

Systematic tunnel safety

Complete solutions for
electrical infrastructure in tunnels



Far more than a black hole



Reliable operation



Long-term plant safety



Forward-looking planning



Flexible system solutions



Maximum tunnel safety

Tunnels are increasingly important to our present-day traffic infrastructure. Thousands of people and tons of merchandise flow through them every day. The appropriate safety precautions are of pivotal importance, because malfunctions and operating interruptions can have serious repercussions.

At first glance operating a tunnel safely seems a relatively trivial matter: the main requirements are light and fresh air, so basic equipment includes lighting and ventilation. But additional operational and safety equipment is essential in order to cover every type of operation, including situations created by breakdown, accident and fire.

A list of the most important systems therefore includes the following:

- Lighting
- Ventilation
- Traffic engineering installations
- Safety installations
 - communications installations, e.g. emergency call stations, video monitoring, radio systems and loudspeaker installations
 - fire alarm systems
 - fire extinguishing installations
 - fire emergency lighting and escape route signage
- Ancillary systems / control centres
- Power supply
- Superordinate management system

Cabling solutions from Dätwyler Cables are the first choice when every installation has to function perfectly.

High-performance engineering



Central control



Preventative fire protection



Effective video monitoring



Clear signalling

The right system can save lives



When an incident occurs, a fire for example, the first few minutes are crucial to the safety of tunnel users. The safety philosophy should therefore be designed primarily with the aim of protecting people in the escape phase and only secondarily for rescue and structural protection. In addition to structural precautions it is therefore important that operational and safety equipment should be extremely reliable and must function perfectly.

The control management of these installations and systems is normally carried out by tunnel management, which defines particular mutual dependencies using an effect matrix. This ensures, for instance, that when a fire alarm goes off the primary control centre is alerted, the ventilation system initiates the fire program, the lighting operates at the highest level, the fire emergency lighting is activated, the video cameras concentrate on the seat of the fire, and traffic control blocks access to the tunnel.

These systems are monitored from the command centre. From there it is possible to intervene in the activities of individual systems using the control systems. In order to ensure safe operation during any type of incident the flawless interplay of all technical installations is an absolute must.

The cabling infrastructure plays a central role here. Dätwyler Cables supplies safe, high-performance cabling systems which guarantee reliable power and data transfer, even in a fire.

Your expert partner for electrical infrastructure in tunnels

Everything we think and do is geared to ensuring our customers' success and protecting their investment. As an innovation leader Dätwyler Cables implements total solutions for forward-looking tunnel electrical infrastructures that give a unique price-performance ratio. In our company every customer-specific solution is based on many years of experience and the expertise of qualified engineers and technicians.

We supply complete one-stop solutions for every customer-specific application. From offer discussions through planning and installation to system maintenance it goes without saying that advice, training and support form part of our comprehensive service. Dätwyler Cables always has every system component in stock, so short delivery times are guaranteed. We respond to simple and complex questions rapidly, competently and with foresight.

