Air Infiltration Review

a quarterly newsletter from the IEA Air Infiltration and Ventilation Centre

International Energy Agency — AIVC

Vol. 10, No. 3, June 1989

Workshop Focuses on the COMIS Multi-zone Infiltration Model

10th/11th April, 1989

Report by Martin Liddament, Head, AIVC

The COMIS (Conjunction of Multi-zone Infiltration Specialists) initiative has attracted experts from several countries to work together at Lawrence Berkeley Laboratory, California on the development of a multi-zone infiltration model. The task is to develop an algorithm taking into account crack flow, HVAC systems, single-sided ventilation and flow through large openings. The object of this workshop was to review progress at the half way stage of this 12 month project.

his introduction, Helmut Feustel, the COMIS leader, outlined the scope of the project and the extent of progress to date. He emphasised that the program is being developed on a modular basis with a different task group assigned to each module. By adopting such an approach COMIS can be used as a basis for future extensions in order to increase the capabilities of simulating ventilation, heat flow and the spread of pollutants. Special attention is being devoted to the development of a "user friendly" input routine. Other considerations include the ability to use the COMIS algorithms either as a stand alone infiltration programme or as an infiltration module of a total building energy simulation programme.

Information on the structure of the COMIS algorithms was presented by Hans Phaff of TNO, Netherlands. He emphasised the need for flexibility within the routines so that the most efficient approach was selected relevant to the problem to be solved. The ultimate goal was to implement an expert system approach for problem definition but this would not be implemented immediately.

Peter Hartmann of EMPA, Switzerland described the development of an interactive input program.

Input is based on seven different blocks, these being problem description, 3D-building description, direct network description, operating schedules input, wind

Inside this issue:

presure coefficients, environment description and meteorological description. Part of this input routine is now complete and was available at the workshop for demonstration.

Liu Mingsheng from the Harbin Architectural and Civil Engineering Institute, China described the incorporation of building details within the code. He discussed possible methods by which the facades, interior partitions and associated leakage loctions could be incorporated starting from a reference location. A discussion on the simulation of flow through openings was introduced by Francis Allard of Laboratoire Equipment de l'Habitat, France. His discussion concentrated on flow through large openings which could be solved either by including the opening as part of the overall flow network or by treating it as a separate problem which then becomes a fixed flow parameter within the mass balance equation for the zone. Both approaches are being compared and evaluated before a decision is taken on the preferred method. Flow through cracks was discussed by Liu Mingsheng. Of particular importance was the structure of crack openings, the influence of temperature on flow rates and the mathematical flow description. Further work on incorporating these concepts into the COMIS model was required.

Of significant importance in the simulation of flow is the interaction of HVAC systems. This was discussed by Hiroshi Yoshino of Tohoku University, Japan. Much of this work has concentrated on describing in mathematical terms the flow characteristics of ducts and fans as a function of pressure difference. HEVAC systems can then be incorporated as part of the flow network. Mario Grosso of the Politecnico Di Torino, Italy is developing algorithms to describe the wind pressure coefficients of openings. He emphasized that averaged wall values of pressure coefficient were not always of sufficient accuracy and that more detailed evaluations were necessary. An algorithm describing the spacial pressure coefficient on the windward side of buildings has been developed and this work was currently being extended to include the remaining building faces. The results of several wind tunnel studies are being used in the preparation and checking of the wind pressure algorithm. Validation tests are also being planned.

Magnus Herrlin from the Royal Institute of Technology, Sweden, described the range of solution techniques being considered by the COMIS group. He explained the need to have a solver which would be reliable under a wide range of operating conditions. Experiments on reliability and convergence times for several solvers are currently being performed but a decision on the approach to be finally applied has yet to be made. Additional contributions on solution techniques and multizone modelling were made by George Walton of the National Institute of Standards and Testing, USA and by Earle Perera of The Building Research Establishment, UK.

