



KEYWORDS: industrial risks, safety & security, flammability, fire, explosion, BLEVE, fire resistance, atmospheric dispersion, evaporation

RESEARCH AIMS

- Understanding and modelling accidental phenomena linked to industrial risks
- Studying and proposing technological solutions to plan for and reduce the consequences of dangerous phenomena

ACTIVITIES

Expert industrial risk assessment:

- Fire / flammability
- Explosions: gas, dust
- BLEVE, boilover
- Leaks of gases or liquids
- Atmospheric dispersion
- Blowouts
- Accidental water pollution

SCIENTIFIC EXPERTISE

- Expert assessment for the conducting of dangerous tests
- Rapid, distributed, synchronised metrology
- Multi-scale testing (laboratory, testing facility and in the field)
- Formulation and characterisation of fire-resistant materials

FIELDS OF APPLICATION

- Energy
- Petrochemicals
- Chemicals
- Materials
- Nuclear Industry
- Pharmaceutical Industry
- Civil Security

IMPLEMENTATION

- Expert assessment
- Collaborative research
- Feasibility studies
- Design of prototypes

PROTOTYPES HALL

- High-pressure water column (80 bar)
- Aerodynamic wind tunnel
- Water basin
- Shock tube
- Detonation tube
- Dust explosion tube



High-pressure column

EXPLOSION HALL

- Study of the physics of different types of explosions (dust, gas, BLEVE)
- Interaction between overpressure waves and materials
- Mitigation of overpressure waves



Propane flame thrower fire test at the GESIP

FIRE HALL

- Flammability and combustion dynamics
- Propagation
- Thermal flows emitted
- Fire resistance
- Testing of protection methods
- Reaction to polymer fires



Cone calorimeter test



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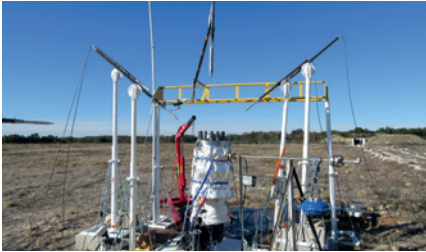
SPARK

Technological Platform —

Risk Research Platform



RECENT PROJECTS



Water BLEVE study prototype
(300°C; 85bar)

Water BLEVE

The aim of the EXPLORE project is to study the explosion of water under pressure and heated to 300°C. In the event of accidental depressurisation, the water's overheated, unstable state that can lead to a violent vapour explosion.

The project characterised the explosion risk of the pressurised tank and the near-field effects of the overpressure waves generated.



Natural gas blowout tests

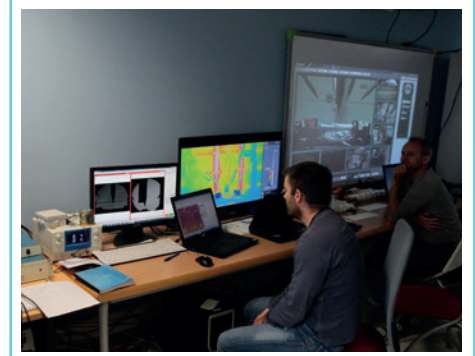
Blowout

The objective is to develop a modelling and decision-making support tool for the implementation of emergency plans for marine oil and gas leaks, including liquified natural gas (LNG).

The aim is both to improve the safety of personnel working on oil and gas facilities at sea and to limit the pollution impact on the marine environment.

MAIN EQUIPMENT AND TECHNIQUES

- Phantom V711, V2512 and Photron SA3 high-speed cameras
- FLIR SC4000 high-speed IR camera and FLIR GASFIND gas detection camera
- Dantec granulometry and 2D speed particle dynamics analyzer
- Full PIV (Particle Image Velocimetry) system
- Explosion measurement chain with HBM high-speed data acquisition system and PCB sensors
- Captec radiant and total heat flux sensors
- FARO 3D laser scanner
- Networks of PID detectors and FID analyzers for gas clouds
- Thermal Analysis coupled with FTIR Spectrometry
- 1x1 m sample surface electric / gas-fired radiant panel
- Pyrolysis-GC/MS
- Microscale combustion calorimetry
- Cone calorimetry coupled to FTIR Spectrometry
- Limiting Oxygen Index
- UL94 vertical flame testing
- Glow wire testing



You want to
develop a project ?

Contact details

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The IMT Mines Alès research centers

- C2MA Materials Research Center
- LGEI Center of Industrial Environment and Industrial and Natural Risk
- LGI2P Center of Computer and Production Engineering

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