LOW CAPITAL IMPROVEMENTS IN ACCESS TO PUBLIC TRANSPORT FOR THE DISABLED

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Abstract:

Growing concern in the community has been expressed to provide better transport service to the physically and mentally handi-capped, despite trends to reduce deficit spending public transport. This paper relates the results of a research program carried out in the Sydeny region that included 1,700 disabled persons and identified key problem areas and potential improvements of a low capital cost nature.

INTRODUCTION

The number of persons in Australia who cannot avail themselves of public transport because of intellectual and physical disabilities is substantial. Estimates for Sydney placed about 5% population in this category. That population is also varied. Approximately a quarter of the handicapped population have no physical difficulties with transport because their disabilities are not physical. The people with the greatest difficulty using public transport are persons in wheelchairs, but they comprise only about 2.5% of the disabled. In fact, the ability to travel is so widespread among the handicapped that only 20% of a survey in Sydney have never used public transport. In this situation, low capital improvements in access can be made to the physical structure and operating policies of transport providers which will assist most of the handicapped.

Grave concern in Australia lately over government budgets and expenditures has, on occasion, overshadowed concerns for social welfare programs. Established social welfare programs are fighting for their survival, and that allows very little space in the balance sheet for new programs. The philosophy of integrating the handicapped into society, so that they may participate as fully as possible in a comfortable, modern life, has just recently gained wide acceptance among social welfare organisations and government policy (Commonwealth Department of Transport, 1978, and Department of Social Security, 1977). However, achieving that degree of integration is a very difficult task.

No service or industry is faced with a grimmer forecast of access to government funds and capital than the public transport industry. While taxes are increasing to the point of public antagonism transit operations in Australia's largest cities are reporting staggering deficits. The prospect of them undertaking new, costly programs for a minority of users is unlikely and politically unpalatable. Past programs for the handicapped have been undertaken, but they have been jointly funded by private resources and not nearly so visible as metropolitan transport systems. It has yet to be seen whether programs to assist the handicapped in moving freely within society will be popularly received by the general community.

This paper identifies the handicapped as a large and varied portion of the population, and already a major consumer group of transport services. A totally accessible system for the disabled would be an incredibly expensive undertaking, and one with dubious benefits and chance of success. There are, however, actions available to the transport operator which enable him to decrease the difficulties experienced by handicapped users, while still providing a flexible and efficient service. This paper refers to material that was compiled on the Sydney Metropolitan Area as part of an investigation undertaken by Planning Workshop Pty Ltd (1979) for the NSW Public Transport Commission's review of transport for the disabled. However, the data are more generally applied to the experience of the handicapped person on transport throughout Australia.

Information came from two sources, the first was a survey of social service agencies, and the second was a survey, done as interviews and questionnaires, of handicapped individuals. In total, more than 1,600 persons were covered in the results, while the most useful information came from the 528 completed individual surveys. Contacts were not entirely random, but rather persons were contacted in accordance to the rate their disabilities were believed to occur in the population. Personal interviews were conducted to eliminate bias against disabilities that make reading and writing difficult. Both physical and intellectual handicaps were covered, because both affect the ability to travel.

ABILITY TO TRAVEL

The ability to travel was the key investigation of the research. Using a scale that had been developed earlier in Pak-Poy's study of agency transport in South Australia (1978), agencies who assisted their clients in travelling and, later, handicapped individuals were asked to identify their transport dependence. Table 1 shows how the sample was categorised, and also how the two surveys showed a different profile of the disabled. A great deal of this discrepancy can be explained by age differences between the two groups. Many agencies deal with handicapped children or aged persons, and age affects one's independence despite one's physical capabilities.

