

# Air Infiltration Review

a quarterly newsletter from the IEA Air Infiltration Centre

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## New Service for the research community

The Air Infiltration Centre (AIC) is a recently established organisation for the technical support of active research in air infiltration in buildings and its effect on energy consumption. The primary role of the AIC is to provide a technical information service to those engaged in research in this important and specialized field. In this first issue of AIR we outline the background, function and structure of the AIC and give some information on the International Energy Agency (IEA), through which the Centre was inaugurated.



Head of the AIC, Peter Jackman

## The Air Infiltration Centre—Its Background

Air infiltration is the uncontrolled leakage of air through cracks and openings in the building envelope. A certain amount of fresh air is required to maintain satisfactory ventilation conditions, but any additional outside air represents an unnecessary energy demand on the building's heating system. Studies have shown that infiltration can account for up to 50% of a building's heating load: since the heating of residential and commercial buildings usually accounts for a large proportion of a country's total energy requirement, reducing infiltration rates can have a very significant impact in the area of national energy conservation.

Many efforts have already been made to reduce the heating loads of buildings by increased insulation standards, double or triple glazing etc. These efforts have resulted in significant reductions in conduction losses, and so the heat losses due to infiltration are becoming relatively more important. Infiltration is a universal problem, but the mechanisms and driving

potentials which control infiltration are not adequately understood. The IEA R & D project on Energy Conservation in Buildings and Community Systems is already active in other areas of energy conservation. The first annex which began in 1976 was a project to compare and evaluate the computer programs of the participating nations which simulate the energy flows within buildings. The aim of the project was to establish internationally accepted state of the art analytical techniques to be used in simulating building energy performance. It was soon apparent that one of the major causes of uncertainty in the simulation process was the estimation of air infiltration. Infiltration depends upon a wide range of variables—climate, building form and leakage. In order to simulate the phenomenon of air infiltration, and to establish defensible building standards, much more information is needed about the controlling parameters, over a wide range of building forms. The Air Infiltration Centre is being set up as a vehicle to assist the international research community in its endeavour to improve the understanding of the controlling mechanisms of infiltration to a level comparable with the other building energy transfer processes.

The AIC is being funded by eight of the member countries of IEA; Canada, Denmark, Italy, Netherlands, Sweden, Switzerland, United Kingdom and United States of America.

## Services

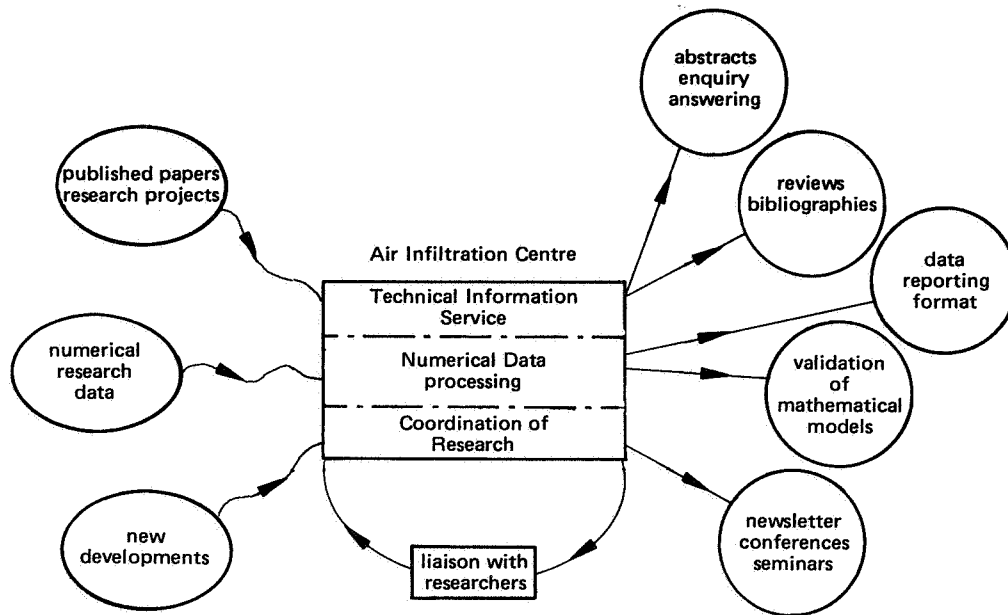
The main functions of the AIC are:

- providing a technical information service
- processing numerical data
- co ordinating research activity

The diagram overleaf illustrates these functions elaborated below.

