



## Reference list of rail and metro tunnel projects

Year	Project	Client / Project owner	Country
since 2016	<b>Upgrade of Lötschberg base tunnel</b> Planning of temporary and final ventilation system for the construction stage	BLS Network, Berne	CH
since 2014	<b>Stuttgart 21</b> Planning of ventilation system for 30 km of tunnels and underground main train station	Deutsche Bahn, Stuttgart	CH
since 2014	<b>Pumped storage power plant Linth-Limmern</b> Design and implementation of the temporary ventilation system	AXPO, Baden	DE
since 2014	<b>Gothenburg West Link project</b> Optimisation, validation and invitation to tender of the ventilation system for 6 km tunnel and 3 stations	ÅF – Infrastructure division, Stockholm	CH
since 2013	<b>New RBS-Station Berne</b> Planning of tunnel ventilation for new underground station at main train station	Regionalverkehr Bern-Solothurn RBS, Worblaufen/Bern	SE
since 2012	<b>Brenner base tunnel</b> Control engineering and invitation to tender of the ventilation and cooling for the operating, construction, and outfitting stages (aerodynamic, climate, smoke expansion calculations, maintenance)	Brenner Base Tunnel Company, Innsbruck	CH
since 2009	<b>Ceneri Base Tunnel</b> Final design for mechanical equipment and cabinets in cross-passages	IG IM+FMNi / AlpTransit Gotthard AG, Lucerne	AT
since 2003	<b>Ceneri Base Tunnel</b> Review of the project submitted for approval; preliminary design for ventilation; final design for ventilation	ITC, Lugano	CH
since 2000	<b>Gotthard and Ceneri Base Tunnel</b> General contract for Aerodynamics and Climate Working Group	AlpTransit Gotthard AG, Lucerne	CH
2017	<b>Railway tunnel of Austrian Railways</b> Flow measurements at the current collectors of railcars	Siemens AG, Krefeld	CH
2017	<b>Gotthard Base Tunnel</b> Measurements and actions to minimise dust deposition in the cross passages	Schweizerische Bundesbahnen (SBB), Olten	DE
2017	<b>Maintenance works in Swiss tunnel</b> Development of the ventilation concept and of procurement specifications for mobile tunnel ventilation	Swiss Federal Railways (SBB), Olten	CH
2017	<b>New build and upgrade of Erfurf-Hallstadt connection</b> Expert review of the detailed design for the rescue tunnels' ventilation	Deutsche Bahn, Erfurt	CH
2016	<b>Connecting tunnel Zürich West</b> Preliminary design and implementation of the ventilation for the heat supply tunnel	ERZ Entsorgung + Recycling, Zürich	CH

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2016	<b>Metro Copenhagen Ring - Branch to Södhamnen</b> Ventilation tender design and execution of simulations for 5 km twin tunnel and 5 stations	JV Zueblin – Per Aarsleff, Copenhagen	DK
2016	<b>Tunnel Vereina</b> Expert review for fire ventilation and tunnel safety for the 19 km long tunnel	Rhätische Bahn AG, Chur	CH
2016	<b>California Highspeed; Palmdale - Burbank</b> Concept study regarding ventilation and tunnel climate for tunnels up to 35 km in length	Sener Engineering and Systems Inc., Los Angeles	US
2016	<b>Metro Melbourne Project</b> Invitation to tender for the ventilation and execution of simulations for 9 km long tunnel and 5 stations	JV of CPB Contractors Pty Lim, Ghella Pty Ltd; Salini Impregilo S.P.A., Melbourne	AU
2016	<b>Brussels North-South Tunnel</b> Invitation to tender for the ventilation refurbishment of a 3 km long tunnel with 6 tracks and 3 stations	Cegelec Mobility, Lyon	BE
2016	<b>Lötschberg Summit Tunnel</b> Concept studie for ventilation in case of incident in the 15 km long single tube tunnel	BLS Network, Berne	CH
2016	<b>Tunnel Rosshäusern</b> Expert opinion on the emergency exit ventilation in case of incident in the 2 km long tunnel	BLS Network, Berne	CH
2016	<b>Tunnel Eppenbergr</b> Expert opinion on the emergency ventilation of the 3 km long tunnel	Swiss Federal Railways (SBB), Olten	CH
2016	<b>Tunnel Heitersbergr</b> Simulation of the pressure changes during normal operation	Swiss Federal Railways (SBB), Luzern	CH
2016	<b>Mobility hub Augsburg</b> Update of the efficacy proof of the emergency ventilation through execution of CFD calculations of the smoke expansion in the underground station	City of Augsburg	DE
2015-2016	<b>Zürich Airport Underground Station</b> Flow simulations and measurements in the station and in the access tunnels (up to 3 km in length)	Unique Zurich Airport, Zurich	CH
2003-2016	<b>Gotthard Base Tunnel</b> Design project of railroad engineering 50Hz supply; design of electrical cabinets in cross-passages; signage and handrails	Joint venture of IM+FMNi / AlpTransit Gotthard AG, Lucerne	DE
2015	<b>Swedish rail tunnel</b> Flow simulations to increase pressure comfort in the tunnel of the high speed rail network	Schwedische Staatsbahnen Trafiverket, Borlänge	SE
2015	<b>Saline de Bex</b> Preliminary project for the safety concept and measures for the underground tunnel system	Schweizer Salinen, Bex	CH
2015	<b>Forrestfield-Airport Link</b> Invitation to tender for the ventilation of 5 km long tunnel with 2 underground stations	John Holland / Leighton JV, Perth	AU

