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**CONGRESSO BRASILEIRO DE TÚNEIS
E ESTRUTURAS SUBTERRÂNEAS**

**SEMINÁRIO INTERNACIONAL
"SOUTH AMERICAN TUNNELLING" - 2008**

23 A 25 DE JUNHO DE 2008

DESIGNING PRESSURE AND DRAUGHT RELIEF SHAFTS FOR A METRO SYSTEM

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**CENTRO FECOMÉRCIO DE EVENTOS
SÃO PAULO - SP**



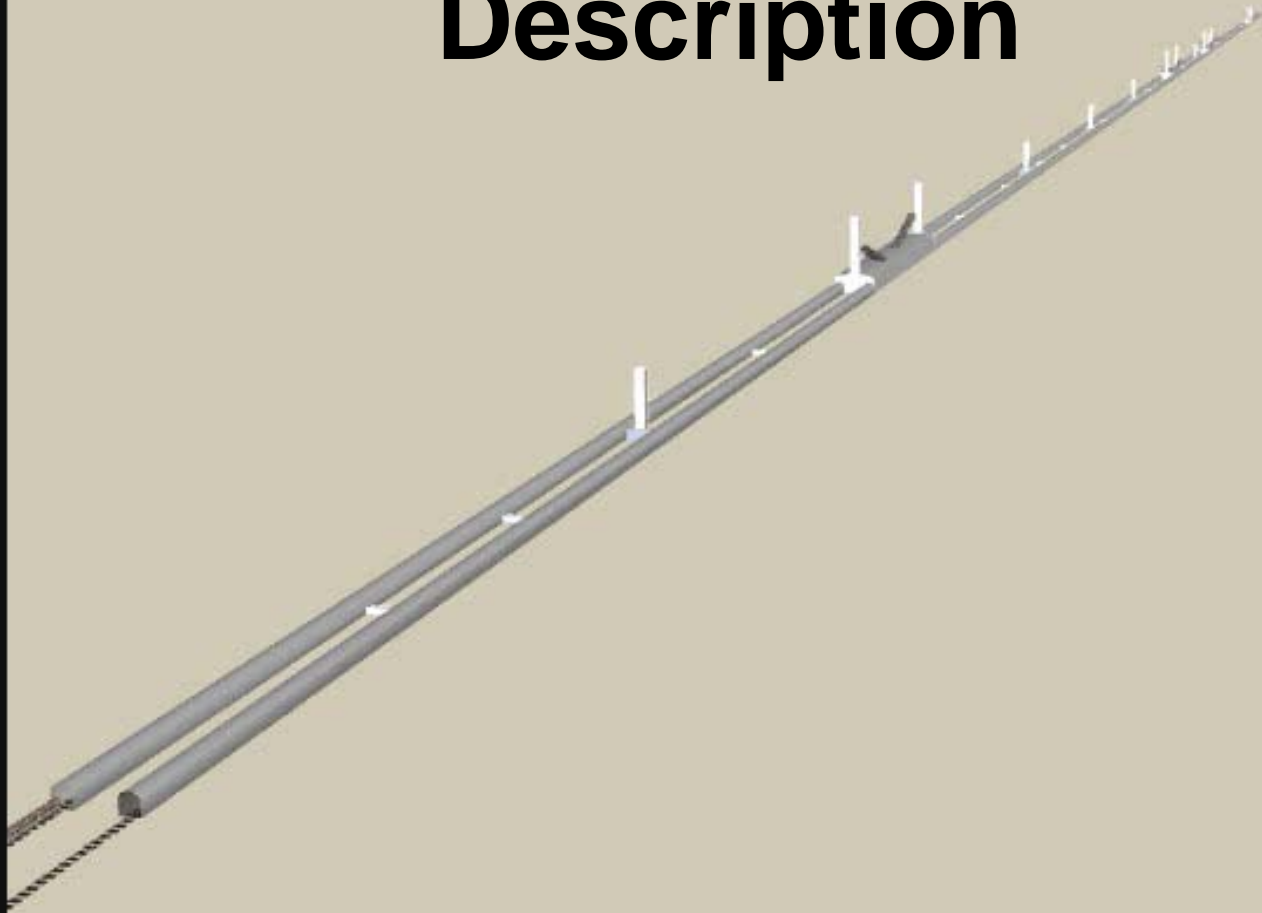
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Design Concept and System Description





