



CPV – proposal, design, CFD simulation

Real projects of the buildings

The scope of the realized project :

- ✓ Car park ventilation - day to day ventilation – DIN VDI 2053:2004 ¹⁾
- ✓ Car park ventilation – smoke ventilation - BS 7346-7:2013 ²⁾
- ✓ CNG/LPG ventilation - DIN VDI 2053:2004 ¹⁾
- ✓ Escape routes ventilation – EN 12 101-6:2006 ⁴⁾





The scope of the day to day ventilation:

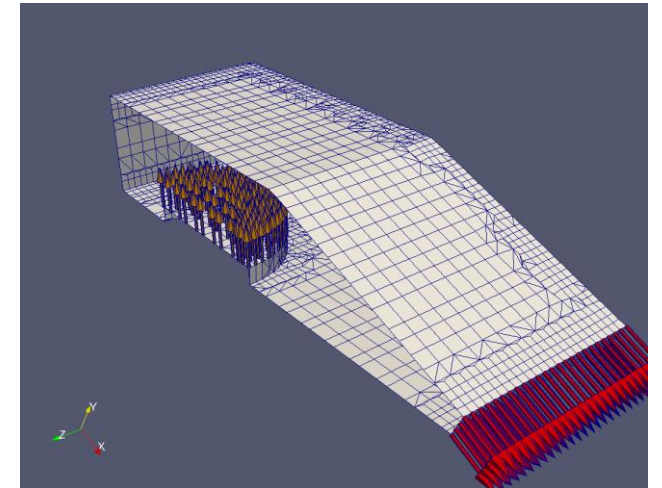
- ✓ CPV is calculated acc to a real conditions - time, distance, slope
- ✓ ErP 640/2009/ES ⁵⁾ – all the axial fans equiped with frequency invertes (IE2)
- ✓ Enviroment friendly – driven by CO concentrations measurment
- ✓ Preheating of the inleat air – water exchanger
- ✓ CPV is running only in case of CO / CNG / LPG detection
- ✓ COLT Cyclone 100N fans





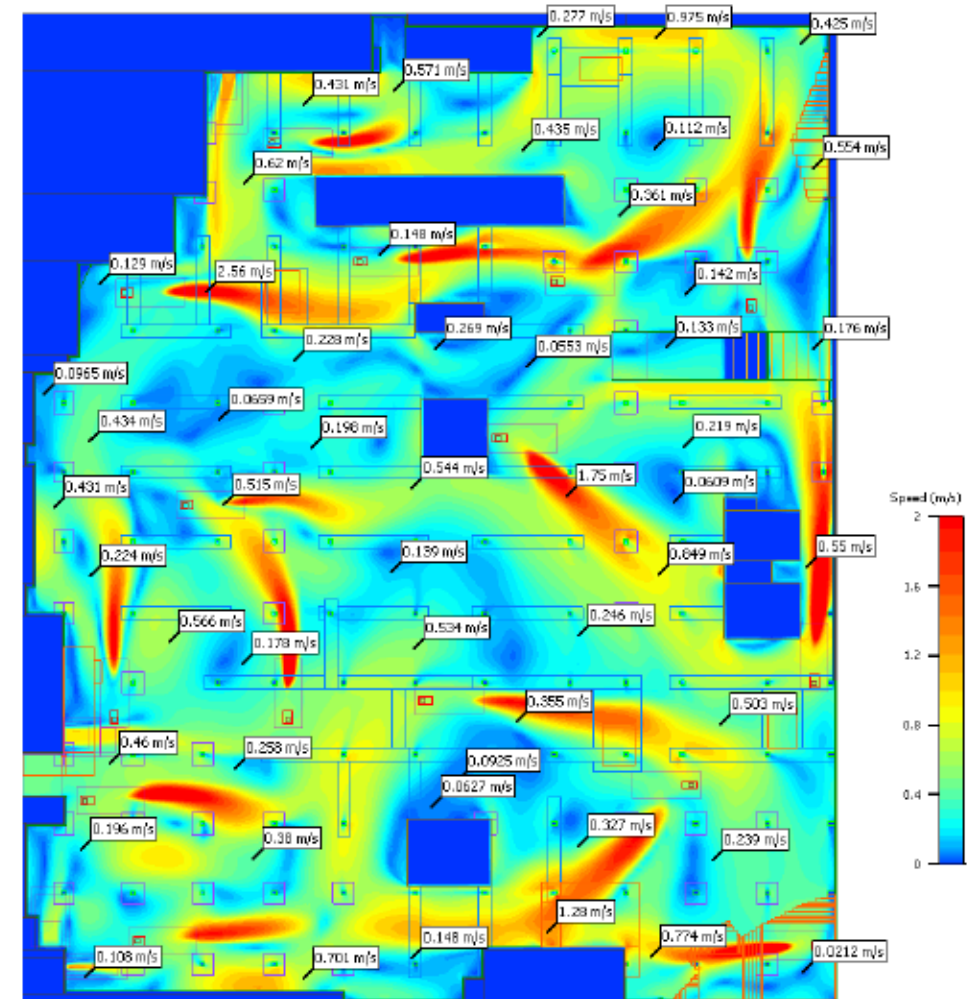
Advantages of used induction fans:

