

## SERPES - AN ALTERNATIVE APPROACH TO SEWERAGE REHABILITATION PLANNING?

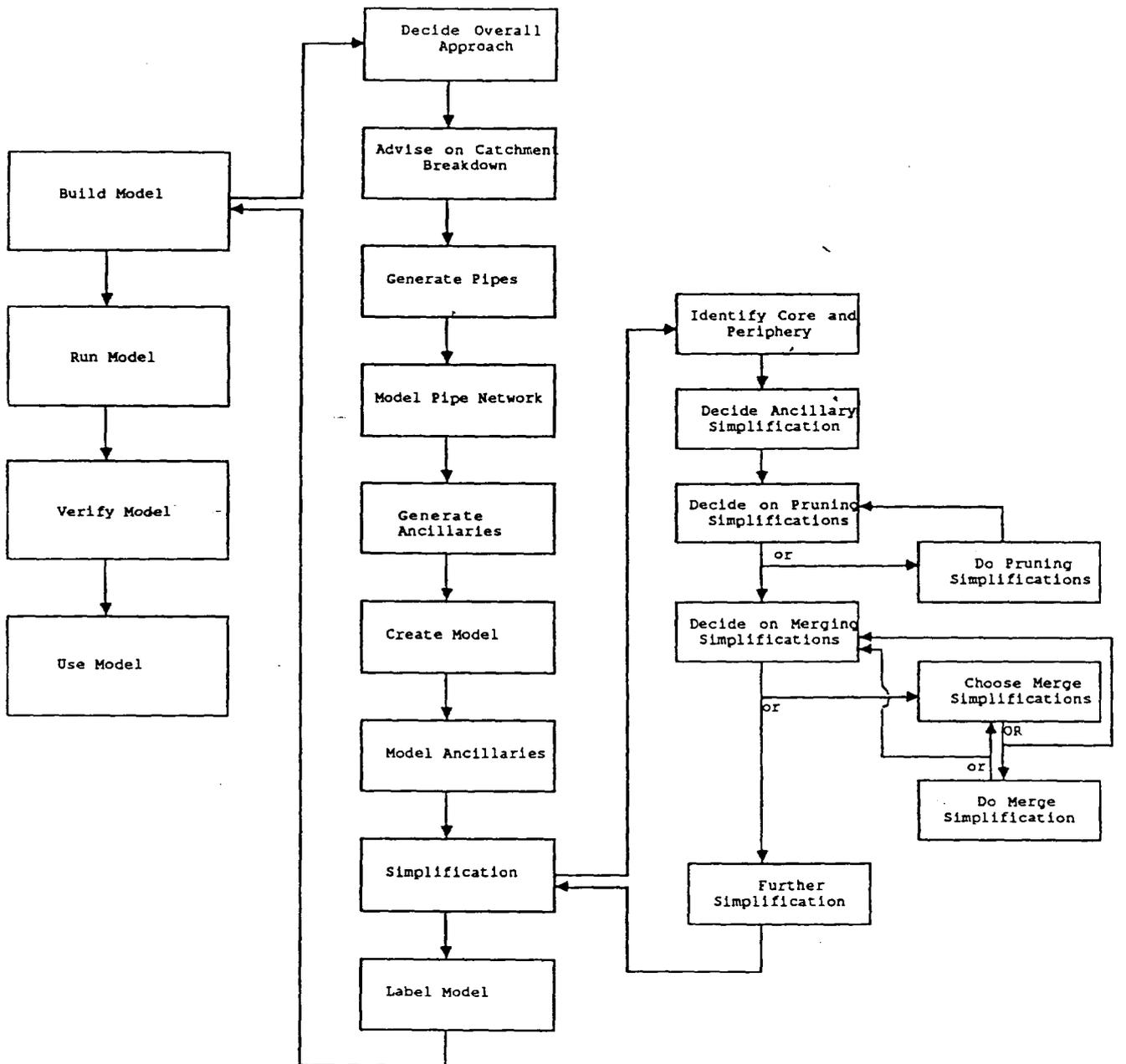
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The paper describes the development of a prototype expert system called SERPES (Sewerage Rehabilitation Planning Expert System) and considers its potential for future use in the Water Industry.

An expert system is a specific form of computer program, in which knowledge of one or more experts is stored and manipulated in order to simulate their performance in solving problems. In general, the knowledge elicited from the experts is stored independently of the more general program which takes that knowledge and applies it to the specific example. Programs like WASSP-SIM carry out iterative mathematical calculations using clearly encoded algorithms which lend themselves to the FORTRAN language in which it is written. An ES by contrast handles facts, and rules of the "if ... then ... type", many of which are based on experience and cannot be defined in strict mathematical terms. Such information is capable of being dealt with by new high level languages such as PROLOG which is the source language of SERPES.

There are substantial potential benefits to be gained from applying an expert system approach not only to sewerage rehabilitation planning but also other areas in the Water Industry. However, the problems in combining two relatively new and rapidly developing areas of work should not be underestimated. SERPES does show a way forward to assist both inexperienced and experienced engineers involved in working with WASSP-SIM but will be unlikely to entirely remove the need for engineering judgement.

An example of SERPES Problem Decomposition



Tasks and subtasks within SERPES  
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 Progression from task to task

To illustrate the procedure adopted, 9 sub-tasks have been expanded out from the Build Model task, and 8 sub-tasks from the Simplification task, within this.