

Fluidyn Newsletter - October 2023

Explosion Modelling: Visualizing the Unpredictable, Turning chaos into Control

Upcoming Events:

November 23rd 2023

Free On-demand Webinar on Reactor Explosion Study and Mitigation. Invitation will be sent out soon for registration process.

November 28th– 30th WNE—World Nuclear Exhibition, Paris

Fluidyn is participating in **WNE 2023**, the world's leading Civil Nuclear Exhibition.

Past Events:

October 27th, Lecture at PDEU

Mr. Nirav Nagadiya, Manager at Fluidyn delivered a lecture at **National Symposium on Automation & Digital Transformation at PDEU (Pandit Deendayal Energy University)** about importance of CFD and Multiphysics for HVAC & Energy Efficiency.

October 10th-13th POLLUTEC 2023, LYON

Fluidyn participated in **Pollutec 2023**, and presented its innovations in the largest show on solutions for environment.

September 21st to 25th Greater Noida, India

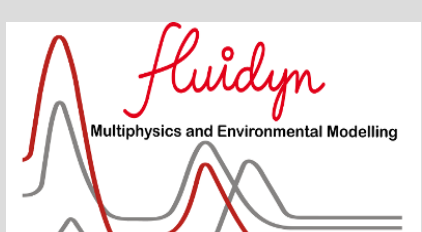
Fluidyn and its partner firm Nishkam Technology exhibited in **UP International Trade Show 2023**, the biggest Sourcing Show in India.

September 20th DRDO Bhawan, New Delhi

Fluidyn attended a seminar on DGNAI Integrated QA Architecture organised by Indian Navy. Venue: DRDO Bhawan, New Delhi

August 12th DRDO Jodhpur

Fluidyn Participated in Prof. D S Kothari Memorial Tech Conclave 2023 at DRDO, Jodhpur and presented a poster paper.



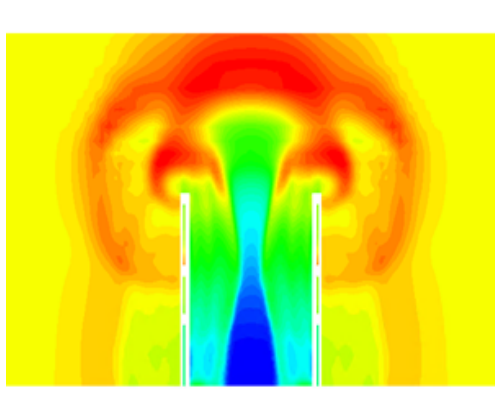
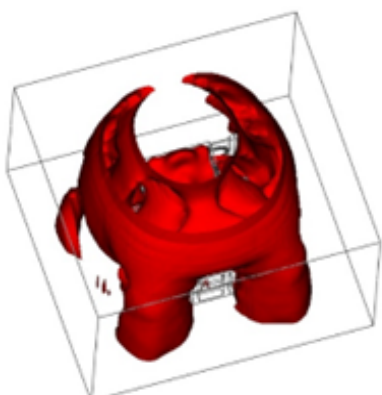
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A strange beast indeed- an explosion. Its simulation is often done not to foresee the consequences but to determine the initial conditions which led to the accident. An explosion refers to a violent reaction with gas emission at high temperature & pressure. But the simulation may also be done to foresee and limit the extent of structural damage around, if explosion happens. An explosion, either a deflagration or a detonation, with very different consequences, can be modelled with the response of the structures around.

Often explosion modelling requires working thru a multitude of scenarios and initial conditions. But how to ensure when they are sufficient? This task of establishing a Best Practices Guide on Simulation is undertaken in France by a Working group of industries, academic experts, etc. headed by **INERIS** (French Institute of Industrial Environment). Fluidyn is of course an active partner. As it has already happened for a similar Best practice Guide for leak dispersion, such thorough analysis and the guide is later adapted by other European countries too.