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2015	<b>Follo Line</b> Site ventilation of the 22 km long, twin tube, single track tunnels	Acciona/Ghella JV, Oslo	NO
2015	<b>Lusail Light Rail Doha</b> Collaboration for the ventilation conceptual design of the rail system with 10 km long tunnels and 7 underground stations	Cegelec Mobility, Lyon	QA
2015	<b>Awash – Kombolcha – Hara Gebaya Link</b> Evaluation of the need for mechanical ventilation in tunnels up to 2 km long	Yapi Merkezi, Istanbul	ET
2015	<b>Tunnel Eppenberg</b> Expert opinion on the tunnel ventilation	Swiss Federal Railways (SBB), Olten	CH
2015	<b>Tunnel Furka</b> Expert opinion on the tunnel ventilation	Matterhorn-Gotthard Bahn, Brig	CH
2014-2015	<b>High speed immersed tunnel</b> Study for pressure relief and for energy requirements of the tunnel	GS Engineering & Construction, Seoul	RK
2013-2015	<b>Fehmarn Belt fixed rail/road link</b> Expert opinion on tunnel ventilation and on safety	Femern A/S, Copenhagen	DK
2014	<b>Gotthard Base Tunnel</b> Simulations of the flow conditions in the tunnel at higher train velocities and during the start-up of the ventilators	IG GBTS, Zurich	CH
2014	<b>Cave project Lüntigen</b> Update of the site and operating ventilation underground extraction site	IUB Engineering AG, Berne	CH
2014	<b>Pumped water storage plant Linth-Limmern</b> Quality assurance Review of the smoke extraction and execution of measurements	AXPO, Baden	CH
2014	<b>New build and upgrade Erfurt-Hallstadt</b> Expert advice on the ventilation of the driven through rescue tunnels	Deutsche Bahn, Erfurt	DE
2014	<b>Delhi Metro Line 8 Section 4</b> Review and design of the ventilation for 5 stations and 10.5 km long tunnel	Isolux Ingeneria and Sterling & Wilson Consortium, Delhi	IN
2014	<b>Plant rescue tunnels KVA Bern</b> Monitoring concept for the Warmbächliweg district heat	IUB Engineering AG, Berne	CH
2014	<b>Grimselbahn Base Tunnel</b> Feasibility study on the ventilation and safety of the tunnel	Zentralbahn, Luzern / Matterhorn-Gotthard-Bahn, Brig	CH
2014	<b>Aerodynamics of SBB rolling stock</b> Measurement of key aerodynamic data of passenger trains in Gotthard Base Tunnel	Swiss Federal Railways (SBB), Olten	CH
2014	<b>Hauenstein Tunnel</b> Design, tender specifications and site supervision of temporary ventilation of tunnel refurbishment	Swiss Federal Railways (SBB), Olten	CH
2014	<b>Red Line North of Metro Doha</b> Expertise regarding increase of mutual distance of cross-passages	JV of Impregilo - SK E&C - Galfar (ISG), Doha	QA

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2013	<b>Pumped storage power plant Grimsel</b> Preliminary and detailed design and call for tender for temporary and permanent ventilation	KWO, Innertkirchen	CH
2013	<b>City Line DML Zurich</b> Expert review of tunnel ventilation of main underground station	Federal office for transportation, Berne	CH
2013	<b>Pumpspeicherwerk Linth-Limmern</b> Project management support of planning and construction of electro-mechanical systems	Axpo, Baden	CH
2013	<b>Pir Panjal Tunnel Himalaya</b> Three-dimensional analysis of train fire and smoke propagation in 11 km long tunnel	IRCON International, Delhi	IN
2013	<b>Top of Europe station of Jungfraubahn</b> Planning, tender and site supervision of fire safety measures for underground station	Jungfraubahn, Interlaken	CH
2013	<b>Xayaburi Hydro-Power Plant</b> Feasibility of ventilation of underground spaces of hydro-power plant	AF-Consult Switzerland AG	LA
2013	<b>Ceneri Base Tunnel</b> Detailed design of tunnel ventilation for 15 km twin-tube, single-track rail tunnel	ITC, Lugano	CH
2013	<b>Fixed Fehmarnbelt Crossing</b> Temporary ventilation concept for a 16 km long, 4-tube, subsea road and rail tunnel	Wayss & Freytag Ingenieurbau AG, Frankfurt	DK/DE
2013	<b>Gotthard Base Tunnel</b> Supervision of ventilation and climate control during installation of railway systems	Transtec Gotthard SA	CH
2013	<b>CEVA, Geneva – Annemasse</b> Egress analysis for 4 underground stations for normal and emergency operations	Swiss Federal Railways (SBB), Geneva	CH
2012	<b>Metro Athens extension of line 2 and 3</b> SES computations on ventilation system	Attiko Metro / Laiakis & Matagos, Athens	GR
2012	<b>Gotthard Base Tunnel</b> Supervision of installation works of permanent ventilation system	AlpTransit Gotthard AG, Lucerne	CH
2012	<b>Stuttgart 21, simulation of tunnel ventilation system</b> Simulation and concept variation of tunnel ventilation (30 km tunnels, main station)	Kofler Energies, Deutsche Bahn, Stuttgart	DE
2012	<b>Brenner northern access line</b> Proof checking of structural analyses for tunnel equipment	ÖBB Infrastructure, Vomp	AT
2012	<b>City link Zurich / Main train station</b> Expertise and design check regarding ventilation and fire safety	Federal Office of Transport (BAV), Berne	CH
2012	<b>High Speed 2 (HS2)</b> Analysis of pressure transients in tunnels (pressure comfort, micro-pressure waves)	Parsons Brinckerhoff, London	UK
2012	<b>Qatar Integrated Railway Project</b> Fundamentals and tender documentation for tunnel ventilation for approx. 90 km tunnel and 34 underground stations	Qatar Railways / DB International, Doha	QA

