FIRE MODELING WITH CAD/GE1 TECHNIQUES

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16th August 2011

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Introduction – Background Information

- Fire Engineering approach is needed when the design could not fully comply with the local fire safety codes.
- Numerical simulations prove the design performance.
- Many difference parties
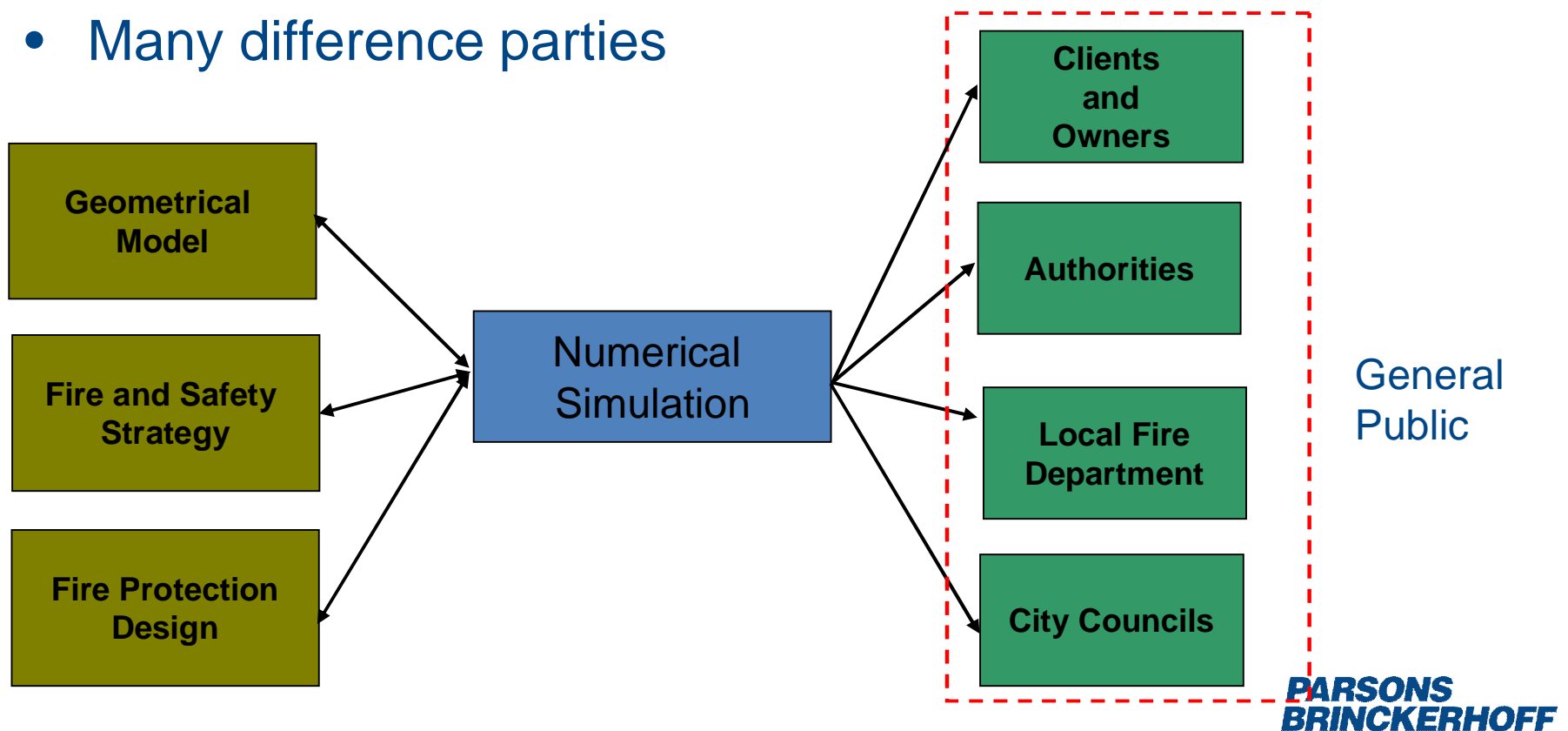
Introduction - Visualization

Present the engineering design to general public

- Presentation form Engineers view

  – Boundary Conditions
  – Initial Conditions
  – Mesh cell size
  – Domain/mesh configurations
  – Fire properties
  – Solver
  – Duration of Simulation
  – Turbulence Model
  – Tenable Environment

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- Presentation form General Public view

