Innovative transport modes

Fact Sheet by Upali Vandebona posted 11 Aug 2008

Although conventional road transport is an essential element in any new development, supplementary transport options can be considered to achieve the full potential of planned developments.

Categorised under:

- Feasability, Planning, Design, Completion,
- Greenfield Development,
- Access and Transport,
- Developer, State Government,

Introduction

There are transport options that do not fit to the conventional mould and such innovative concepts could be considered in urban development.Â In some major cities in Australia, light rail is a viable option.Â A high frequency bus rapid transit system is another option worth consideration. For some developments mono-rail can be a suitable option to avoid reliance on car access to the site. Car pooling is an option directed at better usage of motor vehicles in a manner that reduces the congestion and average operating costs.

Conventional public transport options such as bus and railway systems are discussed in a fact sheet about mix of transport modes.

Lightrail

Light rail or light rail transit (LRT) is a form of urban rail public transportation that generally has a lower capacity and lower speed than heavy rail and metro systems. The term is used to refer to modern tram systems with rapid transit-style features that usually use electric trams operating mostly in private rights-of-way separated from other traffic but sometimes, if necessary, mixed with other traffic in city streets. Due to the mixed-traffic nature of light rail, whether it is a true rapid transit system varies depending on its implementation.

The most difficult distinction to draw is that between light rail and tram systems. There is a significant amount of overlap between the technologies, many of the same vehicles can be used for either, and it is common to classify trams as a subtype of light rail rather than as a distinct type of transportation. The two general versions are:

- The traditional type, where the tracks and trains run along the streets and share space with road traffic. Stops tend to be very frequent, but little effort is made to set up special stations. Because space is shared, the tracks are usually visually unobtrusive.
- A more modern variation, where the trains tend to run along their own right-of-way and are often separated from road traffic. Stops are generally less frequent, and the vehicles are often boarded from a platform. Tracks are highly visible, and in some cases significant effort is expended to keep traffic away through the use of special signaling, level crossings with gate arms or even a complete separation with non-level crossings.

Guided busways

Guided buses are buses steered for part or all of their route by external means, usually on a dedicated track. This track, which often parallels existing roads, excludes all other traffic, permitting the maintenance of reliable schedules on heavily used corridors even during rush hours.

Guidance systems can be either physical, such as kerbs, or remote, such as optical or radio guidance.

On kerb-guided buses (often abbreviated to KGB) small guide wheels are attached to the bus, and these engage vertical kerbs on either side of the trackway. The bus is steered in the normal way away from the guideway. The start of the guideway is funnelled from a wide track to the normal width. The trackway allows for high-speed operation on a narrow guideway as well as precise positioning at boarding platforms, facilitating access for the elderly and disabled.

The longest guided busway in the world is the O-Bahn Busway route in Adelaide, South Australia, which has been operating successfully since the mid 1980s.Â Â The 12 km long guided busway uses buses that are equipped with guide wheels that lock into concrete guide rails and travels at speeds up to 100 km/h.Â It claims to be fastest gu ided bus service in the world.Â The system is able to move about 18,000 passengers an hour in one direction.Â Â The co f the entire O-Bahn project including the bus fleet at the time of construction was $98 million in 1986.

Â

Bus rapid transit (BRT)

Bus rapid transit (BRT) is a broad term given to a variety of transportation systems that, through improvements to infrastructure, vehicles and scheduling, attempt to use buses to provide a service that is of a higher quality than an ordinary bus line. Each BRT system uses different improvements, although many improvements are shared by many BRT systems. The goal of such systems is to at least approach the service quality of rail transit while still enjoying the cost savings of bus transit. The expression BRT is mainly used in North America; in Europe and Australia, it is often called a busway.