Case Example 1 - Autoclave Explosion Modelling by Fluidyn

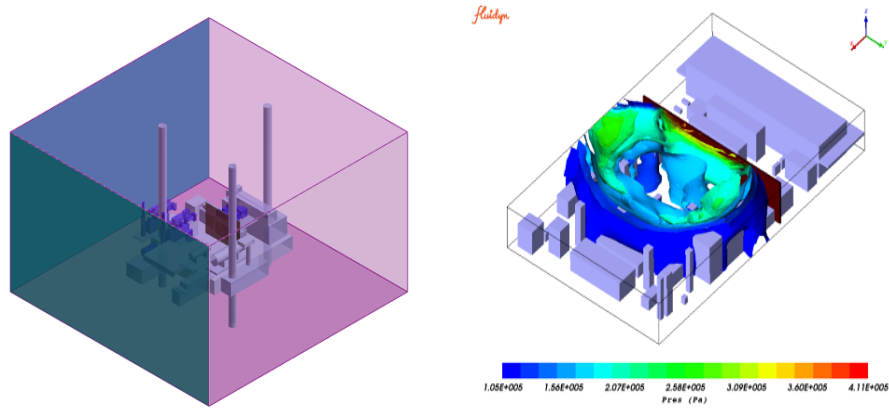
Autoclaves operate at high temperature & pressure. If used improperly, it may cause serious safety hazards and sometimes accidents. To ensure, safety of the plant and workers in case of an Autoclave explosion, **Fluidyn-VENTEX** is often used to simulate explosion- structure interaction with structural integrity of Autoclave room. Such studies help in designing Autoclave room, in finding out maximum effected area & in ensuring structural strength of Autoclave Room to ensure safety of nearby equipment & personnel.



Case Example 2 - Leakage and Explosion of Gas in Sewage system

A case in point is a major accident a few years ago at Qing Dao in China. Leaked gas, from a nearby Sinopec plant, accumulated for several hours in a sewage system in the inhabited area nearby before exploding. The simulation, using **Fluidyn-VENTEX** could relate the cars upturned in the street and several dozen fatalities, very far from the facility, to the gas in sewage system. As usual, the explosion had destroyed the initial conditions which led to explosion. Only the simulation of multiple scenarios allowed to pinpoint the cause - a leak several hours earlier in a faraway plant.

Reference - *Influence of Multiple Factors on the Explosion Characteristics of Flammable Gases in Municipal Sewage Pipelines; Pengfei Lv, Jiaxu Z., Lei P., Kai Y., and Siheng S, Beijing Institute of Petrochemical Technology, China*



Case Example 3 - Leakage & explosion in Offshore plants

During extraction & transport of offshore gas, leaks do take place; they require very fast alert and emergency response time. **Fluidyn-REALTI** is used for quick detection of the source and **Fluidyn-VENTEX** for designing safe locations in the limited space of offshore platforms.

Reference - *Study of leakage and explosion of Hydrogen & blast wall failures in an offshore platform; Chenthil K, Vishnu R, Anil K, Amita T; Proceedings of the 25th International Conference on Nuclear Engineering, China*

Explosions in a chemical plant need to be avoided at all costs. A free on-demand webinar on Reactor Explosion study & Mitigation has been scheduled on 23rd November, 2023. A separate invitation will be circulated shortly with registration process. Please feel free to write to us with any specific topics you'd like us to cover in the webinar.

Academic Alliance - MoU Signed with SRM Institute, Chennai



Yet another significant milestone in our continued collaborations with premium institutes in India, Fluidyn signed MoU with SRM Institute of Science and Technology, Chennai. Under this MOU, Fluidyn will provide the 3D CFD Modelling software (20 users) for academic research, teaching and educating students cost free for one year. Fluidyn will also offer Industrial Consultancy projects, internship opportunities and access to Industry Oriented Courses to the students.

Pollutec 2023 - Innovations Presented by Fluidyn.

Air Quality Monitoring and Atmospheric Emissions Mapping tool:

Fluidyn-SENSORMAP is dedicated to atmospheric emissions monitoring by inverse modelling of sensor data. By CFD-3D calculation of outdoor / indoor dispersions on complex domains (city/industry), it ensures optimal network deployment and then, by continuous inversion of measurement batches, it produces maps of distributed sources (roads/housing/industries) or point sources (leaks). Used for industries impact and risks (leaks / IAQ / OAQ) and / or on an urban scale for OAQ and GHG assessments.

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Battery and Fuel cells Simulation tools:

Fluidyn-BFC is a numerical platform dedicated to battery and fuel cell modelling. Featuring a simplified interface accessible event to non-technical audience, and multiphysics solvers describing the complete phenomenology of such systems, it covers the simulation needs of all industrial actors in electromobility and energy storage, from optimization in the design phase to thermal management and real-time risk analysis in the operating phase.

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