Inner City Bypass Project Brisbane

4.5 Kilometres
Links Hale Street at Paddington
to
Kingford Smith Drive at Hamilton

Client:	**Brisbane City Council**
Superintendent:	**Sinclair Knight Merz**
Contractor:	**Leighton Contractors**
Design:	**Leighton's Design Team** **Contact: Mr. Iain Burgess**
Engineers:	**Maunsell McIntrye** **Contact: Mr. John Hart**
Concrete Supplier:	**CSR Construction Materials** **Contact: Mr. Todd McGurgan**
Xypex Australia:	**Marketing Executive** **Contact: Ms. Maria Bobeldyk**
Waterproofing Contractor:	**Xycrete** **Contact: Mr. Kevin Hill**

Contents:

Trial Information
Project Works containing Xypex products
- **Landbridge**
- **Inner Northern Busway Tunnel**
- **RNA Tunnel**

Maunsell McIntyre

Maunsell McIntyre Pty Ltd
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Australia
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Maunsell

FACSIMILE

To:	MMPL (ICB Site Office)		Sheet: 1 of
Attention:	Peter Kouparitsas	Fax No:	07 - 3872 2765
From:	Frank Collins	Copied to:	John Hart (ICB Site Office)
Date:	27 July, 2000	Ref No:	Fgc055
		Project No:	10206200.09
Subject:	**BICB – Xypex – Mix Trials and Slab Tests**		

Peter,

Further to my Draft DC 1690 sent by email Friday 21/7/00, & following discussion regarding the mix trials with Iain Burgess, LCPL are keen to conduct mix trials as well as producing trial cracked concrete slabs to test the effectiveness of Xypex for waterproofness. I have discussed this with John Connal and have the following suggestions:

1. The concrete mixes need to be essentially identical to the type of concrete mixes that CSR Readymix would use in this project for the concrete slabs in the Land Bridge and tunnel roof slabs. From the concrete mix trials we would be seeking clarification of the following information:

(i) Comparison concrete mixes with and without Xypex.

(ii) Measurement of the following fresh concrete properties (to Australian Standard AS1012): Initial slump and slump loss over 45 minutes, bleed, fresh density, air content, time to initial set, time to final set, compatibility with other chemical admixtures

(iii) Measurement of the following hardened concrete properties (to Australian Standard AS1012):

- Compressive strength at 1, 3, 7, and 28 days
- Drying shrinkage (to 56 days)
- Water absorption

2. Waterproofness of cracked slabs

Testing the waterproofness of cracked slabs, made on-site and of similar proportions to the Land Bridge deck slab, will be a better indicator of the waterproofing properties of Xypex compared with testing of laboratory-size samples. The slabs are designed to crack under the action of restrained shrinkage.

It is proposed to make six (6 No.) slabs at the ICB site. It is proposed that the slabs are representative of the Land Bridge deck slab and are of dimension (at the cracked

FACSIMILE cont.

Subject: **BICB – Xypex – Mix Trials and Slab Tests** SHEET 2 OF

section) of 160 x 1000 x 3000 millimetres. A typical slab is shown in the attached Figure 1. The proposed slab types are as follows:

(i) 3 No. slabs, with the configuration as shown in the attached figure, made with concrete containing no Xypex. The slabs are designed to generate cracking at mid-span under the action of restrained shrinkage. It is proposed that the cracked slabs are ponded with water on the top surface and the amount of water flow through the crack is monitored.

(ii) 3 No. slabs, with the configuration as shown in the attached figure, made with concrete containing Xypex. The slabs are designed to generate cracking at mid-span under the action of restrained shrinkage. It is proposed that the cracked slabs are ponded with water on the top surface and the amount of water flow through the crack is monitored.

The slab configuration and method of ponding are outlined below.

Internal restraint is provided by the 1 metre anchorage length (at each end) of Y20 bars longitudinally cast into the slab. The central 1 metre portion of the bars are sheathed with smooth PVC electrical conduit to minimise the concrete to steel bond. The cross-section at the centre of the slab is reduced by casting in a removable angle section to create a groove suitable to act as a crack initiator. The slabs should be made and cured to the same methods that LCPL would implement for the construction of deck slabs made with and without Xypex. The slabs should be de-moulded at 24 hours and placed (preferably) on roller supports (or on 2 layers of polythene plastic sheet on a smooth level surface). Following the period of curing, the slabs should be left exposed to drying conditions (& preferably sheltered from rain) to enable restrained shrinkage (& cracking) to occur. Cracks of different width can be generated by maintaining some of the slabs under drying conditions for longer duration of time.

Following cracking and prior to water ponding, the crack width should be measured at several locations at the top and side. A reservoir for ponding water should be set up on the top surface of the slab (e.g. – PVC pipe section sealed with silicone sealant) and a constant water head (e.g. – 50 millimetres) maintained for 7 days. The top of the reservoir should be cover to prevent evaporation. Water permeating through the crack from the down-stream concrete face should be collected in a tray and the quantity measured. The two types of concrete, with and without Xypex, can be ranked. If the concrete slab containing Xypex has not healed sufficiently and seepage continues the post-cracking treatment using Xypex concentrate should be implemented and assessed. Following completion of the test the cores should be drilled through the cracked section to assess the amount of healing that has occurred across the crack due to the action of Xypex.

FACSIMILE cont.

Subject: **BICB – Xypex – Mix Trials and Slab Tests** SHEET 3 OF

I welcome your comments on this test programme. I believe there is a risk involved with not using a conventional waterproofing membrane and the effectiveness of Xypex, and potential side-effects with it's use, should be thoroughly assessed before we can approve it's use.

Regards

Frank Collins

Three structures on the ICB were sealed using Xypex Admixture concrete, the Inner Northern Busway tunnel at Normanby, the RNA tunnel under the RNA showgrounds and the Landbridge at York's Hollow.

The RNA tunnel was built using the cut and cover method. It consists of cast insitu walls covered with precast planks with and in-situ deck slab. The Landbridge used conventional T-Roff girders with a cast in-situ deck slab. On both structures, a waterproof membrane was specified to reduce leakage and prevent water from dripping onto the carriageway of the ICB.

The design life of structures on the ICB is 100 years. During investigations of the various membrane types, the longevity of the membrane on the landbridge and the RNA tunnels was questioned. On both structures, heavy equipment would be needed to place the soils and to install drainage and irrigation systems once the soil had been placed.

Both structures were to be covered in soil with a depth varying from 0.3m to 1.0m. This left the membrane for both structures exposed to potential damage from excavators, tent stakes and garden forks both during and after construction.

The use of a topping slab was considered on the RNA tunnel but rejected due to the difficulty in placing and ensuring no damage to the membrane during placement, as well as the extra expense.

A topping slab on the Landbridge would reduce the depth of soil available for the plants and trees due to the structural requirements that limited the depth of soil allowed.

A number of alternatives to a waterproof membrane were investigated. Xypex was identified as potentially a superior solution, which will fulfil long-term water proofing requirements including the ability to accommodate structural cracks. Xypex concrete had been successfully used on the South Bank Parking Structure without a waterproof membrane. There a 1m depth of fill, which has been planted in a similar manner to the landbridge, was placed over the slab. The average slab thickness was approximately 200mm. The parkland has a permanent irrigation system and the soil is constantly wet. Inspections of the structure showed no noticeable leakage. A number of commercial residential buildings built with Xypex and without a waterproof membrane that had similar gardens to South Bank were also inspected and no leakage found.

A series of trials were set up to determine the effectiveness in the autogenous seal healing properties of Xypex.

The results of the water flow tests show that Xypex can effectively seal small cracks up to 0.7mm. Xypex appears to reduce the flow in cracks wider than 0.7mm. In time these crack may self heal, however a proper repair as per the Xypex specification should be used.

The results of the physical concrete tests indicate that concrete with Xypex added shows no adverse reactions. Slump, consistency and set times were all within the normal limits of conventional concrete.

Xypex concrete was used first on the Landbridge and then on the RNA tunnel. The advantage of the Xypex concrete was seen during backfilling operations when full size trucks were used to replace the approximately 15,000m^3 of soils imported and compacted on top of the tunnel roof slab to form the basis for the pavement in the RNA. Drainage, sewerage and services where then reinstated. Once completed, the area was topped with asphalt to form a parking lot.

Interim Report – Xypex Trials conducted August/September 2000.

1. Reason for the Trials

The design life of structures on the ICB is 100 years. During investigations of the various membrane types, the longevity of the membrane on the landbridge and the tunnels was questioned.

A number of alternatives to a waterproof membrane were investigated. Xypex has been identified as potentially a superior solution which will fulfil long term water proofing requirements including the ability to accommodate structural cracks. Xypex concrete had been successfully used on the South Bank Parking Structure without a waterproof membrane. There a 1m depth of fill, which has been planted in a similar manner to the landbridge, was placed over the slab. The average slab thickness was approximately 200mm. The parkland has a permanent irrigation system and the soil is constantly wet. Inspections of the structure showed no noticeable leakage. A number of commercial residential buildings built with Xypex and without a waterproof membrane that had similar gardens to South Bank were also inspected and no leakage found.

MMPL proposed a series of trials to prove the Xypex system for this particular project for use in the Landbridge, RNA tunnel and the Normanby Tunnels.

2. MMPL Trial Specifications

Concrete test requirements were as follows:

(i) Measurement of the following fresh concrete properties (to Australian Standard AS1012): Initial slump and slump loss over 45 minutes, bleed, fresh density, air content, time to initial set, time to final set, compatibility with other chemical admixtures

(ii) Measurement of the following hardened concrete properties (to Australian Standard AS1012):
- Compressive strength at 1, 3, 7, and 28 days
- Drying shrinkage (to 56 days)
- Water absorption

Testing the waterproofness of cracked slabs, made on-site and nilar proportions to the Land Bridge deck slab, was proposed as a better

indicator of the waterproofing properties of Xypex than testing of laboratory-size samples.

MMPL proposed that 3 slabs be made at the ICB site. The slabs were to be representative of the Land Bridge and RNA tunnel deck slabs and have a dimension (at the cracked section) of 160 x 1000 x 3000 millimetres. A typical slab is shown in the attached drawings. The slabs were designed to crack at mid-span under the action of restrained shrinkage.

A 0.5 metre anchorage length (at each end) of Y20 bars longitudinally cast into the slab provided internal restraint. The central 2-metre portion of the bars were sheathed with smooth PVC electrical conduit to minimise the concrete to steel bond. An angle section was cast in to created a groove suitable to act as a crack initiator and reduce the cross section of the slab to 160mm.

Once cracks developed, a reservoir consisting of a 500mm high, 300mm-diameter cylinder was to be sealed onto the top of the cracks, and the rate of flow through the cracks monitored.

Following completion of the test the cores will be drilled through the cracked section to assess the amount of healing that has occurred across the crack due to the action of Xypex.

3. Sample Preparation

The slabs were made and cured to the same methods that would be implemented for the construction of deck slabs. Following the period of curing, the slabs were left exposed to drying conditions (sheltered from rain) to enable restrained shrinkage (& cracking) to occur.

After two weeks no cracks had formed. The slabs were then placed on timbers directly under the crack inducers, in order to induce a crack, this was unsuccessful. An attempt to crack the slabs with a sledgehammer was unsuccessful. Slab 1 was rocked over a timber to produce an impact, and a hairline crack was approximately 0.1 – 0.25mm formed. The crack increased in size over the following week to 0.7mm

At the end of three weeks, an excavator was used to break slabs 2 and 3 producing large cracks of the order of 0.6 – 0.9mm. These cracks also increased in size to 0.9mm to 1.2mm. Cracks were measured on the left hand face, the right hand face, and adjacent to the edge of the cylinders.

Slab No.	LHS	RHS	Centre 1	Centre 2
Slab 1	0.85	0.4 + 0.35 (two cracks)	0.6	0.7
Slab 2	0.7	1.1	0.9	0.8
Slab 3	1.1	0.9	1.2	1.3

Cracks greater than 0.7mm are larger than what Xypex claim they can effectively seal through autogenous self-healing alone without further Xypex repair procedures. They were flexural cracks, which taper down, at the bottom of the slab as opposed to shrinkage cracks, which would be of similar size throughout the slab. The flow path of the water through the flexural cracks produced differs from the shrinkage cracks in that the flow was more horizontal than vertical. The length of the flow path is similar and the head of up to 500mm is of a similar nature to what can be expected in the field. Photos 5 to 9 show the approximate crack sizes and shape.

At this stage the cylinders were sealed onto the slabs using silicone and tested for leakage.

3. Results

On filling the cylinders with water, it was noted that the water was not flowing along the crack, but was simply flowing out the crack under the silicone. We increased the width of the silicone seal around the cylinders over the crack to 75mm, to force the water to flow through the crack.

The cylinders were filled with water and monitoring began on all three slabs. The cylinders were monitored approximately hourly for the first day, thereafter at least twice per day. The cylinders were re-filled when there was approximately less than 20mm of water left in the bottom. On a number of occasions, the cylinders ran completely empty, particularly overnight on the first two days. Thereafter, the flow had decreased enough that filling was only necessary either in the morning or late afternoon.

Figures 1 –3 show the results of the trials up to 13/09/2000. At that stage, we believed that although the flow rate had decreased, we would not effectively seal the cracks in slabs 2 and 3. The crack size was monitored during the trial, there was an increase in the size of the cracks in the early morning when compared to those measured in the afternoon,

indicating that the cracks were affected by the thermal movement of the slabs.

Slab No.	Morning (7:30AM)	Afternoon (3:00 PM)
1	0.85mm	0.7mm
2	1.1mm	1.0mm
3	1.2mm	1.1mm

The tests were stopped on Slabs 2 and 3 and the cylinders were removed and the Xypex repair procedure followed. The tests continued on Slab 1 until the 20/09/2000. Figure 4 shows the results including the last week of testing. The flow rate in slab 1 decreased to a negligible amount.

The Xypex specification for the admixture calls for a thorough inspection of the surface for shrinkage cracks within 48 hours of the initial set. Any cracks found are to be treated with a Xypex concentrate solution. In line with this specification, the cracks on slabs 2 and 3 were ground back, and a Xypex concentrate slurry applied to the crack in accordance with the Xypex Specification. Photos 10 to 12 show the repair operation. The cracks were then cured for 4 days. To date there are no visible cracks on the repair. The repairs will be tested along similar lines to the initial tests

Attached are the concrete test results. The slump, slump loss and initial set time are all within practical limits.

The strength tests show consistent higher concrete strengths when compared to a typical 40Mpa concrete mix.

The results of the drying shrinkage test initially indicated that a high shrinkage strain expected, however, the current results indicate a drying shrinkage of the order of 800 microstrain at 56 days is likely. This is approximately 150 microstrain higher than the average reported by CSR over the last six months for the standard N40 mix. This is contrary to the Xypex literature and shrinkage test results for Xypex concrete used on other contracts around Brisbane. Further shrinkage tests on standard N40 mix and an N40 with Xypex have been performed. The test results are still outstanding.

4. Conclusions

The results of the physical concrete tests indicate that concrete with Xypex added shows no adverse reactions. Slump, consistency and set times were all within the normal limits of conventional concrete.

The results of the water flow tests show that Xypex can effectively seal small cracks up to 0.7mm. Xypex appears to reduce the flow in cracks wider than 0.7mm. In time these crack may self heal, however a proper repair as per the Xypex specification should be used.

The Xypex specification calls for a thorough inspection of the slab within 48 hour after pouring the concrete. All cracks are to be treated with a Xypex concentrate repair. This process should eliminate the large cracks that were tested in the trial.

The Xypex specification calls for the degree of crack control to be "moderate to strong" when implementing Clause 9.4.3.4 of AS3600 and requires a minimum of 1% (0.25% per layer in each direction) which is expected to limit the crack width to less than 0.4mm. With these requirements met, it can reasonably be expected that any cracks from shrinkage and creep that occur after the deck has been covered will be less than 0.7mm and thus would autogenously self heal.

5. Recommendations

Xypex concrete is recommended to replace waterproof membranes in the INB Tunnel, the Landbridge and the RNA Tunnel subject to the following conditions:

(i) The Xypex dosage rate in the concrete is as per manufactures specification
(ii) The Xypex specification is strictly adhered to in regards to batching, placing, compaction and curing.
(iii) The crack control steel as per AS3600 Clause 9.4.3.4 is included in the design.
(iv) A thorough inspection of the deck is carried out within 48 hrs and all cracks repaired in accordance with the Xypex specification.

6. Attachments

Drawing of Trial slab reinforcing layout.
MMPL DC No. 2471 – Comments on Leighton Xypex Report
Xypex Standard Concrete Waterproofing Specifications – Xypex Admix C-1000NF / C-2000NF
Xypex Procedure for Supervision of Xypex Admix Pours
Xypex – Introduction to Xypex Waterproofing by Crystallisation
CSR Report on Xypex Concrete Trial – 23/09/2000
CSR Batch Record – Xypex Concrete S40MXYP

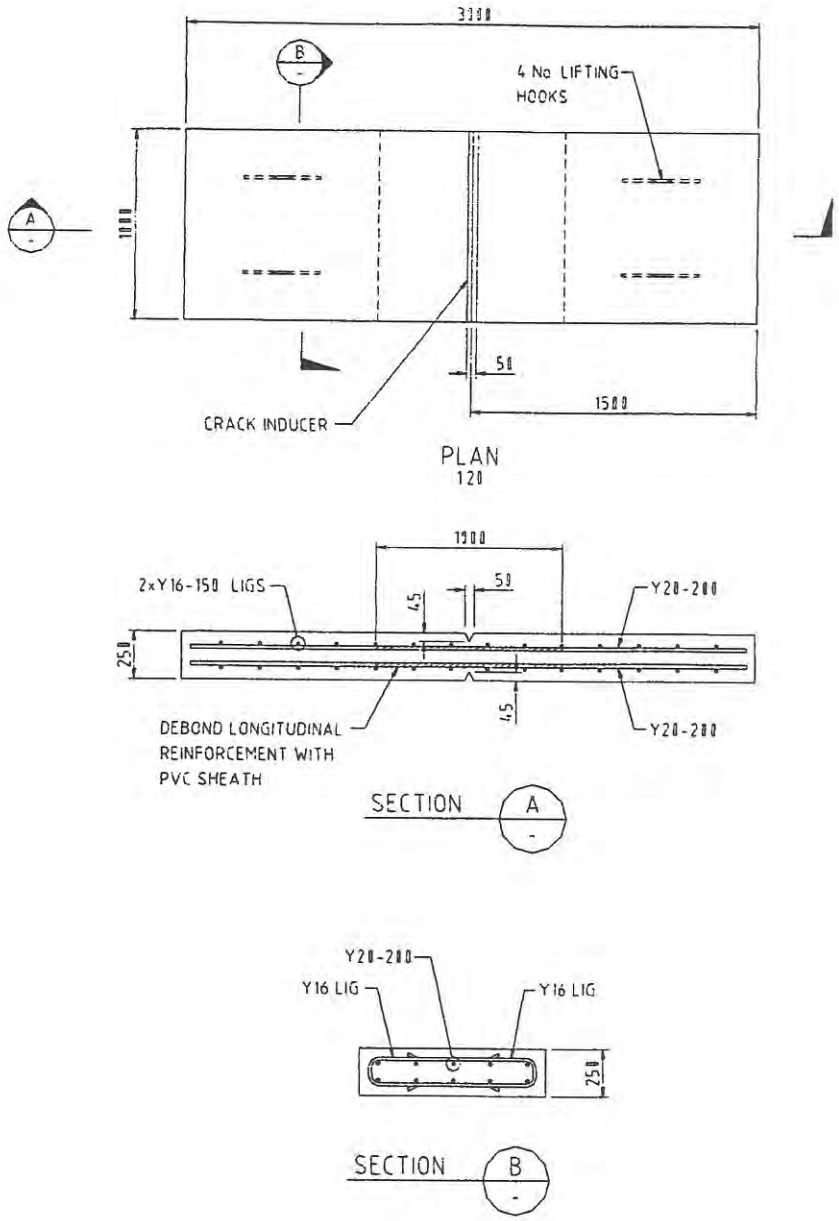


Figure 1 **Proposed Restrained Slab Configuration for Xypex Testing**

CSR Readymix Concrete

CERTIFICATE OF MIX DESIGN

Date: 24 May, 2000
Client: Leighton Contractors Ptv. Ltd.
Contract: Inner City Bypass
Attention: James Hamilton
Facsimile: 07 3872 2700

We are pleased to submit for your approval, the following details of the concrete mix we propose for use to the above, from our despatch depot at Albion and Geebung.