  – Fire Load and Location

  – Tenable Environment
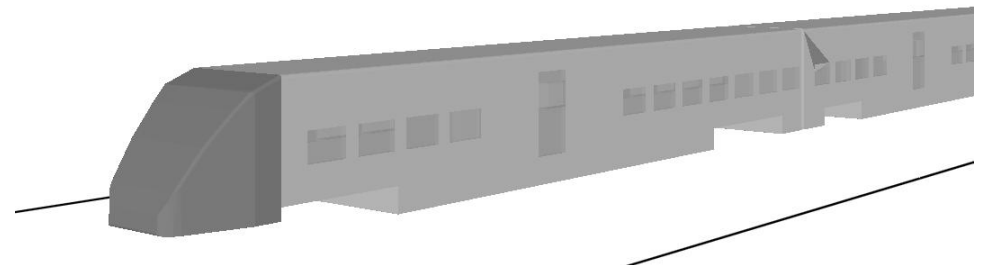
  – **Geometry Details**
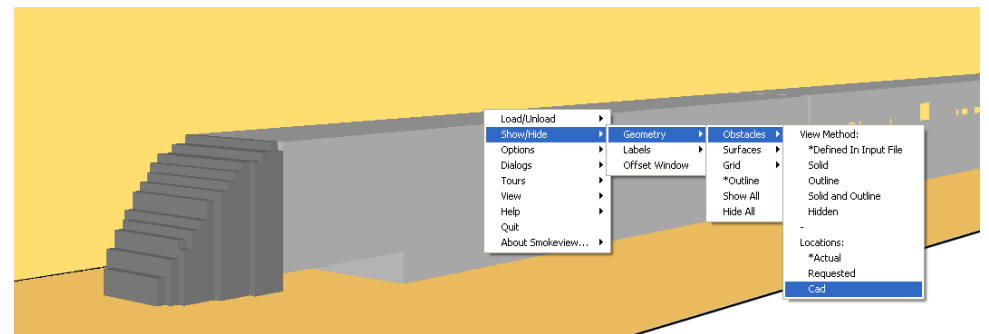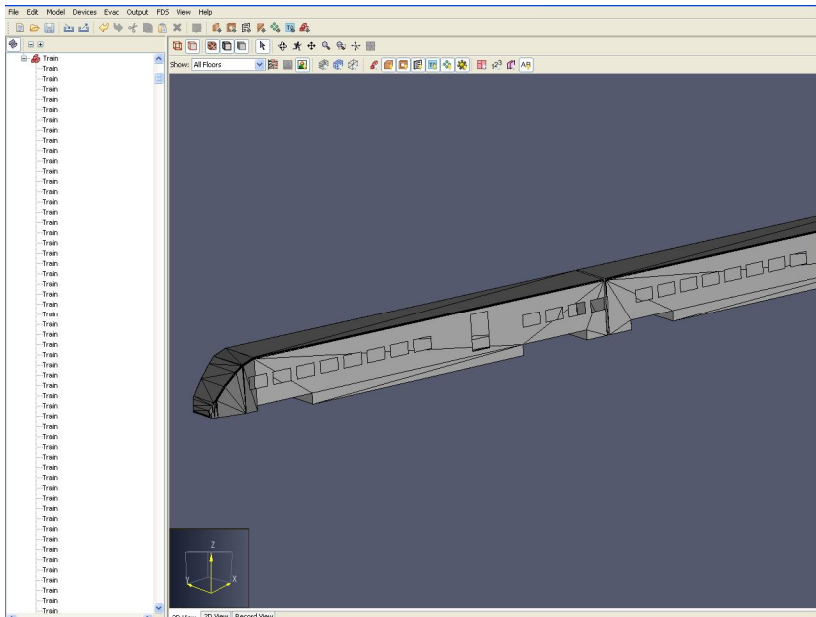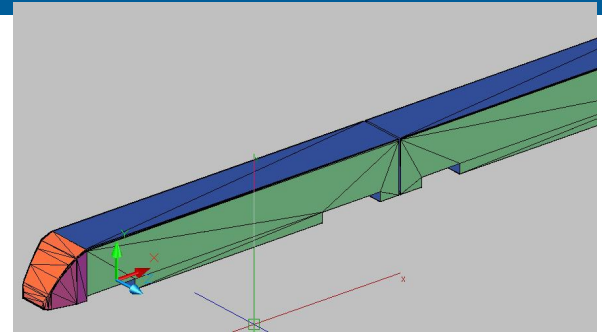
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Introduction – CAD/GE1

- SmokeView geometric description file (.GE1)