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Objectives

- Provide consultancy for the preliminary design of pressure and draught relief shafts
- Dimension the pressure/draught relief shafts to keep the air velocities below 5 m/s at the stations



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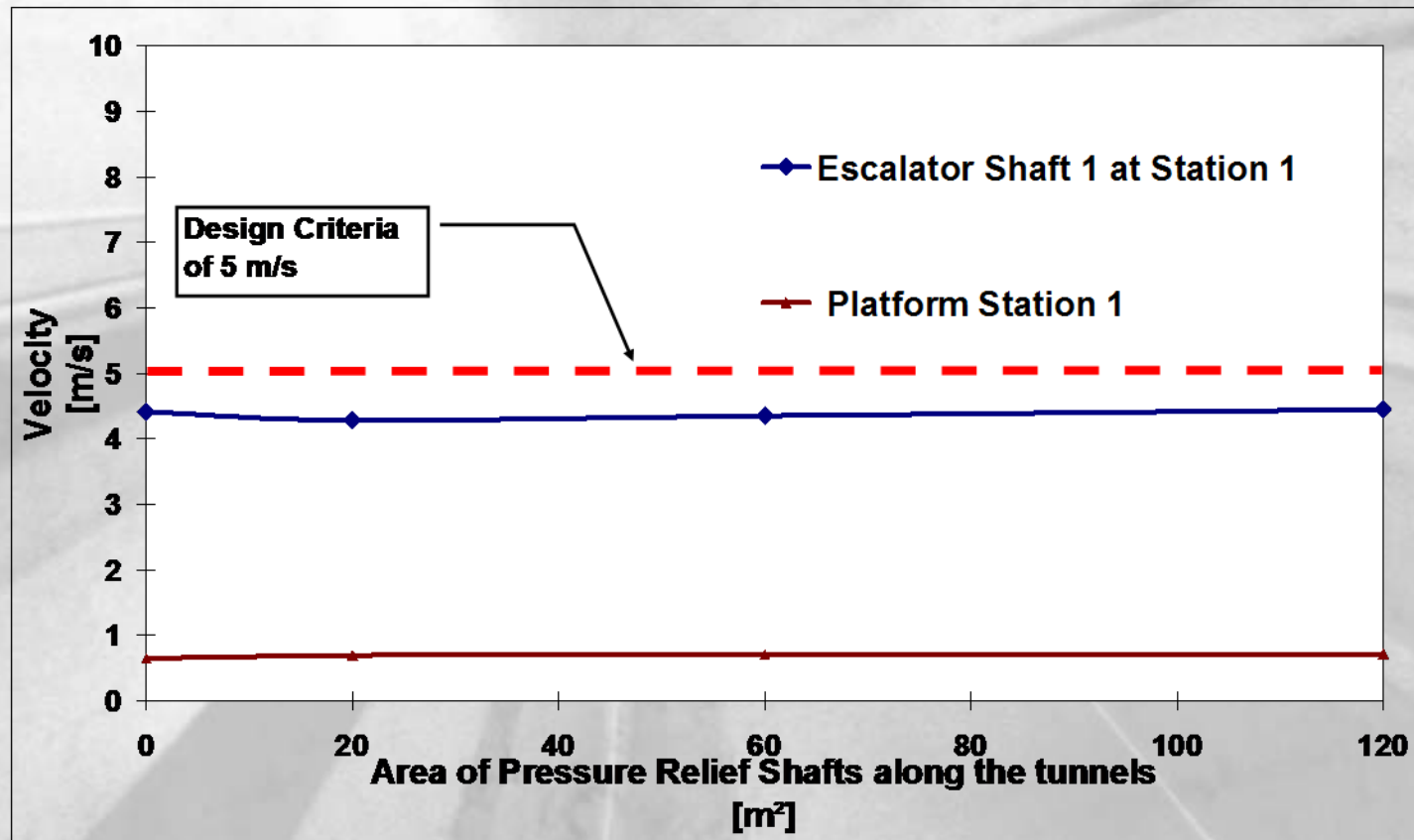
Simulation Methodology

