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**EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT
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SOFIA MINISTERIAL MEETING 2007

POLICY RESPONSES TO CONGESTION : BETTER SYSTEM MANAGEMENT

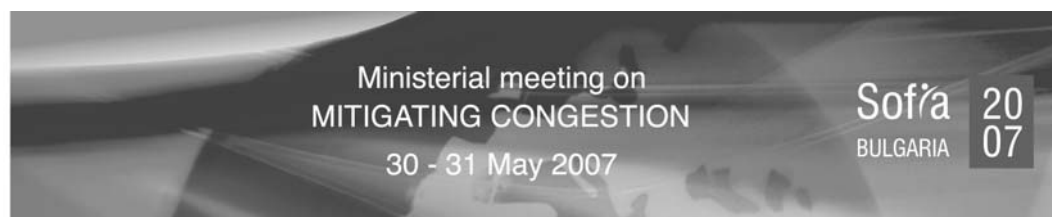
Reference document for Session 2A

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BETTER SYSTEM MANAGEMENT

Reference document – Session 2A

KEY ISSUES

Congestion mitigation strategies

- Are there successful examples of congestion mitigation strategies that can serve as good practice or provide lessons for countries?
- At what level of authority should congestion mitigation strategies be developed and for what types of congestion?
- A strategic approach to congestion management requires enhanced coordination among transport agencies at different levels of government and with non-transport sector institutions (e.g., land use, employment, public safety institutions). Where is inter-agency co-ordination working/not working and why?

Traffic management v. Demand management

- Can road traffic management measures such as those outlined in 3.1 be effective in reducing congestion alone or must they be accompanied by upstream efforts to curb demand for existing capacity (e.g., access restriction, parking, road pricing)?

Intelligent transport systems

ITS systems are playing an increasingly important role in providing and communicating information about transport system performance.

- Have expectations for ITS to solve congestion problems been too high?
- What is the right role for government in developing and making available these technologies? How can government stimulate innovation in ITS? Who should bear the costs involved?
- How can ITS solutions best serve a comprehensive approach to congestion mitigation and management? Who should maintain that strategic perspective and how can ITS investments best be coordinated across the system?

- How can inter-operability of ITS applications be ensured across transport networks in different countries? How can multi-lateral dialogue on this issue be enhanced to better address ITS applications designed to help reduce congestion?

Inter-modal interfaces

- How serious are the congestion problems at inter-modal interfaces? Which difficulties/inefficiencies contribute most to backlog at these nodes (e.g., lack of interoperability, cumbersome administrative procedures)?
- To what extent are these problems (and therefore their solutions) the responsibility of private sector actors and where is/should government be playing a role in increasing efficiency at these points?

Access to airports and ports

- Are the key congestion problems at airports and ports primarily related to road, rail or inland waterway access to these sites?
- Can better management and maintenance of these access sites largely solve most of the congestion problems? To what extent is it rather a question of new investment needed?

Modal shift as a policy tool

- Where has modal shift as a policy tool led to reduced congestion?

Facilitating trade

- How can **administrative and regulatory impediments** that lead to bottlenecks in the system be overcome to fluidify transport flows and facilitate trade?

Border crossings

- Is congestion at borders considered by those countries most affected as a serious hindrance on trade and economic development? Which entities are bearing the most costs from border congestion?
- Given that the reasons behind back-up at borders are largely known and understood, why is it that this problem remains in many countries? Is it mostly a question of lack of resources for upgrading and modernizing border crossing sites and equipment, or are there more fundamental underlying reasons?

- How has bilateral dialogue and multilateral debate on this topic helped (or not helped) to improve the situation at border crossings? What more can/should be done across countries?
- How have enhanced security measures at borders exacerbated congestion at borders both in the aftermath of 11 September 2001 and more recently? Are bilateral solutions such as the Canada-US Smart Border Declaration the most efficient way to handle these issues or are more multilateral agreements necessary in Europe?

Visas

- Why do administrative procedures continue to be a problem in the issuing of visas for professional drivers and therefore in slowing down passage of trucks at borders?
- Why has implementation of the ECMT's 2002 Resolution on this topic proven so slow? Are there outstanding issues that must be addressed to facilitate fluidity of passage at borders?

1. CONTEXT

A frequent response of decision-makers and transport system agencies to congestion is to invest in additional capacity. This is often justified given that recurring congestion is largely due to insufficient network capacity relative to traffic volumes. While an important option for decision-makers, adding infrastructure to the transport system is costly and often requires complex strategic and transport sector-specific decision-making. Prior to making costly investments in new transport infrastructure, options for better utilising and managing existing system capacity can be explored.

This session will set out a number of key actions that policy-makers can take in order to improve the operations and management of the transport system and thereby clear bottlenecks and reduce congestion.

