



**Tagung der Alpenkonferenz**

**IX**

**Réunion de la Conférence alpine**

**Sessione della Conferenza delle Alpi**

**Zasedanje Alpske konference**

**TOP / POJ / ODG / TDR**

**13**

**SL**

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**OL: FR**

**PROMET**

**A Poročilo predsedstva Delovne skupine**

**B Predlog sklepa**

**Priloge:**

- Priloga 1: Report by the « railways corridors » subgroup
- Priloga 2: Report by the « transport costs » subgroup
- Priloga 3: Mandat Delovne skupine
- Priloga 4: Final document of the European Expert Conference „Environmentally Friendly Travelling in Europe – Challenges and Innovations Facing Environment, Transport and Tourism“

## A Poročilo

### 1. Določitev delovnega programa

Sedanji mandat Delovne skupine Promet, ki zajema glavne cilje Protokola Promet, je drugi po začetnem mandatu, določenem s strani VII. Alpske konference v Meranu.

Nastal je na podlagi ciljev, ki so jih določili ministri na VIII. Alpski konferenci v Garmisch-Partenkirchenu, dne 10. novembra 2004:

- »za pomembno izboljšanje železniških storitev in prispevanje k spremembi načina prometa je treba za vse čezalpske železniške koridorje, ki s tem še ne razpolagajo, vzpostaviti aktivno sodelovanje med upravitelji omrežij in železniškimi operaterji, ter ugotoviti dejansko stanje storitev;
- da bi dosegli trajnostno mobilnost v medalpskem območju je treba razviti sodelovanje z omrežji krajevnih in območnih skupnosti v Alpah, da bi inovacijske dejavnosti na področju povezav zbrali in podprli s skupnimi prevozi med alpskimi naselji, ter z dostopom do velikih alpskih turističnih območij na način, ki kar najbolj spoštuje okolje;
- poglobljanje že začelih dejavnosti, da bi se v še večji meri upoštevali vsakovrstni stroški pri določanju cen za infrastrukturo in da bi ugotovili, kakšen je zaželeni razvoj ter s tem prispevali k bolj usklajenemu določanju cen cestnega prometa v alpskem loku;
- izdelava globalne analize ukrepov, ki so bili izvedeni ali predvideni v zvezi s prometom, in ki bodo prispevali k temu, da dosežemo cilje kakovostnega zraka v alpskem območju;
- nadaljevanje dela na področju spoznavanja čezalpskih prometnih tokov in krepitev sodelovanja s SOIA pri izdelavi podatkovnih baz in komunikacij v zvezi s prometom, posebno pri določanju kazalcev kakovostnega okolja.«

Kot dopolnilo mandatu je na 31. seji Stalnega odbora (septembra 2005) med drugim bilo sklenjeno, da se Poročilo o stanju Alp, čigar izdelava je bila sklenjena na zadnji Alpski konferenci, posveti temi promet.

V skladu s tem razvojem je Delovna skupina Promet aktivno sodelovala pri večini tem, ki sestavljajo njen program, čeprav pri vsaki od njih ni mogla doseči enakega napredka. Aktivno je sodelovala tudi pri izdelavi Poročila o stanju Alp.

Sestala se je šestkrat: 28. januarja 2005, 9. septembra 2005, 24. februarja 2006, 24. aprila 2006, 7. julija 2006 in 5. oktobra 2006.

## **2. Napredek del**

### **2.1. Izboljšave obstoječih železniških koridorjev**

Ocena stanja prostora za tehnično sodelovanje na čezalpskih železniških koridorjih, s katerim se je ukvarjala že VIII. Alpska konferenca, je pokazala:

- da obstaja tesno sodelovanje med upravitelji omrežij in železniškimi operaterji ter transportnimi podjetji samo pri koridorju Brenner in pri koridorju sever – jug preko Švice ter delno pri koridorju Tauern, s ciljem optimalne izboljšave celotnega sistema povezav;
- da je pomembno, da tudi pri drugih koridorjih pride do podobnih ukrepov.

Na tej podlagi in ob upoštevanju prvih pozitivnih rezultatov, do katerih je prišlo pri zgoraj omenjenih koridorjih, je delo podskupine »koridorji«, pod vodstvom nemške delegacije, potekalo na drugih velikih čezalpskih koridorjih:

- Koridor Semmering/Wechsel: os Brno-Udine
- Koridor Tauern: os München-Salzburg-Ljubljana
- Koridor Mont Cenis: os Lyon-Torino
- Koridor Trst/Koper: os Benetke-Trst-Koper-Postojna-Ljubljana
- Koridor Pyhrn/Schoberpass: os Budejovice-Maribor
- Koridor Donava: os München-Passau -Bratislava-Budimpešta

Vsak od teh koridorjev je bil temeljito analiziran: podrobno poročilo podskupine, ki prvič predstavlja celotno stanje železniških čezalpskih koridorjev, je priloženo temu poročilu (priloga 1). Ocenjeni so bili ukrepi za izboljšanje kakovosti storitev, ki so bili po svoji naravi in intenzivnosti zelo različni v vsakem posameznem koridorju: tekoči ali predvideni projekti sodelovanja, uvedba sistema ERTMS... Upoštevali so tudi take akcije, ki so se v času Konferenca v Garmischu šele začele, na primer poskusni razvoj storitev železniške avtoceste med Lyonom in Torinom.

Skupina si je prizadevala za povezavo z deli, ki se izvajajo v okviru Zürške skupine (sodelovanje med ministri za promet v alpskem prostoru), v zvezi z izkoriščanjem rezultatov ankete CAFT 2004, ki opredeljujejo značilnosti velikih čezalpskih povezav pomembnih za gospodarstvo. V zvezi z revizijo Bele knjige, ki jo je nedavno sprejela Evropska komisija, poročilo podskupine potrjuje potrebo po promociji železniških alternativ in po kombiniranju različnih načinov, s ciljem najboljšega izkoriščanja njihovih specifičnih možnosti.

Predsedstvo Delovne skupine Promet si je izredno prizadevalo za vključitev ministrov za promet v to delo.

Na podlagi teh del je podskupina zaključila, da je med velikimi koridorji, katere je proučevala, treba dati prednost predvsem dvem koridorjem (koridorjema Mont-Cenis in Trst-Koper), pri katerih so s strani držav že začeli s konkretnimi ukrepi, upraviteljev in operaterjev.

Med drugim je promocija teh ukrepov vključila veliko najraznovrstnejših akterjev in povzročila zelo tesno povezavo z investicijsko politiko v vsaki državi. Na podlagi opravljenega dela podskupina predlaga, da na naslednji Alpski konferenci predstavi najnovejšo stanje ukrepov, ki se izvajajo na prednostnih železniških koridorjih.

## **2.2. Stroški in cene transporta v Alpah**

Podskupina »stroški«, je pod vodstvom italijanske delegacije nadaljevala svoje delo z ocenjevanjem in primerjavo zunanjih učinkov in stroškov pri treh pomembnih čezalpskih cestnih koridorjih: Brenner, Saint Gothard, Fréjus.

Delovni dokument (priloga 2) je v svojem trenutnem stanju pomemben prispevek, ki predstavlja uravnoteženo vizijo kot povzetek različnih stališč delegacij. Omogočil je neposredno sodelovanje pri izdelavi poglavja »C1« Poročila o stanju Alp, ki je posvečeno vplivu gospodarskih faktorjev na promet.

V bodoče bo lahko podskupina na podlagi lastnega dela:

- končala svoje delo z upoštevanjem notranjih in zunanjih stroškov,
- predložila svoje končno poročilo v informacijo državam in Evropski komisiji,
- nadaljevala svoje delo v zvezi s strukturo stroškov v alpskem prometu,
- v tem okviru proučila, kako se v alpskem prostoru za konkretne prometne alpske koridorje uveljavlja direktiva o evrovinjeti (definicija gorskega perimetra, razmišljanje o navzkrižnem financiranju, pojmovanje koridorjev...).

### 2.3. Kakovost zraka

Predsedstvo Skupine je izdelalo vprašalnik, s pomočjo katerega se bo vsaka delegacija opredelila glede:

- kakovostnih in količinskih ciljev kakovosti zraka v alpskem območju v povezavi s prometom,
- glavnih ukrepov za zaščito zraka, ki so predvideni ali uvedeni na področju prometa,
- načinov opazovanja in kazalcev učinkovitosti teh ukrepov,
- načrtov dolgoročnega ukrepanja s ciljem izboljšanja kakovosti zraka,
- ugotovljenih ali pričakovanih rezultatov.

Na splošno so imele vse delegacije naslednje težave:

- pristojnosti glede ukrepov za kakovost zraka so nejasne,
- ni specifičnega nacionalnega cilja glede kakovosti zraka za območje Alp,
- prav tako ni specifičnih ciljev za sektorje, še posebej za promet (delež onesnaženja, ki ga specifično povzroča promet, je zelo težko ugotoviti).

Vendar pa so uspeli točno določiti mejne vrednosti onesnaževanja, v skladu s priporočili specializiranih mednarodnih organizacij (WHO, ES/ZN). Prav tako so lahko evidentirali najpogostejše ukrepe za zaščito zraka, ki so predvideni ali uvedeni na področju prometa: nanašajo se na tehnične naprave (motor, izpuh), sestavo goriv, merjenje prometa (največja dovoljena hitrost), določanje cen (podpora alternativnega načina prevoza)... Tako so, na primer, v vsaki državi uvedli različne vrste mrež za nadzor in merjenje. Na splošno so že ugotovljeni prvi pozitivni rezultati (zmanjšanje emisije SO<sub>2</sub>, CO, Pb), vendar je potrebno nadaljnje ukrepanje v zvezi z nekaterimi kategorijami onesnaževalcev (dušikov dioksid, prah, drobni delci, težke kovine...).

Naslednje srečanje Delovne skupine bo to temo obravnavalo na dnevnem redu in jo obravnavalo v prisotnosti strokovnjakov, da bi določilo organizacijo dela in točen koledar glede kakovosti zraka, izključno glede na prometno komponento. Zasledovali bodo lahko naslednje možne poti:

- ponoven pregled in priprava seznama različnih skupin ukrepov ali obstoječih študij, še posebej tistih, ki se že izvajajo ob čezalpskih oseh

- ocena vpliva različnih politik ali ukrepov na področju vodenja/regulacije, ki se izvajajo na oseh čezalpskega prometa in poudarek na eventualnih dobrih praksah.

Delovna skupina opozarja Stalni odbor na potrebo po prizadevanju za kakovost zraka tudi pri drugih komponentah (ne le prometnih).

## **2.4. Izboljšanje okolju prijazne dostopnosti turističnih krajev in notranje povezave alpskega območja**

Na to temo Skupina ni dosegla zastavljenih ciljev, ker je v začetni fazi trajalo razmeroma dolgo, preden so našli konkretne teme za obravnavo, potem pa še možne pristope. Poleg tega pa francosko predsedstvo Delovne skupine Promet ni imelo na razpolago dovolj časa za učinkovito vodenje dela na tem področju.

Vendar je predsedstvo dne 30. maja 2006 kljub temu prvič združilo strokovnjake, ki jih je pooblastila vsaka od delegacij, in ugotovilo, da so na to temo pristojnosti decentralizirane in izredno razpršene. Na podlagi obstoječih dobrih praks in ukrepov s strani sodelujočih omrežij (projekti INTERREG, programi za čezmejno sodelovanje) je Skupina pripravila vprašalnik, s pomočjo katerega naj bi ugotovili:

- skupne prometne povezave med alpskimi naselji: pristojne oblasti (sredstva, akcije), alternativne storitve za posamezna vozila (vozni redi, stroški, obveščanje javnosti, prometne povezave), infrastrukture za obvoz ali za omogočanje tekočega prometa, politika lokalizacije in okolju prijazne umestitve odstavnih parkirišč...
- dostop do alpskih turističnih območij in notranje povezave med turističnimi mesti: tekoči ali načrtovani inovativni in eksperimentalni ukrepi (okvir, sodelujoči operaterji, rezultati, perspektive), razpoložljive študije...