Table 1

Survey Differences on Transport Dependence

Category	Agency Survey	Individual Survey
Persons totally dependent on others for all movement and travel	7.2%	6.7%
Persons needing at least one person to help them, and special equipment	11.2%	4.5%
Persons needing some assistance, but able to use a standard vehicle	25.6%	9.9%
Persons needing an escort	24.1%	19.2%
Persons now able to use transport without assistance	32.0%	59.4%

The startingly high proportion of the handicapped now able to use public transport unassisted is reinforced by other findings. 39% of all agency clients travelled by public transport to agency facilities, while a further 20% are delivered by taxi. The agencies provide their own transport for 10% of the clients, but standard model sedans, vans and buses make up 80% of the agency fleet. The individual survey reveals greater use of public tranpsport, and of the users 60%

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ride three or more times a week. The majority of handicapped
persons are transport users, and with some modifications, more could
travel with little difficulty. The issue is not just one of inducing
non users to travel on the system, but rather improving service and
expanding upon an existing market.

It is estimated that the handicaps which discourage or prevent
people from travelling on public transport affect between 4% and 9.3%
of the Sydney population, although the percentage is more likely to
fall around 5%. The difficulty in establishing a single figure was
because of interpretation problems with the limited data available
outside the surveys. 'Handicapped' is not a word with a single
definition, and more complexity is added to the problem by discussing
only handicaps which affect the ability to travel, which reduces the
comparability with other statistics and research. Even at the
relatively low 5% figure, the handicapped are making 136,000 trips a
weekday on public transport.

Most of the trips are work related (sheltered workshops and
other employment), which account for 48.4% of non homebound trips.
The next largest segment of trips are for training (school, vocational
training, and therapy), which are 20% of the sample. Shopping rates
10%, while all medical trips only come to 6.8% of travel. The
prominence of work trips is also reflected in the time distribution of
travel, over two thirds of all the trips are made in the morning and
evening peak hours.

COMPOSITION OF THE HANDICAPPED MARKET

The previous discussion described how important a group the
handicapped are to public transport; however, the handicapped form an
extremely varied group, and it is somewhat misleading to discuss them
as a single body. The surveys contained 16 categories of disability,
and almost 15% of the sample falls outside the categories. For
simplicity, five subgroups were created to contain all the
disabilities. The groups were the wheelchair users which contained
paraplegia, quadriplegia and spina bifida; the intellectually
handicapped, which contained the mentally retarded and the mentally
disturbed, not because these groups necessarily had the same problems,
but because they did not have physical difficulties; the blind, which
included all visual impairments; the deaf, which contained all aural
disabilities; and the physically disabled group which contained all the
mobility limiting disabilities, but still allowed the person to be
semi ambulatory.

Stratifying the sample into these groups reveals significant
behavioural differences. It is, therefore, important to estimate the
relative incidences of these disabilities. Wheelchair users were
estimated to be 2.5% of the handicapped population, the deaf to be 5%,
the blind 4%, the intellectually handicapped 22.5%, and the physically
disabled 66%. This means that in any discussion of the entire
handicapped population, the physically disabled overwhelm the other

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groups. It also means that operators can target certain groups for
special assistance, but should expect little measurable effect from
programs other than those which assist the physically disabled.

Perception of Problems

A series of questions on the individual survey dealt with
problems faced by handicapped travellers. Firstly, problem areas
were identified. These included planning a trip by public transport,
travel between the home and the public transport service, boarding
and disembarking from a vehicle, and riding on the vehicle. Within
each of these areas several specific difficulties were listed, and
the respondent was asked to rank the problems that caused him the
greatest difficulty. Space was allowed for additional problems. After
completing the specific questions, respondents were asked which of the
problem areas they felt caused them the most difficulty, and discouraged
them from travelling on public transport.

The results were used to rank problems. The raw results were
modified by two factors. First, the raw data was disaggregated by
disability type and adjusted from the sample proportions to the
estimated proportions of the handicapped population. Then the results
of the question about problem area of greatest difficulty was used to
adjust the stratified sample by a priority of difficulty, so that
specific difficulties from the 'boarding the vehicle' section were
multiplied by a priority of 1.5, while the other areas were unchanged
since their priority factor was 1. The outcome of this weighting
process can be seen in Table 2.

