Concrete washwater – big implications

James Tucker of **Siltbuster** outlines the importance of treating concrete washwater on construction sites.

Without careful planning, significant water pollution incidents can far too easily arise on construction sites. Cementitious water is one of the most common and challenging waters with which construction sites have to contend. Under environmental legislation, concrete washwater cannot be released to surface or groundwater without a bespoke discharge permit from the Environment Agency. Therefore, measures to control, store and treat concrete washwater before discharge will need to be implemented.

Given that it can be caused by an array of day-to-day building activities – whether it's through washing down mixing trucks, chutes, skips and equipment, hydro-demolition, grouting or tunnelling – construction firms must prioritise its management and develop control over these processes.

THE PROBLEM

Concrete washwater is highly alkaline even though it may appear visibly clear. Its pH is 12–13, which is the same as domestic oven cleaner, making it highly damaging. The release of untreated highly alkaline water into the aquatic environment can have devastating effects on the health and biodiversity of the receiving waterbody.

One measure that firms can adopt to better manage concrete washwater is to establish a designated washout area well away from drainage gullies, surface water drains and water bodies. This serves to contain slurry, solids and any liquids generated during the washing down of equipment that has come into contact with fresh concrete. At this point, the liquid phase should be treated to ensure its safe disposal.

NOT DILUTION

When it comes to dealing with such water, dilution isn't practical or cost-effective due to the pH scale being logarithmic. It would take 10,000 litres of water to reduce the pH of 1 litre of concrete washwater from 13 to an acceptable 9, as typically stipulated in Environment Agency discharge consents. Using mineral acids as neutralising agents isn't the answer either. Sulfuric and hydrochloric acids, for example, are dangerous to handle, must be securely stored, can easily end up creating polluting acidic water, and create 'secondary pollutants' – sulfate and chloride. Citric acid has its own issues, increasing the biochemical oxygen demand of water above the limits that are acceptable to the Environment Agency.

Tankering the problem away to a suitably licenced waste management system is advocated by some, but this is an expensive solution. Typical tankering costs are approximately £150–200/m^3. On a larger site generating circa 30m^3/day, that amounts to in excess of £100,000 per month in additional costs.

Carbon dioxide is by far the best neutralising agent for cementitious water. It's impossible to over-acidify water by using it, and it is easy to store and doesn't give off any hazardous by-products.

In addition, there are simple, safe and easy-to-operate mobile treatment systems that use carbon dioxide which can be hired to treat concrete washwater and other potentially polluting site waters.

Siltbuster systems can introduce CO_2 automatically whenever wastewater pH is detected as being higher than a defined set point. This reduces operator input and allows systems to maintain compliance 24/7.

HINKLEY POINT C

The company was recently called in to treat contaminated waters generated as part of Balfour Beatty's £214 million Hinkley Point C overhead line contract for National Grid. The work included the use of cement-bound sand (CBS). Surface water and groundwater were coming into contact with CBS and so the pH was becoming highly alkaline. The task was to neutralise the alkaline waters and discharge them to the watercourse.

To do this, five Siltbuster PM20 units were mobilised, treating flows between 5 and 13m^3/hr in each unit. The units use carbon dioxide to neutralise wastewater and are fitted with lamella plates to settle out the suspended solids.

Steps can be taken to prevent and minimise the risk of creating on-site concrete washwater problems. And if problems do arise, there are tried and tested solutions to implement. The key is to plan – be pre-emptive rather than reactive, anticipate the problems, prepare for the unexpected and know the solutions.