Za ta vprašalnik se je izkazalo, da je preveč kompliciran za uporabo ter težko obvladljiv za delegacije, zato ni dosegel svojih ciljev.

Vzporedno s tem je francosko predsedstvo aktivno sodelovalo na konferenci o trajnostni mobilnosti, ki jo je organiziralo avstrijsko predsedstvo Alpske konvencije 30. in 31. januarja 2006 na Dunaju. Razprave v okviru konference in še posebej sprejeta priporočila dajejo konkretne predloge, kako se delovanje na tem področju lahko nadaljuje, kot dopolnilo k drugim virom podatkov in informacij:

- dela, ki jih je neposredno sprožil Stalni sekretariat (analiza vozniških redov javnega prometa med alpskimi kraji),
- elementi, zbrani za Poročilo o stanju Alp (potniški promet, obstoječe povezave med naselji v alpskem prostoru),
- zaključki italijanskih seminarjev SWOM in projektov INTERREG (program INTERREG III B Alpski prostor).

Na podlagi izmenjave mnenj so se kot najbolj praktične izkazale tri delovne teme:

- zbiranje in širjenje že ugotovljenih dobrih praks v alpskih državah v zvezi s trajnostno mobilnostjo, tako za vsakdanje življenje (prometne zveze v naseljenih in podeželskih območjih, povezave med ozemlji), kot za dostop do turističnih krajev;
- študija ponudbe kolektivnih prometnih storitev na dolge proge, ki bi omogočile dostop do alpskih turističnih krajev in mest, in analiza eventualnih šibkih točk pri infrastrukturi (čezmejne linije, priključki na regionalna omrežja...);
- pomoč nosilcem projektov pri razvoju konkretnih akcij, še posebej v okviru priprave bodočih programov evropskega sodelovanja, kot nadomestilo za INTERREG (določanje tem, ki bodo lahko služile kot konkretna podpora pri ponudbi projektov, na primer o centralah mobilnosti, organizaciji usklajevanja med obstoječimi linijami, alternativnimi načini dostopa do turističnih krajev, čezmejnimi storitvami...).

Na tej podlagi se bodo strokovnjaki, ki so jih za to pooblastile delegacije in zainteresirana združenja, sestali dne 30. oktobra 2006 v Parizu, da bi naredili podroben osnutek delovnega programa.

### **3. Prispevek k Poročilu o stanju Alp**

Delovna skupina je konec leta 2005 preusmerila svoje delo, da bi lahko aktivno sodelovala pri izdelavi Poročila:

- definicija kazalcev za kakovost okolja za boljšo ilustracijo poročila, v sodelovanju s Skupino SOIA;
- izdelava poglavja D, ki obravnava področje ukrepov s strani javnih administracij in politike v zvezi z alpskim prometom; ta del sintetizira in hkrati posodablja dokument o stanju izvedbe Protokola Promet v alpskih državah, ki ga redno ob priliki vsakokratne Alpske konference dopolnjuje Delovna skupina Promet;
- skupaj s Stalnim sekretariatom izdelava poglavja E, ki vsebuje zaključke;

- lektoriranje in sodelovanje pri usklajevanju celotnega poročila na skupnih sestankih Skupine Promet in integracijske skupine za pripravo Poročila o stanju Alp integracijo (24. april, 18. september in 17. oktober 2006).

#### **4. Priprava IX. zasedanja Alpske konference v Alpbachu**

Delovna skupina predaja Alpski konferenci naslednje dokumente:

- poročilo o del, ki temelji na prispevkih podskupin (določanje cen, železniški koridorji) in elementih, ki jih je zbralo predsedstvo (v zvezi s kakovostjo zraka, mobilnostjo med alpskimi območji), kateremu se dodajo: končno poročilo o železniških koridorjih, začasni delovni dokument o stroških.
- in predlog mandata do X. Alpske konference.

Oba dokumenta je pregledala in odobrila Delovna skupina Promet dne 5. oktobra 2006.



## **B Predlog sklepa**

### Alpska konferenca

1. vzame poročilo o delu Delovne skupine Promet na znanje in se zahvali predsednici in Delovni skupini za opravljeno delo,
2. naroča Stalnemu odboru in Delovni skupini Promet, da ustrezno sklenjenemu mandatu v prilogi 3 nadaljuje z delom in o tem poroča X. Alpski konferenci, in
3. vzame poročilo o Evropski strokovni konferenci „Okolju prijazno potovati v Evropi. Iz-zivi in inovacije za okolje, promet in turizem“ na znanje in prosi, da se v zaključnem dokumentu vsebovane vsebine in predlogi za ukrepe (gl. Prilogo 4) upoštevajo v okviru Delovnih skupin Alpske konvencije.

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**OL: EN**

**ANLAGE/ANNEXE/ALLEGATO/PRILOGA**

**1**



## **Cooperation on Alpine Railway Corridors**

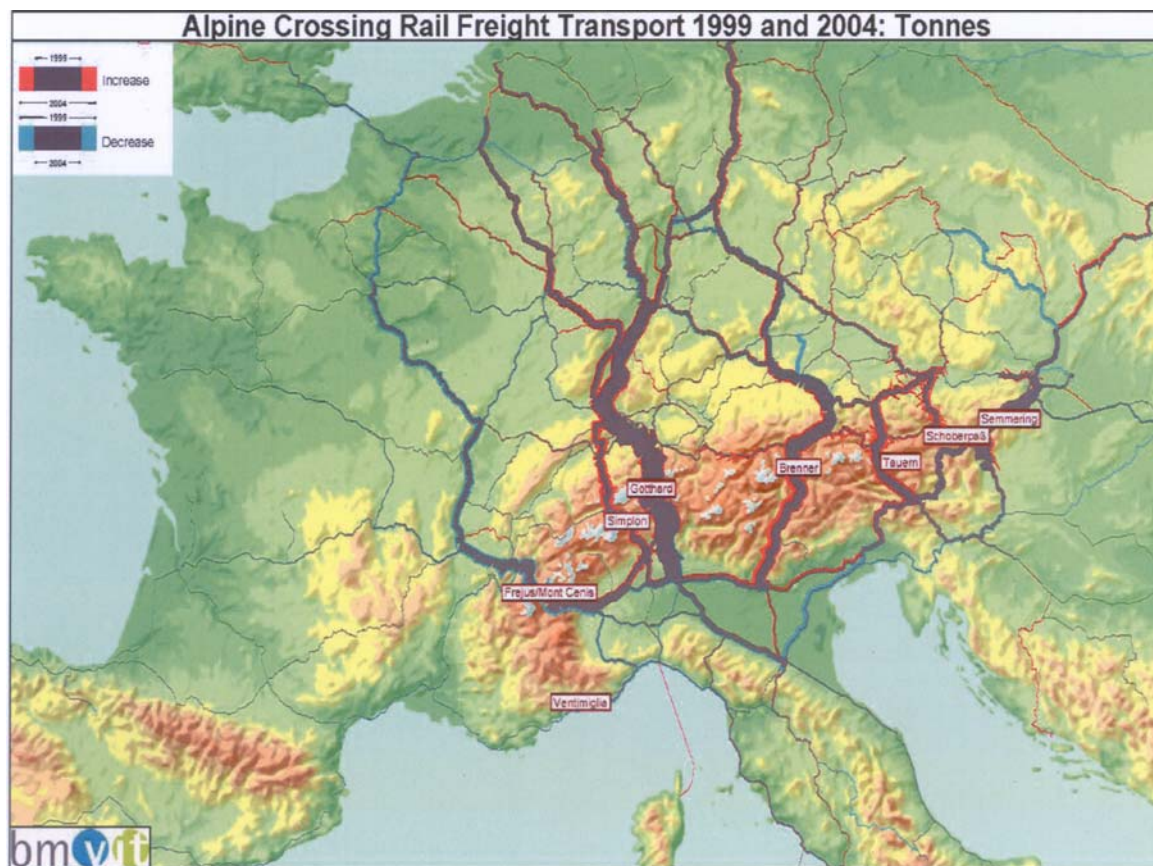
Report by the Transport Working Group

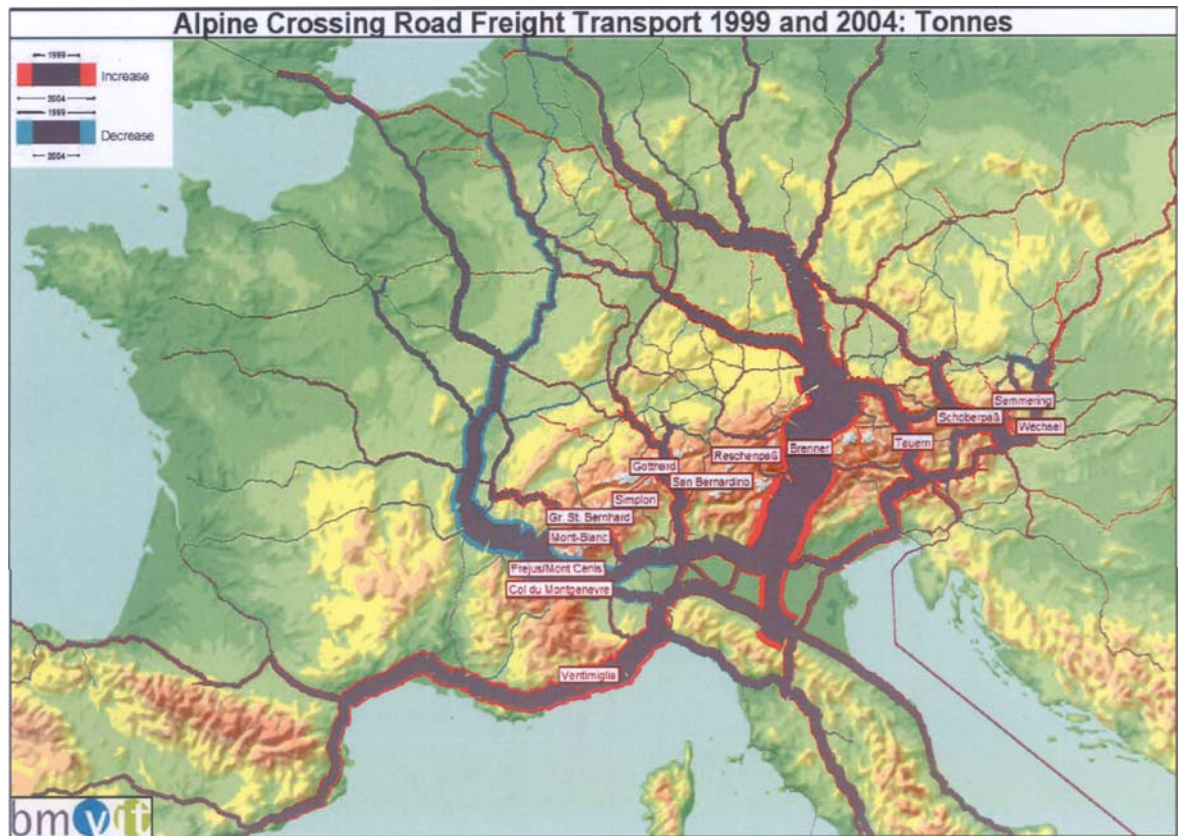
**October 2006**

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## 1. Mandate

A fundamental objective of the Transport Protocol of the Alpine Convention is the modal shift of freight from road to rail. How reasonable this objective is was also shown very clearly by the 2004 CAFT survey. There is a dynamic growth (3,7 % p.a.) on trans alpine transport demand, even if growth has slowed down in the last 5 years (5,4 % p.a. between 1994 and 1999). Since 1994 freight traffic across the Alpes (rail and road) increased from 132,4 million tonnes to 190,2 million tonnes in 2004 (+ 44 %). Total road transport share increased from 62 % to 67 %. More than 30 million tonnes (one fourth) of road freight passes Brenner and Gotthard is the most important crossing concerning rail transport (15,6 million tonnes).