The Western Sydney Tway is a typicalÂ bus rapid transit system.Â The Tway route between Liverpool and Parramatta is about 31 km long and serves 35 purpose built bus stations.Â The construction cost of the transit way and stations was about $350 million.Â This Tway has served about 30,000 passengers a week within one year of operation.Â

Key Issues

Benefits

Provision for innovative transport modes can lead to improved traffic performance that can elevate property values and rental incomes.Â At the same time, the average cost of travel to individuals can be kept relatively low.Â Furthermore, there are positive environmental outcomes through reduction of emissions and fuel consumption.Â

The benefits are derived through the reduction in number of vehicles required to perform the total travel task.Â This reduction of what is known as VKT (vehicle km travelled) also improves the neighbourhood amenity and reduces overall delays.Â Â Car pooling enthusiasts have pointed out that sharing a common vehicle has the added benefit of reducing stress associated with driving at peak times.

Risks

Innovative modes may require a long lead time to implement and there can be unforseen technical glitches at the initial period that may lead to waning public support.Â Â There can be a fluctuation of support from different stakeholder organisations that maybe a concern as cooperation among key players is important to the success of introduction and operation of these transport systems.

There is always a certain amount of obsolescence risk when integrating rapidly changing technical fields, particularly in areas of telecommunication and computer specialisations.Â Â Specialist guidance should be sought to account for these risks in business plans.

Savings

Application of an innovative mode in comparison to conventional heavy rail application for a high density development can provide significant cost savings to the community.Â Â Innovative modes also pay special attention to savings in the area of environmental costs.Â For example, these solutions would lead to a reduced level of fuel consumption per person as well reduced level of pollutants and noise generated from traffic.

A specific aim of application of innovative modes is to reduce the total number of vehicles on the road system.Â Â This provides travel time savings.Â In cost benefit analysis, a significant proportion of the benefit is derived from the value of travel time savings.Â

Costs

Light rail operations are relatively expensive compared to a bus operation.Â The construction and maintenance of tr acks and power supply are specialised engineering tasks.Â Although the total cost is said to be not as high as bu ilding a conventional rail solution, a light rail track could cost anywhere between $20 million and $100 million per km depending on terrain conditions.Â On the other hand these systems are suitable to where the forecast tr ansport demand is high as LRT can serve 10,000 to 30,000 passengers per hour depending on vehicle configurations adopted.Â The superior level of passenger comfort and low noise levels are specific attractions of mo dern light rail systems.

Successful integration of innovative transport concepts require investments on pedestrian and bicycle facilities. TheseÂ contribute to construction and maintenance costs.Â

Innovations such as car pooling require investment on an ongoing coordination system.Â Although trip matching sy stems can be automated, there is still a necessity for ongoing supervision of co-ordinated car pooling systems.Â These applications are relevant for scenarios with relatively low level of public transport demand.Â

Hail a bus, dial a bus and similar bus based innovations generally require investment on a command centre to place passenger requests and dispatch controllers.Â However, a large proportion, if not all, of these costs are ge nerally recouped from the travelling public.

Barriers

In car oriented societies in the western world, a lack of leadership and funding are known barriers to introduction of public transport innovations.Â Â Lack of support in theÂ general community for public transport initiatives could act a significant deterrent to harness political support and support of key institutional stakeholders.Â Â There are also unde rstandable opposition to innovative modes because of the unfamiliarity and untested nature of systems under local conditions.Â Â

Lack of flexibility and tacit opposition from competing transport providers could prevent smooth integration of the new system to overall urban transport system.Â This should be considered at the planning stage to ensure that po tential competitors are provided with avenues to increase their revenue.Â Compensation may be considered as a la st resort.Â

Benchmarks

There are no Australian benchmarks to aim for in the area of innovative transport modes. However, there are rigorous safety standards, emission controls and minimum service obligations for transport operations. Standards Australia, Austroads and Australian Roads Research Board should be consulted for prevailing standards for a particular type of vehicle, track or communication application.