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2012	<b>Metro Panama Line 1</b> Detailed design for ventilation of 7 underground stations and 7.5 km tunnel	Sener SA, Madrid	PA
2012	<b>Estimation of MAK-values</b> During maintenance works in the Gotthard base tunnel	Swiss Federal Railways (SBB), Berne	CH
2012	<b>High-speed rail link Vienna – St. Poelten</b> Measurement of rooftop aerodynamic conditions at high-speed trains	BTC Einsiedeln/ÖBB, Vienna	AT
2012	<b>Katzenberg high-speed tunnel</b> Measurement of rooftop aerodynamic conditions at high-speed trains	BTC Einsiedeln/DB, Munich	DE
2012	<b>PSW – Linth-Limmern, Glarus</b> Review of ventilation and fire safety aspect of the pumped-storage hydro power plant	Axpo, Baden	CH
2012	<b>Grimsel 3</b> Detail design of ventilation for operation phase of the hydroelectric power plant	KWO, Innertkirchen	CH
2012	<b>Underground station of Zentralbahn</b> Fire tests for tunnel ventilation commissioning	Marti Engineering, Moosseedorf	CH
2012	<b>Hauenstein Tunnel</b> Assessment of fulfillment of occupational health requirements and ventilation	Swiss Federal Railways (SBB), Olten	CH
2012	<b>Simandou Project, Guinea</b> Peer review of ventilation design	Aecom, Oakland	GN
2012	<b>Risk analysis on cross-winds</b> Analysis of cross-winds acting on rolling stock at critical locations of rail network	Swiss Federal Railways (SBB), Berne	CH
2012	<b>Channel Tunnel France-England</b> Feasibility of modified operation concepts for tunnel ventilation and crossover doors	Eurotunnel, Coquelles	FR/UK
2009-2012	<b>Metro Singapore Downtown Line DTL 2/3 and NSLE</b> Review for concept- and detailed design of tunnel ventilation systems	Land Transportation Authority, Singapore	SG
2008-2012	<b>Brenner northern access line</b> Concept, design and site supervision for ventilation during installation phase of 30 km of tunnels	ARGE Alptransit Brenner Rhomberg Bahntechnik GmbH / Alpine Bau GmbH	AT
2011	<b>Qatar Integrated Railway Project</b> Concept and simulations of tunnel ventilation for underground rail network (approx. 130 km tunnel and 60 underground stations)	Qatar Railways / DB International, Doha	QA
2011	<b>Fire protection of Jungfrauoch station</b> Design and documentation of measures for public parts and underground station	Jungfrau Railway, Interlaken	CH
2011	<b>High-speed subsea rail tunnel</b> Design solutions for alleviation of aerodynamic conditions in twin-tube tunnel	GS Engineering and Construction, Seoul	RK
2011	<b>Grimsel 3</b> Ventilation during construction and operation of the hydroelectric power plant	KWO, Innertkirchen	CH

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2011	<b>Chestenberg railway tunnel variants</b> Studies of aerodynamic conditions in various high-speed rail tunnels	Swiss Federal Railways (SBB), Olten	CH
2011	<b>Brenner Base Tunnel</b> Engineering of ventilation and cooling designs for operation, construction and outfitting phase including aerodynamics, tunnel climate, fire incidents, maintenance	Brenner Base Tunnel Company, Innsbruck	AT
2011	<b>Underground airport train station Zurich</b> Aerodynamic conditions in station, terminal buildings and access tunnels (up to 3 km)	Swiss Federal Railways (SBB), Zurich	CH
2011	<b>Expanding / low-level submission (lowering of) Zentralbahn Lucerne</b> Layout of fan station including analysis of pressure losses in duct system	Marti Engineering, Moosseedorf	CH
2011	<b>Aerodynamics of high-speed trains</b> Numerical investigation of pressure comfort, traction power of passenger trains	Siemens Industry Sector, Krefeld	DE
2011	<b>KW Innertkirchen 1A and Handeck 2A</b> Ventilation during construction and operation of the hydroelectric power plant	BKW FMB Energy, Berne	CH
2011	<b>Lötschberg Base Tunnel</b> Measurements of ventilation performance and study of start-up behaviour of fans	BLS Network, Berne	CH
2011	<b>Stansertunnel (Western railway)</b> Analysis of aerodynamic conditions in tunnel at train velocities of 200 km/h	ÖBB Infrastructure, Vomp	AT
2011	<b>KVA Berne utility tunnel Berne</b> Ventilation concept and tender for utility tunnel for climate control	IUB Engineering AG, Berne	CH
2011	<b>Metro Panama Line 1</b> Preliminary design for ventilation of 7 underground stations and 7.5 km tunnel	Sener SA, Madrid	PA
2010	<b>Torino-Ceres to RFI-Network Connector</b> Safety and quantitative risk analysis of 2 underground stations and 3 km of tunnels	Geodata, Torino	IT
2010	<b>Hauenstein Base Tunnel</b> Impact of modifications of vent shaft on fire safety and aerodynamics of 8 km tunnel	Swiss Federal Railways (SBB), Olten	CH
2010	<b>Ventilation of Stations Isartor and Rosenheimer Platz</b> Design of fire ventilation system	DB Station Service, Munich	DE
2010	<b>Cable tunnel ventilation Mushriff-Mamzar-Nahda, Dubai</b> Design of temperature control system for a 15 km long utility tunnel	Nexans France, Paris	AE
2010	<b>Ferrocarril Transandino Central</b> Ventilation and safety concept for 52 km long base tunnel in the Andes	Geodata, Torino	RA/RC
2010	<b>Pir Panjal Tunnel</b> Review of electro-mechanical / ventilation design of 11 km long Himalayan tunnel	IRCON International, New Delhi	IN

