HUPAC July 2012 www.hupac.ch

moving
solutions for intermodal logistics

Incident of the century at the Gotthard – a retrospective

For approximately four weeks, the Gotthard railway line was closed due to a rockfall. Traffic resumed on both tracks on 2 July 2012. The suspension of the main north-south connection through the Swiss Alps caused severe obstructions to freight transport.

Thanks to pragmatic cooperation between the authorities, railways and operators concerned, much of the freight traffic was diverted via the Lötschberg-Simplon axis. Only a marginal portion of the traffic switched to foreign transit axes (Brenner, Tauern, Mont Cenis). The Swiss Federal Office of Transport worked to ensure that capacity at the Lötschberg and Simplon was not affected by diverted passenger trains. The number of daily freight train paths was increased from 90 to 135 on the Basel-Domodossola axis. There was a persistent bottleneck at the Domodossola freight yard, where the shortage of acceptance capacity meant that trains had to be parked on the access routes. During the stoppage at the Gotthard, the Rola was temporarily reduced in favour of the remaining freight traffic.

Operations were anything but simple. Combined transport operators and rail companies pooled their resources to make best use of transport capacity. BLS Cargo provided shunting services on the mountain lines, while SBB Cargo International deployed additional shunting teams on the borders. The Italian infrastructure operator RFI established a pool of locomotives and drivers for the shunting operations, to bypass the international interface in Domodossola. The customs authorities also adjusted their operations to meet the increased demand on the Lötschberg/Simplon axis, remaining on duty around the clock.

Hupac managed the traffic volume to allow the greatest possible utilisation of capacity. A rolling planning system was set up in collaboration with customers, taking account of the available capacity in terms of transport volume, profile, rolling stock and terminal handling. As the emergency programme was put into action, more and more trains were handled via Lötschberg/Simplon and to a lesser extent via Modane. Overall, Hupac maintained 60 to 70% of the service via Switzerland. There was no reasonable alternative for the domestic traffic on the Basel/Aarau ⇆ Stabio/Chiasso link.

Once the Gotthard line was reopened, traffic soon stabilised again. Many customers who had been forced to reorganise their transport in the meantime quickly found their way back to combined transport. “We are confident that our customers will continue to rely on the railways as a safe and reliable mode of transport”, says Peter Howald, director of Sales & Operations at the Hupac Group.

editorial

After the crisis is before the crisis

The four-week closure of the Gotthard line tested freight transport to its limits. Yet the pipeline on the north-south axis was maintained thanks to a joint effort. Our thanks go to our customers, partners and employees as well as the authorities, who gave their full support to rail freight transport.

There are four lessons that we can learn from these long, difficult weeks. Firstly, there must be an international crisis scenario prepared in advance so that rapid and coordinated action can be taken in an emergency. Secondly, construction work must be coordinated at international level for all Alpine passes. Simultaneous construction work on multiple central transport axes is an unacceptable risk, as we have now seen. Thirdly, the system needs adequate reserves and redundancies so that it remains operational in an emergency. It is worth maintaining the Gotthard mountain line as a bypass in future. Having sufficient sidings where freight trains can await transit is not a luxury but a requirement for operational stability. And fourthly, interoperability remains a key issue. The differing technical parameters of the rail network must be overcome so that traffic can be shifted more easily from one route to another.

As the emergency at the Gotthard has shown, there is no way around the international harmonisation of infrastructure management.

Irmtraut Tonndorf
Communications Manager
of the Hupac Group

The struggle to find suitable alternative routes

Deviations from normal operations clearly illustrate the need to standardise systems and adapt operating procedures to advance the development of liberalised transport on the railways.

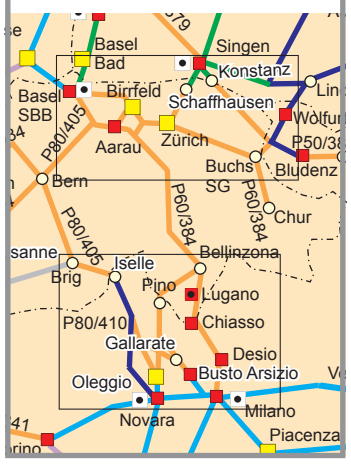
by Urs Brotschi Head of the Transport Systems course at the ZHAW School of Engineering in Winterthur

The Gotthard landslide at the beginning of June shows how vulnerable our transport system is. More than 120 freight trains usually run on the Gotthard mountain route. After the line closure, only a fraction of those trains could be diverted via alternative routes. Although the track gauge is identical, the various rail systems in Europe do not fit together well. Improving interoperability will take years if not decades.

