EKOPipe – the development of a low carbon steel reinforced concrete pipe.

Adrian Cahill[1]
Jannie van Deventer[2]
[1] RCPA
[2] Zeobond

Reduction of carbon emissions associated with civil infrastructure construction, and particularly for concrete elements, has become a high priority in Australia. Until recently, little focus has been placed upon buried structures such as reinforced concrete pipes. In response to industry demands for a reduction in Portland cement content and inclusion of recycled materials, Reinforced Concrete Pipes Australia (RCPA) has created a new product called EKOPipe which uses the proprietary "BX3" technology. BX3 technology has been developed specifically for the zero-slump concrete used for dry cast pipe manufacturing and enables the replacement of Portland cement with supplementary cementitious materials (SCM's) at very high levels. This allows a reduction in Portland cement use greater than 80%, with minimal effect on early age strengths. The net effect is a reduction in embodied CO2 emissions for concrete made with BX3 technology of greater than 50% when compared to standard concrete used in pipe manufacturing. The low carbon concrete pipe is called EKOPipe. This paper explains the unique methods used to produce dry cast concrete pipes and reviews the development process and testing undertaken to verify that the steel reinforced concrete pipes made with BX3 technology meet the performance requirements for the Australian Standard for steel reinforced concrete pipes AS/NZS 4058:2007 for strength performance and durability. The primary assessment methods utilised in AS4058 and reviewed in the paper are pipe load testing for strength verification and a water absorption test for durability, although other concrete testing parameters have been assessed and reported.