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2010	<b>Gotthard Rail Tunnel</b> Simulation and measurements of impact of high-speed trains on oncoming traffic	Swiss Federal Railways (SBB), Berne	CH
2010	<b>Station at Brussels airport</b> Control concept for ventilation system	Zitron Netherland BV, Hengelo	BE
2010	<b>CEVA, Geneva – Annemasse</b> Egress analysis for 4 underground stations for normal and emergency operations	DAEL – Direction of projet CEVA (canton Geneva, SBB), Geneva	CH
2009-2010	<b>Metro Sydney Line 1</b> Ventilation concept as part of a tender design for the planned underground line	Kujika (Bovis Lend Lease, Downer, Keolis, McConnell Dowell, Thales), Sydney	AU
2009-2010	<b>Rock cavern Laentigen</b> Planning of preliminary and permanent ventilation of underground cavern	Läntigen Stein AG, Morschach	CH
2009-2010	<b>Metro Kolkata East-West Connection</b> Ventilation concept as part of a tender design for the planned underground line	Dywidag International, Munich	IN
2009-2010	<b>Swedish Rail Tunnels</b> Aerodynamic simulations and survey on key parameters for design of new high-speed network	Swedish National Rail Banverket / COWI, Stockholm	SE
2009-2010	<b>Semmering Base Tunnel</b> Design check of tunnel ventilation system	Austrian Federal Railways (ÖBB), Vienna	AT
2009-2010	<b>Lötschberg Base Tunnel</b> Concept, implementation and measurements of alternative cross-passage ventilation	BLS Lötschbergbahn AG, Berne	CH
2009-2010	<b>Metro Copenhagen Cityringen</b> Ventilation concept as part of a tender design for the planned underground line	MET-4 (MT Højgaard, Züblin, Hochtief, Pihl og Søn), Copenhagen	DK
2008-2010	<b>Tunnel Engelberg</b> Planning, tender, award of contract and site management for the ventilation system for 4-km rail tunnel with extreme inclination	Zentralbahn, Stans	CH
2008-2010	<b>Lötschberg Base Tunnel</b> Concept for additional ventilation scenarios for normal operation of service tunnels	BLS Lötschbergbahn AG, Berne	CH
2007-2010	<b>Metro Athens extension of line 2 and 3</b> Climate predictions, analysis of aerodynamic aspects for normal operation and simulation of the fire ventilation	Attiko Metro / Laiakis & Matagos, Athens	GR
2007-2010	<b>Brenner northern access line</b> Planning of the ventilation system during the installation phase of the rail equipment in a 34 km tunnel with galleries	Heitkamp Rail, Berlin	AT
2009	<b>Aerodynamic specification of double-deck trains</b> Specification of required pressure sealing of new-generation passenger trains	Swiss Federal Railways (SBB), Olten	CH
2009	<b>Utility tunnel of KVA Berne</b> Concept and detailed design of ventilation for utility tunnel	Energy Water Berne (EWB), Berne	CH
2009	<b>City link Zurich / Main train station</b> Expertise and design check for the Federal Office of Transport regarding ventilation	Swiss Federal Railways (SBB), Zurich	CH

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2009	<b>Metro Budapest, DBR Line 4</b> Risk analysis, design check and project optimisation	Budapesti Közlekedési Zártkörűen Működő Részvénytársaság (BKV), Budapest	HU
2009	<b>Metro Barcelona Line 9, Tramo 1</b> Ventilations concept and numerical verification for tunnels and 14 stations	Amberg Infrastructure SA, Madrid	ES
2009	<b>Tunnel Albstieg NBS Wendlingen – Ulm</b> Preliminary ventilation of the. 6 km long, double-tube, high-speed tunnel	Grontmij BGS Engineering alliance mbH, Frankfurt	DE
2009	<b>High-speed rail link Zagreb-Rijeka</b> Analysis of aerodynamic conditions in several tunnels of a high-speed rail link	Civil Engineering Institute of Croatia, Zagreb	HR
2008-2009	<b>Mobile rail tunnel ventilation</b> Concept, design and tender documents for fans installed on a maintenance train for operation in various tunnels	Rhätische Bahn AG, Chur	CH
2008-2009	<b>Lötschberg Base Tunnel</b> Concept for ventilation during extension and at the completed state of tunnel	BLS Lötschbergbahn AG, Berne	CH
2008-2009	<b>Hydro-power station Grimsel</b> Concept for ventilation during construction and operation for access tunnel network	Kraftwerke Oberhasli, Innertkirchen	CH
2008-2009	<b>Airport station Brussels</b> Design of draught relief shafts and tunnel ventilation by 1-d-simulation; 3-d-analysis of smoke extraction at station (CFD)	Zitron Nederland BV, Hengelo	BE
2008-2009	<b>Gautrain Rapid Rail Link</b> Consultancy in the fields of tunnel ventilation, aerodynamics and safety	Lebone Engineering Ltd, Kelvin	SA
2007-2009	<b>New Rail Link Prague-Beroun</b> Investigation of all aspects of tunnel aerodynamics for a 25 km long rail tunnel for high-speed rail traffic	Metroprojekt, Prag	CZ
2007-2009	<b>Exploitation tunnel quarry Rüti</b> Concept for ventilation during construction, tender documents, site management	Steinag, Stansstad	CH
2007-2009	<b>Underground station Augsburg</b> Proof of concept of the ventilation (smoke removal) using 3d-analysis	City of Augsburg	DE
2004-2009	<b>Underground Station Marienplatz, Munich</b> Design, call for tender and supervision of the subsequent installation of a mechanical smoke extraction system	City of Munich	DE
2008	<b>Rail Tunnel Velsen</b> Analysis of aerodynamic conditions and consequences for tunnel ventilation	Arcadis Infra BV, Amersfoort	NL
2008	<b>Aerodynamic characteristics of train</b> Measurements of several aerodynamic aspects of a new type of high-speed train	Alstom, La Rochelle	FI
2008	<b>Simplon Tunnel</b> Measurement of pressure fluctuations in tunnel during high-speed train operation	Swiss Federal Railways (SBB), Berne	CH/IT



