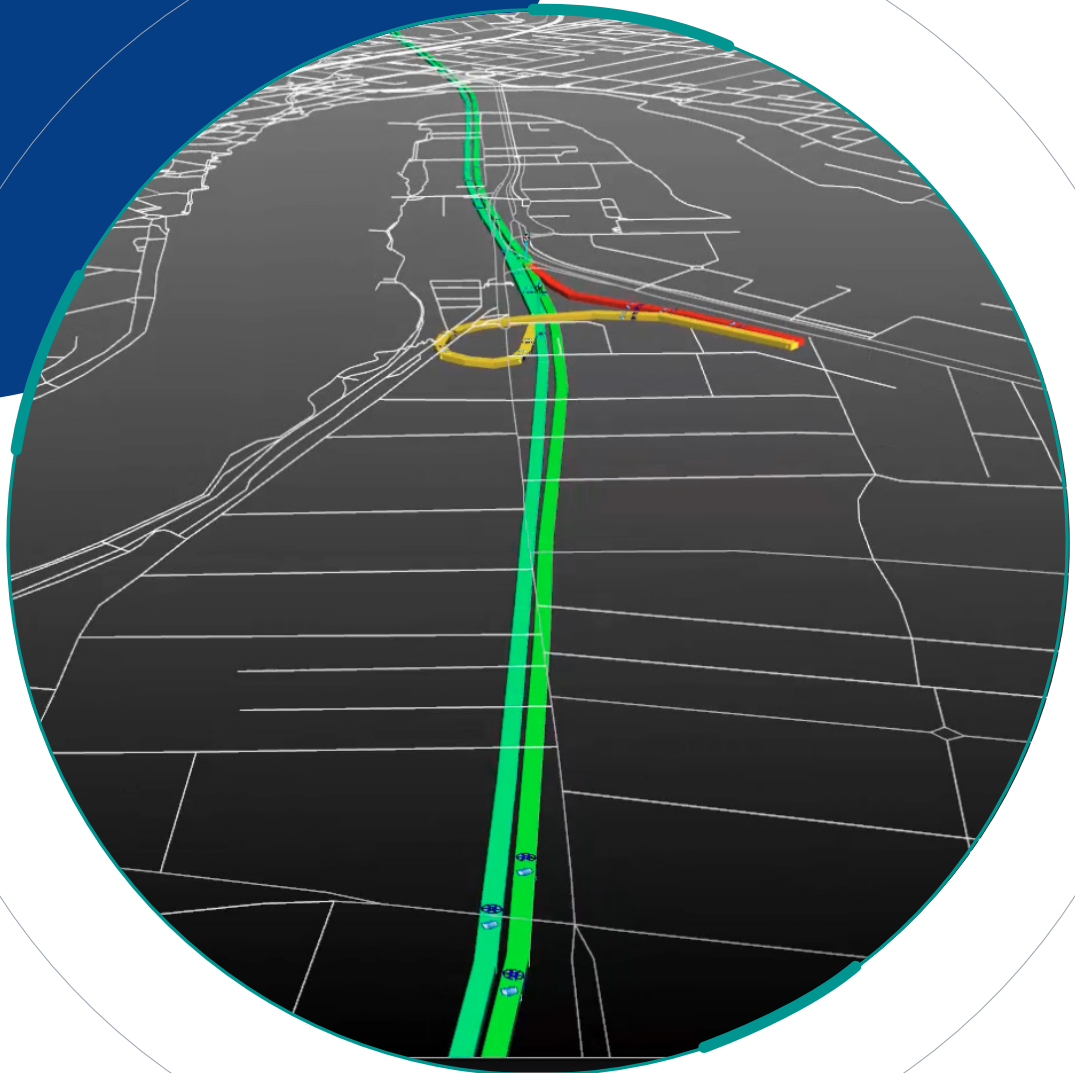


Ventsim™ Tunnel Design

Optimised tunnel ventilation system
design using accurate modelling
and performance analysis



Ventsim™ Tunnel DESIGN gives tunnel engineers a unique tool for the development of highly efficient, responsive, and safe tunnel ventilation systems

Based on almost 30 years of active use within underground ventilation design and simulation, the latest Ventsim™ Tunnel DESIGN version addresses all aspects of road tunnel air flow management and emergency smoke extraction, while providing actionable insight and output to engineers working on tunnel ventilation. This could be:



Design engineers

Tunnels are substantial pieces of infrastructure involving complex engineering. A key component for successful operation is the ventilation system. Success can be measured in terms of providing an assured level of safety for future tunnel users in normal and emergency situations, while also optimising the whole system by balancing performance against operational costs. Ventsim™ Tunnel DESIGN enables designers to arrive at the best solution based on comprehensive modelling.



Tunnel operators

There is an ever-increasing need to maintain tunnel operations at the most optimal level. This is to maximise efficiency as well as stay up to date with evolving vehicle types, traffic volumes, and conditions. Ventsim™ Tunnel DESIGN can be used to record an accurate view of existing tunnel ventilation systems and allow operators to both benchmark performance and consider future scenarios.



Academic engineers

Road tunnels have a strong future as travel needs and the limits of land access increase. As a major element of operation and cost, ventilation is an attractive area of study. Ventsim™ Tunnel DESIGN offers researchers a practical method of testing hypotheses with a view to bringing increased insight and diverse design approaches. This can be particularly important in understanding the impact of trends such as greater use of electric vehicles and the ability to deal with lithium battery fires.

