(b) The Leicester Study
- P Shelton, Severn Trent Water Authority

This presentation discussed in general terms aspects of the initial phases of a Drainage Area Study undertaken for Leicester. The way in which extensive sewerage systems can be modelled was considered, and the use of large WASSP networks and the Spatially Varying Rainfall version of WASSP-SIM was described. Reference was made to:-

(a) the need for large models and deciding on their size
(b) "proving" a model - ensuring that it is stable and consistent
(c) difficulties in defining vertification targets
(d) potentially contradictory performance comparison data
(e) the use of three rainfall gauging points

Finally the conclusions drawn from the project were assessed.

Discussion:-

D Dring, Severn Trent Water Authority
How was the variable DWF dealt with in the model.

P Shelton

Precise figures for DWF were established for diurnal flow and infiltration. An appropriate DWF was selected for the time at which the event occurred.

D Dring

Over what time period was the flow survey conducted.

P Shelton

An intensive 5 week flow survey was supported by data on surcharge, flooding etc collected over 24 months.

Dr J Suter, Haiste Ltd

Were comparisons made of depth as well as flow.

P Shelton

Yes, with agreement not as good as for flow.

T Lloyd, Wirral BC

What hardware was WASSP mounted on and what access to the programme was afforded to Leicester.

P Shelton

ICL 2900 series mainframe, Leicester had access via a terminal at the local STWA office.

P Crisp, Wessex Water Authority

What was the cost of the study, how many staff were involved and what was the relationship with the district Council.

P Shelton

No figures are available regarding cost at this time. One member of STWA staff managed the project which was undertaken by one DC Engineer who had back-up from his technical staff.

B Wilkinson, Yorkshire Water Authority

How were resources determined for the study.

P Shelton

There was no objective decision made at the start other than one man was allocated to the project to see what could be achieved in the time available.

C Jeffries, Dundee College

What was the scatter design approach to the results.

P Shelton

All available data was examined initially with regard to its reliability. All data passing this process was used to check the model and comparisons were made for depth, flow, and volume. These showed a range of variations some extreme but were generally grouped around the norm. The agreement of the model was therefore considered to be good.

D Balmforth, Sheffield Polytechnic

Was care required in assessing critical storm durations.

P Shelton

There was no single critical storm duration. The total area was 70km^2 and therefore different durations caused problems at different locations, e.g. 30 min. storm caused problems in the centre and 120 min. storms caused problems at the outfall.

J Blanksby, Oldham MBC

Was there a significant difference in results when using the spatially variable rainfall package.

P Shelton

In overall terms there were no significant differences between averaging the rainfall and entering a single hydrograph as against entering three separate hydrographs. For the size of the catchment, three profiles is an insufficient number.

J Blanksby

Were any other methods tried to overcome spatial variation, e.g. splitting the model down into smaller sections.

P Shelton

No, this was not an appropriate option due to interaction between sub-models. Rainfall was allocated for three profiles.

A Eadon, Severn Trent Water Authority

Was the "broad brush" study followed by more detailed studies.

P Shelton

7 catchments are to be studied in more detail. Acceptable agreement was obtained with the large model for the first subcatchment.

c) The Leicester Study

P. Shelton, Severn Trent Water Authority
See Leeds Meeting for Synopsis
Discussions:

T. Peacock, Thanet D.C.
What was the total range of error in fits for verification.

P. Shelton
Some hydrographs showed no correlation at all, as much as 100% difference in volume.

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R. Moore, Welsh Water Authority
Have results been used for Water Quality aspects yet.

P. Shelton
Have not yet reached that stage, however it is suspected that the sewer system needed will be far more accurate than the river basin method.

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A. Eadon, Severn Trent Water Authority
What agreement was reached on flooding and surcharge.

P. Shelton
The system is not sensitive to flooding but where it was known to occur it showed good agreement. Surcharge and depth correlation was generally poor.

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Mr. Melhuish, Grove Consultants
Was the model simplified to extent of using a global roughness.

P. Sutton
Actual roughness coefficients were used where known, otherwise the default global roughness was used. The model appeared sensitive to roughness for depth but did not for flow.

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M. Gooch - Southern Water Authority
What was the maximum number of hyetographs that could be input and was the spatially variable rainfall package better than average.

P. Shelton
Only three hyetographs could be input. From recent recommendations the area of the study would warrant 30 - 40 raingauges, but only up to a maximum of 7 were used. Averaging is not realistic over such a large catchment, however using only 3 hyetographs or one averaged hyetograph made little difference to the core area. Therefore, the choice would be not to use Spatially Variable Rainfall Package.

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J. Dickinson, Welsh Water Authority
How long did the model take to run

P. Shelton
A maximum of 12 hours and on average 7 hours.