- ✓ CPV – dilution of CO concentration , smoke concentration
- ✓ No ducts – no need for floor CO sucking
- ✓ Appropriate for lower installation heights, double speed fan, F300 rated
- ✓ Thrust up to 100 N means – distance up to 80 m blowing
- ✓ Is able to cover and treat of about 1000 m² / of the floor
- ✓ CFD simulation – was a part of the proposal



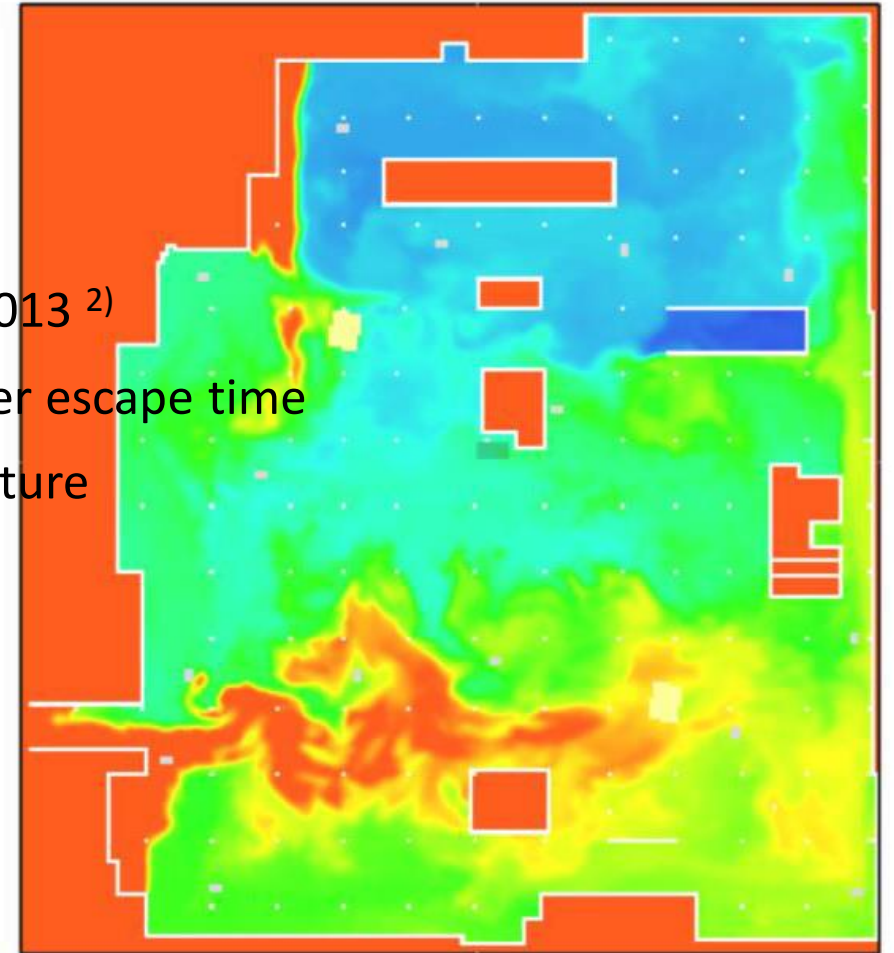
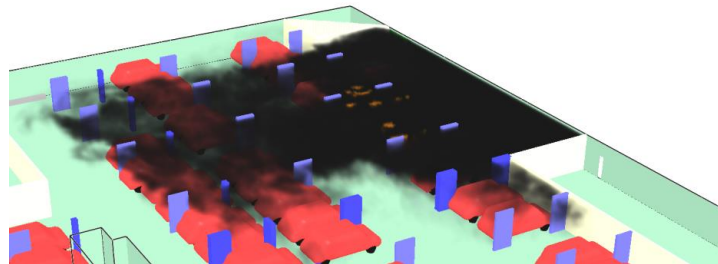
CFD – how we made it ?