MATERIALS

Material	No	Supplier	Works, Quarry, Pit	Specification
Type GP Cement	1	QCL	Bulwer Island	AS3972
Fly Ash	2	Pozzolanic	Tarong	AS3582.1
20mm Aggregate	3	CSR Readymix	Petrie	AS2758.1
10mm Aggregate	4	CSR Readymix	Petrie	AS2758.1
Coarse Sand	5	CSR Readymix	Tivoli	AS2758.1
Fine Sand	6	CSR Readymix	Oxley Creek	AS2758.1
Not in use	7	-	-	-
Not in use	8	-	-	-
Water Reducer	9	WR GRACE	Archerfield	AS1478/79
Air Entrainer	10	WR GRACE	Archerfield	AS1478/79
Not in use	11	-	-	-

MIX DESIGN

Mix Description	Slump (mm)	Mass of Materials (kg/m3)								Admix. (mL/m3)		
		1	2	3	4	5	6	7	8	9	10	11
N20/20 - N202GMRS	80	180	80	770	350	550	400			1560	100	-
N25/20 - N252GMRS	80	205	85	770	350	530	380			1740	100	-
N32/20 - N322GMRS	80	225	95	780	350	520	370			1890	100	-
N40/20 - N402GMRS	80	260	110	780	360	500	350			2220	0	-
N50/20 - N502GMRS	80	320	140	810	360	460	300	-	-	2760	0	-

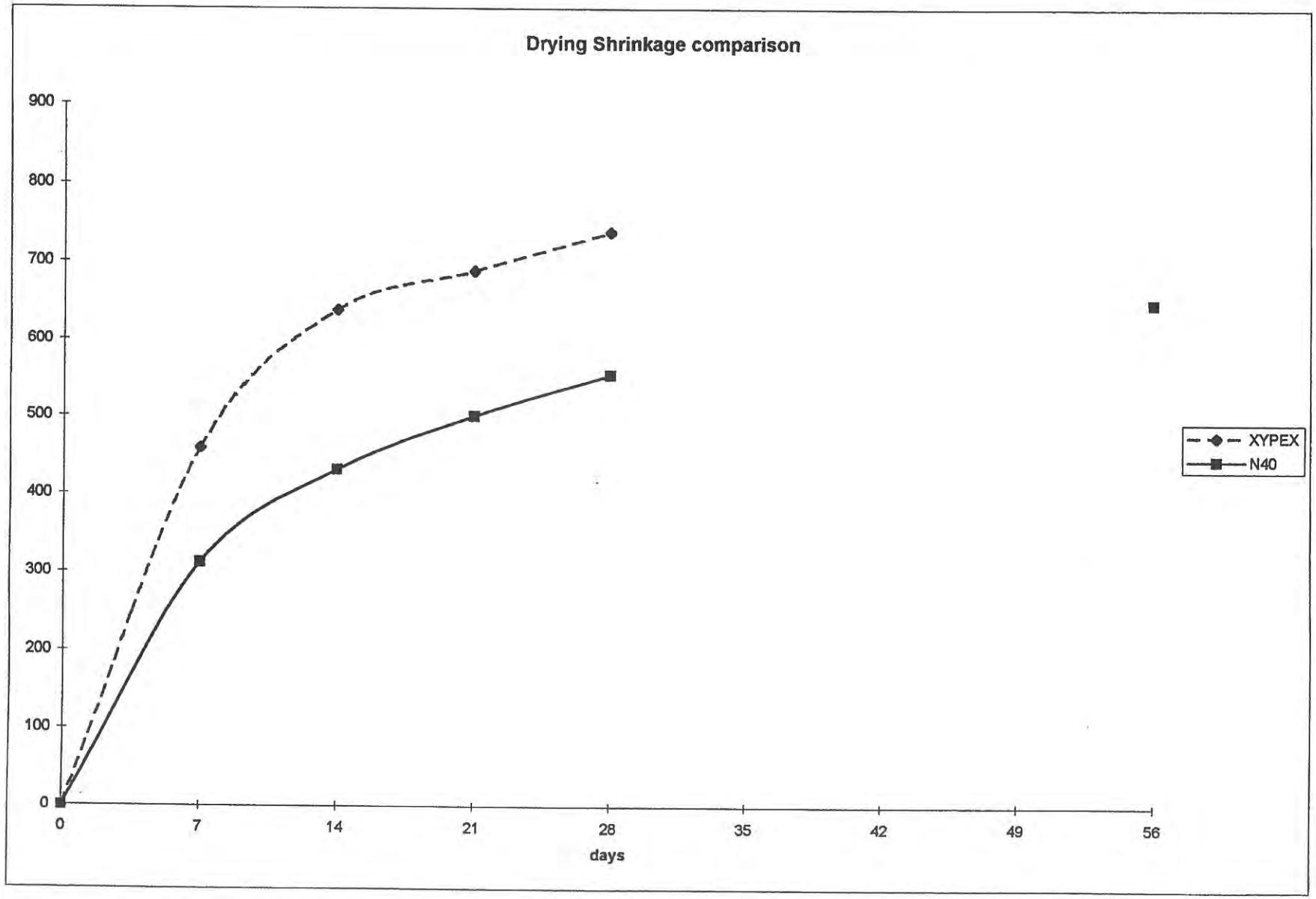
Comments: Coarse and fine sand moisture contents are at 6% and 8% respectively (subject to change). Above figures , including the Aggregate, and Admixture combinations and quantities, are subject to change to ensure compliance with AS3902 and AS1379 requirements. Water Reducer (Wrre) dose will vary to control set time properties.

Yours Faithfully,

Todd McGurgan
CSR Readymix Concrete

Reproduction of CSR Readymix Batch Ticket for Xypex trials

Selection:	Date MONDAY, 14-Aug-00 only											
	Ticket 17052137 only, Shipping plant number 3 only											
Sequence:	Weights report											
Ticket number	Plant No.	Truck No.	Batch	Mix Design	Slump	Hot Water	Amount	Design	Actual	Variance Unit	Variance Percent	Mix code
Plant 03 Crosby Road												
17052137		67	01 of 01	S40MRXYP	80		03.00	03.00	03.00	0	0.00%	380ppe01
				PET 20				002370	002380	10	0.42%	
				PET 10				001071	001050	-21	-1.96%	
				TIVCS				001491	001500	9	0.60%	
				OXCFSW				001020	001040	20	1.96%	
				BULGP				000801	000806	5	0.62%	
				TARFA				000339	000348	9	2.65%	
				WR				003420	003400	-20	-0.58%	
				WATER				000200	000192	-8	-4.00%	
				XYPEX				Added at plant by Xypex				
			Measured slump		80							
			Available water from materials				182	litres				
			Batch water				200	litres				
			Slump stand				50	litres				
			On-site				40	litres				
			TOTAL WATER				472	litres				
			Total cementitious				1154					
			W/C ratio =				0.41	compared with 0.42 design estimated				



CSP OVER 12 mth period
XYPEX 1 test

CSR Readymix Concrete

CONCRETE TESTING SERVICES

XYPEX TRIAL

DATE 14/8/00

NATA

Tests were carried out by the following registered Concrete Laboratory.
BRISBANE TEL (07) 5546 6935

FIRST LOAD CONCRETE DOCKET No. 17052137

JOB SITE / LOCATION: XYPEX LEIGHTONS FCB

FIELD TEST SHEET NUMBERS: 233444

ON SITE	OFF SITE	WAITING	TRAVEL	A/HRS
8.35	15.30	HRS	HRS	HRS

ESTABLISHMENT COST: $

OTHER SERVICES:

TEST DETAILS SHRINKAGE

C.C.C.T.R.	CAST ONLY	TEST ONLY	SLUMP ONLY
QTY 12	QTY	QTY 1	QTY

NAME: CHAS WEST.

SIGNATURE:

FORM 10A

C40RMX265

Limited ACN 000 001 276

CSR Readymix®

Concrete Delivery Docket

Control No (USE ONLY) 335975

DOCKET No. 17052137

WARNING **WORK SAFELY WITH CONCRETE**

Why you should take care
- When hardened concrete products are cut, drilled, sawed, routed, chased, sanded, broken up or ground, silica dust may be released. Breathing silica dust over time may lead to lung diseases including bronchitis, silicosis and lung cancer.
- Freshly mixed concrete may irritate eyes and skin and may cause dermatitis.

Protect yourself against breathing dust or getting it in your eyes, and against skin contact.

When cutting, drilling, sawing, routing, chasing, sanding, breaking up or grinding hardened concrete products
- Use suitable dust extraction equipment
- Wear protective clothing
  wear a P2 dust mask (AS/NZS 1715/1716) and eye protection (AS/NZS 1337)

When working with **freshly mixed concrete:**
- wear protective clothing, gloves (AS 2161) and eye protection (AS/NZS 1337)

First Aid
- Eyes and Skin - wash with plenty of water.
- Dust breathed in - move straight to fresh air.

Clean up every day
- Wash your work clothes often - it's best not to put them in the same wash with other clothes.
- When working in an enclosed area wet and sweep OR dry-vacuum all dust, collect solid waste and put all in a covered container - wear all protective gear.
- Follow local authority requirements for getting rid of waste.

See Readymix® Premixed Concrete Material Safety Data Sheet for details - call 1-800-807668 for copies.

Ver 6 18/1/95

This sale is subject to CSR Construction Materials Terms and Conditions of Sale. Whilst your attention is particularly drawn to the selected clauses printed on the reverse side of this delivery docket, please note that all Terms and Conditions of sale do apply.

Customer Signature .....

Waiting Time		Water Added	
On Site		Batch + Moisture	L
Finished Pour		Slump Stand	L
		On Site	40 L
Waiting Time	Minutes	Customers Request	L
		Max. Water	L
Customer Signature:		Customer Signature:	

CASH SALE ONLY

Received the sum of: $ Cash ☒ Cheque ☐ Credit Card ☐

Received by: .....

Customer No.	Customer Name	Customer Order No.	Job No	Plant No	Date
5993	LEIGHTON CONTRACTORS PTY LTD	T B A	79	3	14-Aug-00
Batched 8:30PM	Delivery Address: HERSTON GILCHRIST AV GATE AT MAIN SITE	S40NRXYP 380PPE01	Truck 67	Km / Zone 5	

Load m3	Progressive m3	Ordered m3	Strength	Agg	Mix Description	Actual Slump	Design Slump
1.00	3.00	3.00	S40	20MM	MAIN ROADS XYPEX CONC		80.00

Unit Price $/m³
Other Charges
Total this Load
Progress Total
Waiting Time (this load)
Total Due $

EXTRA PRODUCTS

Description	Quantity	UOM	Unit Price	TOTAL PRICE
SUR-XYPEX40	3.00	M3		
NO MIN CART	1.00	MTR		
Dosed with Xypex Admix C1000NF				

Customer Service ph 131188

Qty Delivered	Qty Dumped	On Distance	Payment Code

Pink – Signature Copy Blue – Customer's Copy

CSR Readymix

CSR Limited ACN 000 001 276. PO Box 1143, Milton, Qld 4064 Australia
Telephone (07) 3364 2831 International +61 7 3364 2831
Facsimile (07) 3364 2926 International +61 7 3364 2926

To:	**Iain Burgess**	From:	Todd McGurgan
Company:	**LEIGHTON CONTRACTORS Pty Ltd. - Inner City Bypass**		
Fax Number:	**07 3872 2700**	Reference:	
Date:	23rd September 2000	Pages inc. cover:	2 3
Subject:	Report on XYPEX concrete trial		

Iain,

please find below a summary of the concrete performance measured on the XYPEX concrete trial on your project 14th August 2000.

Mix supplied	S40MRXYP + standard dose of additives
XYPEX	added at plant by XYPEX personnel
Water cement ratio	0.42
slump measured	80mm @ 30 minutes
2nd slump measured	65mm @ 60 minutes
concrete temp.	28°C
air temp.	24°C
Bleed	minimal
Initial set	normal (checked @ 2 hours)
final set	normal (checked @ 4 hours 20 minutes)

notes:

- The mix appeared to be more pasty than the normal 40MPa concrete. This would have contributed to the low amount of bleed. If low bleed is to be expected, the use of an Aliphatic Alcohol to control evaporation of surface moisture would be necessary.
- The slump loss measured may have been contributed to the amount of water added to the rear of the load on-site, as apposed to being part of the initial mix water. This will need to be monitored on site, as part of our normal concrete monitoring. Additional set retarding admixtures may be required to reduce slump loss. This will need to be confirmed through XYPEX.

CSR BEENLEIGH LABORATORY
PO BOX 617
BEENLEIGH QLD 4207

RF0016

CSR Construction Materials

Client: XYPEX AUSTRALIA
ATTN: MARIA BOBELBYK
PO BOX 228
NORTHGATE QLD
Project: LEIGHTONS- I.C.B. (TRIAL)

Addendum to
Report No: 20005141
Date: 25/10/00
Sample Date: 14/08/00

CONCRETE SHRINKAGE REPORT

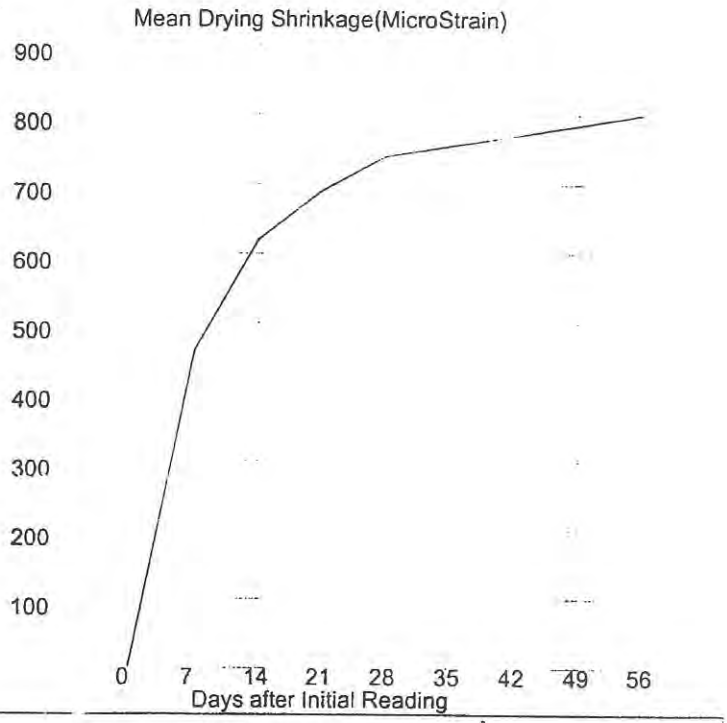
We advise that the sampling and slump were carried out in accordance with AS 1012.1 and AS 1012.3 as appropriate and moulding,curing, and measurement in accordance with AS 1012.13 unless otherwise stated in notes.

Plant	Sample No.	Mix Design	Delivery Docket	Sample Time	Initial Cure Hrs	Actual Slump	Despatch Date/Time	Cond Rec'd	Demould Date/Time	Received Date/Time
ALB	233444	S40/20/80 S40MPa	17052137	14:10	20	80	15/08/00 10:00	Sat'd	15/08/00 10:00	15/08/00 10:00

Location:XYPEX TRIAL

Initial Reading: 21/08/00

Drying Period in days	Test Date	Drying Shrinkage in MicroStrain Spec.# M	Spec.# N	Spec.# O	Avg
7	28/08/00	472	448	452	460
14	04/09/00	636	612	608	620
21	11/09/00	704	680	676	690
28	18/09/00	756	732	724	740
56	16/10/00	816	792	796	800



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Accreditation 1559

Authorised Signatory: S.G. HUNT

CSR
Readymix

CERTIFICATE OF MIX DESIGN
(XYPEX concrete)

Date: 13 December, 2000~~2 November, 2000~~
Client: Leighton Contractors Pty. Ltd.
Contract: Inner City Bypass
Attention: James Hamilton
Facsimile: 07 3872 2700

We are pleased to submit for your approval, the following details of the concrete mix we propose for use to the above, from our despatch depot at Albion and Geebung.

MATERIALS

Material	No	Supplier	Works, Quarry, Pit	Specification
Type GP Cement	1	QCL	Bulwer Island	AS3972
Fly Ash	2	Pozzolanic	Tarong	AS3582.1
20mm Aggregate	3	CSR Readymix	Petrie	AS2758.1
10mm Aggregate	4	CSR Readymix	Petrie	AS2758.1
Coarse Sand	5	CSR Readymix	Tivoli	AS2758.1
Fine Sand	6	CSR Readymix	Oxley Creek	AS2758.1
7mm Aggregate	7	CSR Readymix	Petrie	AS2758.1
Free water - design	8	B.C.C	-	-
Water Reducer - GWR	9	WR GRACE	Archerfield	AS1478/79
Air Entrainer	10	WR GRACE	Archerfield	AS1478/79
Superplasticizer - D19	11	WR GRACE	Archerfield	AS1478/79

MIX DESIGN

Mix Description	Slump (mm)	Mass of Materials (kg/m3)								Admix. (mL/m3)		
		1	2	3	4	5	6	7	8	9	10	11
S40/20 - S40MRXYP	80	260	110	780	360	500	350	-	165	1110	0	0
N40/10 - N401GMRS	80	285	95	-	1000	600	320	-	165	1140	0	0

Comments: Coarse and fine sand moisture contents are at 6% and 8% respectively (subject to change).
Above figures , including the Aggregate, and Admixture combinations and quantities, are subject to change to ensure compliance with AS3902 and AS1379 requirements.
Water Reducer (Wrre) dose will vary to control set time properties.
XYPEX to be added @ dose rate nominated and controlled by XYPEX.

Yours Faithfully,

Todd McGurgan
CSR Readymix Concrete

CERTIFICATE OF MIX DESIGN
(XYPEX concrete)

Date: 2 November, 2000
Client: Leighton Contractors Pty. Ltd.
Contract: Inner City Bypass
Attention: James Hamilton
Facsimile: 07 3872 2700

We are pleased to submit for your approval, the following details of the concrete mix we propose for use to the above, from our despatch depot at Albion and Geebung.

MATERIALS

Material	No Supplier Specification	Works, Quarry, Pit
Type GP Cement	1 QCL AS3972	Bulwer Island
Fly Ash	2 Pozzolanic AS3582.1	Tarong
20mm Aggregate	3 CSR Readymix AS2758.1	Petrie
10mm Aggregate	4 CSR Readymix AS2758.1	Petrie
Coarse Sand	5 CSR Readymix AS2758.1	Tivoli
Fine Sand	6 CSR Readymix AS2758.1	Oxley Creek
7mm Aggregate	7 CSR Readymix AS2758.1	Petrie
Free water - design	8 B.C.C	-
Water Reducer - GWR	9 WR GRACE AS1478/79	Archerfield
Air Entrainer	10 WR GRACE AS1478/79	Archerfield
Superplasticizer - D19	11 WR GRACE AS1478/79	Archerfield

MIX DESIGN

Mix Description	Slump (mm) Mass of Materials (kg/m3) Admix. (mL/m3)	1	2	3	4	5	6	7	8	9	10	11
S40/20 - S40MRXYP	80	260	110	780	360	500	350	-	165		1110	0	0
N40/10 - N401GMRS	80	285	95	-	1000	600	320	-	165		1140	0	0

Comments: Coarse and fine sand moisture contents are at 6% and 8% respectively (subject to change). Above figures , including the Aggregate, and Admixture combinations and quantities, are subject to change to ensure compliance with AS3902 and AS1379 requirements. Water Reducer (Wrre) dose will vary to control set time properties.

CSR Readymix

CERTIFICATE OF MIX DESIGN
(XYPEX concrete)

Date: 2 November, 2000~~2 November, 2000~~
Client: Leighton Contractors Pty. Ltd.
Contract: Inner City Bypass
Attention: James Hamilton
Facsimile: 07 3872 2700

We are pleased to submit for your approval, the following details of the concrete mix we propose for use to the above, from our despatch depot at Albion and Geebung.

