

Transfund News

A monthly newsletter published by Transfund New Zealand

February 2000 Issue 19

Benefit values under review

Transfund is about to commence the consultation stage of its review of the benefit values used for evaluating funding proposals for roading — and alternatives to roading — projects.

The objective of the review is to ensure that the values of those benefits being measured in project evaluations will lead to a pattern of investment which more fully reflects user preferences, and optimises Transfund's mission of funding a safe and efficient roading system. Stage 1 of the review is due for completion in June, and will establish the theoretical framework, appropriate research methods and a programme to determine the benefit values and priorities that road users need and want.

Seeking feedback

A key component of Stage 1 involves consultation meetings throughout New Zealand with road controlling authorities, regional councils, district officers of the Automobile Association and Road Transport Forum members, in order to get general feedback on road user needs and preferences. This will provide input to the design of Stage 2.

The consultation meetings with road controlling authorities and regional councils will be held at the venues listed below.

Participants at the meetings will be asked for their views on those benefit categories that

should be included in Transfund's evaluation procedures, those that are currently omitted, and the importance and priority ranking of these benefits.

Workshop findings

Prior to the current stage, in September, a preliminary workshop was held at which project evaluation practitioners and industry experts identified and prioritised an initial list of benefit categories they believed should be included in Transfund's procedures.

The workshop considered the adequacy of the values for those benefits currently covered including time benefits, vehicle operating costs, accident savings, intangibles such as environmental factors, and non-market benefits such as reduced driver frustration.

The workshop also identified benefit types that are not currently included in the PEM. These include perceptions of safety, such as facing high-speed oncoming traffic, and levels of service that road users desire, e.g. the additional level of service gained if a road has fewer, or gentler, bends.

Expert panel

Following the workshop an expert panel, assembled by Transfund to lead the project, met to consider

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Location	Date	Venue	Time
Wellington (Lower Hutt)	11 Feb	Angus Inn, Lower Hutt	9.00 am
Napier	14 Feb	War Memorial Conference Centre	12.00 noon
Wanganui	15 Feb	Avenue Motor Inn	9.00 am
Hamilton	18 Feb	Alcamo Motel	12.00 noon
Christchurch	21 Feb	Airport Plaza Hotel	12.00 noon
Dunedin	22 Feb	Southern Cross Hotel	12.00 noon
Auckland	28 Feb	Copthorne Harbour City Hotel	10.30 am

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the workshop findings and develop the research methodology for the project. The panel, chaired by Nick Allison of Transfund, comprises experts in transport modelling, transport economics, market

research, and valuation analysis, and includes support from Australian experts. The panel has confirmed that the willingness-to-pay approach is the correct theoretical basis for valuing user benefits within the cost/benefit analysis

framework, and has verified the extent of the research and survey programme required for Stage 2 of the review, scheduled for completion by June 200 1.

*Transfund contact: Ian Melsom,
direct dial 04 495-3266*

Widespread road damage in Otago storms

Extensive damage was caused to roads in the Queenstown Lakes District during the November storms that left Queenstown and Wanaka severely flooded. Applications received for emergency funding by Transfund amount to over \$9 million, most of which will be spent in the current financial year.

Between 9am on November 14 and 9am on November 18, 409 mm of rain fell at the head of Lake Wakatipu and 3 14 mm at the head of Lake Wanaka.

At one stage during the event all roads to Queenstown were cut off by slips and flooding. The heavy rain triggered two slips above Frankton Road (State highway 6A), one at an "ancient" slip site that led to 40 houses being evacuated. Police closed the State highway at Frankton and all traffic had to detour via the Arrowtown-Queenstown road.

Crown Range Road

Particularly badly affected was the Crown Range Road, which had been almost ready for sealing. Months of preparation work was washed away as the Cardrona River cut a new path down the Cardrona Valley. At the Wanaka end of the Crown Range Road a 1.3 kilometre long section of road was completely destroyed by the river.

State Highway 6 was closed near Makarora when a large gabion wall collapsed, causing the road to slump into a gully. The only method of repair available was to construct a 58-metre Bailey bridge over the

section where the road used to be. Engineers have suggested that a permanent bridge will be necessary at this site.

Glenorchy was also isolated by damage to the Special Purpose road that serves the community. At one site, now known as Earthquake Slip, a massive slip destroyed 600 metres of road and left the site looking as though it had been hit by an earthquake. Queenstown Lakes District Council engineers are continuing to monitor the site before determining what remedial action will be taken.

Transfund Southern Region manager Neil Bennett and his staff have been working closely with all affected road controlling authorities, in order to facilitate the speedy reinstatement of nonnal road services in the Otago and Southland regions.

Transfund contact: Neil Bennett phone 03 341-6012



Above: This Bailey bridge on SH6 near Makarora was the only way of repairing the road when it dropped into a gully.



A massive slip on the road to Glenorchy caused this earthquake-like damage.

CPP workshops

As reported in the December issue of Transfund News, as the next stage in the process to improve consistent application of the competitive pricing procedures (CPP), Transfund is arranging a series of workshops for RCAs, consultants and contractors.

On behalf of Transfund the NZ Institute of Highway Technology (NZIHT) has now finalised details of these workshops, to be titled "CPP Tender & Evaluation Procedures". Content has been compiled by the CPP Industry Working Group and is aimed at improving practices for administering tenders using CPP

The two-day workshops will cover all aspects of the CPP tendering process including:

- the Request for Tender
- the different forms of CPP available
- advice on the submission of attributes
- the principles of tender evaluation
- project performance reports.

The workshops will begin with an overview (on Day 1) of all the issues to be dealt with, followed on Day 2 (optional) by a closer study of the more practical details.

Presenters will include representatives from Transfund Transit NZ, contractors and consultants. Dates and locations are as follows:

Wellington	21-22 March
Wanganui	23-24 March
Auckland (Airport)	27-28 March
Auckland (N. Shore)	29-30 March
Hamilton	4-5 April
Napier	6-7 April
Dunedin	11-12 April
Christchurch	13-14 April

To obtain further course information or a registration form (if you have not already received one) contact Lynette Walsh at the NZIHT - Box 4273 New Plymouth, phone: 06 759-7056, fax: 06 759-7066, email: admin@nziht.co.nz

*Transfund contact: Alex Gray,
direct dial 04 495-3265*

Major Projects Review+ heralds key 'changes

Transfund will shortly undertake wider discussion with the roading industry, having briefed the new Minister of Transport, the Hon Mark Gosche, on the key findings of the Major Projects Review. The recommendations were reported to the Transfund Board and Transit Authority – along with several key national industry organisations – last December.

If implemented, these recommendations will have a significant impact on the development and delivery of road construction projects, as well as on the way Transfund conducts its business with road controlling authorities.

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Talking Points

Transfund places a strong emphasis on consultations with industry stakeholders in all matters affecting its funding policies. Some of the policy initiatives on which we're currently consulting are:

Issue	Parties invoked	Timing	Transfund Contact
Review of benefit parameters used in Transfund's project evaluation procedures	RCAs, RCs, AA, Road Transport Forum, MoT	Consultation meetings being held around NZ in February	Ian Melsom 04 495-3266
Consultation on the findings from the Review of Major Projects	RCAs, consultants, contractors and other industry groups	February-April	Peter Wright 04-495 3270
Sector outcomes, draft key performance indicators (KPIs) and impacts on NRP agreements	Roading and Passenger Transport working parties	Meeting during February	Alar Treial 04 495-3440
Evaluation procedures for funding of existing passenger transport (PT) services	Technical Working Group (TWG) (RCs, PT operators, MoT, Auckland City Council)	Meets frequently - next meeting March 2000	Jayne Gale 04 495-7604
Passenger transport issues	Passenger Transport Advisory Group (PTAG)	Next meeting 29 or 30 March (to be confirmed)	Glen McGregor 04 495-3262
Funding responsibilities for local road connections to State highways	Manukau City Council and Transit New Zealand	End of February	Chris Olsen 04 495-3260
CPP Training Workshops	RCAs, consultants, contractors	21 March- 14 April in 8 centres nationally	Alex Gray 04 495-3265

NRP Update

New NRP projects to the value of \$2 1.6 million were approved at Transfund's December and January review meetings. The following are the most significant new approvals (full list available on request from NRP manager Murray Riley, direct dial 04 495-3263).

Region	Project name	Project phase	Est. Total Cost (\$000)	1999/2000 Transfund allocation
Auckland	SH1 - Barkers Bridge (bend realignment)	Works	1,316.0	750.0
"	SH1 - Wiri St/Gt South Rd intersection	Works	950.0	900.0
Waikato	Mill St - Tristram St, Hamilton City	Works	919.3	450.5
Hawkes Bay	SH2 - Omahu Rd-York Rd	Works	1,800.0	315.0
Taranaki	SH3 - Mountain / Skeet (realignment)	Works	1,390.0	800.0
"	SH 3 - Okoki North reconstruction	Works	1,800.0	400.0
"	SH 45 - Otakeho realignment	Works	1,300.0	500.0
Manawatu/Wanganui	SH2 - Ngawapurua Bridge North	Works	944.7	500.0
"	SH1 - Sanson-Himatangi (seal widening)	Works	870.0	800.0
"	SH4 - South of Lawrences	Works	2,550.0	600.0
Nelson/Marlborough	SH1 - Sinclair St extension, Blenheim	Works	4,330.0	400.0

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Construction projects of all sizes are likely to be affected not just high value projects.

Transfund is now proceeding to the next stage of the review. This will involve publication of a newsletter detailing the findings and recommendations, and consultation with all affected sectors at a series of industry workshops.

These workshops are planned as follows: Christchurch 28 March; Dunedin 29 March; Wellington 4 April; Auckland 5 April; and Rotorua 6 April. Details of times and venues will be available shortly.

Following this process, key feedback will be reported to the Transfund Board and Transit Authority in May, and final decisions will be taken on the recommendations.

Transfund contact: Peter Wright, direct dial 04 495-3270.

Auckland cycleway to boost safety

At its November NRP review meeting, Transfund approved \$1.42 million for construction of a cycleway from Waterview to the Auckland CBD.

The Waterview-City Cycleway, which is an extension to the existing Te Atatu-Waterview cycleway, will be constructed over the next three years. It will become a key link in the cycle network envisaged under the Auckland City cycle and walking strategy, and will provide a safe route, away from traffic, from the city's Western suburbs to the edge of the central business district.

It will be able to be used by cyclists, walkers, joggers and small wheeled vehicles for commuting or recreation.

The first stage, planned for implementation in the present financial year, will be construction of a route along the south side of the North

Western Motorway, from Carrington Road to St Lukes Road. This route will comprise a cycle/pedestrian path south of the motorway alongside Chamberlain Park Golf Course, connecting to cycle lanes on Carrington Road and the Unitec Campus and Point Chevalier shops, via Sutherland Road.

Future stages will involve additional new sections, combined with existing footpaths upgraded for shared cycle/pedestrian use, and will connect footpaths and residential streets in the Kingsland Valley.

Transfund contact: Ralph Hull, phone 09 529-9936.



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Traffic control at roadwork sites – feedback wanted

Transfund wants all road controlling authorities (RCAs) to use its “*Interim Procedures for the Safety Audit of Traffic Control at Roadwork Sites*” on a regular basis, and to provide feedback on their use of the procedures.

The publication was issued in February 1999, following Transfund’s audit of traffic control at 28 North Island and 31 South Island roadwork sites, which found that most sites were seriously deficient. It provides detailed guidance on setting up an audit, procedures for conducting the audit, and advice on the reporting process and format.

Following publication of the interim procedures, a well-attended series of seminars was held in nine different centres to summarise the main issues arising and to discuss the way forward.

These were followed in September 1999, by a meeting which included representatives of the NZ Police, LTSA, Local Government New Zealand, the OSH service of the Department of Labour, NZ Contractors’ Federation, Transit NZ, and Transfund.

Issues arising from feedback at the seminars were reported and discussed and there was strong support for the initiative taken by Transfund. Transit agreed that in the 1999/2000 construction season it would audit a sample of construction sites on a weekly basis until the site was acceptable, and then monthly thereafter. The NZ Contractors’ Federation also agreed to publicise the audit results.

Remember the objective

Transfund believes it is important for those commissioning audits to keep in mind the key

objective — to make roadwork sites safer for everybody. Only personnel experienced in temporary traffic control should be included on audit teams, and overall impressions, concentrating on the safety principles rather than the fine detail, should be conveyed to the contractors concerned.

If audit team members observe deficient traffic control at a site, it makes sense for them to bring it to the immediate attention of those in charge — as well as reporting it — so that the matter can be rectified promptly in the interests of safety. As roadwork sites are continually changing, it should also be recognised that some deficiencies may exist only for a short while, so that a word of advice on site will be of far more practical value than a report delivered some time later.

While the interim procedures include advice on the composition of audit teams, common sense and practical experience are essential attributes of team members. There could also be merit in a form of ‘peer review’ by inclusion of other industry personnel — such as another contractor — on the audit team.

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RCA's need to get edge-wise

Numerous Transfund safety audits have identified problems associated with road delineation, sometimes concerning the application of edgelines, sometimes the placing and condition of edge marker posts.

An example of good parking shoulder width.



In places where edgelines are applied, confusion often exists as to desirable shoulder widths, in spite of there being clear guidelines as to when and how edgelines should be installed.

of similar sections of road. As a guide, edgelines on rural roads should be applied to routes with a minimum seal width of 6.6 metres and a minimum traffic volume of 750 vehicles per day.

It is also important to note that for rural roads the desirable minimum traffic lane and sealed shoulder widths are selected according to traffic volumes, as described in the Austroads Guide to Geometric Design of Rural Roads (tables 4.1 and 4.2).

In urban areas, shoulder widths of between 1.0 and 2.0 metres should be avoided as they encourage vehicles to park on the shoulder, and subsequently encroach on the traffic lane. The desirable width for a parking shoulder is 2.0 – 2.5 metres (MOTSAM Part II Section 2.1.1).

Edge marker posts

Marker posts are an important means of delineation on rural roads, and there is a very wide range of situations where these are installed. Audits have shown they are often positioned incorrectly, resulting in significant problems on horizontal and vertical curves, and that several high volume roads have a poor standard of delineation, particularly where the older type of posts are still in place.