- Improve the realistic level

- Independent to the FDS mesh

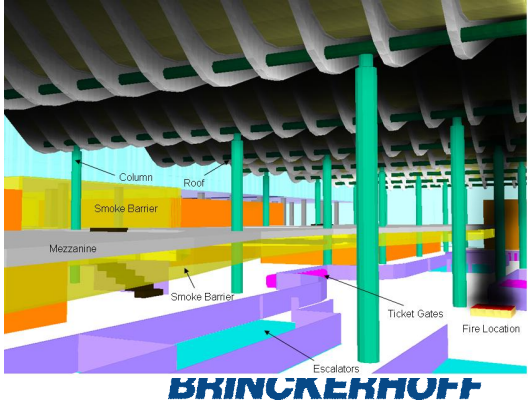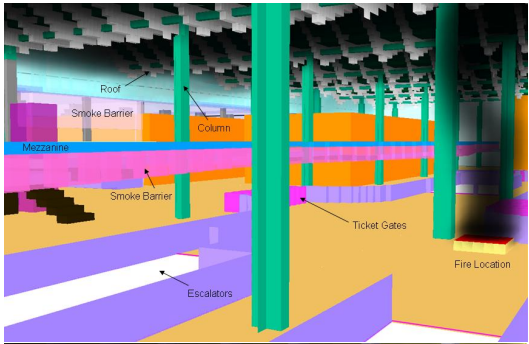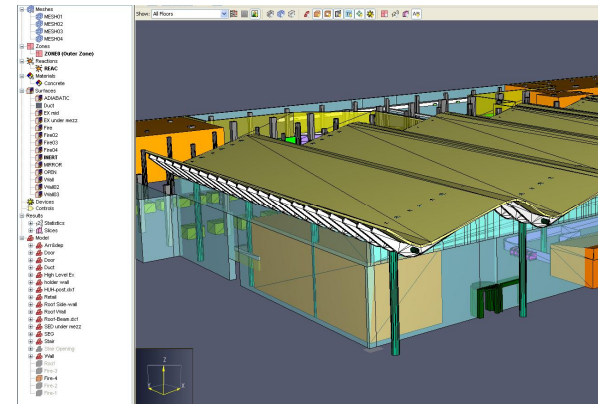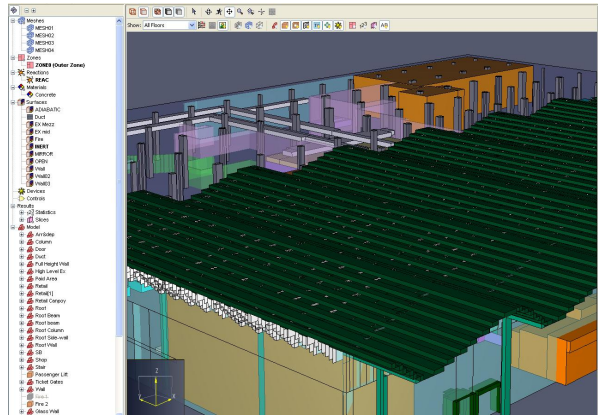- All geometric details
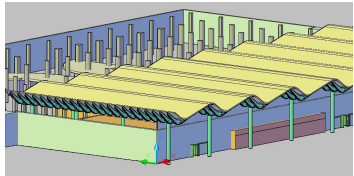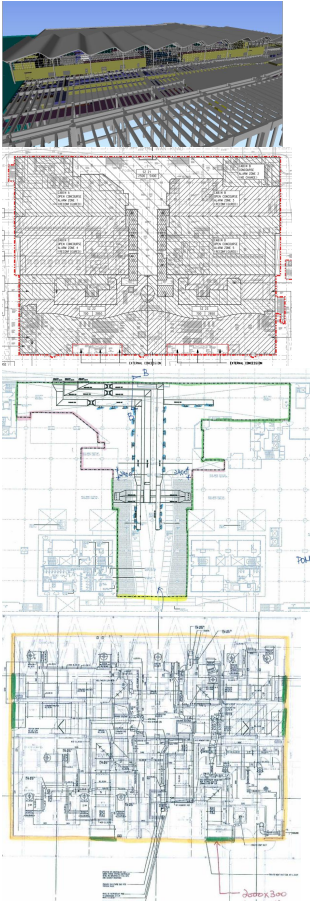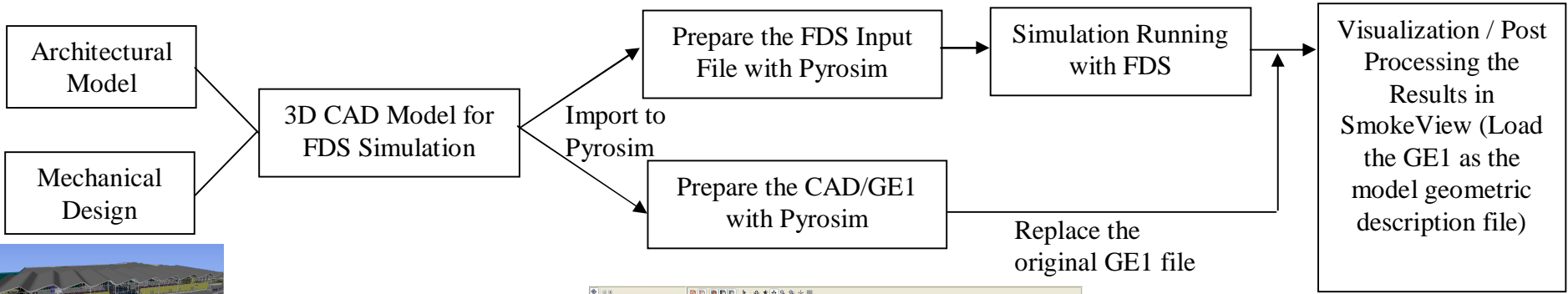
- Modified geometric anytime
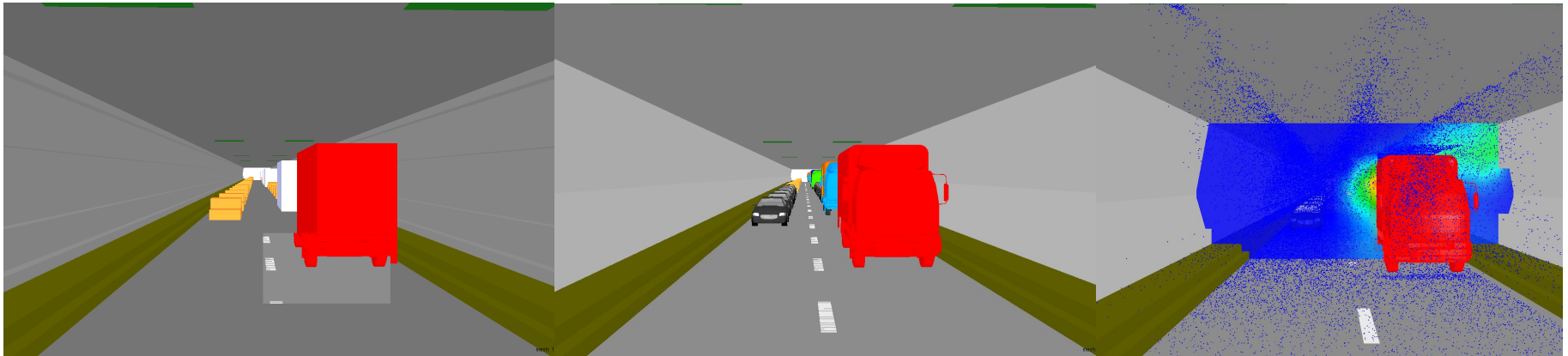
How to prepare the CAD/GE1