MATERIALS

Material	No	Supplier	Works, Quarry, Pit	Specification
Type GP Cement	1	QCL	Bulwer Island	AS3972
Fly Ash	2	Pozzolanic	Tarong	AS3582.1
20mm Aggregate	3	CSR Readymix	Petrie	AS2758.1
10mm Aggregate	4	CSR Readymix	Petrie	AS2758.1
Coarse Sand	5	CSR Readymix	Tivoli	AS2758.1
Fine Sand	6	CSR Readymix	Oxley Creek	AS2758.1
7mm Aggregate	7	CSR Readymix	Petrie	AS2758.1
Free water - design	8	B.C.C	-	-
Water Reducer - GWR	9	WR GRACE	Archerfield	AS1478/79
Air Entrainer	10	WR GRACE	Archerfield	AS1478/79
Superplasticizer - D19	11	WR GRACE	Archerfield	AS1478/79

MIX DESIGN

Mix Description	~~Slump~~ (mm)	Mass of Materials (kg/m3)								~~Admix~~ (mL/m3)		
		1	2	3	4	5	6	7	8	9	10	11
S40/20 - S40MRXYP	80	260	110	780	360	500	350	-	165	1110	0	0
N40/10 - N401GMRS	80	285	95	-	1000	600	320	-	165	1140	0	0

Comments: Coarse and fine sand moisture contents are at 6% and 8% respectively (subject to change). Above figures , including the Aggregate, and Admixture combinations and quantities, are subject to change to ensure compliance with AS3902 and AS1379 requirements. Water Reducer (Wrre) dose will vary to control set time properties.
XYPEX to be added @ dose rate nominated and controlled by XYPEX.

Yours Faithfully,

Todd McGurgan
CSR Readymix Concrete

CSR Readymix

CERTIFICATE OF MIX DESIGN
(XYPEX concrete)

Date: 7 March, 2001~~2 November, 2000~~
Client: Leighton Contractors Pty. Ltd.
Contract: Inner City Bypass
Attention: James Hamilton
Facsimile: 07 3872 2700

We are pleased to submit for your approval, the following details of the concrete mix we propose for use to the above, from our despatch depot at Albion and Geebung.

MATERIALS

Material	No	Supplier	Works, Quarry, Pit	Specification
Type GP Cement	1	QCL	Bulwer Island	AS3972
Fly Ash	2	Pozzolanic	Tarong	AS3582.1
20mm Aggregate	3	CSR Readymix	Petrie	AS2758.1
10mm Aggregate	4	CSR Readymix	Petrie	AS2758.1
Coarse Sand	5	CSR Readymix	Tivoli	AS2758.1
Fine Sand	6	CSR Readymix	Oxley Creek	AS2758.1
7mm Aggregate	7	CSR Readymix	Petrie	AS2758.1
Free water - design	8	B.C.C	-	-
Water Reducer - GWR	9	WR GRACE	Archerfield	AS1478/79
Air Entrainer	10	WR GRACE	Archerfield	AS1478/79
Superplasticizer - D19	11	WR GRACE	Archerfield	AS1478/79

MIX DESIGN

Mix Description	Slump (mm)	Mass of Materials (kg/m3)								Admix. (mL/m3)		
		1	2	3	4	5	6	7	8	9	10	11
S40/20 - S40MRXYP	80	260	110	780	360	500	350	-	165	1110	0	0
N40/10 - N401GMRS	80	285	95	-	1000	600	320	-	165	1140	0	0

Comments: Coarse and fine sand moisture contents are at 6% and 8% respectively (subject to change).
Above figures , including the Aggregate, and Admixture combinations and quantities, are subject to change to ensure compliance with AS3902 and AS1379 requirements.
Water Reducer (Wrre) dose will vary to control set time properties.
XYPEX to be added @ dose rate nominated and controlled by XYPEX.

Yours Faithfully,

Todd McGurgan
CSR Readymix Concrete

Compressive strength comparison:

age	S40MRXYP (MPa)	typical N402GMRS (MPa)
24 hours	8.2	7.3
72 hours	26.5	20
7 days	34.5	30
28 days	53	48.5

Drying Shrinkage comparison:

	(microstrain)	(microstrain)
7 days	460	313
14 days	640	432
21 days	690	502
28 days	740	556
56 days	TBC	650

Estimated 56 day shrinkage for XYPEX Mix = 800

Please don't hesitate to call for any further information.

Regards

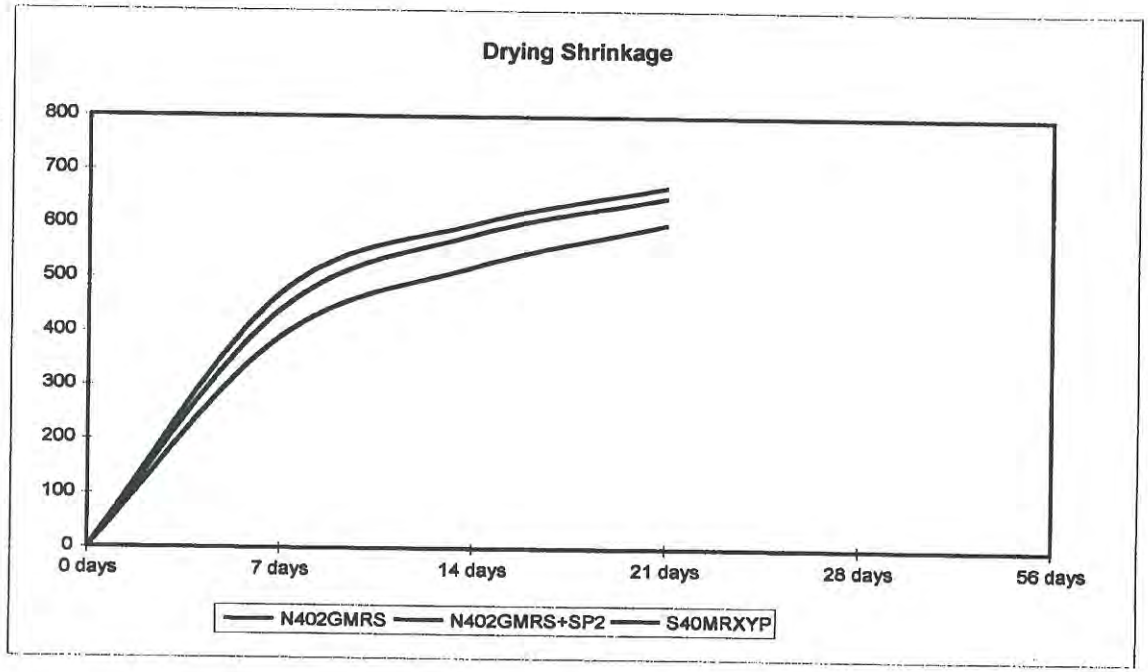
Todd McGurgan
Projects coordinator
mobile: 0419 474 782
e-mail: TMcGurgan@csr.com.au
CSR Readymix Concrete

Shrinkage trial - Leighton ICB

date poured: 14/9/00

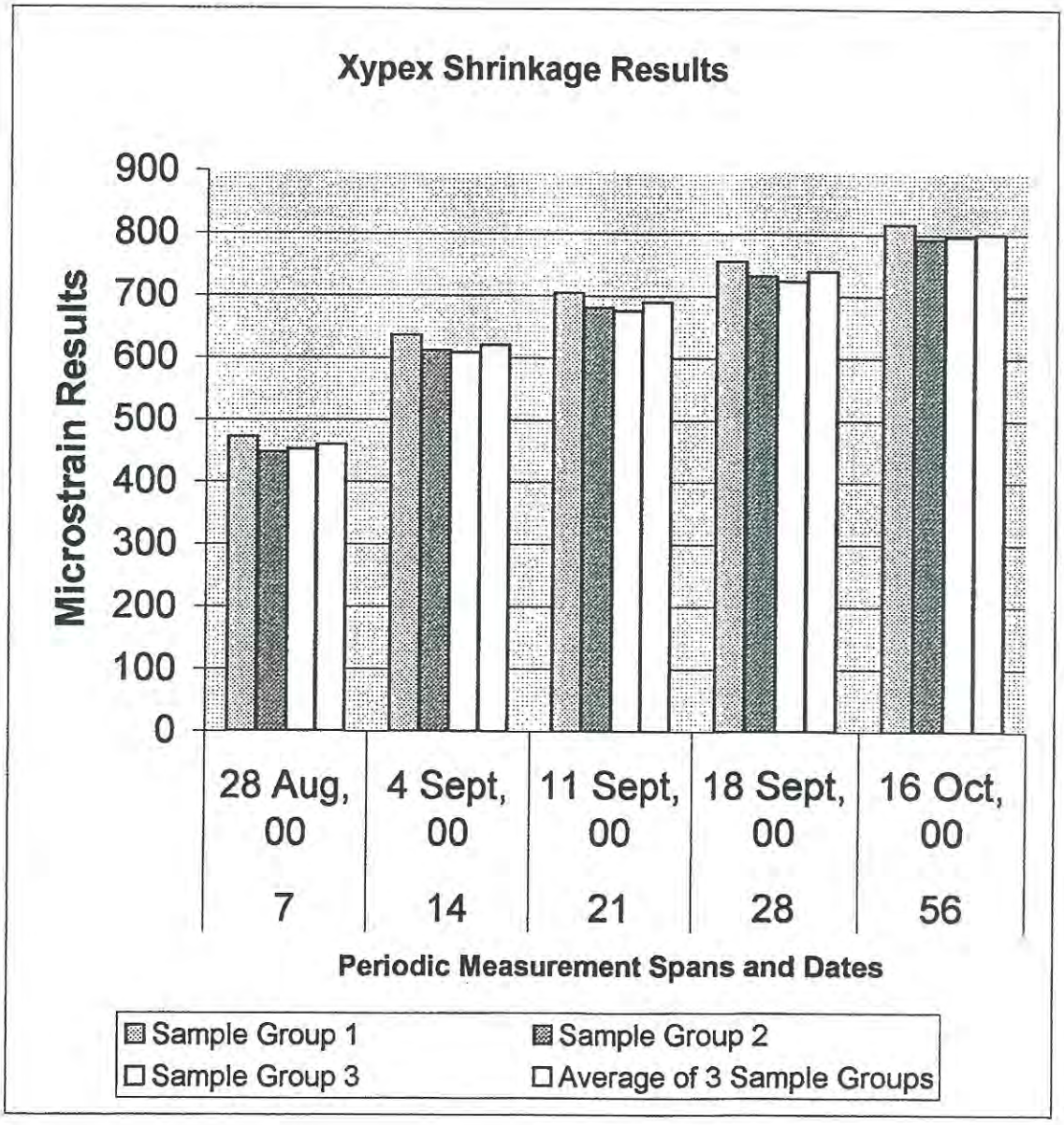
	Compressive		
Mix	N402GMRS	N402GMRS+SP2	S40MRXYP
slump	70	110	80
W/C ratio	0.46	0.37	0.41
7 day compression	35	33	32
28 day compression	55.5	53	48.5

	Drying Shrinkage		
	N402GMRS	N402GMRS+SP2	S40MRXYP
0 days	0	0	0
7 days	470	390	440
14 days	600	520	580
21 days	670	600	650
28 days			
56 days			
Sample Number	243200	243203	243206



Xypex Shrinkage Results
Inner City Bypass Trials

Drying Period In Days	Initial Read: 21 Aug, 00 Test Date	Spec 1	Spec 2	Spec 3	Average
7	28 Aug, 00	472	448	452	460
14	4 Sept, 00	636	612	608	620
21	11 Sept, 00	704	680	676	690
28	18 Sept, 00	756	732	724	740
56	16 Oct, 00	816	792	796	800

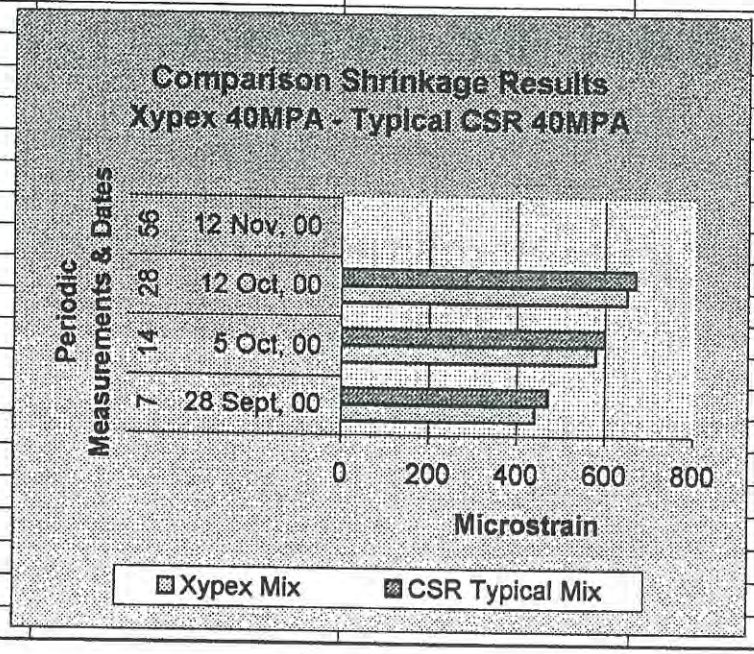


Carried out Aug 2000

Test Results - Inner City Bypass Trials

Microstrain/Shrinkage Results

Drying Period In Days	Cast Shrinkage Bars Test Date: 14 Sept, 00 Initial Read:21 Sept,00	Shrinkage Results Average Xypex Mix	Shrinkage Results Average CSR Typical	Mix Design Xypex Admix S40MRXYP - C1000NF	Mix Design Typical N402GMRS
7	28 Sept, 00	440	470	GP Cement - 260kg	GP Cement - 260kg
14	5 Oct, 00	580	600	Fly Ash - 110 kg	Fly Ash - 110 kg
28	12 Oct, 00	650	670	Xypex C1000 @ 0.8 %	
56	12 Nov, 00				
				Water Reducer dosage 300ml per 100kg cementitious content	Water Reducer dosage 300ml per 100kg cementitious content
				Water/Cement Ratio 0.42	Water/Cement Ratio 0.42



Trials carried out Sept 2000

Shrinkage trial - Leighton ICB

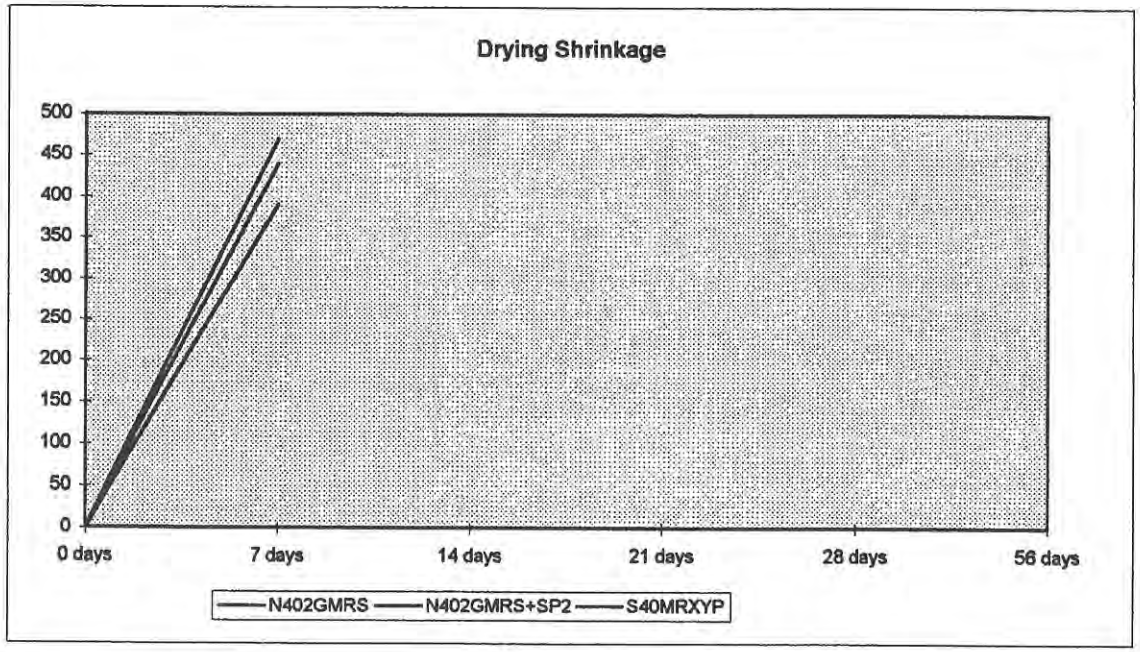
date pored: 14/9/00

Compressive

Mix	N402GMRS	N402GMRS+SP2	S40MRXYP
slump	80	70	110
W/C ratio	0.46	0.41	0.37
7 day compression	30	32	33
28 day compression			

Drying Shrinkage

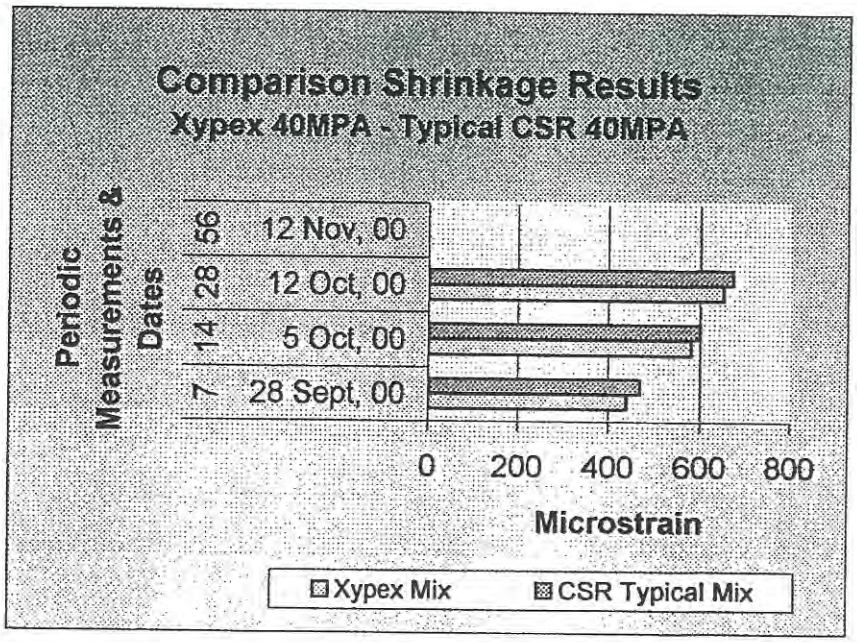
	N402GMRS	N402GMRS+SP2	S40MRXYP
0 days	0	0	0
7 days	470	440	390
14 days			
21 days			
28 days			
56 days			



Test Results - Inner City Bypass Trials

Microstrain/Shrinkage Results

Drying Period In Days	Cast Shrinkage Bars Test Date: 14 Sept, 00 Initial Read:21 Sept,00	Shrinkage Results Average Xypex Mix	Shrinkage Results Average CSR Typical
7	28 Sept, 00	440	470
14	5 Oct, 00	580	600
28	12 Oct, 00	650	670
56	12 Nov, 00		



Mix Design Xypex Admix S40MRXYP - C1000NF	Mix Design Typical N402GMRS
GP Cement - 260kg Fly Ash - 110 kg Xypex C1000 @ 0.8 %	GP Cement - 260kg Fly Ash - 110 kg
Water Reducer dosage 300ml per 100kg cementitious content	Water Reducer dosage 300ml per 100kg cementitious content
Water/Cement Ratio 0.42	Water/Cement Ratio 0.42

