FOUR INITIATIVES FOR PIARC TO MEET FREIGHT NEEDS AND COMMUNITY EXPECTATIONS IN ROAD TRANSPORT

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ABSTRACT

Road freight transport as we know it originated approximately 100 years ago. In terms of the basic machine elements of the vehicle, very little has changed: combustion engine, driver and load space, steering wheel, frame, axles and transmission. In terms of freight productivity a lot has changed. Taking the relation (load capacity) times (speed) divided by (fuel consumption), the productivity increase has been approximately a factor of one hundred over the past hundred years. Focusing on long distance road freight, this presentation identifies four areas of possible PIARC initiatives.

1. THE PRODUCTIVITY INCREASE AND WEIGHT AND DIMENSION LIMITS

It is fair to say that road freight took a boost in productivity after the 2nd world war. Systematic and scientifically based research and development was introduced among vehicle manufacturers, which lead to an enormous increase in the reliability of the vehicle and the efficiency of the engine.

Four-lane highways were built: the first in Sweden, 15 kilometres between Malmö and Lund in the early 1950s, the Eisenhower highway act of 1956 gave US highways a further boost. The new roads increased average speed.

Thirdly, the road freight vehicles grew in dimensions with the introduction of trailers and semitrailers. A limit on vehicle combination length was not introduced in Sweden until 1968.

All three factors, engine fuel efficiency, road infrastructure investments and the increased dimensions of the vehicles combined to more than a tenfold increase in road freight productivity. Gradually this development slowed down. Engine development had to focus on the reduction of nitrogen oxides and particulates emissions, the public willingness to invest in road infrastructure diminished and restrictions on weights and dimensions were introduced.

As for weights and dimension, a US tradition and an EU tradition can be clearly identified in a global perspective. The US workhorse is a 6x4 tractor with a two-axle semitrailer whereas the EU workhorse is a 4x2 tractor with a three-axle semitrailer. The differences in width and height are almost negligible, the differences in length can be overcome but the differences in permitted axle and bogie weights seem to be cut into stone (or tarmac). EU in general (Denmark is an exception for domestic freight) permits 10 tonnes on each axle and 11.5 on the driven axle whereas the US limit is 8 tonnes and even less, 6 tonnes, in some countries for the steered axle.

For the time being this is less of a problem (except for global vehicle manufacturers), but in an academic sense the 1958 AASHO investigations and the so called “fourth power law” for axle weight versus road wear (or road damage as the not-so-road-transport-friendly prefer to call it: the best road is an unused road) have created a mess.

There is ample evidence that the most costly part of maintenance on major tarmac roads, for example in Europe, stems from the track formation, rutting, which is dependent on ambient temperature, duration (inversely proportional to vehicle speed) and axle weight in the first power, approximately.

This is one area where PIARC could make a public clarification, as we know that otherwise the “fourth power law” will falsely be the foundation for road tolling.

2. THE 96/53/EC DIRECTIVE, SUCCESS OR REGULATORY BARRIER?

It is well known that the Directive 96/53/EC regulates cross-border road freight within the European Union, today 27 countries and some 500 million inhabitants. As compared to many domestic regulations it is a surprisingly simple directive, in particular as it has very few so called bridge formulae for axle distances.

In my view, this Directive has served Europe extremely well and one should be very reluctant to open up a general discussion on changes, to open a Pandora’s box if you like. For those vehicle combinations that are described in the Directive, no technical cross-border documentation is needed and supervising authorities in all countries are aware of the permitted weights and dimensions.

A particular feature of the directive is that it is indirectly is based on some basic load unit lengths as the European semitrailer, 13.6 metres, and the longest European standard swap body, 7.82 metres. Starting with the dimension of standardised loading units makes logistical sense.

Does it standardise vehicle combination design? Yes, it does. Does it allow for incentives and development? Well, not much, but we can attribute some of it to Sweden and Finland when they joined the EU in the 1990s. At that time Sweden already permitted 24-metre combinations up to 60 tonnes GCM. The cost for Sweden to back down to 18.75 metres and 40 tonnes was estimated to 6.5 billion Swedish crowns annually, to be compared with the Swedish net EU fee (Sweden is one of the few net contributors to the EU) of about 20 billion crowns annually.

In the 96/53/EC directive, the resulting compromise was coined the “modular concept”. Over the past ten years the modular combinations have gradually increased in numbers in Sweden and Finland. The Netherlands, by heritage a great trade and transport country, started their own trials, which are still ongoing, and trials are to be initiated in Denmark and Norway (non-EU) as well. Limited trials have been initiated in some German states and there is great interest from other countries with a well developed main-road infrastructure, among them Spain, France and UK.

This is a second area where PIARC could contribute, to set a common best practice for road infrastructure for vehicle combinations longer than 25 metres. Experiences from Sweden, Finland, the Netherlands and elsewhere show that the old German criterion of the 96/53 directive (full circle turning within inner radius 5.3 metre and outer radius 12.5 metre) is much too conservative for modern main roads.

3. ECONOMIC GROWTH, TRANSPORT AND STATISTICS

Most freight statistics, regardless of transport mode, is by tonnes lifted and/or tonne-kilometres. This reflects an older and by now outdated (or should be) view of the relationship between goods transport and economics. There seems to be evidence enough that transport of bulky goods, goods by cube rather than by weight, is increasing more than high density goods on European roads. This reflects the changes in the European economy. Electronic goods in consumer packaging, clothes, flowers, some food-stuffs, cars, vehicle components and other goods will fill up the load space before permitted GCM and axle weights are reached. The cross-over for standard vehicle combinations is at average goods densities of 200-300 kilogrammes per cubic metre.

The question of high-density, low-value goods versus low-density, high-value goods is one of the forgotten parameters of the sometimes high-voiced debate on de-coupling (of transport growth from economic growth) and modal shift (basically from road to rail) in European transport. In particular, the lack of relevant statistics contributes to misunderstandings about so called under-utilised vehicles in long distance road freight.

This is a third area where PIARC could make a difference, to initiate statistics not only in terms of tonne-kilometres but also for cubicmetre-km or even goods-value-km.

4. ROAD USER AND ROAD OWNER ON-LINE COMMUNICATION

Road freight transport will continue to grow at least at the pace that economy grows, at least. Inland transport of goods on rail will grow as well. Because of the high investment costs and the extended investment period and the priority of passenger transport, goods transport by rail will not keep pace with the economy. Rail freight is approximately 80 percent investments and 20 percent operational costs. The opposite holds for road freight.

Road is the preferred mode, not least for reasons of reliability and security, due to the autonomy of each transport unit and the availability of an alternative choice of route. Sometimes freight can be re-scheduled within minutes but always within hours.

Some twenty years ago, truck drivers communicated by short-distance radio. This was how accidents, severe congestions and police enforcement checkpoints were reported throughout the road transport system. Ten years ago drivers got access to general communication via mobile phones. Today and tomorrow, each driver and vehicle is accessible via the Internet. Sometimes this has an adverse effect. Not so serious navigation system suppliers might lure drivers to take routes through small villages or using roads that are not designed for large goods vehicles.

This is a fourth area where PIARC could make a difference, setting standards for Internet and GPS navigation and road transport safety, security and efficiency. Today, road infrastructure is not only physical (tarmac and concrete) but also virtual including active communication between road owners and road users, professional drivers in particular.

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