Wortley East - Rotating Biological Contactor

ingenious solution saved six weeks, cut risks, and costs

by **Phillip S Worrall**

The existing sewage treatment works at Wortley is located approximately 1km south west of Barnsley in South Yorkshire. The current resident population is 109 and the population equivalent served is 299. The works comprised an 'Agisac' inlet screen with manual screenings handling, one RBC (Rotating Biological Contactor) complete with integral primary and humus tank zones and a tertiary sand filter, before discharge to a water course. Mechanical failures with the existing RBC rotor had resulted in damage to the biozone trough, which separates the biozone from the primary zone beneath. In addition, the three primary zone desludging pipework outlets had corroded severely. These defects gave rise to a progressive deterioration in effluent quality from the RBC unit, with corresponding increased demand on the sand filter to maintain effluent standards.

Wortley East: Rotating Biological Contactor in temporary tank preparing for installation

Watermark, a joint venture between *MJ Gleeson and MWH*, appointed by Yorkshire Water to deliver solutions involving some 200 problem wastewater projects per year of varying sizes (£5 to £2m), were presented with this deficient works and challenged to investigate and provide a solution.

The scheme

Several possible solutions were investigated, including the complete replacement of the RBC plant with an alternative package plant.

Following detailed analysis, *Watermark* was aware that modern RBC rotor design had advanced considerably allowing this technology to be recycled. This treatment features relatively low power consumption and simplicity of treatment compared to alternative systems.

Wortley East: Installing the new Rotating Biological Contactor

The proposed solution was to simply replace the existing deficient RBC rotor, housed in its concrete structure. This structure was found to be adequate following a minor strengthening under one of the two bearing supports. The replacement rotor was supplied by *Copa Limited*, which included the latest improvements in RBC design following many years of research.

How we save time and money

One major issue to the programme of works, and corresponding costs, was that of temporary treatment whilst the new rotor was to be installed. Traditionally, a temporary package plant would be installed, commissioned, seeded and when treating at an appropriate standard, allow the existing plant to be decommissioned. Only then could the defective plant be removed and replaced.

In addition, the new plant is then installed, commissioned, seeded and again, when treating to the appropriate standards, allows the temporary plant to be decommissioned and removed.

***Watermark* devised a solution to reduce this overall commissioning time to less than half that described. Rather than providing a temporary plant, a low cost, fabricated steel trough was produced to support the new RBC rotor and provide a temporary biozone on site, adjacent to the existing plant. The influent was then pumped from the existing primary zone into and through the temporary biozone trough with new RBC rotor and returned to the existing RBC rotor for treatment.**

F**ollowing the successful seeding of the new RBC rotor (circa 6 weeks), the old rotor was then simply isolated (influent taken away by tanker for several hours) and removed by crane. The new rotor was placed into the existing structure by the same crane and resumed treatment immediately all on the same day.**

This sequence, including the low cost temporary trough, enabled the immediate introduction of the new RBC rotor to be seeded on-line without the usual delay of seeding and commissioning a temporary treatment plant, followed by that of the new rotor.

This technique saved some 6 weeks from the programme, reduced the risk and significant costs of a temporary treatment plant and allowed removal of the old rotor and the installation of the new unit - all on the same day.

Conclusion

Wortley East treatment works is fully commissioned and operational. Performance tests have confirmed a significant improvement in final effluent quality (Biological Oxygen Demand and Suspended Solids).

The existing discharge consent does not require the removal of Ammonia, however, the new rotor provides a fully nitrified effluent which, in turn, improves the river quality and its environment.

The new rotor is performing well and compliance of this works is now assured following a shorter seeding and commissioning programme.■

Note: *The author of this article, Philip S Worrall, is Project Leader, Watermark, Wakefield.*

The pictures in this article showing the New Rotating Biological Contactor being fitted were taken by Tony Speight of Carte Blanche. Copyright: Watermark, Wakefield.

Wortley East: Lifting the new Rotating Biological Contactor into place