The non-standard use of edge marker posts to mark roadside hazards — instead of approved hazard markers — has also been noted in many situations.

As with edgelines, determining whether or not edge marker posts are required depends on the traffic volume and road width. This information should be used in conjunction with RTS5 to decide whether marker posts should be installed and to what standard.

MOTSAM Part II, Section 5.05, provides guidelines on the positioning and spacing of edge marker posts. The basic rules for rural local authority roads carrying less than 1500 vehicles per day are:

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Update planned

This year Transfund plans to repeat the safety audits on a sample of sites to see whether there has been any improvement in performance.

“Communication is the key to improvement,” says Dr Ian Appleton, Transfund’s Safety Audit Manager.

“Auditors need to give prompt and practical feedback to contractors — immediately if necessary — and we’d like to receive feedback on how well these procedures are working.”

It is intended to review the interim procedures later this year, with a view to publishing an updated manual.

RCA's, consultants or contractors who do not already have a copy of the interim procedures should contact Dr Appleton on phone 04 495-3271 or email ian.appleton@transfund.govt.nz

Edgelines – why and when?

Edgelines delineate the edge of the traffic lane and, where the shoulder is paved they separate the shoulder from the traffic lane. Guidance on the application of edgelines differs between urban and rural roads, and may be found in the Transit/LTSA Manual of Traffic Signs and Markings (MOTSAM) Part II, Section 2.03.

Comprehensive guidance on the delineation of rural roads may also be found in Transit/LTSA’s Road and Traffic Standard 5 (RTS5).

In general, the need for edgelines on rural roads is based on seal width and traffic volumes, while for urban roads other factors such as kerbside parking and roading hierarchies (as defined in district plans) have to be taken into account.

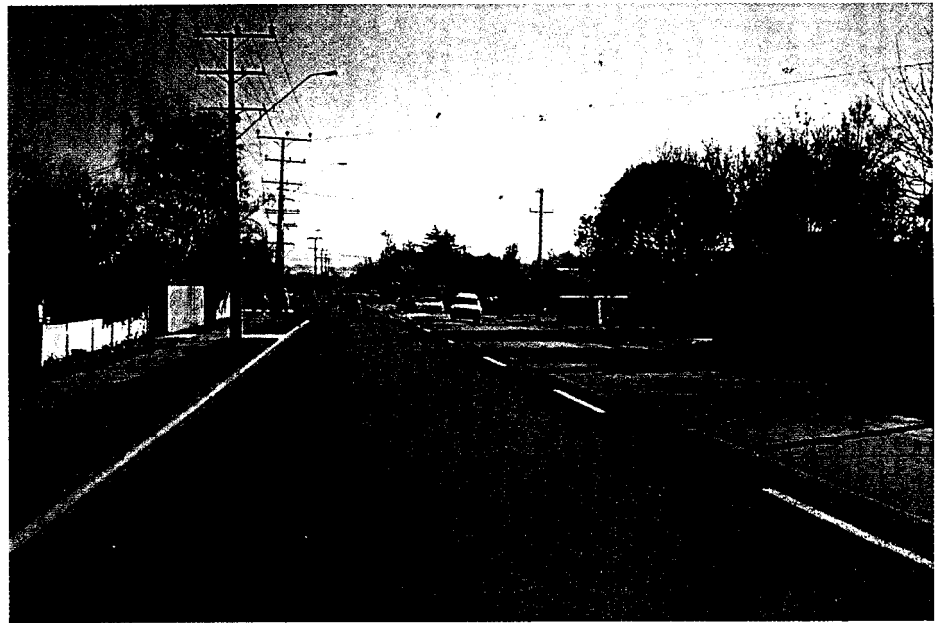
When edgelines are applied, it is desirable that they are applied over the entire length

- on **straight** stretches, edge marker posts should be installed in straight lines on both sides of the road, spaced 100 metres apart
- on **horizontal curves** (bends), one post should be positioned in the driver's line of sight, other posts being spaced off this post, so that the driver can always see three posts. Post spacings depend on the curvature.
- on **vertical curves** (crests and dips), spacing must be reduced so that the top 300 mm of at least three edge marker posts are visible to approaching drivers.

For State highways, and for local rural roads carrying more than 1500 vehicles per day, edge marker post spacing on curves depends on the radius of the curve and is calculated from Tables 5.3 and 5.4 in MOTSAM Part II.

Maintenance

Audits have also shown that maintenance of edge marker posts is frequently to a poor level, mostly



Wide carriageway with no edgelines, which can encourage traffic wander.

arising from the non-replacement of damaged or missing posts.

This was particularly noted during night-time surveys when "holes" appeared in the road delineation where marker post maintenance was lacking.

Based on the results of surveys of existing roads undertaken by Transfund, there are clearly several issues relating to the inconsistent application of delineation standards and guidelines on both urban and rural roads. While some RCAs have identified deficiencies themselves and have programmes in place to address them, Transfund urges all authorities to check the relevant guidelines and ensure their correct and consistent application, in the interests of greater road safety.

Copies of RA98/709S ("Summary Report of Safety Audits of Existing Roads undertaken in 1998 & 1999") may be obtained from Transfund's Safety Audit Manager: Ian Appleton, phone 04 495-3271, email ian.appleton@transfund.govt.nz



Shoulder width is too narrow for parking, but there are no No Stopping lines to restrict vehicles from parking at the kerbside.



An example of poor application of edge marker posts on a horizontal curve.

Student cites dangerous sites

A Dunedin secondary school student, **Jeremy Walthert of John Mcglashan College, could well be headed for a career as a safety audit officer.**

Jeremy recently won no less than four awards at the Otago Regional Science Fair — including the special Millennium Cup from Otago Regional Council — for his study of temporary signs at road works sites, which he concluded were frequently deficient.

He carried out a detailed inspection of a site in his home town, rating it using Transfund's site danger factor — since renamed site hazard rating (SHR) — and studied information and guidelines obtained from the Otago Regional Council and Dunedin City Council.

He also obtained and studied the LTSA's Road Crash Data at Road Works Sites,

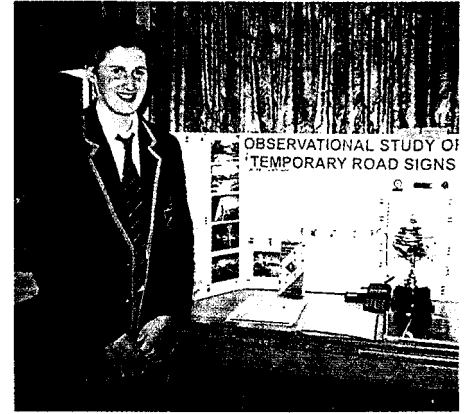
Transit NZ's Working On The Road handbook, Transfund's 1998 Pilot Safety Audit of Traffic Control at Roadwork Sites: Summary Report, and the 1999 Interim Procedures for the Safety Audit of Traffic Control at Work Sites.

Following his analysis of these documents, and his physical inspections, he recommended that:

- road signs should be made smaller, so they are not a hazard to cyclists, and should have reflective strips on the reverse side;
- signs should have better designed stands (or they should be drilled into the pavement), so that they cannot blow over;
- there should be frequent check-ups on sites and temporary signs, with penalties for unsafe sites; and

- that contractors should be educated on road safety.

"Hear, hear!" says Dr Ian Appleton, Transfund's Safety Audit Manager, in congratulating Jeremy on the professional way he tackled his project.



Jeremy Walthert with his award winning project

Transfund investigating safety aspects of buses

In evaluating the benefit/cost ratio (BCR) of Transfund's investment in roading construction projects, a key safety benefit is the potential for accident reduction that could result from undertaking the project. The value of this benefit can be calculated with acceptable accuracy using well-developed formulae.

Valuing the safety benefits of passenger transport services, in which Transfund also invests, involves a different approach. Since public transport is one of the safest modes of travel, it follows that every person travelling on a passenger service reduces the potential for road accidents. Accordingly, the safety benefit is valued on the basis of the diversion of motor vehicle drivers and passengers to a mode of passenger transport.

However, in the course of developing procedures for evaluating existing passenger transport services — using the

alternatives to roading (ATR) evaluation process — Transfund became aware that it had no comparable data with which to measure the contribution to increased safety of public transport passengers who would otherwise have been cyclists or pedestrians.

This group contains a high proportion of children and students, many of whom use school bus services as an alternative to walking or cycling.

Transfund needed to ascertain the accident rates of cyclists and pedestrians — particularly children, who are less safe in both those travel modes — in order to evaluate the safety benefits of their switching to passenger transport.

As part of the working group assisting Transfund in this project, Canterbury Regional Council advised that it would be incorporating these safety aspects into ATR evaluations it was undertaking of some urban school bus services.

The council's consultants, Booz Allen & Hamilton, found that no passengers would walk if they were unable to take the particular bus services studied, but that many would cycle. This was mostly because of the distances to be travelled. Thus their report studied the accident rates for cyclists and showed that these children were indeed significantly safer travelling by school bus.

The consultants calculated the cost of accidents involving cyclists (in Christchurch) as 40c per kilometre travelled, and estimated that for Auckland the comparable figure might be as high as 80c/km. These values compare with a national average of 5c/km for accidents involving motorists. The Canterbury findings will assist Transfund in establishing a more comprehensive basis upon which to value the safety benefits of passenger transport services.

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TranSearch

A newsletter published by Transfund New Zealand



March 2000 Issue 39

Geosynthetic roadside drains – New guidelines

As every road engineer knows, pavement performance and life expectancy is dependent on adequate subsoil drainage.

Traditionally, aggregate drains with a perforated drainage pipe have been used, and have been developed to include a geotextile wrapping to provide filtration.

With the development of geosynthetic materials, composite drains comprising a geosynthetic core wrapped with geotextile have been used increasingly overseas in the past 20 years, and more recently in New Zealand. These

continued over page

*Installation of geosynthetic drain
Photo: Moccaferri New Zealand*



Editorial

Once again we are calling for applications for research projects for our annual research programme. The deadline for proposal applications is 10 April 2000. Copies of Transfund's Request for Proposal and Research Strategy documents can be obtained electronically via Transfund's website, www.transfund.govt.nz or from the programme administrator, Ineke Brockie, Email ibrockie@deloitte.co.nz.

This year we have an updated style guide to help the task of report writers and to ensure consistency in all Transfund reports. A copy will be included in every 2000/2001 research contract. The *Transfund New Zealand Style Guide* is a valuable document for researchers – make sure **you** use it!

Subsoil drainage is essential to the life and health of our road pavements. Increasingly, roadside drains are being constructed out of geosynthetic materials. Overseas studies suggest that these drains perform well, so long as they are installed correctly. Our cover story discusses guidelines for use in New Zealand.

In this issue, also, we report on parking restraint policies in our three major urban areas (page 4), and discuss methods for catching sediment contained in road runoff before this is discharged into the drainage system and ultimately into waterways in the Auckland region (page 5).

The introduction of a wider range of bitumens for use in chipsealing in New Zealand could reduce the cost of road making. But first we need to know more about the behaviour of these bitumens, many of which have different temperature sensitivities than those specified in current New Zealand specifications. See page 6.

Finally, on page 7, you can read how three basecourse pavement materials fared under a range of test conditions using both the Australian Standard test and a proposed new test for this country.

Happy reading!

Martin Gummer
Chief Executive
Transfund New Zealand



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YOUR VIEWS

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ISSN 1170-7321

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TranSearch

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Editor: **Diana Moir**

Transearch is published quarterly by Transfund New Zealand. Its purpose is to report the results of research funded through the Transfund New Zealand Research Programme, and to act as a forum for passing on national and international information to aid collaboration between all those involved – to stimulate enquiry, discussion and solutions concerning road, traffic, safety and land transport problems in New Zealand.

Contributed articles are welcome, and should be typed in double spacing and not exceed 1000 words. Illustrations may be either black and white or colour, and must be of high quality. *Transearch* reserves the right to edit, abridge or decline any article.

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drains offer potential cost and time savings over traditional drains, particularly in areas where aggregate is costly, or difficult to obtain due to resource management issues or the local geology.

A number of overseas studies, mainly in the USA, have shown that geosynthetic composite drains perform as well as traditional drains, provided they are designed and installed with care. The main problems identified in these studies relate to poor installation and backfilling as well as poor design.

A recent Transfund report provides guidelines for the use of these drains in New Zealand.

“Geosynthetic drains need to be carefully chosen and designed to meet the drainage requirements of individual soil conditions in order to ensure long-term good performance,” says P. Brabhaharan of Opus International Consultants.

“They also require installation with appropriate placement and backfilling,”

Research carried out by Opus during 1998-99 considered the benefits and constraints associated with the predominant types of geosynthetic composite drains available in New Zealand, most of which can be classified according to whether they have rigid, semi-rigid or flexible cores. These are generally wrapped with a commonly used geotextile, although special orders with different geotextile wrapping can be obtained at a higher cost.

While all types are suitable, the more rigid non-cusped core drains are more robust and can withstand higher traffic loads as well as requiring less rigorous standards of installation, P Brabhaharan says.

The report includes a flowchart for considering design and construction issues, and for the selection and detailing of appropriate systems in the New Zealand context.

It also recommends updating the existing Transit New Zealand

specifications for subsoil drain construction to reflect current industry trends and technology.

P Brabhaharan: “The revised specifications should be generic, covering the range of products available to allow contractors to use alternative systems, provided they meet design, construction and performance criteria appropriate to the project. They should also cover installation requirements to ensure that the drains are placed and backfilled correctly.”

To further our knowledge of construction issues appropriate to the New Zealand situation, the report suggests that field construction trials should be carried out to assess the suitability of the various types of backfill available in different areas of New Zealand, and to evaluate placement and compaction methods.

“To reduce costs and to appraise real life project construction issues, these trials should be carried out as part of actual construction projects.”

Contact for more information:
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Geosynthetic drain installation
Photo: Ground Engineering Ltd

Transfund's 2000/2001 Research Programme

Transfund's annual research programme funds proposals that contribute in making New Zealand's roading system safer and more efficient for road users. The 2000 research programme began last month with the release of the 2000/2001 Request for Proposal (RFP). Applications are now being sought for the 2000/2001 programme with a deadline for proposals of 10 April 2000.