Wide range of simulations to meet all tunnel operational design requirements

Ventsim™ Tunnel DESIGN enables a large set of elements, from air and gas to smoke, to be modelled according to potential conditions. This provides design engineers a thorough understanding of behaviours that can be expected when the tunnel is operating normally and in emergency situations.

The result is a final system design that is optimised on the basis of sizing, efficiency, and safety.

Model based on:

- Air flow - pressure and piston effect
- Gas flow - including diesel particulate matter (DPM), nitrogen dioxide, carbon monoxide, nitrogen monoxide
- Fire/smoke - flow and procedures

Built-in cost calculations for financial and performance analysis

Relative costs associated with design options are a key consideration as projects need to meet construction as well as operational requirements.

Within Ventsim™ Tunnel DESIGN, cost models can be updated with real information and data on all ventilation system components. This provides an accurate view of the costs and ensures the selected design is optimised in terms of performance and cost.

Cost analysis based on:

- Construction cost model
- Operational projections based on annual power cost

High integration with industry tools and datasheets

Compatibility with common project design tools contributes to easier, more consistent, and faster design development and review. Additionally, industry and equipment datasets and key calculations are all built into Ventsim™ Tunnel DESIGN. This integration enables designers to analyse models based on accepted standards and evaluate the impact of typical scenarios. Overall, this provides the assurance of an effective and safe design.

Tools and data sets:

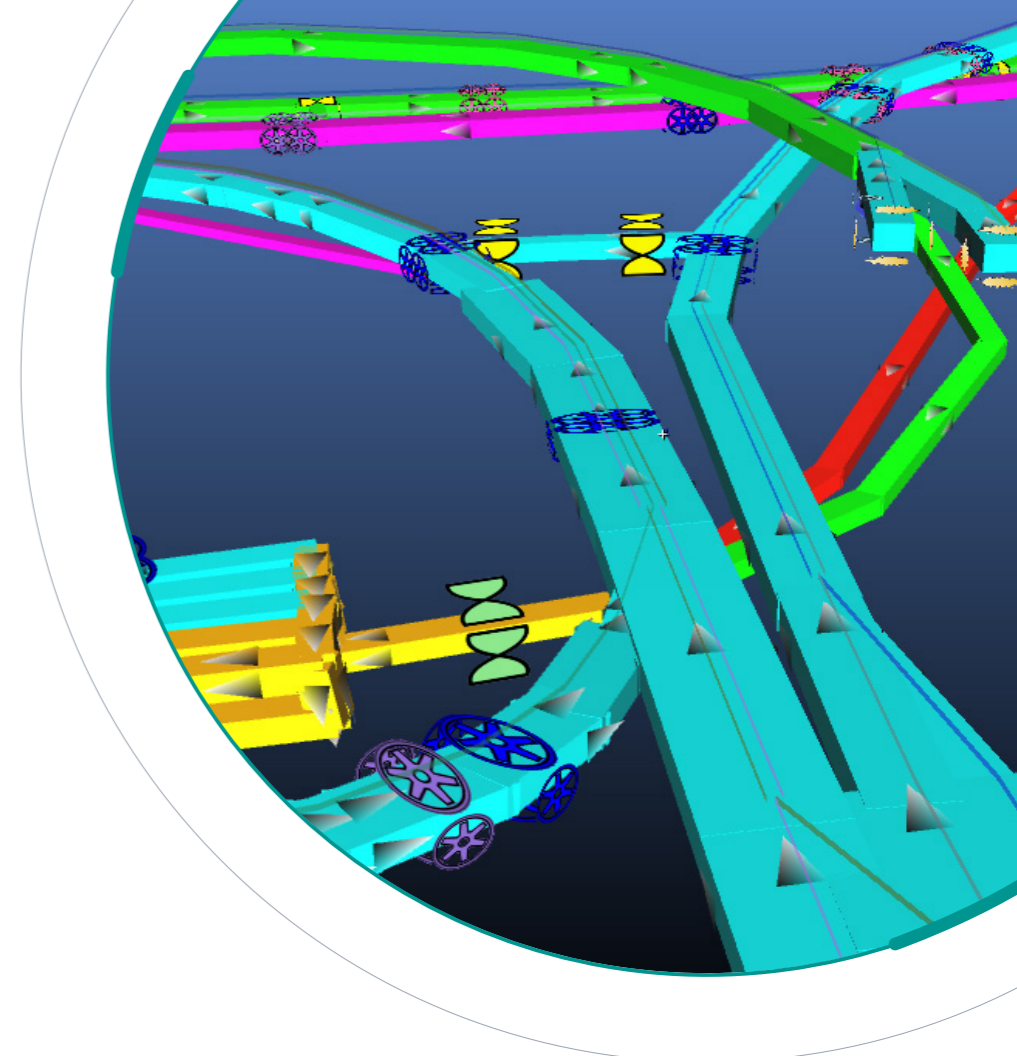
- CAD & BIM - model import
- Critical velocity - automatic calculations addressing flow and back layering
- Expandable fan digitiser to build in fan data
- PIARC vehicle type database
- Excel – model data and charts export function

Highly visual and user-focused

As an enabling tool, Ventsim™ Tunnel DESIGN is focused on delivering functionality in an easy and understandable way for users. This translates to quicker development and assessment of designs to meet project schedules. Being highly visual by using colour, mapping and textual content, Ventsim™ Tunnel DESIGN provides greater clarity over all aspects of the ventilation system within the context of the whole tunnel. This also increases clear communication of system design concepts with all stakeholders.

Ease of use aspects:

- Intuitive interface
- Topographical view
- Graphical representation of gases including peaks (location and timing)
- Strong visualisation using colours aligned to key parameters and customisable on-screen data



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