Trials carried out Sept 2000

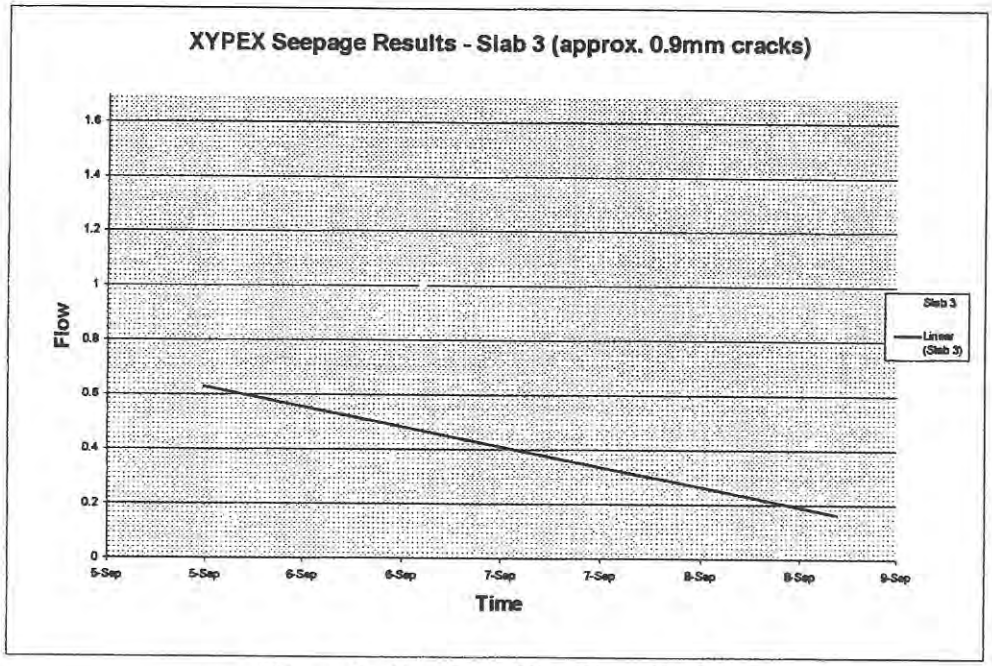


Figure 3 - Seepage Results - Slab 3

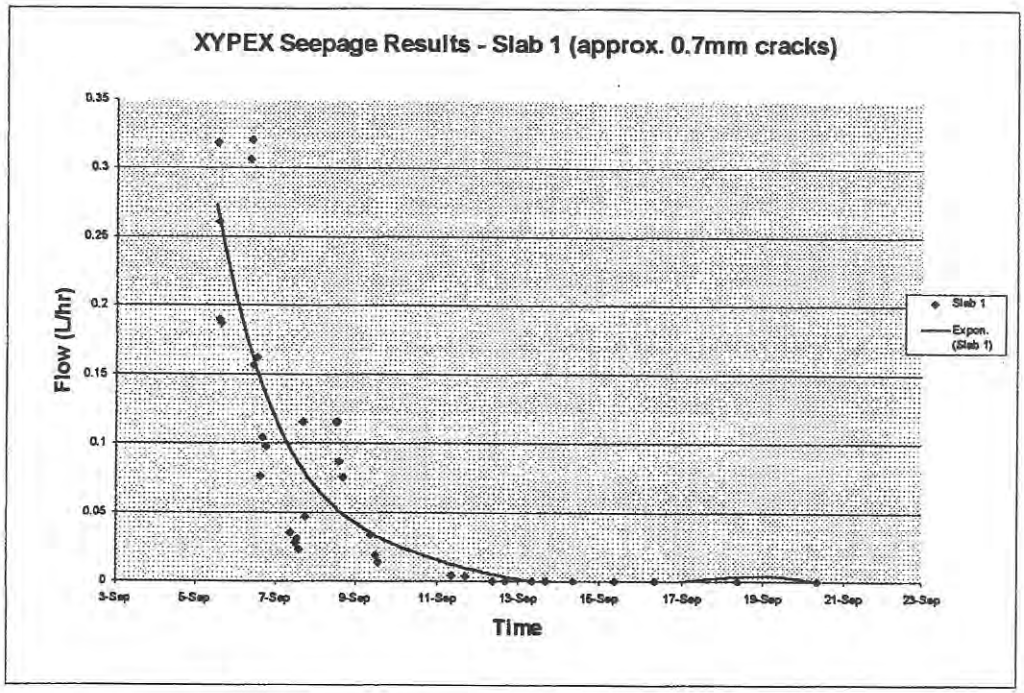


Figure 4 – Extended time base Seepage Results - Slab 1

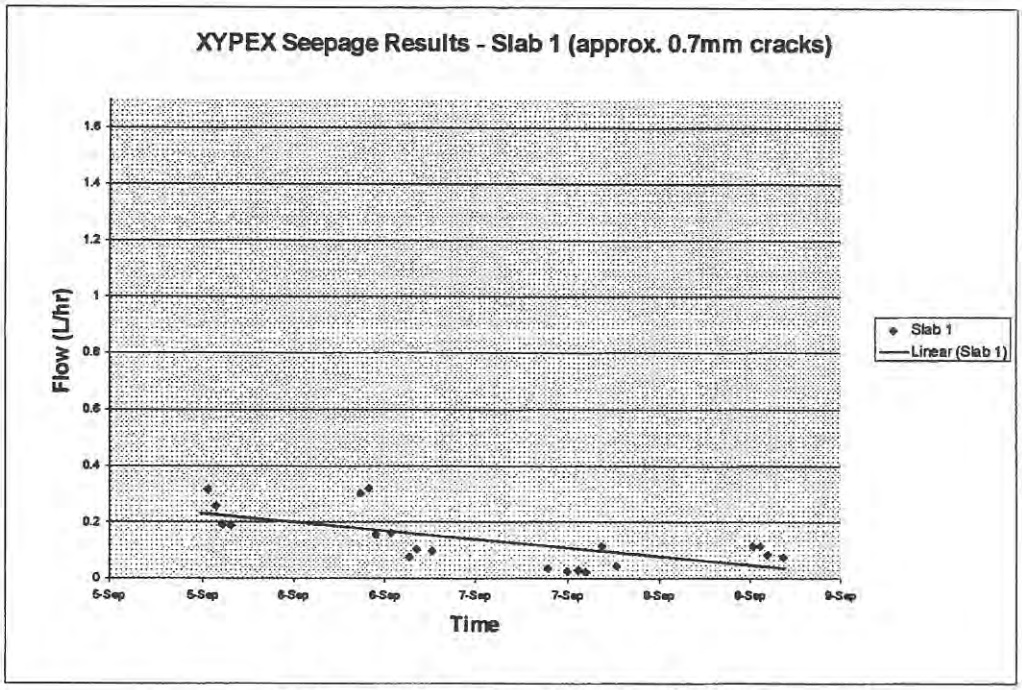


Figure 1 – Seepage Results – Slab 1

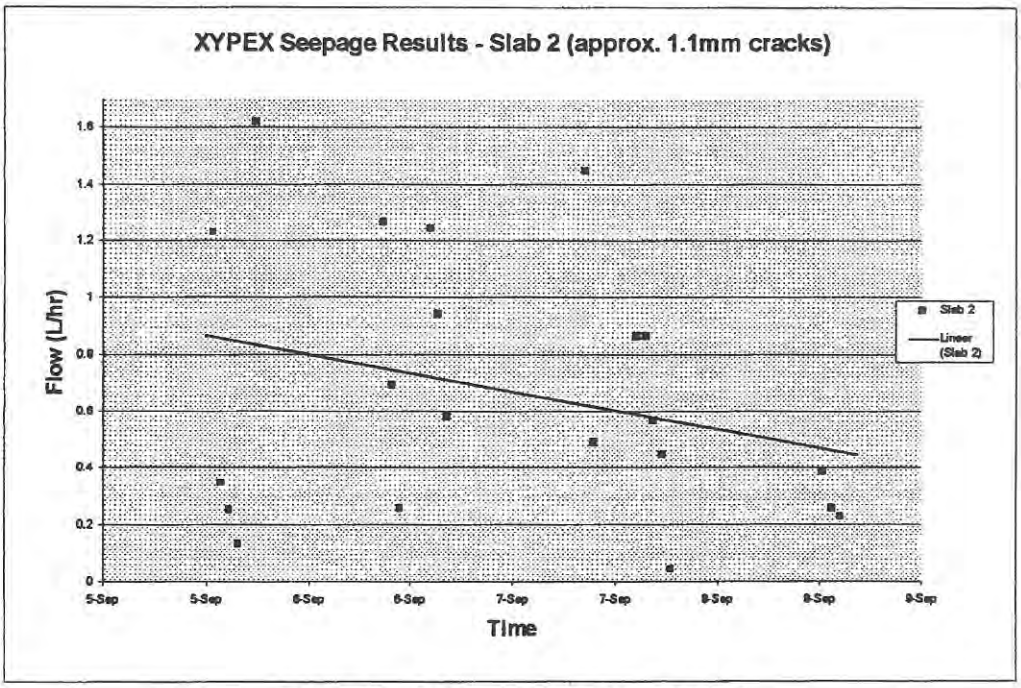


Figure 2 – Seepage Results – Slab 2

CSR BEENLEIGH LABORATORY
PO BOX 217
BEENLEIGH QLD 4207
ph.: 07 5546 6935
fax: 07 5546 7066
A.C.N.: 000 001 276

CSR Readymix

Client: XYPEX AUSTRALIA
ATTN: MARIA BOBELBYK
PO BOX 228
NORTHGATE QLD 4013

Project: LEIGHTONS- I.C.B. (TRIAL)

FINAL REPORT
Date : 11/09/00
Report No. :20005141
Page : 1 of 1
Sample Date : 14/08/00

Construction Materials Laboratory

CONCRETE TEST CERTIFICATE

Slump,Compressive Strength,Flexural,Indirect Tensile

We advise that the sampling, slump, moulding, curing and testing were carried out in accordance with AS1012 parts 1,3.1,8.1,8.2,9 and 12.1 unless otherwise stated in remarks or notes. All densities SSD unless otherwise stated in remarks.

Batch Details							Specimen Details										
Sample No.	Truck No.	Mix Description F'c/Agg./Slump MPa/mm/mm	Delivery Docket No.	Batch Time	Sample Time	Actual Slump (mm)	Type	Comp	Frac	Cap	Date Tested	Curing Int/Std hrs/days	Dimensions Avg.Dia. (mm)	Height (mm)	Age days	Strength (MPa)	Mass per Unit Vol. (kg/m3)
233444A	67	S40/20/80 S40MPa	17052137	13:36	14:10	80	C	E	N	S	15/8/00	20/0	100.1	200	1	8.4	2480
233444B							C	E	N	S	15/8/00	20/0	100.0	200	1	8.0	2460
233444C							C	E	N	S	15/8/00	20/0	99.9	200	1	8.4	2480
233444D							C	E	N	S	17/8/00	20/2	99.9	200	3	27.0	2480
233444E							C	E	N	S	17/8/00	20/2	100.0	200	3	26.0	2480
233444F							C	E	N	S	17/8/00	20/2	99.9	200	3	27.0	2460
233444G							C	E	N	S	21/8/00	20/6	100.2	200	7	34.5	2460
233444H							C	E	N	S	21/8/00	20/6	100.2	200	7	35.5	2480
233444I							C	E	N	S	21/8/00	20/6	99.9	200	7	33.5	2480
233444J							C	E	N	S	11/9/00	20/27	99.9	199	28	53.0	2500
233444K							C	E	N	S	11/9/00	20/27	100.2	199	28	53.0	2500
233444L							C	E	N	S	11/9/00	20/27	99.9	200	28	52.5	2500

Plant: ALB
Location: XYPEX TRIAL

Notes 1. Type: C=Compressive; F=Flexural; I=Indirect Tensile
2. Compaction: R=Rodding; E=Vibration; A=Ramming
3. Fracture: N=Normal; S=Shear; A=Abnormal; C=Cap Failure
4. Cap Types: S=Sulphur; R=Rubber
5. Zone: Tropical
Other Remarks: External vibration not in accordance with AS1012.8

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Accreditation 1559

Approved Signatory: S.G. HUNT

CSR BEENLEIGH LABORATORY
PO BOX 617
BEENLEIGH QLD 4207
ph.: 07 5546 6935
fax: 07 5546 7066
A.C.N.: 000 001 276

CSR Readymix

RECEIVED
24 AUG 2000
BY:

Client: XYPEX AUSTRALIA
ATTN: MARIA BOBELBYK
PO BOX 228
NORTHGATE QLD 4013

Project: LEIGHTONS- I.C.B. (TRIAL)

INTERIM REPORT
Date : 21/08/00
Report No. :20005141
Page : 1 of 1
Sample Date : 14-08-00

CONCRETE TEST CERTIFICATE

Slump,Compressive Strength,Flexural,Indirect Tensile

We advise that the sampling, slump, moulding, curing and testing were carried out in accordance with AS1012 parts 1,3.1,8.1,8.2,9, and 12.1 unless otherwise stated in remarks or notes. All densities SSD unless otherwise stated in remarks.

Batch Details							Specimen Details										
Sample No.	Truck No.	Mix Description F'c/Agg./Slump MPa/mm/mm	Delivery Docket No.	Batch Time	Sample Time	Actual Slump (mm)	Type	Comp	Frac	Cap	Date Tested	Curing Int/Std hrs/days	Dimensions Avg.Dia. (mm)	Height (mm)	Age days	Strength (MPa)	Mass per Unit Vol. (kg/m3)
233444/A	67	S40/20/80 S40MPa	17052137	13:36	14:10	80	C	E	N	S	15/8/00	20/0	100.1	200	1	8.4	2480
233444/B							C	E	N	S	15/8/00	20/0	100.0	200	1	8.0	2460
233444/C							C	E	N	S	15/8/00	20/0	99.9	200	1	8.4	2480
233444/D							C	E	N	S	17/8/00	20/2	99.9	200	3	27.0	2480
233444/E							C	E	N	S	17/8/00	20/2	100.0	200	3	26.0	2480
233444/F							C	E	N	S	17/8/00	20/2	99.9	200	3	27.0	2460
233444/G							C	E	N	S	21/8/00	20/6	100.2	200	7	34.5	2460
233444/H							C	E	N	S	21/8/00	20/6	100.2	200	7	35.5	2480
233444/I							C	E	N	S	21/8/00	20/6	99.9	200	7	33.5	2480

Plant: ALB
Location: XYPEX TRIAL

Notes 1. Type: C = Compressive F = Flexural I = Indirect Tensile
2. Compaction: R=Rodding: E=Vibration: A=Ramming:
3. Fracture: N=Normal; S=Shear; A=Abnormal; C=Cap Failure.
4. Cap Types: S = Sulphur; R = Rubber
5. Zone: Tropical
Other Remarks: External vibration not in accordance with AS1012.8

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation. This document shall not be reproduced except in full

Accreditation 1559

Approved Signatory: S.G.HUNT

CSR BEENLEIGH LABORATORY
PO BOX 617
BEENLEIGH QLD 4207
ph.: 07 5546 6935
fax: 07 5546 7066
A.C.N.: 000 001 276

CSR Readymix

Client: XYPEX AUSTRALIA
ATTN: MARIA BOBELBYK
PO BOX 228
NORTHGATE QLD 4013

Project: LEIGHTONS- I.C.B. (TRIAL)

INTERIM REPORT
Date : 18/08/00
Report No. :20005141
Page : 1 of 1
Sample Date : 14-08-00

CONCRETE TEST CERTIFICATE

Slump,Compressive Strength,Flexural,Indirect Tensile

We advise that the sampling, slump, moulding, curing and testing were carried out in accordance with AS1012 parts 1,3.1,8.1,8.2,9, and 12.1 unless otherwise stated in remarks or notes. All densities SSD unless otherwise stated in remarks.

Batch Details							Specimen Details										
Sample No.	Truck No.	Mix Description F'c/Agg./Slump MPa/mm/mm	Delivery Docket No.	Batch Time	Sample Time	Actual Slump (mm)	Type	Comp	Frac	Cap	Date Tested	Curing Int/Std hrs/days	Dimensions : Avg.Dia. (mm)	Height (mm)	Age days	Strength (MPa)	Mass per Unit Vol. (kg/m3)
233444/A	67	S40/20/80 S40MPa	17052137	13:36	14:10	80	C	E	N	S	15/8/00	20/0	100.1	200	1	8.4	2480
233444/B							C	E	N	S	15/8/00	20/0	100.0	200	1	8.0	2460
233444/C							C	E	N	S	15/8/00	20/0	99.9	200	1	8.4	2480
233444/D							C	E	N	S	17/8/00	20/2	99.9	200	3	27.0	2480
233444/E							C	E	N	S	17/8/00	20/2	100.0	200	3	26.0	2480
233444/F							C	E	N	S	17/8/00	20/2	99.9	200	3	27.0	2460

Plant: ALB
Location: XYPEX TRIAL

Notes 1. Type: C = Compressive F = Flexural I = Indirect Tensile
2. Compaction: R=Rodding; E=Vibration: A=Ramming:
3. Fracture: N=Normal; S=Shear; A=Abnormal; C=Cap Failure.
4. Cap Types: S = Sulphur; R = Rubber
5. Zone: Tropical
Other Remarks: External vibration not in accordance with AS1012.8

Accreditation 1559

Approved Signatory: S.G.HUNT

CSR BEENLEIGH LABORATORY
PO BOX 617
BEENLEIGH QLD 4207
ph.: 07 5546 6935
fax: 07 5546 7066
A.C.N.: 000 001 276

CSR Readymix

Client: XYPEX AUSTRALIA
ATTN: MARIA BOBELBYK
PO BOX 228
NORTHGATE QLD 4013

Project: LEIGHTONS- I.C.B. (TRIAL)

INTERIM REPORT
Date : 16/08/00
Report No. :20005141
Page : 1 of 1
Sample Date : 14-08-00

CONCRETE TEST CERTIFICATE

Slump,Compressive Strength,Flexural,Indirect Tensile

We advise that the sampling, slump, moulding, curing and testing were carried out in accordance with AS1012 parts 1,3.1,8.1,8.2,9, and 12.1 unless otherwise stated in remarks or notes. All densities SSD unless otherwise stated in remarks.

Batch Details							Specimen Details									
Sample No.	Truck No.	Mix Description F'c/Agg./Slump MPa/mm/mm	Delivery Docket No.	Batch Time	Sample Time	Actual Slump (mm)	Type	Comp	Frac	Cap	Date Tested	Curing Int:Std hrs/days	Dimensions Avg.Dia. (mm)	Dimensions Height (mm)	Age days	Strength (MPa)	Mass per Unit Vol. (kg/m3)
233444/A	67	S40/20/80 S40MPa	17052137	13:36	14:10	80	C	E	N	S	15/8/00	20/0	100.1	200	1	8.4	2480
233444/B							C	E	N	S	15/8/00	20/0	100.0	200	1	8.0	2460
233444/C							C	E	N	S	15/8/00	20/0	99.9	200	1	8.4	2480

Plant: ALB
Location: XYPEX TRIAL

Notes 1. Type: C = Compressive F = Flexural I = Indirect Tensile
2. Compaction: R=Rodding: E=Vibration: A=Ramming:
3. Fracture: N=Normal; S=Shear; A=Abnormal; C=Cap Failure.
4. Cap Types: S = Sulphur: R = Rubber
5. Zone: Tropical
Other Remarks: External vibration not in accordance with AS1012.8

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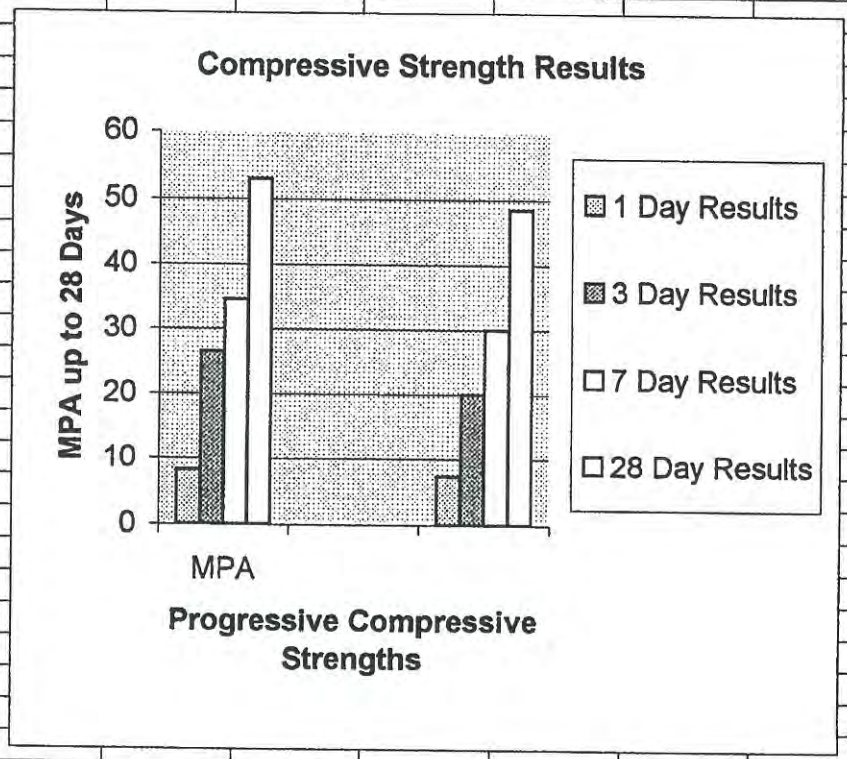
Accreditation 1559