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2008	<b>Brenner northern access line</b> Numerical analysis of lift forces acting on cover-plates of cable ducts and trackway	Brenner Eisenbahn GmbH, Innsbruck	AT
2008	<b>Gotthard Base Tunnel</b> Investigation of pressure fluctuations in ventilation ducts and access galleries	Ingenieurgesellschaft GBTS, Zurich	CH
2008	<b>Ceneri Base Tunnel</b> Concept for cooling and ventilation during the phase of installation of rail equipment	AlpTransit Gotthard, Lucerne	CH
2008	<b>Ferrocarril Transandino Central</b> Variants of tunnel systems regarding safety and ventilation for rail link in the Andes	Geodata, Torino	RA/RC
2008	<b>Karlsruhe Underground City Railway</b> Detail design of smoke extraction in underground stations	KASIG –Schieneninfrastruktur-Gesellschaft mbH, Karlsruhe	DE
2008	<b>Gotthard Base Tunnel</b> Investigation of pressure fluctuations below false floors in cross-passages	Burkhalter AG	CH
2008	<b>Berapit Tunnel and Larut Tunnel</b> Review and proposals regarding planning of safety for rail tunnels	Geodata, Torino	MY
2008	<b>Tunnel Eppenberg</b> Analysis of aerodynamic conditions and traction power requirements in tunnels	Swiss Federal Railways (SBB), Olten	CH
2008	<b>Brenner Base Tunnel</b> Planning of preliminary ventilation for the excavation phase (adit to the section Innsbruck-Ahrental)	Brenner Base Tunnel SE Innsbruck	AT
2008	<b>Pressure tightness of passenger trains</b> Analysis of required pressure tightness of future Swiss high-speed passenger trains	Swiss Federal Railways (SBB), Olten	CH
2008	<b>High-speed rail link Prague-Beroun</b> Analysis of fire ventilation and egress times of the 25 km long high-speed rail tunnel	Metroprojekt, Prague	CZ
2008	<b>Swedish high-speed rail tunnels</b> Consultancy of the operator of the Swedish rail network regarding tunnel aerodynamics	Banverket / COWI, Stockholm	SE
2008	<b>CEVA, Geneva</b> Ventilation concepts, 1-d and 3-d studies (CFD) on smoke control, Study of various aerodynamic aspects	DAEL - Direction de projet CEVA (Canton of Geneva and Swiss Federal Railways)	CH
2000-2008	<b>Lötschberg Base Line</b> General contract for project coordination in the field of ventilation and mechanical equipment	BLS AlpTransit AG, Thun	CH
1991-2008	<b>Lötschberg Base Tunnel</b> Aero- & thermodynamic studies to predict tunnel climate; ventilation concepts for normal and emergency operation	BLS AlpTransit AG, Thun	CH
2007	<b>Tunnel Engelberg</b> Concept study and simulation of measures regarding smoke propagation in a 4 km long and highly inclined rail tunnel	Zentralbahn, Stans	CH

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2007	<b>Expert group for Maglev tunnels</b> Preparation of guidelines for planning of maglev tunnels regarding aerodynamics, climate, safety and ventilation	Transrapid International, Berlin	DE
2007	<b>Aerodynamic tests at pantographs</b> Measurement of air flow at pantographs of trains during passage of tunnels	Federal Office of Transport, Berne	CH
2007	<b>Rail tunnels in Finland</b> Parametric study of aerodynamic conditions in various rail tunnels	Pöyry, Zurich	FI
2007	<b>Brenner northern access line</b> Investigation of aerodynamic aspects in tunnels; specification of requirements for the civil works and the tunnel equipment	Brenner Eisenbahn GmbH, Innsbruck	AT
2007	<b>Sihl Tunnel Zurich</b> Concept study and supervision of the ventilation during refurbishment of a 1.5 km long rail tunnel and two stations	Sihltalbahnhof, Zurich	CH
2007	<b>High-speed rail tunnel, Rastatt</b> Ventilation concept for cross-passages of a 5.9 km long rail tunnel	Deutsche Bahn / BUNG Ingenieure AG, Heidelberg	DE
2007	<b>Commissioning Lötschberg Base Line</b> Execution of tests during commissioning phase regarding aerodynamics, climate, ventilation and mechanical equipment	BLS AlpTransit AG, Thun	CH
2007	<b>Hardtberg light-rail line, Bonn</b> Fire safety and ventilation concept for a 1.4 km tunnel and 2 underground stations	Bundesstadt Bonn	DE
2007	<b>Hydro-power station Innertkirchen</b> Concept for ventilation during construction and operation, tender documents	BKW FMB Energy Ltd., Berne	CH
2007	<b>Lötschberg Base Line</b> Coordination of test runs for aerodynamic measurements during the implementation phase	BLS AlpTransit AG, Thun	CH
2007	<b>Monitoring concept climate in the LBT</b> Concept for collection and analysis of relevant data for climate predictions in LBT to optimise ventilation during operation	BLS Lötschbergbahn AG, Berne	CH
2007	<b>CEVA Rail Link Geneva – Annemasse</b> Ventilation concept for four underground stations	DAEL - Direction de projet CEVA (Canton of Geneva and Federal Swiss Railways)	CH
2007	<b>Brenner northern access line</b> Aerodynamic investigation regarding traction power demands of passenger and freight trains in different tunnels	Brenner Eisenbahn GmbH, Innsbruck	AT
2007	<b>Liefkeshoek / Beveren Tunnel</b> Definition of the ventilation equipment for the smoke control in a 6.7 km and a 1.2 km long rail tunnel	Zitron Nederland BV, Hengelo	BE
2007	<b>Training tunnels Lungern / Balsthal</b> Preparation of tender documents for mock ups for training of fire fighting in tunnels	BSB + Partner, Biberist	CH