Clearance profile

Freight trains that require a large clearance profile are not easy to divert, because they run in suitable corridors. Combined transport trains with 3.86 metre-high semi-trailers run via the Gotthard line to the existing terminals such as Busto Arsizio and Novara. Compositions of this type can only be diverted along the 4-metre corridor via Lötschberg/Simplon (PC80/405 profile). But the capacity for this profile has already been used up. Transport is only possible with the lower PC45/364 profile. The Fréjus line between France and Italy also only offers the PC45/364 profile. A 4-metre profile exists 200 km further east on the Brenner axis to the Verona terminal. The route through the Tauern tunnel 500 km further east demands an even longer detour.

Clearance profiles in the Alpine region



Power systems

A number of different power systems have become established in Europe for historical reasons. At the Brenner as well as Mont Cenis (Fréjus), two systems meet at the national borders. There are also variations within the power systems. Locomotives that run in Germany/Austria and Switzerland thus require pantographs of different widths.

Train control systems

Alongside the power systems, a variety of train control systems have also become established. These are set to be replaced with the ETCS (European Train Control System) to allow interoperability, though we are still a few years or even decades away from that objective. For the moment, the different systems in the freight corridors are overcome using multi-system locomotives, the number of which is adjusted to particular corridors and normal operation.

Between Switzerland and Italy, most railway undertakings operate with interoperable locomotives. Between France and Italy, freight trains run with French BB 36000 (Alstom Astride) units without changing locomotives in Modane. Between Austria and Italy, Austrian 1216 (Siemens ES64U4), German 186 (Bombardier TRAXX F140 MS), 189 (Siemens ES64F4) and Italian 412 (Adtranz) locomotives are deployed across the border. For many freight trains on these axes, however, the locomotives need to be changed at the border stations, which causes time delays.

Construction work

It never rains but it pours. The rockfall at the Gotthard happened while work was being undertaken on a number of important transalpine routes, thus severely restricting capacity. The Simplon tunnel and the line between Iselle and Domodossola are currently being repaired. The railway line over the Brenner, now more than 130 years old, is also set for reconstruction on the Austrian side. In June, July and September it will only be available as a single-track line, whilst in August and on six weekends until October it will be completely closed.

A line closure such as that seen at the Gotthard has serious consequences in this situation. In addition to the missing train paths, operations must be organised so that the scarce remaining train paths can be used. The challenge for the schedulers of the various logistics and rail companies is to apply creative solutions to overcome the technical restrictions in the best possible way.

On 11 May, the Terminal strategy for north Italy was signed at the Transport Forum "NEAT – opportunity for economics". From left to right: ambassador Bernardino Regazzoni, transport minister of Lombardy Raffaele Cattaneo, national advisor Fabio Regazzi, Hans-Jörg Bertschi (Hupac), Marco Gosso (Cemat), Mauro Moretti (RFI) and Bernhard Kunz (Hupac)

Terminal development strategy for north Italy signed

The Gotthard base tunnel will increase the competitiveness of goods transport on the Rotterdam-Genoa corridor, provided the existing gaps in the infrastructure in Switzerland and abroad can be overcome. An important step is represented by the strategy for terminals in north Italy signed by Gruppo FSI, Cemat and Hupac.

by Irmtraut Tonndorf

Transport companies are prepared to give the railway a chance provided it proves competitive and efficient – this was the quintessential point emerging from the Forum organised by Hupac in Lugano on its 45th anniversary. The speakers were Bernardino Regazzoni, the Swiss Ambassador to Italy, the national advisor Fabio Regazzi, member of the Transport Commission, and Raffaele Cattaneo, Minister for Infrastructure and Mobility for the Lombardy Region. The special guest of the event was Mauro Moretti, CEO of Gruppo FSI and President of the Community of European Railways.