Approved Signatory: S.G.HUNT

Test Results - Inner City Bypass Trials

	MIX DESIGN - XYPEX S40MRXYP		MIX DESIGN - TYPICAL N402GMRS
AGE	COMPRESSIVE STRENGTH		COMPRESSIVE STRENGTH
1 Day	8.2		7.3
3 Day	26.5		20
7 Day	34.5		30
28 Day	53		48.5
	Xypex Mix Results		Mix Details
	3 x samples cast		August/Sept 2000
1 Day	8.4		GP Cement - 260kg
	8		
	8.4		Fly Ash - 110 kg
3 Day	27		Water Reducer dosage
	26		300ml per 100kg
	27		cementitious content
7 Day	34.5		Water/Cement
	35.5		Ratio 0.42
	33.5		
28 Day	53		
	53		
	52.5		



Test Results - Inner City Bypass Trials

AGE	MIX DESIGN - XYPEX S40MRXYP COMPRESSIVE STRENGTH	MIX DESIGN - TYPICAL N402GMRS COMPRESSIVE STRENGTH
1 Day	8.2	7.3
3 Day	26.5	20
7 Day	34.5	30
28 Day	53	48.5

Mix Details August/Sept 2000

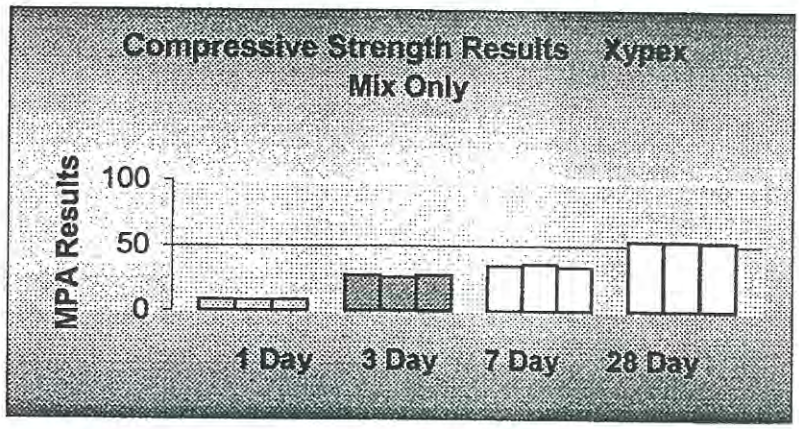
GP Cement - 260kg
Fly Ash - 110 kg

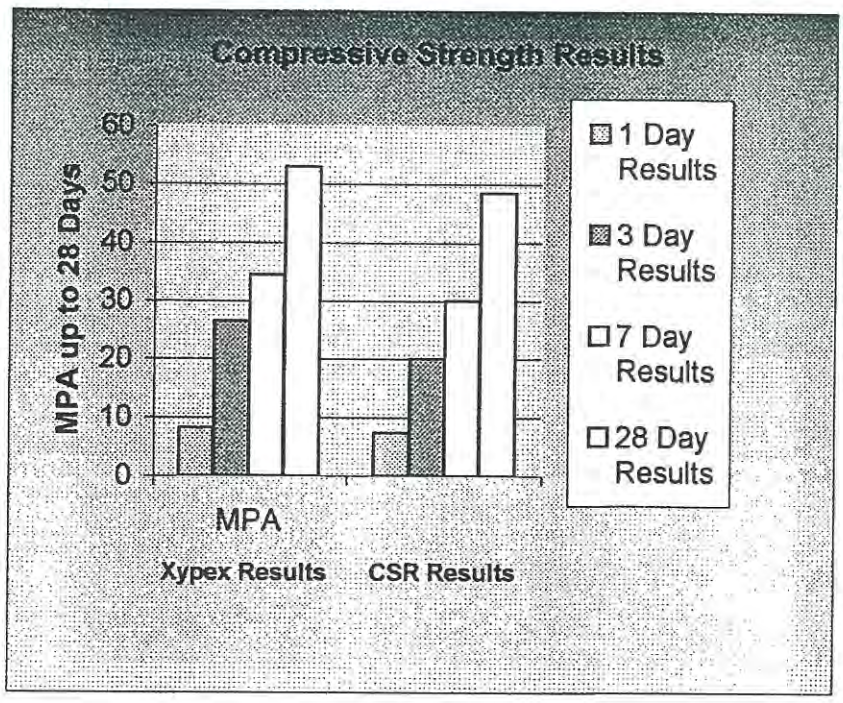
Water Reducer dosage 300ml per 100kg cementitious content

Water/Cement Ratio 0.42
Xypex Admix C1000NF dosed @ 0.8% of total cementitious content per m3

Xypex Mix Results 3 x samples cast

1 Day	8.4
	8
	8.4
3 Day	27
	26
	27
7 Day	34.5
	35.5
	33.5
28 Day	53
	53
	52.5

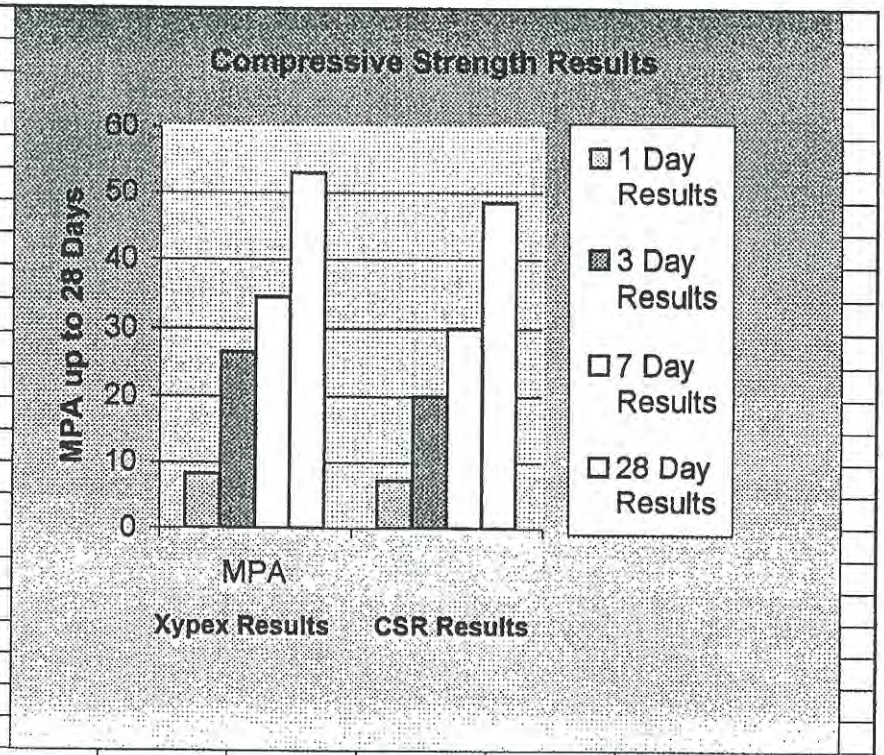


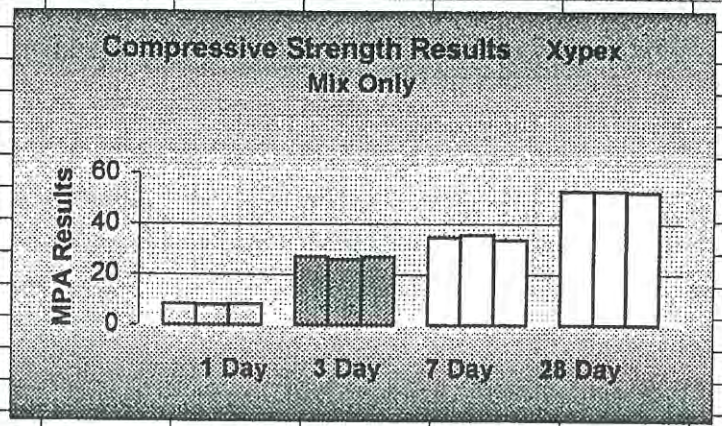


Results
Xypex Mix Trial Only

Test Results - Inner City Bypass Trials

	MIX DESIGN - XYPEX S40MRXYP	MIX DESIGN - TYPICAL N402GMRS
AGE	COMPRESSIVE STRENGTH	COMPRESSIVE STRENGTH
1 Day	8.2	7.3
3 Day	26.5	20
7 Day	34.5	30
28 Day	53	48.5
	Xypex Mix Results	Mix Details
	3 x samples cast	August/Sept 2000
1 Day	8.4	GP Cement - 260kg
	8	
	8.4	Fly Ash - 110 kg
3 Day	27	Water Reducer dosage
	26	300ml per 100kg
	27	cementitious content
7 Day	34.5	Water/Cement
	35.5	Ratio 0.42
	33.5	
		Xypex Admix C1000NF
28 Day	53	dosed @ 0.8%
	53	of total cementitious
	52.5	content per m3





Results
Xypex Mix Trial Only

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BATCHING RECORD FORM XYPEX Admix C-1000NF/C-2000NF

PROJECT:	INNER CITY BY-PASS TRIAL. PAGE: 1
CUSTOMER:	LCPL (LEIGHTONS)
CONCRETE COMPANY:	C&R.
APPLICATOR:	XYPEX.

DATE	TRUCK NO	TIME	DOCKET NO	PRODUCT WEIGHT DOSED	PRODUCT BATCH NO	CUBIC METRES (M^3)	VERIFIED AT SITE
14/08/00	0	2:10	17052137.	9KG.		3	✓
	80	SLUMP @ 1ST TEST.					
2:45	65	SLUMP @ 2ND TEST					

ROUTES ADDED @ SITE. *

2:00 / 2:10 (1 hour from batch.)

* MATCH UP ALL DOCKET NO'S TO DELIVERY DOCKETS AT SITE AT THE COMPLETION OF THE POUR

SIGNED: .....

LEIGHTONS INNER CITY BYPASS TRIAL

fax to: Maria 3266 6406

Date: 14-Aug-00
Time: 16:10

SAP SOUTHEAST QUEENSLAND (BCSDPM)
Ticket Detail Report

Selection: Date MONDAY, 14-Aug-00 only
Ticket 17052137 only, Shipping plant number 3 only
Sequence : Weights report

Ticket Number	Plant No.	Truck No.	Batch	Mix Design	Slump	Hot Water	Amount	Design	Actual	Variance Unit	Variance Percent	Mix Code
Plant 03 CROSBY RD												
17052137	67	01 of 01	S40HRXYP		80		03.00	03.00	03.00	0	0.00%	380PPE01
			PET20					002370	002380	10	0.42%	
			PET10					001071	001050	-21	-1.96%	
			TIVCS					001491	001500	9	0.60%	
			OXCFSW					001023	001040	20	1.96%	
			SULGP					000801	000806	5	0.62%	
			TARFA					000339	000348	9	2.65%	
			WR					003420	003400	-20	-0.58%	
			WATER					000200	000192	-8	-4.00%	

1 Ticket(s) on report

batch water - 200ℓ ∴ = 67 ℓ/m³

Slump stand + onsite = 50+40 ℓ ∴ = 30 ℓ/m³

Materials = 60 ℓ/m³

157ℓ/m³

∴ 0.42 w/c ratio

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PRE CONCRETE POUR CHECKLIST

XYPEX ADMIX C-1000NF / C-2000NF

Date: 14/09/00

PROJECT NAME: Inner City Bypass
Location: Land Bridge – Wing walls
Client: Leighton Contractors Contact: Matt Killen
Address: off Gregory Terrace Phone: 38722600
(Centenary Pool) Fax:

CONCRETE COMPANY: CSR Readymix Concrete
Plant: Albion – Crosby Road, Albion
Batcher: Greg Hines Phone: Fax

PLANT STAFF BRIEFING	
XYPEX dose rates and mixing sequence checked	
Use of other admixtures checked and possible effects explained MB	YES
Contingency in place for possible plant breakdown or other batchers being aware of XYPEX requirements MB	YES
	MB YES

MIX DESIGN DETAILS

1. Design strength: N40 mpa Mix code: N40MR6X4P
   (if possible supply mix design)
2. Total water (m³)
3. Total cementitious (m³): 380
4. Cement type (eg. Blend, F.A., Slag, SL): GP + ASH
5. Other admixtures WATER REDUCER
   - Type GWR – GRACE DUST
   Dosage 300ml per m3
6. Xypex Admix Dose rate 3kg per /.m³ C-1000NF / C-2000NF (Circle product used)

Estimated total cubic metres to be dosed 5m³

XYPEX Applicator to sign Maria Bobeldyk (Print name) MARIA BOBELDYK

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BATCHING RECORD FORM

XYPEX ADMIX C-1000 NF / C-2000 NF

(Can be substituted by copies of concrete batching records, if all pertinent data present)

Page No. 1 of 1

Project: Inner City Bypass Date: 14/09/00

Location (Address): Land Bridge Wing Wall Trial @ Gregory Tce

Concrete Company & Plant: CSR Readymix – Albion

Xypex Admix Dose: Bags/weight/m³ 5 Bags – 15kg = 5m³

Truck No:	Time (Batch)	Docket No.	Xypex Batch Code(s)	Cubic Metres	Product dosed (Bags/weight)total
399	9.09	17055196	1540A	5	15kg

Applicator or where applicable, Concrete Company Batcher/Manager

Date: 14/09/00

Print Name: Maria Bobeldyk

Signature: Maria Bobeldyk

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DELIVERY DETAILS

(Where the applicator is providing on-site supervision)

Page No: 1 of 1

Project Name: Inner City By-Pass Date: 14/09/00

Location (Address): Land Bridge Wing Wall
Off Gregory Tce Springhill

Concrete Company: CBR Readymix

Plant Location: Albion

Truck No:	Time of discharge	Docket No.	Cubic Metres	Remarks (eg. water added, time truck on site prior to discharge)	Slump as tested
399	9.40	17055196	5	9.50am 10 litres added	80 slump
Slump Test – 9.50am = 80 slump					
	3 cylinders taken			1 x 7 day	
				2 x 28 day	
	tested approximately ½ way into load				
Shrinkage	Bars taken & set @			9.58am	
Air Temp – 27°c			Concrete Temp – 25°c		

Signed: Maria Bobeldyk

Print name and Company Name: MARIA BOBELDYK – XYPEX AUSTRALIA

N.B. **Insert Pre-cast panel numbers in Remarks column**

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ON SITE CHECKLIST

(To be completed during on site supervision)

Project name: Inner City Bypass **Pour / Casting No:** Trial 14/09

1. **To be answered and confirmed by responsible party, ie Site Supervisor / Project Engineer.**

   Reinforcement :

   Design and placement conforms to requirement of AS 3600 –1994 or other pertinent standard / requirement where applicable.

   Confirmed by:

   (Signature) ..... (Print Name) .....

   (Position) (Date/Time) WING WALLS – 14/09/00

2. **To be answered and confirmed by Concrete Placement Supervisor:**

   Formwork:

   Inspected – clean... YES ..... Yes / No

   Concrete Placement:

   - Notate delays that may / will result in "cold joints". N/A
   - If cold joints occurred what action taken..... N/A

   Vibration:

   Adequate vibration undertaken to conform to requirements. ... ✓ .....

   Confirmed by:

   (Signature) ..... (Print Name) .....

   (Position) ..... (Date/Time) .....

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ON SITE CHECKLIST

(To be completed during on site supervision)

Project name: Inner City Bypass ... **Pour / Casting No:** Trial 14/09

To be answered and confirmed by XYPEX Applicator.

3. Did temperature during placement reach or exceed 25° Celcius: (Yes) / No.
4. Was aliphatic alcohol employed? Yes / (No) FORMED WALL
5. Surface finish included "power trowel' or equivalent hand finishing: (Yes) / No
6. Was a subsequent finish applied? eg broom **Yes / No** (If Yes describe)
   Concrete placed into formed wall. Surface hand trowel
7. **Curing:**
   Time of commencement of curing... N/A
   Duration and frequency if applicable.... N/A
   Who conducted curing eg Contractor, applicator? N/A
   Type: Water / Curing compound If water, how applied, eg sprinkler, hand, hessian etc
   If curing compound, Type..... Comply to AS 3799. **Yes / No**
8. **Inspections:**
   Inspection performed (list time/date).... TRIAL MIX POURED TO TAKE COMPRESSION CYLINDERS & SHRINKAGE BARS.

Notate observation from inspections eg, No cracking evident .....

Cracking notated, treated with XYPEX Concentrate etc. .....

Confirmed by XYPEX Applicator:

(Signature) .... M Robeldyk ..... (Print Name) MARIA ROBELDYK

(Company) Xypex Australia ..... (Date/Time) ..14/09/00 2.00pm..

Reproduction of CSR Readymix Batch Ticket for Xypex trials

Selection:	Date THURSDAY 14-Sep-00 only											
	Ticket 17055196 only, Shipping plant number 3 only											
Sequence:	Weights report											
Ticket number	Plant No.	Truck No.	Batch	Mix Design	Slump	Hot Water	Amount	Design	Actual	Variance Unit	Variance Percent	
Plant 03 Crosby Road												
17055196		399	01 of 01	S40MRXYP	80		05.00	05.00	05.00	0	0.00%	
				PET 20				003960	003970	10	0.25%	
				PET 10				001780	001840	60	3.37%	
				TIVCS				002490	002500	10	0.40%	
				OXCFSW				001700	001680	-20	-1.18%	
				BULGP				001335	001334	-1	-0.07%	
				TARFA				000565	000564	-1	-0.18%	
				WR				005800	005800	0	0.00%	
				WATER				000480	000494	14	2.92%	
				XYPEX				Added at plant by Xypex				
			Measured slump		70							
			Available water from materials				266	litres				
			Batch water				480	litres				
			Slump stand				40	litres				
			On-site				0	litres				
			TOTAL WATER				786	litres				
			Total cementitious				1898					
			W/C ratio =				0.41	compared with 0.42 design estimated				

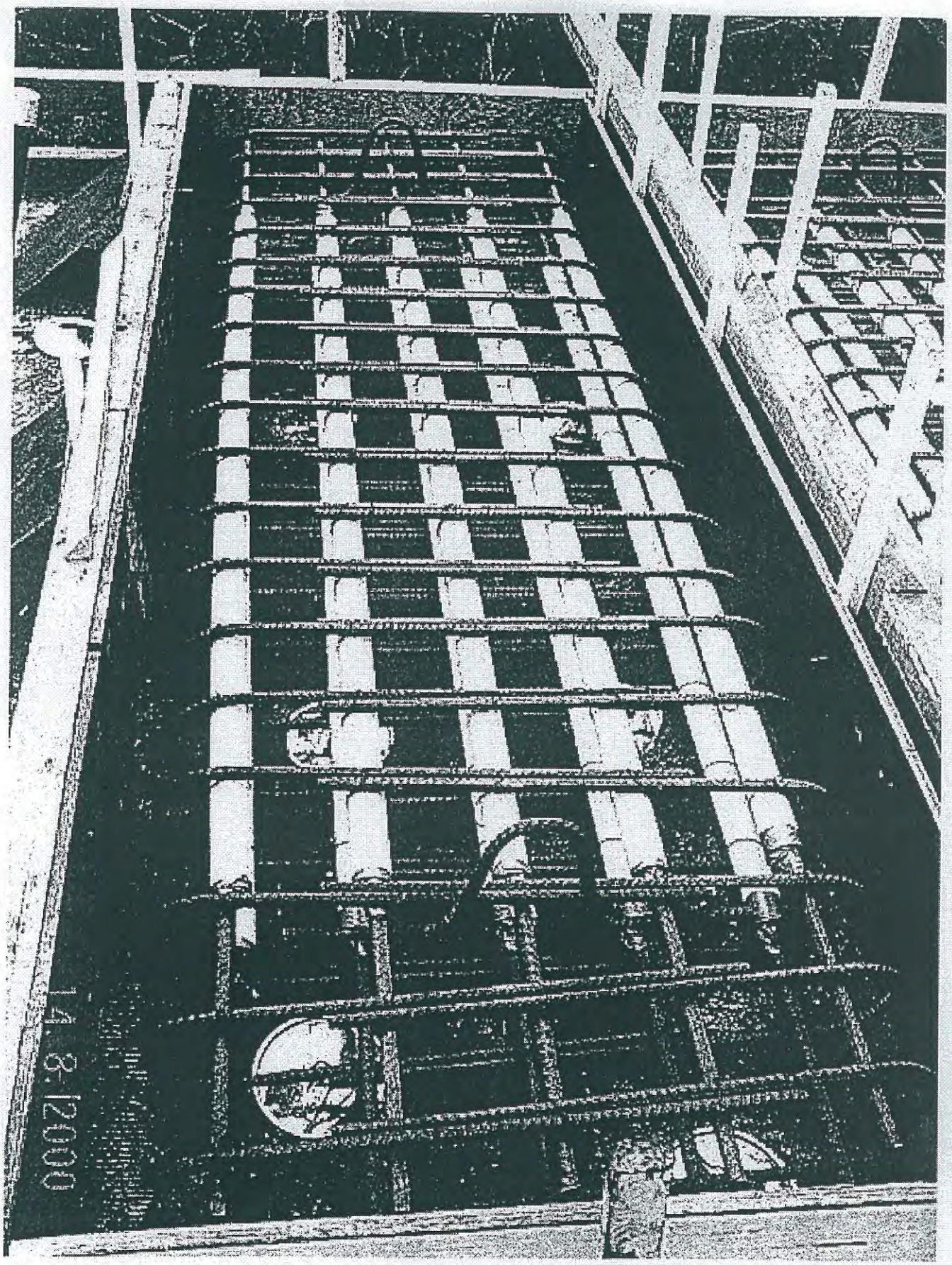
Reproduction of CSR Readymix Batch Ticket for Xypex trials