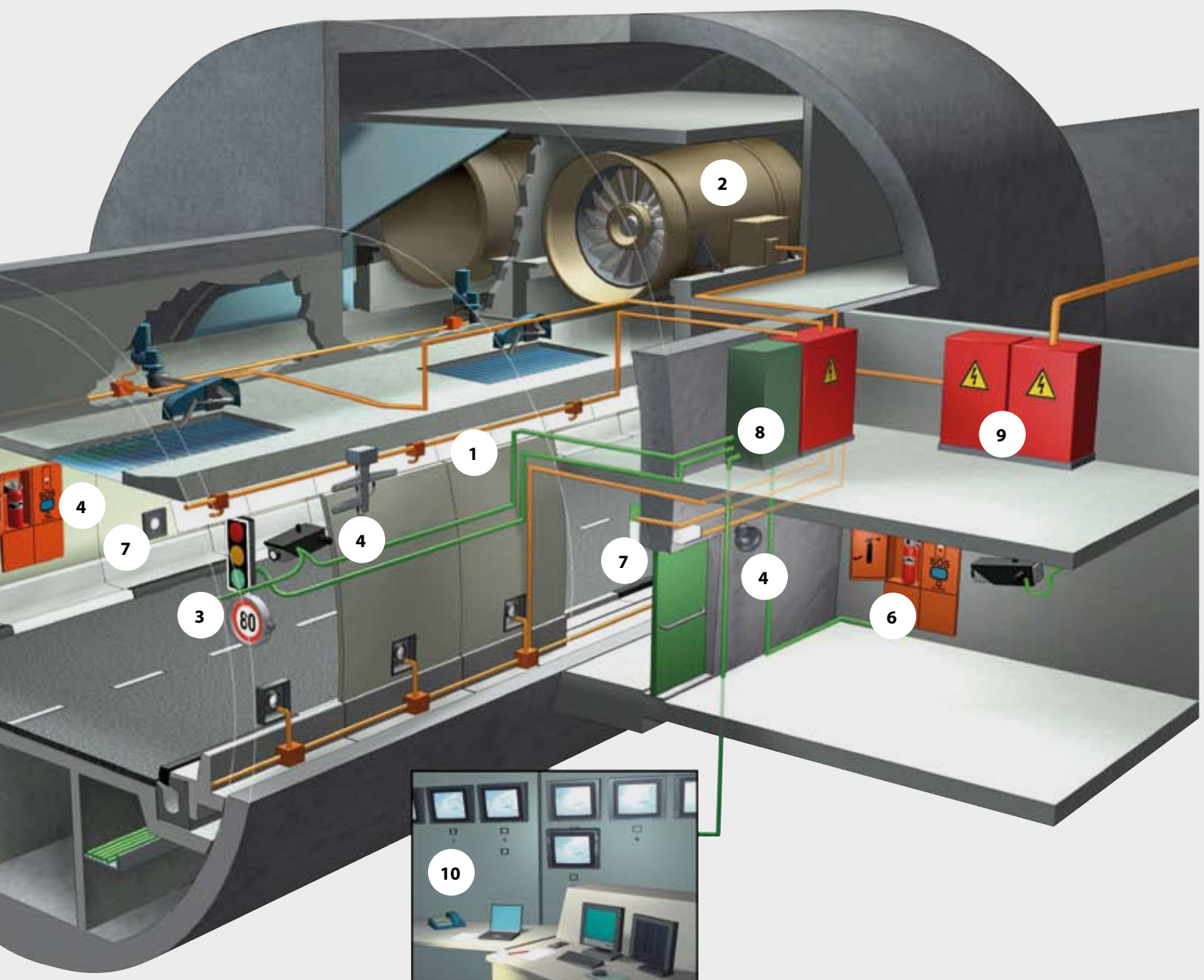
Year after year Dätwyler Cables invests in even better materials and process technologies, production equipment and test methods. Our system solutions are therefore better than the relevant applicable standards and are constantly setting new standards. The vital functions that our systems need to perform in practice demand the ultimate in safety and reliability. Reason enough for us to test each product several times against stringent quality standards before it leaves the factory.

For us uncompromising quality means constant demands on all our staff and a warranty promise to our customers.

- 1 Lighting
- 2 Ventilation
- 3 Traffic engineering installations
- 4 Communications installations
- 5 Fire alarm systems
- 6 Fire extinguishing installations
- 7 Fire emergency lighting and escape route signage
- 8 Ancillary systems / control centres
- 9 Power supply
- 10 Superordinate management system



Applications



Applications in tunnels



Lighting

pyrosys® and ecobus® solutions from Dätwyler Cables provide a safe and swiftly installed supply of adaptive, passage and emergency lighting, thus guaranteeing constant adequate visual conditions for road users. In the event of an incident the orientation of users and emergency forces is ensured for a definite period.



Ventilation

The ventilation system is an essential element in the escape and rescue phase as well as in regular operation. Here again specialist functional integrity cables ensure flawless operation. The use of optofil® fibre optic safety cables guarantees reliable smoke vent control in the event of fire.



Traffic engineering installations

Traffic lights, dynamic variable traffic signs and traffic lane signalling are used to control traffic according to the incident. Here again, in the event of accident or fire innovative cabling solutions from Dätwyler Cables help secure the relevant location as quickly as possible through the command centre.



