

WaPUG AUTUMN CONFERENCE 1993
WORKSHOP 4
ANCILLARIES WORKSHOP

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The main topics discussed were:

- Syphons
- Tanks
- Hydrobrakes
- Pumping Stations
- Overflows

Syphons

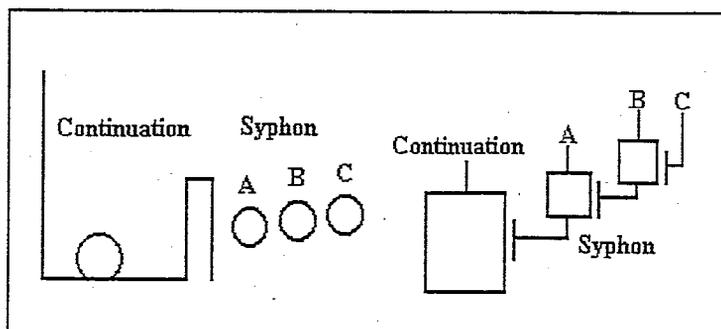
The general feeling was that it was best to model syphons as "straight" pipes with additional head loss given in manholes:

Problems arising were the energy losses in manholes were not adequately represented and that storage was over estimated by modelling in this way.

The former could be verified by flow survey and the relative importance of the latter could be determined.

Another problem was the deposition of sediment which resulted from low velocities. This could be determined from site inspection and it was felt that it might be useful to investigate at regular intervals to determine rate of deposition.

An unusual problem was that of an overflow which had a three barrel syphon as the overflow pipe. This could be modelled as a series of three on line tanks, the overflow pipes from the first and second being oversize to allow for surcharge. Otherwise SPIDA was seen as a panacea.



Tanks

The main concern was that there is not a direct relationship between storage provided and spill volume. This is caused by the reduction of continuation flow because of increased time of flow at reduced head.

Initial volumes could be determined by:

- Storing all hydrographs at a flood point
- Doubling the spill or flood volume

Which ever method is used it is more effective to start with excess storage and then reduce, rather than to increment upwards.

When modelling tank sewers use level pool and lower the upstream end of the pipe to account for backwater. The backwater calculation in WALLRUS has difficulty starting with an empty tank.

Allow time for the tank to drain down.

Hydrobrakes

Model the "correct" characteristics ie. an approximation with positive slope for all steps of the head discharge relationship. Alternatively model as an orifice.

Pumping Stations

The problems discussed centred around the provision of storage in the wet well. In this case the pumping station is acting as a tank with a pumped continuation flow and similar difficulties in determining storage volume were encountered.

Overflows

Avoid surcharging the overflow pipe as this can induce instabilities. Model a larger pipe for the first pipe on the overflow branch.

Use SPIDA as a panacea.

General Points

Ancillaries have significant effect on system performance, more significance than the word implies.

Understand the performance of the prototype.

Understand what the model does.

Model performance, not physical appearance. Therefore keep good documentation so that the real intentions are known.

Instabilities can be inherent in the prototype as well as being induced in the model.

When de-simplifying a model always take sensible steps and understand what the original model builder intended.