TOWARDS CO-ORDINATED TRANSPORT PLANNING AND RESEARCH

T.H. COOKE

ABSTRACT: *The paper examines arrangements for land transport planning and research in Australia with a view to identifying means of achieving a coordinated program. Features of the Defence Science and Technology program are outlined and are used as an indicator to management and support requirements which might generally apply to a research program; against this background deficiencies in the Transport R & P program are identified and initiatives suggested which would aid in attaining coordination and increased effectiveness of the transport planning and research program.*

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Introduction

The theme of this forum concerns the relationship and effectiveness of research on transport operations in Australia. Within this context this paper examines the position as seen by those concerned with co-ordinating national planning and research in land transport.

Transport research provides a means of identifying ways in which transport systems can be made more efficient by innovation, investigation and evaluation and provides a means by which various options may be considered prior to investment.

Taplin (1975)[1] has stated that while the quality of Australian transport research is high, the limited research resources available and the fragmented approach in many areas of research, make it essential that the resources be used in an efficient and effective manner. Further it is essential that research and planning be oriented to the transport goals.

Those involved in transport research and planning at both Commonwealth and State levels are at present denied basic support which is necessary to promote and sustain a healthy R & P capability and it is suggested that Commonwealth initiative in this field may greatly improve the situation.

Research programs, irrespective of the subject of the research, have many common features and as an example the Defence Science and Technology program is examined. From this an indication of fundamental support is gained and it is suggested that similar support may aid the establishment of a co-ordinated and effective transport research program.

Commonwealth assistance for research is now provided under the Transport (Planning & Research) Act 1974 and

an examination of projects which are presently proceeding provides some insight to the need to achieve a co-ordinated program.

This paper does not seek to solve problems besetting transport R & P managers but is an attempt to identify some deficiencies associated with land transport research and to suggest means by which it may be rendered more effective. Definitions of research and planning for the purposes of this paper are given by Taplin[1].

Transport Goals and Objectives - Where should we direct our efforts?

Transport relatable costs in Australia have been estimated at 15-20% GNP. Because of this high investment and because of the sensitivity of the public to transport inadequacies transport represents a significant element in both Commonwealth and State Government policies.

At the highest level the policy goals in transport are enunciated by the Government. Thus the broad national objectives have been summarised as:[2]

- Promoting fast, safe, efficient internal transport services to meet the needs of individuals and businesses.
- Encouraging maximum utilisation and flexibility in the provision of road, rail, air and sea transport services.
- Ensuring efficient and economic transport is available for purposes of our overseas trading.

- Supporting the development of complete urban arterial road systems to meet the demand for public and private transport and for the transport of freight.

- Ensuring that urban and environmental considerations are fully assessed prior to initiation of new transport systems.

In support of this statement of objectives the Minister of Transport has summarised other needs including "the encouragement of greater interest in transport management education, wider dissemination of transport technology and information and particular policies for each transport mode".

In each State there will also be a transport policy which, whilst similar to the Commonwealth policy on many points, may differ on others. It is thus clear that there must be close co-operation between Commonwealth and States in the translation of the goals which are subjective to defined objectives towards which research and planning must be directed.

In November 1975 these matters were considered by a number of working panels representing all disciplines at the conference "Metropolitan Transport - the Way Ahead" which was organised by the Institution of Engineers, Australia, with the co-operation of the Royal Australian Planning Institute, the Economics Society of Australia and New Zealand and the Sociological Association of Australia and New Zealand. The consensus of opinion was that, for the foreseeable future, the limited resources available to transport would permit only incremental amendment, modification and extension to existing systems.[3]

It is suggested that within the above context research and planning resources in Australia need to be focussed to optimising present systems, to developing improved management structures and increasing efficiency of existing systems; we need to ensure proper consideration of alternatives and above all to ensure that R & P resources are wisely used for, in the present economic climate, they are bound to suffer from financial cut backs.

Evolution of Transport Research & Planning in Australia

Research into transport is not new - fundamental to the development of each mode of transport has been research, development, investigation and planning. What has emerged in the relatively recent past is the need for across the board consideration of the role of transport in moving people and material and the need for this to be economic, convenient, efficient and environmentally acceptable within available resources: in the skills and disciplines required for effective R & P new branches of science including sociologists, economists and environmentalists often tend to assume equal or greater significance than the technologists. The recognition that land use and transport systems are inseparable in considerations of urban development adds further dimensions to the field which must be covered by transport R & P.

In Australia there has been little to challenge the motor car as a means of transport so that it is not surprising to find that in 1960 the State Road Authorities established the Australian Road Research Board (ARRB) and to thus take a first step in establishing an institutional element in road research.

The broad terms of road research to be undertaken by ARRB include:[4]

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"the undertaking of road research into road planning, location, design, safety, materials, construction maintenance, structures, equipment, traffic, transport economics, financing, management, accounting and any other matters affecting the provision upkeep, use protection and development of roads".