In conjunction with the COMIS programme a series of validation experiments are taking place. These include tests being made in a local test house as well as the use of data from other locations. Francis Allard discussed some of the experimental analysis which includes pressure testing to determine the leakage characteristics between zones and multi tracer gas testing to determine the interzonal flow patterns for various climatic conditions. Pressure measurements on the face of the building are also proposed. Claude-Alain Roulet of Ecole Polytechnique Federale de Lausanne, Switzerland described the validation data available from the LESO building in Switzerland. Validation data includes leakage characteristics, flow netw[illegible] meteorological data, wind pressure coefficients and infiltration for 10 zones.

In the concluding session, Helmut Feustel expressed confidence in securing the basic objectives of COMIS within the 12 month operating period. As its contribution to this project, the Air Infiltration and Ventilation Centre is sponsoring the publication of the COMIS work. This will include publishing a Technical Note covering the technical basis for COMIS and publishing a user handbook for the program. The computer code itself will be obtainable from COMIS members.

Further details on COMIS and a regular newsletter are available from:

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Lawrence Berkeley Laboratory
Building 90, Room 3074
Berkeley
California 94720 USA

Air
Infiltration
Review

Editor : Janet Blacknell

Air Infiltration Review has a quarterly circulation of 3,500 copies and is currently distributed to organisations in 39 countries. Short articles or correspondence of a general technical nature related to the subject of air infiltration and ventilation are welcome for possible inclusion in AIR. Articles intended for publication must be written in English and should not exceed 1,000 words in length. If you wish to contribute to AIR, please contact Janet Blacknell at the Air Infiltration and Ventilation Centre.

Conclusions and opinions expressed in contributions to Air Infiltration Review represent the author(s)' own views, and not necessarily those of the Air Infiltration and Ventilation Centre.

Review

The Inside Story: a Guide to Indoor Air Quality

United States Environmental Protection Agency, Office of Air and Radiation and United States Consumer Product Safety Commission EPA/400/1-88/004, September 1988

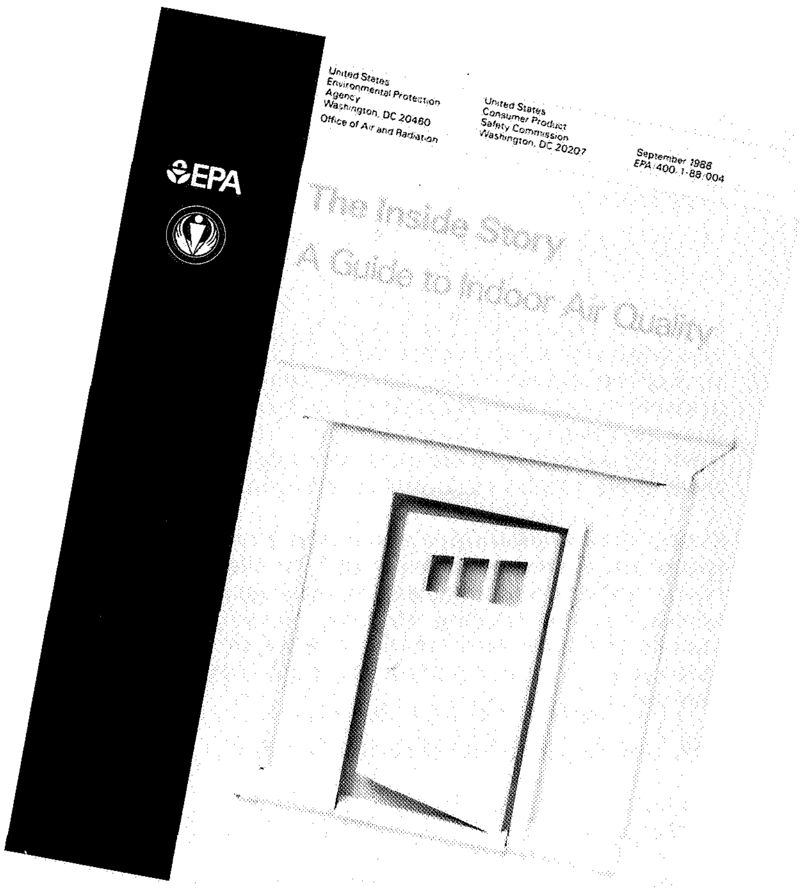
This is a detailed booklet aimed at the householder, giving guidance in all relevant aspects of indoor air quality.

