

# Problems caused by the motorway/railway freight traffic share in the Tyrol

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**Abstract:** Managing transit freight traffic across the Alps was an important source of income for the regional population for several hundred years. The introduction of technical transport systems, first railway followed by car and truck, changed the situation radically. No more stops were necessary and therefore the positive economic effects from transit traffic for the local alpine population were lost. The benefits moved to big economic structures outside the alpine regions. Noise and air pollution from uncontrolled growth of truck traffic in narrow alpine valleys had negative effects on quality of life as well as on tourism. Resistance against transit freight traffic through the Alps therefore has an economic background too.

To shift goods from road to rail, a toll on haulage charge over the Brenner route was introduced. Harmonization with European rules removed this financial barrier by about 90 per cent. Improvements of rail infrastructure, like the bypass of Innsbruck, have no effect on the modal split. Also, the eco-point system is not an effective instrument as it is not obeyed by the relevant neighbours in the European Union (EU). Road transport is therefore not only faster and simpler but also much cheaper than rail. Effective measures must be introduced to reach the desired goals, especially as these are also officially declared goals of the EU commission. A night-time ban for trucks, a better management on the rail network (not only in the Alps, but in the whole of Europe) and a substantial increase in costs for road freight transport will be necessary. If the alpine freight transit problem is not reduced by politicians, it is very likely that the local population will increasingly block the north-south traffic on the road.

**Keywords:** freight, traffic, Alps

## 1 HISTORICAL BACKGROUND

For hundreds of years the population in the Alps welcomed transport as an important contribution to their economy and wealth. The attributes of the historical transport system were:

- low speed, close to walking pace;
- frequent stops and the need for overnight stays;
- the requirement for additional manpower, local transfers, energy and trade.

The movement of people and goods was an important factor not only for business but also for structural development. Many cities in the Alps developed at the hubs of the transport network. Owing to the low speed of the transport system in the Alps, the travel time spent in the region was long enough to create positive economic effects. Skills in logistics, based on local resources, were developed during this time. Tolls and haulage charges were common not only

for longer sections of the road but also sometimes for single elements like bridges.

The introduction of railways increased the amount of freight across the Alps substantially. In valleys and regions with stations, economic activities and employment were concentrated, while in regions without this new mode of transport, stagnation and often decay occurred. However, the effects of new railway lines in the alpine regions were still mainly positive. The accessibility of many parts of the Alps reached its peak and tourism flourished. In some regions, the railway became the main employer for the people. Adverse environmental effects were still low.

The description of the historical background is necessary to understand why politicians and the population in the Alps had such positive expectations when faced with planned improvements of road transport infrastructure. There was no experience about negative environmental, economic and social effects from previous transport systems.

When the era of motorways appeared, local politicians welcomed this new kind of transport infrastructure enthusiastically. They expected more economic growth, more employment, etc. It was not recognized that the attributes

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of this new transport system were quite different from the previous ones. Travelling with higher speed, the necessity to stop for a break or to stay overnight decreased. Less money was spent in the region traversed. However, more costs in the form of air, water, soil and noise pollution were incurred by the traversed regions. More and more tourists did not stop in the region, because they could move quickly through the Alps, even without paying a toll! However, the greatest disappointment was the rapid development of transit freight traffic on the motorways. Motorways in the Alps were often built as bypass routes for the roads through villages and cities. They fulfilled this function well for a certain time. The situation inside the villages and towns was improved for a limited period of time. However, after a few years, the increase in traffic on the motorway produced air pollution and noise which destroyed the quality of life in the whole valley and even on the mountain slopes. Since the whole living space of the population is concentrated there (only about 8 per cent of the area of Tyrol is arable), more or less everybody has to suffer under these circumstances [1].

The most well-known example is the Brenner route which has been analysed for many years [2–6]. The opening of this highway eliminated most of the capacity problems in the north–south transit corridor and had substantial effects on the whole freight system of Europe. Before the Brenner motorway was opened, the freight forwarders had to develop sophisticated logistics including rail as well as road transport and sea shipping for transporting goods from north to south of Europe and vice versa. The capacity of the road system was limited and rail and sea ships took their share. After the Brenner Autobahn was opened, the capacity of the road system was (at least for the first decades) more or less unlimited. The only barriers remaining were national borders and toll sections. The north–south transport system had been

thrown totally out of balance. The effects can be seen in Fig. 1.