A shift in focus from constructing and maintaining new infrastructure, the traditional approach to congestion management in many countries, to one of better managing operations on existing infrastructure is under way in a number of countries. In recent years, transport authorities have begun to develop strategies that focus on better management and operation of existing motorways, transit systems and freight logistics, instead of on development of new network capacity. This is requiring an increasingly cooperative approach to decision-making among transport authorities and agencies at different levels of government and with non-transport sector institutions (e.g., land use, employment, public safety institutions).

This note will examine first the necessity for a strategic approach to congestion management. It will then focus on how three broad policy areas can lead to better system management and reduced congestion: enhancing traffic management, improving inter-modal interfaces and facilitating trade.

2. A STRATEGIC APPROACH TO CONGESTION MANAGEMENT

Recent ECMT-OECD research¹ suggests that before looking at the specifics of how particular measures to mitigate congestion can be applied to better manage the transport system, a more strategic approach should be taken that addresses both direct and more indirect causes of congestion. Drivers of road congestion that are most proximate or direct include too many vehicles for a given roadway's design and dynamic changes in roadway capacity caused by lane-switching and car-following behaviour, among others. More indirect – but nevertheless key causal factors – include patterns of land-use and employment; trends in car ownership, infrastructure investment, regional economic dynamics and infrastructure investment.

A first step then in identifying ways to reduce congestion is to look at how all factors - both proximate and more distant -- inter-relate to create a congested situation. Only when a comprehensive, multi-pronged approach – looking at both the on-road “micro triggers”, as well as the off-road “macro drivers” of congestion is taken, will the solutions be effective and lasting. As noted in the findings and conclusions of the research, “congestion is not only, nor necessarily a traffic engineering problem”. Three strategic principles for better managing the **road** system are proposed:

- Ensure that land use planning...is coordinated with congestion management policies;
- Manage roadways to ensure adequate system performance;
- Deliver predictable travel times.

The research also points to an important principle for decision-makers: when road capacity is freed-up due to better management (or additional capacity), measures to manage demand for that newly available capacity must be put in place in order to “lock in” the benefits of the congestion relief on that road. Otherwise, newly created capacity can induce or attract new travel on the road in question.

Managing demand for this released or new capacity involves a number of important and widely examined policy approaches and measures; they include:

- directly managing the physical access to the roadway through **access** policies, which seek to restrict vehicle access to certain links (ramp metering) or certain zones (e.g. historical centres in cities);
- indirectly managing access to the roadway network and directly influencing road travel to particular urban areas through appropriate **parking policies**, and/or

1. OECD-ECMT JTRC (forthcoming), *Managing Urban Traffic Congestion*.

- managing the level of traffic through **road pricing policies** that target the use of, or access to, roads or urban areas.²

Again, these measures should be used not in isolation, but as part of an overall congestion management strategy. They are essential in reining in pressing demand for new capacity on the road network in particular.

3. ENHANCING TRAFFIC MANAGEMENT

With this strategic approach as context, traffic management measures play an important role in preventing, mitigating and managing congestion on transport infrastructure.

3.1 On roadways

3.1.1 Traffic management measures

Traffic management measures are designed to both improve speeds of existing traffic volumes and improve speeds by reducing traffic volumes.³ This section describes widely used traffic management measures used to relieve road congestion and how their efficacy is enhanced by recent Intelligent Transportation System (ITS) technologies, in particular dynamic traffic management, and traffic incident management techniques.

There are a wide variety of traffic management options that are in use in many ECMT and OECD countries, they include⁴:

Prioritisation of passenger over freight traffic on roads in peak periods: this measure is designed to temporarily free up capacity in times of particularly heavy traffic.

Tidal Flow: In use since the 1970s in many countries, tidal flow allows the direction of traffic in one lane or more of a highway or trunk road to be reversed to cope with peaks in traffic volumes. Signage above the roadway indicates which lanes are in use and their direction. The lane direction changes occur usually without use of temporary segregation by cones (as with contra-flow) so it can only be used in relatively safe areas.

Dedicated lanes: Only specific types of vehicle – e.g. heavy goods vehicles, or buses – can use these lanes. There are a number of different forms of these dedicated lanes: high-occupancy vehicle (HOV) lanes, first used in the United States in the 1970s, are usually designated for vehicles carrying more than one passenger. They are

2. Ibid.

3. The World Bank, 2002, *Impact of Better Traffic Management*.

4. List based on Dutch, German and US experience reiterated in the UK National Audit Office (2004): *Tackling congestion by making better use of England's motorways and trunk roads*.

increasingly used to promote commuter car share and other schemes, and have been combined in recent years with pricing initiatives to enhance their efficacy.⁵

In urban areas or along motorways used for commuter access to cities, dedicated bus lanes are proving to be effective in keeping public transport moving in heavily congested conditions. In this way, the passenger transport (as opposed to vehicle) capacity of the system is enhanced. A network of dedicated bus lanes in Dublin and Paris, for example, have proven effective in improving travel times for buses in those cities.