For the first time the RFP and our five-year research strategy are now available electronically either from the Transfund web-site (www.transfund.govt.nz), or from our programme administrator, Ineke Brockie at Deloitte Touche Tohmatsu, PO Box 1900, Wellington, fax (04) 472 8023, Email: ibrookie@deloitte.co.nz.

The most significant change to the 2000/2001 research programme is that the Transfund Board has approved a trial of project-based tendering for the 'Travel Behaviour' topic area.

This trial has been adopted due to the difficulty in assessing the 30 bids received in this area last year, only two of which were subsequently funded. Several projects were duplicated and others were submitted without all the required information.

The objective of the Travel Behaviour topic area is:

to provide a better understanding of travel behaviour and user preferences by:

- understanding the broader benefits/impacts/user expectations of passenger transport
- providing a better understanding of why people travel
- building better transport models and evaluating transport modelling techniques
- understanding the effect congestion pricing could have on local economies and travel behaviour

New style guide

Transfund is issuing an updated style guide for use by researchers, writers and editors when applying for and preparing Transfund research contracts. This useful document provides guidelines on the style to be followed when preparing a Transfund report, the order in which tasks could be carried out, and on layout. It also advises authors about preparing material for Transfund's website, which will be used to publicise reports.

The guide will be available on request to all Transfund research applicants and will also be included in all research contracts awarded in the 2000/2001 financial year. Copies are also available on request to the programme administrator, Ineke Brockie, at Deloitte Touche Tohmatsu, PO Box 1900, Wellington, fax (04) 272 8023, Email ibrookie@deloitte.co.nz

- understanding people's propensity to switch/choose between transport modes
- improving the mobility of those who depend on public transport.

- defining/understanding level-of-service requirements and community values/expectations/willingness to pay

- understanding the potential effect of telecommunications on transport patterns

- improving education/increasing public awareness of transport choices

- understanding the interaction between land use and transport

- understanding freight movements and logistics.

Project-based tendering involves:

- working with users/industry to identify and rank priority projects

- preparing project briefs

- identifying those organisation capable of carrying out the work

- inviting tenders from those organisations

- assessing tenders and awarding contracts.

The advantage of the tendering process is that the industry can invite specific tenders in response to its brief, rather than relying on the current system (which is driven by the researchers).

A small specialist sub-committee, consisting of two representatives from the larger regional councils, two NZ

researchers specialising in this field, an independent peer reviewer and three Transfund representatives, has been formed to implement the trial. Process and programme information will be available from 21 March 2000 from the research administrator.

A minor change made to this year's RFP is the requirement to provide complete proposals with a full cost breakdown. In previous years, evaluators have had difficulty assessing incomplete proposals. This year the lower limit for proposals has been reduced from \$40,000 to \$20,000-\$25,000 in order to encourage the submission of smaller proposals.

Transfund is particularly interested in receiving practical research proposals that have **written** end user support. Following last year's research process, the research strategy group agreed that written support from end users would be given greater weight than verbal support in the evaluation process.

Seminars

Later this year we plan to publicise some of our key research findings in a series of seminars, to be held in Auckland, Wellington and Christchurch. The purpose of these seminars, at which researchers will be invited to give presentations of their projects, is to encourage greater knowledge and discussion of research findings so that they can be taken up by the end user.

Controlling urban parking

Of New Zealand's three main centres, Wellington has done the most to introduce parking policies aimed at decreasing commuter road traffic. The capital city's coupon parking scheme, and the limit set by Wellington Regional Council on long-stay carparks in major urban centres has resulted in a much higher proportion of controlled parking spaces in Wellington than either Christchurch or Auckland.

However, the fact that the majority of CBD parking stock in New Zealand's major centres is in private ownership limits the ability of local government in all three regions to control parking supply and pricing.

These are some of the findings of a project aimed at providing guidelines for developing and implementing parking restraint policies for New Zealand's major urban centres.



Photo: Christine Prebble

Following a review of international practice and experience, the project focused on:

- Identifying impediments to extending peak period parking restraint measures in New Zealand, and developing proposals for overcoming them.
- Analysing and developing policy for parking in the CBD/inner areas of Auckland, Wellington and Christchurch.
- Peak period parking issues, with a special emphasis on commuter parking.

The researchers, led by Ian Wallis of Booz.Allen & Hamilton (New Zealand) Ltd, identified a number of measures that could be implemented effectively in the three major urban centres.

Ian Wallis: "We looked at these in terms of how easy they would be to implement, as well as their likely effectiveness in restraining CBD traffic, reducing commuter parking and increasing public transport usage."

The research indicates that the easiest measures to implement would be systems for controlling or charging for on-street parking. However, the effectiveness of these would depend to a large extent on the level and type of enforcement resources provided.

The most cost-effective measure would be to impose a levy on both public and private carparking buildings or lots. Overseas experience suggests that introducing this with a differential rate would achieve significant decreases in commuter parking numbers.

Ian Wallis: "The greatest impact, under present conditions, would occur in Wellington where 90% of CBD on-street parking is controlled, compared to Auckland and Christchurch where only 45% is controlled."

While the most effective measure would be to introduce charges on private vehicles in private use, given that these make up 60% of CBD parking stock, it would also be the most difficult, according to Ian Wallis.

"It could require enabling legislation, particularly if such measures were to be used to provide funding for public transport."

Contact for more information: Ian Wallis, Booz.Allen & Hamilton, phone (04) 915 7777, Email wallis_ian@bah.com

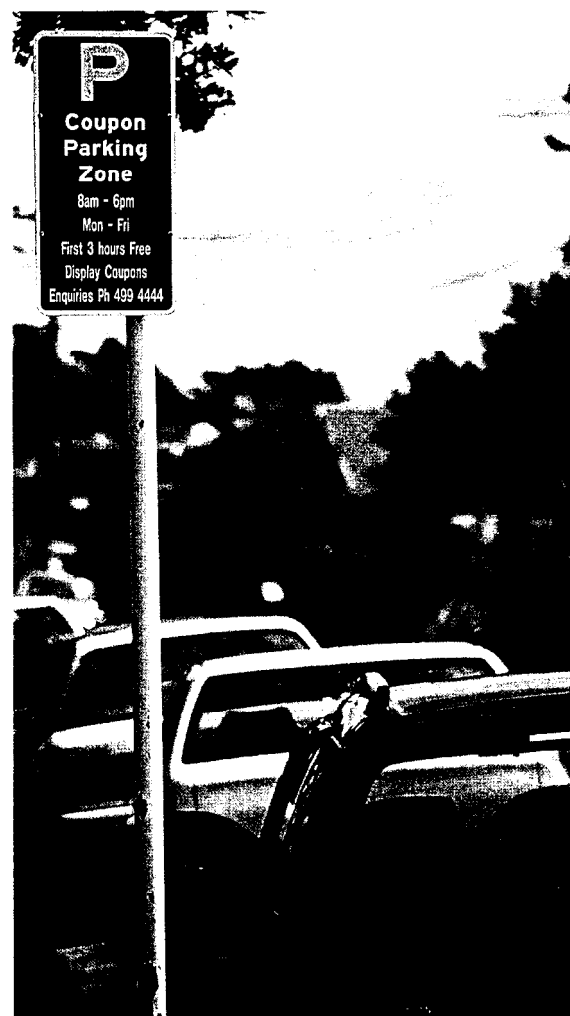


Photo: Christine Prebble

Capturing storm water sediment

Most parts of the Auckland Central Business District drainage system discharge stormwater directly into freshwater streams, estuaries and the sea. Studies carried out between 1992 and 1995 on stormwater quality in the region indicate that the discharged stormwater is often contaminated with petroleum-based hydrocarbons and other pollutants such as heavy metals and suspended solids. The main source of these contaminants is the transport system, including run-offs from roads and emissions from vehicles.

The most common solution to the stormwater problem is to provide a detention pond so that contaminants settle out before the stormwater enters its receiving waters. However, this solution is not economical in heavily urbanised areas such as Auckland because of limited land availability and high land prices. As an alternative, several studies have proposed inserting devices to capture sediment in catchbasins. These units, sometimes also known as sumps or gully pits, are constructed between the road and the stormwater pipe to carry surface run-off to the drainage system for further discharge.

One such insert device was designed and tested in the laboratory at Auckland University in 1995. The results showed that this device was effective in removing sediments from stormwater and might promote the removal of contaminants that have become absorbed onto sediment surfaces.

A further project, carried out in 1998-99 by N Singhal and H.D. Gunasekera of the Auckland University's Department of Civil and Resource Engineering, sought to test the device (with some modifications) under field conditions. 10 catchbasins in the Auckland region were selected for the field study.

Naresh Singhal: "The first stage involved measuring sediment accumulation over 10 weeks in the selected catchbasins before insert devices were fitted.

"The second stage involved installing insert devices in four of the 10 catchbasins. Over the next 20 week period, we again monitored sediment accumulation, checking the particle size and distribution of trapped sediments, and also the concentrations of polycyclic aromatic hydrocarbons (PAHs), heavy metals, oil and grease metals within the sediment."

Findings:

The field tests confirmed the laboratory results that installing the catchbasin insert allows for more sediments to accumulate in catchbasins and not to be flushed into the effluent.

Other findings:

- Many of the existing catchbasins have outlet pipes located close to the catchbasin bottom. In these catchbasins, sediment buildup is possible only for a short period of typically a few weeks. Other catchbasins have their outlet pipes at elevated levels, which allows for buildup over periods of six months or more. The present cleaning frequency of three times a year is therefore not appropriate for all catchbasins – some require more frequent cleaning while others could be reduced to once every six months.

- The sediment concentration in stormwater flow into catchbasins is a complicated function of rainfall and catchment characteristics such as land use, vehicle density and air pollution. The study identifies catchment slope as a major factor during periods of heavy rainfall.

- The study demonstrates that the concentrations of PAHs, oil and grease and heavy metals absorbed onto sediments shows a large variation. A more comprehensive study involving more frequent sampling is required to demonstrate the benefits of insert installation.

Naresh Singhal: "Overall, the project clearly demonstrates that the installation of catchbasin-insert devices results in increased detention of sediments that would otherwise be discharged to receiving waters."

Contact for more information: Dr Naresh Singhal,
Department of Civil and Resource Engineering,
Auckland University, phone (09) 373 7599 ext 45 12,
Email: n.singhal@auckland.ac.nz



Photo: Christine Prebble

Bitumen behaviour

- How does temperature sensitivity affect seal performance?

Following a review of refining practices by the New Zealand Refining Company, a wider range of bitumens for use in chipsealing surfaces is likely to become available, which could reduce the cost of road making. However, some of these bitumens have different temperature sensitivities than those specified in current New Zealand specifications and would not meet current New Zealand requirements.

“Until recently, chipseal design in New Zealand was based on accepted practice, rather than on any precise understanding of the relationships between bitumen properties and seal performance,” George Ball of Opus Central Laboratories says.

“In particular, we have limited understanding of the effects that might occur with bitumens that are softer at high temperature and harder at low temperatures.”

To further such understanding, Opus Central Laboratories carried out research between 1993 and 1996, developing laboratory tests and field trials to compare the results of trial bitumens produced by NZRC and the more usual 180/200 Safaniya bitumen.

The results showed that chipseals constructed with more temperature sensitive bitumens using current New Zealand procedures are more liable to fail under traffic.

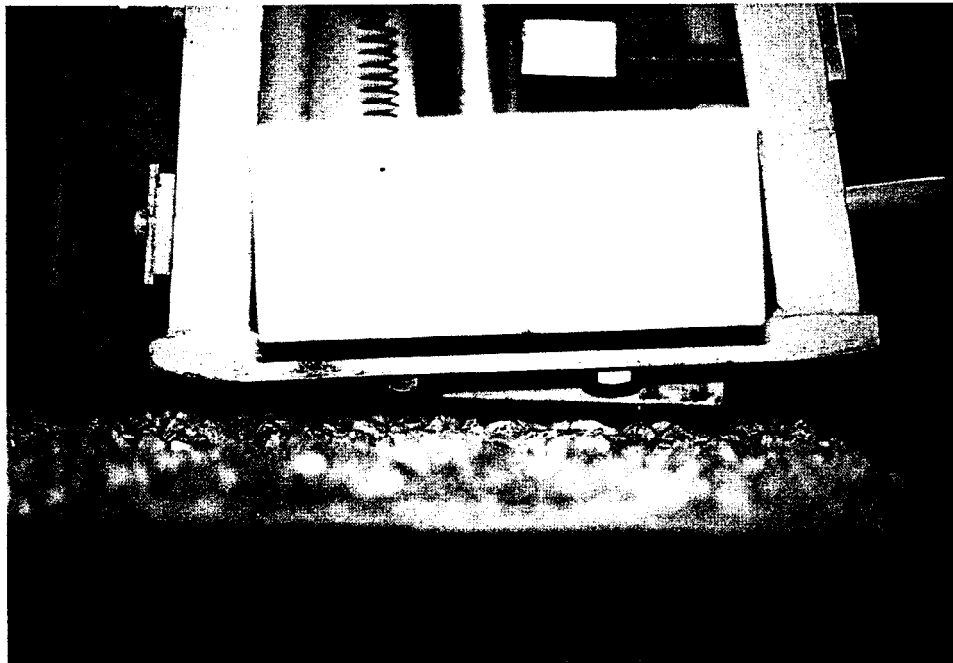
The laboratory testing indicated that traffic induced chip loss at low temperatures is unlikely to occur in New Zealand with currently used bitumens, which do not get brittle enough for failure. However, significant winter chip loss could occur for any bitumens which are harder than currently used bitumens at low temperatures, and for cases where large chip is used for

sealing and/or the seal has not yet compacted fully under traffic. In summer, the lower viscosities of temperature-sensitive bitumens at high road temperatures are more likely to result in chip rollover.