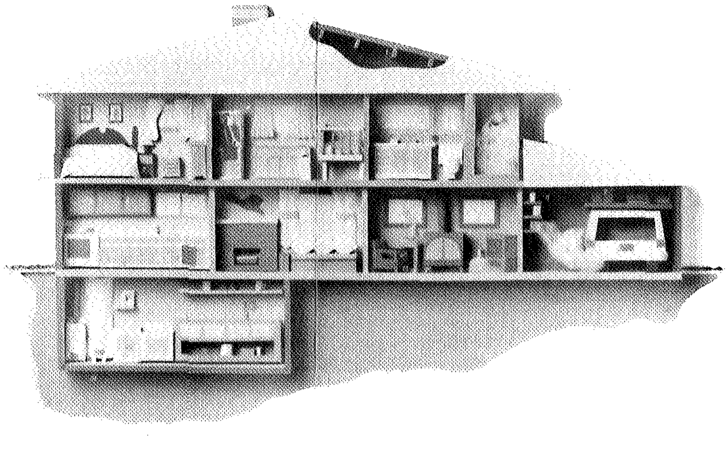
The contents are as follows:

1. Diagram of potential air pollution sources in the home
2. Introduction
3. Indoor air quality in your home
4. What if you live in an apartment?
5. What can you do to improve the air quality in your home?
6. A look at source specific controls:
    - Radon
    - Environmental tobacco smoke
    - Biological contaminants
    - Stoves, heaters, fireplaces and chimneys
    - Household products
    - Formaldehyde
    - Pesticides
    - Asbestos
    - Lead
7. Reference guide to major indoor air pollutants in the home
8. To keep in mind if you are building a new home

Does your office suffer from "Sick Building Syndrome"?

10. Where to go for additional information
11. Glossary





The levels of pollutants from individual sources may not pose a significant risk to health by themselves. But most homes have more than one source that contributes to indoor air pollution. There can be a serious risk from the cumulative effects of these sources. Fortunately, however, there are steps that most households can take both to reduce the risk from existing sources and to prevent new problems from occurring. This booklet was prepared by the US Environmental Protection Agency (EPA) and the US Consumer Product Safety Commission (CPSC) to help you decide whether to take actions in your home that can reduce the level of indoor air pollution. Because so many Americans spend a substantial amount of time in offices with mechanecal heating, cooling, and ventilation systems, there is also a short section on the causes of poor air quality in offices and what you can do if you suspect that your office may have a problem. A glossary and a list of public and private organizations where you can get additional information are listed at the back of the booklet.

Recirculation of Air in Dwellings

Differences in Concentrations between Rooms in Dwellings due to the Ventilation System

W F de Gids and J C Phaff
TNO Division of Technology for Society Netherlands

Summary

The Dutch Standard NEN 1087 "Ventilation of Dwellings: Requirements", is at this moment under review. A statement is made that outside air is required as fresh air for bedrooms. Bathroom, kitchen, W.C. and living room are allowed to be ventilated with air from other rooms. During the last years air heating systems have become more popular. These systems have in their most simple form recirculation of air from the living room to the bedrooms. The requirement of fresh outside air for bedrooms can only be reached with these systems when selective recirculation takes place.

During the reviewing process of the standard, TNO has carried out some studies to investigate the differences in concentrations of contaminants in dwellings due to different ventilation and heating systems. Measurements and calculations have been made in a lot of conditions to reconsider the requirement of pure outside air for bedrooms.

In this investigation the following aspects were studied;

* what pollutant is the most important with respect to recirculation,
* what concentrations may be expected under several weather conditions and living habits,
* what is the influence of staying different periods of time in different rooms (i.e. housewife versus baby) et cetera.

Field measurements in two dwellings and calculations with the TNO ventilation model (VENTCON) were compared.