Ramp metering using traffic signals or lights has for a number of decades proven helpful in controlling the rate at which vehicles can enter a motorway from an access road. A similar “drip-feed” system has been effective in optimising traffic flows through the Gotthard tunnel in Switzerland.

Variable Speed limits can be applied on both motorways and urban roads to improve traffic fluidity, improve road safety and thereby reduce congestion. Variable or dynamic speed controls smooth traffic flow by changing the speed limit according to real-time traffic speed and flow data. Sudden disruptions in traffic are detected by sensors and appropriate reduced speed limit messages are displayed to approaching traffic by variable message signs.

Hard shoulder running entails allowing the hard shoulder on motorways to be opened up for traffic during peak periods.

Dynamic lanes are a relatively recent measure distinguished by lights on the surface of the road that alter the number and width of lanes on a motorway to temporarily increase the capacity of the road.

3.1.2 *Using ITS technologies to enhance traffic management*

Intelligent transportation systems (ITS) based on the latest computer and communications technology provide ways to collect and share information about the conditions and functioning of the transport system. Transport system agents use the information to make decisions on managing traffic incidents; the information can then be communicated to travellers to help them make decisions on how and when to travel. In this way ITS facilitates management and operation of the system and helps keep passenger and freight traffic flowing.

Examples of ITS applications include closed-circuit television cameras; dynamic messaging signs that provide updated information on traffic conditions; roadway-embedded sensors and wireless communications systems that transmit traffic and other information to actors throughout the transport system, including transport officials, police, emergency-response agencies, and the public.

5. See examples in CEMT/ITF(2007)9 on Pricing.

Synergies and interfaces between types of technology are constantly increasing and improving as the technologies become more widely available: it is anticipated that future vehicles will be equipped with on-board navigation systems that are able to receive real-time traffic information.⁶

A recent report conducted for the US Federal Highway Administration identifies a number of operations-based congestion mitigation measures that can be enhanced by the use of advanced technologies or ITS; these include:

○ Metering traffic onto freeways	○ Anticipating /addressing special events that cause surges in traffic
○ Optimising timing of traffic signals	○ Better freight management, esp. reducing delays at border crossings
○ Faster and anticipatory responses to traffic incidents	○ Reversible commuter lanes
○ Traveller information on travel conditions; alternative routes and modes	○ Movable median barriers to add capacity during peak periods
○ Improved management of work zones	○ Restricting turns at key intersections
○ Identifying weather and road surface problems and rapidly targeting responses	○ Geometric improvements to roads and intersections
○ Providing real-time information on transit schedules and arrivals	○ Converting streets to one-way operations
○ Monitoring the security of transit patrons, stations and vehicles	○ Access management

Source: Cambridge Systematics and Texas Transportation Institute⁷.

Use of these applications is growing in ECMT and OECD countries. No one of these solutions, however, will provide lasting congestion relief; their application must be part of a comprehensive, coordinated strategy for congestion reduction.

Dynamic Traffic Management Systems

Dynamic traffic management systems attempt to facilitate a comprehensive approach to congestion management decision-making. These systems use simulation models along with real-time traffic and origin-destination information to predict the effects of different congestion-mitigation strategies (e.g., incident management (see below) ramp metering, signal control, traveller information) on network flow patterns and travel times.

6. *Operational Solutions to Traffic Congestion*, Paniati, Jeff, Public Roads (November/December, 2004).

7. Cambridge Systematics, Inc and Texas Transportation Institute (19 July 2004): *Traffic Congestion and Reliability: Linking Solutions to Problems*.

Dynamic traffic management systems are still under development. They rely on data – particularly origin-destination data – that remains difficult to obtain in many cases. Geographic positioning systems (GPS) should help to provide this information in the coming years.⁸

Incident management

As noted earlier, non-recurring congestion can be caused by accidents, disabled vehicles, work zones, planned events or unexpected weather conditions. Incident management is a process of planning and coordination that detects, responds to and removes the impediments caused by traffic incidents and re-establishes road capacity the quickest way possible.

Incident management plans include ITS area surveillance and traffic controls by cameras, especially on motorways, aimed to facilitate the detection and verification process.

Regional traffic management centres bringing together transport authorities, public safety agents (police, fire protection), emergency services and the media can be instrumental in facilitating efficient incident management and ensuring faster and safer operations. Through variable messaging systems, in-vehicle technologies or radio information, users are informed of delays, traffic flow and alternative travel routes. This cooperative approach has proven very efficient in clearing accidents and re-establishing traffic flow, thus minimizing delays, possible accidents and induced congestion.⁹

In the UK, roving Highways Agency Traffic Officers work alongside police on motorways to alleviate congestion caused by traffic incidents. These officers coordinate resources of emergency services, manage traffic and re-open routes, and as of end 2006, operate across the road network in England. They assist motorists at motor vehicle accidents, removing damaged and abandoned vehicles, clearing debris on roadways, carrying out high-visibility patrols; temporarily closing roads and supporting police.