For the field trials, a standard 180/200 bitumen and a more temperature sensitive 180/200 were used to construct seals with bitumen sprayed at three different rates in each case. Seals constructed with both bitumens and with standard bitumen spray rates behaved satisfactorily under traffic. When the spray rate was reduced by 20%, the standard bitumen seal remained in good condition, but the seal with higher temperature sensitivity bitumen showed chip loss at the onset of winter.

“The results showed that chipseal performance could be adversely affected using a more temperature-sensitive bitumen, with increased risks of chip loss in the first winter and of chips rolling over during periods of high pavement temperatures” says co-researcher John Patrick.

Contact for more information: George Ball, Opus Central Laboratories, phone (04) 568 3 119, fax (04) 568 3169, Email george.ball@opus.co.nz



Laboratory simulation of a tyre skidding on a chipseal surface

Pavement pounding

- Determining dynamic load properties of New Zealand basecourse

'Unbound granular basecourse materials' may not be a household term in New Zealand, yet these materials play an integral part in the design and repair of our road pavements.

The function of an unbound basecourse is to dissipate the load from a vehicle in order to protect the subgrade from high stress. The basecourse must also have sufficient shear strength under traffic to prevent rutting and deformation.

New Zealand has recently adopted the Australian Standard for tests determining the *resilient modulus* – the ability of the basecourse to dissipate load – and the *permanent strain* – the shear strength of the basecourse material. While the test appeared to have the potential for distinguishing between materials that would perform well in the field and those that would fail, there were concerns that it had not been confirmed for New Zealand materials and moisture conditions.

In view of these concerns, Transfund commissioned Opus Central Laboratories to compare the performance of three basecourse materials under a range of test conditions using both the Australian Standard test and a proposed new test for this country.

According to researcher John Patrick, the aim was to develop a testing protocol that could distinguish between premium basecourse and material whose performance might be considered suspect.

John Patrick: "We carried out tests to determine the resilient modulus of three aggregates, two of which had failed the Transit New Zealand specification for basecourse. Each sample was tested using saturated-drained conditions, saturate-undrained conditions and optimum water content (OWC)-drained conditions.

"Two different stress sequences were used, the Australian Standard and a proposed New Zealand sequence.

"We also subjected the three aggregates to permanent strain tests at two levels of compaction under five different conditions of water density, ranging from maximum dry density to fully saturated.

"Finally, we treated one of the aggregates with different concentrations of cement and lime and cured these for varying lengths of time."

Main Findings

Resilient modulus tests

- The New Zealand stress sequence with saturated-undrained conditions distinguishes effectively between the materials tested.
- The Australian test procedure stress sequence does not distinguish well between the materials tested under any conditions. However, it does not appear to over-stress the materials as first thought.

Permanent strain tests

- The preferred option for testing is with saturated-undrained conditions because these allow degrees of compaction to be clearly distinguished and there is a clear understanding of the stresses applied to the sample. The test condition also distinguishes between a 'good' and a 'poor' New Zealand basecourse.

Lime and Cement stabilisation tests

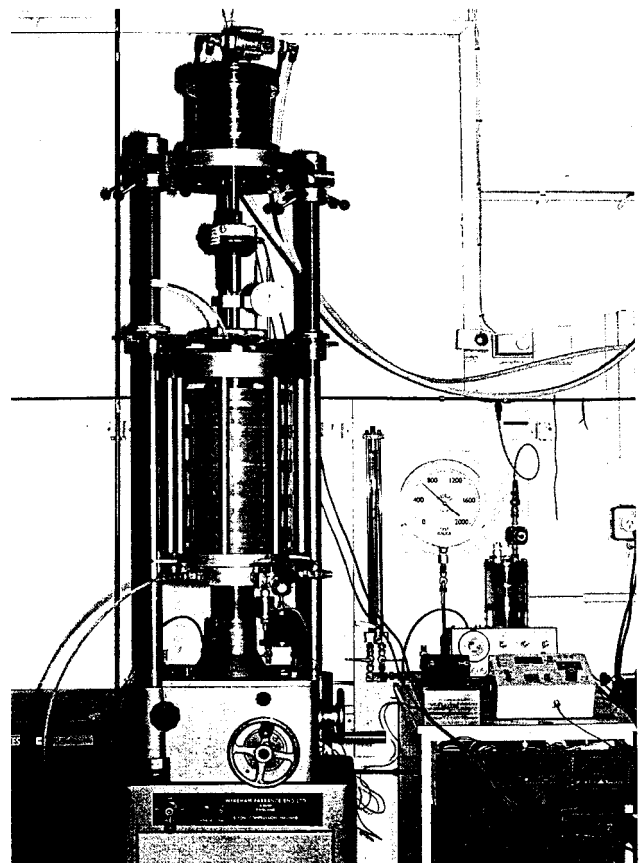
- Following lime and cement stabilisation, there is significant improvement in the strength of the materials tested under dynamic loading, with cement stabilisation being more effective than lime on the material tested.
- The preferred curing time for permanent strain

tests of stabilised materials is at least seven days.

John Patrick: "For the assessment of a basecourse that may be marginal in terms of the current basecourse specification, we recommend that the proposed New Zealand test procedure with saturated-undrained conditions be used for *resilient modulus* testing and also for dynamic *permanent strain* testing. Pavement designers can of course use less demanding test conditions for specific projects where they are confident of the moisture conditions occurring in that pavement.

"To confirm our findings and give confidence to pavement engineers, we recommend that further studies should be carried out on samples taken from actual pavements that have failed prematurely."

Contact for further information: John Patrick, Opus Central Laboratories, phone (04) 568 3 119, fax (04) 568 3 169, Email: john.patrick@opus.co.nz



Repeated load triaxial testing of pavement aggregates

Published Research Reports

A full list of the research reports published by Transit New Zealand and Transfund New Zealand grouped under their key topic areas.

A. Road Asset Management

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Notices

PIARC – Surf 2000

4th International Symposium on Pavement Surface Characteristics of Roads and Airfields

Nantes

FRANCE

22-24 May 2000

The PIARC Technical Committee on Surface Characteristics (C1) organises this symposium to evaluate and compare recent research results in the field of:

- Methods and equipment for measuring pavement surface characteristics
- Pavement-tyre interaction
- Comfort and safety of road users and adjoining property users
- Performance and durability of materials
- Quality objectives for new pavements
- Decision rules for maintenance

For further information,

contact the website [Http://www.aipcr.lcpc.fr](http://www.aipcr.lcpc.fr); or

The Symposium Secretariat

LCPC – Centre de Nantes

PIARC SURF 2000

Route de Pornic – BP 4129

44341 BOUGUENAI Cedex

Tel: +33 2 40 84 58 37

Fax: +33 2 40 84 59 98

Email: Michel.Boulet@lcpc.fr

'The Travel Bug'

Transportation 2000 AITPM International Conference

ANA Hotel

Gold Coast

Queensland

AUSTRALIA

7-9 June 2000

Papers are now being called for this conference, which will focus on solutions to potential failures in our traffic and transport systems, and the nature of failures which may occur.

Issues relating to The Travel Bug may evolve from the following areas of transportation management and planning:

- Public transport
- Urban planning and design
- Road use enforcement
- New technology, including ITS
- Traffic planning and management
- Social and behavioural sciences
- Road safety
- Road use education
- Travel demand management
- Environmental preservation.

The Australian Institute of Traffic Planning and Management aims to involve other professional organisations, both local and international, as co-hosts for the Conference.

For further information, contact:

The Travel Bug

Transportation 2000 Conference

PO Box 5719

West End Queensland 4101

Additional Contacts:

National Secretariat

Phone: +61 2 9875 2855

Fax: +61 2 9875 2855

Email: aitpm@bigpond.com

Conference Convenor

Neil Horrocks

Phone: +61 7 3834 8461

Fax: +61 7 3834 8355

Email: Neil.C.Horrocks@mainroads.qld.gov.au

2nd International Symposium on Highway Geometric Design

Mainz

GERMANY

14-16 June 2000

This symposium aims to provide insights to stimulate continued improvement of highway geometric design. The focus will be on the latest research and developments in policies, procedures and practices worldwide.

Papers will be presented on the following topics:

- Rural highway and urban street design
- Alignment, sight distance and cross-section design
- Intersection and interchange design
- Safety and operational effects of geometric design
- Safety audits in design
- Speed-related issues in design
- Flexibility in geometric design
- Design exceptions/deviations from standards
- Human factors in highway design
- Design for pedestrians and cyclists
- Traffic calming techniques and experiences

The contact for further information is:

Raymond A. Krammes

Federal Highway Administration, HSR-20

6300 Georgetown Pike

McLean, VA 22101

USA.

Phone: +1 703 285 2971

Fax: +1 703 285 2679

Email: ray.drammes@fhwa.dot.gov

International web site: <http://ttl-trb.tamu.edu>

10th Road Engineering Association of Asia and Australasia Conference

Keio Plaza Hotel

2-2-1 Nishi-Shinjuku

Shinjuku-ku

Tokyo

JAPAN

4-9 September 2000

This conference, sponsored by the Road Engineering Association of Asia and Australasia (REAAA), will focus on road development for the 21st century. Sub-themes are:

- Road environment
- Road safety and security for daily living
- Road technology and efficiency of road traffic
- Road financing, and public and private partnership
- Road development and policy

For more information, contact:

Secretariat for the 10th REAAA Conference

C/o Expressway Technology Center

3-7-2 UBE Bldg.9F, Kasumigaseki, Chiyoda-ku

Tokyo 100-0013, Japan

Phone: +81 3 3503 2340

Fax: +81 3 3519 5092

Email: reaaa@extec.or.jp

Internet: <http://www.extec.or.jp/reaaa>

ISATA 2000

Automotive and Transportation Technology

Dublin

IRELAND

25-29 September 2000

Papers are now being sought on a range of topics for this conference, covering such issues as:

- Electric, hybrid, fuel cell and alternative fuel vehicles
- Safety issues
- Automotive interiors – materials, ergonomics, manufacturing, ICE and comfort
- Intelligent transportation systems (ITS)
- Surface transportation -non-automotive applications - buses, trams, light rail, intermodal transportation
- Automotive electronics
- Simultaneous engineering and rapid product development
- Simulation and virtual reality
- Chassis engineering
- Advanced manufacturing
- Body structures, materials and structural engineering and recycling
- Lasers and joining applications
- Robotics, motion and machine vision
- Powertrain technology – developments in petrol/diesel engines and transmissions

The deadline for abstracts is 31 January 2000.

To register for the conference or for more information:

ISATA

Epsom House

10C East Street

Epsom

Surrey KT17 1HH

United Kingdom

Fax: +44 1372 720 101

Internet: <http://www.isata.com>

7th world Congress on Intelligent Transport Systems

Turin

ITALY

6-9 November 2000

For more information, contact:

Congress

VERTIS

Mr Seiji Sakuma

Nishi-Shimbashi Tachikawa bld

2-11-4 Minato-ku

Tokyo 105-0003, Japan

Phone: +81 3 35 19 21 81

Fax: +81 3 35 92 00 91

Email: s-sakuma@vertis.or.jp

Internet: <http://www.vertis.or.jp>

Asphalt Rubber 2000 Conference

Vilamoura

PORTUGAL

14-17 November 2000

This is the first international conference dedicated exclusively to asphalt rubber, the modification of asphalt bitumen with crumb rubber from recycled tyres, which is rapidly gaining worldwide popularity for use in road rehabilitation projects.

Site visits are planned, including guided tours to a crumb rubber production plant.

The conference will be of special interest to pavement engineers, researchers, contractors, consultants, managers, road infrastructure planners, and to tyre recyclers, using new and recycled materials.

Papers are still being accepted and will be submitted for peer review to the International Journal of Road Materials and Pavement Design.

Further details on Asphalt Rubber 2000, organised by CONSULPAV, RECIPAV and RECIPNEU, and partly sponsored by the Rubber Pavements Association and the European Tire Recycling Association can be obtained either by E-mail to: patricia.consulpav@taguspark.pt or through www.Consulpav.Com/AR2000.

NZ contact:

Dr Bryan Pidwerbesky

NZ Pavement & Bitumen Contractors' Association

PO Box 12013, Wellington 6038

Phone: (04) 496 3271

Fax: (04) 496 3272

Mobile: 025 477 098

Internet: bitumen.org.nz

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Deadline for next issue

Copy for the next issue of
TRANSEARCH must be in the
Editor's hands by 30 April
2000.

New Transfund research publications

Prices include postage, handling and GST

Parking Restraint Measures and their Implemen ta tion

Transfund New Zealand Research Report
No. 145

Booz.Allen & Hamilton (New Zealand) Ltd,
Wellington

Price: \$20

See article this issue

Dynamic Load Properties of New Zealand Basecourse

Transfund New Zealand Research Report
No. 151

A. Dodds, T. Logan, B. Fulford, M.
McLachlan & J. Patrick

Opus Central Laboratories, Lower Hutt

Price: \$15

See article this issue

Wavelength Analysis of State Highway Longitudinal Profiles

Transfund New Zealand Research Report
No. 153

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basecourse and through the top of the seal
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ISSN 1170-7321



Major Projects Review Final Report



March 2000

This bulletin summarises the analysis and findings of the Major Projects Review – a review of the development and delivery of major road construction projects in New Zealand. The content of this report represents the analysis and findings of the review project work teams, with input and oversight from the Boston Consulting Group and Sinclair Knight Merz. The report reflects extensive input from the industry stakeholder representatives on the review work teams. It is now being published prior to formal consultation with the wider roading industry in New Zealand. Formal consultation will be an important step in refining the recommendations and gaining broad support for required changes.

Transfund wishes to acknowledge the very considerable contribution to the review work teams made by representatives from Transit New Zealand, local government, the contracting industry and consulting industry. Their efforts have helped shape the review findings, and ensured they reflected industry knowledge and experience.

Foreword

The analysis and recommendations in this report have been presented to the Transfund Board and Transit Authority, and briefed to the Minister of Transport. They will now proceed to two separate consultation processes – one with the Ministry of Transport (for those recommendations affecting central government agency accountabilities), and the second with road controlling authorities and the wider roading industry (for the remainder). The consultation process will take place through to late April 2000, and final recommendations and implementation plans will be reported back to the Transfund Board in May.