The Forum was introduced by **Hans-Jörg Bertschi**, president of the Board of Directors of Hupac. The intermodal operator was founded 45 years ago in Chiasso and today ranks second in Europe. The network extends throughout the whole of Europe and in recent years it expanded into emerging markets such as Russia and China. But the core business remains transalpine traffic: two Hupac deliveries out of three have their source or destination in Italy. The Gotthard base tunnel, which will become operational in 2017, represents a great opportunity. But it is essential to adapt the access lines along the entire corridor to enable intermodal trains to compete with road traffic and transfer goods transports from road to the railway. "The key to success resides in productivity of the system", explained Bertschi, "we need a rail infrastructure capable of handling trains 750 meters long, weighing 2000 tonnes driven by a single locomotive, capable of loading modern trailers 4 meters high. In a few years the subsidies paid by Switzerland to intermodal transport will run out. We must be ready to compete on the market thanks to our strengths".

Today the lines present far more modest parameters, limited to trains 575 metres long with a profile of 3,80 metres. According to Hupac, improvements to the Bellinzona-Luino-Novara line which handles 80% of intermodal traffic via Gotthard and serves major terminals to the west of Milan, must be carried out by 2020. The project calls for works on a modest scale, some of which are already programmed. A bigger challenge is increasing capacity on the route via Chiasso, providing for construction of the Gronda Est Seregno-Bergamo to bypass the Milan node. The works will be finalised only after 2030. "Both lines must be adapted. The Luino line is more urgent, whereas the Chiasso line is more important because it will handle greater volumes in the future", concluded Bertschi.

The Forum was organised by Hupac for the purpose of bringing representatives together from both Switzerland and Italy, to discuss the thorny issue of infrastructure strategy for the Rotterdam-Genoa corridor. Coordination is being carried out by the Swiss Embassy in Italy, represented at the Forum by **Bernardino Regazzoni**. "We welcome the signs from intermodal operators, institutions and railways, and we will make every effort to draw up a scheme offering tangible and generally endorsed responses", declared Regazzoni. According to the existing laws, Switzerland can support the construction of new terminals also abroad. The Memorandum of Understanding for terminal projects in Northern Italy, signed by FSI Group, Cemat and Hupac, is an important cornerstone in the edifice of European freight transport. The next step is a Memorandum of Understanding on minister level for the upgrading of the rail lines between Switzerland and Italy.

The national advisor **Fabio Regazzi**, a member of the Transport Commission of the Swiss Parliament and President-elect of the Swiss Shippers Council, also requested concrete measures in support of goods transport. The programmed transfer objective must be translated into tangible measures in line with market requirements. "Freight requires our attention. It is the duty of politicians to draw up an infrastructure development strategy for the Swiss Federal Railways and to remain vigilant regarding its implementation", concluded Regazzi. "We must aim for investments in infrastructure which increase the productivity of freight transport rather than in subsidies that do not contribute to productivity progress in logistics chains".

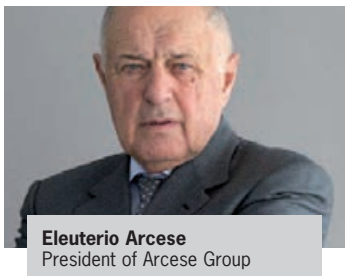
In Italy the opportunities offered by Alptransit are clearly perceived. "Lombardy is one of the main European economic areas and naturally has ambitions to establish better connections with the north", emphasised **Raffaele Cattaneo**, minister of Infrastructure and Mobility for the Lombardy region. The terminals at Segrate, Busto Arsizio, Gallarate, Mortara and Sacconago were created thanks to significant contributions from the Lombardy Region. "But that is not enough. Considering that of the 400 million tonnes shipped each year in Lombardy only 6% are carried by rail, it becomes obvious we must meet the challenge in terms of further development of the infrastructure network". Works are now being expediting by the "Regional Round Table for Freight Transport" which brings together transport and terminal operators, railways and railway infrastructure managers. In regard to the opening of the Gotthard Tunnel, the capacity of the Chiasso-Milan line will be increased by technological improvements by 2020 and construction of the Gronda Est Seregno-Bergamo will start during a subsequent phase. The intermodal terminals remain the core issue. "The terminal strategy endorsed by the FSI Group, Cemat and Hupac is an important development. The Lombardy Region will play its role in implementing the projects", assured Cattaneo. The existing terminals clustered around the outlet of the Luino line must not been forgotten. They are a major economic factor, both for competitiveness of Italian export and jobs in the logistics industry. "The existing lines must be improved by minor intervention works", concluded Cattaneo.

