

LOW-VOLUME ROADS IN AUSTRALIA

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CONTEXT

With a population of about 17 million, over 9 million registered motor vehicles and a land area of 7.7 million square kilometers, Australia is both highly motorized and one of the most sparsely populated countries in the world. With over 60 per cent of the population living in major cities on the coast, it is also a highly urbanized country. Non-urban road travel is characterized by long distances, high speeds and low traffic volumes.

Parts of the primary (National) highway network and a substantial proportion of the secondary (State) highway networks can carry less than 400 vehicles/day. Hence low-volume roads play a very important role in Australian transport, serving not only rural access functions, but also primary and secondary highway functions.

DESIGN

Pavement

Many of the low-volume roads have evolved from earth surfaces, and this road type is still common for the lower volume access roads. Constructed pavements typically comprise 100 to 300 millimeters of unbound granular material, often a local material which may not fully satisfy traditional specification requirements. Depending on traffic volume and road function, a chipped bituminous surface seal may be applied. As well as providing a better running surface for road users, the surface seal also serves to maintain an equilibrium moisture condition within the pavement structure.

For the sealed network, ride quality is generally good and does not have a great influence on vehicle operating costs.

Cross-Section

Carriage way widths for unsealed roads typically range from 5 to 8 meters. The narrower carriageways pertain to very low traffic volumes and little anticipated growth. The wider carriageways are for higher traffic growth situations where future upgrading to a sealed roadway is anticipated.

Sealed roadways typically comprise a 6 meter seal (2 x 3 meter lanes) and 1 meter gravel shoulders. The earlier practice of 5.6 meter seals for less than 300 vehicles/day has largely been abandoned because of excessive seal edge maintenance costs.

Current design policies call for single-lane (3.7 meter) seals if a seal is to be provided on roads carrying less than about 150 vehicles/day. This practice is falling into disfavor, however, because of perceived safety problems, and seal edge and shoulder maintenance costs.

RECENT DEVELOPMENTS

Maintenance Standards

With continued tightening of roads budgets, maintenance funding is coming under greater scrutiny. Asset management reviews have been undertaken at both state and local government levels to develop maintenance and rehabilitation strategies. These reviews have typically indicated that past maintenance standards on many low-volume roads have been higher than is economically warranted. In some instances, previously sealed roads may be converted back to a gravel surface to avoid the cost of maintaining a bituminous seal.

In-Situ Stabilization

The granular resheet (overlay) has been the traditional rehabilitation treatment for Australian unbound granular pavements. However, with increasing cost and, in some regions, scarcity of pavement materials this is becoming a relatively expensive treatment. This has resulted in renewed interest in in-situ recycling by cement stabilization as a rehabilitation and strengthening option.

Seal Widths

Some sealed roads are being converted back to gravel, and many planned extensions to the sealed network are being deferred. However, where seals are applied there is a trend to greater seal width. This has come about from the realization that, in a life-cycle cost sense, the initial seal is relatively cheap but maintenance is expensive.

sive. At least for low-volume State Highways, several agencies are now including part-sealing (0.5 m) of shoulders in the seal width. This is based on increased safety, reduced shoulder and seal edge maintenance, and shifting the pavement edge zone which is seasonally weakened by moisture ingress away from the outer wheel path.

Geotextile Reinforced Seals

In the drier regions of Australia, earth formations are structurally adequate to carry low traffic volumes, provided they are kept dry. However, dust is a nuisance in the dry season and roads can become impassable in the wet season. Recent trials have demonstrated that these problems can be overcome with a geotextile reinforced bituminous seal laid directly over clay subgrades. This can be achieved at about 25 per cent of the cost of a conventional unbound granular base and seal.

EMERGING ISSUES

Funding

Most of Australia's low-volume road network is under the control of local government authorities. Funding for

these roads comes from three sources: federal government road grants; state government road grants; and local taxes. Current funding levels are not sufficient to maintain the low-volume network in its present condition, but it is becoming accepted that lower condition targets may be more appropriate. The whole question of inter-governmental funding of roads is currently under review and it is likely that, at least at the federal level, road grants to local authorities will be replaced by untied grants. It remains to be seen whether roads are sufficiently high on the local political agendas for road expenditures to be maintained at current levels under such an arrangement.

Community Service Obligations

Low-volume roads in Australia have long been seen as having a social as well as an economic purpose, particularly for sparsely populated rural regions. However, for many of these roads, ongoing maintenance cannot be justified in a strict economic sense. As with Australian rail and telecommunications services, it is now recognized that the road agencies will need to differentiate between the community service obligation and economic objectives for roads, and that different maintenance criteria and funding arrangements may be required to meet these different objectives.