Readers are cautioned to confirm that any funding proposals they submit, or changes that they may institute in their operational procedures, conform to the Board's policies current at the time.

Introduction

New Zealand road funding and management is at the leading edge of international practice. Significant efficiency gains have been achieved during the past decade. A number of value-adding initiatives have been introduced, including contracting out and competitive tendering for professional services and physical works, the separation of funder and provider, value management and partnering on major works, and the formalised use of contingency management. Preliminary analysis of current practices revealed a number of additional opportunities to enhance the value delivered through major roading projects.

The aim, therefore, of the Major Projects Review (the Review) has been to examine those opportunities to improve all aspects of generating, evaluating, selecting, and delivering major road construction projects. The Review has been a co-operative effort involving Transfund, Transit, local government, the road contracting and consulting industries, and was facilitated by consultants Boston Consulting Group in association with Sinclair Knight Merz.

Initially, the Review was structured around four cross-industry work streams, which examined:

- institutional accountabilities and incentives
- assuring quality project development and funding evaluation
- project development and delivery methods
- risk assessment and management.

It was co-ordinated by a project team (comprising Transfund and Transit staff, and consultant representatives) and overseen by an industry steering group, comprising representatives from all key stakeholder organisations and two Transfund Board members.

The four work teams presented their initial report to the industry steering group on 30 September 1999. The steering group endorsed the emerging recommendations and identified areas for further analysis and development. After this meeting, the Risk Assessment and Management team members were transferred to the other teams to apply key learnings regarding risk assessment.

Final recommendations were presented to the steering group on 11 November 1999. Again, the steering group largely endorsed the recommendations. Comments from the steering group and the project's independent peer reviewers, Dr. David Stupples and Gareth Firth of the PA Consulting Group (UK), have been considered and incorporated into a final report which was presented to the Transfund Board on 30 November and to the Transit Authority on 1 December 1999. More recently the Minister of Transport has been briefed on the recommendations, which are now proceeding to final consultation with the Ministry of Transport (for central government agency accountability issues) and the wider roading sector (for all other recommendations).

Key Recommendations

The key recommendations to emerge from the Review are summarised below. Detailed background to each recommendation is contained in the next section of this report.

The recommendations comprise a series of integrated proposals for major change in the way in which road construction projects are conceived, evaluated, selected and delivered in New Zealand. Many of the recommendations are inter-dependent and should be viewed as a 'package' rather than a menu of options or initiatives. The Review asserts that the maximum benefit can only be obtained by the composite introduction of all of the recommendations.

1. Transfund and road controlling authorities (RCAs) should adopt a clear accountability framework, supported by robust key performance indicators (KPIs) and related incentives and sanctions, in which each party has clear roles and objectives.

This recommendation will underpin practices to enhance 'value for money' because it will serve to:

- Clarify the roles of Transfund and road controlling authorities (RCAs) as 'purchaser' and 'suppliers' respectively.
- Align performance indicators with these clear roles and strengthen accountability for the delivery of outputs (RCAs) and achievement of land transport sector outcomes (Transfund).
- Enforce an improved accountability framework through the implementation of stronger incentives and sanctions associated with good and poor performance.

2. Transfund should adopt a 'portfolio focus' rather than a project-by-project focus when making investment decisions.

- Transfund should communicate Government's expectations regarding the desired sector outcomes Transfund seeks to achieve with its project portfolio. RCAs could then react accordingly and submit projects that are aligned with those outcomes.
- Transfund should introduce output funding (an allocation of funds for a group of negotiated outputs) to increase RCA flexibility, and strengthen the RCAs' accountability for delivering outputs:
 - output funding should be phased in over time on the basis of its success as a purchasing mechanism (success may be judged by KPIs)
 - larger and higher risk projects would continue to be evaluated and approved by Transfund on a project-specific basis.

3. Transfund should enhance its funding evaluation process in two ways:

- Take a segmented approach to the funding evaluation process. Projects (or group of projects with similar characteristics) would be assigned to a segment based on their cost and risk profile:
 - Three segments are recommended: “Case Managed” (high risk, high cost), “Phase Gated” (medium risk, medium cost), and “Output Funded” (low risk, low cost)
 - Different methods and levels of project liaison, evaluation and management would be applied to projects in the different segments
 - A case manager would be assigned to high risk, high cost projects to identify and resolve potential funding issues, monitor risk areas, enable clear lines of communication, and negotiate interim funding hold points with RCAs, as required.
- Improve key project development processes by reaching agreement with RCAs on best practice. Transfund should then perform audits to confirm that best practice was being applied:
 - Transfund should take greatest interest in processes for the early stages of project development (e.g., option generation and option selection) because the opportunity to influence the project’s outcome and overall effort diminishes as its development progresses. (e.g., if a sub-optimal option is selected, the result will be sub-optimal.
 - The level of auditing would vary, based on the size/complexity of the project and the capabilities of the RCA.

4. Transfund and RCAs should develop best practice for risk assessment.

- Risk assessments should be applied and reviewed at key decision points between all phases of a project’s development.
- The rigor of risk assessment should be proportionate to a project’s complexity and cost.
- New Zealand Standard 4360 should be the benchmark for assessing and managing project risk.

5. Fixed Price Lump Sum should feature in all physical works contracts within four years to achieve greater certainty on costs through efficient allocation of risks to suppliers.

- Contract risks that cannot be quantified or managed more efficiently by contractors should continue to be priced on a schedule of rates.

6. Alternative delivery methods (such as Design-Build and Design-Refine-Build) should be trialled over the next two years. If trials are successful, alternative delivery methods could be used for -40 % of major projects.

- Delivery methods should be selected on a project by project basis to take advantage of opportunities to innovate and to allocate contractor-manageable risks more appropriately.
- Focusing on key management practices would enhance the quality of outputs delivered. These practices include more robust risk assessment, a more proactive approach to Resource Management Act (RMA) issues, and improved selection and performance assessment of suppliers.
- Feedback from a formal evaluation of the trial projects would be used to refine and improve the implementation strategy.

Background to Key Recommendations

The details of the analysis directing the recommendations follow.

1. Adopt a clear accountability framework

Well-defined accountabilities and related incentives and sanctions can help achieve higher value for road users.

In the current New Zealand roading environment, the roles and accountabilities of Transfund and Transit, at a functional level, are not clearly defined. Numerous performance measures are duplicated (e.g., Transfund and Transit are both evaluated on measures of road smoothness) and others are applied to inappropriate organisations (e.g., Transfund is measured on total length of pavement rehabilitated). There is also an overriding need to develop more complete coverage for performance measurement of Transfund and all road controlling authorities, and to carefully design those measures to underpin desired behaviours.

Revising the accountability framework to emphasise the delivery of high quality projects and management accountability is a precondition for many of the Review recommendations. Recommended clarifications and enhancements to the accountability framework include:

- Transfund should be accountable for the achievement of broader land transport sector outcomes over time.
- Transfund and road controlling authorities should share responsibility for determining which outputs should be produced to meet the desired sector outcomes.
- Road controlling authorities (including Transit) should be accountable for efficient and effective development and delivery of specified outputs and larger projects, to agreed standards.
- Transfund should remain accountable for the overall efficient utilisation of funds.

In support of this revised accountability framework, a set of potential performance measures has been developed for consideration in industry consultation. These Key Performance Indicators (KPIs) relate to:

- outcomes
- network results
- outputs (for output funding)
- project specific results
- portfolio management.

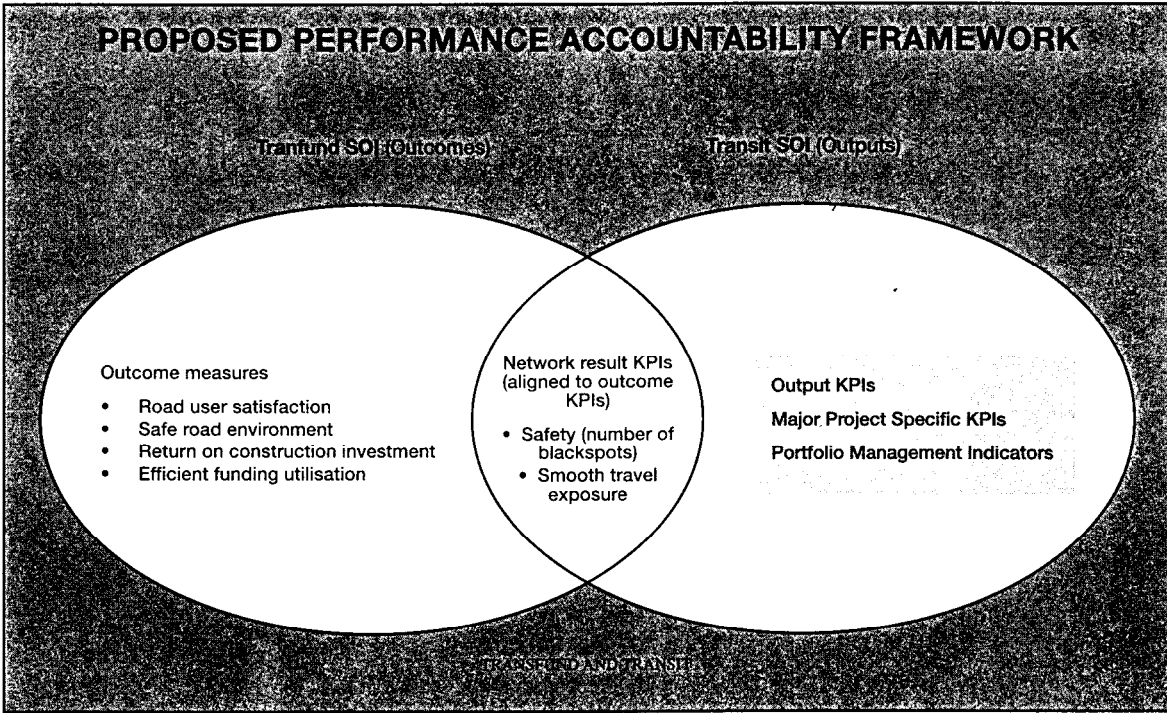
Defining the appropriate performance indicators and ensuring a proper mix of indicators is a challenging but essential ingredient of the overall Review recommendations. These measures are designed to create an incentive to achieve efficient and effective project development and delivery, and to enable RCAs and Transfund to be held accountable for their performance. The information provided by the performance measurement process would also enable informed portfolio management and investment decisions. The compliance costs of collecting this information are likely to be low, relative to the value added by these measures.

These performance measures will only be effective if accompanied by incentives and sanctions. To strengthen existing incentives and sanctions it is recommended that performance targets negotiated in the NRP agreements between Transfund and Transit should be aligned and linked with the targets reported in their Statements of Intent (*see Figure 1*). Performance should then be reported to Parliament through Transfund's and Transit's respective Annual Reports and Statements of Service Performance. Parliament would then have the opportunity to act on the basis of performance results.

Similarly, other RCAs would explicitly report through their Annual Reports on the achievement of applicable KPIs. Further work will be done to develop an appropriate regime of incentives and sanctions for territorial authorities.

The review recognised that Transfund's relationship with territorial authorities differs slightly from its relationship with Transit. Transfund and territorial authorities are also co-purchasers with largely common – but not completely overlapping – objectives. There needs to be an emphasis on working in partnership to achieve alignment about, and reconcile any differences in, strategic or project objectives at an early stage.

Figure 1: SOIs should reflect performance against NRP targets



2. Transfund should adopt a portfolio focus

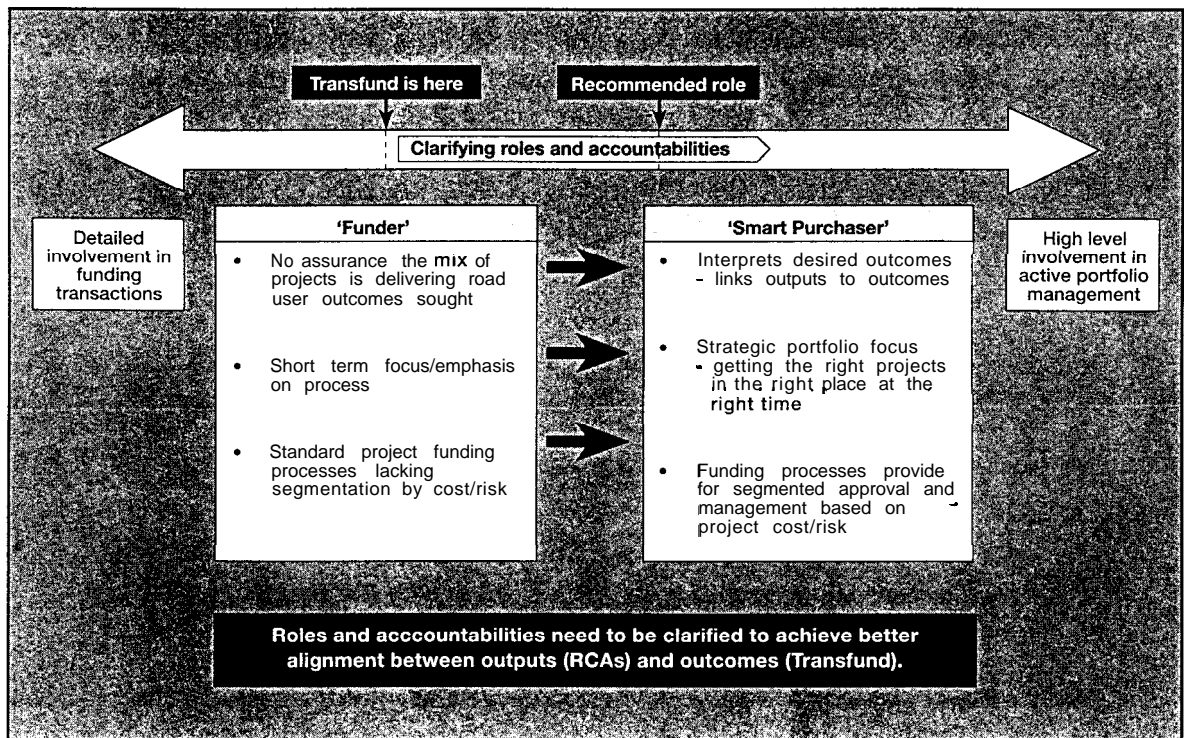
To assist Transfund in achieving a more effective overall performance, it is recommended that Transfund’s role should evolve from that of a ‘funder’ (i.e., purchasing specific projects driven by a bottom-up application process) to the role of a ‘smart purchaser’ (purchasing outputs which directly contribute to broader sector outcomes). Transfund should link the outputs provided by the road controlling authorities, including Transit, with desired sector outcomes (see Figure 2). These outcomes should also be reflected in Transfund’s funding criteria.