1. Add following in FDS Input File:

   "&DUMP RENDER_FILE='XRL7.ge1'"

2. 3D Geometry CAD Model (3D Face)

3. Convert 3D CAD to FDS input file with Pyrosim

4. Modified the FDS Model for analysis

5. Load the GE1 CAD file

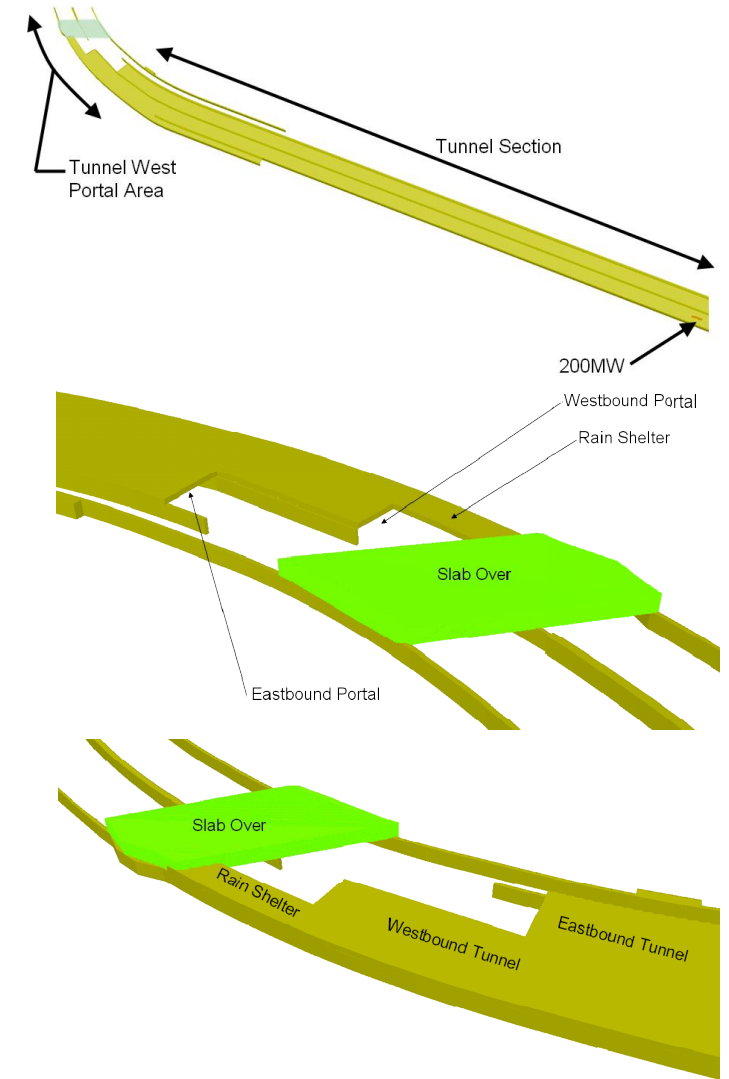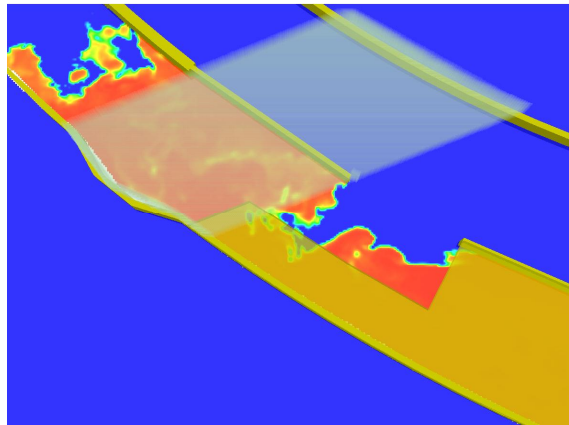# CAD1/GE1 for Large Scale Complex Geometry Projects

The Benefits for Commercial Projects

- Communication

- Understanding for General Public

- Avoid over Detail FDS Model

- Save Computer Resources

- Avoid Re-run

- Efficiency

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Case Studies 1 - Large Scale Hub Station in Hong Kong

- **4 lines interchange station expansion**
- **Parsons Brinckerhoff is leading the building services BIM design**
- **19 FDS simulations for the Fire Engineering approach**
- **Station Concourse coverage approximately 160m x 120m x 15m**
- **Complex geometry in concourse**