These exceptionally broad terms allow ARRB a freedom to research all aspects of roads and the ARRB programs are developed in close association with the National Association of Australian State Road Authorities (NAASRA). In effect the existence of ARRB, its program and close association with NAASRA serves to emphasise the lack of a similar institution associated with rail transport in Australia.

Direct Commonwealth aid for road research began when, under the Commonwealth Aid Roads Act 1964, provision was made for grants to cover research and planning associated with the roads program. Specific approval of Research and Planning projects was not required under that Act.

The establishment of the Commonwealth Bureau of Roads (BOR) in 1965[5] (following legislative action of 1964) provided a second institutional body with R & P capability. Although this initiative was again limited to roads and road transport the establishment of BOR emphasised the need to identify national objectives and to plan and implement future road systems to meet these objectives.

The Commonwealth Aid Roads Act 1969 introduced an arrangement whereby approved research and planning projects on roads were assisted by direct Australian grant at an approximate level of $3m p.a. over the period 1969/70 to 1973/74

inclusive. No conditions for this assistance were imposed other than that the projects be approved by the Commonwealth Minister for Transport.

The Bureau of Transport Economics (BTE), (6) which began operations in 1971, is at the moment the only institutional research agency in Australia with R & P capability and responsibilities which embrace all transport modes. The prime role of BTE is to undertake research programs which assist in formulating Commonwealth policy on transport systems, efficiency, costs and the rationalisation of future transport facilities.

The Urban Public Transport (Research and Planning) Act 1974 introduced assistance to approved projects in UPT for which $1m was available in 1973/74. For the first time conditions required that the expenditure by the State be certified against each approved project and that, at the completion of the project, a comprehensive report be provided.

Transport (Planning and Research) Act 1974

Under the Transport (Planning and Research) Act 1974 $26m for assistance on a 2 to 1 basis for projects by way of research on roads and urban public transport is provided in the triennium 1974/75 to 1976/77. Projects submitted by the States are subject to approval by the Minister for Transport, and certification of expenditure and the provision of a comprehensive report on the completion of the project are conditions of assistance under the Act.

The objectives of the Act may be summarised as promoting an integrated approach to R & P for transport development, to encourage new initiatives, to make results generally available to others, to identify and where possible avoid duplication and to ensure that proper consideration of alter-

native options precedes major investment proposals.

In the first year of the program some 275 projects incurring a total cost of $8.4m were assisted and approvals in 1975/76 have been given for projects at an estimated total cost of $15.5m.

A significant factor of the program under this Act is that the State Governments must assemble and submit their programs and allocate priorities to the individual projects in the program. This requirement has resulted in the need for each State to develop an integrated approach in relation to management and allocation of its own R & P resources between the transport modes.

An advantage to State Authorities will also flow from the Commonwealth requirement that a report be provided on completion of the project - although this is yet to be realised it should provide a significant aid to management.

Commonwealth assistance to encourage and support continuing transport R & P as outlined above appears necessary if a co-ordinated program is to be achieved. Cogent reasons of national economy and efficient utilisation of resources make this desirable.

Effectiveness of Transport (Planning & Research) Act 1974

Advantages and progress in terms of R & P identification and management have already been mentioned. There are significant shortcomings to the program as it has existed in 1974/75 and 1975/76 which stem mainly from the requirement for the States to submit individual 'projects', so that the inter-relationship of the projects within a State program and the phasing of the projects is often obscure. Analysis of

the approved program has been limited to noting the emphasis given to various elements of the program in terms of estimated cost and relative allocation of resources.

Steps to achieve better co-ordination and communication between the State planning authorities and Department of Transport have been taken and possible improvements in the legislation are being examined.

One important advance under the present Act is the initiation of a reporting system which will provide a brief description of the project, funding details, progress summary and references to reports, publications and data resulting from the project. The publication of this document will provide the first coherent picture of the results of the present R & P program.

As an example of consideration given to programs so far approved the summary presented in Appendix I has been provided by Mr. J.O.C. White of Urban Transport Branch, Department of Transport. The value of such critiques lies in their identification of aspects which could be improved in future programs/arrangements.

Support for other Research Programs - Some Observations on Defence Science and Technology (DST)

An appreciation of advantages which flow from knowing what research resources exist, how they are developed and what they are achieving may be gained by a brief examination of DST which has extensive research resources, a well identified program and an ability to respond to changing National needs.

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Although fundamental differences exist between DST and transport R & P which stem from single Commonwealth Authority in the former case and from shared Commonwealth/States responsibility in the latter the problems of effective R & P management and operation are similar.

The DST includes some twelve establishments which have a total strength of some 7000 of which about 1500 are professionally qualified and a technical support (sub professional) strength of about 2000.