Problems of the intellectually handicapped

The intellectually handicapped use public transport more heavily
than any other group in the study, and the difference is a highly
significant one between the groups. They also have a low rate of car
ownership, and among adults, a low rate of car availability. Their
modal split for weekday trips was : walking, 5%; special services
provided by agencies and volunteer groups, 6%; minibus or van
services, 9%; taxis, 4%; car drivers, 0%; car passengers, 9%; buses,
34%; trains, 32%; other modes, 2% (usually bicycle). The
intellectually handicapped experienced a much greater level of
difficulty with planning the trip than other groups. Their most
frequent problem in this regard lay with finding out schedules. The
intellectually handicapped had greater difficulties with uncertainty
(especially disruptions like strikes) : some things damaged their
ability to use public transport because they could not respond with a
flexible concept of how to get where they needed to go. In a related
vein, they reported difficulty when services run late, or bus routes
follow an alternative route while displaying a familiar route number.

In terms of gaining access to public transport, the
intellectually handicapped are much less likely to complain about
getting to a service, or encountering physical barriers. Particular

Table 2

Ranking of Problems by Different Disability Groups

PROBLEMS	Total, all Handicapped Groups		Wheelchair Users		Blind or Visually Impaired		Deaf or Aurally Impaired		Intellectually Handicapped		Physically Handicapped	
	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank	No.	Rank
PLANNING												
Finding out schedules	123.9	8	1.4	–	7.8	8	9.0	4	29.4	2	76.3	–
Finding out suitable routes	109.0	–	0.7	–	8.6	6	10.3	3	19.6	5	72.8	–
Not having suitable routes	62.0	–	–	–	1.0	–	5.1	–	8.1	–	48.5	–
Finding routes without transfers	72.0	–	–	–	7.1	10	5.1	–	18.4	8	41.6	–
Need help to read signs	14.3	–	–	–	1.0	–	–	–	2.9	–	10.4	–
Other problems	6.3	–	–	–	–	–	–	–	2.9	–	3.4	–
ACCESSING												
Getting to stop, station or wharf	112.7	10	2.9	5	6.3	–	1.3	–	10.4	–	91.8	–
Waiting at unprotected stop	98.8	–	0.7	–	6.6	–	9.0	6	18.4	7	74.5	–
Nowhere to sit while waiting	112.0	–	0.7	–	5.3	–	3.8	–	12.1	–	90.1	9
Narrow gates, passageways, turnstiles	46.5	–	2.1	8	2.8	–	–	–	3.5	–	38.1	–
Climbing steps to train platform	180.0	4	2.9	6	8.9	5	7.7	9	13.2	–	147.3	4
Finding assistance	73.6	–	1.4	–	4.6	–	6.4	10	15.0	–	46.8	–
Comprehension problems	8.6	–	–	–	0.5	–	–	–	1.2	–	6.9	–
Other problems	11.2	–	–	–	0.3	–	–	–	4.0	–	6.9	–
BOARDING												
Knowing the correct vehicle	133.1	7	1.1	–	14.4	1	17.3	1	35.4	1	64.9	–
Stepping onto vehicle	255.0	1	4.3	2	12.0	2	3.9	–	16.4	10	218.4	1
Not being able to reach handgrips	122.0	9	2.1	–	5.3	–	–	–	9.5	–	101.4	7
Getting a ticket	72.0	–	1.1	–	3.0	–	13.5	2	20.7	6	33.8	–
Not having any assistance	120.6	–	4.3	3	4.7	–	7.7	–	15.6	–	88.4	10
Getting to a seat	164.2	5	2.1	–	9.2	4	5.7	–	12.2	–	135.0	5
Changing train platforms	24.2	–	–	–	0.4	–	5.7	–	2.6	–	15.0	–
Other problems	3.7	–	–	–	0.4	–	–	–	3.5	–	–	–
RIDING												
No seat available	207.6	2	2.1	7	10.0	3	9.0	5	25.3	4	161.2	2
Insufficient handgrips	68.5	–	1.4	10	5.0	–	2.6	–	2.3	–	57.2	–
Jostling by crowds	201.2	3	0.7	–	8.0	7	7.7	7	27.1	3	157.7	3
Quick stops and starts	144.4	6	1.4	9	7.1	9	1.3	–	15.0	–	119.6	6
No place to put wheelchair, etc.	30.6	–	3.8	1	0.3	–	–	–	2.3	–	24.3	–
Narrow aisles	33.0	–	2.9	4	0.5	–	1.3	–	4.0	–	24.3	–
Knowing where to get off	50.1	–	0.7	–	5.3	–	7.7	8	17.3	9	19.1	–
Other problems	10.4	–	–	–	–	–	–	–	–	–	10.4	–