### Technical information service

Relevant published papers and research reports are being collected, indexed and stored at the Centre. Abstracts of each new article will be compiled and a computer-based data management system will be used to file them and to allow rapid retrieval of material by, for example, subject or author classification. Once the system has been fully established, we will conduct literature searches and provide copies of relevant abstracts on request. Copies of papers or reports selected from the abstracts will then be supplied as specified by the enquirer.



In addition to publications concerned directly with air infiltration, information on related subjects such as meteorology, wind tunnel testing and instrumentation is being included. Organisations in member countries will be regularly kept informed of new acquisitions; reviews and bibliographies will also be circulated from time to time.

#### Numerical data

The processing of numerical data arising from research studies will also form a major part of the Centre's work. We will be seeking information obtained during infiltration research, and setting up a numerical data base to facilitate storage and retrieval. Our qualified staff will evaluate the information with a view to the production of reliable data sets for the validation of mathematical models. These data sets will also be indexed and stored. They will be made available to participating organisations and will also be used by the Centre to validate infiltration models of special interest to the research community. To facilitate the future analysis of the data from on-going research, the Centre will develop a standardised format for reporting experimental results.

#### Coordination of research

The Centre will maintain close contact with the experts actively engaged in infiltration research programmes and will keep fully abreast of developments in testing techniques and instrumentation. Dialogue between researchers will be encouraged by the organisation of conferences and seminars dealing with specific and relevant topics. The first of these conferences is due to be held in October 1980 (see separate announcement).

Being at the focal point of international air infiltration research, the AIC will be in a strong position to advise the research community of the most important and potentially fruitful areas of study requiring the most urgent attention.

#### Access

To make use of the AIC you are asked to introduce yourselves through one of the nominated organisations in your country. They will be pleased to assist you to gain the maximum benefit in using the Centre's facilities. The list of nominated organisations appears on the back page of this newsletter.

If you are in a non-participating country, then please contact the AIC direct and we will be pleased to discuss in what way the services might be available to you.

Contact may be made by telephone (Bracknell (0344) 53123) or telex (848288). Should you be in the UK, please find time to call on us; Bracknell is just 20 miles (32km) west of London's Heathrow Airport.

#### Staff

The AIC is located at The Building Services Research and Information Association at Bracknell, UK. The operation of the AIC will be directed by Peter Jackman who has specialised in air infiltration studies throughout his 12 years with BSRIA.

His appointment as Head of the Centre took effect at 1st July, 1979. The initial staff, now being recruited, will include two scientists, a librarian and a clerical assistant. The two scientists will have qualified in fluid dynamics and be particularly involved in the numerical data processing and mathematical modelling aspects of this work of the AIC.

#### Management

The IEA Executive Committee on Buildings and Community Systems has appointed The Oscar Faber Partnership, St. Albans, Great Britain as Operating Agent responsible for overseeing the work of the AIC. Additionally, a Steering Group has been formed comprising one representative from each of the participating countries under the chairmanship of David Curtis of The Oscar Faber Partnership. The national representatives are listed on the back page; you are welcome to contact your country's representative for advice or help in using the Centre to maximum advantage.

#### International Energy Agency

In order to strengthen cooperation in the vital area of energy policy, an Agreement on an International Energy Programme was formulated among a number of industrialized countries in November 1974. The International Energy Agency (IEA) was established as an autonomous body within the Organization for Economic Cooperation and Development (OECD) to administer that agreement. Nineteen countries are currently

members of the IEA, with the Commission of the European Communities participating under a special arrangement.

#### Cooperation in Research

As one element of the International Energy Programme, the participants undertake cooperative activities in energy research, development and demonstration. A number of new and improved energy technologies which have the potential of making significant contributions to our energy needs were identified for collaborative efforts. The IEA Committee on Energy Research and Development (CRD), assisted by a small Secretariat, coordinates the energy research, development programme.