In the mid term review of the European Commission concerning the White Paper on Transport the modal shift to environmentally friendly transport modes and the combination of transport modes (“co-modality”) also remain a priority objective of EU transport policy in any case on long distances and sensible areas like the Alps. On the other side, by placing emphasis at the same time on “the optimization of the specific potentials of the individual transport modes” the aim of the white book 2001 “rebalancing transport models” is diminished.

The 8<sup>th</sup> Conference of Alpine Regions asked the Transport Working Party in Garmisch-Partenkirchen on 16 November 2004 to give special consideration to the enhancement of the rail transport offers on the trans-Alpine rail corridors. In this context, the existing agreements concerning the Brenner corridor and the north-south corridor through Switzerland may provide guidance. This topic is referred to as follows in the ministerial statement on transport adopted in Garmisch: “Not all existing large corridors have yet been covered by programmes that are similar to those implemented in the framework of the Brenner 2005 Action Plan and the north-south corridor. The Conference of Alpine Regions urgently requests governments and railway operators to extend such measures to

...

the other trans-Alpine corridors before the 9<sup>th</sup> Conference of Alpine Regions is held. A statement on the situation is to be made at the 9<sup>th</sup> Conference of Alpine Regions 2006.”

The Transport Working Party cannot directly arrange agreements (such as those mentioned above) between governments, railway companies and other parties involved. However, it can intensify and reiterate the appeal made by the ministers.

This was done by way of discussions within the Transport Working Party of the Conference of Alpine Regions, in which all ministries are represented, and, more specifically, by means of letters of the French chairmanship of the Transport Working Party that were sent to the competent ministries of the countries "with rail corridors" in 2005.

The focus is placed on the following corridors:

Brno – Udine (Semmering)

Munich – Salzburg – Ljubljana (Tauern)

Budejovice – Maribor (Pyhrn/Schoberpass)

Lyon – Turin (Mont Cenis)

Marseille – Genoa (Ventimille) and

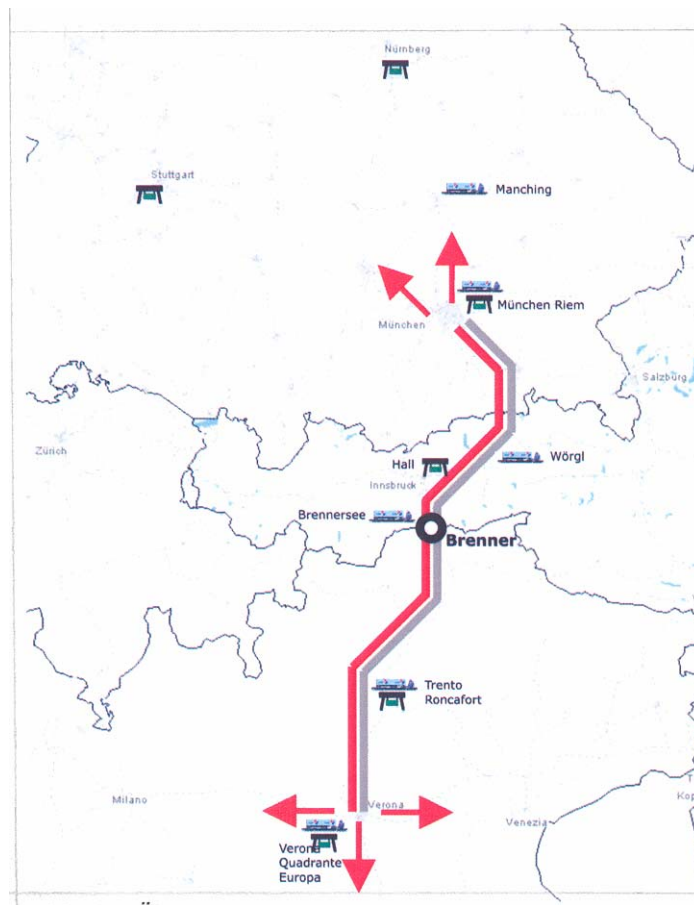
Venice – Trieste/Koper – Postojina – Ljubljana

Passau/München – Bratislava/Budapest (Danube axis)

What are the contents of the Brenner 2005 Action Plan, which provides guidance, and what does the north-south axis involve?



## 2. The Brenner 2005 Action Plan



Via the Brenner Pass, which is the Alpine crossing with the highest traffic volume, approx. 42,7 million tonnes of goods were transported in 2004, accounting for a modal split with a road transport share of more than 70%. (CAFT 2004) The Austrian master traffic plan forecasted at that time an increase to 52 million tonnes by 2015 (with the modal split remaining broadly unchanged). In 2002, these figures prompted the ministries of transport of Austria, Italy, Greece and Germany to establish working groups and charge them with the development of measures aimed at increasing the volume of combined transport on this axis by 50% by 2005 in comparison with 2001.

After a detailed problem analysis had been carried out, three packages of measures with a total of 35 measures were integrated into the Brenner 2005 Action Plan taking account of the time required for their implementation (the planned Brenner base tunnel is not taken into account).



Package of measures I (start of implementation: immediately)

- improvement and intensification of the initial cooperation between the rail transport companies (including the rail network operators)
- improvement of communication and data exchange in order to optimize the interfaces between those involved and to optimize resource management and customer information
- introduction of an integrated quality management system
- removal of operational bottlenecks (rail, terminal)

Package of measures II (short-term implementation)

- development and implementation of a seamless, axis-related traction concept (interoperability)
- enhancement of the service offer in unaccompanied combined transport and further adaptation of quality characteristics to market requirements
- joint assessment of the accompanied combined transport offer (rolling road) and coordination of short and medium-term increases of the offer

Package of measures III (medium-term implementation)

- coordination and assessment of the actual path availability in all network sectors and junctions concerned in order to further increase the transport volume
- upgrading and modernisation of rail infrastructure (lines, junctions)
- improvement of rail links and increase of the transshipment capacities of combined transport terminals in Italy and Germany

If considered individually, all these measures are rather unspectacular; what is interesting, however, is how their implementation is organized; this can be described in three steps:

### Comprehensive participation

The action plan was **jointly** developed and adopted by all parties involved in Brenner transport matters, i.e. the representatives of the relevant ministries of transport, rail transport companies, rail network companies, combined transport operators and terminal operators.

### Specification of responsibilities

Clear responsibilities were specified for the individual measures. In the package of measures I, for example, “Brenner Rail Cargo Allianz” is responsible for the assessment and prioritisation of the existing deficiencies in communication and data exchange. The development of a computerized system for communication with combined transport customers is the responsibility of “Rail Cargo Austria” etc..

### Monitoring

On the basis of regular reports, the ministers of transport of the three countries accompany and support the implementation process in their respective area of responsibility and make appeals to the competent national partners. Among the parties involved, penalties were agreed e.g. for the non-availability of locomotives and train drivers. The agreed “contractual penalties” are paid into a fund and used for improvements in the framework of the Action Plan.

### First successful measures

At the beginning of 2005, the first successful measures were reported:

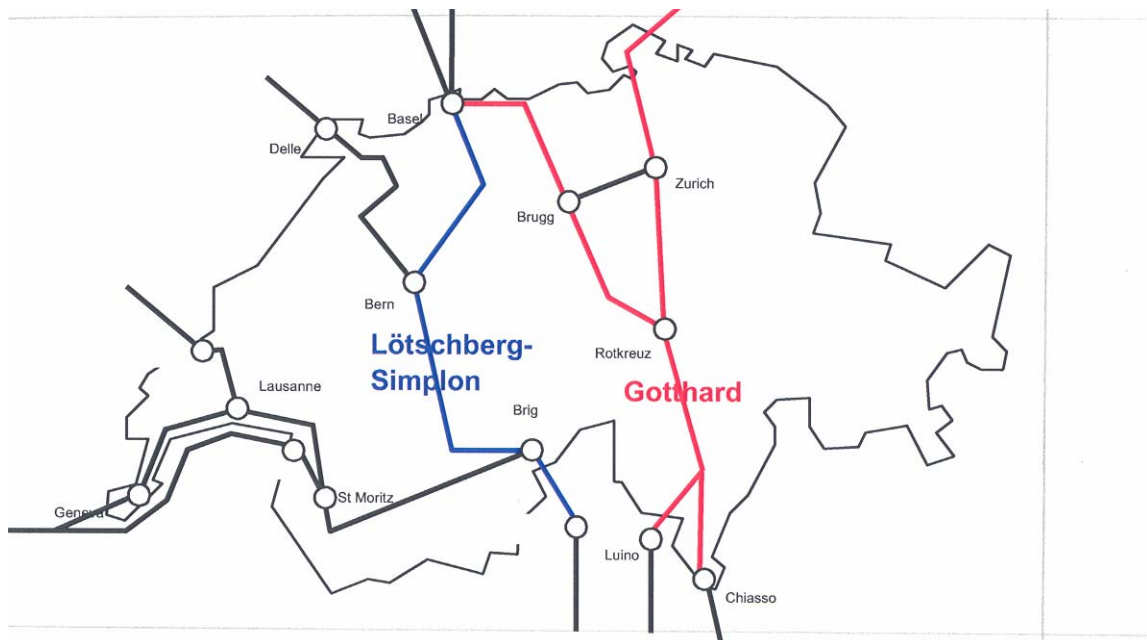
- Thanks to the removal of operational bottlenecks (e.g. allocation of slots for transport and shunting services, improved availability of locomotives and train drivers) it was possible to increase punctuality from an average 40% at the beginning of 2002 to 80% in 2003; since then the percentage has stabilized at this level.
- The terminals Munich-Riem and Verona-Quadrante were equipped with overhead electrification extending as far as possible into the terminals.

- In the combined transport terminal in Verona, a further transshipment module was installed increasing the capacity from 250,000 to 330,000 loading units.
- At the Brenner Pass, a separate office was established which is responsible for managing data exchange, customer information services and GPS-based train monitoring on a 24-hour basis in cooperation with the Verona operational control centre. Through the use of mobile phones for maintaining permanent contact with all train drivers, it is possible to identify irregularities at an early stage and take remedial action. For example, it is also possible to inform combined transport customers in good time of changed dates for the provision of loading units at the terminal of arrival (estimated time of availability).
- Development of an IT component by means of which the quality of the transport process can be visualized on the basis of clearly defined key performance indicators. The relevant basic data are provided by the infrastructure operators concerned.
- Improved formation of block trains through the upgrading of the Verona terminal to a gateway to the Italian network including a shuttle train service between Verona and Bologna.
- Finally, considerable improvements were made with regard to traction: approval of the pusher locomotive, which is required for the north side of the Brenner Pass, so that it can be radio-controlled by the train driver of the first locomotive of double-headed trains (so-called radio control pushing engine). The first multi-system locomotives have also been made available. The question of reciprocal approval has been resolved and only business aspects determine the use of such locomotives. Work is underway to bring forward the international use of train drivers (linguistic barrier).

Despite all this, the objective of increasing the combined transport volume by 50% by 2005 has not yet been achieved. In this context, however, it must be taken into consideration that important framework conditions have changed. For example, the abolition of the ecopoints system on 1 January 2004 has led to a drastic decrease in rolling road transport on the Brenner route whereas unaccompanied combined transport has increased significantly. In 2003, for example, 4.47 million tonnes of goods were transported in unaccompanied combined transport via the Brenner route, 5.09 million tonnes in 2004 (+ 13.5%) and 5.92 million tonnes in 2005 (+ 16.2%). By the end of 2006, an increase to 6.86 million tonnes is expected. In comparison with 2003, this would represent an increase of more than 50%. This can at least partly be attributed to the Brenner 2005 Action Plan. Without the measures agreed in the Ac-

tion Plan it would not have been possible to even maintain the rail transport share. The efforts made to improve the rail transport offer will therefore be seamlessly continued with the BRAVO project in the framework of the 6<sup>th</sup> EU research programme which involves 15 partners from 6 countries (combined transport companies, railway companies, terminal operators, institutions of higher education and also a Swiss waggon manufacturer).

