



Fly Ash in Precast & Prestressed Concrete Structural Concrete Industries link with Boral Country

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Founded in 1979, Structural Concrete Industries provides a wide range of precast and prestressed concrete components for the civil and building construction industries, specialising in innovation and excellence. Managing Director, Godfrey Smith and Director-Engineering Wolfgang Merretz each have more than thirty years experience, covering all facets of the industry. From their factory at Teralba, on Lake Macquarie, NSW, SCI provides large and technically complex components as a matter of routine. Innovative blending of creative design and engineering with sound manufacturing skills has included the incorporation of fly ash in concrete required to withstand aggressive conditions.

The concrete technologists, at the Newcastle Area Office of Boral country at Kooragang Island, work under the guidance and leadership of Col Tyndall. If it has been done in concrete, Colin has done it. One of his team, Murray Simpson, follows the advice of Bryant Mather, the octogenarian Director of the United States Department of the Army, Waterways Experiment Station who claims that no matter what is the end use for concrete, it will benefit by the inclusion of fly ash. Ignoring advice against its use, Murray has developed concrete mixes containing fly ash which comply with requirements for placeability, strength at transfer and durability.

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In recent years, the Roads and Traffic Authority of NSW has realised several things regarding precast concrete and its specification. High strength portland cement concrete has shown lack of durability in the presence of alkali-reactive aggregates, in the marine environment and in acid sulphate soils. Recognising that the inclusion of fly ash in the concrete has been effective in resisting all of these destructive influences, the RTA has modified specifications to allow, and even to require, the inclusion of fly ash in concrete exposed to all or any of the above hazards.

Concrete for use in precast units must be both workable and cohesive at low unit water content. Works Engineer, Julian Borgert, an SCI man from student days, has taken a special interest in the introduction of fly ash concrete. Working in conjunction with Murray Simpson, he has found that, using fly ash, both strength and slump can be achieved at low unit water content with reduced admixture addition plus enhanced cohesion and response to vibration.

To meet 24 hour turnaround of moulds and RTA specified requirements is a tall order. For typical pretensioned products, the minimum transfer strength of 35 to 40 MPa must be achieved in 17 hours or less. Strength at 28 days is never a problem with these mixes. It all sounds too good to be true. In this world it is rare to get something for nothing. Durable fly ash concrete is only a partial exception. In order to reap the benefits, due care must be taken. Because the concrete contains less Portland cement than otherwise, it is more sensitive to the influence of poor curing techniques. Quality control must prevail. Attention must be paid to adequate presetting time, competent steam covers and controlled steaming cycles. Such attention to detail is well rewarded.

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