- 1-D network modelling
- 3-D effects modeled using pressure and viscous loss coefficients
- No thermodynamic effects are modeled
- Generation of pressure waves (compressibility effects) are not taken into account

Results

Effect of "Pressure Relief Shafts" on air velocities at platforms and escalator shafts

- Velocities at platform and in escalator shaft are not effected by change in pressure shaft's cross sectional area

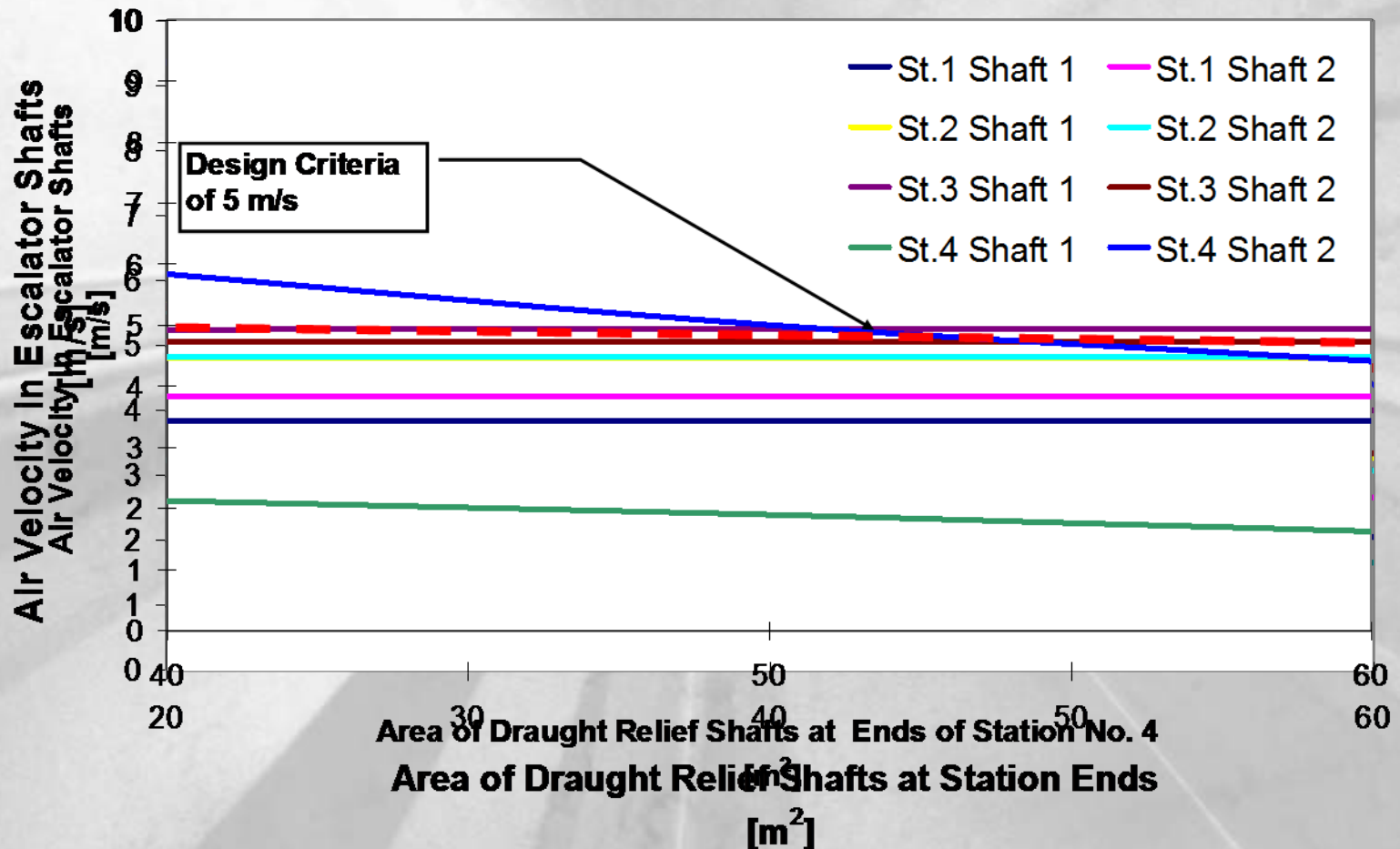