### 3. The north-south corridor Rotterdam-Genoa, IQ-C project (Swiss section)



Although the modal split on the Swiss north-south axis accounts for a rail freight share of approximately two thirds and thus more than the inverse ratio of the Brenner route and the French corridors, the Memorandum of Understanding which was signed in Lugano by the ministers of transport of Switzerland, the Netherlands, Italy and Germany in 2003 is also primarily aimed at further increasing or stabilizing the rail freight share. The rail freight routes on this axis are to be strengthened in order to keep them competitive with road transport.

In this case, too, an international working group was established, initially from representatives of the ministries, which, however, was expressly asked to call in representatives of transport companies (i.e. infrastructure and transport operators, in particular) as well as customs authorities, and to work out measures and proposals for improving the quality of the transport offer on this route in coordination with other interested parties (e.g. railway companies, hauliers etc.).

The measures proposed by the working group were essentially placed under the responsibility of the infrastructure operators and ministries which began working on their implementation.

#### 3.1 Infrastructure operators

The infrastructure managers of the five railway companies involved have intensified their cooperation.

A so-called one-stop shop network for the whole corridor has been in place for some years now. For customers, two computerized systems are available: “Pathfinder” which is for ordering train paths and the European Infrastructure Charging Information System (EICIS) which provides information on infrastructure utilization. Finally, there is a special system for providing train paths to meet short-term needs (System Train Paths).

Furthermore, a corridor manager has been dealing with specific problems concerning the whole corridor since 2005.

Great efforts are also being made with regard to the automated exchange of data between neighbouring infrastructure managers. In addition, the EU funded EUROPTIRAILS project (start: 2006) is to make possible the monitoring of selected trains on the entire corridor.

### 3.2 Ministries

The ministries are responsible for promoting regulations on the reciprocal approval of locomotives and mutual recognition of train driver qualifications. This must be done within the predefined EU framework and is time-consuming. For example, the first EU Directive for the international admission of train drivers is not expected until 2010. Until then, cooperative solutions must be found between the organizations (enterprises) responsible, and, therefore, a range of bilateral agreements have been concluded, e.g. on the mutual recognition of medical and psychological tests for train drivers. A form of cooperation which is particularly appreciated in the framework of trans-Alpine transport is the official enlargement, by experts from Switzerland and the Netherlands, of the Interoperability Working Group (Germany, Austria, Italy) which already exists for the Brenner axis. The Working Group works on the speeding up of processes and cost-reduction with regard to the reciprocal approval of locomotives and also makes its know-how available to third parties.

Following a Swiss proposal, a tailored and simplified customs procedure for rail freight from the EU will remain in force until the end of 2007. (Goods from the EU account for approx. 90% of rail freight via the north-south corridor.)

Finally, the ministers charged the Working Group in 2004 to examine whether it is possible to equip the corridor with ETCS (European Train Control System).

ECTS would mean continuous traction throughout the entire route with every equipped locomotive and therefore increasing productivity, better quality and easier access for operators (the equipment of locomotives with ETCS is relatively inexpensive).

Results of the study: technically feasible by 2012/2015; economic efficiency, however, depends on a broader use of the system, beyond the route Rotterdam-Genoa, on the remaining network. In order to equip the relevant corridor, subsidies are needed for the infrastructure operators.

The results were put in a wider European context. With the Letter of Intent signed on 3 March 2006, the ministers of transport of the four above-mentioned countries decided in formal agreement with EU TEN coordinator, Mr Karel Finck, to implement ERTMS (ERTMS includes both the above-mentioned ETCS and GSM-R (Global System for Mobile Communications – Railways)) on the corridor Rotterdam-Genoa by 2012/2015 at the lowest possible cost. Through the priority introduction of ERTMS on ten further important freight corridors in Europe the cost-benefit ratio for the introduction of the above-mentioned north-south corridor is improved considerably.

For the purpose of implementation, an executive committee will be established in which the EU Commission and the infrastructure managers will also be represented. A management committee ensures coordination with the other measures taken on the corridor.

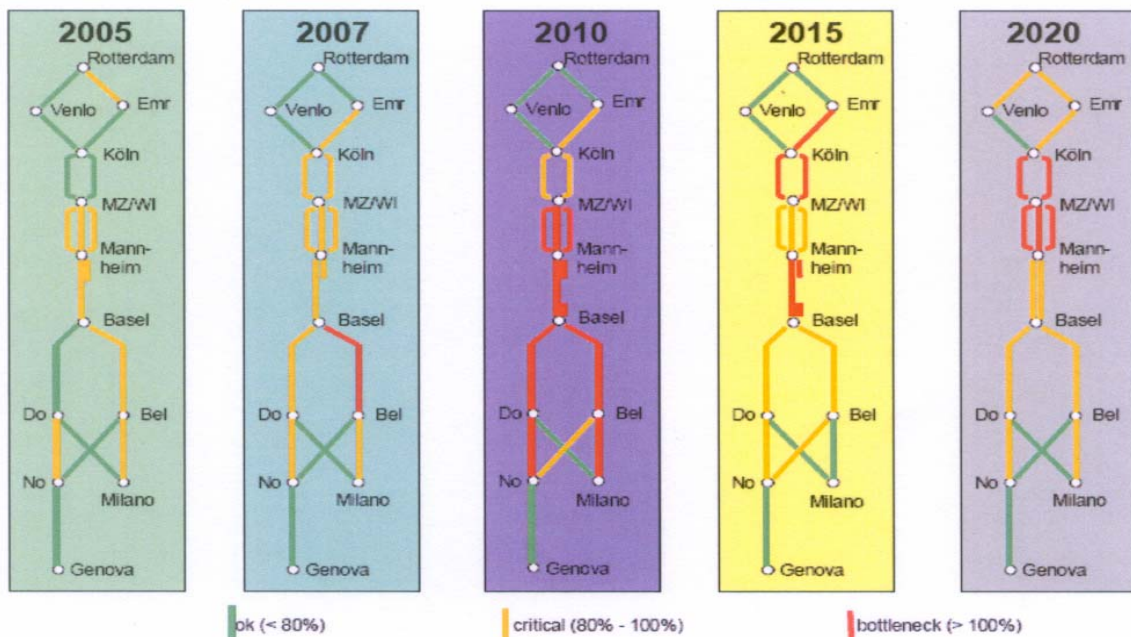
### 3.3 Results and outlook

As regards the success of the described measures, it should of course be taken into account that due to the traditionally large share of rail freight in Switzerland (2000: 70%) strong increases are simply no longer possible. However, apart from the tax on the use of roads by heavy goods vehicles which boosted combined transport and thus prevented a further decrease of the rail freight share, the current stabilization at 65% can certainly be seen as a success that can be attributed to the described measures.

There is still a need for harmonization, inter alia, with regard to the differences in the implementation of the relevant EU Directives in the Member States and the mutual approval of rolling stock. The situation concerning punctuality and delays of the trains is also still unsatisfactory. This aspect will be one of the key areas of the measures in the years to come.

However, given the existing and new bottlenecks in the corridor caused by the increasing traffic volume, it is above all the ministries that must coordinate their plans for the upgrading of their infrastructures.

#### Development of bottlenecks on the N-S Corridor 2005-2020

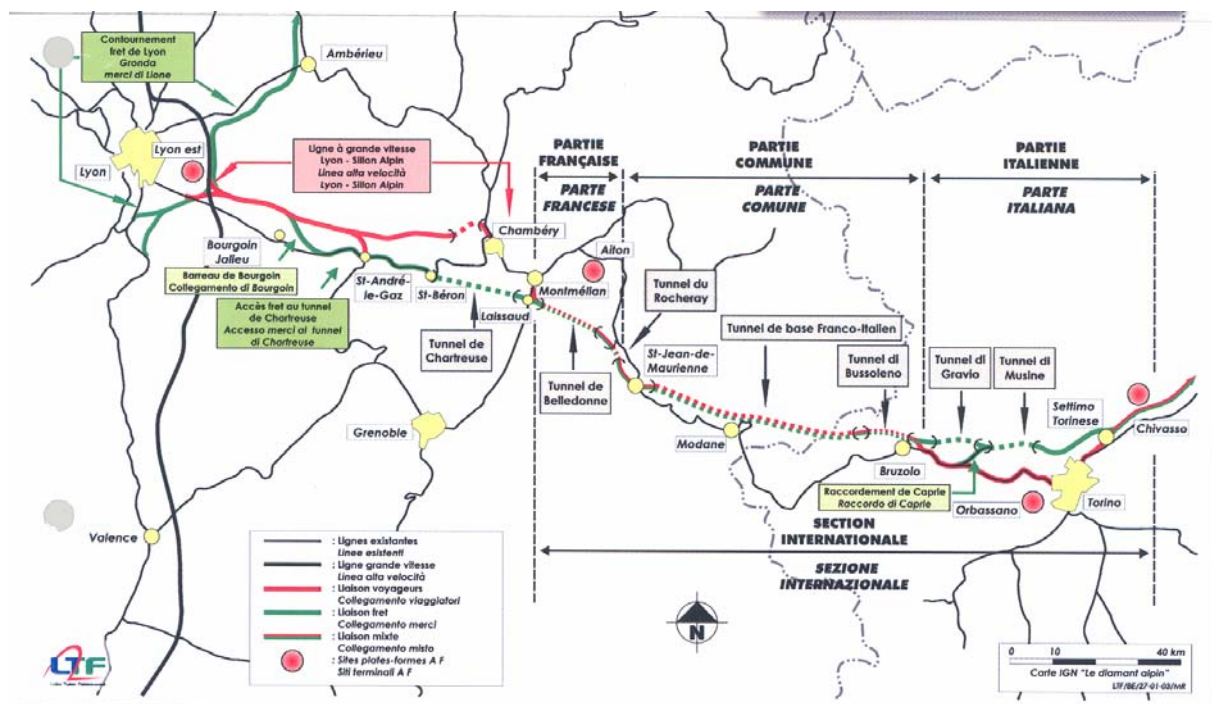




#### **4. The remaining corridors**

Of course, improvements of the quality of the offer have been considered for all corridors long before the conclusion of the Alpine Convention and concrete measures have been and are currently being taken. However, they are very different in nature and range from quasi-contractual cooperations, as in the case of the Brenner 2005 Action Plan and the north-south corridor, through the intent to conclude such agreements in the medium term to the conclusion that such measures do not seem to be useful at all. It is obvious in this context that, given the specific infrastructure and operational requirements, specifically adapted solutions must be found.

##### **4.1 Lyon-Turin (Mont-Cenis) and Marseille-Genoa (Ventimille)**



The Lyon-Turin route is a section of the TEN corridor D Valencia – Ljubljana and the most important rail link between France and Italy (transport volume in 2004: 6.9 million tonnes).

Similarly to the Brenner corridor, there are plans to significantly improve the quality of the rail transport offer in the short and medium term without waiting for the completion of the tunnel between Saint-Jean de Marienne and Orbassano (52 km, completion planned for 2020).

The objective is to achieve at least the transport volume of 1999 (10 million tonnes).

According to the CAFT survey 2004, the French rail transport share via the Alps amounted to a total of 6.8 million tonnes with a modal split share of 14% which has decreased considerably in comparison with 1994 (19%).

The governments of both countries decided to optimize the conditions in the existing Mont Cenis Tunnel and to develop a high-quality rail transport service (rail highway).

#### 4.1.1 Upgrading of the tunnel

The 13.7-km long Mont Cenis Tunnel, inaugurated in 1871 is a high altitude tunnel, with winding lines that include very steep gradients, which can greatly limit train loads and seriously penalises rail transport costs. For example, the incline either verges up or exceeds 30 ‰ and bends are often below 400 m of the curvature radius, on both sides. A systems of two successive banking engines is required for heavy trains between Saint-Jean-de-Maurienne and Modane, on the one hand, and beyond Modane on the other.

Finally, the reduced gauge of these structures, designed for trains of that era, are now found to be unsuitable.