Communications installations

Communications installations such as emergency call stations, video monitoring, radio systems and loudspeaker installations are used for communication between tunnel users and operators. In the event of an incident they also facilitate rapid situation appraisal and optimisation of personnel deployed. The unilan® and optofil® solutions provide for quality high-speed transmission of all the requisite data and images.



Fire alarm systems

Dependable cabling systems are vital for the safe detection of fires, the alarming and activation of fire programs. They back up escape procedures as well as deployment of the emergency services. Here again pyrosys® and optofil® solutions play an important role in the safety of road users.



Fire extinguishing installations

These include hand fire extinguishers, for example in emergency call stations, as well as fire fighting water for the fire service, using either fire extinguishing water supply pipes (hydrants) or fire ponds. If lines are operated by pressure raising systems, these should also be supplied via safety cables with functional integrity.



Fire emergency lighting / escape route signage

Specialised lights in the tunnel are used for orientation and escape route signage. A secure power supply with functional integrity cables makes sure that these lighting systems back up escape procedures for a defined period in the event of fire.



Ancillary systems / control centres

The control centres are at the heart of tunnel infrastructure. Installations such as heating, ventilation and air conditioning, and fire alarm systems are necessary for their safe operation. Dätwyler Cables supplies a complete portfolio of copper and fibre optic systems as well as safety cable systems. For automation ecobus® provides a solution permitting fast installation and flexible modification without disruption.



Power supply

The power supply of all systems is a central function and as a rule is effected by two independent networks. In the event of a total failure an uninterruptible power supply (UPS) also guarantees that safety-relevant installations are maintained for a certain length of time. Tested safety cable systems from Dätwyler Cables ensure perfect operation here.



Superordinate management system

In this sensitive area unilan® and optofil® solutions contribute to the reliable, uninterrupted monitoring and coordination of all technical installations, malfunction message processing, emergency program switching, data transfer (to command centres, police, fire brigade etc.), and to data and image evaluation.

Solutions which “pay off”



Integrated quality modern system solutions for tunnel electrical infrastructure provide key advantages for those involved in all phases of a project.

As an investor you profit from total solutions, due mainly to the fact that integrated systems are more cost-effective at purchase. They guarantee, moreover, that all the components work together smoothly and reliably.

Invest in future-proof systems!

If, on top of this, the cabling systems are flexible and optimally dimensioned, unnecessary additional expenditure and follow-up costs can be avoided from the word go.

At the same time you should always trust modern, future-proof cabling solutions. They allow you to incorporate all the operational functions, centralise the controls, interlink the communications and monitoring systems – and in such a way that future new technologies can easily be integrated at any time.

Make sure you have the relevant warranties for all the systems installed! They add to operational safety and functionality, hence also to the economic viability of the tunnel.

Co-ordinated quality modern system solutions will give you the requisite reliability, high performance and flexibility which you expect from your investment, even after 10 or 20 years.

When selecting future-proof infrastructures trust the expertise of a supplier who can provide appropriate references.

Decide on solutions which comply with statutory safety requirements and standards, and which at the same time are produced by environmentally compatible methods and can be disposed of in an environmentally friendly way when their service life is over.



Benefits at a glance

- Long-term investment protection
- Enhanced value due to high availability and flexibility
- Simplified planning
- Advice and training
- Comprehensive system warranties
- Compliance with the most stringent standards and regulations
- Building Inspectorate test certificates and permits
- Security against liability claims

We support you at the planning and project design stage

Dätwyler Cables is a leading supplier of system solutions for data and communications networks in copper and fibre optic technology, safety cable systems with functional and insulation integrity, systems for building automation and elevator cabling, and our specialists at Dätwyler Cables will be on hand with skilled advice and support right from the planning and design stages of your project.

One of the ways we can help is to provide you with important information and decision-making aids on optimum infrastructure solutions in a wide variety of tunnels. As a manufacturer of reliable, standard-compliant total solutions we will be happy to advise on the most suitable cable systems, components, installation and connection techniques for a concrete project, for current and future applications, and for your specific requirements.



Make use of our expert advisers!

We will also be happy to provide our know-how in the fields of data communication, safety, building automation and elevator cabling. In all these areas we can offer you the benefit of our experience in innumerable projects and many useful tips for time- and cost-saving implementation.

