Workshop 2: Modelling Ancillaries : Dr D Balmforth

The workshops were well attended and the discussions lively. The level of expertise in ancillary modelling is clearly rising as engineers become more experienced, but difficulties in modelling more unusual or difficult ancillaries are still causing problems.

The workshops were divided into three parts - problem solving, strategy of modelling, recommendations.

Problem Solving

Difficulties had been experienced in the following areas:-

Coefficients: The need to carefully follow the recommendations in User Note 2 was identified. More field data was needed to give clearer guidances on weir coefficients, particularly where scumboards were used. It should be possible to provide more information in about 12 months when results of current research programmes become available.

Low side weirs: These were causing difficulties in some areas. There was a wide variety of chamber configurations and an understanding of possible flow characteristics that occur on site was essential. A weir note on modelling low side weirs would be helpful.

Pumping Stations: Difficulties in modelling pumping stations fell into two categories. One was the need to take storm pumps and dry weather pumps to two different outlets (these pumps sharing a common sump). The solution was to split the model at the pumping station and input the pump output hydrograph into the appropriate head branches of the downstream system. The second was how to deal with variable speed screw pumps. Simulation of a stepped increase in speed could be achieved by adding in successive notional pumps with specified HQ characteristics to make the prototype performance. The need to have measured pump discharge data was emphasised.

Flap Valves: Difficulties with reverse flow at Flap valves was causing problems. The flap valve algorithm only operates when the pipe is surcharged and it is therefore possible to have reverse flow in the early and later parts of the storm.

Strategy for Modelling

The following strategy was identified as good practice:-

i) Knowledge of the presence of ancillaries

ii) Engineer to visit each ancillary

iii) Observe operation where possible

iv) Understand operation of the prototype - need for hydraulic analysis

v) Understand the algorithm in the software

vi) Choose parameters to match model performance to prototype performance

vii) Carefully code the data

viii) Carefully review the output

ix) Change the data between verification and running design storms where necessary

x) Keep model up to date

Recommendations

i) Guidance on understanding prototype performance

ii) Guidance on understanding software algorithms

iii) Ability to vary coefficients

iv) Facility for comment lines in SSD file

The latter facility is to be available in WALLRUS 2.0