Bottlenecks caused by road works, a form of non-recurring congestion, have been a recent German policy focus along with improving traffic flow across the German network. Roughly 50 per cent of congestion on German motorways is due not to high traffic, but rather to road maintenance, accidents and other incidents. The Federal Ministry of Transport, Construction and Urban Planning is now revising Guidelines for motorway road works lasting more than eight days that include *inter alia*: short deadlines for carrying out work; flexible working time arrangements (e.g., when there is little traffic on roads); maintaining the number of motorway lanes open during works (e.g., allowing use of hard shoulder as a running lane); carrying out traffic-impact assessments prior to beginning work. Responsibility for implementing these Guidelines remains, however, with the Länder, so coordination among Länder for organising road works will be critical.

8. http://www.calccit.org/itsdecision/serv_and_tech/Traffic_management/dyn_trafficmangmt_summary.html

9. OECD-ECMT JTRC (forthcoming), *Managing Urban Traffic Congestion*.

3.2 On railways

Congestion on **railways** can be addressed through a variety of measures designed to increase productivity without investment in new lines; these include:

- Prioritisation of freight trains over passenger trains at certain times of the day along specific corridors to temporarily free up capacity;
- Sharing of tracks;
- Improving the train control system;
- Re-arranging the train mix;
- Management of risk of disturbances;
- Implementing a common gauge for width/height of rail vehicles;
- Implementing demand management measures;
- Improving freight forecasting; and
- Entering into collaborative arrangements with other railways.

Regarding the latter, Canada's two main rail freight companies, for example, have agreed to operate direct to-destination trains that bypass yards and eliminate railway to railway handovers in order to improve the flow of freight to and from Vancouver area ports. This will eliminate 90% of the traffic interchange between the two railways in the Vancouver area.

Several measures relate to modifications to the rolling stock: for example, increasing freight wagon size; using more powerful locomotives or coupling sets of locomotives, which can accelerate trains more rapidly and thereby reduce conflict between slower and faster trains. Also, the length of trains can be increased up to limits set by passing loops and passenger train station platform lengths.

In addition, signalling systems can be enhanced to reduce spacing between trains and enable increased speeds. And eliminating or protecting highway/railway level crossings can improve both capacity and safety.

Improving reliability can also make a significant difference. Enhancing freight train and wagon management by tracking wagon locations and advising customers of changes in expected arrival times can allow them to adjust loading and unloading schedules.

3.3 In and around ports

A large share of congestion in **ports** is due to organizational, management and operational problems that include: mismatches in storage and loading capacity, poor layout of terminals and inefficiencies in directing trucks, rail wagons and barges to the containers they to pick up or to the yards where they should drop containers off. Coordination between ship and truck movements is complicated and often poor – ports and truck depots work to different schedules/opening hours usually resulting in a double peak for truck arrivals, early in the morning and again in the afternoon.

Possible initiatives to address the congestion-causing administrative, operational and management inefficiencies in ports include flexibility (e.g. extending) in operating hours, introducing booking systems for port-gate truck arrivals, automating document processing and automating freight marshalling operations. Improvements in these areas would be supported by better planning within ports to manage and organize traffic and hinterland connections.

3.4 At airports

Managing scarce capacity at **airports** involves four general processes among other things: airport slot coordination; airline scheduling, flow and capacity management, and air traffic control. According to Eurocontrol, inefficiencies in these processes include unrealistic schedules due to miss-matched slots; imposed delays in flow management to avoid too many flights arriving at once; and early arrivals of aircraft due to early departures from non-slot controlled airports. Better management of the air traffic management system could involve more tightly integrated and transparent slot-coordination that merges airport and air traffic management (ATM) slot processes. With greater predictability of arrivals, departures and ground movements, imposed time buffers between air traffic flow and ground movements could be reduced, leading to capacity gains.¹⁰

Designed to support the Single European Sky legislation by defining and implementing a pan-European ATM improvement scheme, the current SESAR (Single European Sky ATM¹¹ Research) Programme brings together stakeholders from civil and military aviation, legislators, industry, operators, users, ground and airborne personnel to eliminate a fragmented approach to ATM, synchronise plans and actions of these different partners and federate resources to improve ATM, thereby reducing congestion in this sector across Europe.¹²

4. Improving inter-modal interfaces

Most countries now fully subscribe to a transport system that optimises reliance on a variety of modes to transport goods and people within and among countries. Promoting efficient transport operations in a multi-modal supply chain is an essential part of a well-managed and operated transport system. And legislation and both national and regional levels in many countries has made fostering inter-modal transport a priority area for decision-makers.

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10. Eurocontrol, contribution to ECMT consultation on congestion January 2007, « Congestion in Air Transport : Initial thoughts on the Challenges and the Solutions (Eurocontrol DAS/DIA/STRATFOR).
 11. Air Traffic Management.
 12. SESAR Definition Phase – Milestone Deliverable 1, <http://www.sesar-consortium.aero/deliv1.php>

Inter-modal transport is, in this sense, a response – if partial – to longstanding over-reliance on and demand for road transport in particular, which has contributed to growing congestion in this mode in virtually all countries.