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Results

Effect of "Draught Relief Shafts" on air velocities in escalator shafts





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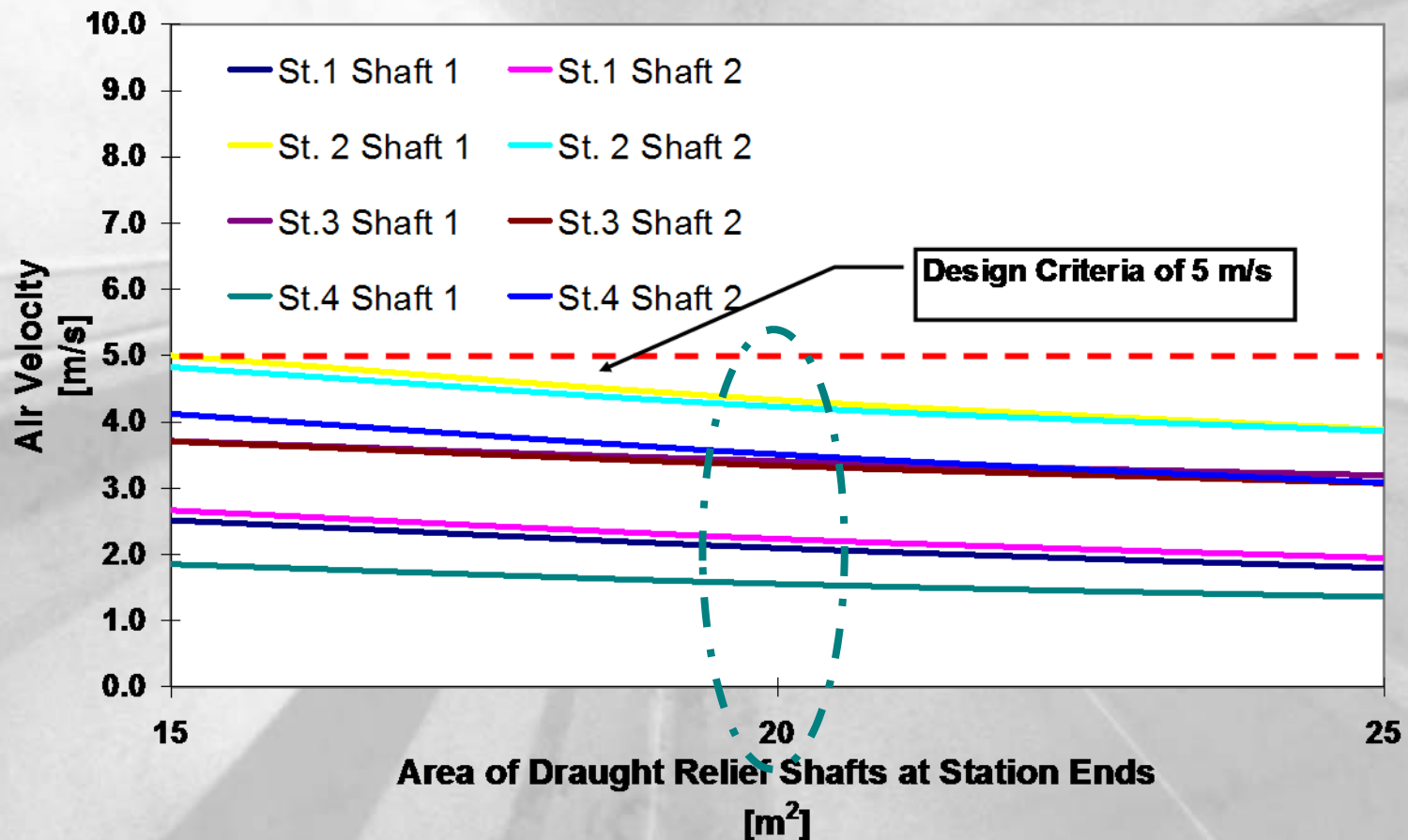
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Improved Design

- Aerodynamically disconnecting the pressure relief shafts
- Changing the geometrical configuration of fire resistance doors at escalator base