- the continuing DST program is related to the Defence five year rolling program
- for resource allocation and management purposes a unit is taken as a Professional Man Year (PMY) which includes technical and general support. Thus for example one PMY may approximate to $30,000
- the DST program is divided into elements or research areas (e.g. Aeronautics, Communications, Surface to Air Missiles etc.)
- each element includes a level of basic research which is not project oriented and which thus tends to develop as a "centre of specific capability" or "centre of excellence"
- the program of work arises from several sources including military services, policy direction and in-house research
  - : Central Office staff role is co-ordination, determining allocation of resources to elements, liaison with customers, ensuring proper definition of projects and maintenance of reporting system

: Establishments implement and manage project including allocation of resources available within element

- program balance can be assessed on basis of PMY's allocated to each element
  : allows program management
  : provides perspective of program orientation
  : allows action towards future need
    + in terms of deployed effort
    + in terms of specific training, secondment of officers etc.
    + in terms of facilities planning
- program demands periodic reporting
  : technical achievement against objects and phasing
  : project and program costs
- program support includes
  : computer based information system common to Australian defence community
    + covering overseas information
    + covering Australian reports, publications etc.
  : structure of technical panels in which UK, USA, Canada and NZ co-operate at working level on aspects of common interest
  : catalogue of laboratory, test facilities and instrumentation available to DST in Australia
  : common support such as mathematical services, electronic and optical instrumentation, photographic etc.

. From this brief examination of DST it is possible to note the essential features and support available to Defence R & D.

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1. The relation and balance of the R & D program can be evaluated and related to goals.

2. The R & D resources are known and are dedicated to R & D.

3. The R & D program is defined.

4. The allocation of resources is known.

5. Future needs in manpower, training, education and facilities can be determined and planned.

6. Ready access to relevant current overseas and Australian information is provided.

7. Research facilities and capacilities are indexed and thus available.

8. An effective communication and reporting system between people working in specific areas and with management exists.

It is suggested that these features may be taken as a pattern of requirements to establish and sustain an effective transport R & P capability. Whilst some of these exist in embryo we must initiate action to establish others.

Co-ordination of Transport R & P in Australia

The problem of determining orientation of a program, of assessing priorities for the future and of resources necessary in transport R & P in Australia is complex. Whereas, in the Defence Science and Technology program, an overview of these aspects is the responsibility of a single central structure headed by the Chief Defence Scientist no such single authoritarian post exists in transport R & P. In the case of

Transport R & P the program responsibility is dependent on close effective co-ordination between Commonwealth and State departments and instrumentalities. There is no room for the dictatorial role and means must be found to develop an effective structure to overview the total program, to review the allocation of resources, to assess R & P needs for the future and to advise on educational and training needs of the transport R & P for the future.

On the roads side NAASRA and ARRB and their various sub-committees provide a medium for the desired co-ordination. Other modes of transport do not have the benefit of an organisation such as NAASRA in which R & P is recognised as an essential element of total program nor do they have an institution such as ARRB devoted to their needs; some movement towards similar recognition of the need for research is discernable in rail transport and future arrangements for assisting land transport R & P may cover this aspect.

At the State level the various public transport planning authorities endeavour to develop programs which consider all modes and are related to future needs in transport systems. The existence of a co-ordinating authority responsible for maintenance of a continuous overview of transport research and planning on a national scale would greatly aid these State functions.

Such a committee should include Commonwealth and State representation, and be representative of all modes. It would review resources allocation, determine the future needs of transport planning and research and would advise Commonwealth and State authorities.

It is suggested that a Transport Research Advisory

Committee could best be established as a Technical Committee reporting to the Australian Transport Advisory Council (ATAC).

Transport Research Resources in Australia

Apart from research and planning on roads and UPT as assisted under the Transport (Planning and Research) Act 1974 there is a need to identify other R & P work not assisted directly by the Commonwealth.

Included in this is work within other Commonwealth and State Departments and institutions, universities and tertiary institutions and in-house work within State road and traffic authorities.

It is inevitable that within authorities concerned with all modes of transport there will be work concerned with scheduling, operations analysis, system optimisation, maintenance routines, examination of performance and efficiency etc. Although these may not be recognised directly as R & P they represent part of the total Australian R & P resources which are devoted to transport. The lack of recognition inhibits effective communication with workers in similar fields and thus they are denied a fundamental aid to effectiveness.

In the broader context of research in Australia there are significant resources with direct interest, involvement and/or applicability to transport R & P which at this time are not widely recognised as such. Here in particular may be listed the several Divisions of CSIRO which have direct or implied relevance to transport, Bureau of Mineral Resources, the Division of National Mapping and those areas of expertise, unique in Australia, which exist within establishments of the Defence Science and Technology Organisation (DST).

Identification of Present Research Projects

There appear two worthwhile reviews of R & P activity in Australia. On the roads side ARRB prepare a tri-annual input to the International Road Federation index for subsequent publication by that body. In fulfilling this task ARRB cover all SRA's and institutions and commission a senior officer to make personal approach to Australian tertiary institutions which are known to be involved in relevant work. At this time the assessment does not appear to include determination of resources available but is confined to determining R & P work in progress.

