

Neutralisation of alkaline concrete waste water

Innovations in Environment

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ABSTRACT: Concrete batch plants produce alkaline water (pH >8.5) through agitator washout and runoff from production areas of the batch plant. This alkaline water is a contaminant capable of causing environmental harm. General practice is to reuse the alkaline water in production where permitted by quality requirements and where there is excess water, dispose of it as regulated waste, at substantial cost. Boral Concrete has designed a concrete waste water treatment system that neutralises the pH of water to pH 6.5 to 8.5 which allows it to be released into the environment without causing environmental harm or reused in concrete batching for high strength concrete without affecting quality requirements.

The system involves using carbon dioxide (CO₂) gas dosing to neutralise alkaline water collected onsite in a pit or tank from pH 11 to 12 to an acceptable environmental range of pH 6.5 to 8.5, typically to around pH 7. The 'CO₂ dosing' system works by pumping alkaline water from settling pits or a tank into a pipe and injecting CO₂ gas into the pipe. The CO₂ dissolves in water forming carbonic acid (H₂CO₃). Carbonic acid neutralises the alkaline water, reducing the pH, and only produces salt and water as by-products. The neutralised water is recirculated in the pit or tank until the overall pH is reduced to pH 6.5 to 8.5. The water is then left to settle for eight plus hours to drop out the salts before re-using or releasing to the environment.

The 'CO₂ dosing' system is inexpensive to install, inexpensive to operate, safe, reliable, easy to operate and can be tailored to each concrete batch plant. Boral Concrete has currently installed six 'CO₂ dosing' systems across Queensland and with the list continuing to grow as the practical benefits are realised.