The main conclusions of these studies are:

* Particles of cigarette smoke can be seen as the most important contaminant in houses, especially considering children's bedrooms.
* Leeward sided bedrooms can receive contaminated air from the living room under certain weather conditions and living habits.
* Due to an effective window opening (large open casement windows) occupants can minimize these contaminant levels.
* There are no significant differences in doses (= concentration multiplied by occupation time) in houses with natural ventilation or mechanical exhaust and air heating systems which can be seen as balanced ventilation systems.
* Babies are more exposed to contaminants from the living room than housewives, both in houses with natural ventilation or mechanical exhaust, and in houses with air heating systems.
* There is a very good correlation between the measured and calculated concentrations of contaminants.
* Simple measures in the air heating installation can give occupants the possibility of ventilating their house with outside air only, which can be a necessity in the case of sick or sensitive people.

1. Introduction

The Dutch Standard NEN 1087 "Ventilation of Dwellings: Requirements" (1) is at this moment under review. A requirement can be found about the quality of air. In fact a statement is made that outside air is required as fresh air for bedrooms. Bathroom, kitchen, W.C. and living room are allowed to be ventilated with air from other rooms.

In recent years air heating systems have become more popular. These systems have in their most simple form recirculation of air from the living room to the bedrooms.

During the reviewing process of the standard, TNO has carried out some studies to investigate the differences in concentrations of contaminants in dwellings due to different ventilation and heating systems. The aim of the studies was to evaluate several heating/ventilation systems on pollutant levels in houses.

2. Pilot Study (2)

The first phase of this study was to determine which pollutant was the most important. No extensive literature research has been carried out. From (3), the situation with tobacco smoke produced in the living room was taken as a reasonable reference situation for these studies. The tobacco smoke can be propagated to bedrooms due to recirculation of air and due to internal flows in the case of natural ventilation. In the bedrooms small children like babies can be sleeping for many hours without having the possibility to open ventilation-windows. With the TNO ventilation model (VENTCON) a comparison on concentration levels of three different systems has been carried out (See Figure 1).

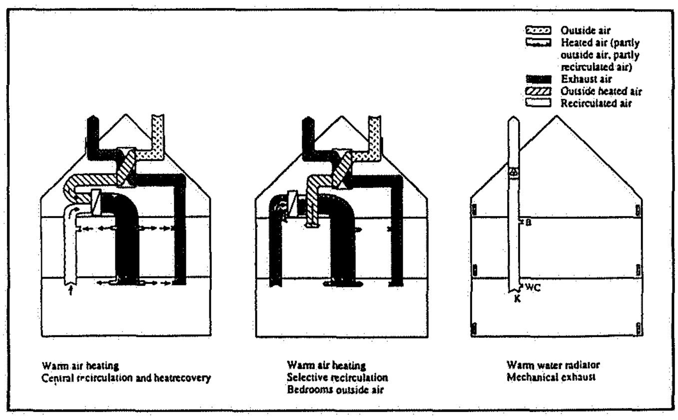


Figure 1.
The three different heating/ventilation systems

type of person	heating/ventilation system warmwater radiator with mech. exhaust	airheating central circulation
baby	12	16
child2-6 y	33	20
child 6-13 y	13	9
housewife	45	23
man	26	13

Table 1.
Time weighted average concentration of particles g/m^3

heating/ventilation system	position of internal doors closed	open
warm airheating selective recirculation	< detectable	< detectable
warm airheating central recirculation	15	25 – 30
warmwater radiator mechanical exhaust	0 – 5	30 – 50

Table 2.
Airflow from the living room to the bedrooms in %

This pilot study was carried out without taking into account the use of the ventilation provisions by the occupants.

The infiltration and mechancial ventilation levels and the particle concentrations in the rooms of the houses were calculated. The calculations have been made for a single family dwelling under a variety of weather conditions (See Figure 2).

On the basis of this result the time weighted average concentrations for five types of person were determined. The five types of person are defined as persons who are staying different lengths of time in the several rooms of the house. The production of tobacco smoke was simulated in the living room. The effects of sedimentation of the particles were neglected.