A survey of current R & P in transportation has also been initiated by the National Committee on Transportation within the Institution of Engineers, Australia[7]. The survey in 1974 was also successful in identifying projects in Government Departments and institutions which, whilst not specifically oriented to transport, did provide data on demands to be expected. The survey was dependent on the identification of transportation related investigation and research in response to a questionnaire circulated by the Institution and, as in any such survey, the significance of a return is dependent on the co-operation, interpretation and judgement of the responding bodies. The 1974 Survey does not represent a comprehensive survey but this is recognised and improvement is anticipated[8].

A third source of information on transport R & P will become available when details of the program assisted by the Commonwealth under the Transport (Planning and Research) Act 1974 are published. There will inevitably be duplication of many of the projects listed by ARRB, IE(A) Committee on Transportation and those under the Act and close examination will be necessary to arrive at a composite program.

There can be little confidence that the above surveys will identify all transport-related R & P current in Australia. Certainly no identification of the extent of resources (professional manpower or facilities) available for R & P is attempted or in fact is there any agreed basis for such assessment. A final observation could be made on the extent and capability of consultancy resources available in Australia. Here for obvious reasons capability is related to selling power and quantification poses problems.

What are our Future Needs in R & P?

If we are to plan for the future there is firstly the need to orient the program to goals and objectives[2][3]. We must know what we are doing and, for the present, the above surveys provide a large part of the answer. We must in some manner assess capability against requirement for resources to meet future projected needs. This, I suggest, would be one of the first tasks of a national transport research and planning committee.

Future Requirements for Manpower, Education and Training

The task of quantifying human resources to match the R & P requirements is one we may well approach with caution. There is a continual voicing of "insufficient people with inappropriate training" and several surveys of tertiary training in Australia have been made[9]. Hidden in this is an attendent problem - the willingness of tertiary institutions to establish new schools and courses to meet the need - which in a relatively short span results in a multiplicity of such centres and an oversupply of variously trained professionals. The result may well be a disservice to transport interests as has occurred in other areas of technology when supply overreaches demand. Against this, the apparent dearth of appropriately trained

manpower is likely to take many years to overcome.

It is probable that there is no necessity to institute further extensive reviews to establish requirements: these have been carried out in U.K. at two levels - the Sharp Committee at the sub-professional level[10] and the Science Research Council at the Professional level[11]. Elsewhere similar reviews have been made. In U.K. a solution was chosen in which centres of concentration were nominated for specific branches of transport:

Leeds University - Transport Planning
Newcastle University - Public Transport Operations
Liverpool University - Maritime Transport
Cranfield/Loughborough - Transport Technology

In addition the Department of Environment funds a multi-disciplinary transport school at Bristol University.

In any future solution to meet transport requirements in Australia a similar solution to U.K. would appear desirable; the task and finances available in Australia are of a lesser order than U.K. and the nomination of possibly two "centres of learning" to meet specific requirements in the transport community would appear adequate.

This total problem is again appropriate to a combined Commonwealth/State examination as would be possible by a Transport Research Advisory Committee.

There is a need to promote interest and involvement in the many facets of transportation research. This is largely in the hands of the State authorities who sponsor such work. The Australian Road Research Board sponsors a research grants

scheme for projects compatible with the objects of ARRB[12]. This scheme is similar to research grants arrangements under the Electrical Research Board and Radio Research Board of CSIRO in which grants provide a stimulus to innovation and initiative. A case clearly exists for a grants scheme covering other transport modes than the ARRB research grants.

Information Systems

There is no justification today for initiating research without knowledge of relevant current work and findings elsewhere in the world. The search and storage capabilities offered by modern computer systems provide a valuable tool for information storage and retrieval and it is inexcusable that no transport information system exists in Australia.

There are at this time a number of computer based information systems available in Australia which directly support research fields other than transport. These include those managed by CSIRO, the Department of Industry and Commerce, the National Library of Australia (NLA) and Department of Defence. In many of these the ANSTEL system provided by NLA plays an essential part by allowing access to the base documents once they are identified[13].

From the research viewpoint two services exist - a regular print out to a profile matching the needs of a particular customer and a retrospective search capability. Neither of these are presently availalbe to transport R & P workers in Australia but steps are in hand to establish them.

Australian participation in the Organisation for Economic Co-operation and Development (OECD) program of Co-operation in Road Research has been sought. This program has two parts:

- the International Road Documentation Sub-Program (IRRD)
- the Road Research Sub-Program.

Participation in the program will automatically confer on Australia rights to the International Road Research Documentation (IRRD) tapes which index research documentation of all participating countries and require, in return, an input covering Australian information. On the initiative of Country Roads Board of Victoria, NAASRA and ARRB the development of an information service on road research based on IRRD tapes is at present in hand.

From a national viewpoint, however, the establishment of an information service serving all modes is essential and an examination of options for this is currently in progress.

Associated with an information service is the need to publicise its availability to all levels of the transport community and especially those involved in R & P. If the apostles of this system are able to spread the word effectively the usage of the system may provide a significant aid to the identification of more obscure R & P activities.