Fire and Safety Simulation

Evacuation Simulation
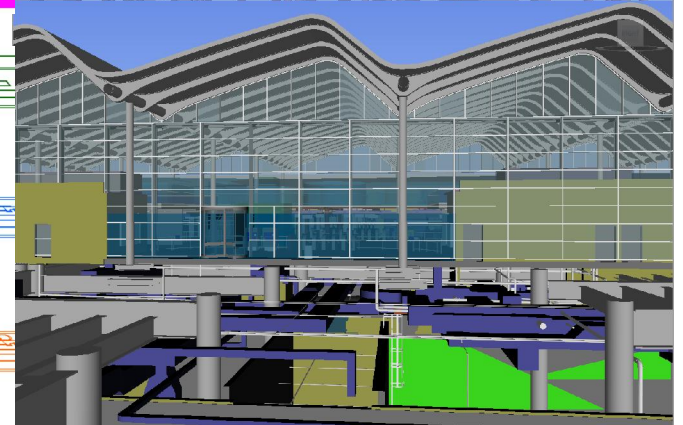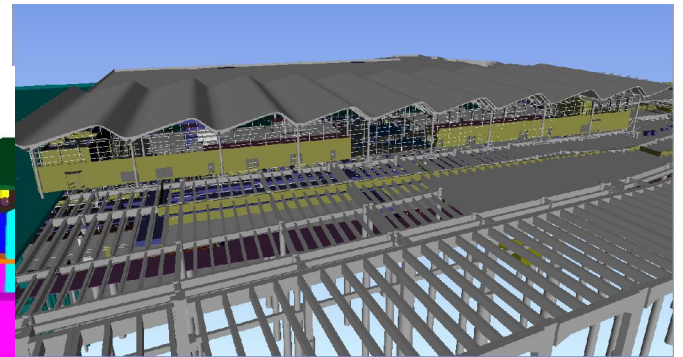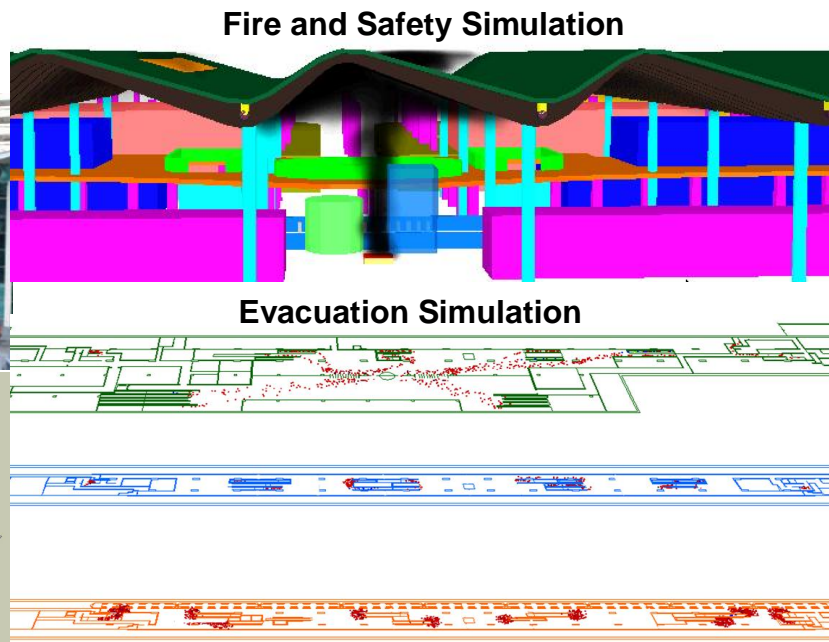