problems arise with the lack of shelter while waiting, and the lack of assistance when it is required. They report little difficulty with boarding a vehicle, but obtaining a ticket, and identifying the vehicle or platform they intended to use can create obstacles. Riding on vehicles is more troublesome, especially deciding when to get off. Along with other groups, they found jostling by crowds difficult, and that riding problems are accentuated, if a seat is not available.

Problems of the visually handicapped

The blind are the handicapped group currently receiving most benefits and assistance from public transport operators, although that help is almost exclusively economic. Fare reductions and passes, as well as allowances for an escort, are offered in most Australian cities. As a consequence, the visually impaired have a high rate of public transport use. A surprisingly large percent of them owned cars, but this did not seem to affect their travel patterns. The modal split for a typical weekday is : walking, 6% of all daily trips; special services, 1%; mini buses or vans, 0%; taxis, 3%; cars, 19%; buses, 37%; trains, 31%; other modes, 2%.

The blind report a significantly higher concern with problems related to reaching public transport service. In terms of planning trips by public transport, they have more complaints about locating routes and schedules, than about the absence of adequate service. The greatest perceived difficulty is in transferring, and planning trips to avoid the problems associated with changing services. Within the most difficult area (reaching public transport service) the major problems are climbing steps at railway platforms, and coping with services changing platforms on short notice. Identifying the correct vehicle is responsible for most of the problems the blind have with boarding, along with the problem of drivers not stopping at bus stops, since the blind cannot distinguish and hail them.

Problems of the deaf

The deaf tend to be less dependent on public transport, since their car ownership is higher, commensurate with their ability to drive. However, 50% of their daily trips are still made on public transport. As a group, the deaf have more special 'non physical' difficulties than any other disability. Their daily modal split is : walking, 4%; special services, 7%; mini buses or van services, 0%; taxis, 11%; car drivers, 19%; car passengers, 4%; buses, 30%; trains, 22%; and other modes, 11%.

The deaf have slightly more difficulty in planning the trip, and slightly less difficulty in boarding the vehicle, than other groups. Difficulties in planning the trip mostly arise, for the deaf, from obtaining route and schedule information. A surprising amount of such information is given orally, either by employees manning the service, or through public announcement systems. Written information is available, but requires more forward planning than is possible in most local travel situations. In reaching public transport services, the

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hard of hearing have little complaint about physical design or location of services. They report difficulty on occasions locating assistance when they require it. Communication remains the problem with boarding the vehicle, as the difficulties are getting a ticket, knowing when to change platforms at a rail station, and identifying the correct vehicle they should board. The pattern is repeated in the replies to the secton on riding : knowing when to get off is the predominant concern, while physical difficulties are under-represented.

Problems of the handicapped in wheelchairs

While the number of the handicapped in wheelchairs is relatively small, about 2.5%, they encounter the majority of barriers to travel on public transport. Very few of the low capital access improvements in this paper will help them. Most of those capable of operating an automobile, do so. They have one of the highest rates of car ownership in the sample. The modal split for weekday travel shows the following : special services, 26%; mini bus or van services, 19%; taxis, 0%; car drivers, 30%; buses, 7%; trains, 0%; other modes, 4%.

Planning public transport trips seems to hold no difficulty for them, especially compared to other aspects of travel. 83% had no difficulty planning, 50% had problems with the other areas (many of those who did not report problems were drivers). Turnstiles and narrow passageways prevent them from getting to services, and once they are there, they cannot find enough assistance to board the vehicle. On the vehicle, there is nowhere to put a wheelchair, occupied or collapsed, and the narrow aisles prevent movement.