Development phase actions

Feasibility

Demand estimation is the main focus during the feasibility phase. This may involve field surveys or mathematical modelling techniques that allow planners to account for travel behaviour of individuals.Â The forecast demand has a direct bearing on the size and quantity of proposed infrastructural elements. Benefit and cost estimations may be required for evaluation of certain projects that require construction of new infrastructure.Â A formal environmental im pact assessment process has to be commenced for designated infrastructure projects.

Involvement of the community at the feasibility phase can reveal potential impediments and solutions in a cost effective manner.Â On-going dialogue with key interest groups during all phases of development is generally re commended.Â

Planning

During planning ensure the integration of the innovative mode to the overall transport system.Â It is also important to identify the role of the proposed mode in relation to the particular development to develop the integrated transport environment.Â High capacity transport systems such as light rail and bus rapid transit systems are often line haul tr ansport applications.Â Dial-a-bus and hail bus solutions are normally suitable for collection and distribution fu nctions.Â Car pooling allows for both line-haul and distributions to be handled without a need for interchange.Â Howe ver, these roles can be swapped when properly reconfigured at the planning phase.Â

Design

Sufficient amount of time and resources should be allocated to design of transport systems that require a large amount of new infrastructure. Structural integrity is only one of the elements to be considered in the design phase.Â Functional aspects and level of service to travelling public are other important elements to be considered in th e design phase. Designs should comply with planning guidelines and Australian standards.

Adequate signage and information systems have to be designed to assist potential public transport users.

Access paths to light rail stations may include bicycle paths as well. Secure bicycle parking facilities may be required to make use of bicycles as a feeder mode.Â Â Personal safety of users and lighting of facilities and access syst em are other features that need particular attention.

Construction

Construction phase can span a considerable amount of time for projects such as building a light rail system.Â Â Mana gement of construction noise, traffic diversions and construction debris have to be carefully addressed as these can be significant problems to neighbouring community.Â It is good practice to keep the community informed of fo reseeable disruptions.Â On-going review of construction practices in relation to the community concerns is im portant for smooth progress of large transport infrastructure development projects.

Lot Creation

Lot creation phase should consider transport oriented development objectives in general and right of way requirements of transport initiatives such as light rail systems. High density sectors of developments have to be

near transport interchanges.Â It is recommended that a public transport facility is available within 400 m of wa lking distance. Right of way has to be set aside for light rail or bus transit routes.

Completion

Car pooling operations require a coordination system to manage ongoing matching of trips. There are number of web-based platforms available. Some web sites operate as commercial ventures whereas there are other sites developed for needs of particular organisations or community groups.Â

Transport initiatives based on light rail and bus rapid transit systems need on going supervision to manage schedules, crew and information systems. A reliable information system is an important requirement during day to day operations.Â

Well maintained infrastructure is important for comfort and safety of the public as well as the perceptions about the public transport system.Â

Links

- Transit Oriented Development
- Adelaide OBahn
- Western Sydney TWay
- Queensland Transport - Bicycle and buslanes fact sheet
- Icarpool - car pooling
- Carpooling - Latrobe University
- Mix of transport modes factsheet

References

Levinson H, Zimmerman S, Clinger J, Harris D, Rutherford S, Smith R, Cracknell J and Soberman R, 2003, *Bus Rapid Transit: Vol. 1 - Case Studies* and *Vol. 2 - Implementation Guide*, Transit C ooperative Research Program Report 90, Transportation Research Board, Washington DC.

TRB, 2000 *Light Rail: Investment for the Future*, Transportation Research Board, CD 41, Washington DC.

Schumann J. and Loetterle F, 2003, 'Status of North American Light Rail Transit Systems', *Proceedings of the 9th National Light Rail Transit Conference*, Portland Oregon.

Vandebona U. and Bennoit R, 2006, 'Bus Rapid Transit Corridors in Sydney for a sustainable transport system: Benefits of Advance Detectors', *Road and Transport Research*, Vol. 15:1, pp. 54-60.

Link to Content

- http://yourdevelopment.org/factsheet/view/id/61