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2007	<b>Soumagne and Walhorn Tunnel</b> Determination of the ventilation equipment for smoke control in 6.5 km and 1.0 km long tunnels suitable for high speed traffic	Zitron Nederland BV, Hengelo	BE
2005-2007	<b>Rail Tunnel Jungfrau</b> Monitoring of the construction project and realisation, commissioning of the ventilation equipment and verification of the ventilation goals by means of measurements and tests	Jungfrauabahn AG, Interlaken	CH
2004-2007	<b>Lötschberg Base Line</b> Project co-ordination in the field of ventilation, mechanical equipment, evaluation of prototypes, site supervision and commissioning tests for installations	BLS AlpTransit AG, Thun	CH
2006	<b>Diabolo Project at airport Brussels</b> Specification of the ventilation system for the planned underground station with adjacent tunnel sections	Zitron Nederland BV, Hengelo	BE
2006	<b>Suvarnabhumi Airport Rail Link</b> Review of the ventilation system for normal, congested and emergency operation	Flowpro Asia, Bangkok	TH
2006	<b>Lungern Test Gallery</b> Preliminary study for a test gallery designed for fire fighting	IUB Engineering AG, Berne	CH
2006	<b>Engelberg Tunnel</b> Measurement and analysis of thermal buoyancy in the rail tunnel	Bucher + Dillier Ingenieur- unternehmung Ltd., Lucerne	CH
2005-2006	<b>Lötschberg Base Line</b> Preparation of manuals for tunnel operator	BLS Lötschbergbahn AG, Berne	CH
2005-2006	<b>Augsburg Mobility Hub</b> Development and evaluation of concepts for smoke extraction to comply with the ventilation objectives	Stadtwerke Augsburg	DE
2005-2006	<b>HSL Zuid</b> Thermodynamic study for normal, congested and maintenance operation, 1D and 3D simulations (CFD)	Siemens NL / Infrasppeed	NL
2005-2006	<b>Brenner Base Tunnel</b> Development of the ventilation and cooling concepts during operation and during the construction and installation phases, calculations for concept verification (aerodynamic and climatic conditions, smoke dispersion in the event of fire)	Brenner Base Tunnel SE	AT
2005	<b>Underground line U55 Berlin</b> Design and tender of the ventilation during the installation phase	Berliner Verkehrsbetriebe BVG	DE
2005	<b>Rail Tunnel Dijon</b> Aerodynamic investigation of the compliance with UIC pressure comfort criteria in TGV high-speed trains for the Dijon Tunnel	Arcadis NL und Arcadis F	FR
2005	<b>MAGLEV Munich - Main Station – Airport</b> Calculation of the air change and of the climate in stations and tunnels	DB Magnetbahn GmbH, München	DE

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2005	<b>Tunnel Karlsruhe of City Railway</b> Smoke extraction in the station "Marktplatz", indication of the feasibility and the realisation	KASIG –Schieneninfrastruktur-Gesellschaft mbH, Karlsruhe	DE
2005	<b>CEVA Rail Link Geneva – Annemasse</b> Verification of the preliminary project, concept proposals for smoke extraction in the underground stations, calculations for the design of the pressure-relief shafts	DAEL - Direction de projet CEVA (Canton of Geneva and Federal Swiss Railways)	CH
2005	<b>Guadarrama Tunnel</b> Investigation of the aerodynamic and climatic conditions; specification of the requirements for the installations	JV's Túnel de Guadarrama North and South	ES
2004	<b>HSL-Zuid Rotterdam Noordrand</b> CFD study for investigation of the efficiency of natural ventilation in the railway tunnel in the event of a burning passenger train	Siemens NL / Infrasppeed	NL
2004	<b>Le Perthus Tunnel</b> Technical examination of due diligence for ventilation design (due diligence)	Scott Wilson Kirkpatrick, Kent	FR/ES
2004	<b>Jungang-Line</b> Technical consultancy regarding the aerodynamic design and the safety installations in the tunnels	Youone Engineering, Seoul	KR
2004	<b>Mobile tunnel ventilation system</b> Ventilation calculations for a mobile ventilation system for maintenance works in railway tunnels	Swiss Federal Railways (SBB), Berne	CH
2004	<b>MAGLEV link Munich (MSB)</b> Investigation of all aspects with regard to tunnel aerodynamics for the tunnels and underground stations of the MAGLEV system between main station and airport	DB Magnetbahn GmbH, Munich	DE
2004	<b>Underground station Marienplatz</b> Investigation of the feasibility of a mechanical smoke extraction system for the platforms in the event of a fire	Landeshauptstadt München	DE
2004	<b>Brenner northern access link</b> Aerodynamic investigation for the tunnels of section Kundl/Radfeld-Baumkirchen	Brenner Eisenbahn-Gesellschaft BEG, Innsbruck	AT
2004	<b>Deep Geological Repository NAGRA</b> Review of a ventilation concept from NAGRA for a deep geological repository	Emch + Berger, Berne	CH
2004	<b>Rail Tunnel Jungfrau</b> Concept study for smoke extraction, specification of fans, dimensioning of fan in the "Mönchstollen"	Jungfraubahn AG, Interlaken	CH
2004	<b>Railway 2000</b> Measurements of pressure comfort in trains in tunnels of new rail link Mattstetten-Rothrist with pressure relief shafts	Swiss Federal Railways (SBB), Berne	CH
2004	<b>Railway 2000</b> Investigation of the aerodynamic stresses on the installations in the tunnels of the new development line Mattstetten-Rothrist	Swiss Federal Railways (SBB), Berne	CH