The growth of freight transport by road increased rapidly. In the early 1970s, when the north–south highway connection was opened on its whole length, about 6 Mt of goods were transported through this corridor. About half of them were transported by road. The effect of the highway connection was that in the mid-1980s about 20 million goods were transported through the corridor. Road freight transport increased more than 400 per cent, while freight transport on rail stagnated. There are also some reasons for this development in the rail system, including:

- ineffective management of the European railway system,
- frequent strikes on Italian State Railways,
- long stops of freight trains at the borders,
- complicated custom procedures.

Much more freight than today could be transported on existing rails through the Alps if the ‘internal barriers of traditions and inflexibility’ of today’s railway management were to be removed [7–9]. In summary, the existing situation is characterized by a continuous growth of freight transit traffic on the road and stagnation on rail. The modal split has changed dramatically within a few years (Fig. 2).

## 2 DEVELOPMENT AND CHARACTERISTICS OF THE TRANSIT FREIGHT TRAFFIC

The availability of new infrastructures was a causal factor for the change in the behaviour of the transport industry throughout the European Union (EU). The modal split in freight traffic is the result of the circumstances. The opening of the Brenner motorway was a signal to the

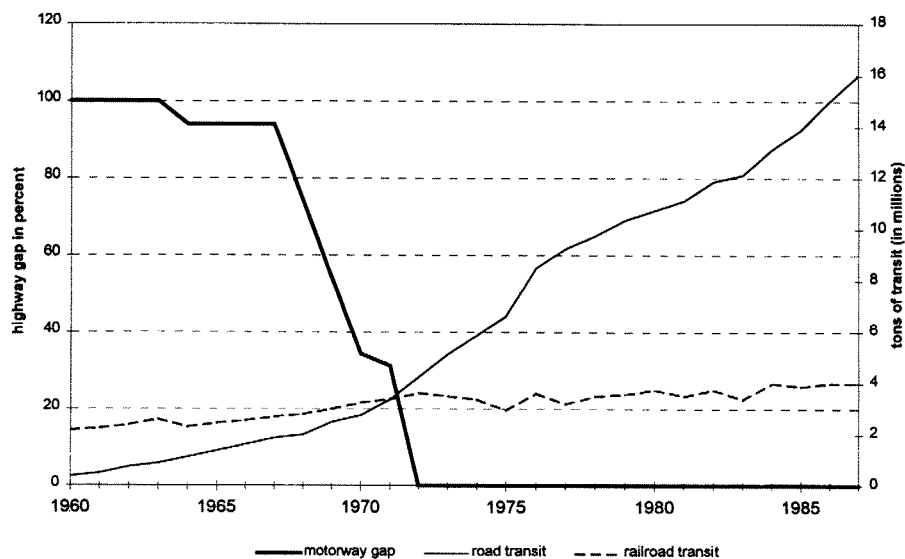


Fig. 1 Connection between the complete upgrading of the A12/A13 and the development of transit of goods [14]