The results of this study are summarised in Table 1.

From this figure can be seen that the particle concentrations due to smoking are for the different persons in the same order of magnitude. The concentrations are even a bit higher in the case of mechanical exhaust ventilation systems.

Nevertheless some people argued that these results were only based on calculations.

3. Measurements

Measurements were carried out in a single family house (4) (See Figure 2).

Carbon monoxide (CO) was used as a tracer and released in the living room. The measurements were carried out in an unoccupied dwelling with an air heating system. The effects of occupancy were simulated. For an impression of the concentration over time Figure 3 and 4 are given.

The global results of this experiment are shown in Table 2.

From these one can conclude;

* No transport of contaminants takes place in the situation with selective recirculation.

* The propagation of contaminants from the living room to other rooms depends on the position of the internal doors.

Under the circumstances with the doors closed the warm water radiator system with mechancial exhaust, leads to lower concentrations in the rooms than the warm air/central recirculation-system.
In the case of the internal doors being open, the situation is the opposite.

4. Validation of the Model

Because some measured data were available, finally some validation exercises have been undertaken.

With the MT ventilation model (VENTCON) some measured situations are simulated. The results are shown in Figure 5.

5. Conclusions

The concentration levels in bedrooms of contaminants produced in the living room are highly dependent on the use of internal doors.

Different heating/ventilation systems can produce the same levels of concentrations throughout the house.