An important aspect of this role shift is the need to take a long term view of transport needs. Inevitably, new investment only impacts at the margin, so it takes time to change the overall performance of land transport infrastructure. There are also significant lead times in the planning, selection and construction of new infrastructure projects.

In practical terms, this issue will come into focus mainly at a regional level. Transfund will wish to purchase the quantity and mix of projects that will achieve agreed regional land transport outcomes and objectives. In turn, Transfund has an interest in ensuring that regional land transport strategies are robust. In metropolitan regions, it follows also that these principles extend beyond roading projects to multi-modal and passenger transport projects and services. Further work is being done on this last point.

Being a ‘smart purchaser’ involves enhanced funding evaluation processes. Transfund’s funding evaluation processes should base project approval and management around segmentation of projects, according to their cost and risk. This aspect is developed more fully in section 3 below.

Figure 2: To improve results, Transfund should move from 'Funder' role to 'Smart Purchaser' role



Transfund should develop a broader view of its roading project portfolio to help develop the right projects at the right place and the right time. As part of being a 'smart purchaser', Transfund should view its roading project portfolio as a basket of projects at different phases (or stages of development), managed as a whole. This focus on portfolio management would allow Transfund to take a more strategic approach to its purchasing role. Enhancements to the current approach would include:

- The ability to better match the volume of projects in the portfolio with future funding.
- A better framework for project development which would enable projects to be developed at the right place and the right time.
- The enhanced ability to assess individual projects or groups of projects against desired sector outcomes, with particular emphasis placed on the alignment of schemes and strategies with these outcomes.

This approach should provide clearer autonomy and accountability for RCAs. It should also provide incentives for RCAs to bring forward their most appropriate projects in a timely way.

To assist in portfolio management, it is recommended that Transfund use output funding as an alternative funding method. Transfund would approve funding allocations on a grouped 'output' basis. Output allocations would be made for four negotiated project outputs: Strategy Development, Scheme Assessment, Design, and Construction. The allocation for each output would be supported by a business case developed by RCAs and agreed with Transfund.

The business case would address:

- road user preferences, network performance, and discrete network problems or opportunities
- proposed value for money spent
- proposed programme and budgets, and how the proposed programme aligns with desired sector outcomes.

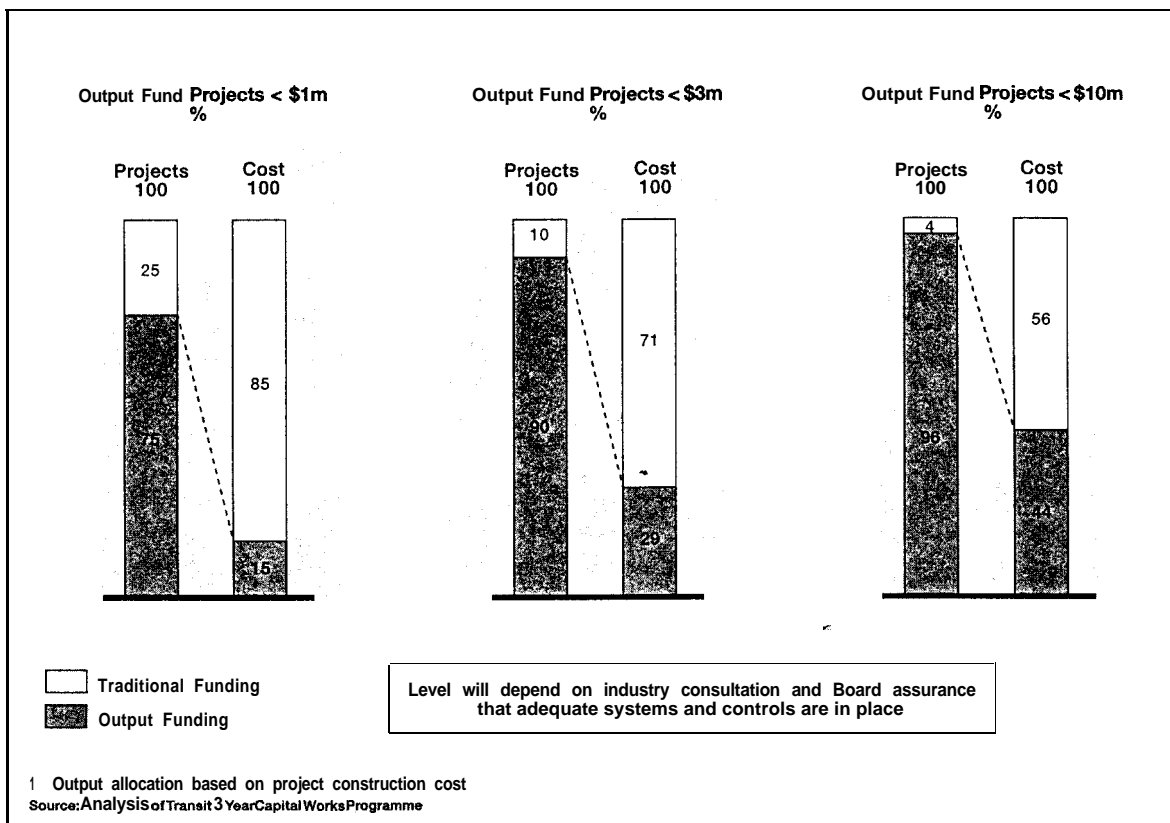
Under output funding, RCAs would have the flexibility to reprioritise funds within an output allocation. This broad discretion would be supported by specific National Roothing Programme (NRP) conditions negotiated by RCAs and Transfund.

Output funding has a number of potential advantages when compared with the current funding system. Output funding would assist Transfund and RCAs in taking a long-term strategic portfolio approach. Output funding would also provide RCAs with the flexibility to be more responsive to changing circumstances and priorities. Increasing the RCAs' autonomy to act allows them to be held accountable for the non-delivery of negotiated outputs within a constrained budget. Output funding would also reduce the volume of transactions and administrative costs associated with small projects by grouping these projects into one allocation. This reorganisation would enable Transfund's management and Board to focus attention on high cost, high-risk projects.

Output funding has some potential risks. There might be some difficulty in determining the proper allocation between outputs and setting the output 'price'. Because this is a more 'hands-off' approach for Transfund, there would be limited opportunity for Transfund to influence project progression and it would have less assurance that output funded projects complied with its funding requirements. These risks could be mitigated through the use of KPIs in conjunction with appropriate incentives and sanctions, and by progressively phasing in output funding.

Initially, the size of projects to be included in each output could be based on the estimated construction cost of the project to completion. These initial thresholds would be determined through industry consultation and would depend on the Transfund Board's satisfaction with the control mechanisms available to manage output funding (e.g., robust KPIs). Output funding thresholds are anticipated to increase over time if output funding proved to be effective and RCAs demonstrated that they could manage this concept well.

Figure 3: A number of potential initial output funding levels' can be considered



3. Transfund should enhance its funding evaluation process

Consistent with Transfund's role as a smart purchaser and "steward of value", it has the responsibility to purchase outputs that achieve desired sector outcomes. A robust funding evaluation process is critical to make these purchases wisely.

Two weaknesses in the current funding and evaluation process were identified:

- There is limited prioritisation of funding and evaluation resources. Each year, approximately 1000 funding variations are reviewed and approved by Transfund. Management and Board efforts could be better focused on high cost, high-risk projects.

- Transfund is not able to determine whether the outputs are optimally delivering sector outcomes.

Two enhancements are recommended to improve the robustness and efficiency of the funding evaluation process:

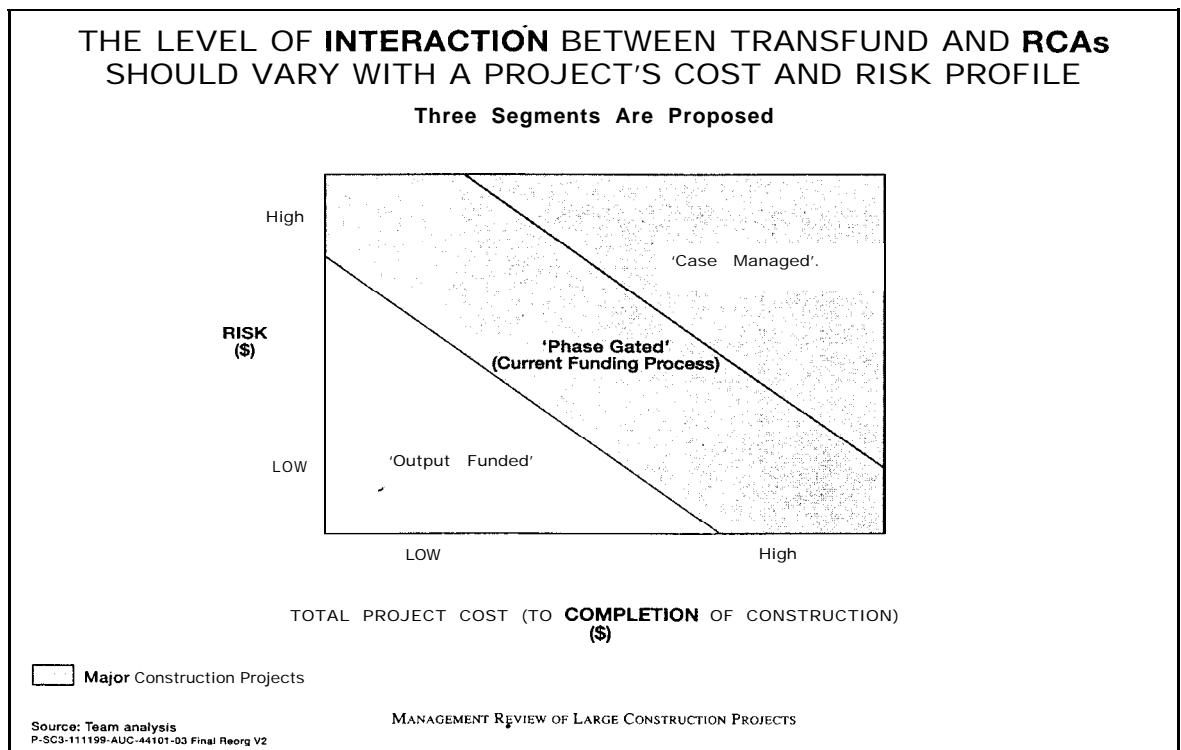
- Take a segmented approach to the funding evaluation process.
- Reach agreement with RCAs on best practice for key project development processes.

Take a segmented approach to the funding evaluation process

High risk, high cost projects have the greatest impact on the value delivered to road users. For example, the top 25% of projects, by number, in the current construction portfolio represent almost 90% of its dollar value. By definition, high risk projects can have a significant negative impact on value if their risks are not well understood and well managed by the RCA. Accordingly, Transfund’s funding evaluation processes should vary with a project’s cost and risk profile and focus on projects that are high cost and/or high risk.

It is proposed that projects be assigned to one of three segments, based on their cost and risk profile. These segments are ‘Case Managed’, ‘Phase Gated’ and ‘Output Funded’. RCAs would be informed about the segment into which a project was classified after the PFR stage. This would be reassessed at each stage of the project’s development to take into account any changes in its risk profile.

Figure 4: The level of interaction between Transfund and RCAs should vary with a project’s cost and risk profile



It should be noted that Transfund would remain responsible for approving or rejecting projects based on its project evaluation methodology, but in the case of output-funded projects this responsibility would be delegated to RCAs.

The way in which Transfund’s project liaison and evaluation functions should vary for each segment is outlined in figure 5 below.