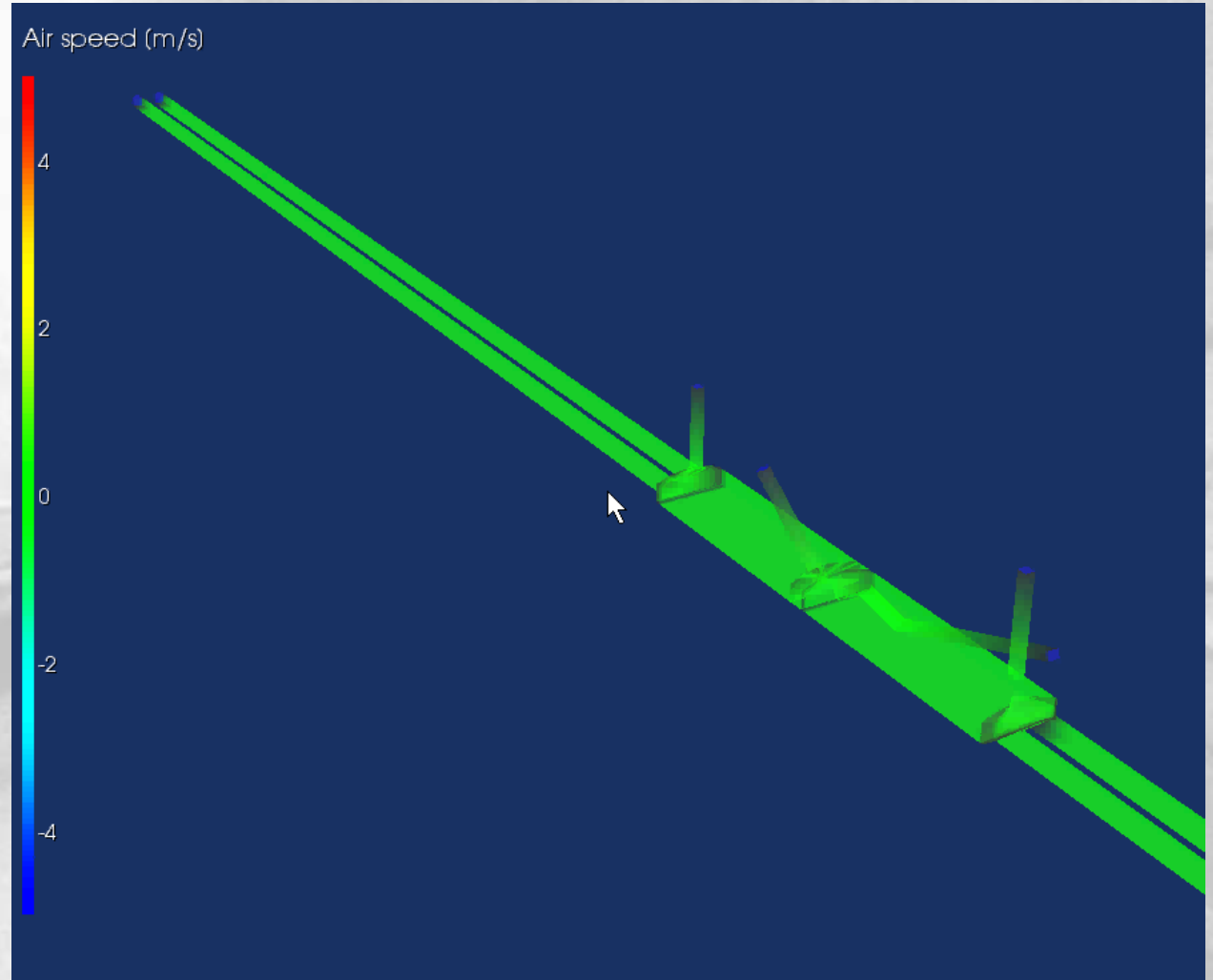
Results

Effect of "Draught Relief Shafts" on air velocities in escalator shafts



- Area of draught relief shafts = 20 m²

- Area of door opening at escalator base increased from 9 m² to 20 m²






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Conclusions

- Aerodynamically disconnecting shafts along the tunnel under normal operations
- Providing draught relief shafts with cross sectional area of 20 m² at all station ends
- Increasing the opening area of the fire resistant doors at the base of escalator shafts

Thank you for your attention

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