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2003	<b>Hydro Power Station Grimsel</b> Design of the ventilation during construction of the power station	BKW FMB Energy AG, Berne	CH
2003	<b>City Railway Stuttgart</b> Investigation of tunnel safety of line U12 in case of a fire as preliminary planning	Emch + Berger, Karlsruhe	DE
2003	<b>Lötschberg Base Line</b> Investigation of thermal stress in the tunnel lining during fires	BLS AlpTransit AG, Thun	CH
2002-2003	<b>Lötschberg Base Tunnel (Test Section)</b> Design and testing of the ventilation system for reducing natural gas in the drainage system of the Lötschberg Base Tunnel and measurement of the water ingress through the tunnel lining	BLS AlpTransit AG, Thun	CH
2002-2003	<b>Le Perthus Tunnel</b> Investigation of aerodynamic effects and rough design of the emergency ventilation as part of a tender for the construction of the railway tunnel	Halcrow Ltd., London	FR/ES
1998-2003	<b>People Mover System 'Skymetro', Zurich Airport</b> Concept, layout and realisation of the ventilation and smoke control system	Unique Zurich Airport, Zurich	CH
2002	<b>Zimmerberg Base Tunnel</b> Concept for emergency exits including design phase	Swiss Federal Railways (SBB), Berne	CH
2002	<b>Tunnel Tschärner</b> Measurement and interpretation of the air velocity in the underground access to the quarry	Vigier AG, Luterbach	CH
2002	<b>Landfill Laufengraben</b> Design of the ventilation for the landfill under consideration of updated geometric data	CSD Engineers and Geologists AG, Berne	CH
2002	<b>Lötschberg Railway Tunnel</b> Investigation with ABB Schweiz Ltd. of the feasibility and costs of ventilation measures in the existing railway tunnel	BLS Lötschbergbahn AG, Berne	CH
2002	<b>Ceneri Base Tunnel</b> Ventilation concept submitted for approval for the option with two single track tunnels	AlpTransit Gotthard AG, Lucerne	CH
2002	<b>City Railway Bonn</b> Investigation of fire and smoke extraction sections of the Hardtberg Line as part of the preliminary planning	Building Authority of the City of Bonn, Bonn	DE
2002	<b>Zimmerberg Base Tunnel</b> Calculation of pressure variations during train operation	Engineering Consortium ZIMBA c/o Basler & Hofmann, Zurich	CH
2002	<b>Lötschberg Base Line</b> Investigation of thermal stress and the risk of frost in the slab-track	BLS AlpTransit AG, Thun	CH
2001-2002	<b>Parramatta Rail Link Sydney</b> Ventilation concept as part of a tender design for the planned underground line	Leighton Contractors / ABB, Sydney	AU

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2001-2002	<b>Wehrhahn Line Düsseldorf</b> Mandate for design and project planning of ventilation equipment for the planned underground line	City of Düsseldorf, Düsseldorf	DE
2001	<b>Grauholz Tunnel</b> Estimation of wind loads at antennas due to train operation	Orange Communication AG, Berne	CH
2001	<b>Railway Station at Frankfurt Airport</b> Mandate as an Expert examiner for smoke extraction in the railway station at Frankfurt Airport	Airrail Center, Frankfurt	DE
2001	<b>Underground Bangkok</b> Assessment of the influence from new train systems on the aero- and thermodynamic conditions in the underground system	Siemens AG, Berlin	TH
1999-2001	<b>Lötschberg Base Tunnel</b> Design of mechanical equipment for the rail tunnel (ventilation, all mechanical installations, specification of prototypes)	BLS AlpTransit AG, Thun	CH
2000	<b>HSL-Zuid</b> Review of safety concept	Siemens Ltd., Berlin	NL
2000	<b>Gotthard Base Tunnel</b> Consultancy and calculations for the design of ventilation and cooling during construction	Batigroup, Bilfinger&Berger, Frutiger, Jäger, Zurich	CH
2000	<b>Railway 2000</b> Train induced side winds along new high-speed lines Mattstetten-Rothrist and Neuchatel-Yverdon	Swiss Federal Railways (SBB), Berne	CH
2000	<b>Power Transformer UW Monbijou</b> Measures for pressure relief in an enclosed transformer station for the eventuality of an explosion	EWZ, Berne	CH
1999-2000	<b>Guadarrama Tunnel</b> Assessment of Safety and smoke extraction concepts	Geodata, Torino	ES
1993-2000	<b>Gotthard and Lötschberg Base Tunnel</b> Scientific project management of Aerodynamics and Climate Working Group	Swiss Federal Railways (AlpTransit Gotthard AG), Lucerne / BLS AlpTransit AG, Thun	CH
1999	<b>New Railway Station Bologna</b> Review of ventilation concept for normal and emergency operation for underground railway station and vehicle access route	DE-Consult, Frankfurt	IT
1999	<b>Young Dong Railroad Tunnel</b> Ventilation design for normal and emergency operation under particular consideration of diesel emissions	Bumchang Engineering Co. Ltd., Seoul	KR
1999	<b>Young Dong Railroad Tunnel</b> Risk analysis and ventilation concept for the 16.3 km long Young Dong Railroad Tunnel	Halcrow Asia Partner-ship Ltd., Hong Kong	KR
1998-1999	<b>Stuttgart 21, Untertürkheim and Obertürkheim Tunnels</b> Safety and smoke extraction concepts	ARGE BUNG/ DE-Consult/Fichtner, Stuttgart	DE
1998-1999	<b>Stuttgart 21, Cannstatt and Feuerbach Tunnels</b> Safety and smoke extraction concepts	ARGE Spiekermann / Vössing, Stuttgart	DE