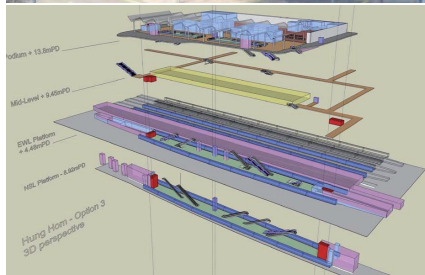
Case Studies 1 - Large Scale Hub Station in Hong Kong

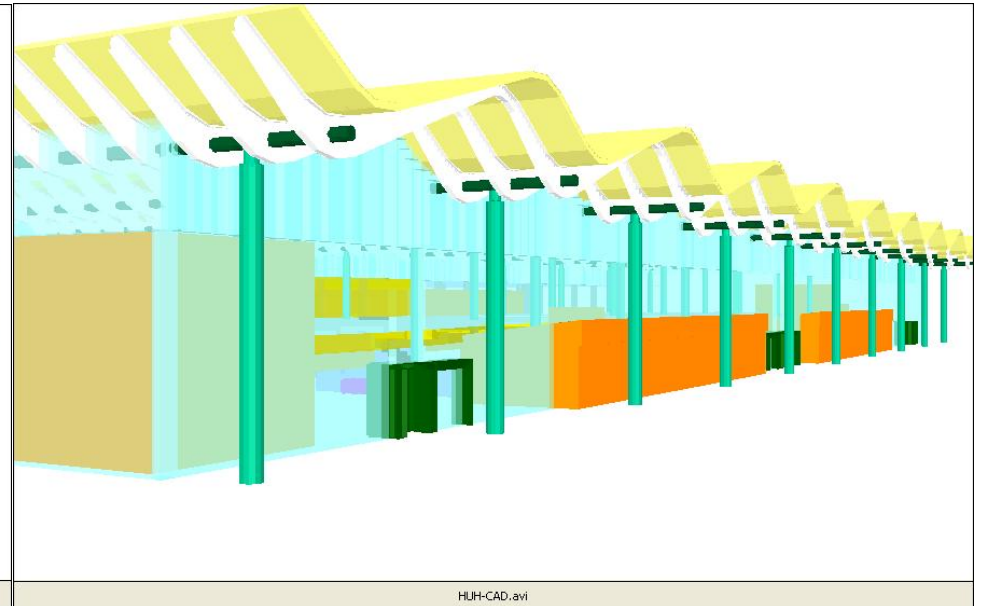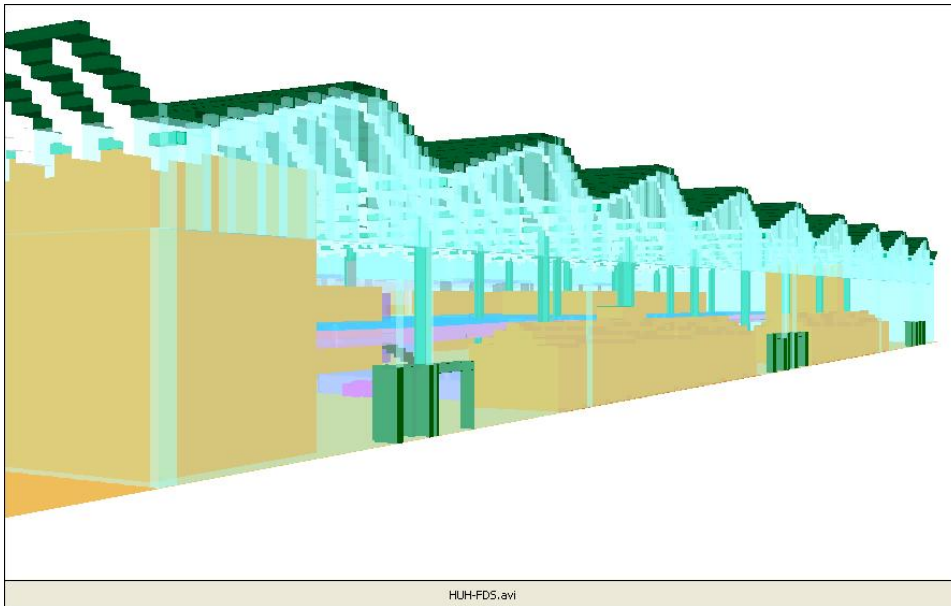Video