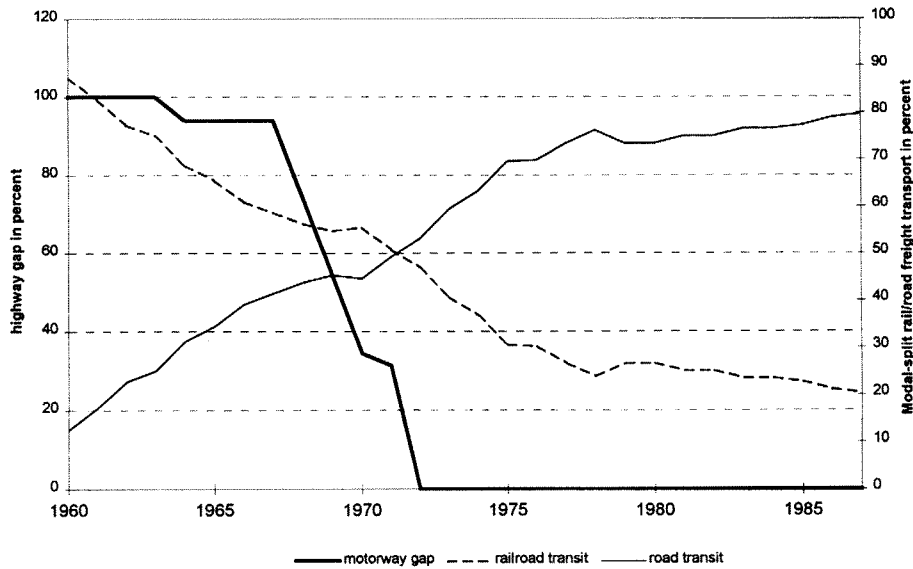


Fig. 2 Connection between the modal split (transit of goods) and the upgrading of the Kufstein–Brenner motorway [14]

industry and the public for easy and cheap transport on roads through the Alps. Built infrastructures function as an information system, as well as financial conditions and organization measures. They influence the behaviour of users as well as potential users. Table 1 shows that the transport system in Europe is in favour of road transport in all countries. When transport operators discovered the bridging of the motorway ‘gap’ in the Alps, they logically started to invest in the truck fleet to send their goods by road and no longer by rail or ship (Fig. 3). Driving forces were the lower handling cost, the shorter times for transport, export subsidies and the externalization of costs. This new infrastructure had positive effects on economic activities for big agglomerations north and south of the Alps. However, the burden had to be carried partly by the local population in the Alps and partly by nature. After

physical barriers had been removed by building the Brenner Autobahn, the European Commission also removed the financial barriers. Transport costs through the Alps were reduced dramatically from ATS 940 (68.31 euro) for a 40 t truck in 1994 to ATS 80 (5.81 euro) in 1998 for the same truck. This is a cost reduction of more than 90 per cent.

The European Commission is thereby not only affecting the population of the Alps but also endangering its own official economic and environmental goals [10]. An imbalance in the competitiveness between modes as well as between regions is the result. Benefits are transferred to big industrial areas in northern Italy and southern Germany, while the alpine region has to carry many disadvantages. The competitive structure between regions is disturbed.

The characteristics of transit freight traffic are different from the characteristics of local freight traffic. Local freight traffic is ‘active’ during working hours of the people. That means during the daytime. There is no or only very little local freight traffic during the night. Thus, the total numbers of trucks on a certain section of motorways cannot explain the different effects on the environment (Fig. 4) [11]. Transit freight traffic does not serve local economic activities. It has to serve activities far away. Transit freight traffic therefore has more or less a steady flow over the full period of 24 h and becomes the main factor causing noise problems during night-time. To understand noise problems in the Alps, it is necessary to know the effects of noise dispersion in valleys [4]. In low-lying areas, the noise level does not exceed a critical level a few hundred metres away from the motorway. However, in mountain valleys the noise level is even higher 2 km away from the motorway and may cover the whole living space of the population (Fig. 5) [12]. Air pollution in narrow valleys with few windy days and poor weather conditions creates a concentration of air pollutants with the worst possible effects on plants and people. In tourist areas, these

Table 1 Share of the different modes of freight transport in the EU, 1995 (t km) in % [15]

Countries	Road	Rail	Inland waterways	Pipelines
B	74.9	12.8	9.9	2.4
D	64.4	16.6	15.2	3.8
DK	83.0	6.7	0.0	10.2
E	91.9	5.1	0.0	3.0
F	63.4	23.0	2.8	10.8
GR	98.1	1.9	0.0	0.0
I	84.7	9.7	0.1	5.6
IRL	90.5	9.5	0.0	0.0
L	72.4	17.2	11.4	0.0
NL	58.6	3.0	33.3	5.1
P	89.5	10.5	0.0	0.0
UK	85.5	7.3	0.1	7.1
A	40.9	36.2	5.3	17.6
FIN	63.5	27.2	9.3	0.0
S	61.3	38.7	0.0	0.0
EU 15	72.3	14.4	7.6	5.6

