BACK BOX

Bunyip conserves energy

Mr Mike Wooldridge of the CSIRO Division of Energy Technology has devised a computer program called BUNYIP (Building Energy Investigation Package) that will allow engineers and architects to calculate the expected energy consumption of any given building while it is still in the planning stage.

The benefit will be that the figures for alternative building designs can be compared, permitting the one with the lowest energy consumption to be chosen. The alternatives could, for example, be sited differently, glazed differently, or constructed of different materials. They could also be fitted with different air-conditioning systems.

BUNYIP can be used to calculate the amount of energy needed to heat or cool any building sited anywhere in Australia. Climatic data for 16 sites throughout the country are listed on a computer tape, and the program-user chooses the data for the nearest site.

Other data fed in by the user (apart from the structural specifications) are the type and size of the central boiler and chiller, and details of the planned ducting system.

Although commercial buildings will be the principal subject for BUNYIP analysis, a complementary program for

residential buildings has been prepared by Mr Ron Ballantyne of the CSIRO Division of Building Research.

BUNYIP will soon be thoroughly checked for accuracy by comparing its predictions with the actual heat loss and system performance of a fully monitored four-storey office building in Glasgow, Scotland.

For the past few months, more than 500 recording channels have been registering temperatures throughout the building, as well as air-flow rates in different sections of the ducts, and outside conditions. This exercise will last until the middle of next year, when the mass of data will be analysed and the building's heating and cooling loads accurately calculated.

BUNYIP will then be 'fine-tuned' in the light of the results, and it should be released for general use soon afterwards.

Few Australian building designs have been run through energy-consumption computer programs because of the complexity of existing programs. Until recently, there was also insufficient pressure to make energy consumption an issue to be borne in mind, partly because operating costs in commercial buildings are often passed on to tenants.

However, buildings designed today will be with us for 25–30 years at least, and it is important to choose energy-efficient designs.

The new program attempts to combine the merits of simplicity with adequate accuracy. It aims at a half-way house between a very crude simulation and the complexity of the best known of the existing energy-consumption computer programs, the United States Department of Energy's DOE 2.

The complexity and cost of DOE 2 have inhibited its use in analysing designs in their early stages, when critical decisions are taken that affect energy consumption.

Mr Wooldridge's hope is that BUNYIP will be used in the very early stages of a building design. The BUNYIP program will be easy to run and could be mounted on a minicomputer costing $5000–$10 000. Alternatively, it could be accessed through a computing bureau.

Development of the program has been assisted by a grant from the National Energy Research Development and Demonstration Council (NERDDC). The International Energy Agency — with the support of research bodies in the United Kingdom, United States, Canada, Belgium, Holland, Switzerland, and Australia — is organizing the Glasgow end of the work. The CSIRO is the Australian participant, again with financial help from NERDDC.

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