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1998-1999	<b>Stuttgart 21, Airport Tunnel</b> Aerodynamic design, evacuation and rescue concepts, concept for smoke extraction for the airport tunnel and station	ARGE BUNG/ DE-Consult/Fichtner, Stuttgart	DE
1998-1999	<b>Gotthard and Lötschberg Base Tunnel</b> Pressure variations and comfort criteria in long alpine railway tunnels	AlpTransit Gotthard AG, Lucerne / BLS AlpTransit AG, Thun	CH
1998	<b>Stuttgart 21, Overall Safety Concept</b> Development of an overall concept for smoke extraction from the whole Stuttgart 21 tunnel system	ARGE BUNG/ DE-Consult/Fichtner, Stuttgart	DE
1998	<b>Stuttgart 21, Filder Tunnel</b> Safety and smoke extraction concepts for the 10 km long Filder Tunnel	ARGE BUNG/DE-Consult/Fichtner, Stuttgart	DE
1998	<b>Ceneri Base Tunnel</b> Analysis of danger from tunnel fire and hazardous spillage scenarios	AlpTransit Gotthard AG, Lucerne	CH
1998	<b>Lötschberg Base Tunnel</b> Determination of the expected climate during the installation phase	AlpTransit Gotthard AG, Lucerne / BLS AlpTransit AG, Thun	CH
1998	<b>Furka Tunnel</b> Investigation of measures for improvement of the climate in the Furka Tunnel	Furka Oberalp Railway, Brig	CH
1998	<b>Fehmarn Belt link</b> Concept and feasibility study, provisional layout of ventilation and ventilation buildings, estimation of costs	COWI-Lahmeyer Joint Venture, Frankfurt	DE/DK
1998	<b>Gotthard Base Tunnel</b> Study of air flow distribution in emergency stations	AlpTransit Gotthard AG, Lucerne / BLS AlpTransit AG, Thun	CH
1998	<b>Bijlmer Station, Amsterdam</b> Aerodynamic effects of passing high-speed trains on passengers and roof structure	ARCADIS Bouw / Infra, Nieuwegein	NL
1998	<b>HSL Zuid</b> Second opinion of pressure comfort criteria and safety aspects, review of proposed specifications for tunnel design	ARCADIS Bouw / Infra, Nieuwegein	NL
1997-1998	<b>Zimmerberg Base Tunnel</b> Analysis of hazards from tunnel fires and hazardous spillage scenarios	Swiss Federal Railways (SBB), Zurich / AlpTransit Gotthard AG, Lucerne	CH
1997-1998	<b>Lötschberg Base Tunnel</b> Influence of leakage in cross-passages on the tunnel climate	BLS AlpTransit AG, Thun	CH
1997-1998	<b>Gotthard Base Tunnel</b> Simulation of smoke distribution outside emergency stations based on realistic train operation scenarios	Swiss Federal Railways (AlpTransit Gotthard AG), Lucerne / BLS AlpTransit AG, Thun	CH
1997-1998	<b>Lötschberg Base Tunnel</b> Dimensioning and call for tenders of cooling installations for the construction phase	BLS AlpTransit AG, Thun	CH
1997	<b>Lötschberg Base Tunnel</b> Dimensioning and layout of ventilation buildings	BLS AlpTransit AG, Thun	CH

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1997	<b>Fehmarn Belt link</b> Intrinsic ventilation of railway tunnels and concepts for emergency ventilation and smoke extraction	COWI-Lahmeyer Joint Venture, Frankfurt	DE/DK
1996-1997	<b>Railway 2000</b> Prediction of pressure waves at the passage through tunnel portals, pressure relief shafts for attenuation of pressure waves	Swiss Federal Railways (SBB), Berne	CH
1995-1997	<b>Gotthard and Lötschberg Base Tunnel</b> Various parameter studies on tunnel climate (evaporation of water, heat transport of trains, friction coefficients of trains, etc.)	Swiss Federal Railways (AlpTransit Gotthard AG), Lucerne / BLS AlpTransit AG, Thun	CH
1996	<b>Grauholz Tunnel</b> Measurement of pressure fluctuations and determination of friction coefficients of freight and passenger trains	Swiss Federal Railways (AlpTransit Gotthard AG), Lucerne / BLS AlpTransit AG, Thun	CH
1994-1996	<b>Furka Tunnel</b> Long-term measurements of tunnel climate (temperatures, humidity, air flows)	Swiss Federal Railways (AlpTransit Gotthard AG), Lucerne / BLS AlpTransit AG, Thun	CH
1991	<b>Underground Railway Station Zurich</b> Ventilation concept for the underground line with station	Swiss Federal Railways (SBB), Berne	CH