You yourself are certainly in the best position to assess precisely where advice is needed. We know that people are happy to accept our expertise from the numbers attending our road shows and seminars every year.

No doubt aspects such as safety, efficiency, flexibility and long-term reliability play just as important a role in your planning as does compliance with current statutory and implementary regulations and all the applicable standards. Our expert advisers bear all these aspects in mind as well.

Our support during the implementation phase naturally also includes the safeguard of system warranties and external system testing as well as decision-making aids for the design of future extensions.



Benefits at a glance

Cut expenditure on planning and project design using

- skilled advice and support in the planning of tunnel electrical infrastructure:
 - power
 - communications
 - safety
 - building automation
 - elevator
- system warranties
- external system testing
- easily adaptable solutions

Systematic installations

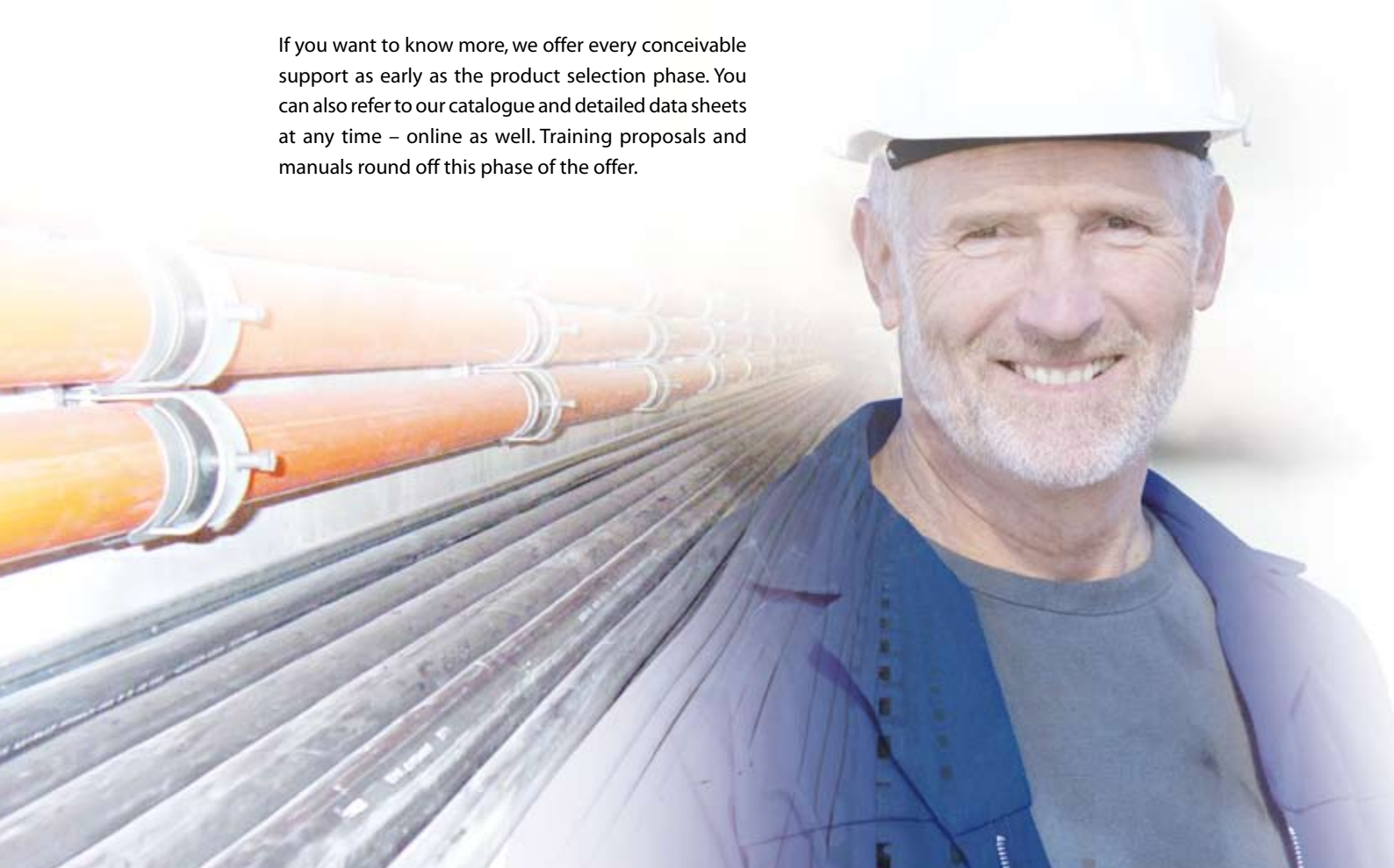
For installation companies the choice of system supplier can be the decisive factor in ensuring the quick and cost-efficient completion of work – and the customer's complete satisfaction with the result.