But the involvement of different modes in the transport chain – road, rail, inland waterway, air, and maritime shipping – implies often complex relationships and interfaces among the modes. A multitude of actors from different modes converge at inter-modal terminals -- hauliers, logistic service providers, rail, inter-modal and terminal operators; shippers, agents, container shipping lines. Without process integration, difficulties arise, engendering or exacerbating congestion on all of the transport networks.

4.1 Problems at inter-modal interfaces

The nature and severity of these problems – their existence even – varies from country to country. In general, the problems at rail-road inter-modal interfaces or nodes that can create or aggravate congestion can broadly be summarised as the following:

- problems with terminal facilities and equipment;
- lack of interoperability between and within transport modes (including dimensions of intermodal transport units);
- often slower overall transit times and punctuality due to poor connections, inadequate frequency, and indirect routing;
- cumbersome administrative formalities and rules including border crossing operations (see below) all of which affect quality of service.

Key concerns for inter-modal connections at airports concern inadequate and congested highway and railway access.

For marine terminals, a number of factors are putting pressure on efficiency in trans-shipment operations: notably, lack of availability of land, requiring terminal operators, for example, to stack containers rather than place them on chassis to be retrieved and removed by trucks, and to limit on-dock rail facilities (which require substantial space).¹³ According to the US Federal Highway Administration, roads that connect marine terminals and other freight facilities with the US national highway system are often inadequate. A number of factors are cited: inter-modal connector roads serving freight terminals have significant pavement and other deficiencies, with connectors to maritime ports in the worst condition; and a general lack of awareness among state and local planners of the importance of freight/inter-modal activities leading to low priority of projects to improve these in transport planning.¹⁴

13. World Shipping Council, statement by Koch, Christopher on Port and Maritime Congestion before the House Transportation and Infrastructure Committee, 23 May 2001.

14. Federal Highway Administration, NHS Intermodal Freight Connectors. A Report to Congress”, December 2000, cited in *ibid*.

Problems at inter-modal terminals causing delays and congestion		
Organisation	Management/ Operations	Infrastructure
<ul style="list-style-type: none"> • Inappropriate/unsuitable terminal organisation; • Incompatibility between rail transport operations and terminal design; • Lack of cooperation among modal actors along the inter-modal transport chain. 	<ul style="list-style-type: none"> • Restricted terminal opening times; • Inefficient administrative and security processes, and poor management of incoming trucks; • Excessive waiting times at entry gates in the absence of real-time scheduling; • Inadequate information flow in cases of delay, incident; • Poor real-time monitoring of operations. 	<ul style="list-style-type: none"> • Inadequate or lack of: <ul style="list-style-type: none"> ○ connector roads serving freight terminals; ○ space for stack and storage; ○ exclusive parking areas; ○ crane/ handling capacity; ○ equipment for handling and storing dangerous goods; • Incompatibility between transport means/load units, terminal equipment; • Poor rail links between main lines and terminals or ports as well as between airports.

Source: Adapted from Rapp Trans ECORYS *Intermodal Services in the Intermodal Chain*, November 2005

4.2 Possible solutions to consider

Recommended actions to address these problems and enhance the efficiency of inter-modal transport – though still not implemented in many cases – include the following¹⁵:

- ensuring that regional plans integrate terminal facilities for combined transport into the planning of commercial freight traffic activities and logistics centres;
- improving infrastructure access to terminals and upgrade terminal facilities for the handling, storage and processing of Intermodal Transport Units (ITUs), and supporting the development of stackable ITUs, suitable for short sea shipping and inland waterway transport;
- ensuring compatibility of railway information and signalling systems for smoother traffic flows;
- promoting the use of effective, interoperable electronic information systems to improve data exchange among transport operators as well as automatic issuing and processing of documents, as well as for real-time monitoring and transmission to clients of combined transport movements;
- enabling customs and border control operations to be carried out at loading and unloading points, as far as possible;

15. This is a partial list extracted from CM(2002)3/Final, ECMT *Consolidated Resolution No. 2002/2 on Combined Transport*.

- increase terminal capacity by offering longer opening hours and more efficient services (e.g., for transshipment operations).

4.3 Modal shift as a congestion mitigation tool

Promoting inter-modality as a way to maximise efficiency across the transport system involves not only improving inter-modal transfer sites, but also seeing how travel and transport can be shifted away from road to other modes. Countries and cities have increasingly been looking to ways to relieve over-reliance on road transport and the congestion and other environmental impacts that it engenders. Modal shift has been defined as both a desired *outcome* for congestion reduction, as well as a policy *tool* to reduce congestion in a wide range of countries. But efforts to successfully move away from road transport have encountered resistance on both the passenger and freight transport sides. And modal shift objectives have often not been met.