The new modern railway infrastructure throughout Switzerland promises excellent prospects for the freight system, since for the first time the traffic will be competitive with that of other transport systems. According to **Mauro Moretti**, CEO of the FSI Group, a results-oriented entrepreneurial strategy is essential for the railway industry, with abandonment of the subsidies-led approach. "NEAT is an opportunity to revitalize the rail freight system which today is operating under extremely difficult conditions given its lack of competitiveness", affirmed Moretti who in February was for the third time appointed as the President of the Community of European Railways (CER). The FSI Group declared it is prepared for its appointment with Alptransit. "To respond efficaciously to the increase in traffic projected by 2030, we will deploy technological solutions to increase capacity of the Chiasso line. During a subsequent stage we will construct the Gronda Est. In addition we will instigate development of infrastructure and terminal services to the east of Milan to guarantee adequate capacity". The projects identified by Gruppo FSI and Hupac provide for the construction or increasing the capacity of terminal facilities in Milan, Brescia and Piacenza. Italy and Switzerland are an integral part of the same corridor and so they must adopt the necessary measures in tandem, as Moretti pointed out. "We note the Swiss priority for the four metre corridor. We are ready for a comparison on the timescales and necessary projects".

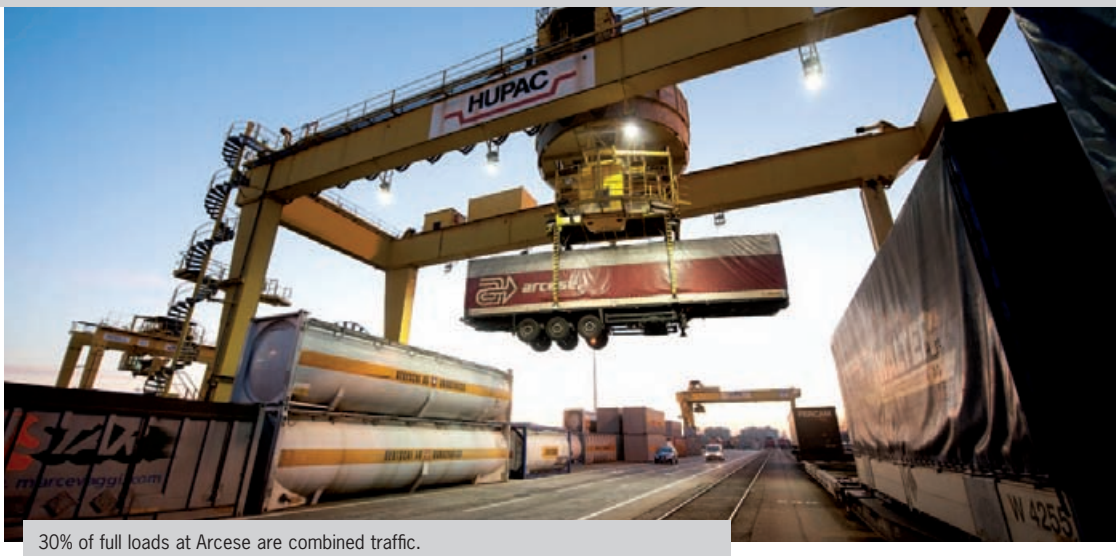
“Combined traffic is the backbone of the corridors”

The Arcese Group, with head offices at Arco in the province of Trento, is one of the top ten logistics operators in Italy. The firm owns one of the biggest fleets of Mega semi-trailers in Europe, with more than 70 operational sites. A company in good shape, growing under the authoritative guidance of its founder, Eleuterio Arcese, who is also President of the ANITA trade association. The Arcese Group is one of Hupac’s major intermodal customers – successfully integrating road and rail traffic for many years.

by Franco Tanel



Eleuterio Arcese
President of Arcese Group



30% of full loads at Arcese are combined traffic.