Selection:	Date THURSDAY 14-Sep-00 only										
	Ticket 17055174 only, Shipping plant number 3 only										
Sequence:	Weights report										
Ticket number	Plant No.	Truck No.	Batch	Mix Design	Slump	Hot Water	Amount	Design	Actual	Variance Unit	Variance Percent
Plant 03 Crosby Road											
17055174		826	01 of 01	N402GMRS	100		04.60	04.60	04.60	0	0.00%
				PET 20				003638	003630	-8	-0.22%
				PET 10				001628	001630	2	0.12%
				TIVCS				002281	002290	9	0.39%
				OXCFSW				001550	001560	10	0.65%
				BULGP				001242	001248	6	0.48%
				TARFA				000529	000538	9	1.70%
				WR				005313	005300	-13	-0.24%
				WATER				000350	000356	6	1.71%
				HWR				009200	009150	-50	-0.54%
			Measured slump		110						
			Available water from materials				246	litres			
			Batch water				350	litres			
			Slump stand				65	litres			
			On-site				0	litres			
			TOTAL WATER				661	litres			
			Total cementitious				1786				
			W/C ratio =				0.37	compared with 0.47 design			
								Note reduced due to s/p			

Reproduction of CSR Readymix Batch Ticket for Xypex trials

Selection:	Date THURSDAY 14-Sep-00 only										
	Ticket 17055142 only, Shipping plant number 3 only										
Sequence:	Weights report										
Ticket number	Plant No.	Truck No.	Batch	Mix Design	Slump	Hot Water	Amount	Design	Actual	Variance Unit	Variance Percent
Plant 03 Crosby Road											
17055142		992	01 of 01	N402GMRS	80		07.40	07.40	07.40	0	0.00%
				PET 20				005852	005850	-2	-0.03%
				PET 10				002626	002580	-46	-1.75%
				TIVCS				003676	003710	34	0.92%
				OXCFSW				002508	002520	12	0.48%
				BULGP				001974	001970	-4	-0.20%
				TARFA				000836	000840	4	0.48%
				WR				008436	008400	-36	-0.43%
				WATER				000620	000632	12	1.94%
			Measured slump		80						
			Available water from materials				397	litres			
			Batch water				620	litres			
			Slump stand				275	litres			
			On-site				0	litres			
			TOTAL WATER				1292	litres			
			Total cementitious				2810				
			W/C ratio =				0.46	compared with 0.47 design			

Xypex batch docket Trial 2 N40
3/7/2001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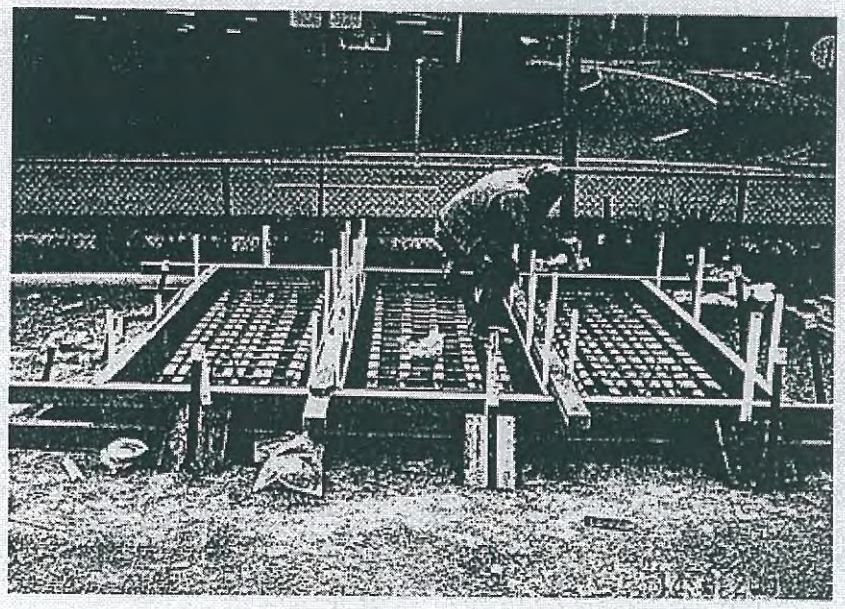
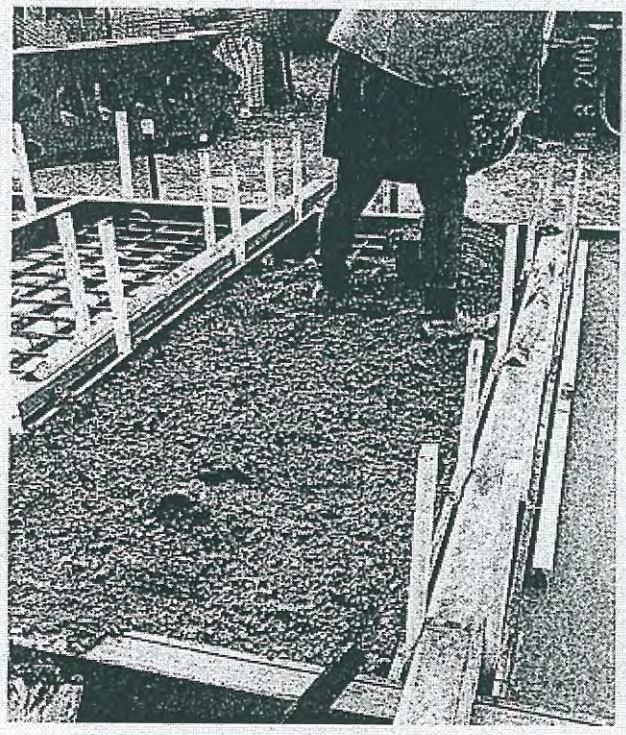
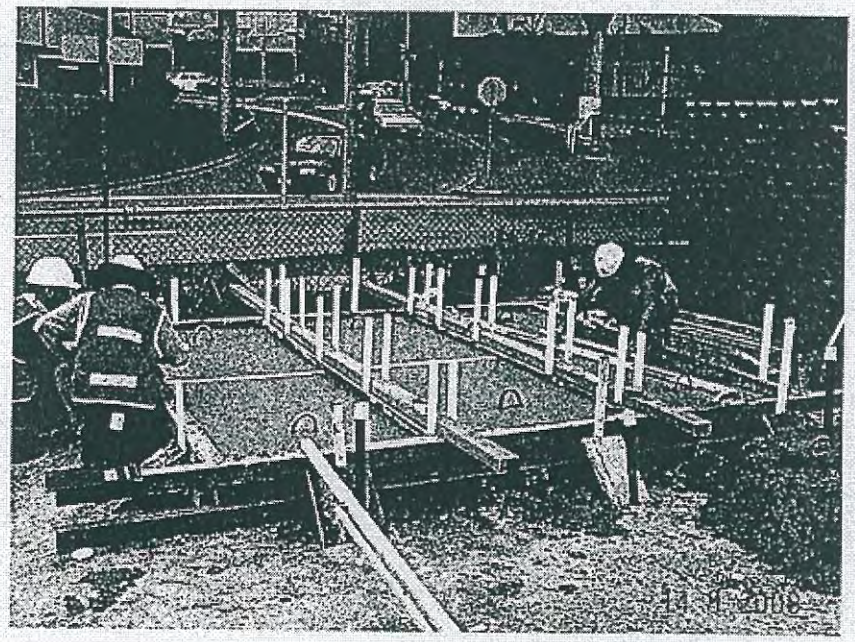
TRIAL PANELS