The survey was difficult for most of the wheelchair users to complete. Their handicap was so severe in terms of travel they did not have the knowledge of the system that other groups had. The obstacles were so overwhelming, they did not know where to start identifying specific problems. They could not envisage a barrier free system, so they did not know whether they would, or could, use such a service if it were available.

Problems of the physically handicapped

The physically handicapped who can do some walking comprise the largest group studied in this report. It is an extremely varied group, and unsuitable for broad generalisation. After those confined to wheelchairs, these physically handicapped are the oldest group. They tend to use public transport less frequently, while still depending upon it for the bulk of trips. Their problems are of a physical nature, particularly in boarding the vehicle.

Over half the sample has no difficulty with planning trips. Of those who have trouble, the absence of routes where they wish to travel is much more of a problem to this group than others. Interestingly enough, transferring is not cited as a problem, while obtaining information about schedules and routes is. Access to service is a more critical area, and the largest single response concerns

climbing stairs at railway platforms. Boarding, besides being the most difficult area, causes the most specific problems : stepping onto the vehicle, then getting to a seat, then inability to reach handgrips. Once on the vehicle, the physically handicapped encounter difficulties with the quick stops and starts, jostling by crowds, and not having a seat. However, their reaction to these is not stronger than other groups. Overall, the group showed itself to be very responsive to the problems encountered by all public transport users, since use increases with independence of movement. At the same time, only 35% feel they would definitely use public transport more if it is made 'barrier free'.

POIENIIAL IMPROVEMENIS IN ACCESS

Once the problems are identified, the task is to find the most cost effective improvements in public transport. It is not an easy task to evaluate satisfactorily. Information, while extensive, is still limited in comparison with the problem, and there is no clear measure of effectiveness for an improvement requiring implementation. The cost of proposals is difficult to assess when those proposals are of a varied nature and comprise unfamiliar operations and equipment. Stress on low capital improvements clearly means that results must be judged on how they perform for a limited budget, rather than presented as solutions to complicated problems.

Low Capital Proposals to Improve Physical Access

Proposals in this class are the most constrained, because of the high cost of anything which must be provided on all transport vehicles. However, the following list is indicative of the range of options considered.

Allocate the seat nearest the front door for use by handicapped

If a disabled person knows that there will be a seat available for him immediately inside the front door, many of the anxieties he may feel about public transport can be minimised. Ihe amount of jostling he will receive is reduced, fewer handgrips are required, and the driver can have a better idea of what is happening. Ihe driver is then less likely to brake or accelerate suddenly. In other countries a sign has been positioned over the seat, reserving it for the handicapped. Ihis serves to keep other passengers from occupying the seat, if further seats are available. If the bus is crowded, and no handicapped person is on board, then there is nothing to prevent the seat from conventional use. Also, if the seat is occupied, there can be no discussion or uncertainty about who should surrender his seat to a handicapped person. Wording should not be so severe as to stigmatise potential users, but it should be short and precise.

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Additional, lower handgrips

Handrails and grips are becoming more common in modern transit vehicle design. They assist the standing passenger, as well as the handicapped passenger. However, an issue often overlooked is the height at which these grips should be provided. It is a difficult design problem, because handrails and grips can become obstructions, especially if they are placed below the line of sight of most people. In order for them to perform effectively, they must be accessible to a handicapped user. Disabilities due to stature need to be considered, as well as those involving little strength or control of the arm and hand. Combination of handrails and grips with the reserved seat concept can help to reduce the requirements for such grips except at the front of the bus, and thereby reduce the inconvenience they cause.

Raising a portion of the train platform to the height of the carriage floor

For a variety of reasons, many train stations have passenger platforms that are at a different height from the floor inside the railway carriages. Usually this causes passengers to step up when boarding a train. For a small capital cost, an asphalt or concrete platform could be placed on the platform to match the interior height of the carriage. Its edges would slope gently to present no safety risk to other passengers and to allow even those in wheelchairs to negotiate it. The difficult part of the construction would be getting the platform in the same relative location at each platform, so a passenger boarding by way of the platform can also get off the train. It would have to be of sufficient length so trains of varying numbers of cars could make use of it.