Mr Arcese, your company is one of the few in Italy truly focussing on combined transport. Why?
For many years we used rail transport – before there was any talk of environmental protection. Then, given the lack of quality of rail services, we abandoned that mode of transport, only to make a firm decision to return to it from 2005. There were many reasons: ecological aspects but also commercial and strategic ones. Intermodal transport avoids critical cost components, such as diesel and motorway tolls. For long stretches it is competitive, since up to 28-30 tonnes can be transported per load unit, reducing consumption and helping overcome the critical aspect of driver time.

To sum up, it is a choice which pays off in terms of your competitiveness?
Companies in north Europe are explicit in their preference for rail because they are highly aware of the environmental impact of their activities. For us rail represents an additional card to play, because we can be flexible. We haven’t created a special intermodal division; this traffic form makes part of full load transport. For us, combined traffic is the backbone of the corridors. We are successful both in terms of quality and economy of service when we succeed to incorporate intermodal transport in large flows of road traffic. The two systems complement each other.

What are your main axes, and what percentage of total traffic does intermodal now represent?
The main axes are Novara and Verona for Germany in the Ruhr and Cologne areas, but also Belgium and Sweden. The percentage varies depending on the destination: for Belgium and Germany it is 20% of loads, but rises to 60% for Sweden. If we review the turnover for full load transport, we are around 30% with future growth predicted. Remember, in 2004 it was zero. Combined traffic is favoured for automotive, petrochemicals, cellulose and heavy industry in general, but also by companies like Nike, more concerned about the environmental aspects.

Are your customers prepared to recognise the added value and pay a premium for eco-friendly transport?
Not always intermodal transport costs more: rail, in specific conditions and for certain distances, may cost less than the road. In other cases the cost is increased. Some customers are prepared to pay a little more for the intermodal option whereas others are not. A client such as Ford, for example, is interested in combined traffic, but also wants road deliveries within 12 hours. In this case the rates are different, and loads which must be delivered the next morning are more expensive, whereas those shipped by rail cost less. We are one of the few companies able to switch rapidly from road to rail and vice versa.

Politicians in Italy and Europe are seeking solutions for the mobility of the future. The transfer to rail of long-distance loads is one of the priorities highlighted by the Italian Minister for the environment. Is this just a pipe dream?
There is a risk of that – because the infrastructure must be adapted within very short timescales, also for central and southern Italy. For mega-trailers with corner heights of 4 metres we need railways that can handle the P400 profile. Now for example, the Novara ⇆ Cologne train must pass via Lötschberg because there is not sufficient profile via Gotthard. To sum up, infrastructure is not just an Italian problem.

Switzerland wants to adapt the profile of lines accessing the new Gotthard tunnel to allow the transit of semi-trailers with the P400 profile. Discussions are underway on implementation by 2023-2025.

What do you think?
We must acknowledge Switzerland’s great commitment and significant investment. However, all this investment will prove pointless if we do not adapt the upstream and downstream infrastructure. On several occasions, the Swiss have sounded the alarm on what is happening in Italy, because they are fearful Italian railway lines will not be able to handle the trains. Italian logistics can only improve if the country joins Alptransit – a project which definitely deserves the government’s close attention.

For some years you have collaborated with Hupac: How are relations developing? In your opinion, what are the strong points of the Swiss operator’s offer, and what aspects could be improved?
The relationship is good, and developing strongly in terms of quantity and medium term programming. Hupac is definitely a good partner. If I must highlight one area for improvement, I would pick real time operating information. When working with our own trucks, if there is a problem we receive details immediately. Rail must do the same and supply real time information on service interruption, although I understand that frequently this information is not directly accessible by Hupac.

What opportunities do you see in general for combined traffic in Europe? What challenges must the sector confront?
The prospects are good, but we need to invest in infrastructure through a Europe-wide programme. The process of liberalising rail transport and projects for total interoperability on international corridors is certainly positive. On future needs, let’s see what happens in Italy because the increasing cost of road transport could generate more interest in combined traffic, but this change can be expected in the medium rather than the short term.

Operating more than 700 trains a year

Marco Manfredini is responsible for combined transport at Arcese. He deals with all operational aspects of the service and mediates between the customer requirements and the constraints of rail transport.