Under these conditions, the political decision was for heavy works aiming to upgrade the Mont Cenis Tunnel gauge to the European B1 gauge, which will be completed at the end of 2008 and then enable technically to transport most of the road traffic that passes in transit along the Mont Blanc / Fréjus corridor route.

Of course these decision in fact led to reduced tonnage transported on the historical line. The works period does not ease operations and, in 2005, a derailed train at the entrance of the tunnel damaged the track even more. The aim is to at least enjoy the same traffic level as in 1999 (10 MT).

#### 4.1.2 The experimental rail highway

A second political decision was to put into service a 175-km long experimental rail highway in Autumn 2003 between Aiton (France) and Orbassano (Italy), in order to test road sector acceptance, the accessible market, carriages, locomotives, terminals, timetables, regularity, handling of lorry drivers.

This service uses the MODALOHR system and low-loader wagons (20 cm from the rail), equipped with standard-sized wheels, because of the present, very restrictive gauge of the Mont Cenis tunnel, thus receiving up to 4-m high and 2.60-m wide lorries (about 6 % of all HGVs using the Fréjus and Mont Blanc road tunnels, which are mostly tankers). The terminals (at Aiton and Orbassano) are user-friendly and enable simultaneous loading / - unloading of lorries (in less than 40 minutes). The tractor must be uncoupled and can board another MODALOHR carriage. The driver moves to a reception carriage at the front of the train, where meals, films and magazines are available.

Since June 2004, semi-trailers can also travel on their own (unaccompanied transport), as the operator performs loading / unloading via a tractor (service jockey).

The rail highway uses the existing railway line where both passenger and freight trains co-habit.

The service includes four rotations a day (5 days a week). Each can load a maximum of 15 to 16 trailers because of the percentage of accompanied trailers (see infra).

After nearly three years of experience, the experimental rail highway has been found to be technically successful, as the MODALOHR system is reliable and efficient. Nevertheless, service regularity is still deplorable. Thus, in 2005, 65 % of trains in the Italy-France direction arrived at Aiton at least 30 minutes late. There are multiple causes for these delays; notably incidents on engines, works in the Mont Cenis Tunnel, priority given to passenger trains, etc....

There is an average 65 % shuttle occupation rate for all traffic (4 daily return journeys), but the saturation point is reached in afternoon and evening shuttles. Indeed, these times are the most sought after by hauliers, as they enable to load at the plant in the morning or during the day.

Traffic was very slow to pick up at the end of 2003 and in 2004. However, since the start of 2005, traffic numbers reached about 250 lorries a week, which was the result of long and profound commercial canvassing work with hauliers.

Also, most unaccompanied trailer transport grew rapidly (from 40 % in 2004 to 60 % in 2006), thus improving rail highway productivity (+25 %) increasing the load/tare ratio and number of trailers per train. At the same time, haulier logistics around both terminals were reorganised, with agreements being signed between French and Italian partners.

Transport of hazardous substances increased continuously and now exceeds 40 %, after the exceptional peak due to the tunnel closure.

However, the Alpine rail highway's economic and financial results are not very satisfactory, as direct revenue is well below charges. Note that the price of a rail highway crossing is lower than the cost of the equivalent road crossing (by about 20 %), in order to make up for the poor service quality (numerous delays) and longer journey (due to loading / unloading time). During the whole test period, France and Italy equally share the rail highway's operating loss, with aid approved by the European Commission.

#### 4.1.3 Future steps towards a concerted France – Italy action plan for the rail corridor

During the Franco-Italian Summit of 4 October 2005, ministers decided to start thinking about operating a further service, at the end of construction work. This mission must notably consider increasing frequencies, improving timetable distribution, lengthening shuttles and possibly proposing regulatory restraints for directly-competing road crossings (prohibiting some types of goods or time intervals, etc...).

Also, in the medium-term, ministers decided to set up a concerted action plan for optimising rail service on the existing line, in order to stop the drop in the rail freight market share and establish the credibility of the longer termin Lyon-Turin project (see ministers' letter of 4 October 2005). For this, RFF, RFI, SNCF and Trenitalia, under the auspices of both ministries, will set up a concrete action plan (monitoring each traffic, work site hazards and delays, setting up a monthly co-ordination committee, improving operational communication between infrastructure managers, connection between the Aiton platform and railway network, etc...). France and Italy could then sign a Memorandum of Understanding, similarly to the approach instituted on the Brenner by Germany, Austria and Italy).

#### 4.1.4 Deploying the ERTMS along corridor D

Similarly to the Swiss section of the IQ-C project, the Lyon-Turin route will also benefit from the intention of the EU Commission to equip the entire corridor D with ERTMS.

In compliance with the Memorandum of Understanding, signed on 17 March 2005 by the European Commission and railway companies, the strategy for deploying the ERTMS on the Valencia (Spain) – Marseille (France) – Lyon (France) – Turin (Italy) – Ljubljana (Slovenia) (= corridor D) standard line is currently being finalised. It will enable to greatly improve service interoperability and quality on this international freight corridor. They planned to deploy the ETCS-level 1 control system.

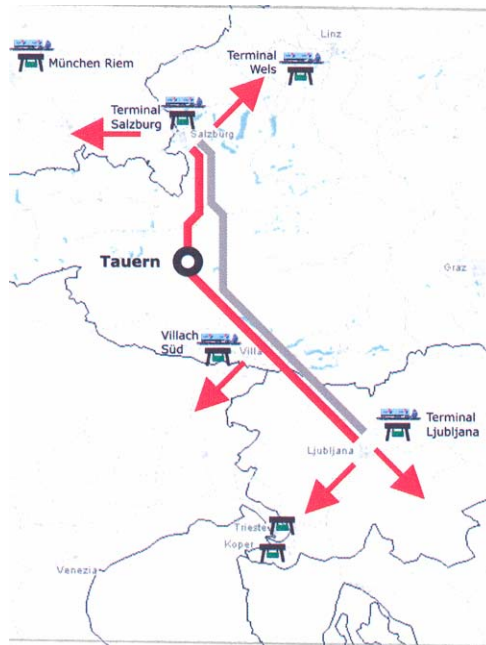
The involved countries' ministers of transport shall soon sign a letter of intent and set up financing required for deploying the ERTMS on the corridor sections in their respective countries. Also, the European Council is preparing financial regulations specifying co-financing application rules for the 2007-2013 period.

The section Lyon-Turin is planned to be equipped in the period from 2010-2014.

#### 4.1.5 Ventimille

Because of the low traffic passing through (0,5 Mio t in 2004), which has been more or less stable for several years), and of the impossibility of modernising this coastal rail route with very restrictive geographical features, Ventimille doesn't offer real optimisation opportunities at all.

## 4.2 Salzburg- Ljubljana (Tauern)



After the Brenner route, the Tauern axis is the route with the second largest freight traffic volume of trans-Alpine traffic via Austria.

The principal function of the Tauern corridor today is to link the ports of Koper and Trieste to Southern Germany and the central region of Upper Austria. Since the volume of traffic on these routes exhibits a rising trend, rail freight via the Tauern corridor still has great potential.

In 2004, approximately 4% of the total freight on the Tauern axis was transported using un-accompanied combined transport services and approx. 5% using rolling road services. Between Salzburg and Trieste, rolling road services are operated with 21 trains per week running in each direction.

For this axis, a so-called “Tauern action plan” has been developed. This is a national research project that was carried out in 2003 and aimed at examining deficiencies of this corridor and possible improvement measures. Therefore, it is comparable with the first stage of the Brenner Action Plan, i.e. the first analysis of the situation.

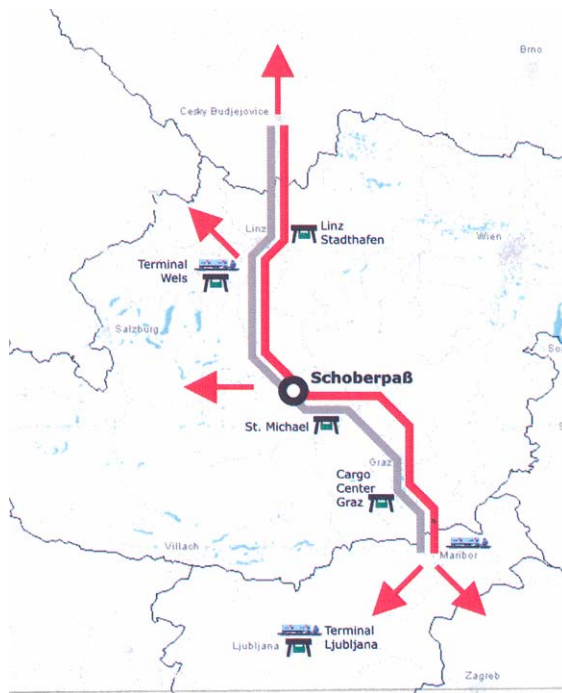
Possible additional measures according to the “Action plan Tauern-Track” which could complete the already planned step by step progressive double tracking of the remaining single track sections, would be

- establishment of an information and quality management system
- removal of operational bottlenecks
- enhancement of the service offer, especially in unaccompanied combined transport, by means of trainload services to Trieste and Koper
- development of a seamless, axis-related traction concept to accelerate the trainload services that are to be introduced

These measures are therefore similar to those set out in the Brenner Action Plan.

The unaccompanied combined transport links from Nuremberg to Trieste ("Trailertrain") and from Munich to Trieste and Koper ("Adria train") have meanwhile been established in the framework of the INTERREG III B project AlpFRail. On the Salzburg-Villach route, capacity was created for an additional nine trains a day in each direction.

#### **4.3 The Budweis-Maribor corridor (Phyrn-Schober axis)**



Since a large part of transport operations on the Phyrn-Schober axis are currently intra-Austrian or bilateral transport operations between Austria and Germany, the same approach as in the Brenner 2005 Action Plan would be less rich in meaning because the interface problems are not the most important aspect in this context.

Although the railway line between Linz and Selzthal is currently for the most part only a single-track line, it can be used for normal combined transport operations without any restrictions. In 2004, 3% of the total freight on the Phyrn-Schober axis was carried using unaccompanied combined transport services and approx. 2.5% using rolling road services. Currently, two rolling road services are operated from Wels to Maribor and from the Cargo Center Graz to Regensburg (42 trains in each direction in total per week). In unaccompanied combined transport, a block train runs between Graz und Duisburg.

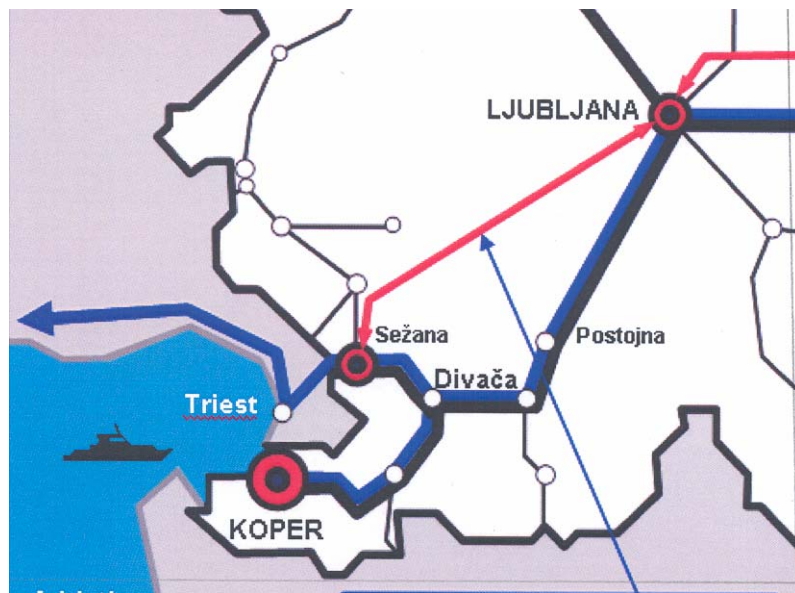
In 2005, the Phyrn-Schober axis was analysed with regard to deficiencies and possible improvement measures.