Several recent initiatives involving neighbouring countries and targeting a shift away from international road transport show promising results. Shifts in traffic from road to short-sea shipping in the Mediterranean region between ports in Spain and Italy are now registering relatively high growth rates.

In the same part of Europe, increasing interest is being shown in developing a “Motorway of the Sea” along the Atlantic seaboard to alleviate high trans-Pyrenees road traffic that has generated major congestion affecting not only the border region but all connecting routes as well.

The Alpine Crossing Exchange is a proposed market-based mechanism designed to manage limited road capacity in Alpine passages and shift growing road traffic in increasingly congested Alpine crossings to rail. This two-pronged project involves on the one-hand, a system of reserving vehicle passage rights for a given time and at a market-determined price. The idea is that vehicles without reservations would have to wait longer to enter the Alpine passages, allowing urgent transport such as trucks carrying perishable goods priority passage.

A second variation of this involves an obligatory system of marketable Alpine passage permits. These permits would be allocated either without charge, sold or auctioned, and after their first distribution, would be tradable at marketable rates. The idea here is to make road transport more expensive and encourage a modal shift to rail.

In both cases, the transaction of these passage rights – delivered in the form of electronic vouchers or tickets that could be printed before the trip or received and presented via mobile phones or other devices – would take place among transport companies through brokers or by Internet.

According to Swiss studies, this Alpine Crossing Exchange system is feasible from both technical and operational points of view. Were it implemented, however, it would

require a cooperative approach among all Alpine countries. It is one aspect being considered in and overall Swiss policy framework for modal shift.

5. FACILITATING TRADE¹⁶

Better management of the transport system also involves alleviating other types of bottleneck that impede trade flows. These include: national regulations that inadequately consider international transport and trade; a large number of trade instruments and trade agreements – not always coordinated -- in certain regions; lack of mutual recognition of customs organizations and procedures as well as a multiplicity of border agencies – all engendering delays at border crossings; and administrative obstacles in obtaining visas for professional drivers. These inefficiencies in trade and transport increase costs and reduce competitiveness, accounting for 2% of the value of foreign trade according to UNCTAD. Trade facilitation involves a number of initiatives that can be taken to remove barriers to efficient trade that are due to inadequate or inefficient legislation or regulation, and cumbersome administrative processes among others. Measures to facilitate trade include:

- Simplification, of formalities, processes, procedures in trade;
- Harmonisation of national trade procedures, operations, documents with international conventions, standards and practices;
- Standardisation through internationally agreed formats for procedures, documents and information.

This section will focus on two particular types of trade bottleneck – border crossings and visas -- though others exist.

5.1 *Border crossings*

5.1.1 *In Europe*

Delays at borders prolong transport times and hence increase the cost both of transport and of the goods transported. They are therefore an important factor in the relative competitiveness not only of transport modes but also of national economies in an increasingly global and competitive marketplace. According to the World Economic Forum, costs in connection with border crossings amount to some 85 billion USD per year worldwide, representing 1.2 percent of the total value of international trade and between 5 and 10 percent of the end price of goods.

In Europe, conditions at border crossings vary significantly across countries. In spite of many actions taken to improve fluidity at borders, including the modernisation of border posts and facilities and greater cooperation between control agencies, the

16. See also Reference document CEMT/ITF(2007)8: The Implications of Border Crossing Obstacles for Congestion and their Impacts on Trade.

situation is still far from sufficient, as average waiting times at border crossings continue to show; particularly on this external borders of the CIS (where they can reach as much as 48 hours for road and 60 hours for rail transport). Delays are also significant in the Balkan region.

Obstacles include the following:

- control procedures, which are without a doubt the main obstacle to free-flowing traffic due to their complexity; changes to current regulations made without prior notice; insufficient use of controls based on risk analysis and of automated clearing systems; lack of cooperation between control agencies, and all too often, the lack of joint controls; and cumbersome procedures for technical controls on the railways;
- infrastructure where, despite certain improvements financed by international programmes, border posts in certain recently created states and at the EU's external borders are under-equipped; systems for communicating and transmitting data between all players at border crossings, and especially between different countries' control agencies and rail operators, are insufficient; railway equipment (and personnel) are not interoperable, meaning that in almost all cases locomotives have to be changed at borders even though the technical conditions for interoperability may sometimes be met;
- staff: often insufficient in number, under-qualified, and in need of further training, border control staff in a number of countries lack motivation and are prone to questionable ethical conduct and even corruption. ECMT recommendations include risk analysis-based controls; a single manager to supervise all border post control operations; and multiple visas for professional drivers¹⁷

Recommended action from the ECMT agreed by Ministers – though still not implemented in many cases – includes risk analysis-based controls; appointment of a single manager to supervise all control operations at border posts and the issuance of multiple visas (see below) for professional drivers.