You will soon discover that our systems offer you numerous benefits. Important aspects repeatedly stressed by many users and installers are, for example, the fact that our cabling solutions are very stable and are simple and time-saving to assemble.

If you want to know more, we offer every conceivable support as early as the product selection phase. You can also refer to our catalogue and detailed data sheets at any time – online as well. Training proposals and manuals round off this phase of the offer.

During material procurement installers profit from many "home advantages": a product made in Switzerland, branch offices or partners and technical expertise at your doorstep and a large European central depot near Frankfurt. In addition we offer you comprehensive logistics services.

And, if you don't find our assembly instructions adequate or if unexpected challenges crop up on site, we will be happy to help you out on the spot at short notice.



Ensure time and cost benefits!

Rely on systems designed for quick, easy, robust installation. We help you react flexibly with our tested, perfectly coordinated cabling solutions.

Our pyrosys® safety cable systems with insulation and functional integrity (FE180/E30-E90) offer a wide variety of possible installations extending far beyond classic installation techniques and allowing you to make substantial savings in materials, time and cost.

For high-speed communications we can supply fibre optic systems which are quick and safe to process or can be blown into tube systems. With optofil® Safety we have developed a non-metallic fibre optic cable with E30 functional integrity conforming to DIN 4102-12. Installation-stable unilan® systems (up to 10 gigabits per second) are available for high-performance copper cabling.

Halogen-free ecobus® flat cable systems, also available in class IP65 protection, provide the option of combining power and bus lines. With plug-in/screw adapters you can create tap-offs easily anywhere along the flat cable without the need to strip the cable jacket. This means that short-term upgrades or extensions are also feasible at any time.

With our innovative connection techniques, pre-assembled and tested subsystems, and project-specific logistics services you reduce installation times and down times for maintenance work to a minimum.



Benefits at a glance

Cut costs and time spent on system procurement, installation and commissioning with