Figure 5: Transfund’s project liaison and evaluation functions will vary for each segment

TRANSFUND'S PROJECT LIAISON AND EVALUATION FUNCTIONS WILL VARY FOR EACH SEGMENT		
Project Segment	Project development and RCA liaison	Project evaluation by Transfund
Case Managed (30-45 projects annually)	<ul style="list-style-type: none"> • Transfund case manager assigned *At project commencement, funding policies/processes and intended best practice application are clarified • Ongoing monitoring, including option selection and risk management, with the opportunity to raise 'red flags' and minimise surprises • Periodic audit of key processes (higher sampling frequency as part of audit) • Power to recommend suspension of funding if key risks are not being managed properly • Role is essentially one of "eyes on – hands off"; RCA remain accountable for project development and delivery 	<ul style="list-style-type: none"> • Transfund evaluation analyst assigned • Policy decision taken on appropriate process for case management and project evaluation • Specified risk information required before approval of funds for each phase • Robust and objective review of funding phase gates (and other agreed hold points) of all outputs including, as appropriate, peer review of specific project features • Transfund Board to approve all project funding • Post construction audit undertaken by RCA
Phase gated	<ul style="list-style-type: none"> • Phase gate review at each stage before funding of all projects • Minimal monitoring with exception reporting • Periodic audit of key processes 	<ul style="list-style-type: none"> • National review of project application for each funding phase (undertaken internally) • Results from key best practice processes reviewed
Output funded	<ul style="list-style-type: none"> • Projects are output funded • Small sample of outputs reviewed • Minimal monitoring, with exception and output KPI reporting by RCAs • Periodic audit of key processes • Need to meet funding guidelines 	<ul style="list-style-type: none"> • No project specific evaluation • Sample audits of projects to confirm compliance with funding policies

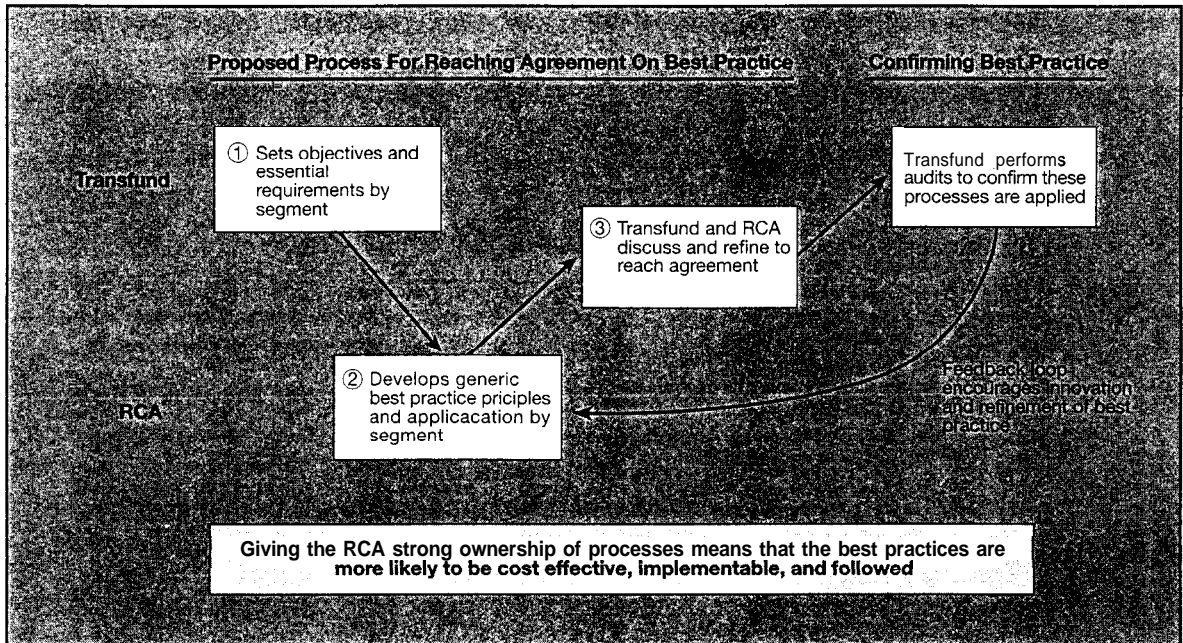
Reach agreement with RCAs on best practice for key project development processes

Certain key processes have a significant impact on the purchase decision made at the end of the I&R phase. These processes include problem definition, option generation, option selection and risk assessment. They are fundamental in developing the project that Transfund purchases. If these processes are not performed with excellence then road user benefits will be put at risk. As a result, for funding evaluation purposes Transfund should have the greatest interest in these project development processes. Moreover, the quality of these processes is difficult to assess at the normal funding evaluation points. For example, at the end of the I&R phase it is difficult for Transfund to determine if the best set of options has been generated.

To gain confidence in these project development processes, RCAs and Transfund should reach agreement as to what constitutes best practice. A four-step process for developing best practice guidelines is recommended:

- Step 1: Transfund sets objectives and ‘essential requirements’ for each process.
- Step 2: RCAs develop generic best practice guidelines and determine how they will apply to each stage of a project’s development (as far as possible, these would be standard across all RCAs).
- Step 3: Transfund and the RCAs discuss and refine the objectives and requirements to reach agreement on best practice.
- Step 4: Transfund performs audits to confirm that processes are being properly applied (see Figure 5).

Figure 6: Reaching agreement on best practice project development processes involves four steps



Transfund would need to augment its current audit programme to gain confidence that best practice processes were being applied appropriately. Feedback would be provided to each RCA regarding their relative performance and opportunities for improvement would be identified. It will be important that this system of 'best practice development' does not inhibit innovation. A formal feedback loop is critical to the success of this recommendation to enable RCAs to develop and refine best practice in pace with new techniques or industry changes, as well as to progress any areas identified for improvement.

Implementing this change is expected to result in a more robust and efficient project evaluation process, whereby Transfund is better positioned to assess quality and gain greater value for money. For phase gated and case managed projects, funding would be conditional on assurance that the RCA was applying best practice. It is anticipated that the emphasis on continuous improvement would result in more benefits to road users in the form of higher quality, efficiently delivered roading projects.

4. Transfund and RCAs should develop best practice for risk assessment.'

To make a wise purchase decision, it is essential that Transfund is aware of the possible impact and distribution of the risks it is assuming and which risks have been allocated to other parties. Transfund also needs to have confidence that the risks held by the RCAs are being managed effectively. Enhanced risk management has potential to add value in the form of reduced project costs, selection of the best option, increased benefits to road users, potential for faster project delivery and reduction in overall project uncertainty.

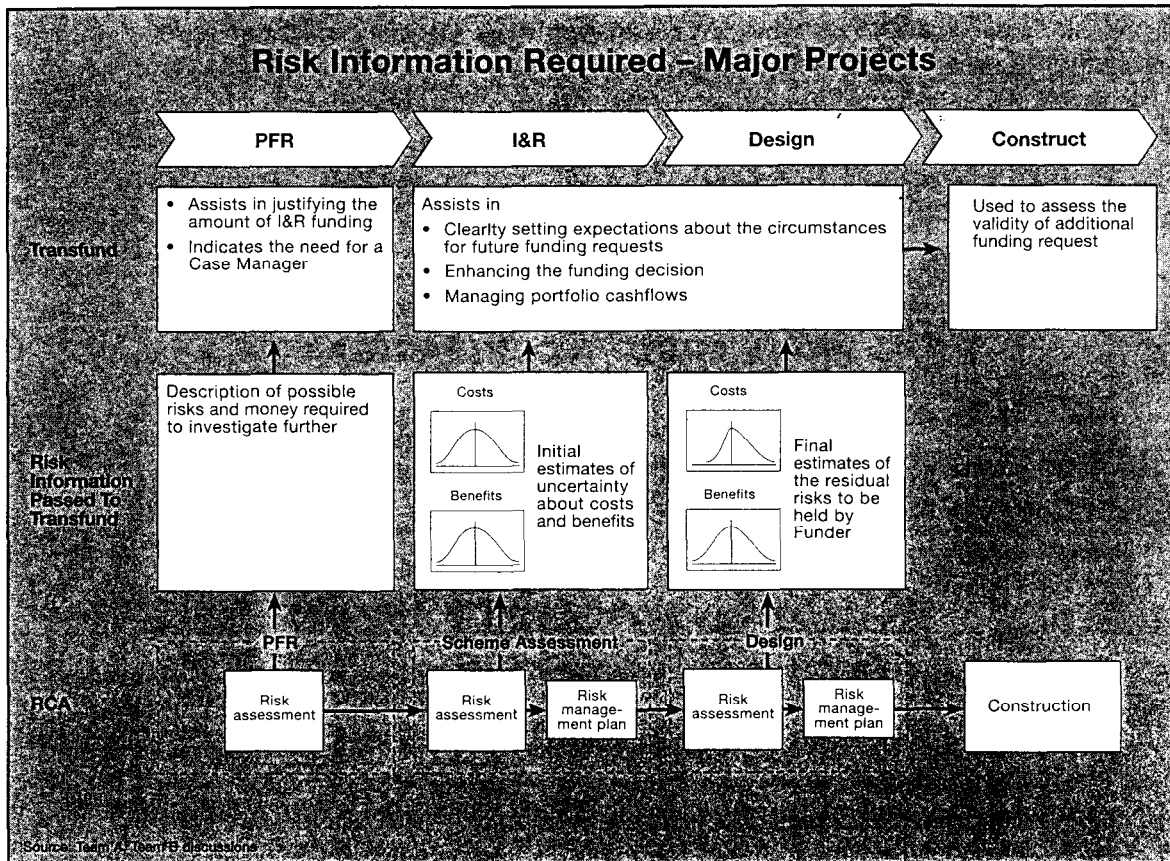
The benchmark for risk assessment is New Zealand Standard 4360. It defines the key elements of a risk assessment as: establishing the context of the assessment, identifying risks, analysing the risks, evaluating risks, and developing risk management strategies. As a key project development process, 'best practice' for risk assessment should be developed by Transfund and RCAs in accordance with this benchmark.

Risk assessments should be applied at the key decision points between all project development phases, with the objective of each assessment varying, depending on the phase. The design of the risk assessment would involve a trade-off in three areas: the level of prescriptiveness (i.e., whether a template approach or 'blank page' approach is used), the level of detail, and the degree of expertise brought to bear on the assessment. The trade-offs made should vary, based on the project's cost and risk profile.

Transfund requires significantly more information on the risk of projects that are phase gated and case managed compared with output funded projects. Cost variations on a major project can have a significant impact on the portfolio as a whole. Information from the risk assessment would assist Transfund in reviewing

a project's option selection, managing cashflows, confirming contingency funding levels and managing expectations about the circumstances under which additional funding might be requested (see Figure 6).

Figure 7: For Phase Gated or Case Managed projects, Transfund will require robust risk information



In contrast, for output funded projects Transfund would require less information because RCAs would manage project risks within their overall output allocation.

Prior to the drafting of the Risk Analysis Guidelines (recently developed by Transit and Transfund, with assistance from Sinclair Knight Merz) there were few explicit requirements in the Project Evaluation Manual for a risk assessment to be carried out. The Review confirmed that the Guidelines would be useful in extending the discipline of risk assessment, as set out above. To enhance the effectiveness of the Guidelines, the following refinements are recommended:

- The expertise of the people performing the assessment should be considered. The expertise of the people undertaking risk assessment is a key driver of the quality of the assessment and this aspect should be given attention as ‘best practice’ is being developed.

Explicit risk information requirements should be developed.

The Guidelines should be explicit about the type of risk information required at each phase. For example, at the PFR phase when risks are not well known a qualitative, rather than quantitative, estimate of risks would be sufficient. Also, for major projects, the measure of aggregate risk produced by Monte Carlo analysis was thought to be more useful than the Guidelines’ ‘risk indicator’.

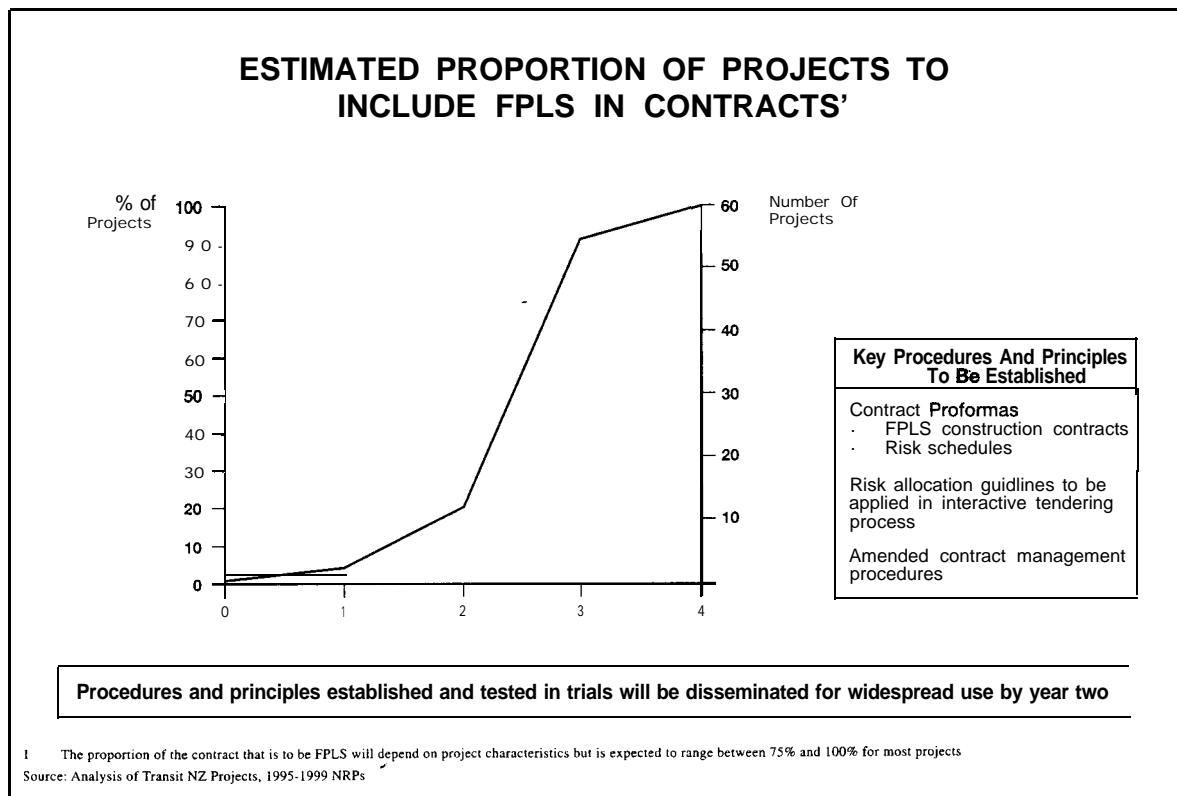
5. FPLS should feature in all physical works contracts in four years

The Review explored the wider application of emerging project development and delivery methods and contract forms accompanied by enhanced project management processes.

Currently, 99% of roading projects use a schedule of rates “measure and value” as the contract form. Internationally, alternative contract forms are being used more frequently and resulting in mainly positive outcomes.

The Review recommends that, subject to the results from specific procurement trials, Fixed Price Lump Sum (FPLS) should feature in all contracts where the risks are capable of being managed by the contractor. This would serve to improve cost certainty and risk allocation. The transition to FPLS should take place over four years (after the contract form is tested in trial projects). Risks best managed by the contractor would include engineering, labour disputes, input prices, and construction delays. Contract risks that are either unquantifiable or best managed by the principal should continue to be contracted on a schedule of rates. Examples of risks best retained by the principal would include political risks, and principal-initiated scope changes (see Figure 7).

