PORTSMOUTH SPIDA MODEL
DEVELOPMENT AND IMPLEMENTATION OF REAL TIME CONTROL
A CASE STUDY

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1. INTRODUCTION

This paper outlines the requirement for a model of the Portsmouth catchment, the problems encountered and the solutions adopted utilising Real Time Control.

2. BACKGROUND

The catchment of Portsmouth is a very large, covering a catchment area of approximately 22 km (2). Sub-dividing the overall catchment are a total of ten sub-catchments, each being a dendritic network draining to a single location.

Since 1988, models have been built representing each of the sub-catchments, with input hydrographs being used to allow for overflows from adjacent sub-catchments. The type of model was dependent upon the date of construction, the total being 4 WASSP models, 5 WALLRUS models and 1 SPIDA model. Each of the models had been verified individually, but required a large number of complex simulations run to represent overflows between catchments with hydrographs.

3. PURPOSE

Within the Portsmouth catchment, there are several overflows out of the system to sea, and their spill frequency is to be limited under the EU Bathing Water Directive (BWD). At the bottom of the system is Eastney Pumping Station, which pumps all dry weather flow down a long sea outfall (LSO). Flows above 3.2 m 3/s (4DWF) are pumped to a large tank which in turn spills when full via a short outfall to sea. The EU Bathing Water Directive and Urban Waste Water Treatment Directive (UWWTD) require increased treatment levels prior to LSO discharge and limited spills from the tanks.

set of rules, but completely alter the applied logic by one simple error.

The completed model of Eastney shows that by utilisation of storage within the catchment trunk sewers and provision of an appropriate pass forward rate, sufficient storage is currently available at Eastney PS to achieve the required spill criteria.

Without RTC, this pumping station would not have been modelled in detail, and a more simplified model might result in predictions indicating a need for additional storage.

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Question   Ian Noble   Montgomery Watson
As you started with a WALLRUS model did you find that with SPIDA RTC you were more able to model things as they were rather than use the modelling fixes that you often have to employ in WALLRUS ?
Did you find that perceptions of how the system operates changed as you developed the RTC rules and found that when those rules were applied the system did not behave as you expected which made you dig deeper for operational information?
Answer
Yes. At Eastney the recording showed that operating procedures are different to people's explanation or description of what was going on. Those differences were then built into the control rules.

Question   Dave Walters   M W Barber Group
The scheme described necessitated moving vast quantities of water around the system. If there were a filter available that could efficiently all particles down to 200 micron would that not be a better solution?
Answer
The implementation of RTC was used to provide optimisation of existing storage. There was no additional costs involved and therefore installing filters as a solution would have increased the costs considerably.

Question   Dave Walters   M W Barber Group
In RTC scheme implementation do you not consider the costs of siltation?
Answer
The costs of the tanks and the tank maintenance already existed. The RTC scheme only optimised the performance of what already existed.

Question   Dennis Dring   Yorkshire Water
Did you have any difficulty verifying the models?
Answer
The main difficulty was on the Eastney model. The mainland Cosham arrangement has not yet been commissioned. There was some time shifting that affected accuracy but it was generally good.