Additional recommendations include the modernisation of border posts – particularly in Europe along the European Union's external borders with the CIS and Balkan states, for example ensuring that appropriate computer equipment and sufficiently spacious access roads and vehicle parks are available. This also involves creation of specific queues for empty or in-transit vehicles, with specific procedures for transit traffic. Essential as well are adequate cross-border information and data transmission systems and the correct attribution of status, pay and training of border crossing personnel. Use of computerised and automated clearing systems to combat corruption is indispensable. And perhaps of greatest importance is the more general need for free access to the road transport market and competition among rail operators.

17. CEMT/CM(2004)7 Removal of Obstacles at Border Crossings: Policy Note and Recommendations.

Visas for professional drivers

Procedures for the allocation and recognition of visas for international truck drivers is a persistent problem at border crossings throughout Europe, leading to delays in passage times and efficiency losses -- this is in spite of initiatives to simplify and streamline the administration of these documents.

Visas for professional drivers are requested by Governments as a measure against a wide range of issues including illegal immigration and employment and for national security reasons. Procedures for the issuing and administration of these visas are not harmonised in countries, however, and navigating different procedures both at borders and in consulates/embassies in countries can result in serious complications and delays of transit.

ECMT Ministers agreed in 2002 a certain number of measures to alleviate the bottleneck of visas. These include among others simplification of formalities for obtaining visas for professional drivers involved in international transport and the issuance of multiple visas valid for one-year. Once again, however, these measures have still not been implemented in many cases, in spite of their potential to contribute greatly to the fluidity of passage at border crossings in Europe.

5.1.2 In North America

Congestion of road freight traffic at border crossing points along the borders of the United States and Canada and the US frontier with Mexico is likewise a severe problem. Economic integration emerging from the North American Free Trade Agreement (NAFTA)—and the subsequent lowering of tariffs and other barriers to trade—has resulted in increased trade with Mexico and Canada. As overland trade between the two countries has grown, so has traffic congestion at the border ports of entry increased. US estimates of costs to road freight carriers at the Ambassador Bridge between Detroit, Michigan and Windsor Ontario range from USD 150M and USD 200M.¹⁸ US Department of Transportation estimates of costs in 2005 to the US economy due to congestion at the Otay Mesa and Tecate border crossings along the California-Mexico border were USD 3.7 billion in output and almost 40 000 jobs.¹⁹

Other estimates put the total cost of delays along the Canada-US border at USD 10.3 billion representing 2.7 per cent of total 2001 US-Canada trade in goods.²⁰

18. <http://www.is.wayne.edu/mbelzer/pubs/JobstunnelEconomicImpactReport.pdf> cited in <http://www.fightgridlocknow.gov/docs/congestioninitiativebrochure.htm>

19. US Department of Transportation
<http://www.volpe.dot.gov/infosrc/strtplns/nstc/brdrgtwy/chap3.html>

20. Taylor, John C. and Associates, The US-Canada Border: Border Economic Costs, Their Causes and Alternative Border Management Strategies, presentation to US DOT Talking Freight Seminar Series, 15 October 2003.

Bottlenecks along these borders have emerged from a number of weaknesses in the system; they include:

- Funnelling of the vast majority of the traffic through a few border crossings;
- Inability of the border facilities to handle inter-modal interchange of equipment and containers, contributing to modal imbalance in favour of highway movements; and
- Lack of uniform truck size and weight standards.

The Canada-United States Transportation Border Working Group

In order to address common issues of concern, the Canadian and US governments established a joint Transportation Border Working Group (TBWG) to facilitate the safe, secure, efficient, and environmentally responsible movement of people and goods across the Canada-U.S. border. The TBWG brings together multiple transport and border agencies, and other organizations, to coordinate transportation planning, policy implementation, and the deployment of technology to enhance border infrastructure and operations. As such, this forum fosters on-going communication, information sharing, and the exchange of best practices to improve the transportation and the safety and security systems that connect the two countries.²¹

One of the main drivers in seeking greater border crossing efficiency in North America has been security²². Already congested conditions at border points linking the US and Canada were exacerbated following the application of enhanced security measures in the aftermath of 11 September 2001. This led to the signing of a US-Canada Smart Border Declaration and Action Plan designed to streamline procedures for certain trucks passing pre-established security criteria.

In partnership with the U.S. Federal Highway Administration, Transport Canada has developed a Border Information Flow Architecture (BIFA) to help guide a deliberate effort to ensure that technology and systems deployed at the border are able to interact with each other. Based on the Canadian and American national ITS architectures, the BIFA describes interactions among physical components of the transportation system including travellers, vehicles, sensors, databases, and control centres. It also describes the information and communications system requirements, how data could be shared and used, and the standards required to facilitate information sharing.