It is planned to double track some single-track sections on the Phyrn-Schober axis. Efforts are being made to bring forward these measures as well as specific capacity increases, for example, through the extension of tracks in crossing stations or measures to enhance signalling technology.

Therefore, a further improvement of the operating quality can be expected in combined transport. Further specific measures to increase capacity are in preparation. The service offer on the rolling road and in unaccompanied combined transport could be increased, in particular, by operating block train services between the Cargo Center Graz and Germany.

#### **4.4 Venice-Trieste/Koper-Postojna-Ljubljana**



The Italian-Slovenian sector as part of the Trans-European Corridor 5 from Barcelona to Ukraine includes the axis Venice-Trieste/Koper-Postojna-Ljubljana. It represents a logistic platform for East-West commercial flows and an important “delivery point”. The existing infrastructural network allows to collect an important traffic quota, including local traffic between Italy and Slovenia, too.

The transport system and logistic network in the Italian-Slovenian borderline is due to develop as part of a larger system integrated with the neighbouring regions.

In 2004, the Italian-Slovenian in/out rail freight flows amount to about 2 million tonnes per year.

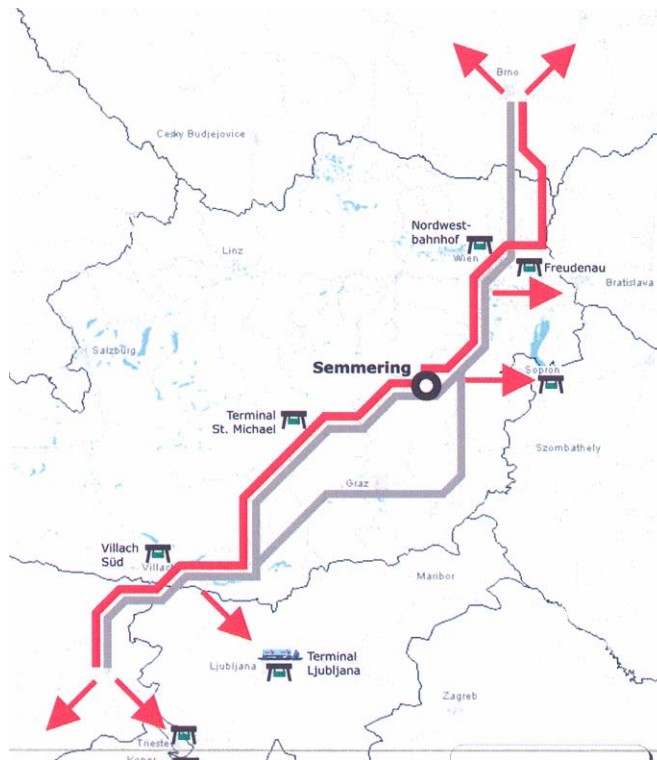
Modernisation of the SS devices on Ljubljana-Sezana line was finished in 2004. The project of doubling the Capodistria/Divaca rail connection has been approved. The segment Divaca/Ljubljana is still under planning.

Other short and mid term projects are:

- Ljubljana-Sezana line (5 stations, 13 line sections 2006-2018)
- Diváca-Koper line (4 stations, 5 line sections 2008-2010)
- Reconstruction of existing track of Diváca-Koper line (2007-2010), Upgrading of SS devices on this line (2006-2007), construction of new double track line on the line in phases (2008-2015 and after 2020)

On the Italian side there is no relevant work in progress yet; critical operational conditions persist in the double track line Venice/Monfalcone-Trieste/Villa Opicina/Sezana from the Isontine plane to the Aurisina Fork, because the 12 % slope limits to 1,100 tonnes the maximum weight allowed per train.

#### **4.5 Brno – Udine (Semmering, South corridor)**



The South corridor is the main connection between the north Italian industrial area, the ports of Trieste and Koper, the eastern region of Austria and Slovakia, the Czech Republic and Poland. Against the background of these states' accession to the EU, this traffic will gain in importance. (In 2004, approximately 5% of all freight traffic were carried out on this route by unaccompanied transport operations.)

The railway from Brno via Vienna, the Semmering and Villach to Udine has been a continuous double-track line since December 2003 when the new double-track section Tarvisio Boscoverde – Udine was opened to traffic. A total of four tracks are available on a number of sections between Vienna and Wiener Neustadt.

Due to small arc radii and narrow tunnel profiles, certain restrictions apply to the carriage of swap containers and semi-trailers on the section over the Semmering Pass. This means that it is impossible to operate a rolling road. In the long-term, the planned construction of the Semmering Base Tunnel and the Koralm railway could make the axis more attractive for combined transport, too.

The line is completely electrified; however, between Brno and the Czech/Austrian border, a different distribution system is used (25 kV/50 Hz). Dual system locomotives are needed here for the section Bernhardstal – Breclav, but the ÖBB (Austrian Federal Railways) is able to provide them in sufficient quantities. In Austria alternating current of 15 KV and 16.7 Hz is used. In Italy, the line is electrified with 3 KV direct current.

Train control on the southern section of the line is currently carried out using track circuits. In Italy, an automatic signalling and section block system has not yet been installed along the entire line, which is why the law requires two engine drivers for each locomotive.

On the Semmering Pass, the line has gradients of up to 26 ‰. Due to small arc radii pusher operations are impossible, for which reason a large number of freight trains have to be split.

It is precisely because of the international importance of this rail link and the above-mentioned “border-related” problems to apply element packages of the Brenner Action possibly could make sense to this route.

The following approaches from the Brenner Action Plan possibly could be applied to this route:

- Quality management and removal of bottlenecks in operations, especially on the Villach – Tarvisio – Udine – Trieste section
- Expansion of the range of services offered in unaccompanied combined transport, especially trainload services from Trieste container port to Vienna, Slovakia and the Czech Republic
- Development of a seamless axis-related traction concept to accelerate the trainload services that are to be introduced
- Coordination and assessment of the actual availability of paths on the South corridor

- Improving the provision of rail links from the South corridor towards Verona and Milan and enhancing the transshipment capacities in Northern Italy and Slovakia, the Czech Republic and Poland.

#### **4.6 Danube axis**

Although the Danube axis is not a trans-Alpine traffic route in the proper sense, it partly runs along the area of the Alpine Convention and is contained in Appendix 1 of the Transit Protocol to the EU Accession Treaty of Austria. Therefore, it has been included for the sake of completeness, especially since it could provide an important alternative to the Tauern axis, in particular, where the volume of South East European traffic is expected to increase as a result of the accession of the new EU Member States Hungary and Slovakia and later on of Romania and Bulgaria.

The Danube axis runs from Passau and Munich in the west to Bratislava and Budapest in the east. The sections from Passau and Munich to Wels are double-track lines; from Wels to Linz there is, in addition to the double-track western line, a third track via Traun. The line between Linz and Vienna is currently being widened to four tracks, and some important four-track sections of the line are already in operation. The eastern line from Vienna to Budapest is a double-track line from which a single-track line branches off to Bratislava-Petrzalka via Kittsee.

Apart from that, there is a further single-track line between Vienna and Bratislava-Central Station north of the Danube, as well as a single-track line to Budapest via Sopron. In 2004, the Danube axis, compared to the other Austrian rolling road axes, had the largest rolling road transport volume.

Where appropriate, measures or elements from the Brenner Action Plan or the North-South corridor (Switzerland) would be welcome and should be taken into consideration.

## **5. Conclusion**

The examples of the “Brenner Action Plan” and the “IQ-C North-South corridor” have shown that it is possible, on the basis of relevant agreements concluded between all parties involved in freight transport concerning operational, technical and organizational measures and their implementation in ambitious but realistic steps, to achieve significant improvements of the service offer on the trans-Alpine rail corridors without having to wait for major tunnel solutions.

Of course, the challenges are corridor-specific so that a simple transfer of measures is not always possible.

For the corridor Lyon-Turin similar forms of cooperation are conceivable.

For other routes, the transfer of individual elements or element packages seems to be useful (for example on corridor Pontebbana (south corridor) and on Danube axis).

Finally, there are routes (e.g. the Phyrn-Schober axis and the Arlberg axis) with no interface problems since domestic traffic predominates on such routes.

The appeal made by the ministers at the Conference of Alpine Regions in Garmisch-Partenkirchen in 2004 did not lead to any new activity in this field, but comforted government’s decisions already implemented, such as on the corridor Lyon-Turin.



**Tagung der Alpenkonferenz**  
**Réunion de la Conférence alpine**  
**Sessione della Conferenza delle Alpi**  
**Zasedanje Alpske konference**

**IX**

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**ANLAGE/ANNEXE/ALLEGATO/PRILOGA**

**2**

**The Alpine Convention**  
**TRANSPORT Workgroup**  
**Costs Subgroup**

**External Cost Assessment In Transalpine Corridors**

*DRAFT REPORT*

*ITALIAN SUB-GROUP PRESIDENCY - OCTOBER 2006*

*FOCAL POINT – dr. Paolo Angelini*

*TECHNICAL CONSULTANTS*

*Dr. Massimo Santori*

*Dr. Roberto Maia*

**1. INTRODUCTION**

This document is a work progress conducted by the Sub-group “Costs” of Alpine Convention WGT Transport during the year 2006 [7] to verify the impact of the different costs on Alpine transport. The document takes into account the technical elaborations coordinated by the Italian Chairmanship, with contributions of French, Swiss, Austrian, German and Slovenian delegations and the outputs of the last WGT Transport meeting in Paris, October 5, 2006.

The document mainly concerns an estimation of external costs deriving from heavy traffic on roads in comparison with the costs that have been incurred into by users through the payment of tolls along the three main transalpine corridors:

- Lyon-Turin, through the Fréjus Pass,
- Basle-Milan, through the St. Gotthard Pass,
- Munich-Verona, through the Brenner Pass.

The task carried out so far has provided interesting information.

However, to meet the requirements of the mandate of Garmisch and to complete the cost analysis in transalpine heavy goods transport in general further work needs to be done. It will include the following steps:

1. rough estimations of the approximate infrastructure costs, including costs for maintenance and operation, of the three corridors;
2. estimations of the difference between the total amount of costs (external and direct costs) caused by heavy duty vehicles on the three corridors and the tolls paid according to their performance on these corridors;
3. estimation of the approximate share of tax payments (fuel tax, vehicle tax) of the haulage industry that can be contributed to the three corridors;
4. drafting proposals for a possible future tarification.

## **2. EXECUTIVE SUMMARY**

The data illustrated in this report provide a rough evaluation of the Alpine the carriage of goods by road system and the coverage of external costs by traffic tarification.

Regardless of the numerical values that have emerged, this survey should be intended as an attempt to develop a rough examination method, which starting from the already available data taken from technical literature without any expensive and sophisticated analysis, has allowed the Costs Subgroup and the WGT Transport to carry out a few quantitative evaluations.

The progress of this report, in comparison with the text delivered in February 2006, does not allow to consider it the final one: a few data are still missing in this report to consider it final.

Specifically with special reference to the following items:

- the traffic data used have been updated considering the CAFT 2004 matrix;
- the tolls have been calculated according to the current tariffs (2006);
- the EURO classification is not updated in relation to the tariffs introduced in the various routes under question; the division of the used vehicles in emission categories from EURO 0 to EURO III has been effectuated considering the vehicle's age expressed in the CAFT matrix for the France-related traffic; more updated data would allow a more accurate evaluation, over all the considered corridors;
- for the evaluation of the external costs the INFRAS method - that provides higher values if compared with other methods - has been used: at this respect, it is also possible to consider a study made by the French Ministry of Transports [5] from which lower external costs are reported, that vary according to the traffic type and to the crossed areas in their Country.

This study also highlights the fact that in the French highway corridors all external costs are fully paid by the tolls: it is therefore compulsory to evaluate if these considerations can be extended to the Italian, Swiss, Austrian and German ones;

- due to the lack of data, neither the infrastructure costs, including maintenance and operation costs, nor the taxes (fuel tax, vehicle tax), have been estimated yet; parametric data concerning Italian costs have been provided, but accurate information about the other Countries are still missing.