FDS model   CAD/GE1 Model

HUH-FDS.avi

HUH-CAD.avi

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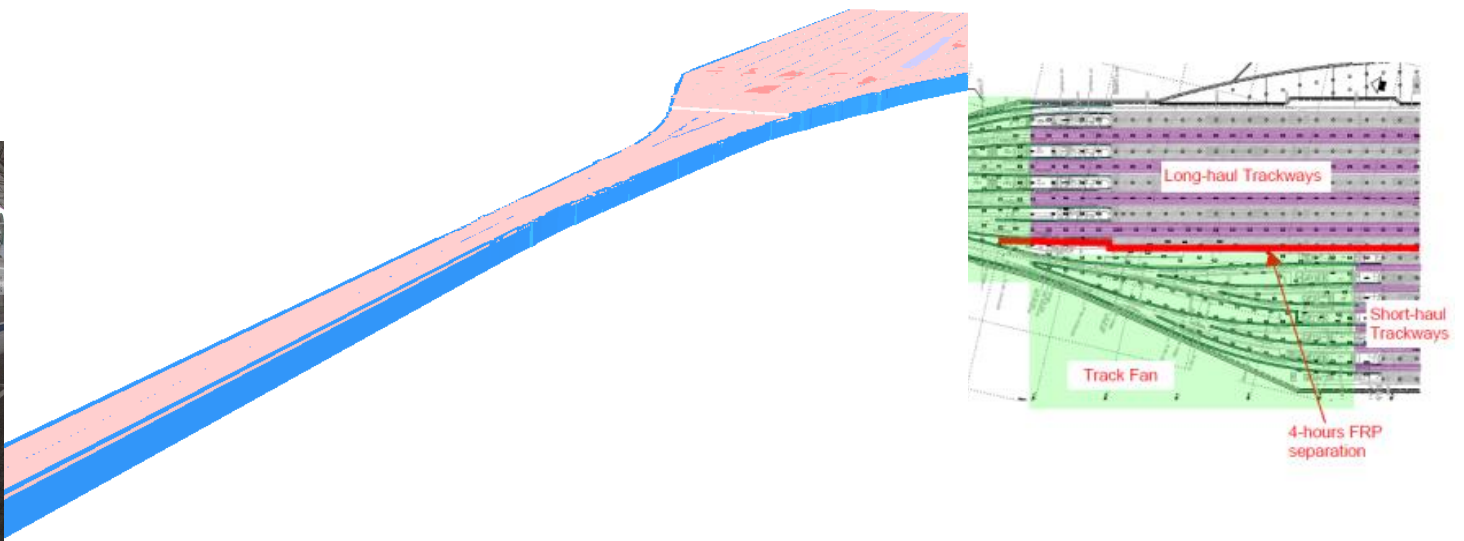
Case Studies 2 - Platform and Fan Track Area For High Speed Railway

- **One of the largest multi-track underground platform and fan track area in Asia**

- **Track crossover included**

- **Parsons Brinkerhoff conducted fire engineering study to analyse the smoke control system.**

