

EcoSmart Sustainable Concrete
 Little Mountain Reservoir
 Seymour Clearwell
 The Contractors Perspective



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Little Mountain Reservoir



Seymour Clearwell



Overview

	LMR	SCW
Volume of concrete	27,000 m3	33,000 m3
Fly Ash Component	40% - 58%	45% - 70%
Time of year	Oct '02 to Oct '03 Incl. winter months	Oct '04 – Oct '05 Incl. winter month



Overview (Cont)

- High fly ash concrete behaved differently as seasons and temperature changed
- Mix design generally coarse in nature to aid in the reduction of plastic shrinkage
- On SCW we produced our own concrete & optimized the mix to maximize Fly Ash & coarseness of the mix to reduce shrinkage.

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Slab on Grade

	LMR	SCW
Base Slab Volume	6,300 m3	11,320 m3
Air content:	3%	3%
Fly Ash content:	> 40%	55%
Placing Method	Pump or Crane & bucket	Pump or Crane & bucket

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Slab on Grade (Cont)

- Slabs were placed using a combination of pump and/or crane and bucket
- Pumped okay over short distances - tended to plug if line pumped.
- Concrete would tend to pile at discharge but would flow easily when vibrated
- Could not place at the specified 70 +/- 20mm. May have been partly due to the coarseness of the mix
- Added a minimum of 1/2 l/m3 of plasticizer to get to an acceptable slump

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Slab on Grade (Cont)

- Very slow set times in winter months – finishing delayed
- Pour in late afternoon – Finish the next morning
- Set times in summer months were quicker but slower than non fly ash mixes
- Trowel finish required
- Bleed water was minimal
- Had to fog mist surface to prevent tearing during initial float in warm weather
- Seemed to have good paste and finished easily after the initial floating operation

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Structural Slab

	LMR	SCW
Volume in slabs	6,800 m ³	7,500 m ³
Air content:	5%	5%
Fly Ash content:	>45%	>45%

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Structural Slab (Cont)

- Difficult to line pump over 60-70m – Again may be mostly due to coarseness of the mix
- Added plasticizer up to 1 l/m³
- Same type of placing characteristic as the slab on grade
- Float finish required – used Deck Finisher
- Set times not a factor due to the float finish
- Had sufficient strength gain to strip falsework after 6 days

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Walls

	LMR	SCW
Volume:	5,800 m ³	10,000 m ³
Fly Ash content:	40%	45%
Wall heights	Reservoir = 30-ft Valve chamber = 40-ft	CW = 32-ft Post Treatmnt = 40-ft
Formwork area	158,000 m ²	300,000 m ²
Design pressure:	1000 psf	1000 psf
Pour rate:	6 ft/hr w/ bucket	6 ft/hr w/ bucket
Rebar	25M @ ±75mm each way	25M @ ±75mm each way

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Walls (Cont)

- Concrete was placed using crane and bucket
- Specifications dictated that walls must be poured continuously full height at a 150mm slump
- Used plasticizer to bring slump to 150mm for the first wall pour only
- Changed spec's on remaining pours: placed at 40-60mm slump
- Lower slump preferred to accelerate initial set times
- Concrete flowed well when consolidated – No honeycomb

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Walls (Cont)

- Achieved the design pour rate of 6'/hr during summer months
- Achieved an average pour rate of approximately 4'/hr, adding 2 ½ hours or 50% more time to the wall pours in cold weather of winter.
- In cooler weather, had to hoard the wall and introduce heat to accelerate initial set.
- Wall reasonably easy to finish – fewer air pocket

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Ground Slab

Finished with Gomaco C-450



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Walls

Finish at LMR



CJ at SCW



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Structural Slabs

Finishing SCW



Soffit SCW



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Summary - Slabs

- Had to plasticize these mixes to aid in placing
- Slow set times equate to higher finishing costs in cool weather
- Alternate finishing techniques required to prevent tearing surface (i.e. fog misting)
- Finished very well after initial floating operation

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Summary - Walls

- Lower slumps flow well when consolidated
- Slower set times equate to higher placing costs in cool weather
- Initial set times acceptable in warmer temperatures
- Good finish on end product – Less air pockets
- Minimal shrinkage cracks in end product

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Question?



Thank you.

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