Marco Manfredini
Responsible for combined transport at Arcese

What are the factors when opting for combined rather than all road transport?
We offer combined loads on international routes. The choice is made on the basis of multiple parameters: cost but also the service level and the transit time we can guarantee by rail. For us the two modes are not in opposition, but rather in synergy.

What are the main destinations served?
Cologne and the Ruhr, the Benelux from where we reach England, and Scandinavia. These areas are linked to the production zones primarily in Piedmont, Lombardy and the Veneto.

What traffic volumes are generated in a year?
On average, we handle three trains a day for 240 days a year. We estimate future growth of at least 15% per annum.

What difficulties do you encounter?
The first is profile: too many railway lines – not only in Italy – cannot cater for the P400 profile and carry Mega semi-trailer trucks. Like Arcese we have invested 10 million euro in special semi-trailers, and we have around 600 special vehicles with inflatable suspension and attachments for loading and unloading gear which cost 30,000 euro each.

And what about the rail cars?
Hupac has made significant investments in this sector, and the problem is not viewed in the same way as in the past. Overall it’s certain more cars are needed.

In your experience, what is the situation regarding lines and terminals?
It’s different for each terminal. In Verona work done over the last couple of years has created severe disruption. On the other hand, Novara is experiencing rail traffic problems. The new terminals to the east of Milan proposed by the trio Hupac, Cemat and RFI should provide a real blast of oxygen. But the biggest challenge is the access lines to the Gotthard base tunnel. Today our intermodal quota via Switzerland is extremely reduced, given the insufficient profile of the lines.

If you had to draw up an overall inventory, what would you say?
In 2010 we were definitely satisfied. 85% of trains were on time, giving us an overall logistics indicator of 95%. Unfortunately in 2011, the service was not so good. If in future we can repeat the performance experienced in 2010, combined traffic has good prospect of growth throughout Europe.

And what would you say about Hupac as a partner?
The word partner is the right one. Hupac is more than a supplier. We work together with an open-books policy. Hupac’s strength resides in its capacity to be at the leading edge both in terms of reading the market and selecting terminals. And they are extremely well prepared in the technical management of rail cars.

Hupac's first company train in Turkey

Since the end of June, Hupac has been running a weekly container train for Borusan Logistics of Turkey. The 1,500-kilometre route runs from Edirne on the Turkish-Bulgarian border to Vienna and back. All container spaces on the train are reserved to Borusan Logistics. The traction is provided by WLC Wiener Lokalbahn Cargo together with its partners Gysev, DBSC Romania und BDZ Cargo. Hupac its taking charge of the operational and administrative transport processes. The first train roundtrips have been successful and in the coming months the frequency is set to be increased to three weekly departures.

Brenner and Simplon routes closed for modernisation

From June to September 2012, ÖBB will be carrying out refurbishments on the Innsbruck-Brenner line. To minimise the impact, ÖBB has devised a flexible solution. A total closure of the line is scheduled from 6 August to 10 September and over the weekends of 16, 23 and 25 June, 14 July as

well as 15 and 22 September 2012. For the remaining time, i.e. from 11 June to 22 September, the traffic will be handled on a single track with a regular schedule.

During the days of closure, Hupac's Rotterdam ⇆ Verona, Antwerp ⇆ Verona, Taulov ⇆ Verona and Genk ⇆ Verona trains will be diverted onto the longer route via the Tarvisio pass.

Construction work has also been announced on the Simplon axis. The line will be completely closed in weeks 33 to 35 so that the damaged Varzo tunnel can be repaired. The Hupac connections via Simplon will be handled via the Gotthard and Brenner axes during that time. Circulation will be intensified according to market request.