Advantages of International Involvement

The contribution to R & P which flows from contact with those involved in appropriate fields in other countries is well recognised. Overseas visits and attendance at symposia and conferences provide contact and opportunity for exchange of knowledge. However, in many cases one suspects that due to economic consideration, to the elevated status of visitors and to the limited time available, the value of discussion is limited to the upper echelons in Australian R & P community.

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With Australian participation in the OECD program on road research new avenues for contact with the overseas R & P research community will be available. Proposals for ensuring proper representation and involvement by Australia are being developed and, in this, the management experience gained from the Technical Co-operation Program (TTCP) in which the Defence R & D communities of UK, USA, Canada, New Zealand and Australia are brought together will be of value.

The TTCP structure[15] consists of a top management overview, sub groups at Senior Principal Scientist level concerned with orientation of programs in specific elements and working panels where those actively working the field meet.

Once we are actively engaged in the OECD program it may be possible to broaden horizons and examine arrangements covering other modes of transport.

Identification of Research Facilities in Australia

So far emphasis has been on human resources available to transport R & P. There may be considerable benefit in indexing facilities and consultative capabilities available to transport R & P so that the location, capabilities and potential at various authorities and institutions can be recognised and publicised. This suggestion is worthy of consideration because of the impact it may have in determining "centres of capability" and efficiencies which may flow from it.

An example of information on defence oriented facilities and consultative capabilities is given in Appendix 2.

Communications and Reporting

Information is the fundamental substance of research: it leads from recognition of a problem, through definition to solution and, in the end, the result of research is information. Communication is the transfer of information and it can be contended that the effectiveness of research is directly proportional to the effectiveness of the communication concerned with it.

This rather philosophical approach merely restates a problem common to our experience: in any program of work there is a requirement for information in varying degree depending on the use to which it is to be put - program management, project funding submission, monitoring, technical progress, etc.

In Australia conferences and symposia form one effective line of communication[1] and a most significant feature of such meetings is that they draw together those interested in particular aspects of R & P.

A further need is for a common and effective reporting system which informs those at varying levels of project objectives, progress, cost and of information obtained in the project.

The program of R & P which is assisted under the Transport (Planning and Research) Act 1974 contains the most extensive part of the Australian program and mention has already been made of arrangements which are in hand to provide summary reports of progress on projects assisted under the Act.

Details to be included will provide reference to

both published and unpublished data and information obtained in the project. This channel of reporting may provide an example of documentation which could prove useful to those concerned with projects funded by other means including State authorities. The adoption of similar methods of reporting could thus lead to a wider and more effective reporting system.

Involvement in IRF requires that roads projects be reported in a format determined by the Federation whilst IRRD also has an established and compatible reporting procedure. In the interests of economy some rationalisation of reporting procedures may be necessary but in the first instance the discipline of reporting must be established.

Need for Research in Rail Transport

There is reason for concern that at present there is imbalance in transport R & P. Little emphasis is given to R & P associated with rail either in its relation to other modes or to improvements which may be possible in vehicle, way or application.

It is possible that legislation similar to Transport (Planning and Research) Act 1974 could include asistance to rail research and planning by the States other than for urban transport but, in view of the considerable responsibilities now held by the Australian National Railways, other solutions may be necessary.

The establishment of a research capability concentrating on rail transport and complementary to the role of the Australian Road Research Board would meet this need in the future. It would appear that Commonwealth initiative in developing and maintaining a rail research capability would be justified in the National interest.

Whilst steps towards an institutional approach to rail research must be ruled out in the present economic climate it is contended that Commonwealth initiative could lead to focussing existing research resources on immediate problems. Benefit would flow from this not only in terms of results of research projects but in developing an awareness and appreciation of the value of research in this area.

Initiatives are already being taken by Department of Transport which could result in a modest but effective program harnessing available resources in CSIRO, ARRB, APO, tertiary institutions and consultants.

Other initiatives towards Co-ordination of Research

Future arrangements for research in the various modes of transport must allow for the benefits that flow from effective communication with those in related research if diseconomies are to be avoided. This implies that co-ordination - the theme of this conference - must apply to all modes including air transport although such considerations are beyond the scope of this paper.

Examination of the present programs under Transport (Planning and Research) Act 1974 indicates the possibility of a number of ways in which the effectiveness of Australian R & P arrangements may be enhanced include:

- the promotion of seminars on specific elements of the program. This could be either at the end of particular studies or during them so that varying methodologies could be examined and possible improvements could be identified;

- ensuring that arrangements for assistance to R & P in the future embrace the considerable input to urban planning represented by ports and terminals including airports;

- an examination of the educational and training needs of the transport R & P community and the projection of this to the future could be undertaken. This could possibly lead to guidance to the tertiary institutions regarding needs to be met in future syllabi;

- the examiantion of resources and skills at present existing in Australia with a view to identifying "centres of capability" which may, in the interests of economy, serve the national R & P community;

- encouragement of arrangements to facilitate exchange of R & P personnel with overseas establishments and authorities;

- the establishment of a research grants scheme for other modes than roads to complement the ARRB arrangements.