Identifying a portion of the train platform to be watched by guards

Insecurity has a lot to do with a handicapped person's perception of his independence. If he feels able to travel without difficulty 90% of the time by public transport, he may still avoid it because of the remaining 10% of the trips. One way to allay some of the most common fears is to mark clearly a part of the platform as fully scrutinised by the guard. If a passenger knows that help can be called if there is a need and that someone is checking to see that he has boarded safely, then he often has received all the assistance he needs. This option could be combined with the previous suggestion for a height equalised platform.

Improved gangplank design

Sydney is frequently identified with its ferry commuter service, but it is not the only Australian city which features boats as a part of the public transport system. Perth, Brisbane and occasionally Hobart are all sites of ferry service. The survey indicated a problem on minimum staffed wharves with the inadequate design of loading gangplanks. The usual deficiency was in width. Narrow gangplanks excluded wheelchairs, but ones without a railing also discouraged the

blind and the physically handicapped from using the service. The need
is for a lightweight design so no more manpower is required, while
sufficient width and security are provided.

Low Capital Improvements other than Physical Modifications

The research shows clearly that some of the difficulties the
handicapped face in using public transport do not relate to physical
barriers but rather information barriers. This is especially true if
one is only examining low capital options. The following list contains
several proposals which could ease travel problems.

Publicity of existing facilities for assisting the handicapped

A surprising amount of facilities already in place could be made
useful to the disabled through publicity and minor modifications.
Many underground train stations in Sydney have commercial establishments
at the platform level, which require a goods elevator to move stock.
To give limited public access to these for people in wheelchairs
would require minor adaptations.

Likewise, superior bus/train interchanges exist, where the
difficulty of transferring can be kept to a minimum. Ferry wharves
exist with wide gangplanks and no entrance steps. Some train stations
even exist with ramps leading to the departure platforms. While none
of these is a complete solution, a handbook on a public transport
system which draws attention to features such as these could serve to
help passengers in the short run while other assistance programs were
in preparation.

At the same time, the operator can make employees more aware of
their actions on the handicapped. For example, most regulations for
bus drivers require that buses be taken as close to the kerb as
possible at bus stops. However, in traffic, with the high levels of
illegal parking, drivers tend not to observe this rule. Stressing its
importance to the disabled may make the driver more responsive to
the issue. Similarly, the handicapped report that drivers get so
impatient with 'slow' boarders that they accelerate quickly to give
them a tumble. Some complain that drivers will not stop to pick up
visibly handicapped people because they are slow to board. An obvious
response of operators must be to include training about the handicapped
in the preparation of new employees, and in special sessions for
current employees.

Secondary information systems

A transport operator is justly proud if he feels his service is
adequately marked, identified and indicated, since most are not.
However, the problems of the blind, deaf and intellectually handicapped
go beyond one information format, and require a secondary one. Signs
are the primary indicators in use on buses, ferries and trains. These
are inadequate for the blind, partially sighted and intellectually

handicapped.. Some inroads have been made through public address
systems at railway stations, but more can be done.. For example, in
Sydney tape loops on platform loudspeakers announce the destination
and next stop of arriving trains.. By modifying the tape, the station
could be announced as well when the train first stops.. Then those
unable to read can know where they are.

Colours can be used as a secondary identification of stations
for those who cannot read.. Even if it is too complicated to
specifically colour code each station, it may be possible to assign a
characteristic colour to each line.. This assists passengers making
transfers or trying to locate the correct platform when they enter
a station..

On buses colour can also be used to signal that a bus is going
to do something unusual, such as run as an express or terminate at an
intermediate stop on the regular route.. Irregular service causes
problems for the intellectually handicapped and a consistent and highly
visible signal on bus roller signs would alert them that the bus may
not be the correct one for them..