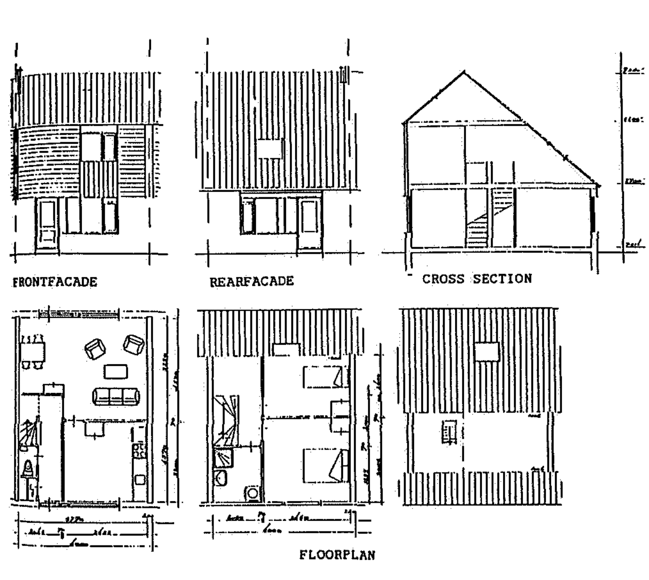


Figure 2.
The dwelling, groundplan, facades, cross section

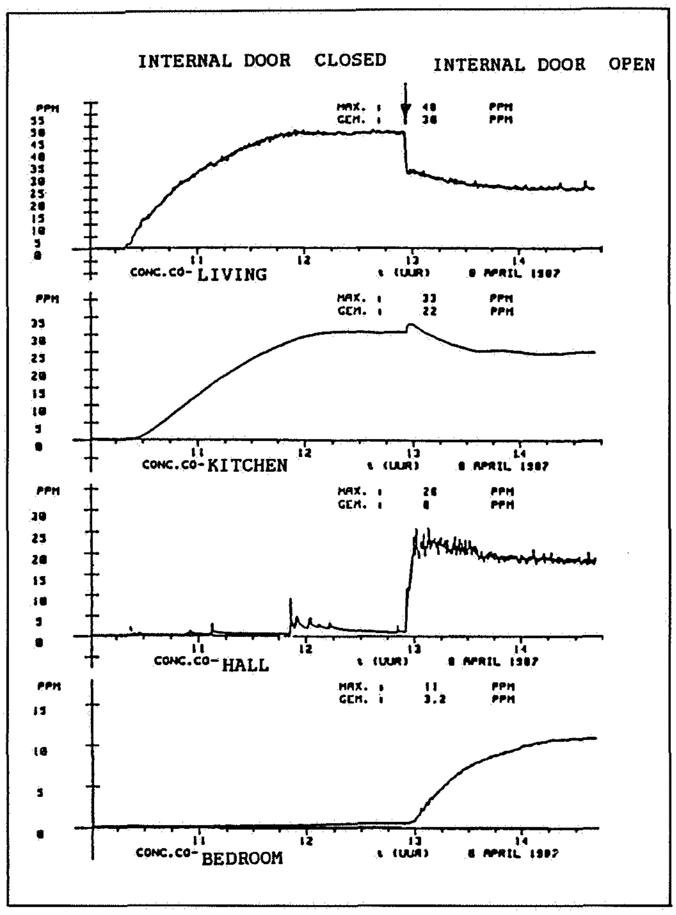


Figure 3.
Concentrations measured in several rooms. Warm water radiator heating system with mechanical exhaust. Door of living room closed or open.

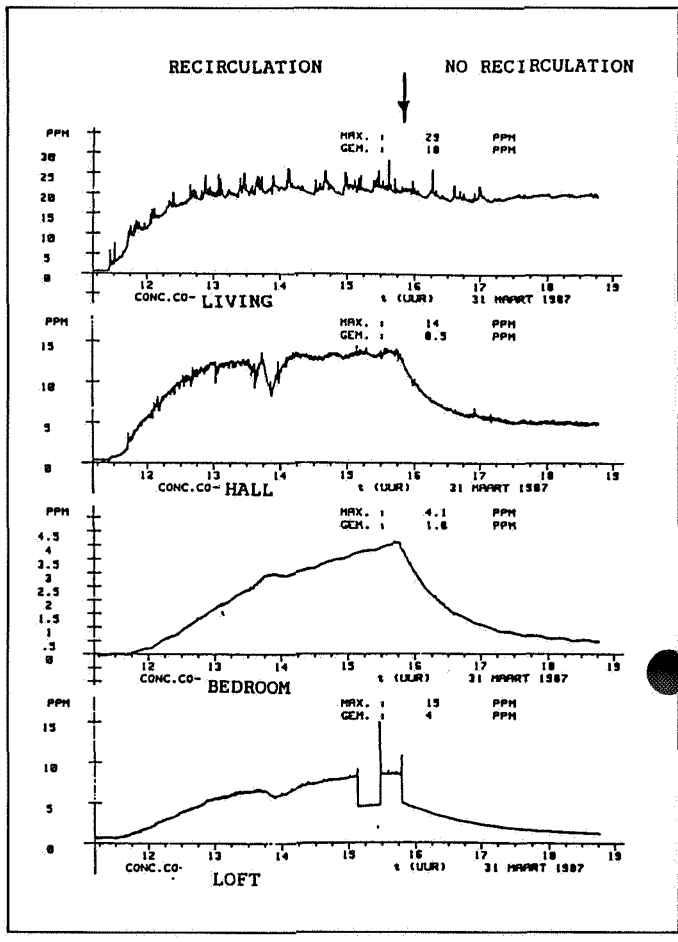


Figure 4.
Concentrations measured in several rooms Warm air heating system with and without recirculation

The exposed doses of people in the house are dependent on their time of occupation in different rooms.

A warm air heating system with selective recirculation does not cause any transport of contaminants from the living room to the bedrooms.

Models can predict concentration levels to evaluate indoor air quality problems.

There is no evidence that the heating/ventilation system is the dominating factor in the propagation of contaminants through the dwelling.

6. References

(1) NEN 1087 (Dutch standard)
Ventilation in dwellings, Requirements
NNI, Rijswijk, 1975

(2) Knoll, B.
Toelaatbaarheid van het recirculeren van lucht uit de woonkamer naar de slaapkamers.
IMG-TNO, Delft, 1985

(3) Trepte, L.
IEA Annex IX
Minimum ventilation rates
Dornier, Friedrichshafen, 1983

