)

1) $U_0=2\text{m/s}$ $G_0=39.14\text{ kg/m}^2\text{-s}$

2) $U_0=2\text{m/s}$ $G_0=51.04\text{ kg/m}^2\text{-s}$

3) $U_0=2\text{m/s}$ $G_0=73.21\text{ kg/m}^2\text{-s}$

Pressure [Pa]

$U_{mf} = 0.018\text{ m/s}$

$U_{mf} = 0.0172\text{ m/s}$ Rabinovich Kalman

$Re_{mf} = 0.000955 Ar^{0.46}$

Std. dev. of pressure [Pa]

$U_c = 0.8\text{ m/s}$

$Re_c = 0.57 Ar^{0.46}$

$U_c = 0.739\text{ m/s}$ Cai et al.

$U_0 = 1.3\text{ m/s}$

Emptying time (s)

U_g (m/s)

$Re_c = 0.169 Ar^{0.54} [D/d_p]^2$

$U_0 = 1.67\text{ m/s}$ Chehbouni et al.

$U_{tr} = 1.4\text{ m/s}$

GLIMPSE OF THE ONLINE SESSION