

PIARC A.3 TECHNICAL COMMITTEE – ROAD SYSTEM ECONOMICS AND SOCIAL DEVELOPMENT

ERNEST ALBUQUERQUE – NEW ZEALAND TRANSPORT AGENCY

24 – 25 MARCH 2011, SINGAPORE

EXECUTIVE SUMMARY

Technical Committee A.3 – Road System Economics and Social Development met on 24 – 25 March 2011 in Singapore. The meeting was hosted by the Singapore Land Transport Authority.

The main purpose of the meeting was to finalise the draft technical reports on

- (a) Worldwide progress of road pricing and assessment of its impacts
- (b) Approaches to evaluation of social impacts of road projects.

At the meeting we also carried out an assessment of the international call for individuals papers and carried out preparatory work for the XXIVth World Road Congress.

On the 25 March afternoon the Singapore Land Transport Authority did a presentation on their electronic road pricing scheme and we visited the control centre.

BACKGROUND

Technical Committee A.3 deals with the economic aspects of mobility pricing and new approaches to appraisal of social impacts.

Issue A3.1 Economic aspects of mobility pricing

Strategies	Outputs
Investigate approaches to the economic evaluation of mobility pricing effects including managing demand, internalisation of external costs, modal shift and social acceptance.	A comparison of approaches and assessment of the maturity of knowledge of road pricing.

Issue A3.2 New approaches to appraisal of social impacts

Strategies	Outputs
Study the changes in approaches to methods of appraisal of social impacts resulting from road development and usage.	Study of new developments, identifying added benefits and/or wider scope. Evaluation of implemented approaches.

WORK PROGRAM OUTPUTS

The main purpose of the meeting was to review and finalise the contents of the two draft reports. The first report reviewed and finalised was the “**Worldwide progress of road pricing and assessment of its impact**”. This report consists of four sections and appendices. The four main sections are:

1. Key notions – this section outlines the objectives of road pricing and the pricing tools used.
2. Worldwide progress on road pricing – towards regulation? This section analyses the vignettes system, development of tolls on major road or highways, distance based tolls for heavy vehicles, congestion pricing experiences, area charging and city tolls and the role of tolls as a means of replacing road transport taxation.
3. The impacts of pricing. This section analyses the impacts of pricing on traffic demand, traffic diversion and assessment of impacts on mobility characteristics, environmental impacts such as air quality, CO₂ emissions and noise, accidents impacts, economic impacts, social inclusion and accessibility, equity and attitudes to road pricing.
4. Conclusion – the key points are discussed and recommendations are proposed.

Case studies of implemented and envisaged road pricing schemes are detailed in the appendices. Case studies include those from the United Kingdom, Switzerland, Austria, Germany, Hungary, Czech Republic, Slovak Republic, Finland, Sweden, Norway, Denmark, Netherlands, France, Italy, Spain, Mexico, New Zealand, United States, Canada, Singapore and Japan.

The second report reviewed and finalised was “**Approaches to evaluation of social impacts of road projects**”. This report consists of four sections and appendices. The four main sections are:

1. Traditional project assessment. This section evaluates the use of environmental and health impact studies, “community preferences” studies and their shortcomings, and other innovative methods that could be used.
2. Diversity, distribution and perception of social impacts in transport infrastructure projects.
3. Implemented approaches to appraisal of social impacts of road projects. In this section ex-ante evaluation approaches are assessed, practices used by international agencies are outlined and ex-post studies are evaluated.
4. Conclusion – key points are summarised and recommendations are proposed.

An overview of advanced systematic approaches for ex-ante evaluation of social impact of social impacts of road projects and case studies are detailed in the appendices.

The meeting also reviewed papers submitted for presentation at the XXIVth World Road Congress. I submitted an individual paper on “Assessing the wider economic benefits of transport projects: The New Zealand experience.” The committee agreed that they would recommend to the PIARC Committee that the paper be accepted.

The content of the TCA.3 session at the World Road Congress in Mexico was also discussed. It was agreed that the TCA.3 session will start with a brief summary of activities carried out by the Technical Committee during the period 2008-11, highlighting the two main reports prepared. Two

half sessions will then follow to examine how social impacts are being assessed in road projects and the impacts of road pricing.

Both half sessions will be organised in a similar way. First, an introductory state-of-the-art will be presented by some Committee members on the basis of the report main findings. This will be followed by open discussion with participants and likely future work directions will be explored.

The introductory presentation on social impact appraisals will look at existing advanced systematic approaches used in various countries and how such social impacts can be incorporated into more traditional socio-economic evaluation approaches. A reflection on the specific efforts that international backers are doing – and still need to do – in developing countries will also be provided.

The introductory presentation on road pricing will start with a description of worldwide progress of pricing; road pricing schemes with a variety of objectives (funding of new/existing infrastructure, road demand management, mobility management), either in urban or interurban areas, will be considered. An overview of which are the impacts that are commonly considered when a pricing scheme is running or just planned will also be discussed.