(4) Phaff, J.C.
Recirculatie in woningen
MT-TNO, Delft, 1987

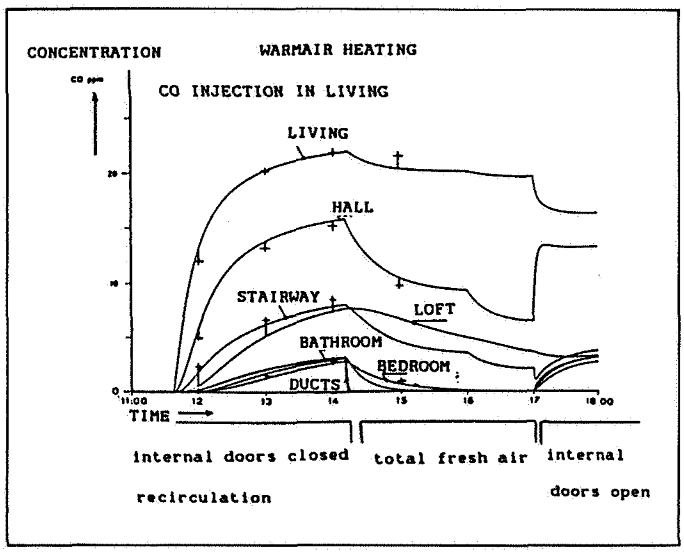


Figure 5.
Comparison between measured and calculated concentrations

AIVC 10th Annual Conference Progress and Trends in Air Infiltration and Ventilation Research

Monday 25th September — Thursday 28th September, 1989

Venue: Hotel Dipoli, Finland

Many developments in ventilation research have taken place since the inauguration of the Air Infiltration and Ventilation Centre in 1979. These include advances in measurement techniques, predictive methods and ventilation strategies. In addition demands for improvements in comfort conditions, indoor air quality and energy efficiency have resulted in the introduction of more rigorous standards in many countries. Over the past 10 years, improvements in ventilation and building design have had a major impact in reducing energy demand. The objective of this conference is to overview recent progress and to present new trends and developments.

Subject coverage includes:

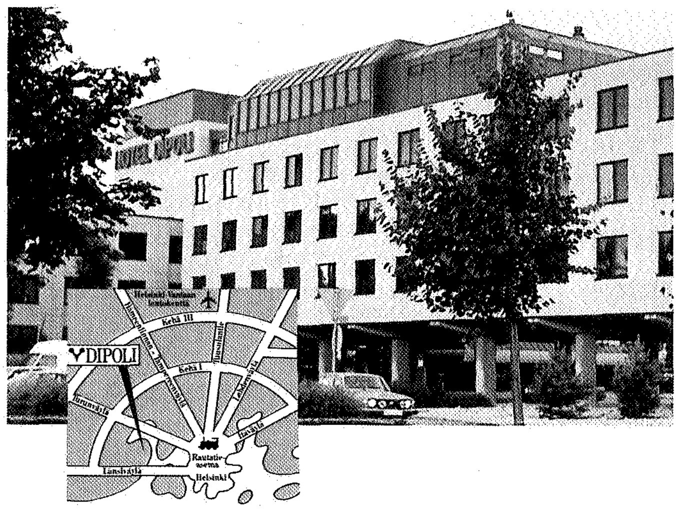
- measurement techniques
- air flow simulation
- ventilation methods
- demand controlled ventilation
- comfort
- moisture transport

This year the poster sessions will begin with an introductory review in which the Chairman will outline the main aspects of each paper.

The conference concludes with group discussion sessions covering:

- Measurement Techniques
- Standards and Codes
- Design Guidelines

Espoo is close to Helsinki and the venue provides ideal facilities for residential conferences.



The full registration fee of £450 (single occupancy) and £420 (shared occupancy) is reduced to £399 (single) and £369 (shared) for registrations received before 31st July, 1989. This fee is inclusive of conference proceedings and full board accommodation at the adjacent Dipoli Hotel from lunch on Monday, 25th September to lunch on Thursday, 28th September.

For significant reductions, spouse or non conference guest rates and accommodation on other nights should be arranged through the AIVC but will be charged directly at the hotel.

The 10th AIVC Conference is open to organisations in participating countries only.