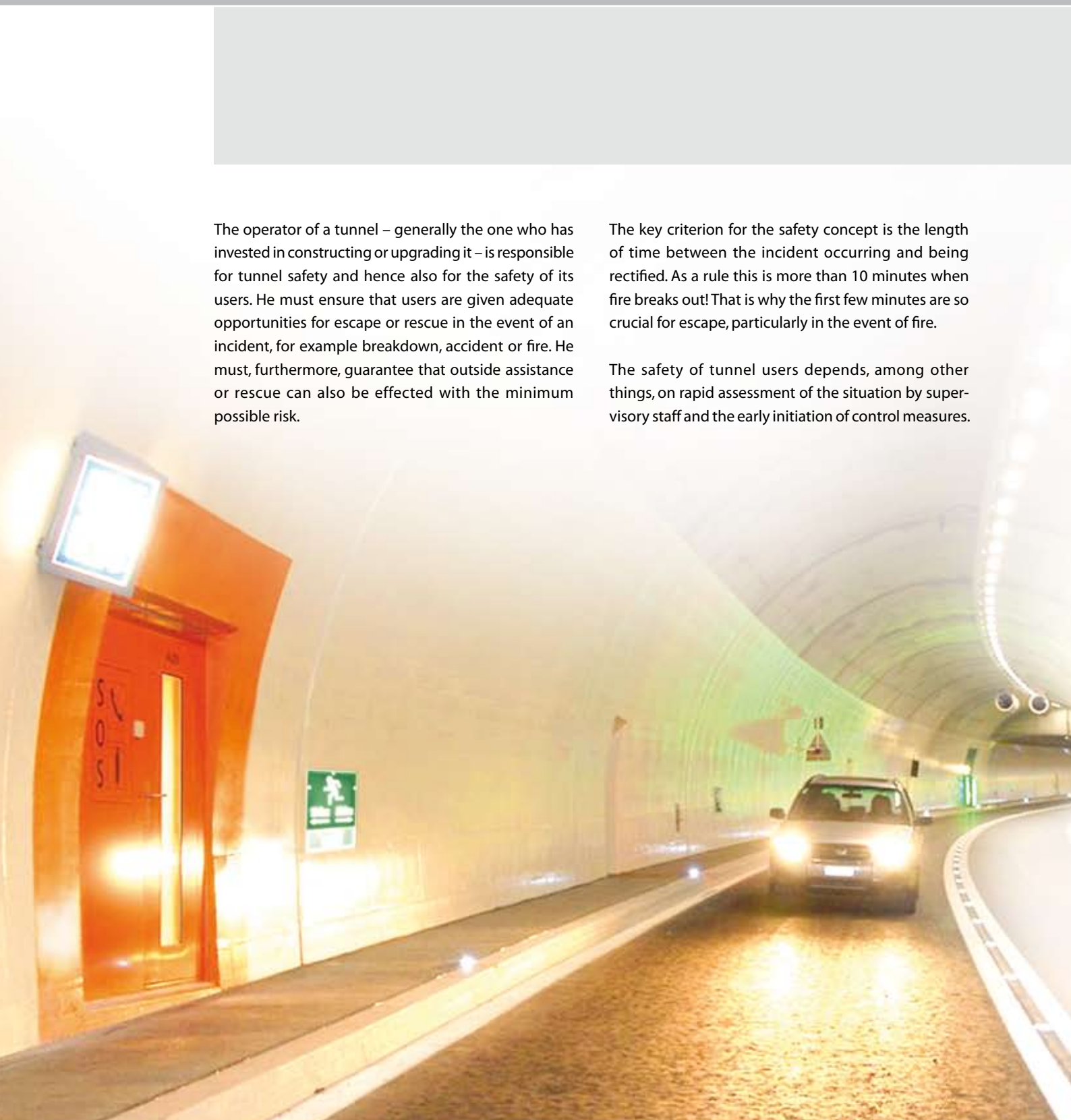
- comprehensive advice and support, from planning through to acceptance
- tested, standard-compliant complete systems
- good scalability due to modular design
- high installation stability
- pre-assembled systems
- fast, easy assembly
- project-specific logistics services
- simple flexible upgrades and extensions

Top quality lasts longest

The operator of a tunnel – generally the one who has invested in constructing or upgrading it – is responsible for tunnel safety and hence also for the safety of its users. He must ensure that users are given adequate opportunities for escape or rescue in the event of an incident, for example breakdown, accident or fire. He must, furthermore, guarantee that outside assistance or rescue can also be effected with the minimum possible risk.

The key criterion for the safety concept is the length of time between the incident occurring and being rectified. As a rule this is more than 10 minutes when fire breaks out! That is why the first few minutes are so crucial for escape, particularly in the event of fire.

The safety of tunnel users depends, among other things, on rapid assessment of the situation by supervisory staff and the early initiation of control measures.



Go for solutions you can bank on in the long run!

Data and video transmission in real time is essential if no time or important information is to be lost.

A high capacity network must be available, particularly for video transmission. The network installed should, moreover, provide the necessary bandwidth at all times, independently of other users, otherwise data loss and errors in representation may result.

For many years, in hundreds of installations, our systems have proved that they meet all the characteristics required in tunnels – be it in the fields of data, voice and video transmission, safety or system control. Even in high security areas their great stability and performance lead to long service lives.

Dätwyler Cables are the experts to talk to when installing and upgrading electrical infrastructures in tunnels. Thanks to innovative developments and many years of experience in numerous tunnel projects, the system solutions available in the fields of power, safety, data communication and control systems also guarantee the perfect long-term functioning of all operational and safety equipment – thus making an important contribution to the safety of every road user.