Nevertheless, the method that has been defined and illustrated in this report may serve as a useful starting point to carry out more accurate, thorough and meaningful evaluations. Hence, the contribution provided by the delegations taking part in the Costs Subgroup is useful to further improve this method and to use more updated traffic data.

## **3. METHODOLOGY**

### **3.1. Approach**

For the purposes of the above-mentioned evaluation, we have deemed it necessary to make a comparison of overall data related to heavy goods vehicles, which actually cover a certain transalpine route during a certain period of time (a calendar year), in order to take into account the whole variety of vehicles under question (type of vehicle, axle configuration, European emission category) and loads.

Once the reference route was identified, an evaluation and a comparison of the heavy goods vehicles transit external and transport charges were carried out in each individual Country concerned.

Before comparing external costs and charges, infrastructure costs have to be deducted from the charges, taking into account the charge policies implemented in each individual Country.

As a result, a comparison is made between the overall external costs generated by the heavy goods vehicles that cover a certain distance on a yearly basis and the amount of money paid, which is available to internalise external costs in each individual Country concerned by their transit.

### **3.1.1. Traffic flow evaluation**

The following steps are the quantitative evaluation of annual traffic flows along the routes under question and the identification of vehicle classes according to their polluting emissions, which is necessary to estimate external costs.

In order to evaluate traffic flows, the O/D CAFT (Cross Alpine Freight Transport) matrix has been used, which is characterized by the following features:

- reference period: 2004,
- subject: the carriage of goods by road through the Alpine Arc,
- zoning of origins and destinations according to NUTS (*Nomenclature of Statistical Territorial Units*) classification for European States and to ISO Alpha 2 for non-European States,
- transport modes under question: rail and road,
- classification of vehicles according to the weight of vehicles, loads and axle configuration.

The tables used for the evaluation were complete enough to allow the classification of vehicles according to the charges implemented in the Countries under question. For every transit the following elements are known:

- Country in which the vehicle is registered,
- origin,
- destination,
- which pass is crossed,
- which transport mode is adopted,
- traffic report: import, export, internal traffic, transit,
- type of vehicle: truck, trailer truck, articulated truck, motor unit without trailer,
- axes configuration,
- vehicle mass,
- load mass,
- expansion factor.

There are 4 parameters for the vehicle mass that are fundamental for the calculations:

- empty truck or motor unit mass,
- empty trailer mass,
- overall maximum permissible truck or motor unit mass,
- overall maximum permissible trailer mass.

The freight mass is to be considered as the net mass of produces transported, including the packaging.

The O/D matrix has allowed to define loads on each individual Pass; the overall result is 9,987,421 vehicles/year.

Table 1 reports the number of road vehicles that have crossed each Alpine Pass in 2004. Hence, the international Passes with the highest traffic rate are: Brenner and Shoberpass in Austria, Fréjus and Ventimille in France and St. Gotthard in Switzerland. This analysis specifically refers to Fréjus, Brenner and St. Gotthard Passes.

Data emerging from the CAFT survey are in line with Alpinfo statistical data published by the Swiss Federal Office for Local Development during this same year.

The overall freight value can be estimated on the total annual number of heavy goods vehicles crossing all the Alpine Arc Passes, and on the total freight amount. Taking into account 130,343,715 tonnes transported by 9,987,421 vehicles, the average load will amount to 13.1 tonnes/vehic. This amount is higher than the amounts suggested by Cipra, Infrac [1] and “Amici della Terra” [3]. That could depend on the actual presence of heavy road vehicles, that often drive on long international routes.

Generally it has to be remarked that the listed numbers on the transport volume relate to the Alpine passes and not to the whole corridor. Simply because, on the one hand, not all trips identified at the Alpine passes actually lead through the entire corridor (e.g. on the Munich-Verona corridor trips from Italy to Innsbruck), on the other hand, the trips within the corridor, which do not lead over the Alpine passes (e.g. trips from Munich to Innsbruck) are not included in the numbers.

Countries	Pass	Traffic flows [vehicle]	Mass [t]	Average load [t/vehicle]
France/Italy	Ventimille	1,339,960	19,370,992	14.5
France/Italy	Montgenèvre	39,324	430,529	10.9
France/Italy	Fréjus	1,130,963	18,093,272	16.0
France/Italy	Mont Blanc	353,107	5,636,832	16.0
Switzerland/Italy	Gr, St, Bernhard	65,067	610,282	9.4
Switzerland/Italy	Simplon	66,598	670,876	10.1
Switzerland/Italy	Gotthard	969,347	9,884,441	10.2
Switzerland/Italy	San Bernardino	154,352	1,330,670	8.6
Austria/Italy	Reschen	135,143	1,966,093	14.5
Austria/Italy	Brenner	1,995,553	31,138,528	15.6
Austria	Tauern	940,813	12,175,467	12.9
Austria	Schoberpass	1,280,848	14,636,255	11.4
Austria	Semmering	527,934	5,639,756	10.7
Austria	Wechsel (Schäffern)	988,412	8,759,723	8.9
	<b>Total</b>	<b>9,987,421</b>	<b>130,343,715</b>	<b>13.1</b>

Table 1 - Heavy road vehicles crossing the main Alpine Passes in 2004 (source: CAFT data and Alpinfo)

### 3.1.2. Routes definition

For every Alpine Pass we analysed, possible routes within the Alpine Arc area were detected. The “Alpine Arc areas” are to be considered as the ones located in the geographical limits established by the Alpine Convention, in order to make the final external costs fall on that specific area. Complying with this process the chosen routes are the following:

- Montmelian-Turin within the Lyon-Turin corridor (Fréjus tunnel) between France and Italy;
- Altdorf-Bellinzona within the Basle-Milan corridor (St.Gotthard pass) between Switzerland and Italy;
- Rosenheim-Bolzano within the Munich-Verona corridor (Brenner pass) between Germany, Austria and Italy.

These are the shortest routes, and they only include motorways: they represent the routes that a truck driver would most likely prefer while driving through the areas taken into account. For this reason, urban areas were not considered (and they would anyway be external to the Alpine Arc area).

### 3.1.3. Emission evaluation

The CAFT survey does not contain a classification of vehicles according to European emission classes, a parameter that is instead used for levy systems in force in Germany and in Switzerland.

In order to bridge this gap, a rough evaluation has been based on the information found in the CAFT matrix about French Passes, that shows the year of registration of transiting vehicles. Then, using the report, showed in Table 2, it was possible to tag every vehicle with the corresponding emission category by the year of registration.

Year of registration	Emission categories
Before Dec. 31st 1992	Euro 0
After Jan 1st 1993 or Oct 10th 1996 (by kind of gas emitted)	Euro I
After Jan 1st 1997	Euro II
After Oct 10th 2001	Euro III

Table 2 - Classification of emission categories by vehicle registration year.

Table 3 reports the percentage classification of emission categories reflecting the situation of French Alpine Arc passes in 2004, calculated on the basis of data taken from the above-mentioned source, which classifies vehicles according to the fuel they run on and to the EU emission categories they belong to (91/542 Stage I, 91/542 Stage II, 93/59 Euro I, 96/69 Euro II, 98/69 Euro III, 99/96 Euro III).

Emission Category	Number of vehicles	%
non identified	35,689	1.25%
Euro 0	54,586	1.91%
Euro I	95,042	3.32%
Euro II	1,172,115	40.94%
Euro III	1,505,922	52.59%
<b>Total</b>	<b>2,863,355</b>	<b>100.00%</b>

Table 3 - Classification of heavy road vehicles transiting the French Alpine Arc passes in 2004 by emission category (source: CAFT matrix).

## 4. RESULTS

### 4.1. Traffic

#### 4.1.1. Lyon-Turin Corridor

The Montmelian-Turin route has a total length of 172 km, subdivided into 83 km within the French territory, from Montmelian to Modane (A43 motorway) and 76 km in Piedmont, from Bardonecchia to Turin (A32), in addition to a further 13 km long section of the Fréjus Tunnel (T4).

Based on the CAFT data, it can be inferred that 1,130,963 heavy goods vehicles pass through this road in both directions.

Traffic [vehic/year]	Mileage [km]	Total gross laden weight [t]	Average freight [t/vehic]
1,130,963	172	18,093,272	16

Table 4 - Annual Traffic along the Montmelian-Turin route (source: CAFT data).

#### 4.1.2. Basle-Milan Corridor

The Altdorf-Bellinzona route crosses Switzerland for 106 km (A2 motorway) transiting the St. Gotthard Pass.

This corridor can be subdivided into three sections. The two sections Altdorf-Gotthard Tunnel (northern access) and Bellinzona-Gotthard Tunnel (southern access) are typical mountainous road with long bridges and tunnels; the central section is the Gotthard Tunnel. The sections between Bellinzona, Chiasso and Milano have not been taken into account because the traffic flows have a relevant local component; therefore these flows cannot be directly determined through the CAFT matrix.

Based on the CAFT data, 969,347 heavy goods vehicles transit every year along this road in both directions.

Traffic [vehic/year]	Mileage [km]	Total gross laden weight [t]	Maximum permissible gross laden weight [t]	Average permissible gross laden weight [t]	Average gross laden weight [t/vehic]
969,347	106	9,884,441	33,073,273	34.1	10.2

Table 5 - Annual Traffic along the Altdorf-Bellinzona route (source: CAFT data).

Please note that the average gross laden weight value referred to 2004 for the Altdorf-Bellinzona route is about double the amount of 1999, increasing from 6.4 to 10.2 tonnes. This difference is due to the increase in the maximum permissible gross laden weight (28 tonnes in 1999, 34 tonnes in 2004) and to the performance-linked tax allowance on heavy traffic in order to optimise the capacity of articulated lorries travelling through Switzerland.

#### 4.1.3. Munich-Verona corridor

The Rosenheim-Bolzano route stretches throughout Germany, Austria and Italy. Every year 1,995,553 heavy goods vehicles travel along this corridor in both directions, over a total mileage of 222 km: 27 km in Germany, from Rosenheim to Kufstein along the A93 motorway, 110 km along the Austrian A12 and A13 motorway sections from Kufstein to Brenner, and 85 km on the A22 motorway from the Brenner Pass to Bolzano South.

Traffic [vehic/year]	Mileage [km]	Total gross laden weight [t]	Average gross laden weight [t/vehic]
1,995,553	222	31,138,528	15.6

Table 6 - Annual Traffic along the Rosenheim-Bolzano route (source: CAFT data).

#### 4.2. Tolls

##### 4.2.1. Lyon-Turin corridor

Toll payment along the corridor linking France to Italy concerns the following motorway tollgates: Chiguin barrière, and Saint Michel Maurienne barrière along the A43 motorway, Salbertrand tollgate, Avigliana tollgate and Bruere tollgates along the A32 motorway. Toll is also due to enter the Tunnel.

Size [N° axles]	Traffic [vehic/year]	Mileage [km]	Unit rate [€/vehic]	Total Costs [€]
2	11,249	83	24.60	276,725
3 or more	1,119,714	83	32.90	36,838,601
TOTAL				37,115,326

Table 7 - Total annual costs borne by heavy goods vehicles along the Lyon-Turin Corridor, Montmeliane-Modane (A43) section, in France.



<b>Size</b> <b>[No. axles]</b>	<b>Traffic</b> <b>[vehic./year]</b>	<b>Mileage</b> <b>[km]</b>	<b>Unit rate</b> <b>[€/vehic.]</b>	<b>Total Costs</b> <b>[€]</b>
2	11,249	76	10.20	114,739
3	10,413	76	15.50	161,394
4	63,267	76	20.90	1,322,283
5 or more	1,046,035	76	24.20	25,314,038
TOTAL				26,912,455

*Table 8 - Total annual costs borne by heavy goods vehicles in Italy along the Lyon-Turin Corridor, Bardonecchia-Turin section (A32).*

In addition to motorway charges, the Frejus Tunnel toll is also levied. The information on the year of registration of the vehicles transiting along the pass have been used to classify the heavy goods vehicles passing through the Fréjus Tunnel according to the European emission categories.