5.1.3 *Integrated Border Management and the Single Window Concept*

Facilitating trade across borders is at the heart of the Integrated Border Management (IBM) concept, which is designed to improve the efficiency and effectiveness of a country's border control operations. As articulated by the World Customs Organisation,

21. http://www.thetbwg.org/index_e.htm

22. Enhanced security measures since the 2001 attacks have led to back-up not only in road transport at borders, but in other parts of the transport system and modes as well. Efforts are underway in many countries – both multilaterally and on an individual country basis – to streamline security procedures and reduce the congestion that these have engendered in recent years. This is a topic unto itself, however, and will not be a focus of discussion at the Sofia Ministerial.

IBM includes the adoption of international standards, a sound legal framework, cross-border cooperation and coordination and efficiency gains and financial savings from joint controls and use of equipment, pre-clearance of people and goods, and harmonisation of documents and data, among other things. IBM includes application of a Single Window concept, allowing trading parties to lodge standardized information and documents with a single body to fulfil all import, export and transit-related regulatory requirements. In an effort to improve efficiency in border crossing security through the single window application, Australia, for example, identified in 2005 the potential to reduce its number of data elements in customs and trade forms to 663 from 7 649 via simplification and harmonization of procedures across 41 government agencies.

6. CORRIDORS AND GATEWAYS: AN INTEGRATED APPROACH TO CONGESTION MANAGEMENT

Most efforts to reduce congestion have concentrated to date within modes. With transport becoming increasingly inter-modal, however, a more strategic, modally integrated approach is necessary that considers how congestion reduction efforts in individual modes can be co-ordinated in such a way that the positive congestion mitigation impacts are shared across modes and overall system costs minimised.

Corridors and gateways enable this strategic integration of transport networks and supply chains – linking key inter-modal interface points and facilitating the convergence of transport flows in different modes. They comprise a range of policy, technology and investment initiatives designed to maximise use, management and operations of existing capacity, and provide for new investments where needed. Corridors and gateways are increasingly seen as an important factor in ensuring smooth trade flows and promoting economic growth in a geographic area. Whilst their spatial, modal, and geographical configuration may vary, they are all designed to maximise the efficiency of freight and passenger flows and preventing bottlenecks in the system.

There are a number of examples of corridors that are illustrative of a strategic planning, operational and management approach to managing traffic congestion. The Betuwe Line in the Netherlands began in 1990 as a Government decision to build a rail link from the Rotterdam area to the German railway network in order to: speed up the connection of Rotterdam with inland, rail-based trade; relieve the congestion on the existing railway (NS) lines that were already carrying large volumes of passenger trains; and relieve congestion on the Dutch highways. A second section of the Line is now expected to be completed in 2007 and will complete the high capacity (up to 10 trains/hour each way), all-freight link with the German network. So far DB Netz, the German rail infrastructure company has not announced any investments to improve capacity for onward journeys in Germany.

The trans-European transport network (TEN-T) was developed in order to identify and alleviate problems limiting the free flow of passengers and freight within the Union. TEN-T covers highways (89,500 Km), railways (94,000 Km) of which 20,000 Km are to be higher-speed passenger lines operating at 200 Km/hr and above), inland waterways (11,250 Km) and 366 airports. The target for completing the TEN-T network

improvements is 2020, although the approach contains a large number of specific corridors and investment components, some of which are already underway or completed.

The Alameda Corridor Project dates to 1981, when the Southern California Association of Governments established a Ports Advisory Committee to address concerns about growing traffic at the area's ports. The specific task of the Project was to alleviate the highway and rail congestion that growing traffic through the ports would create. The initial focus of the analysis was highway access to the ports, and a number of purely highway projects were identified and have been implemented over the last two decades. It became clear by 1984 that rail congestion could be a potential problem and that improved rail access could also act to relieve road and highway congestion, with corresponding environmental benefits in reduced air pollution emissions. By 1989 the Alameda Corridor Transportation Authority (ACTA) had been created and after six years of discussion and planning the project was set at US\$ 2.4 billion, involving a 32 Km double track, signalled main line of which 16 Km would be in a depressed trench, and the remainder on the surface. It consolidated four local rail lines and included a series of bridges, rail flyovers and street improvements that act to separate rail freight from road traffic and from local passenger trains. The result is a much-improved rail connection between the two ports and the main interstate rail network with significantly reduced impact on the road system.

Canada has recently launched the Asia-Pacific Gateway and Corridor Initiative, an integrated package of investment and policy measures designed to promote efficiency in western Canada's network of ports, key road and rail connections, border crossings and major Canadian airports extending south to the United States. The objective of this Initiative is to address transport system bottlenecks emerging in trade with the Asia-Pacific Region. Productivity gains in transport over the last 20 years have begun to drop. The privatisation, deregulation and commercialisation measures driving the increase in productivity were largely mode-specific. It is hoped that the downward trend will turn around with a modally integrated supply chain as set out in the gateway.

7. IN CONCLUSION

Better management and use of the transport system both within and across modes is an essential prerequisite to additional investment in capacity. While industry and government both have important roles to play, overcoming regulatory and administrative impediments to congestion reduction is a key factor. And this is one area where Transport Ministries in particular can help.