



# EVOLUTION IN RTA CONCRETE SPECIFICATIONS & INFLUENCE ON PACIFIC HIGHWAY UPGRADING

## A Chronological Review

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**CASE  
STUDY  
NO. 5**

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The Roads and Traffic Authority of NSW (RTA) develop specifications for concrete in each of their various Sections - Bridges, Pavements and so on. Back in 1993 there seemed to be little if any interchange between the various sections. Fly ash was specified in concrete sub-base and roundabouts but was proscribed elsewhere.

### 15 DECEMBER 1992

A delegation of four representatives from the Ash Development Association of Australia (ADAA) met at Rosebery with four representatives of RTA Bridge Section to discuss inequities in the RTA Bridge Specification B 80, Edition 1 Rev 5, which stated "Fly ash shall not be used". After several hours of discussion, four dejected men left Rosebery.

*At about this time, Barney's Point Bridge over the Tweed River, the first stage of the Chinderah Bypass, was out to tender to the above specification. Fly ash was not permitted in the concrete. The Chinderah area presents both the problems of salt water in the river and acid sulfate conditions in the surrounding wetlands.*

### SEPTEMBER 1994

The Chinderah Bypass Specification R5, Ed 1/Rev5 called for S50 concrete for culverts in the above aggressive environments. The use of fly ash was not permitted. A written submission to RTA Rigid Pavements Section and to the Site Engineer, Jim Campbell, included the following:

*As an outsider, I have found it interesting to watch the evolution of concrete specifications within the R.T.A. Sections to meet essentially the same exposure conditions. The Bridge Section B80 Specification now comes out quite strongly in favour of the use of fly ash and limits*

*maximum compressive strength. For Chinderah, fly ash is not an option and yet across the border, it becomes mandatory! The specification both of ACSE cement and shrinkage limits seems unnecessarily restrictive. A revised version might specify Type SL (shrinkage limited cement).*

*As a concrete technologist I am totally bewildered by the specification of a maximum air content of 4% and as Chairman of the Australian Standards Committee BD/33 on Chemical Admixtures for Concrete and as a formulator of chemical admixtures, am concerned that only two brands of high-range water-reducing admixture are permitted.*

### OCTOBER 1994

In discussion with RTA engineers, the options of permitting fly ash and high-range water reducing admixture in concrete for culverts were suggested.

### FEBRUARY 1997

Contact was made with RTA Bridge Section requesting a suitable project for a case study on fly ash in RTA concrete. The surprising response was "Contact Jim Campbell, Site Engineer for Chinderah Bypass".

### CHIDERAH, MAY 1997

All is revealed.

### SOUND BARRIERS

Very attractive, lightweight-concrete sound barriers were precast in Victoria for use on Barney's Point Bridge. Fly ash might have been proscribed from use in the bridge foundations but this was not the case with the finishing touches.

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## CONCRETE CULVERTS

In October 1994, a revised version of the Specification R5 for Earthworks & Drainage (Ed 1/ Rev6) permitted *blended cement containing not less than 20% nor more than 35% of Fine Grade fly ash to AS 3582.1*. Fly ash concrete was used in the precast culverts supplied.

## ROADS

Sub-base concrete for all roadworks, to R51 Ed2 / Rev0, was specified to contain at least 100 kg of fine grade fly ash per cubic metre with at least 90 kg of cement. However, since the minimum total binder *shall not be less than 250 kg*, fly ash addition of 150 kg or more is normally used.

## MEDIAN BARRIERS

Being specified as Normal Class concrete, it was virtually inevitable that the slip-formed "Jersey" barrier would be placed using fly ash concrete.



## OTHER BRIDGEWORKS

Eighty km south of Chinderah, two small road bridges are currently under construction, as part of Bangalow Bypass, in the continual up-grading of the Pacific Highway. Ground conditions here are similar to those at Chinderah.

Edition 3 / Rev 0 of Bridge Specification B 80, which applies, addresses potential problems of aggressive groundwaters and possible alkali reactive aggregates. Addition of fine grade fly ash at the concrete batchplant is permitted to meet the requirements for blended cement.

New specified **Requirements for Durability** include:

- (e) For exposure classification U the following additional requirements shall be met:
- (i) aggregates shall comprise limestone or dolomite with a minimum acid solubility of 90% in accordance with Clause C 4.2 of AS 3735 Suppl- 1991.
- (ii) cement shall be a blended cement containing fly ash with a content of between 30-40% of the cement by mass.

Mission accomplished.

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