Conclusions

A review of transport research and planning in Australia has been made with a view to determining how the effectiveness of available resources might best be enhanced. It is concluded that:

- a single authority is necessary to determine and define priority objectives; to maintain and overview

of programs and resources in relation to objectives; to advise on future manpower levels including educational and training requirements

- it is suggested that this may best be effected by the establishment of a Transport Research Advisory Committee comprising both Commonwealth and State representation and responsible to the Australian Transport Advisory Council.

- The Commonwealth should identify and implement a research program in rail transport using available research resources
  - subsequent action should lead to an institutional approach which is closely aligned to other transport research institutions.

- Section 96 grants to the States under Transport (Planning and Research) Act 1974 have encouraged and identified R & P. Similar arrangements which are broadened to include rail, airports, ports and terminals would appear justified for the future
  - advantages of a co-ordinated R & P program include economies due to reduced duplication, access to the R & P work by other States and benefits flowing from involvement in a national program with proper support
  - from the Commonwealth/State viewpoint program efficiencies through co-ordination may reduce total funding requirements and program orientation may be assessed and guided.

- There is a role for Commonwealth initiative as a source of funding, in the co-ordination of programs

and in sponsoring necessary support of the R & P program

- in the establishment of a multi modal information system servicing the whole transport community including the R & P sector
- in the establishment of effective liaison and reporting systems on the R & P program
- in sponsoring symposia and meetings within the R & P community
- in cataloguing R & P facilities and resources
- in fostering R & P in other modes than those related to roads
- in servicing a Transport Research Advisory Committee

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APPENDIX 1

Some thoughts on the effectiveness of the Transport (Planning and Research) Act 1974 in promoting research in Urban Public Transport.

J.O.C. White BE, BA, MIE Aust.

The following notes cover:

1. An interpretation of what is going on
2. What areas of research should we be moving towards.

. . . . . .

1. Interpretation of Current Situation

Within the urban transport field, there has been considerable change over the last few years, and particularly since the introduction of the Transport (Planning and Research) Act. Prior to that time, advances in urban transport planning were relatively haphazard; they were mostly associated with metropolitan transportation study activities. These studies represented a first attempt to undertake multi-modal analysis of urban transport; they were relatively unsophisticated in terms of consideration of transport policy alternatives and in other respects. Subsequent work has been more satisfactorily based in the realities of the existing infrastructure, likely finance availability, and shorter term needs.

Since the Transport (Planning and Research) Act 1974 was introduced, it has been possible to gain some insights into overall activities within urban transport planning field. This has provided opportunities for analysis of the current situation and for interpretations to be drawn about where improvements could be made in current activities.

A few examples of current deficiencies in approaches to transport planning are in:

- the structure of studies. The majority of studies continue to be ones dealing only with single transport modes. The descriptions provided of studies submitted for Transport (Planning and Research) funds in 75/76 seldom made reference to co-ordinated multi-modal planning; even fewer studies were sufficiently broad in scope to encompass land use/development considerations. One consistent omission was any attempt to relate road provision, or public transport improvement proposals to parking (availability/controls), despite overseas and local experience pointing to the importance of parking as an integral factor in transport planning analysis and transport system performance.

The consequence of unco-ordinated or narrowly based planning is likely to be unco-ordinated or inferior development, and the above deficiencies in the structure of studies undertaken must be viewed with some concern for this reason.

- Planning methodologies. No information was made available on methodologies to be used in undertaking the studies submitted for funding. Most often the actual methodology would be developed in the course of the study.

  It is quite likely that the majority of studies will be undertaken on the assumption of existing travel patterns and behaviour being continued into the medium (10 year) or long term (15-20 years) future. Unfortunately transport policy has not in the past remained unchanged over such periods, and is not likely to in the future. Recent developments in London, for example (restrictive parking controls in the CBD), and in Singapore (supplementary licencing for travel into the CBD) represent major policy changes which have had very great influence on metropolitan travel patterns, temporal distribution, and usage of respective modes.

  Such policy changes are not unlikely here. As well, social changes, such as in the incidence of staggered working hours, are likely to invalidate evaluations using 'standard' methodologies. For many projects, new methodologies should be developed which evaluate the project realistically under possible alternative transport policies, and indicate the robustness of the project's justification to such variations. A step has been taken in this direction in the recent study of public transport alternatives for Canberra. (1)

- Planning study assumptions and base data. Every study undertaken makes assumptions about some critical factors (demand, cost, finance availability, union acceptance etc). The success of the study depends on the appropriateness of these assumptions and on the 'variation testing' undertaken. Such testing must cover the effect of variations from these assumptions where changes occur in combination as well as singly, thus establishing the robustness of the solution.