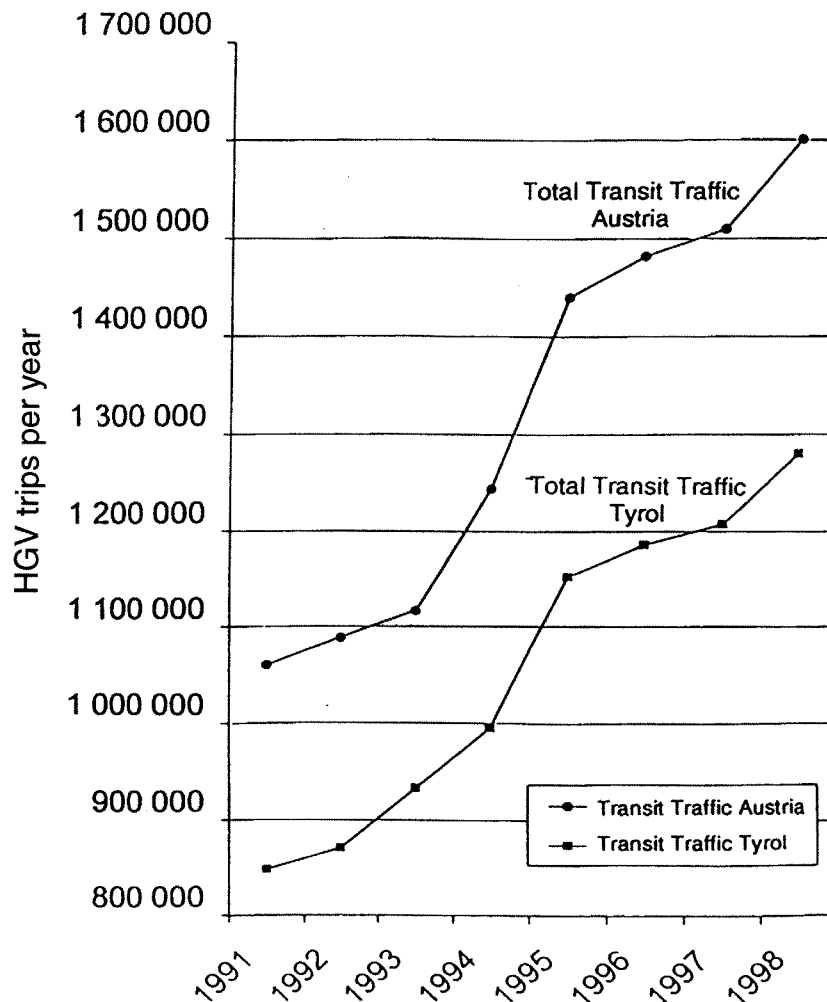


Fig. 3 HGVTrip per year [1]

effects are adversely affecting the whole living space and economic base of the people.

### 3 MANAGING TRANSIT FREIGHT TRAFFIC

Switzerland has a total night-time ban for trucks on the road. Before Austria became a member of the EU, bilateral agreements with foreign countries were used to control transit traffic on the road. Under pressure from the local population, Tyrolian politicians were forced to develop strategies for the management of transit freight traffic. The first step was the introduction of a special toll (Table 2). When Austria joined the EU, the so-called 'Transit Treaty' was signed. It was based on a promise (from the EU) that transit freight transport would not be allowed to grow by more than 8 per cent from 1991 to 2003 [13]. Austrian politicians informed the Austrian public that this agreement was a step forward in transit policy. If the facts are

examined, it is easy to recognize that reality is far away from the goals of this treaty. Transit freight traffic increased from 1991 to 1998 by about 50 per cent and continues to grow to this day. Austrian people have gained the impression that the EU is an unfair partner and cheating its own principles and contracts [1]. Since there is also a kind of helplessness at the national political level, people have the feeling that they must help themselves by blocking the Brenner Autobahn from time to time.

Building a new rail infrastructure cannot replace necessary transport policy measures. An example is the construction of a bypass rail line in Innsbruck, a very expensive project consisting of several bridges and a long tunnel. The forecast was that this additional rail section would change the modal split in favour of rail. However, reality shows the opposite development (Table 3). Rail freight traffic decreased after the opening of this new infrastructure. The existing Brenner rail corridor still has about 70 per cent more capacity than is used today.