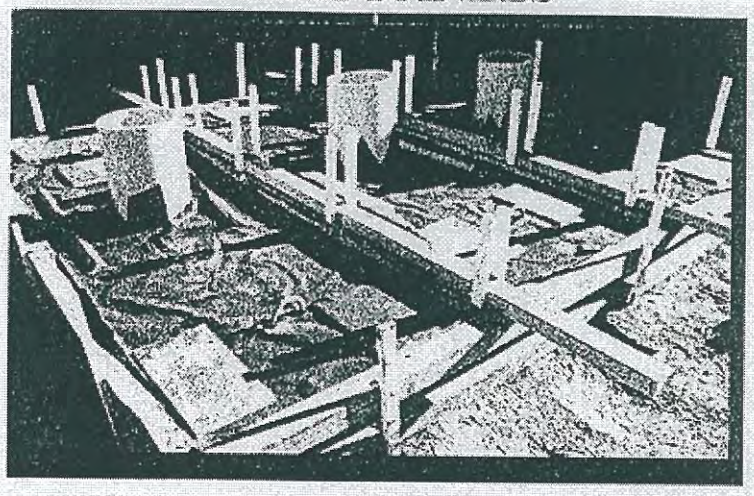


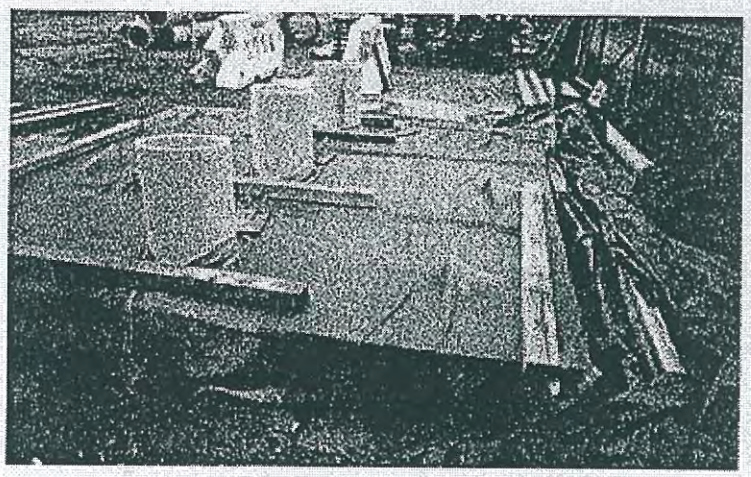


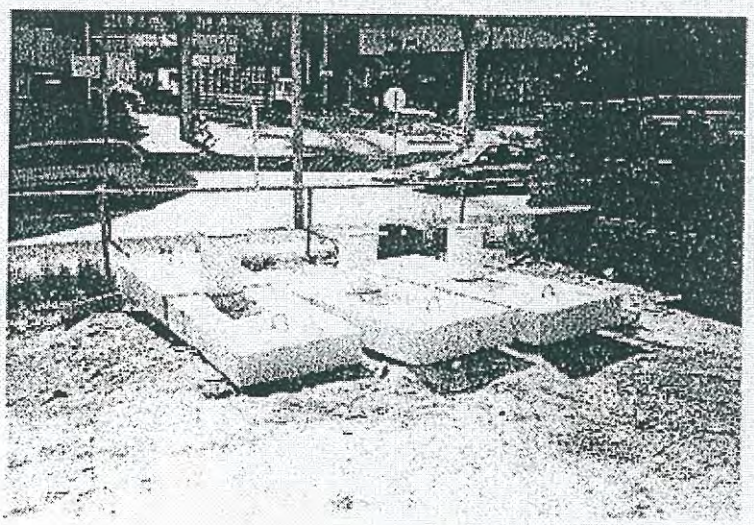
TRIAL PANELS

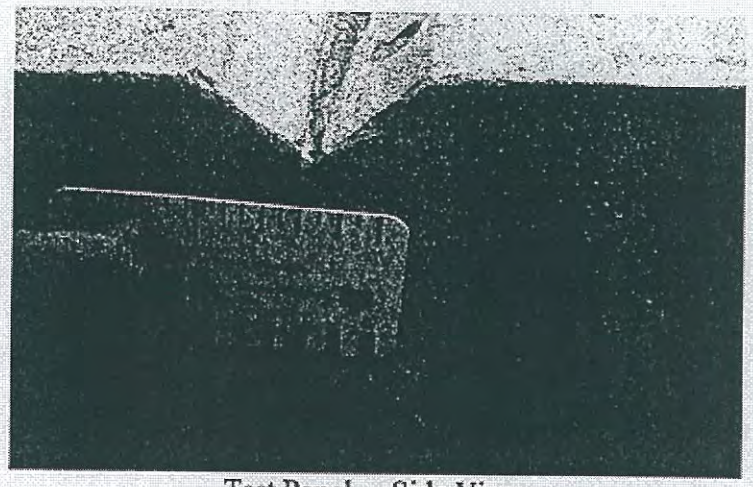


TRIAL PANELS

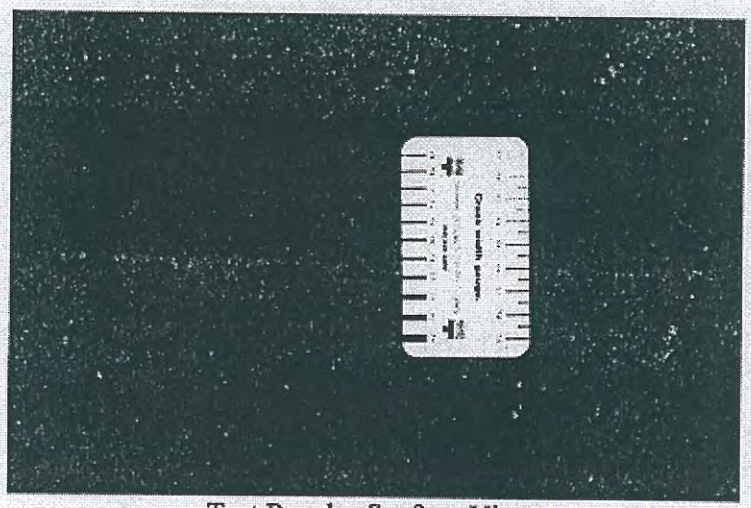




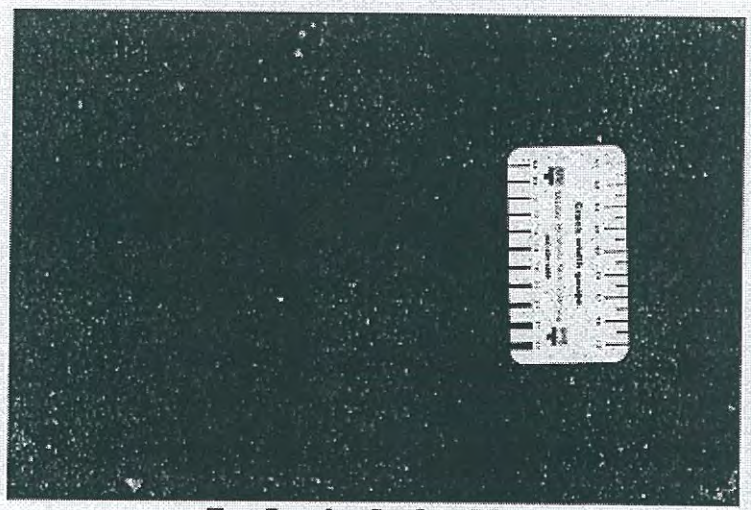




Test Panel – Side View

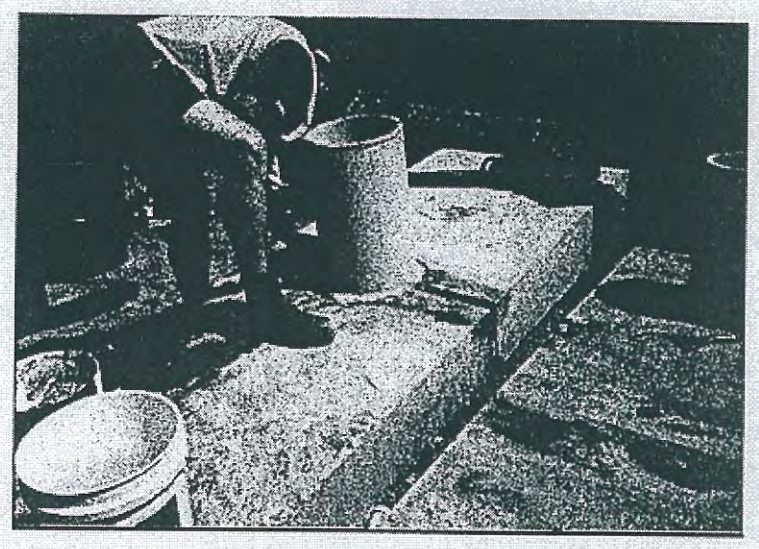


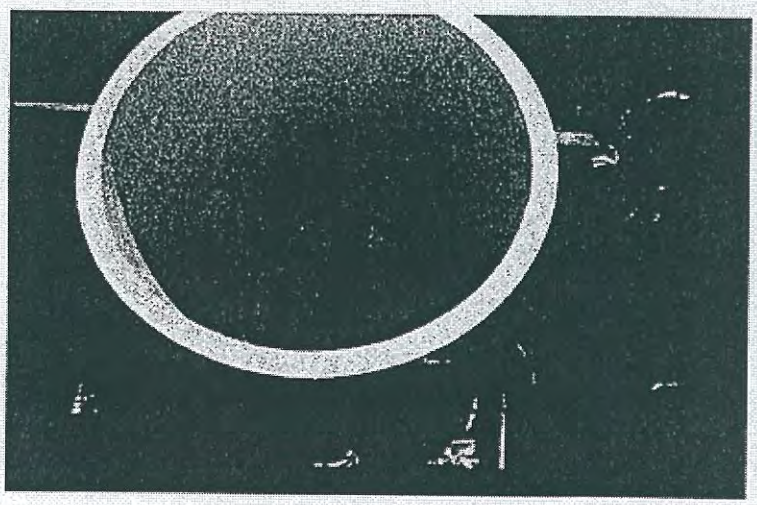
Test Panel – Surface View

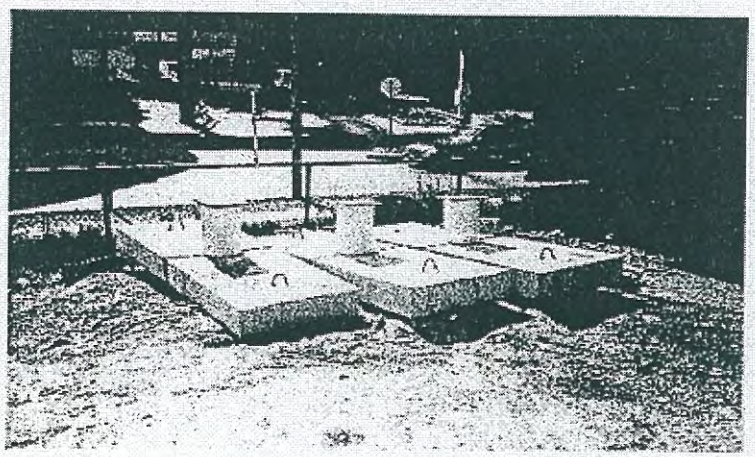


Test Panel - Surface View

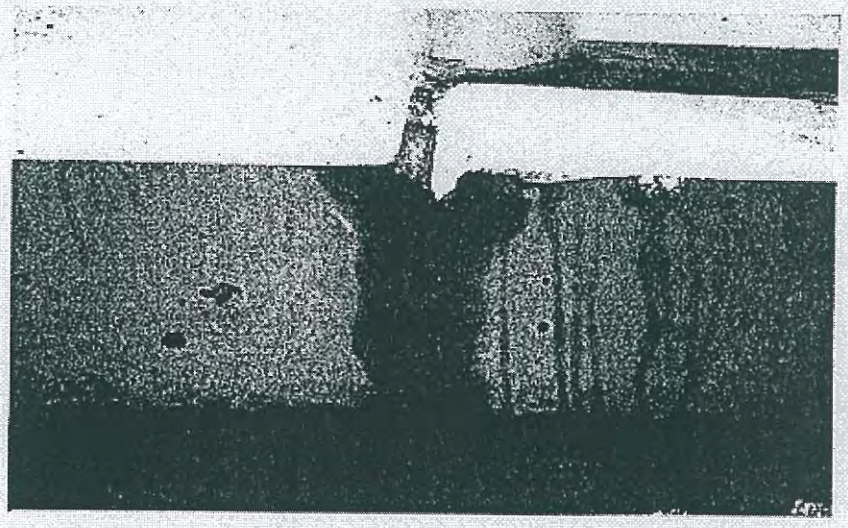
TRIAL PANELS

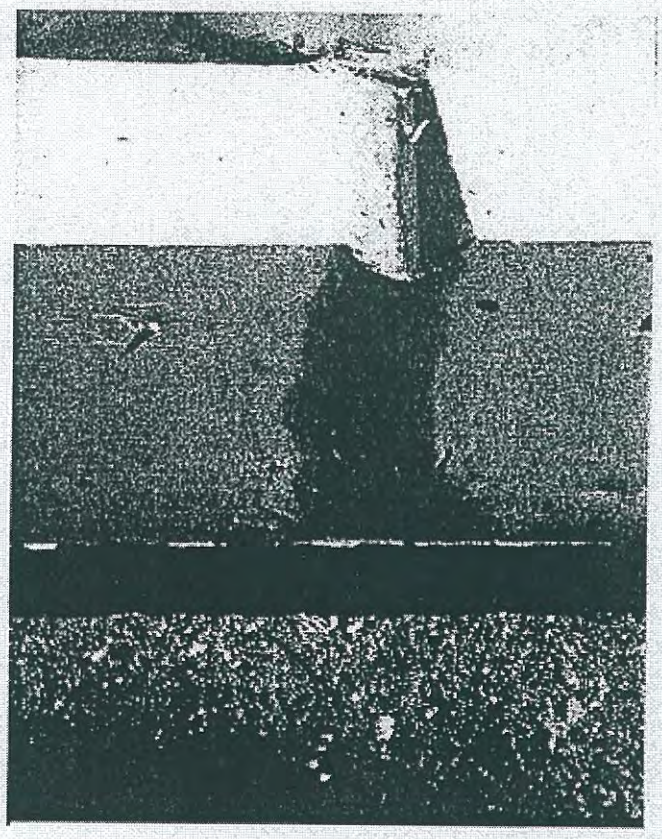






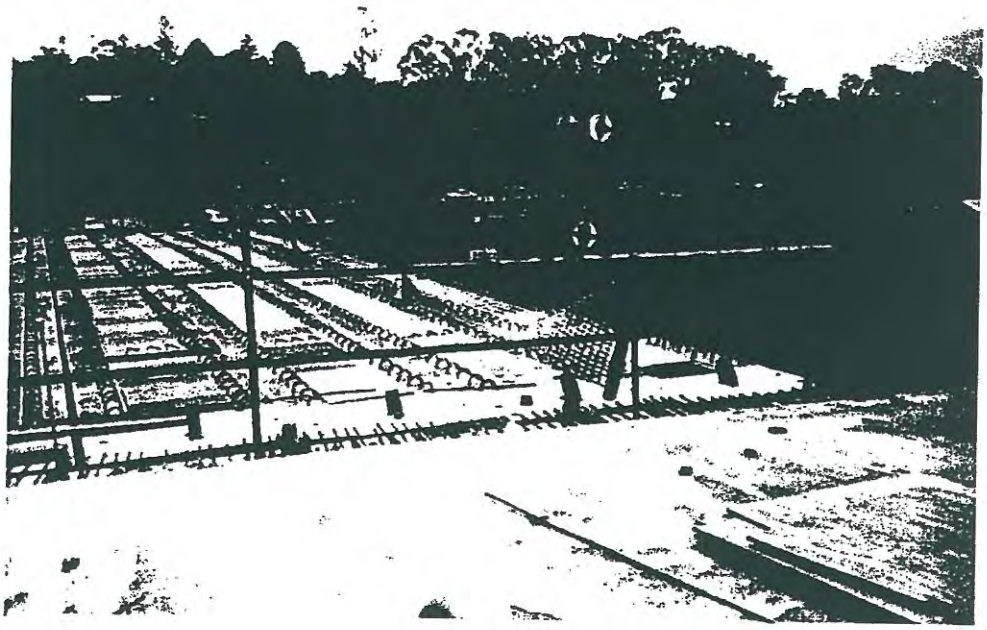
TRIAL PANELS

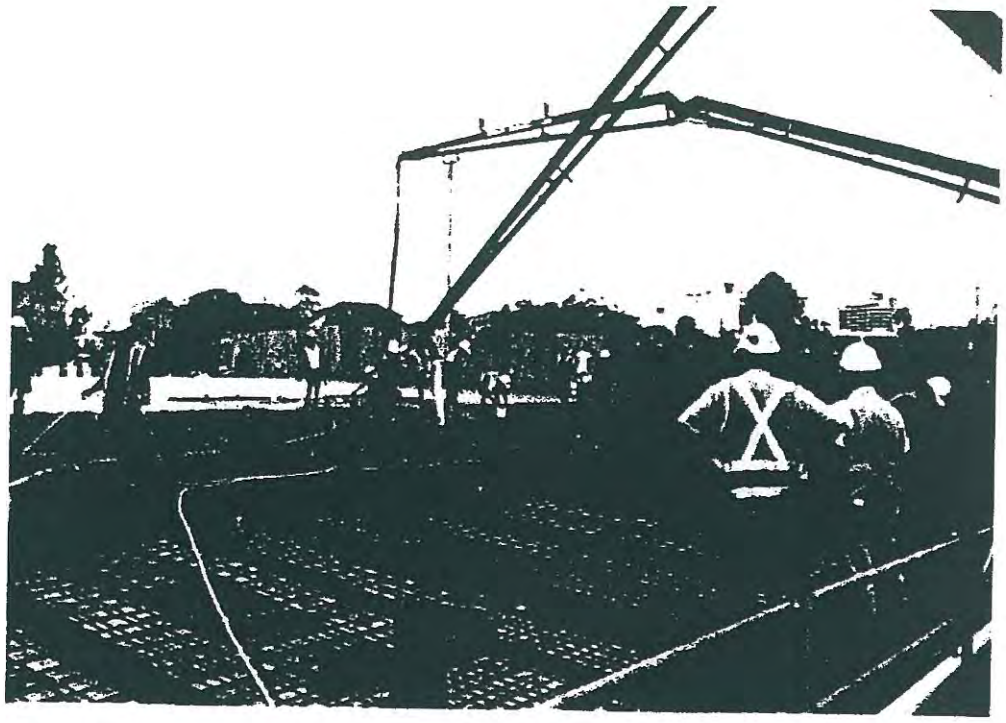




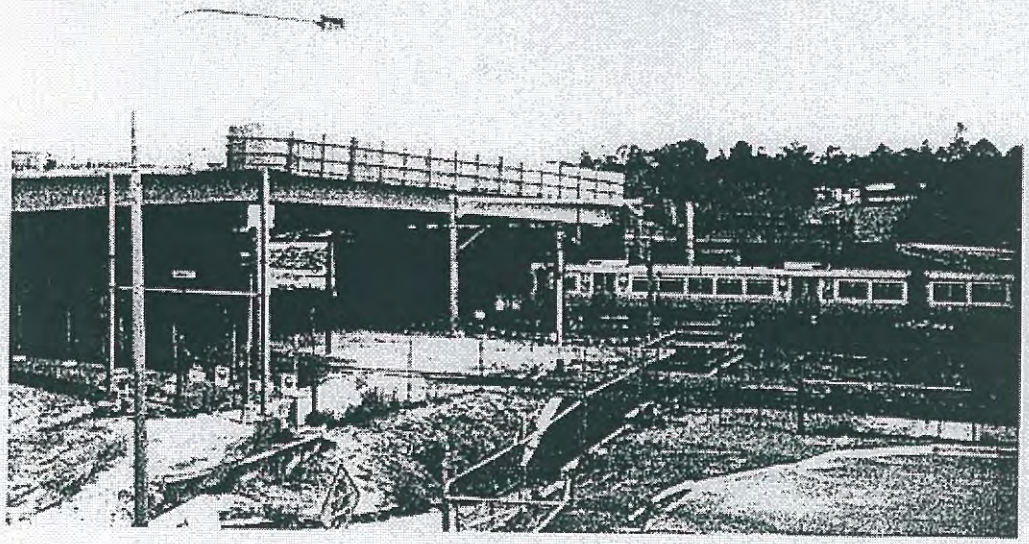
Trial Panel Repairs

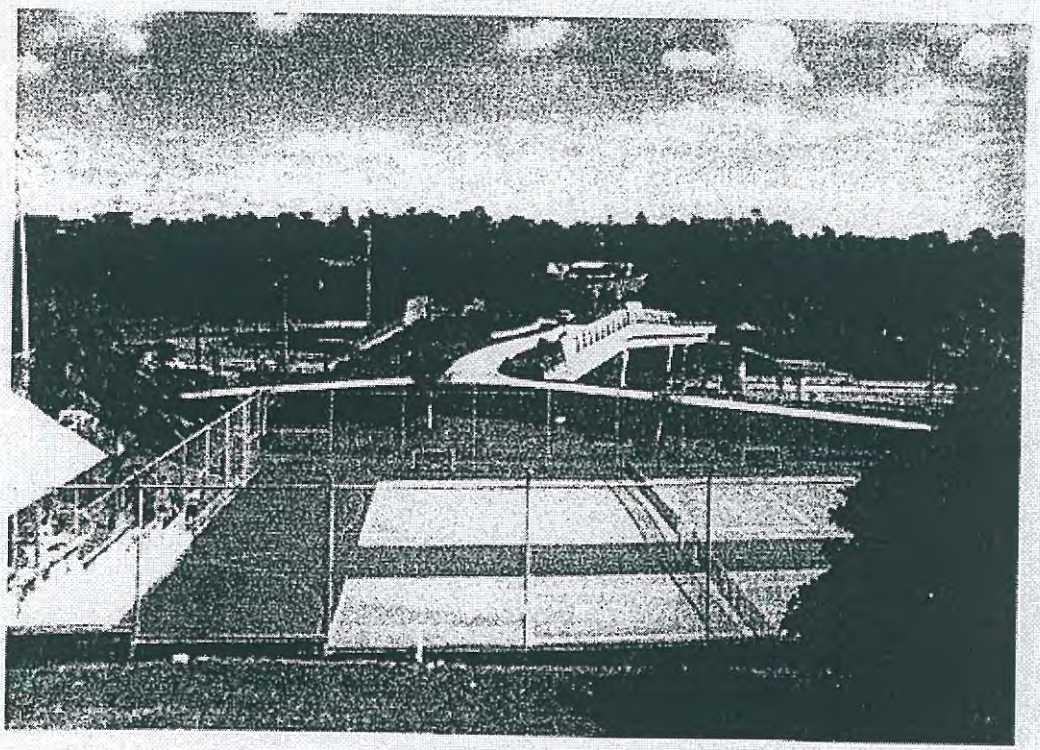
LANDBRIDGE



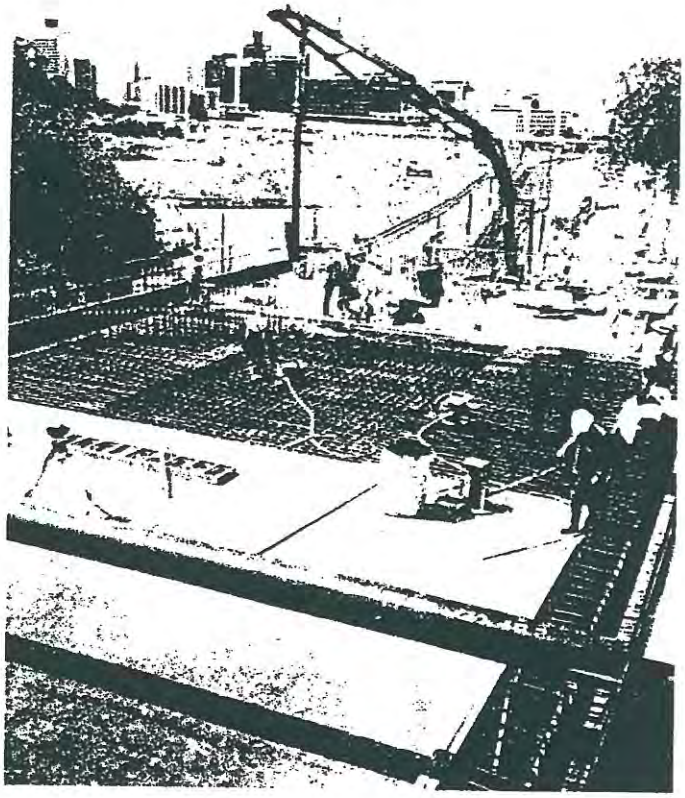


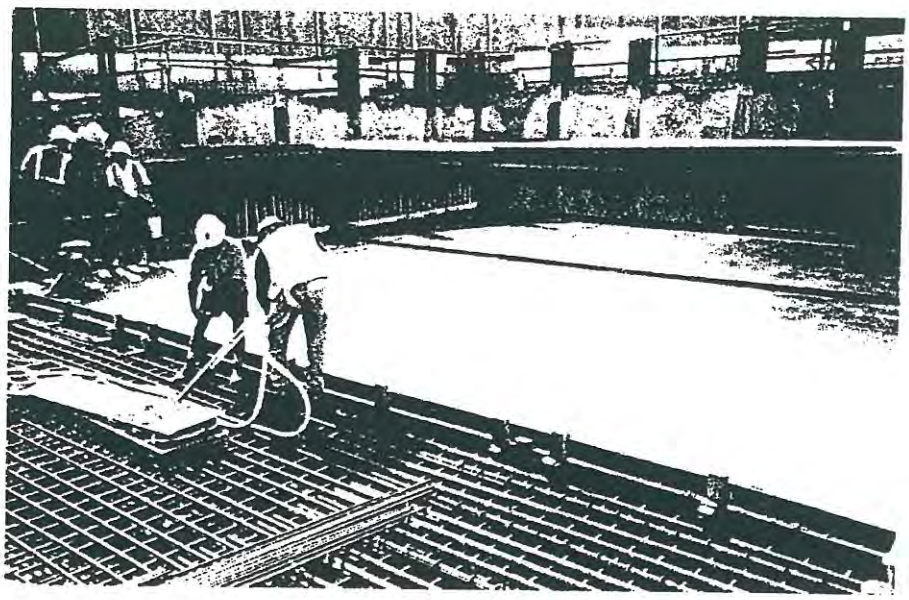
LANDBRIDGE





INNER NORTHERN BUSWAY TUNNEL





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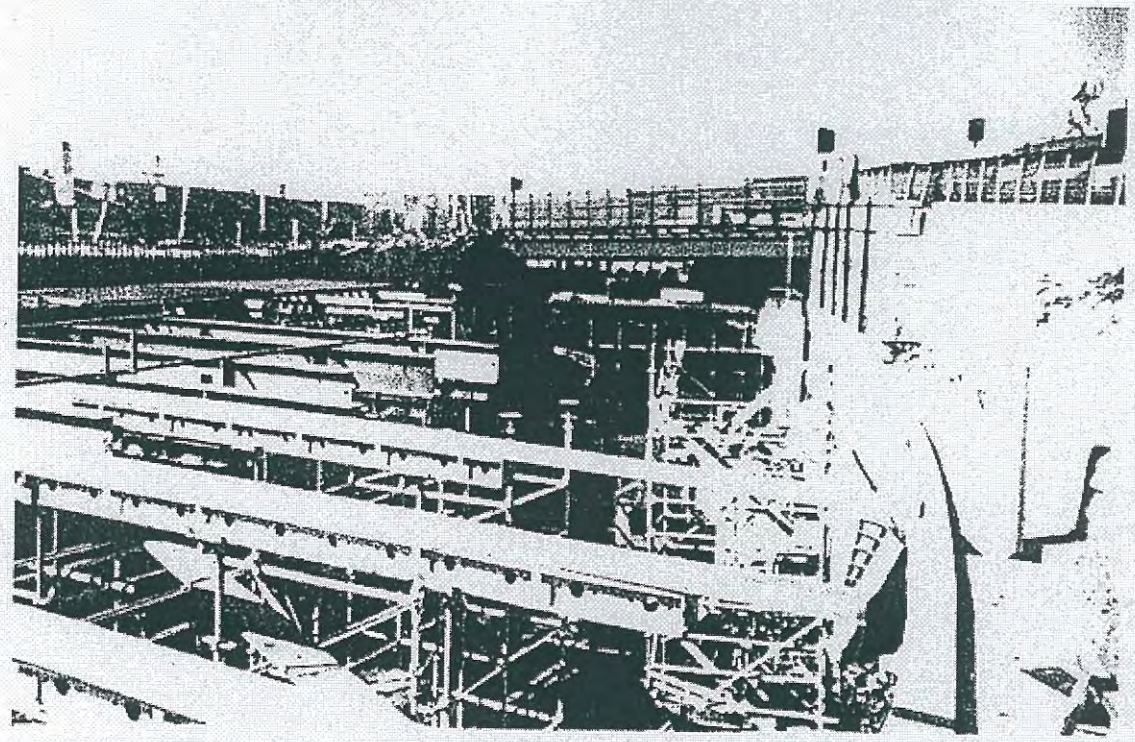