The absolute number and the percentage of heavy goods vehicles passing through the Fréjus, divided by emission categories, are reported in Table 9. The result is the amount of tolls reported in Table 11.

Emissions category	NO. vehicles	% vehicles
<b>Euro 0 – Euro I</b>	42,146	3.78%
<b>Euro II</b>	466,104	41.77%
<b>Euro III</b>	607,529	54.45%
<b>Total</b>	1,115,778	100.00%

Table 9 - Heavy goods vehicles passing through the Fréjus Tunnel in 2004 subdivided by emission category (elaboration on CAFT data).

		2-axis Vehicles			Vehicles with 3 or more axles		
		Traffic [vehicle]	Rate [€/vehic]	Total [€]	Traffic [vehicle]	Rate [€/vehic]	Total [€]
<b>Euro I</b>	3.87%	425	113.60	48,269	42,294	228.30	9,655,810
<b>Euro II</b>	41.77%	4,699	107.10	503,277	467,748	215.30	100,706,163
<b>Euro III</b>	54.45%	6,125	107.10	655,981	609,672	215.30	131,262,347
<b>Total</b>	100%	11,249		<b>1,207,526</b>	1,119,714		<b>241,624,319</b>

Table 10 - Tolls paid annually by heavy goods vehicles travelling along the Lyon-Turin corridor passing through the Frejus Tunnel.

The total amount paid by the 1,130,963 heavy goods vehicles passing through the Fréjus Tunnel corresponds to 242,831,845 €.

Yet, the result appears to be overestimated due to the possibility to obtain a return ticket rather than a one-way ticket for heavy goods vehicles valid for the next 24 hours of the fifteenth day since the day after the emission. Thanks to this return ticket, a lower rate of 19.40% on average is obtained as against the sum of two one-way tickets. Assuming that all the lorries benefit from this discounted return rate, the total tolls paid amount to 195,722,467 €. Hence, this value will be taken as reference for the following evaluations.

Total costs Paid in France [€]	Total costs paid in Italy [€]	Total costs paid in the Fréjus Tunnel [€]	Total costs paid along the corridor [€]
37,115,326	26,912,455	195,722,467	259,750,248

Table 11 - Total annual costs paid along the Montelian-Turin section.

#### 4.2.2. Basle-Milan corridor

In order to calculate the levy on heavy goods vehicles (LSVA) adopted in Switzerland, the Euro 0 and Euro I vehicle percentage values are grouped together, up to a total of 38.3%.

Lacking any further data related to the specific case, for the classification of lorries in the remaining emission categories, the percentages of traffic within the French Alpine passes are used, supplemented by the results obtained for the Euro 0 category. Please refer to the breakdown reported in the following Table 12.

Emission category	Percentage
Euro 0 - Euro I	4.0%
Euro II	42.0%
Euro III	54.0%

Table 12 - Breakdown according to the European emission categories of heavy goods vehicles that every year travel along the Basle-Milan corridor passing through the St. Gotthard Tunnel (elaboration on CAFT data).

At this point, the LSVA levied on an annual basis for the transit of heavy goods vehicles can be calculated, by dividing the total maximum permissible gross laden weight (33,073,273 tonnes) by the percentages of emission categories, assuming that the weight is proportionally distributed. The overall distance amounts to 106 km.

	%	Maximum permissible gross laden weight [t]	Rate [CentCHF/t×km]	Rate [Cent€/t×km]	Total costs [CHF]	Total costs [€]
Euro 0 - I	4.0	1 322 931	2.88	1.81	4 038 644	2 538 431
Euro II	42.0	13 890 775	2.52	1.58	37 105 038	23 321 834
Euro III	54.0	17 859 568	2.15	1.35	40 701 955	25 582 624
<b>Total</b>	100	33 073 273			81 845 636	51 442 889

Table 13 - Distribution of the maximum permissible gross laden weight among the European emission categories and calculation of the costs incurred into by the heavy goods vehicles, which every year cover the Altdorf-Bellinzona distance (A2) along the Basle-Milan corridor.

The tolls paid by the 969,347 heavy goods vehicles that cover the Altdorf-Bellinzona section passing through the St. Gotthard amount to 51 442 889 €.

#### 4.2.3. Munich-Verona corridor

The vehicles reported in Table 13 are expected to pay the heavy traffic levy along the 27 km long distance within the German territory. The heavy traffic levy amount is reported in Table 14, assuming a distribution proportionate to the percentages of vehicles up to 3 axles and those with 4 axles or more.

Emission category	Percentage	Traffic [vehic/year]
Euro I	4.0%	79,822
Euro II – III	96.0%	1,915,731
<b>Total</b>	100.0%	1,995,553

Table 14 - Breakdown according to the European emission categories of heavy goods vehicles which every year travel along the Rosenheim-Bolzano corridor (elaboration on CAFT data).

		Euro I			Euro II-III		
	Traffic > 12t [vehic/year]	Traffic [vehic/year]	Rate [€/vehicxkm]	Costs [€]	Traffic [vehic/year]	Rate [€/vehicxkm]	Costs [€]
Up to 3 axles	209,749	8,390	0.13	29,449	201,359	0.11	598,036
4 axles or more	1,785,804	71,432	0.14	270,014	1,714,372	0.12	5,554,565
<b>Total</b>	1,995,553			299,472			6,152,601

*Table 15 - Breakdown of vehicles whose weight is > 12 tonnes according to European emission categories and calculation of annual costs incurred into along the Rosenheim-Kufstein section of the Munich-Verona corridor.*

The total LKW-Maut amount for the section under question is 6,452,064 €.

In Austria, the (GO-Maut) heavy traffic levy includes two charges for all vehicles with a weight more than 3.5 tonnes: a standard rate and a special additional rate regarding to 35 km section along the Innsbruck-Brenner A13 motorway (Table 16 and Table 17).

Size [N° axles]	Traffic [vehic/year]	Mileage [km]	Standard km Rate [€/vehicxkm]	Total Costs [€]
2	153,437	110	0.130	2,194,155
3	56,312	110	0.182	1,127,358
More than 3	1,785,804	110	0.273	53,627,698
<b>TOTAL</b>				56,949,211

Table 16 - Annual costs calculated on the basis of the standard charges applied in Austria for heavy goods vehicles along the Munich-Verona corridor, Kufstein-Brenner (A12-A13) section.

Size [N° axles]	Traffic [vehic/year]	Brenner Supplementary Toll [€/vehic]	Total costs - Brenner [€]
2	153,437	23.50	3,605,779
3	56,312	32.90	1,852,651
More than 3	1,785,804	49.40	88,218,724
<b>Total</b>			93,677,154

Table 17 - Annual costs calculated on the basis of the special charges applied in Austria for heavy goods vehicles from Innsbruck to Brenner (A13).

Costs paid according to the standard rate [€]	Costs including the Brenner supplementary toll [€]	Total Costs paid in Austria [€]
56,949,211	93,677,154	150,626,365

Table 18 - Total annual Austrian charges paid by heavy goods vehicles along the Munich-Verona corridor, Kufstein-Brenner (A12 - A13) section.

On the Italian territory the same 1,995,553 heavy goods vehicles are required to pay the charges (reported in Table 19) between the Brenner tollgate and Bolzano South tollgate on the motorway A22.

Size [N° axles]	Traffic [vehic/year]	Mileage [km]	Unit rate [€/vehic]	Total Costs [€]
2	153,437	85	5.20	797,875
3	56,312	85	6.30	354,763
4	71,014	85	10.10	717,239
5 or more	1,714,790	85	12.20	20,920,443
<b>TOTAL</b>				22,790,319

Table 19 - Total annual costs paid by heavy goods vehicles in Italy along the Munich-Verona corridor, Brenner-Bolzano South (A22) section.

The total costs paid along the whole corridor are reported in Table 20.

<b>Total paid costs in Germany [€]</b>	<b>Total paid costs in Austria [€]</b>	<b>Total paid costs in Italy [€]</b>	<b>Total paid costs along the corridor [€]</b>
6,452,064	150,626,365	22,790,319	179,868,748

Table 20 - Total annual costs paid along the Rosenheim-Bolzano section.

#### 4.3. External costs

To calculate external costs, cost coefficients have been defined according to the 1995 Infrast-IWW method [1][7] (updated at year 2000), which takes into account some cost components, such as the average PM<sub>10</sub> concentration level, the loss of output capacity due to death or disability, the amount of insurance premiums for vehicles, medical expenses, the fleet composition, the frequency and severity of road accidents, the percentage of population exposed to noise, the impact on the natural environment and landscape, land use, urban effects and indirect costs.

The Infrast-IWW method suggests differentiated costs for each Country concerned and it highlights all the differences existing at a national level for each impact category. Anyhow, rather than using distinct values for each Country, it has been preferred to use the indicated value of average unit's cost of 7.01 cents €/ (ton×km) and to consider a spread between 5.5 and 8.5 cents €/ (ton×km) (i.e. ± 22%) to include possible differences between Countries, and cost actualisation.

Table 21 shows the external costs calculated with the INFRAS method subdividing the corridor into two homogeneous sections corresponding to the interested Countries.

<b>Corridor</b>	<b>Mileage [km]</b>	<b>External costs - lower bound [€]</b>	<b>External costs - upper bound [€]</b>
A32 - Torino-Frejus tunnel	76	75,669,067	117,118,365
A43 - Frejus tunnel-Montmelian	83	82,638,587	127,905,583
A2 - Bellinzona-Gotthard tunnel	27	14,686,001	22,730,562
A2 - Gotthard tunnel-Altdorf	57	31,003,780	47,986,742
A22 - Bolzano-Brennero	85	145,648,052	225,429,787
A13 - Brennero-Innsbruck	35	59,972,727	92,824,030
A12 - Innsbruck-Kufstein	75	128,512,987	198,908,636
A93 - Kufstein-Rosenheim	27	46,264,675	71,607,109

Table 21 - Calculation of external based on the Infrast methodology along the three corridors taken into account.

#### 4.4. Infrastructure costs

The share of charges paid by heavy goods vehicles to cover infrastructure costs for each transalpine corridor is now calculated in order to estimate the available amount to cover external costs derived from their transit through the Alpine area.

This is a very critical step because the infrastructure costs to be taken into account, shared in depreciation and maintenance costs, can vary a lot among the involved Countries as function of age of the infrastructures, taxation norms and other specific factors.

For this reason, in absence of sufficiently precise indications, the estimate of the infrastructure costs has not been made, limiting this report to the supply of tentative values, valid for the Italian reality, to be compared to those that might be supplied by other Countries:

- construction costs for a section of highway in Alpine area: 28 ÷ 50 Million €/km,
- construction costs for a section of tunnel: 200 ÷ 300 Million €/km,
- maintenance costs for a section of highway in Alpine area: 350,000 ÷ 600,000 €/km.

It should also be borne in mind that the infrastructure costs can be used to cover maintenance costs in order to reduce external costs, with special reference to noise pollution (building noise barriers or noise-absorbing paving), safety (*guardrails*, drainage paving and facilities, fixed and variable road signs), aesthetics (plant arrangement and grass mowing along the sides of the road). Yet, the relationship between maintenance costs and the internalisation of external costs is not an easy one.

#### **4.5. Taxation**

To complete this analysis it is also important to take into account the tax paid when buying the fuel, which depend upon the use of the infrastructure by the vehicle, and are therefore proportional to the external costs generated upon the examined corridors.

Also in this case there are harmonisation problems among the various Countries: it is possible for a transport Company to pay the fuel tax in a Country and to use the vehicle in a corridor crossing another Country. In many cases the Country cashing the tax is different from that suffering the damage from the external cost of the transport.

This evaluation would anyway require precise knowledge about fuel taxation in the various Countries. In Italy the fuel tax corresponds to 52% of the price, and includes various local, regional and state duties.

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