- ✓ SCA Guide CFD Modelling for CPV Systems
- ✓ Speed, temperature, CO concentration
- ✓ Improvement of the proposal
- ✓ Defined criteria like speed, thrust on the doors
- ✓ Cooperated with local fire authorities demands



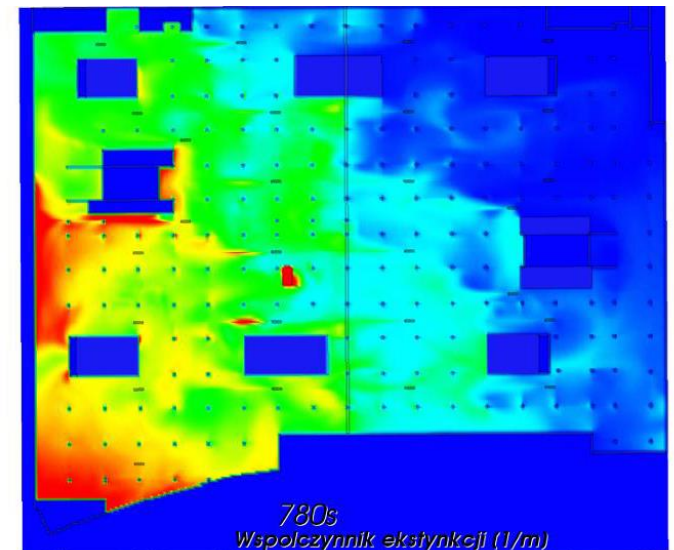
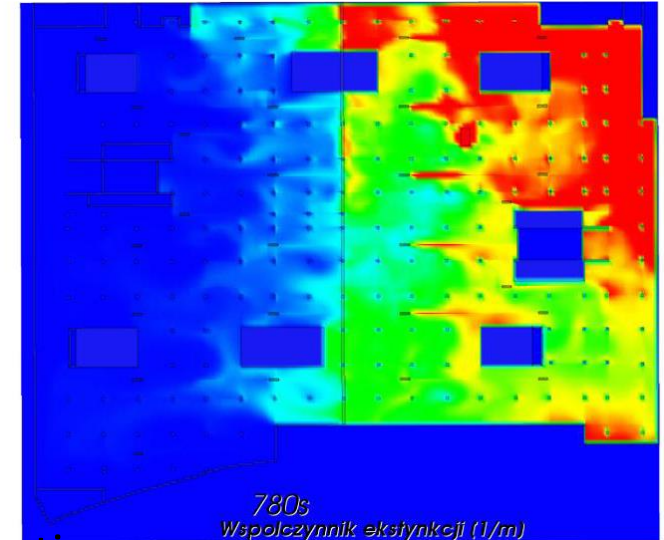
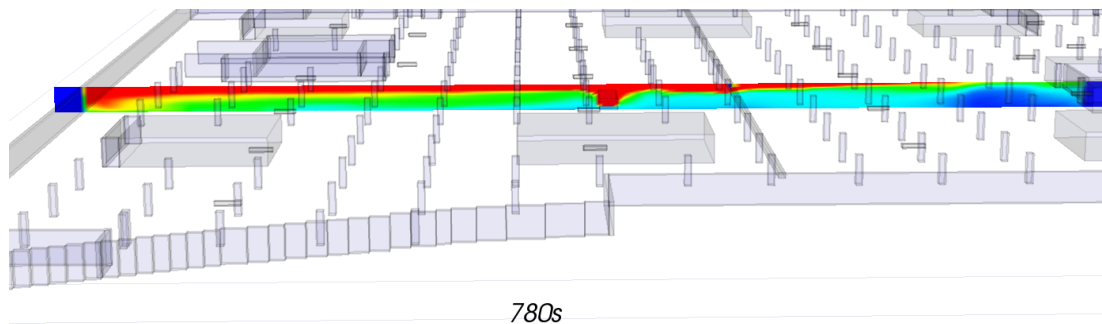
CFD modelling of the fire :

- ✓ Calculated acc to CEN/TR 12 101-6 ⁴⁾ and BS 7346-7:2013 ²⁾
- ✓ Smoke clearance effect – temperature decrease , better escape time
- ✓ CFD acc defined criteria – distances, visibility, temperature
- ✓ Hot smoke test in real CPV conditions
- ✓ CFD simulation – a part of the project documentation