All information at www.hupac.ch

moving

Rolling stock – the key to success

Since its foundation, Hupac has relied on its own rolling stock, focusing on the demands of the market and environmental protection.

by Michael John

Michael John
Rolling Stock Development

From the start, rail wagons have been the backbone of Hupac. Today, the company has around 5,000 wagons of its own, with another 1,000 on long-term lease. Alongside 400 Rola wagons, the fleet mainly comprises container and pocket wagons for unaccompanied combined transport in 4 and 6-axle versions or as 4x4-axle close-coupled Mega units. The variety of wagons impressively mirrors the development of road vehicles (semi-trailers) and their containers (including swap bodies). As the semi-trailers became heavier, longer and higher, Hupac worked with the manufacturers to develop the corresponding rail wagons. Over a period of 40 years, this has seen the creation of several generations of pocket wagons with the model names T1 to T5. The T1, developed at the start of the 1970s, is designed to carry semi-trailers and swap bodies up to 35 tonnes. That is no match for the current T5, which can transport semi-trailers with a total weight of 44 tonnes! It is not just the 9-tonne increase in load but also the capacity to carry mega-trailers with interior heights of up to 3.0 metres that highlights the rapid development of the transport sector. The international standards for combined transport, such as UIC 571-4 and UIC 596-5, have been co-determined and constantly expanded by Hupac.

Simple approval

All these wagons have been licensed in Switzerland and can also run internationally. Until 2001, SBB was the registering railway responsible for approving private wagons. Today, the wagons are licensed by the Swiss Federal Office of Transport. To run internationally, trains have been required to comply with the Technical Specifications for Interoperability (TSIs) since 2007. Yet the TSIs hinder the further development of wagons, particularly the use of new, innovative solutions not yet covered by the regulations. That is what Hupac is currently experiencing with the licensing of a new multi-pocket unit, derived from the existing Hupac Mega units with a view to increasing the load capacity and expanding the envelope. Because of the limited space, a Y25 bogie with a wheel rim diameter of 840 mm is used. Braking of the unit in operation up to 120 km/h required a new solution and a combined block/disc brake fulfilled the requirements. Yet the existing rules do not allow for this brake configuration in conjunction with a wheel set 840 mm in diameter. The search for a technically unproblematic solution thus requires a time-consuming and expensive process involving applications and a large amount of theoretical and practical analysis.

The existing TSIs are a comparatively rigid set of rules with numerous formal considerations that are technically known in principle but still demand a great deal of evidence. This substantially increases the time and expense required for the licensing of freight wagons. One can only hope that the new edition, which comes into effect in 2012, will stipulate fewer details and will in fact be based on functional and general requirements without specifying the solutions and components in detail.

Efficient noise reduction

Since the introduction of the TSI Noise in June 2006, new wagons have been required to comply with a lower noise level limit, which cannot be achieved with the conventional cast iron brake pads. The technical standard for compliance with the limit includes the use of composite brake pads (K pads). Hupac has stipulated this technology since 2000 when ordering new wagons. The Swiss Federal Law of 2001 on Railway Noise Reduction makes it a mandatory requirement. So Hupac was one of the first operators to gain extensive experience with the K pad in actual operation. It soon became clear that the first generations of K pads, although licensed, were not suitable for everyday use. Damage to the pads such as cracks, chipping and transverse wear, as well as high wheel tread wear, lead to far higher operating costs.

The realisation that the system of cast iron brake pads, developed over decades, cannot be easily replaced by the K pad system without consideration of the boundary conditions was the starting point for a comprehensive examination of the K pad braking system. Hupac worked with brake pad and brake component manufacturers to find new solutions. The enhancements to the brake pads, including an improvement of the bond between the bearing plate and synthetic material as well as an adjustment of the pad outline to the wheel profile, led to better results. A more precise design and adjustment of braking power was also successful. Operating costs have been substantially improved as a result. However, even if the noise bonus of 1 centime per kilometre on Swiss lines is taken into account, cost neutrality in comparison to the cast iron pads has not yet been achieved. Further development potential must be exploited in the near future. Since 2009, Hupac has reduced the noise of around 350 of its own wagons and since 2001, it has only purchased low-noise wagons. Around 90% of all Hupac wagons are therefore low-noise.

moving impressum

Moving is published in English, German and Italian.

Publisher: Hupac Ltd, Viale Manzoni 6, CH-6830 Chiasso

Editorial: Irmtraut Tonndorf
Tel. 0041 91 6952936
itonndorf@hupac.ch

Online form
Under www.hupac.ch/moving-en you can order Moving free of charge as a single copy or as a subscription. Use the form as well if you wish to change the address or unsubscribe to Moving.

Printed on ecological paper with FSC Mixed Sources (CQ-COC 000010) and Ecolabel (Rif. IT/011/04) certification