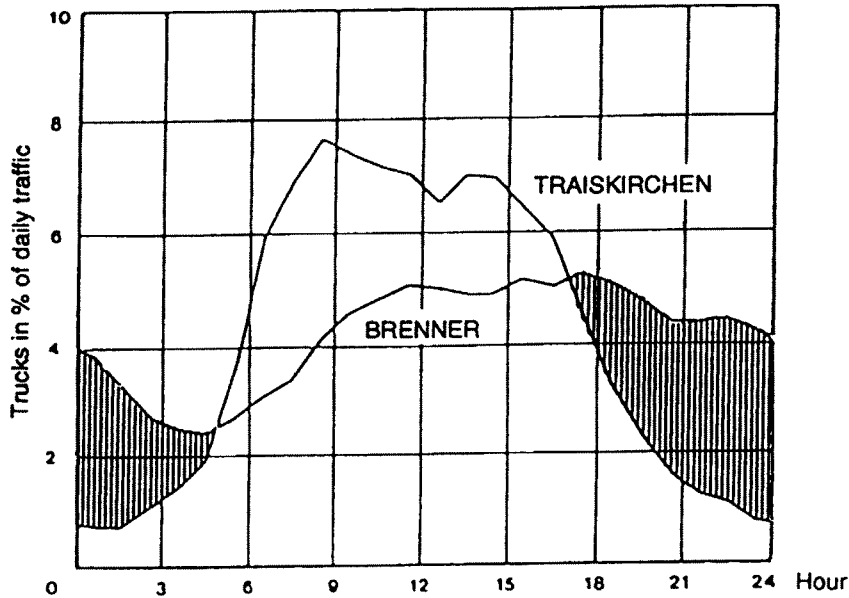


Fig. 4 Relative share of trucks over a 24 h period (Tuesday to Thursday) on the Brenner Motorway (Matrei) and on the A2 Motorway (Traiskirchen). The relative share of trucks is equal, but the distribution of heavy traffic over the 24 h period is different, and therefore the disturbance is also different [11]

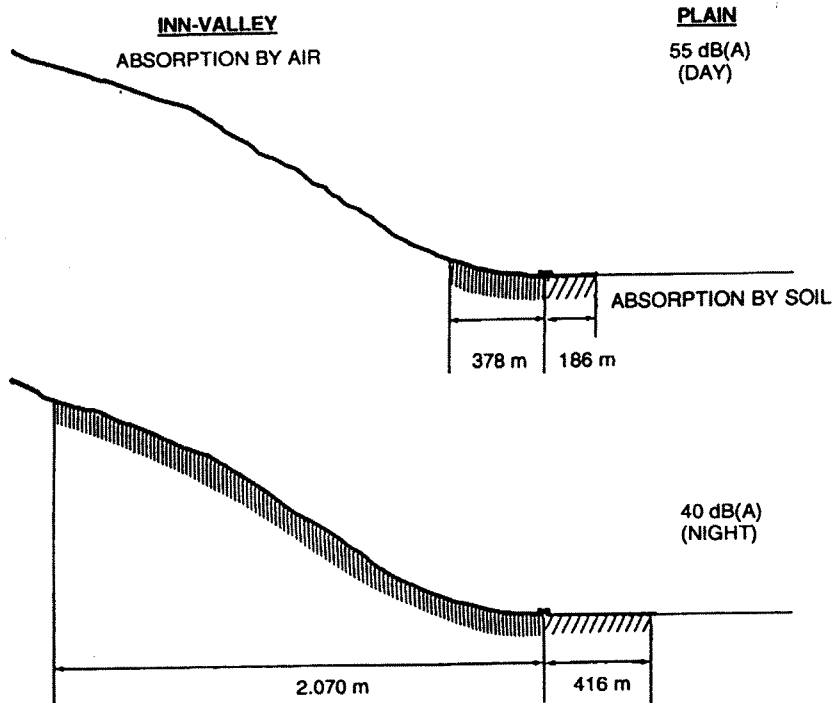


Fig. 5 Dispersion of road traffic noise [12]