- **The total area is around 800 m x 200 m x 10m**

- **8 FDS simulations for the Fire Engineering approach**
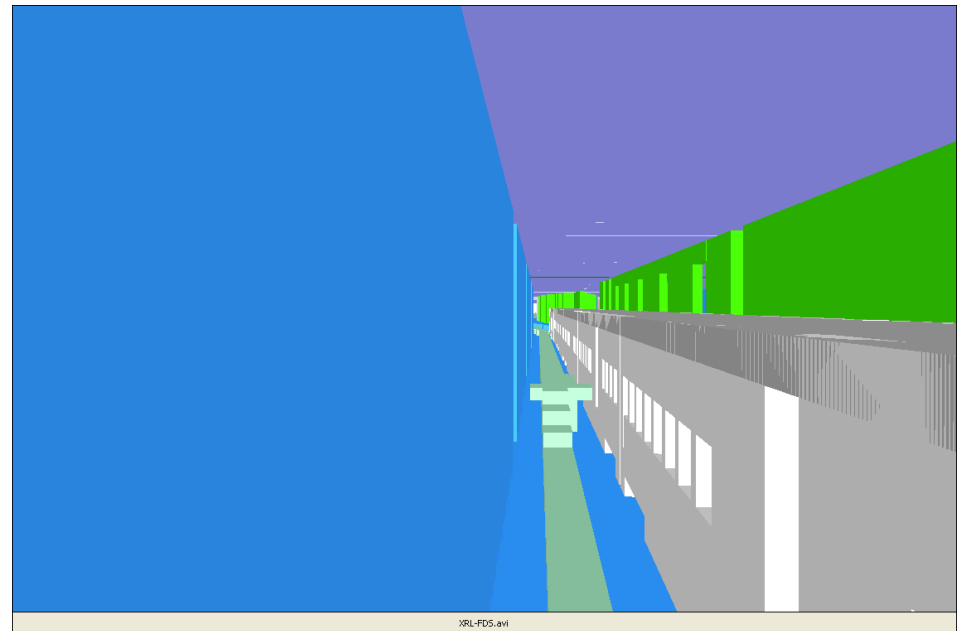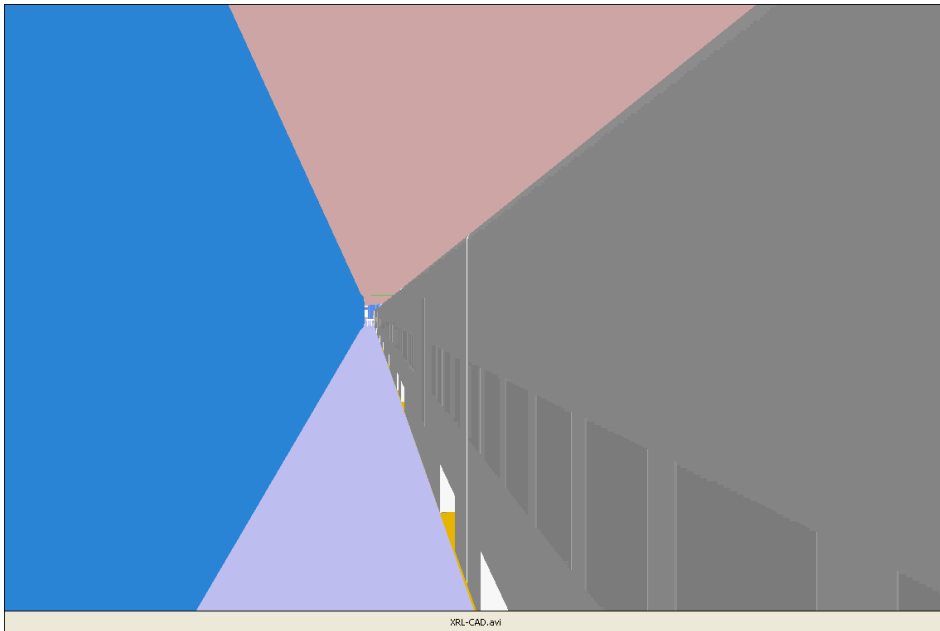
Case Studies 2 - Platform and Fan Track Area For High Speed Railway

Video

FDS model   CAD/GE1 Model

Conclusion

- **CAD/GE1 is an user-friendly function for FDS post-processing.**

- **Architectural 3D models are ready.**

- **With Pyrosim, the ge1 will be generated for each simulation.**

- **Enhanced the result visualization.**

- **Improved the communication and understanding.**

- **Balance the visualization demand and simulation resources.**

Way Forward

- **There are few suggestions for the CAD/GE1 function**

  – **Improving the integration with "texture" function**

  – **Display "Hole"**

  – **Match the "Vent" setting with FDS model**

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Thank You!

Q&A