

Tianjin Airport Canals, Tianjin, China

Application date: 31st March – 1st April 2010

Summary

Aim: to reduce the concentration of phosphorus in the canals located near Tianjin Airport.

Description: Manmade airport canals

Size (ha): 1.6

Max. depth (m): 2

Average depth (m): 1

Conductivity ($\mu\text{S/cm}$): N/A

Dosage: 6.5 Tons on 31/3/2010 to 1/4/2010

Airport Canals



Figure 1: Application site 2.5 km from Tianjin Airport.

The Tianjin Airport Logistics site is approximately 2.5 km from Tianjin Airport (and south east of Beijing). The site is made up of an integrated system of man-made canals, owned by the Tianjin Airport Corporation. The canals serve several purposes with managed storm water control, treated waste water routing by local industry and flood mitigation. Due to nutrient loads in inflow water and deposition of sediment containing high levels of phosphorus, there were problems with water quality in the canals giving rise to odours and seasonal cyanobacteria outbreaks. Odours were also being generated by high BOD/COD levels, all a direct result of untreated and partially treated inflows into the system over time.

The Treatment

A trial application of 6.5 tons of Phoslock was applied to 3 manmade canals around the Airport Logistics site on 31st March-1st April 2010 (Figure 2). The Phoslock was mixed with the application water on site by using a series of containers and hoses. All Phoslock was applied from a hose based on the shore. This was due to the logistics of the application site.



Figure 2: Application of Phoslock to the canals, owned by the Tianjin Airport Corporation

Results

Monitoring was carried out prior to and after the Phoslock application and on the 8th April (7 days after application) the Filterable Reactive Phosphorus (FRP) in water body decreased by 97%, the COD reduced by 54%, and the chlorophyll *a* concentration decreased by 51%. Figure 3 shows the reduction in Total Phosphorus, Total Dissolved Phosphorus and PO_4 over a period of 200 hours. There were changes in the form of P in the sediments over time (Figure 4).

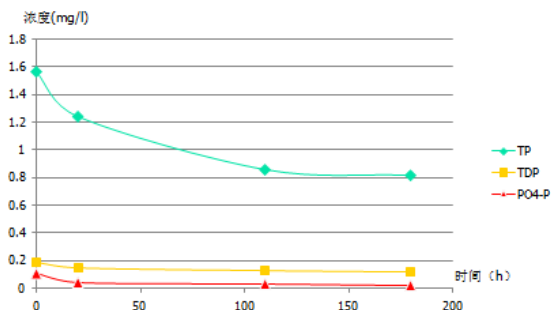


Figure 3: Phosphorus reduction over time in the south west treatment area

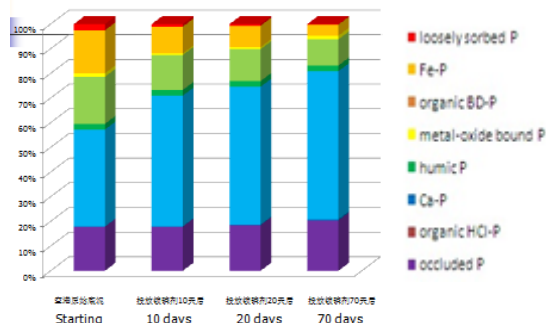


Figure 4: Changes in the form of P in the sediment over time

Conclusion

Phoslock was found to successfully reduce the concentration of phosphorus in both the water column and the underlying sediments over time. At all application sites, the proportion of bio-available P in the sediment was reduced and a majority of P was transformed into non-reactive species. This occurred even under conditions of high pH and little to no oxygen. Results from this trial have been published in a paper by the Tianjin Hydraulic Research Institute, China in the Journal of Water Science & Technology. The paper is available upon request.

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