**4 CAUSES FOR INTERNATIONAL TRANSIT TRAFFIC**

Not all international transit traffic is caused by real necessary economic activities. Local surveys have shown

that about 20–30 per cent of international freight transit is caused by subsidized freight transport. Export subsidies have created many dummy firms in northern Italy to obtain exemptions as local hauliers. If strikes in Italian harbours occur, goods are sent by road over the Alps to German and

**Table 2** Brenner-Autobahn (A13), length 38 km, connection between Innsbruck Ost and Brenner Paßhöhe (T), all numbers in ATS

Motorcycles	100
Vehicles with a height of up to 1.3 m (person cars, vans and mobile homes)	110
Additional charge for trailers (except single-axle, lightweight trailers)	40
Vehicles with a height of more than 1.3 m and up to three axles (e.g. buses)	300
Vehicles with a height of more than 1.3 m and more than three axles (e.g. buses)	1500
	2300
Cards with prepaid accounts	
Vehicles with a height of up to 1.3 m (person cars, vans and mobile homes)	90
Vehicles with up to three axles	240
Vehicles with more than three axles from 22:00 pm to 05:00 am	1500
	2300
Annual season tickets	1200
Annual season tickets for commuters	400

**Table 3** Freight transport by rail over the Brenner route since opening of the rail bypass in Innsbruck (May 1997) [1]

	1994	1995	1996	1997	Tendency
Freight (net freight Mt)	8.41	8.05	7.92	7.88	Going down
In lorry units	467.000	447.000	440.000	437.000	
Truck transit traffic on road	995.325	1152.563	1135.980	1207.634	Going up

Dutch harbours. There is also an interaction between sea freight transport and transit freight transport in Europe on the north-south route.

## 5 MANAGEMENT BY ECO-POINTS [1]

### 5.1 Goal

The goal is to reduce NO<sub>x</sub> emissions from transit freight traffic by 60 per cent on the basis of 1991. A measure with a quantitative goal in relative figures is dependent on the basic data. If they are sound, the goal can be accepted. However, there are two problems:

1. A measure is only good if it can be controlled. Air pollution is difficult to control.
2. The assumed number of trips in 1991, used as the basis for calculation, was much higher than the real number of trips.

### 5.2 Difference to the goal

Today the emission level is 70 per cent above the level of 1991 [1]. After several years of experience with the eco-point system, it can be stated that this system is only a symptom-oriented measure and a sign of helplessness in European transport policy. Inside the EU it seems much more difficult to take care of local and regional needs than was promised before the treaty was signed.

The Austrian State Railways offered in the 'Transit Treaty' additional transport capacity on the rails for goods transport in the north-south direction. In the same treaty,

Austria promised to transport 1.1-1.6 million units with about 20 Mt of freight in piggy-back traffic for the transit routes. With additional improvements on the Tauern and Phyrn railway (both have sections with only one track), this capacity can be enhanced by an additional 700 000 to 1.5 million units per year [14].

Together with other projects, Austria is able to transport between 50 and 80 Mt per year on rail in the north-south direction, but there is no need for this transport capacity because it is much easier, cheaper and faster to transport freight on the motorways. Several terminals for intermodal transport were built in Austria. However, their use is far away from their capacity.

### 5.3 Experiences with the closure of motorways

Austria has had two experiences with the closure of transit motorways. Problems with the collapse of a motorway bridge in Kufstein caused positive effects for the environment in 1990. Road traffic was reduced substantially and the railways were used much more. The same effect occurred in 1999 when the Tauern tunnel on highway A10 had to be closed for 3 months after a tunnel fire destroyed parts of the tunnel structure. Some of the goods were then sent by rail. It seems that the only effective measure to shift goods from road to rail is the closure of roads, at least in sensible areas. If this situation continues, blockades of transit motorways by the local population or the closure of roads will be a radical (but not very elegant) political solution for the future.

## 6 CONCLUSIONS

All attempts to shift transit freight traffic from road to rail have more or less failed. The existing transport conditions show excellent management in the road sector and poor management strategies for the rail sector.

Transport politics concerning transit traffic through the alpine parts of Austria become bogged down in 'Sunday speeches' and no real measures are taken. Transport costs on the road are too low. National government and international bodies such as the EU seem to be unable to take the effective measures necessary for the future. This example demonstrates that the implementation of a rail-oriented transport policy has had no visible effects so far.

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