  Although project descriptions included no details of the assumptions and base data to be used, it is reasonable to expect, on the basis of previous studies, that the base data used in one study will sometimes be in conflict with that used in a complementary study, and that no comprehensive variation testing will be undertaken. In the past base data conflicts have been most common in the population projection, mode split and travel value areas. In the current climate, assumptions regarding unit construction costs are likely to be very inaccurate, and project justifications, heavily dependent on such assumptions, will

therefore be quite often uncertain.

As suggested above, these are a few examples of deficiencies in current approaches, and they suggest improvements that can be made to current transport planning initiatives.

2. New Initiatives in Transport Planning/Research Activities

Consideration of the list of approved 1975/76 Transport (Planning and Research) projects, recent transport developments in Australia, and overseas initiatives suggests several areas of transport research and planning which could quite profitably be pursued to gain advances in the field. Examples in areas of planning are given below:

- Efficiency

  There are many areas where resources are currently being wasted through inefficiencies in urban transport systems planning.
  Prime examples are:

  - specification of objectives. Many authorities are operating without their objectives being clear or consistent. Considerable advantage could be gained by developing clear and understandable objectives, such as the published "corporate aim" of London Transport.(2)
  - transport pricing. Transport in Australian cities is generally considered to be under-priced. Such under-pricing has led to wastage of resources through over utilisation of the elements of the system, encouraged the spread of the cities, and due to existing demand-based forecasts of transport needs, led to overinvestment in transport infrastructure to certain areas (such as CBD's). Non-discriminatory pricing has resulted in relative disadvantage being imposed on certain groups (e.g. off peak public transport users).
  - fare collection. It is likely that introduction of automatic ticketing into urban public transport systems would considerably improve their cost effectiveness.
  - traffic control. Operational efficiency depends in part on satisfactory control of traffic in critical areas. Metropolitan wide parking policies (relating especially to CBD's and sub metropolitan centres) and inter-related parking pricing controls would enhance operational efficiency. Separation of pedestrians from other traffic through more widespread pedestrianisation of high activity areas within city and sub metropolitan centres could also be considered.

- Equity

  Initiatives aimed at efficiency improvements may well have adverse equity effects. Very little resources seem to have been devoted to studies aimed at improving the situation facing those disadvantaged by urban development processes. In this context, greater consideration could be given to:

  : housing location policies have regard for transport services. Low cost housing is most effective in reducing disadvantage when it is located in areas of high transport accessibility (to appropriate employment, retail, educational and social service facilities). There is evidence to suggest low cost housing in other places is likely to develop or perpetuate slums and maintain previous levels of disadvantage

  : travel subsidies. Rather than provide the rapidly escalating subsidies currently required for urban public transport services, it would be more efficient and equitable to subsidise only those who need to be subsidised and to have others pay full costs (or nearly so) of their travel. Subsidies in this case could take the form of direct assistance to those in need, or subsidy of fares to low income employment centres, or on routes known to be used predominantly by low income travellers etc.

- House bound people. Few studies refer directly to the needs of people "housebound" in the suburbs, who do not have access to private transport. In this context, it would seem worthwhile studying the possibility of community based solutions to local public transport problems, which could be the most effective means of overcoming disadvantage to housebound people.

- Research areas. Many deficiencies in methodologies used in urban transport planning are well known and quite critical, yet no co-ordinated research is being undertaken of these areas. Examples are:

  - land use/transport interaction
  - methods of assessing externalities in transport evaluations.
  - consideration of the overall costs and benefits of urban development (including transport and other services) at different feasible development densities in land use and transport strategy work.
  - operating costs for urban public transport services. No reliable information is available on average and marginal peak/off peak operating costs for urban public transport services. This means the information is not available which would allow informed decisions to be made on extension or curtailment of services, or re-

placement of an existing service with a more satisfactory one.

- demand elasticities with respect to fare, service, income etc. Once again, the availability of this information for each urban public transport service (bus, rail, tram) is essential if informed decisions are to be made.
- economic base effects. A greater understanding is required of the effects of transport and land use developments (e.g. road improvements or centralisation of employment) on the economic base, and hence overall wealth, of the metropolitan region.

These are some of the more significant areas where research needs to be undertaken to improve the quality of transport planning methodologies, and where new initiatives are required to promote more co-ordinated and credible transport plans.