PRESENTATION BY LAND TRANSPORT AUTHORITY SINGAPORE

The Singapore Land Transport Authority gave a presentation on the Electronic Road Pricing system used.

Congestion pricing has long been associated with Singapore, starting way back in June 1975 with its Area Licensing Scheme and then in 1988, changing to the Electronic Road Pricing (ERP) scheme.

The ERP scheme is a Dedicated Short-Range Communication (DSRC) system that has three major groups of components:

- The first centred around the in-vehicle Unit (IU) and the stored-value smart card.
- The second group comprises equipment installed in the field – at the ERP gantries. These include the antennae, the vehicle detectors and the enforcement camera system. Data collected is transmitted back to the Control Centre continuously through telecommunication lines.
- The third group of components is at the Control Centre, and includes various back-end computers, monitoring systems as well as a master-clock to ensure that the timing at all ERP gantries are synchronised. All the financial transactions and violations are processed here.

The ERP system is designed to be simple to use. With the smart card inserted into the IU, the appropriate ERP charge would be automatically deducted wherever the vehicle passes through the ERP gantry. There would be a short beep to signify a successful transaction. Should there be insufficient cash in the smart-card or should there be no smart-card in the IU, the enforcement cameras in the gantry will take a picture of the rear of the vehicle. A similar enforcement picture would also be taken of any vehicle that had no IU installed. The vehicles' registration numbers would be automatically read using the OCR techniques and the vehicles' owners issued with a letter asking for payments of outstanding charges, inclusive of administration fees. Failure to pay the charges and fees could result in the offender being called up to appear in the Courts.

ERP charges are applicable for all types of vehicles during the operating hours, with the exception of emergency vehicles (ambulances, fire engines and police cars). The charges vary from SG\$0.50 to SG\$3.00 per passage through the ERP gantries when the system was first launched.

The ERP system, being less dependent on manpower, allowed more frequent changes to be made to the road pricing charges. This helped to better optimise usage of road space in the network. The rates are set to ensure that flow rates are kept high as is practicable (and thereby allowing the maximum number of road users to benefit), and this is measured using average speeds as the proxy. On urban roads, the average speeds should be between 20km/h to 30km/h while that of expressways, the speeds should be between 45km/h to 65km/h.

The computation of these optimum speed ranges are based in speed-flow curves derived from empirical data collected on expressways and arterial roads. The lower speed threshold is a value close to the apex of the speed-flow curves that gives the maximum traffic flow. On expressways, this is 45km/h and on arterial roads, this is 20km/h. The lower value for arterial roads is due to the presence of traffic signals and various side-frictions caused by various road-side activities such as on-street parking and the picking up or dropping of passengers. The upper speed thresholds were chosen to allow stability in the ERP rates, as too narrow a range is likely to give oscillating ERP rates each time they are reviewed. When the speed goes above the upper threshold, too few vehicles are deemed to be using the roads and hence, the road space available is not being optimally used. Hence, the road pricing charge can be reduced to allow vehicles to use the roads. Conversely, if the speed falls below the lower threshold, too many vehicles are on the roads and this is a signal that the road pricing charge can be increased.

The ERP review is conducted every 3 months based on the average of speeds measured on the roads. Recently, the method of computing the speeds for evaluation based on the threshold values were revised, and is now based on the 85th percentile value. Over the years due to the regular monitoring and adjustment of ERP rates, the ERP charges have been stabilised with only a handful of gantries having their rates adjusted each time the ERP rate review takes place.

The original ERP contract was about SG\$200 million, with half the amount being for a million IUs. The ERP revenue collected goes to the Government Consolidated Fund and not hypothecated for transport. The ERP in Singapore has always been positioned as a traffic management tool and revenue was and is never a consideration.

LEARNINGS FOR AUSTRALIA AND NEW ZEALAND

One of the main lessons learnt is the importance of being flexible and adaptive, and being ready to make changes to pricing schemes to target specific groups contributing to traffic congestion on roads.

Congestion pricing should give outcomes that are in line with the experience of the motorists as they travel on the roads.

While a congestion pricing scheme may be justified from a technical and transport economics perspective, it is necessary that the rationale of the scheme must be communicated effectively to road users and the community including businesses.

There should always be viable alternatives for motorists who cannot or who decide not to pay the congestion pricing charges – it might be an alternative route or alternative time of travel. For those who decide not to drive, there has to be a viable public transport alternative.

Congestion pricing schemes are not the ultimate solution to traffic congestion in urban areas. Ultimately, it has to be a combination of schemes. Travel demand has to be managed also in other ways e.g. through proper land-use planning and decentralisation policies, in car-ownership policies and providing more effective public transport alternatives.

DISSEMINATION

The two reports produced by the Technical Committee A.3 will be made available on the PIARC website.

CONCLUSION

The information in the two reports will be a valuable resource for any agency seeking information on mobility pricing and evaluation methods/tools for carrying out evaluations on the social impacts of roads.

The discussion among members, both formal and informal, allowed for the exchange of ideas and for issues to be clarified and I found this to be invaluable.