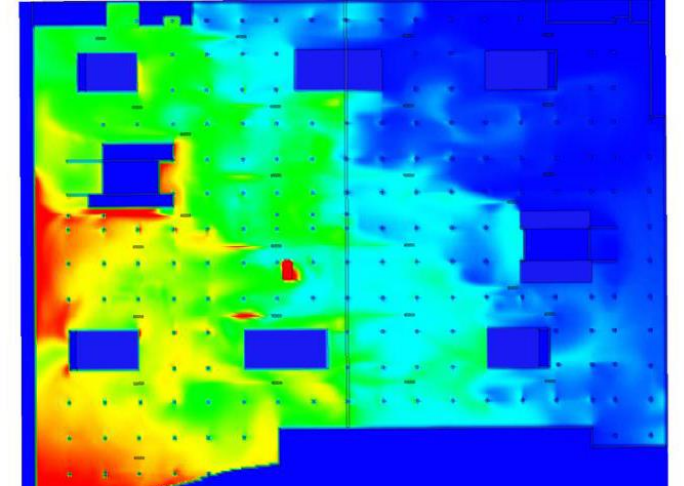
Project with impulse fans:

- ✓ Calculated acc to CEN/TR 12 101-6⁴⁾ and BS 7346-7:2013²⁾
- ✓ Smoke clearance effect – temperature decrease , better escape time
- ✓ Using of JET RT fans allows to reverse direction of blowing
- ✓ Hot smoke test in real conditions
- ✓ CFD simulation – allows you to find weak points



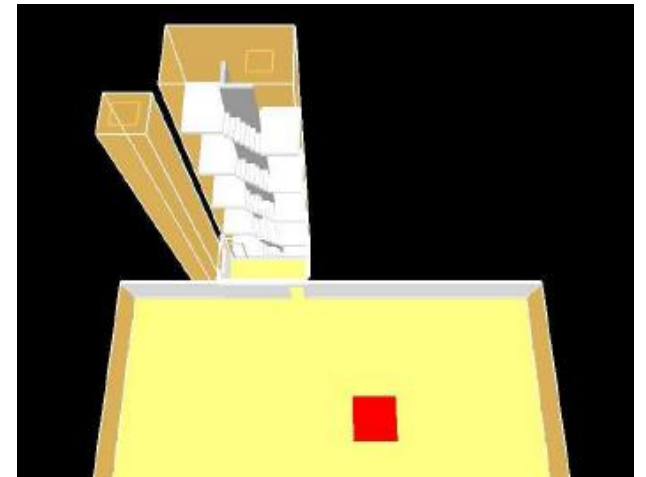
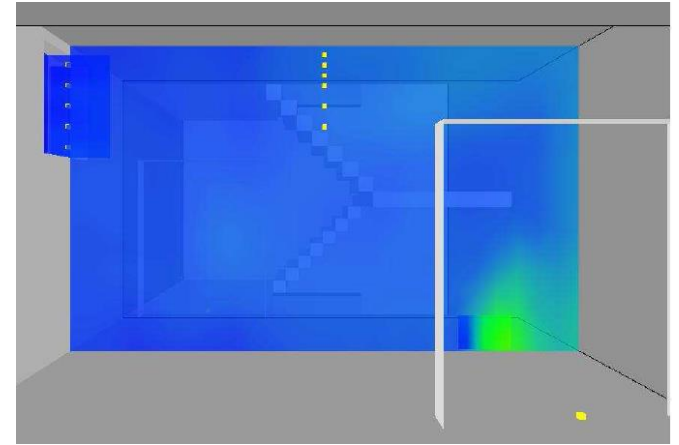
Hot/Cold smoke testing:

- ✓ Real conditions scale model acc AS4391-1999 standard
- ✓ Testing gives experience with real situation
- ✓ Hot smoke test or more simple cold smoke test
- ✓ Measurement of the time , speed in the shafts
- ✓ A fire brigade has possibility to test the system



Escape routes acc COLT shaft system:

- ✓ Calculated acc to CEN/TR 12 101-6 4)
- ✓ Colt smoke shaft system – dedicated for the escape routes
- ✓ Stair/Lobby - pressure difference measurement
- ✓ Fans equipped with frequency inverters
- ✓ Dedicated for the tall buildings



Legislation frame:

1. DIN VDI 2053:2004 Air treatment for car parks (ICS 91.140.30)
2. BS 7346-7:2013 Components for smoke and heat control systems (ICS 13.220.20)
3. EVS 919: 2013
4. EN 12 101-6 Smoke and heat controls systems – Part 6 (ICS 13.220.99)
5. Commission regulation ERP/640/2009
6. CEN/TR 12 101-5 Smoke and heat controls systems – Part 6 (ICS 13.220.99, 23.120)
7. EN 12 101-3 Smoke and heat controls systems – Part 3 (ICS 13.220.99, 23.120)





Thanks for your attention !