Appendix 2

Sheet 1

TYPICAL CATALOGUE OF DST FACILITIES

Equipment and Maker	Type or Model	Technical Details and Application	Laboratory	Officer/s for Contact	Phone No. /Ext
ENVIRONMENTAL TESTING (Continued)					
Chamber, climatic cycling (Tonna)		Dimensions 2 x 2 x 3 m. Temp range 20 to 75°C. Relative humidity to 95% max.	ADE	L. H. Winter N. Webb	317-9001/180 317-9001/251
Chamber, climatic cycling (Montford, UK)		Dimensions 900 x 900 x 900 mm. Temp range 20 to 73 °C Relative humidity range at 20°C, 50 to 95% at 75°C, 5 to 95% Suitable for testing explosives to ISAT A and B cycles.	ADE	L. H. Winter N. Webb	317-9001/180 317-9001/251
Chamber, climatic portable (NIC)	1/94-40-1	Dimensions 580 x 530 mm dia Temp range -73 to +177 °C. In danger area for explosives and explosive components.	MRL-VIC	S. Thomas O. L. Fallinfaw	31-7222/345 31-7222/1109
Chamber cold	Rex	For use with vibration exciter. Dimensions 1450 x 450 x 300 mm. Min temp -40°C. In danger area for explosives and explosive components.	MRL-VIC	S. Thomas O. L. Fallinfaw	31-7222/345 31-7222/1109
Chamber, cold		Dimension 2400 x 900 x 900 mm Min temp -50°C. In danger area for explosives and explosive components	MRL-VIC	S. Thomas O. L. Fallinfaw	31-7222/345 31-7222/1109
Chamber conditioning		Dimensions 2 x 2.7 x 2 m Temp range -20 to +65°C.	EFM	J. F. Pisani	31-7222/1359
Chamber, corrosion testing		Salt, acid and alkaline. Meets the requirements of DEF 133.	WRE	G. V. Hart	259-9111/454
Chamber damp heat	Eight Off	Dimensions 2.5 x 4 x 4.2 m. Dimensions from 660 x 680 x 600 mm to 2 x 1.9 x 2 m Temps ranging from 0 to 70°C.	ADE	E. A. Talbot	317-9001/133
Chamber, decompression		For engine altitude tests. Capacity 180 kW at 3 km. 90 kW at 3.6 km	ADE	L. H. Winter N. Webb	317-9001/180 317-9001/251
Chamber, deep freeze (Cincinnatti Werner)		Dimensions (i) 1000 x 500 x 600 mm (ii) 380 x 430 x 400 mm. Temp range -62 and -90 to 0°C	GAF	B. R. Bernau	64-0661/443
Chamber, driving rain (Production Eqpt.)		1 to 8 shower heads confirming to spec DEF 133. Pressure 550 kPa max. Rotating table 0.07 r/s	ADE	E. A. Talbot	317-9001/133
Chamber, driving rain		Dimensions 2.5 x 4 x 4.2 m Pressure 480 kPa max. Nozzle volume 130 ml/s.	WRE	G. V. Hart	259-9111/454
Chamber, dry heat	Twelve Off	Dimensions from 430 x 400 x 450 mm to 2 x 1.9 x 2 m. Temps ranging to 250 °C max.	ADE	E. A. Talbot	317-9001/133
Chamber, dry heat	Six Off	Dimensions from 380 x 380 x 430 mm to 610 x 610 x 610 mm. Temp ranges ambient to 300°C	GAF	B. R. Bernau	64-0661/443
Chamber dry heat	Three Off	Dimensions 1.5 x 1.5 x 2 m. Temp 75°C max. In danger area for explosives and explosive components.	MRL-VIC	S. Thomas O. L. Fallinfaw	31-7222/345 31-7222/1109

Appendix 2

Sheet 2

TYPICAL LISTING OF CONSULTATIVE CAPABILITIES IN DST

Scientific Field	Subject	Laboratory	Officer's for Contact	Phone No / Ext
ACOUSTICS	Acoustic and sound field measurement.	MRL-VIC	D. J. Pinson J. S. Howe	31-7222/1057 31-7222/276
		RANRL	W F Hunter I S Jones	32-2211 32-2211
	Acoustic and sound level measurement.	2AQAU -MFF	P. Hamstead	623-0171
		3AQAU	R W Tawton	31-7222/1317
		ISL-NSW	R Tanner G Lucas	667-0522/235 2-0959/156
		ISL-VIC	D C Smith	31-7222/1861
		WRE	G V Hart	259-9111/454
	Acoustic emission	ARL	I G Scott	64-0251/663
	Acoustic measurement.	GAF	B Bernau	64-0661/443
	Hydrophone calibration	RANRL	W F Hunter I S Jones	32-2211 32-2211
		WRE	J J Bagley	259-9111/5104
	Seismic detection and measurement systems.	WRE	C N Gerrard	259-9111/5402
	Sonic boom.	ARL	A S. Kaye N. W. Page	64-0251/674 64-0251/674
	Steady state and impulse sound measurement and analysis.	ADE	L H Winter	317-9001/180
	Underwater acoustic measurement	RANRL	W F Hunter I S Jones	32-2211 32-2211
		WRE	H A d'Assumpcao	259-9111/5313
	Vibration spectrum measurement.	GAF	B Bernau	64-0661/443
		RANRL	W F Hunter I S Jones	32-2211 32-2211
		WRE	G V Hart	259-9111/454
AERODYNAMICS	Acoustic holography.	ARL	A J. Farrell	64-0251/613
	Aerodynamic heating.	WRE	L. M. Sheppard G Jepps	259-9111/6719 259-9111/825
	Aircraft flight simulations.	WRE	K. D. Thomson	259-9111/744