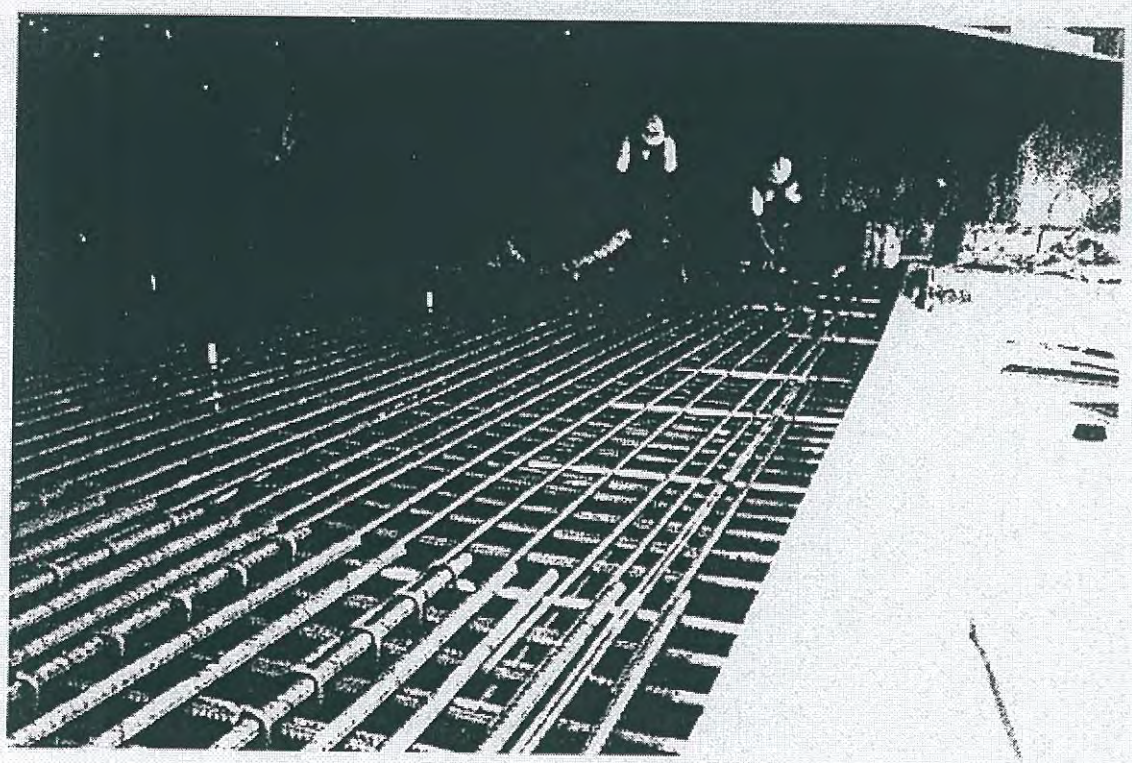

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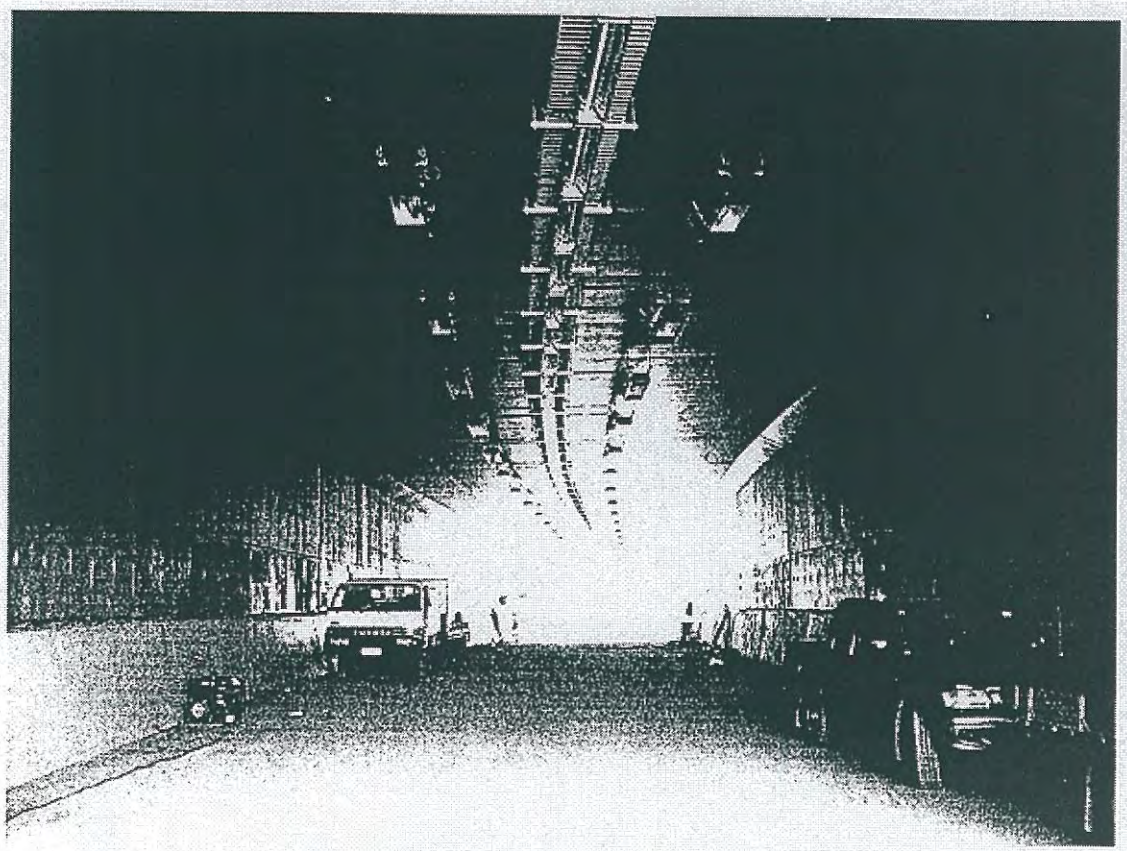

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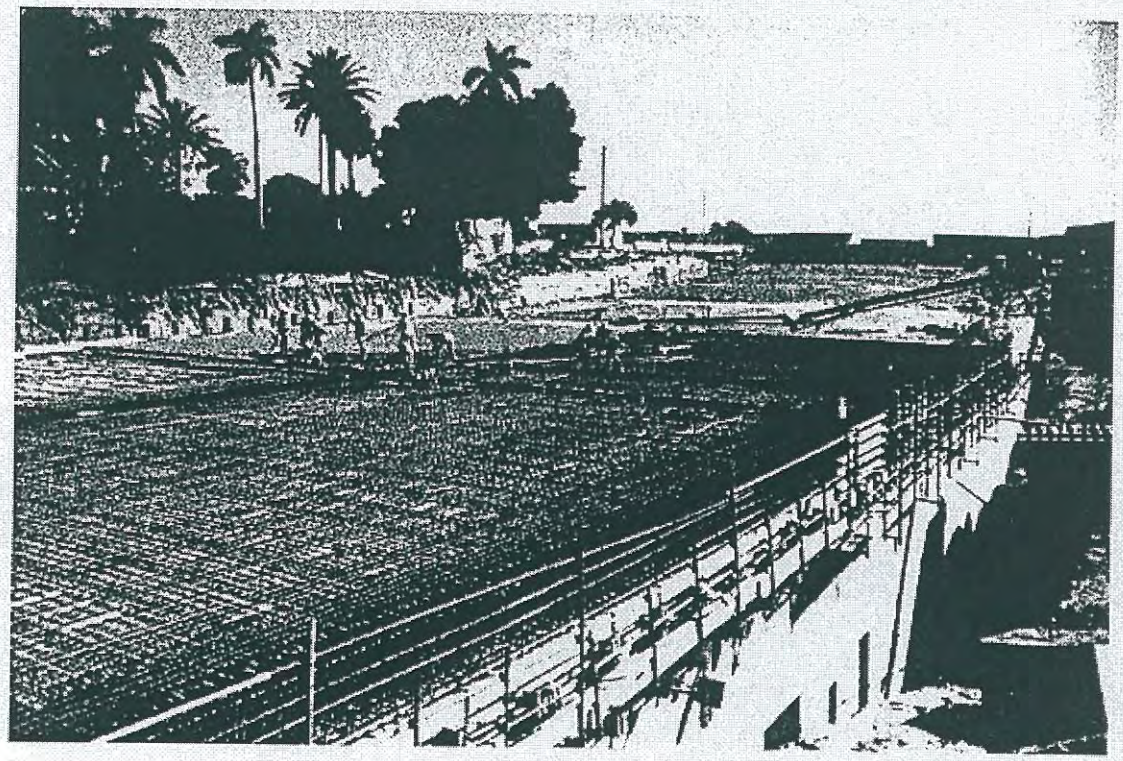

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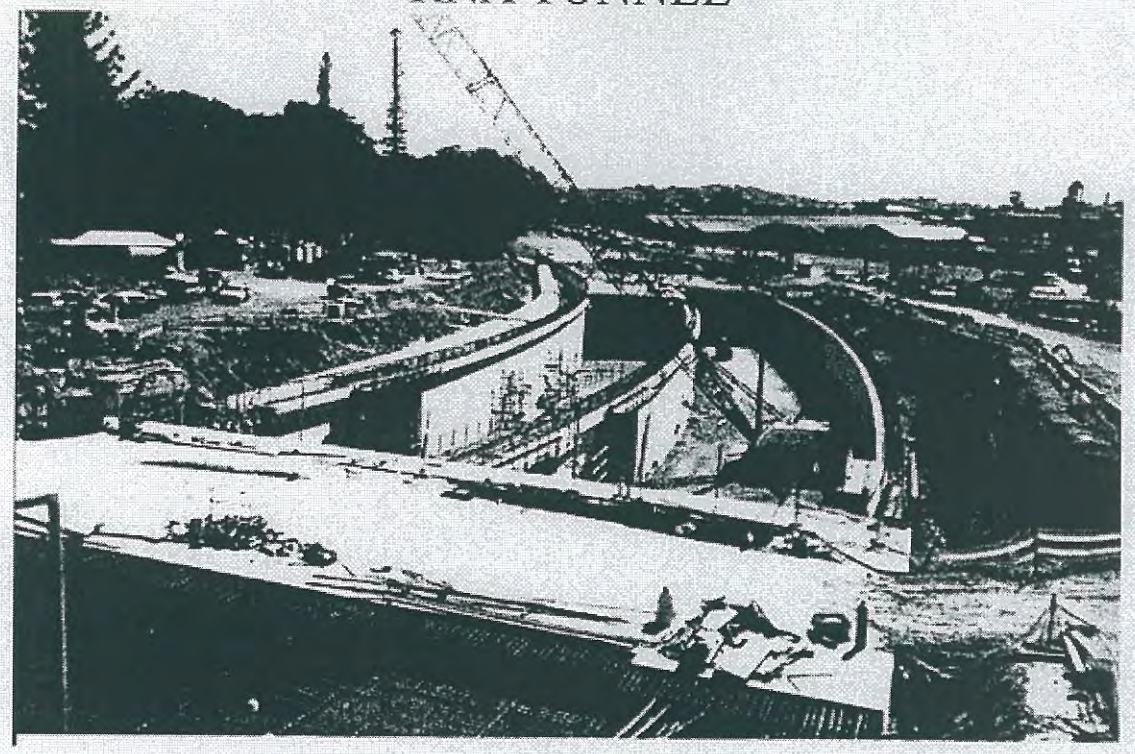

Draft for consideration
To be used in conjuction with written workmanship warranty from applicator

WARRANTY

PROJECT:

APPLICATOR:

1. Concrete Waterproofing Manufacturing Pty Ltd, hereinafter called the Manufacturer warrants that the material as sold by the Manufacturer to the Supplier, shall be free from material defects and will be consistent with the Manufacturer's normal quality and manufacturing specifications.

2. The Manufacturer agrees to replace with a normal quality or, at the Manufacturer's option, refund the purchase price of any material sold that is either proven defective or fails to be consistent with Manufacturer's normal manufacturing specifications, provided the material has been stored and applied in accordance with the Manufacturer's written instructions. The Manufacturer shall not be liable for any direct, indirect or consequential cost, loss or damage however incurred or caused, including but not limited to damages for personal injury or death, damage to property or loss of profits.

3. This Warranty is void if the materials sold are applied by persons not authorized by the Manufacturer, or if the materials sold are applied more than 1 year after date of supply from the Manufacturer, or if the materials sold are improperly stored, altered, repaired or tampered with. This warranty expires year(s) from the date the materials are supplied to: .....(INSERT APPLICATORS DETAILS HERE)

THIS WARRANTY IS ISSUED IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER OBLIGATIONS AND LIABILILITES ON BEHALF OF XYPEX AUSTRALIA.

Dated this dayof 2000

XYPEX®
AUSTRALIA

45 Union Road, PO Box 255
Lavington, NSW 2641, Australia

Concrete Waterproofing Manufacturing Pty Ltd
T/A XYPEX AUSTRALIA ACN 060 139 968

Telephone: 02 6040 2444
Facsimile: 02 6040 2411

STANDARD CONCRETE WATERPROOFING SPECIFICATIONS
XYPEX ADMIX C-1000NF / C-2000NF

1. GENERAL

1.1 Summary: This specification covers the requirements for waterproofing of all new concrete structures (as described in AS 3600 – 1994)

References:
a. AS 3600 – 1994
b. AS 3799 – 1990
c. CIA Z9 Recommended Practice Curing of Concrete

1.2 System Description: The concrete waterproofing material shall be manufactured by Concrete Waterproofing Manufacturing Pty Ltd trading as XYPEX Australia, and shall be of the cementitious crystalline type known as "XYPEX Waterproofing by Crystallization", (no known equal). The product chemically controls and permanently generates non-soluble catalytic multiplicative crystalline fibres throughout the capillary voids of the concrete. (Note: XYPEX crystalline products should not be considered to be flexible.)

1.3 Storage of materials: Store manufacturers sealed and labeled material containers off the ground in a dry enclosed area at a minimum temperature of 7°C. The shelf life is one year when stored under proper conditions.

2. DOSAGE:

By weight: Percentage dosage rates of XYPEX Admix C-1000NF / C-2000NF to the cementitious (ordinary portland cement [O.P.C.] and reactive pozzolans {eg; reactive fly ash}) content of the concrete.

Dosage rate must be between 0.8% and 1.0% by weight of cementitious (BWC) unless otherwise specified.

Example; 230 kg O.P.C. and 75 kg Fly Ash, total cementitious = 305 kg.
Dose rate @ 0.8% = 2.44 kg and @ 1.0% = 3.05 kg.

Refer to Annex A for applicable number of bags to be dosed in regard to cementitious content. Instances where this chart does not apply require that XYPEX Australia be contacted for determination and advice.

NOTE: THE CEMENT (O.P.C.) CONTENT OF THE MIX SHALL NOT BE LESS THAN 10% BY WEIGHT.

CHEMICAL STORAGE AND CONSTANT HIGH WATER PRESSURE APPLICATIONS SHOULD BE REFERRED TO XYPEX AUSTRALIA FOR SUITABLE DOSE RATES.

3. BATCHING AND MIXING:

Batching plant procedures, facilities and manpower will dictate the preferred / required batching technique. For example it is anticipated that the method described for Central mix plants is not generally feasible in Australian conditions.

3.1 Ready Mix Plant – Dry Batch Operation

Prior to batching, add XYPEX Admix in powder form to the drum of the ready-mix truck. After batching, mix the materials for 2-3 minutes to ensure the Admix is distributed evenly throughout the batch. (The batch must be agitated at high speed to ensure thorough dispersion.) A minimum of 10 minutes must elapse before discharge of the concrete. A further 1 minute of mixing at high speed immediately prior to discharge is recommended.

3.2 Ready Mix Plant – Central Mix Operation

Mix XYPEX Admix with water to form a thin slurry (e.g. 7.0 kg of powder mixed with 13.0 litres of water). Pour the required amount of material into the drum of the ready mixed truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready mix truck). Pour the concrete into the truck and mix for at least 5 minutes, to ensure even distribution of the XYPEX Admix throughout the concrete.

3.3 Precast Batch Plant

Add XYPEX Admix to the rock and sand, then mix thoroughly for 2 – 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

NOTE: It is important to obtain a homogeneous mixture of XYPEX Admix with the concrete. Therefore, do not add dry powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur. It is however suitable to add wet concrete to dry powder ensuring that thorough mixing is achieved (as per Dry Batch Operation).

XYPEX soluble bags are most suited for use in the Dry Batch operation.

Maximum water cement ratio should not exceed **0.5.** Requirements for higher water cement ratio's must be referred to XYPEX Australia.

The XYPEX Admix C-1000NF/ C-2000NF will act as a plasticiser and takes at least 10 minutes to become fully activated and will last approximately 30 minutes after placement of concrete.

Extension of set time may occur when using XYPEX Admix C-1000NF / C-2000NF. Amount of extension will depend on concrete mix design, temperatures and dosage rate of XYPEX. Care should be exercised when other admixtures are being used, when mixed with XYPEX extended set times can result. This category includes set retarders and may include water reducers, plasticisers etc.

4. REINFORCEMENT

4.1 General: Shall be in accordance with the pertinent, current Australian Standards.

4.2 Concrete slabs: All reinforcement shall be "Rib deformed bar" or "welded wire fabric" (other than fitments) and designed in accordance with Australian Standard AS 3600 – 1994.

NOTE: Exposed concrete decks (joint free) must contain reinforcement to minimise thermal movement, for which the content and placement of reinforcement steel required shall be sufficient to satisfy the requirements of **AS 3600 - 1994 Clause 9.4.3.4.** The attention of Specifiers, Engineers etc is drawn to **AS 3600 – 1994 Section 4 para 4.3 (EXPOSURE CLASSIFICATION)** in its entirety.

In the event that the requirements of AS 3600 –1994 be less than 1.0% (exposure classification A1 or A2) reinforcement steel requirement will in no case be less than 1.0% applied proportionately throughout the concrete and apportioned at not less than 0.5% on the top and 0.5% on the bottom face of the concrete.(ie; 0.25% either direction at both faces). 1.0% equates to a degree of crack control between moderate and strong as defined by AS 3600 - 1994 Clause 9.4.3.4.

4.3 Pre-stressing (Post Tensioning): Is to conform to the above standards and or other current pertinent standard and requirements where applicable.

5. COMPACTION and FINISHING and CURING

Must comply with the provisions of AS 3600 –1994 Clauses 19.1.3.,19.1.4,and 19.1.5.(CIA RECOMMENDED PRACTICE NOTE Z9) respectively.

5.1 Compaction

The concrete shall be compacted until the following conditions are attained;

Entrapped air is expelled,

Formwork is completely filled to the intended level,

All reinforcement, penetrations and the like are completely surrounded, and

The required properties of the concrete are achieved.

5.2 Finishing

Note: Finishing of the concrete shall include the process of "re-working" the surface of the concrete. This will involve either power trowelling of the surface and or vigorous hand steel trowelling. Subsequent to this finishing any desired finish can then be applied.

In hot weather (above 25°C) aliphatic alcohol **must** be used during placement and finishing to control the early loss of bleed water, and which may also assist in the control of shrinkage.

5.3 Curing

The concrete shall be cured in accordance with the above references, to enable the achievement of maximum potential XYPEX crystalline growth.

Curing should begin immediately following the final set. The use of aliphatic alcohol does not take the place of standard concrete curing practices.

In formed concrete, formwork provides good protection and curing for concrete, and should be left in place for a period of seven (7) days, only exposed surfaces need to be kept moist.

5.4 Alternate Curing (Aus. Standards 3799)

Curing compounds complying with the above and having retention levels of 90% or more are a satisfactory curing agent for XYPEX Admix C-1000NF / C-2000NF treated concrete.

6. BACKFILLING

Normal backfilling procedures, after curing of the concrete, may take place. If backfilling takes place within seven (7) days after the initial set, the backfilling material must be moist so as not to draw moisture from the concrete.

7. APPLICATION OF PAINT, EPOXY, GROUT, CEMENT PARGET COAT, PLASTER OR STUCCO

XYPEX Admix C-1000NF / C-2000NF treated concrete will become completely and permanently waterproof. The crystalline formation of dendritic fibres will fill the pores and capillaries thus reducing the suction characteristics of the concrete. For this reason an additional bonding system may be required.

NOTE: It shall be the responsibility of the installer of the render or particular surface applied material to be applied over the concrete, to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the concrete surface.

8. CORE FILL FOR CONCRETE BLOCK WALLS

Refer to XYPEX Australia for dosage rates for core fill applications in block walls, however, dose rate shall never be less than 3.0 kgs per cubic metre.

The core fill must have a slump between 200 and 220 mm (W/C not to exceed 0.5) and blocks must be damp before placement of core fill.

NOTE: Due to the nature of blocks, block wall construction and the inherent difficulties of core fill placement XYPEX Australia does not warrant the water proofing of the wall structure where only the corefill has been treated.

9. SHOTCRETE

Refer to XYPEX Australia for specification and dosage rates for XYPEX Admix shotcrete applications.

XYPEX®
AUSTRALIA

PRE CONCRETE POUR CHECKLIST

XYPEX ADMIX C-1000NF / C-2000NF

Date: 14/08/00

PROJECT NAME: Inner City Bypass Trial Panels
Location: Brisbane
Client: Leighton Contractors — Contact: Iain Burgess
Address: Gilcrest Avenue — Phone: 38722600
Bowen Bridge — Fax: 38722700

CONCRETE COMPANY: CSR Concrete
Plant: Crosby Rd, ALBION Q
Batcher: Greg Hinze — Phone: 38621077 — Fax 38624055

PLANT STAFF BRIEFING	
XYPEX dose rates and mixing sequence checked	✓
Use of other admixtures checked and possible effects explained	✓
Contingency in place for possible plant breakdown or other batchers being aware of XYPEX requirements N/A	✓

MIX DESIGN DETAILS

1. Design strength: 40 MPA — Mix code: 540MRX4P *(if possible supply mix design)*
2. Total water (m³) .....
3. Total cementitious (m³): 370kg
4. Cement type (eg. Blend, F.A., Slag, SL): GP + ASH MAIN ROADS SPEC
5. Other admixtures WATER REDUCER
   - Type GRACE GWR
   Dosage 300ml per 100kg cementitous
6. Xypex Admix Dose rate 0.8/3KG/m³ ... C-1000NF / C-2000NF (Circle product used)

Estimated total cubic metres to be dosed 3m³

XYPEX Applicator to sign Maria Boberdyk (Print name) MARIA BOBERDYK

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AUSTRALIA

BATCHING RECORD FORM

XYPEX ADMIX C-1000 NF / C-2000 NF

(Can be substituted by copies of concrete batching records, if all pertinent data present)

Page No.....of.....

Project: Trial Panels ..... Date: 14/08/01

Location (Address): Inner City Bypass

Concrete Company & Plant: CSR - Albion

Xypex Admix Dose: Bags/weight/m^3 ...3kg per m^3

Truck No:	Time (Batch)	Docket No.	Xypex Batch Code(s)	Cubic Metres	Product dosed (Bags/weight)total
67	1.36pm	17052137		$3m^3$	3kg per m^3

Applicator or where applicable,
Concrete Company Batcher/Manager
Date: 14/08/01

Print Name: Maria Bobeldyk

Signature: Maria Bobeldyk