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Technical Note: Integration of Cycling and Public Transport in New Zealand

Matthew Ensor, Technical Director (Transportation), Beca.

Abstract

Making it easier for people to use both their bicycles and public transport as part of a trip leads to increased usage of cycling as well as increased patronage on public transport. Internationally there are many initiatives underway to better integrate public transport and cycling, particularly so in the United States and Western Europe. However in New Zealand there are still barriers to implementing initiatives such as secure bicycle storage at bus and rail stations and providing for bicycles on buses and trains due to the lack of relevant information on the likely benefits of such schemes. This Technical Note reports on progress being made on research in this area, and presents some results from relevant international studies.

1 The context for the research

Currently there are limited opportunities in New Zealand for cyclists to cycle for part of their journeys and use public transport (PT) for other parts of their journeys. Providing better integration for cycling and public transport will complement the focus on sustainable transport and travel plans at workplaces and schools.

There are particular physical barriers to cycling, such as the Lyttelton Tunnel and Auckland Harbour Bridge where cyclists cannot share lanes with motorists, as well as other barriers related to security of bicycles during the day, and the ability to take a bicycle on a bus should someone's plans have changed during the day.

There is readily available information on best practice for integrating cycling and PT, particularly related to providing secure storage at stations / terminals as well as carriage of bicycles on buses, trains and ferries. However a key barrier in New Zealand is the lack of information on the forecast benefits of investing in cycle/PT integration. This makes justifying the feasibility of investing in these schemes problematic.

The goal of this research project is to provide information on the economic benefits of integration initiatives and thus make it easier for transportation practitioners in New Zealand to seek funding through justification of the relative investment required.

The benefits from better integration of cycle/PT include amongst other things increased patronage on PT services through a larger catchment, environmental benefits from increased cyclist-kilometres and reduced vehicle-kilometres, and the reduced cost of providing cycle-parking at stations as compared to vehicle parking.

The outcomes of the research will be procedures for:

- Estimation of the likely level of use of secure storage facilities in particular locations;
- Estimation of the likely increases in public transport patronage;
- Calculation of the additional benefits for any project costs related to providing secure storage or the ability for cycles to be taken on PT services; and
- Estimation of intangible benefits through reduced CO_2 from transport activities.

This project will tie in with the parameter values in Land Transport New Zealand's economic evaluation manuals.

2 Findings from international studies

The review covered multiple forms of public transport including buses, ferries, and various types of commuter rail services. A wide range of literature was found to be available on the topic from around the world, including information from Australia, USA, China, the UK, the Netherlands and Canada.

Of particular interest to this study are the recent findings from North America. Unlike in mainland Europe, where both public transport and cycling are well established, many North American cities have began integrating cycle and public transport within the last ten years. In the United States, changes in Federal funding policies in the 1990s meant that federal grants became available for cycle integration projects. This in turn has led to a body of research that is valuable in a New Zealand context, as it describes the results of cycle planning in highly motorised cities with historically low cycle mode share.

2.1.1 Increased patronage catchment area for PT

The results are similar from eight studies on catchment areas, despite the variety and differences of nations. Patrons are willing to walk for about 10 minutes to reach public transport, but cyclists are also willing to cycle for about 10 minutes. As cyclists travel more quickly, integrating cycle and PT has the potential to increase patronage radius by about 3 - 4 times greater than for walking alone.

To give a context to this effect, the potential effects of expanding the catchment area of rail in Melbourne have been examined. The study found that if the catchment area radius was increased by 1 km to 2 km, then the potential market increased from 6% to 33% as the expanding catchment radius covers more homes.[i]

2.1.2 Mode shift

When establishing the benefits of integrating cycling with public transport, one issue is establishing what portion of cyclists would be using public transport irrespective of the provision of cycle facilities, and therefore how effective the facilities are at prompting mode shift.

A study by Denver Regional Transportation District in 1999 found that of the 2,300 daily users of bus mounted cycle racks, 50% of riders surveyed said they were new riders to public transport and 27% said they would be sitting in a single occupancy vehicle if they did not have the option to put their bike on the bus.[ii] An earlier study in 1992 in Vancouver, Canada, found that 30% of users at Vancouver's bike lockers at a commuter rail station had not previously used public transport to commute.[iii]

Brisbane City Council[iv] successfully undertook a trial of bike racks on selected bus routes. They found that there is high support from the community as well as bus users, bus operators and cycle advocacy groups. 87% of bus users responded favourably to the trial and there is high demand for other routes. However, the outcome of the project did not deliver a clear picture on the change in patronage that can be expected. The trial was conducted on 3 routes, one of which is a circular (non-commuter) route, at a cost of A$6,000

per bus for purchase, installation and bus modifications. The majority of those using the racks have been commuters, with frequency of service being identified as a key issue to cycle uptake.

It is estimated that:

- 20% are from previous bus users now riding a bike,
- 80% is new bus patronage (75% from cyclists making a bus/cycle trip & 5% previously going by other modes).

Of particular interest is the issue of safety. After two years of trial, the bus services operating with cycle racks have yet to report a single safety incident or injury.

