

# RAL

## DESIGN & DISCOVERY

### Open Days July 1990

**RUTHERFORD APPLETON LABORATORY**  
SCIENCE AND ENGINEERING RESEARCH COUNCIL

#### BUILDING PERFORMANCE ASSESSMENT

##### INTRODUCTION

It has long been accepted that the success of the UK energy conservation programme is dependent upon reducing energy consumption in buildings and their associated services, since this accounts for approximately half of the total amount of prime energy consumed nationally for all purposes. Consequently during the 1970's there was considerable growth in the number of Research and Demonstration projects in this area.

The role of the Science and Engineering Research Council (SERC) is to maintain and enhance the research capability of the UK in all areas of pure and applied sciences. It does this by supporting research and postgraduate training in the universities and polytechnics, both directly and by the provision of central facilities nationally and internationally. Research and Development in the renewable energies is broad-ranging and the SERC adopted a policy of concentrating the available funds in those areas perceived to be of national importance. One such area is Energy in Buildings and since 1979 RAL has supported a strong research community in this subject area.

##### Energy in Buildings Research at RAL

The Energy Research Unit (ERU) of the Rutherford Appleton Laboratory has been involved in energy in building related research since 1979. Some work is also carried out on energy strategy and there is a programme of work on wind energy. Including university personnel on secondment to the site, there are currently 14 scientists, engineers and architects who are actively collaborating in joint projects with the group at RAL.

##### Research Programme at RAL

The role of the Energy in Buildings group has evolved over the years from one of support to one of collaboration. For a number of years RAL provided general support to some 35 groups in the academic sector and has collaborated with the universities of Bath, Bristol, Cranfield, Liverpool, Newcastle, Nottingham, Strathclyde and UWIST also with Leicester Polytechnic the Building Research Establishment, units within the Departments of Energy and Environment and the Energy Monitoring Company.

Amongst the major projects undertaken are the following:-

- the Energy Kernel System model construction environment
- the SERC/BRE thermal model validation exercise
- the development and application of validation techniques
- Better Insulated Homes performance assessment
- assessment of energy savings of insulation thickness
- Performance assessment of 'Better Insulated Homes'
- Relative energy savings of insulation thickness, low emissivity glazing and a condensing gas boiler
- efficiency of domestic central heating boilers
- management of a Meteorological Data base the research development and application of
- a thermal transmission U-value estimation technique
- a surface heat transfer estimation technique
- thermal model validation techniques
- the energy Kernel System thermal model construction environment
- a sensitivity analysis technique



- . higher order time series and spectral estimation
- . nonlinear performance assessment tools

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