Simplified ticket purchasing

The apparently simple procedure of obtaining a ticket can be
very challenging for persons with handicaps.. Besides speech and
understanding, ticket purchasing can mean extra steps at a train
station, extra motions on a crowded bus.. Several staff training the
intellectually handicapped said that handling money was the most
discouraging part of bus travel for their students, especially since
special concession fares result in odd amounts of change. The most
direct method of dealing with these problems is the availability of an
all purpose public transport pass.. For a set fee, the disabled could
make any trip, on any transport mode, with any frequency.. The fare
for such a pass would not necessarily have to lose the operator
money and it would allow the handicapped traveller much more
flexibility..

The deaf have problems in purchasing tickets. Obviously, a
pass would assist them particularly, but the occasional user would
still encounter great difficulty.. Increased use of ticket machines,
that display destinations, along with the associated fares can be very
useful, particularly if placed near system maps..

Direct marketing to the handicapped users

So many projects are just being undertaken by marketing
departments in public transport agencies that it is often difficult to
justify concentrating on small groups such as the handicapped..
However, in terms of achieving social goals, at a moderate price, it
is a reasonable thing to do.. Having someone trained in sign language
at a major information centre, or available for presentations to
organisations that assist the deaf, can reach groups starved for
information.. Embossing the telephone number for travel information

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on passes distributed to the blind may give just the added assistance
necessary to a small, but very dependent, section of the community.
Just keeping social service agencies informed of changes to time-
tables in their area can change the image of transport reliability to
a group of people who could make signfiicant use of some services. An
ongoing program for education, information distribution and customer
feedback seems justified for even small systems. Only the amount of
staff time invested would vary.

What is Missed in a Low Capital Program

Many of the suggestions made in this report may be dismissed by
some as merely cosmetic. Real problems certainly do remain. The
greatest ones are somehow getting disabled people onto buses and
between levels at train stations. No full solution to this problem is
low capital because all modifications need to be system-wide to be
effective, and all involve changing, or retro-fitting, terminals and
vehicles designed for other purposes under other constraints.

Many projects overseas, such as 'kneeling' buses and escalators
are being attacked for still excluding those in wheelchairs. The
degree of accessibility a system will offer the community must be set
before programs can be selected. Standards are just being adopted for
accessibility and the feasibility of their implementation is still to
be tested. Public transport is a very expensive place to try out such
programs and not very appropriate. Assessing the performance of
modified vehicles in partial service is not valid if there are few
places a disabled person can go on the service. Phasing the improve-
ments to public transport accessibility must be made in conjunction
with other community facilities, such as barrier free buildings, not
before or after because people travel to a destination not for the
attractions of the service.

Benefits to the General Public

Many programs suggested in this paper have been argued on the
basis of assistance to the handicapped, but few disadvantage the other
segments of the travelling public. On the contrary, proposals for
secondary information systems, broader transport passes, and other
programs stand to benefit the entire population of public transport
users. Even improvements not mentioned in this paper because of their
cost, such as ramps at railway stations, escalators and elevators,
become much less expensive on a user basis if parents with young
children, shoppers with parcels, or the elderly are considered as well.
It is not entirely necessary to label such programs as only assistance
to the handicapped. Such descriptions can inadequately assign the
benefits and can further separate the handicapped from the community.

CONCLUSIONS

Complete access to public transport service for the handicapped is a frightening concept to most transport operators because of its staggering costs. Granted, major modifications will be expensive and several severe barriers now exist for handicapped persons who wish to use conventional transport, but improvements can be made in public transport short of those expenditures for complete accessibility. In the area of physical improvements, provision of reserved seats on buses and trains, a raised area of railway platforms to eliminate the step onto the carriage, and improved design of ferry gangplanks can assist the 80% of the handicapped population capable of using public transport. Improved access to information, non verbal ticketing mechanisms, and marketing programs directed at the handicapped user appear to hold much potential for aiding the disabled without draining funds from other operation areas of public transport providers.

ACKNOWLEDGEMENTS

The data given in this report were produced as part of a research program for the New South Wales Public Transport Commission. The author wishes to thank the Commission for the use of that material, although the conclusions and opinions expressed are solely those of the author.

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