Benefits at a glance

Spare capacity for future requirements provides high planning and investment security

- optimised dimensioning of the cabling infrastructure
- high quality solutions with corresponding warranties
- high performance
- high operating safety
- long service life
- low running costs
- compliance with all statutory requirements
- flexible, economically viable change of use and extension

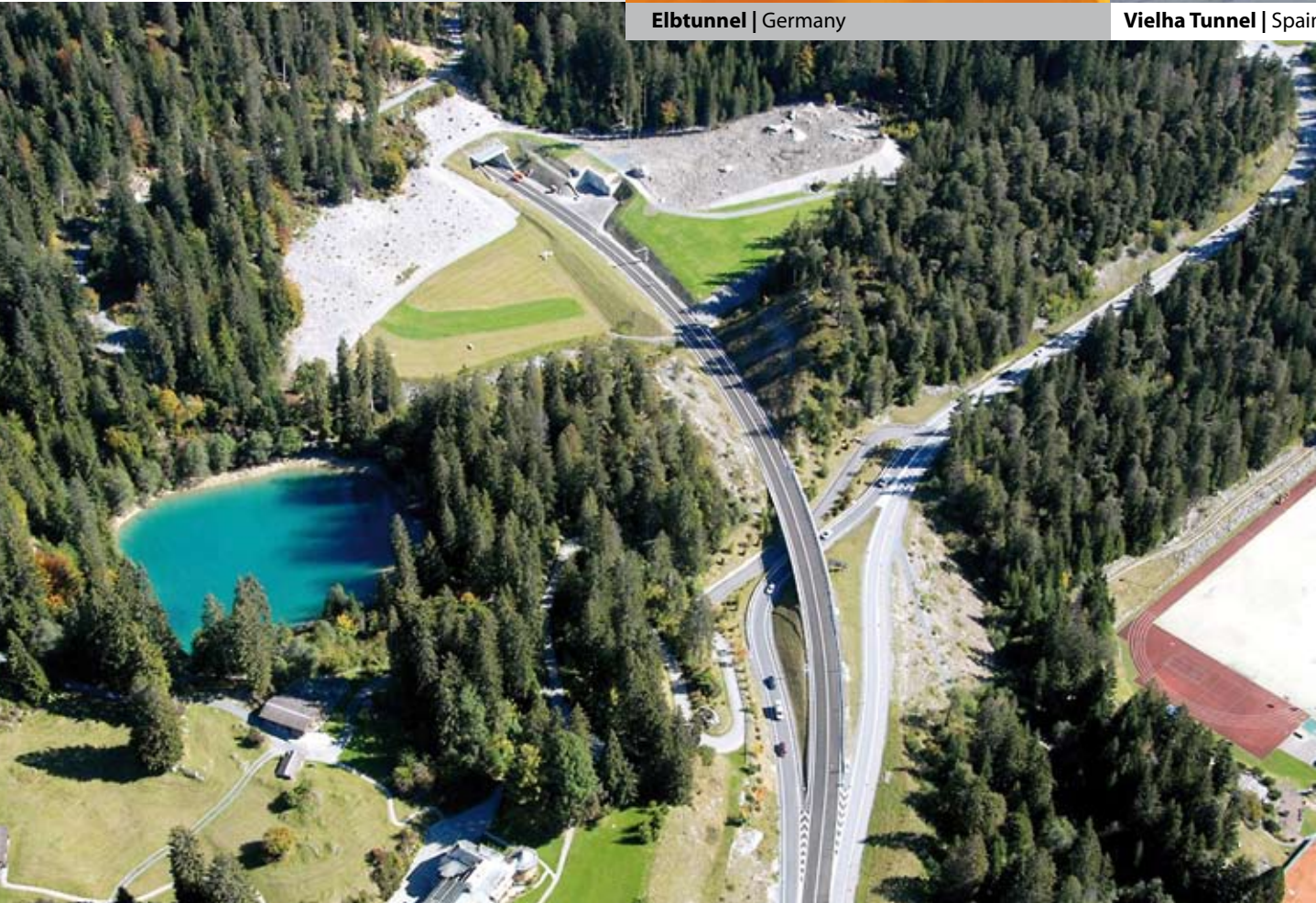
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Vielha Tunnel | Spain



Flims Bypass | Switzerland



Munich Underground | Germany



Uetliberg Tunnel | Switzerland

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