2.1.3 Cycle integration and mode share

Quantitative 'before and after' statistics for cycle integration are rare due to the costs of initiating passenger surveys. However, a study for the First Great Eastern Railways (now called "One Railway") in the UK found that the installation of cycle parking at its stations resulted in the portion of people cycling to double from 1.5% to 3%.[v]

From studies in the US and Canada[vi], Cycle/PT integration initiatives appear to increase cycle mode share by around 2% from a basic 1%. Poor climate appears to have little effect on these figures.

2.1.4 Reduced Capital Costs

The literature review also identified the difference in capital costs between vehicle parking and cycle parking[vii]. A study by Transportation Alternatives found that the typical costs of cycle parking are a 50th of the cost of providing parking for automobiles[viii], and also come with space savings, as eight cycle parks can be accommodated in the space of one car park.[ix]

The Chicago Area Transportation Study (CATS) found that half of all drivers using park-and-ride lived within 2 miles of the facility. Providing cycle integration to encourage local park and ride users to cycle rather than drive could therefore be a means to freeing up parking for those travelling longer distances to use the facilities.

In a study by the US Department of Transportation Federal Highway Administration the study identified that car parking at railway stations minimises the opportunity for development that is suitable for highly accessible areas such as high-density residential, office and retail. When considering the cost of car parking, reference should be made to the opportunity cost of the land. As land becomes increasingly expensive, providing cycle parking becomes an increasingly attractive option.

2.1.5 Bikes on Buses: North American experience

Since 1991, the United States has provided limited federal funding toward cycle initiatives across America. Among other initiatives, a number of cities have trialled Bikes on Buses (BOB) programmes. A review was undertaken of 15 US transit agencies [x], with almost 5,000 BOB equipped buses. The findings showed that transit agencies view the investment and operational costs to be minimal compared to the return in the investment. BOB

programmes attract new patrons, encourage increased use of public transport, and expand the catchment area. The following usage statistics were identified:

- 33% of users have been combining cycling and public transport for over 3 years;
- 65% use BOB four or more days per week;
- One in four BOB users are new public transport users. 80% said ability to integrate was the reason for mode switch;
- 75% of users have increased their public transport use because of BOB programs;
- 72% of BOB users are commuters; and
- 61% cycle more than a mile (1.6 km) to reach public transport.

In 1996 the Californian county of Santa Clara[xi] introduced an integrated approach to cycle transport in response to congestion and air quality issues. Santa Clara has a spread-out population, a high rate of automobile ownership, and significant congestion problems.

The County's entire fleet of 540 buses were equipped with 2-bike cycle racks through an investment of $US 300,000. Train carriages were modified to allow cycles on board in especially designated areas with wall mounted cycle racks, through a further $US 200,000 investment. The weekday patronage figures doubled over 4 years from 2,235 cycles on PT per day to 4,336. These figures suggest that more than a million cycles are carried per year, for an initial $US 500,000 investment.

3 Next stages of the research

The next stage of the research project involves data collection, refinement of the framework for analysis, and the research analysis itself to produce the information required to assess the economics of providing cycle/PT initiatives.

This will involve approaching local authorities and public transport operators, to gather information specific to the New Zealand context regarding patronage numbers for cyclists using public transport facilities, either those carrying cycles on board or leaving cycles at public transport stations and terminals.

The project team will then develop methods for estimating the patronage and environmental benefits of initiatives for integrated cycling / PT, and provide estimates based on different baseline scenarios. Using the data acquired from New Zealand and abroad, an economic model will be developed to assist in justifying expenditure on integration initiatives. The final report will provide estimates on the likely benefits of cycle integration both at a national level and for project level scenarios.

4 Conclusion

This research project is currently around 50% complete, and there is now the opportunity to include data, and information on past and present cycle/PT initiatives in New Zealand. I would welcome such information and be interested in discussing with practitioners the opportunities for this research to be applied in local contexts. From the results of the literature review, I believe that there is a compelling case for further investigations of integrating cycling and public transport in New Zealand.

APPENDIX: REFERENCES

[i] *National Bicycle and Walking Study - Linking Bicycle/Pedestrian Facilities with Transit*, US Department of Transportation Federal Highway Administration

[ii] **Robinson, Lisa:** *Bike on Buses – A North American Success Story* – Paper E0094

[iii] Bike/Transit Integration' TDM Encyclopaedia

[iv] *Trial Of Bikes on Buses*, PowerPoint Presentation, Brisbane City Council

[v] *Bike and Rail; A Good Practice Guide,* Department of Transport, Gloucestershire

[vi] **Pucher, John** and **Buehler, Ralph**: *Cycling Trends and Policies in Canadian Cities,* Rutgers University, New Jersey

[vii] **Replogle & Parcells:** *Linking Bicycle/Pedestrian Facilities with Transit,'* US Federal Highway Administration.

[viii] Bike/Transit Integration, TDM Encyclopedia

[ix] *Bike and Rail; A Good Practice Guide,* Department of Transport, Gloucestershire

[x] **Hagelin, Christopher**: *A Return on Investment Analysis of Bikes-on-Bus Programmes*, National Centre for Transit Research, 2005.

[xi] **Jenkins, Austin**: *Bikes on VTA's Trains: A Success Story, Santa Clara Valley*, Transportation Authority (VTA), San Jose, California.