



The role of PHOENICS/FLAIR CFD software for improving the capabilities of Fire Brigades in the analysis and prognosis of fire and chemical release hazards

GENERAL

PHOENICS/FLAIR is a CFD software package specialising in the simulation of scenarios involving fluid flow, heat transfer, combustion and chemical reaction processes occurring in the built and natural environment.

FLAIR is utilised by architects, design engineers and safety officers concerned with the performance of air-flow systems for both the internal and external environment.

FLAIR enables users to visualise, understand, evaluate and refine the air-flow patterns in steady-state or time-dependent scenarios, in micro- as well as macro-scale.

FLAIR permits the safe investigation of “What-If” scenarios involving ventilation system failures, fires, explosion, gas and chemical releases; and the subsequent effect of remedial action.

FLAIR shows results for:

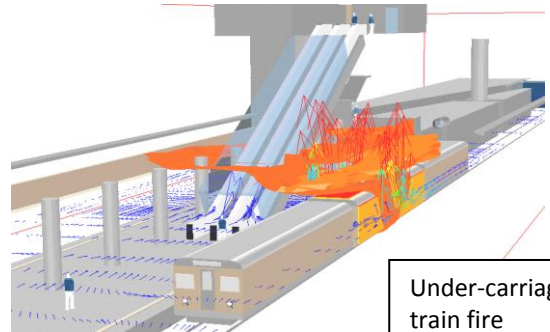
- Air flow patterns
 - Velocity
 - pressure
 - temperature
 - turbulence
- Temperature distribution / stratification
- Radiation
- Humidity
- Thermal comfort
- Age of air / residence time
- Air change effectiveness
- Smoke layering and concentration
- Visibility / line of sight
- Pollutant spread and concentration
- Transport of contaminants
- Effect of sprinkler- and fan- fire control methods





FLAIR contains:

- CAD import and repair features
- Standard objects for diffusers, fans, sprinklers and equipment types
- Heat sources, inlet, outlet and other boundary conditions
- Wind and wind profiling
- Solar gain
- ISO, Green Star and ASHRAE standards
- A library of materials
- A property database
- A relational data input (RDI) feature



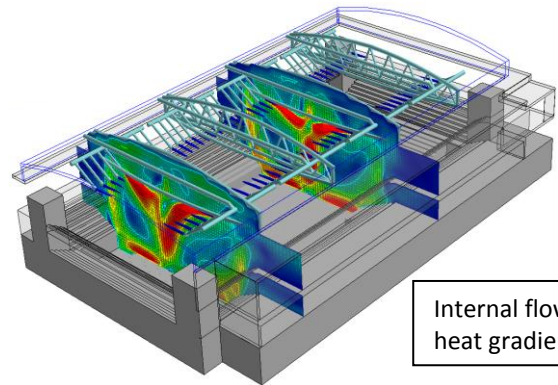
Under-carriage train fire

FLAIR displays:

- Building geometry and terrain data
- Velocity vectors
- Streamlines
- Iso-surfaces
- Contours of pressure, temperature, concentration, relative humidity & thermal comfort parameters
- Animated results

FLAIR permits:

- Addition of user-defined functions
- Addition of user-defined materials
- Addition of user-defined properties



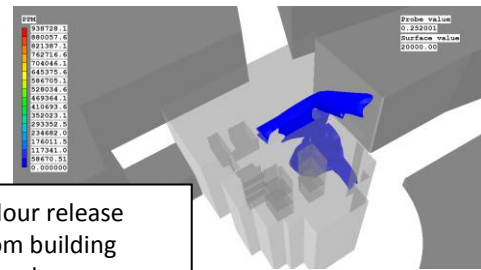
Internal flow heat gradient

FLAIR applications include:

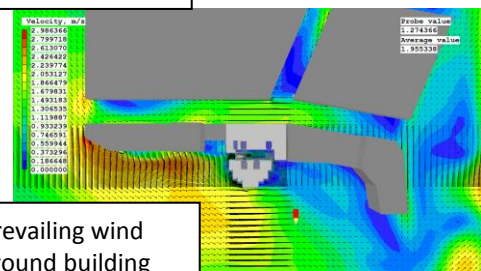
- Heating, ventilation and air conditioning, thermal comfort
- Fire and smoke hazards
- Chemical release and pollution spread
- Wind loading on structures

FLAIR cases include:

- Atria
- Building complexes
- Car parks
- Clean Rooms
- Furnaces & incinerators
- Railway stations
- Sports stadia
- Cityscape street canyons
- Road and rail tunnels
- Hilly terrain



Odour release from building complex



Prevailing wind around building complex