Figure 8: The use of FPLS in contracts is expected to increase rapidly once procedures are established and industry education has occurred

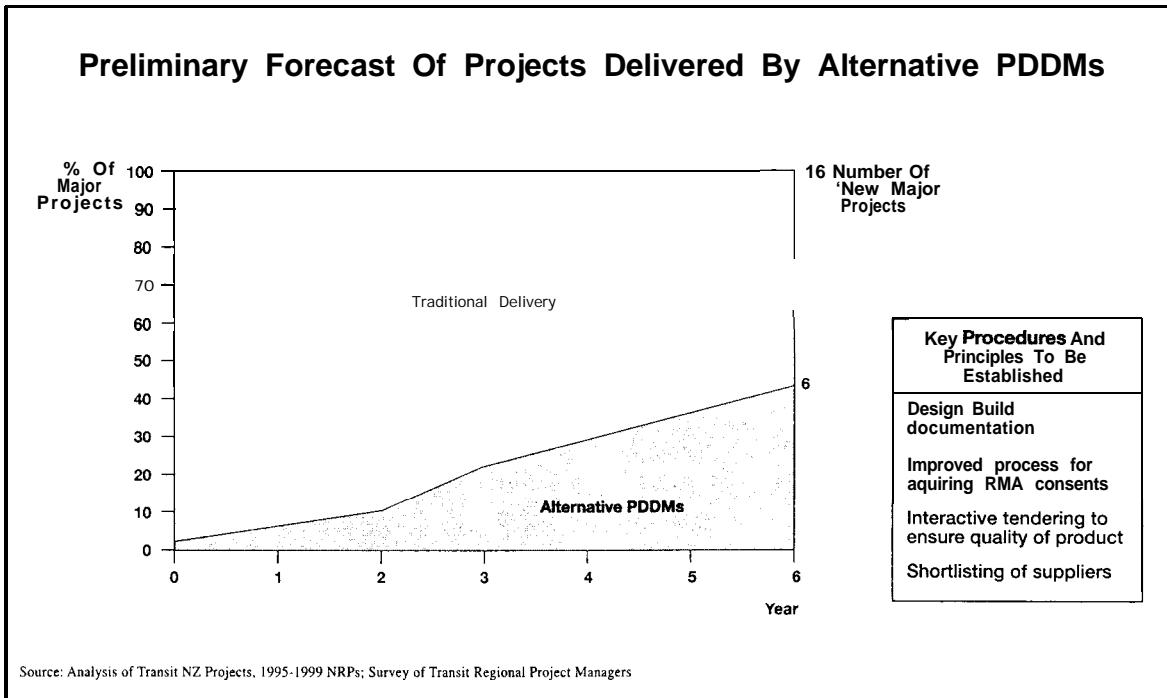


6. Alternative delivery methods should be trialled over the next two years.

The Review explored various alternative delivery methods. Separate investigation, design, and build delivery mechanisms are used in 97% of New Zealand roading projects. These traditional project development and delivery methods (PDDM) separate the designer and the builder, and therefore restrict innovation. They also reduce the potential for the contractor to ‘design risk out’ or assume higher risk. It is recommended that the selection of project development and delivery methods should be based on a project’s risk profile and the opportunity to add value through innovation. This approach would lead to a growing proportion of alternative delivery mechanisms, such as ‘Design-Build’ and ‘Design-Refine-Build’.

The Review estimates that by 2005 alternative delivery methods will be used for up to 40% of major projects. Since larger projects offer greater potential to add value through innovation, the mix of projects using alternative delivery methods will be skewed towards those with higher capital cost. It is therefore estimated that this 40% of projects will account for up to 70% of construction expenditure (see Figure 9).

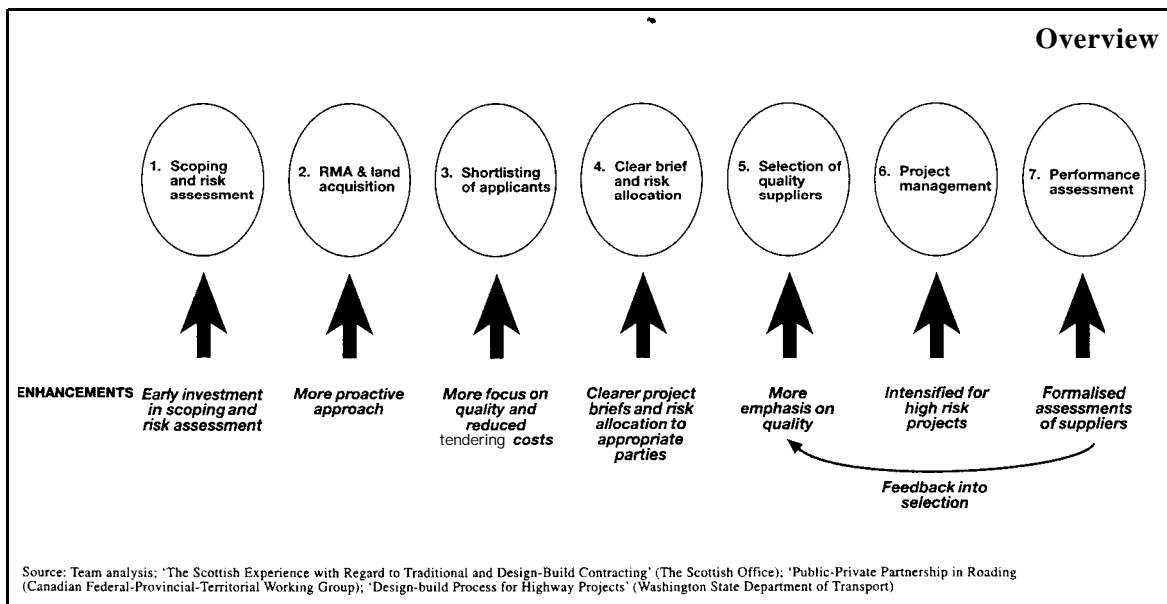
Figure 9: The use of alternative PDDMs will increase gradually over six years and is conditional on the results of trials



The proportion of the projects to be delivered by alternative project development and delivery methods will be based on the results of trial projects and their ongoing experience. The trials will be formally evaluated at five points (post short-listing, post award, final design, post completion of works, and at the end of the warranty). The feedback from the evaluations will be used to refine the implementation strategy and improve the programme overall. This will require the development of a formal evaluation framework and a dedicated resource to manage the evaluation programmes. An annual newsletter to communicate overall results and monitor value delivered is planned by Transit.

The Review identified seven key processes in project delivery that should enhance the quality of the output and value for money (see Figure 10).

Figure 10: Focusing on seven management processes in project delivery will enhance output quality and value for money



1. Invest early in scoping and risk assessment:
 - I&R work should clearly define the scope of the project and performance requirements especially when Design and Construct is proposed to follow.
 - High quality risk assessments should be carried out in order to achieve optimal risk allocation under Fixed Price Lump Sum.
2. Take a proactive approach to RMA and land acquisition issues:
 - Early consultation should take place with consent authorities, potential objectors and landowners.
 - Expected environmental effects and mitigation measures should be analysed thoroughly at the Scheme Assessment Phase.
 - Land acquisition strategies should be prepared for all major projects with significant land acquisition issues.
3. Shortlist applicants on projects with high tender costs:
 - Shortlisting should be used on most Design-Build projects.
 - Most traditional projects should remain open tender.
 - Quality attributes would still be the basis for shortlisting tenderers.
4. Provide clear briefs and risk allocation under FPLS:
 - Request for tender should include clear statements of Principal's requirements, design criteria, performance standards, consent conditions and risk allocation.
 - Interactive tendering should be used to clarify project brief, including risk allocation, and to deal with alternatives.
5. Streamline supplier selection processes:
 - For I&R, and designs where scope is not well defined, quality should dominate supplier selection.
 - Selection of physical works suppliers for minor projects with well-defined scope should be based on lowest priced conforming tender.
 - As project size and complexity increases, quality becomes a more important factor in physical works supplier selection, except when preceded by shortlisting.
6. Undertake intensive project management for high risk projects:
 - High-risk projects should have specialist expertise in project management and design review.
 - Key risk areas should be identified and closely managed.
7. Formalise supplier performance assessment process:
 - Key aspects of supplier performance such as output quality, timely delivery and cost should be measured.
 - Supplier performance reports should be made available to other RCAs.
 - Previous reports should feed into supplier selection.
 - A range of incentives and sanctions should be used to improve supplier performance.

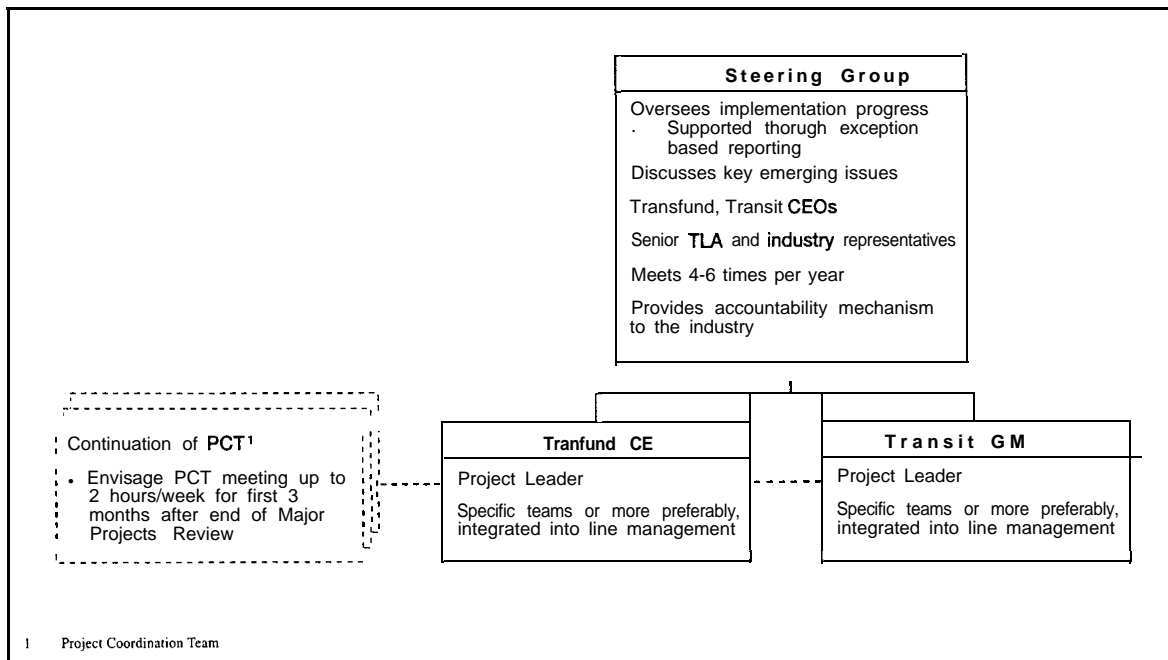
Implementation

These recommendations were arrived at after rigorous research, analysis, and debate over the course of the twelve week Review. There is clear evidence the proposed changes will produce significant gains to road users. A well structured implementation plan is critical to ensure that these gains are realised and the changes are 'locked in'.

Implementation of the proposed changes would have significant effects on the wider roading industry. The Review has highlighted some immediate priorities for preparing the industry including up-skilling of contractors and consultants in alternative contract forms and delivery methods, preparing to address effects on the supplier industry, and communicating the recommendations to the industry in a systematic way.

One of the major success drivers of this Review has been the close cooperation among the cross-industry staff on the various teams. In light of this, an integrated, cross-industry approach to implementation is recommended. An industry steering group would play a key role in providing an accountability mechanism to the industry to ensure that recommendations are implemented as planned and value gains are realised (see Figure 11).

Figure 11: Integration of the change programme is essential



Progress reporting will involve three major activities: construction and operation of a project management database, reporting on progress against specific project KPIs, and a pilot evaluation to assess both the achievement of objectives and further opportunities for improvement.

Conclusion

While New Zealand road funding and management is at the leading edge of international practice, the Major Projects Review identified a number of opportunities to improve current processes and enhance the value delivered by large roading projects.

Implementation of the Review recommendations is likely to result in:

- reductions in construction costs
- capped risk to road users and Transfund
- improved utilisation of resources
- greater innovation and flexibility in the provision of quality roading solutions
- more timely commencement and completion of projects.

These benefits will be achieved through:

- clearer accountabilities and improved performance measurement for Transfund and Transit
- greater investment in project scoping and identification and management of risks
- better linkage between outputs (eg, road improvements) and desired land transport sector outcomes (eg, improved safety)
- better matching of the volume of projects with available funding
- greater use of fixed price lump sum in contracts and design/build delivery methods.

Summary of impacts and benefits of proposed changes

The proposed changes would have widespread impact on all roading sector organisations, resulting in better project selection, specification, evaluation, management and delivery. These impacts, and the specific benefits associated with them, are summarised below.

Organisation/stakeholder	Impacts/Results	Benefits
Road users	<ul style="list-style-type: none"> • Efficiency gains recirculated into more construction projects • Better alignment between outcomes sought and construction priorities 	<ul style="list-style-type: none"> • Better value for money • Greater meeting of road user needs priorities • More timely project delivery
Transfund	<ul style="list-style-type: none"> • Changes to: <ul style="list-style-type: none"> - accountabilities - purchase role and arrangements with RCAs - funding methods - evaluation processes - internal organisation 	<ul style="list-style-type: none"> • Clearer, more effective purchase role • Stronger influence over RCA performance • Reduction in risk of poor project time/cost performance • Focus resources on activities which add greatest value
Road controlling authorities	<ul style="list-style-type: none"> • Tighter, clearer accountabilities • Development of output funding for lower cost/risk projects • More emphasis on early stages of project development • Interaction with Transfund re case management of high value/risk projects • Changes in procurement, contracting and project delivery methods 	<ul style="list-style-type: none"> • Greater performance freedom and incentives • Better project specification and selection • Greater potential for innovation • Better allocation and management of project risk
Roading contractors	<ul style="list-style-type: none"> • Closer relationships with client and designer/consultant • Greater responsibility for managing risk under FPLS and alternative delivery mechanisms • Enhanced skill requirements 	<ul style="list-style-type: none"> • Earlier involvement in project development • Greater potential for innovation
Consultants	<ul style="list-style-type: none"> • Ability to propose higher value solutions • Closer relationship with contractors for some projects • Wider range of contract forms, delivery mechanisms and associated procurement methods • Enhanced skill requirements 	<ul style="list-style-type: none"> • Greater potential for innovation • Potentially greater reward through value enhancement

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