#### Energy Conservation

Conservation, the efficient rational use of energy, must be an objective wherever energy is used. Although the opportunities for significant gains will vary from situation to situation, energy conservation should be a major objective in the design of our communities, buildings and transportation systems. It

must also be an objective in industrial production and be taken into account of the system-design level as well as on the level of component design and performance.

The OECD has estimated that an aggressive conservation programme in Member countries could by 1985 reduce OECD energy consumption by the equivalent of over 4 million barrels of oil per day, or 8% of the energy demand projected for oil in that year.

#### Role of the IEA

Most of the obstacles to achieving near-term conservation goals are economic, regulatory and institutional. However, there are areas where, for the medium and long-term, research, development, and particularly demonstration can play a role in achieving energy conservation gains through application of known techniques and the development of new technologies. The IEA is now active in several research, development and demonstration areas that offer opportunities for significant gains in conservation. Other projects with similar objectives are in preparation.



*BSRIA Laboratory —  
home of the Air Infiltration Centre*

### AIC Conference

The first conference is being planned for 6–8 October 1980 in the UK. The theme of the conference will be:

*“Instrumentation and Measuring Techniques”*

We are inviting a maximum of two presentations per participating country and with the recent rapid developments in this vital aspect of infiltration research, we expect an interesting and informative three days. Your Steering Group representative is now seeking offers of papers, so if you wish to contribute please contact him now.

Attendance at the conference will be limited to 30 invited delegates; again contact your representative to make a booking.

## Representatives and Nominated Organisations

Participant	Steering Group Representative	Other Nominated Organisations		
Canada	R. Dumont, Division of Building Research, National Research Council, Saskatoon, Saskatchewan, Canada S7N 0W9. (Tel: 306-655-4204)	J. Shaw, Division of Building Research, National Research Council, Ottawa, Canada K1A 0R6.		
Denmark	P. F. Collet, Danish Institute of Technology, Copenhagen, Denmark. (Tel: 02-996677)			
Italy	M. Cali, Instituts di Fisica Tecnica, Politecnico di Torino, CS0 Duca Olegli Abrutti, 24-Torino, Italy. (Tel: 011-537353) (Telex: 220646)			
Netherlands	W. de Gids, IMG-TNO, P.O. Box 214, Delft, Holland. (Tel: 015-569330) (Telex: 31453)			
Sweden	L. Sundbom, Swedish Council for Building Research, St. Göransgatan 66, S-112 30 Stockholm, Sweden. (Tel: 08-540640)	A. Elmroth, Royal Institute of Technology, Division of Building Technology, Fack, S-100 44 Stockholm, Sweden.		
Switzerland	P. Hartmann, EMPA, Section 151, Ueberlandstrasse, CH 8600 Duebendorf, Switzerland. (Tel: 01-8234251) (Telex: 53817)			
The Oscar Faber Partnership (UK)	D. Curtis, The Oscar Faber Partnership, Marlborough House, Upper Marlborough Road, St. Albans, Herts, Great Britain. (Tel: 0727-59111) (Telex: 889072)	J. Wilson, ETSU, AERE, Harwell, Oxon, Great Britain. (Tel: 0235-24141) (Telex: 83135)	J. Cockroft, BSRU, University of Glasgow, 3 Lilybank Gardens, Glasgow, Great Britain. (Tel: 041-334-2269) (Telex: 778421)	BSRIA, Old Bracknell Lane, Bracknell, Berks RG12 4AH, Great Britain. (Tel: 0344-25071) (Telex: 848288)
U.S.A.	H. Ross, Department of Energy, 20 Massachusetts Avenue N.W., Washington D.C. 20545, U.S.A. (Tel: 202/376-4672)	C. M. Hunt, Building Thermal & Service Systems Division, Centre for Building Technology, National Bureau of Standards, Washington D.C. 20234, U.S.A. (Tel: 301/921-3560)	D. T. Grimsrud, Energy & Environment Division, Building 90, Room 3078, Lawrence Berkeley Laboratory, Berkeley, California 94720, U.S.A. (Tel: 415/486-4023)	



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