AIVC 10th Annual Conference Progress and Trends in Air Infiltration Research

25-28 September, Hotel Dipoli, Finland

PROGRAMME

MONDAY 25TH SEPTEMBER

13.00 Arrival and Lunch

SESSION 1 Chairman: Marianna Luoma (Finland)

14.00 — 18.00 Opening and Keynote Presentation

Building Energy Conservation Activities within the International Energy Agency.
S Irving (UK)

Annex 14 — Condensation and Energy.
H Hens (Belgium)

Annex 18 — Demand Controlled Ventilating Systems.
L-G Mansson (Sweden)

Annex 20 — Trends in Airflow Design and Management.
A Moser (Switzerland)

Afternoon Tea

Ventilation and Building Design.
A Elmroth (Sweden)

Developments in Tracer Gas Techniques.
M Sherman (USA)

The Performance of the Passive Perfluorocarbon Method.
J Sateri, P Jyske, A Majanen and O Seppanen (Finland)

Experimental Study of Air Flow Patterns in a Three Bedroomed House.
B A Fleury, A Gadilhe, V Richalet and M Kilberger (France)

Multizone Flow Analysis and Zone Selection using a New Pulsed Tracer Gas Technique.
P J O'Neill and R R Crawford (USA)

19.00 Reception and Conference Dinner

TUESDAY 26TH SEPTEMBER

SESSION 2 Chairman: Mark Riley (Canada)

08.30 — 12.30 Mathematical Modelling of Infiltration and Ventilation.
H Feustel (USA)

Validation of a Multizone Air Infiltration Program with a Set of Full Scale Measurements.
J-M Furbringer, R Compagnon, C-A Roulet and C Roecker (Switzerland)

Airflow Simulation Techniques.
P Nielsen (Denmark)

Coupled Air Flow and Heat Conduction Model for Mechanically Ventilated Foundations.
C-E Hagentoft and L-E Harderup (Sweden)

Morning Coffee

Minimum Ventilation Rates to Prevent Surface Condensation: A Case Study.
C Aghemo, C Lombardi and M Masoero (Italy)

Experimental Method to Measure 3D Air Velocity.
G Gottschalk, P Tanner and P Suter (Switzerland)

Airflow Measurement Techniques Applied to Radon Mitigation Problems.
D T Harrje and K Gadsby (USA)

Wind Pressure on Low-Rise Buildings. An Air Infiltration Analysis.
J Gusten (Sweden)

12.30 Lunch

14.00 Technical Visit: Technical Research Centre of Finland — Laboratory of Heating and Ventilation

18.30 Dinner

SESSION 3 Posters and Demonstrations — Chairman: Marco Masoero (Italy)

19.30 — 22.30 Accuracy and Development of Tracer Gas Measurement Equipment.
B Kvisgaard and P F Collet (Denmark)

The Application of Acoustic Techniques to the Measurement of Air Leakage in Buildings.
X Zhao, D J Oldham, S Sharples and I C Ward (UK)

A Comparison Between the Step-Up, Step-Down and Pulse Injection Techniques for the Measurement of the Mean Age of Air.
R Niemela and A Saamanen (Finland)

The Development of a Microprocessor-Controlled Tracer Gas System and Measurement of Ventilation in a Scale Model.
S B Riffat (UK)

Methodologies for the Evaluation of Ventilation Rates by Tracer Gas Comparison.
I Meroni, P Tirloni, C Pollastro and W Esposti (Italy)

A Comparison of Different Methods of Calculating Interzonal Airflows from Multiple Tracer Gas Decay Tests.
R E Edwards and C Irwin (UK)

A Modern Concept for Office Buildings: Energy Saving and Good Indoor Climate are No Longer Contradictory.
W Braun (Switzerland)

Air Change in Flats with Natural Ventilation: Measurements and Calculations.
A Olsson-Jonsson (Sweden)

Outdoor Air Inlet without Draught Problem.
G Werner (Sweden)

Energy Use for Transport of Ventilation Air.
P Wickman (Sweden)

Comparison of Air Infiltration Rate and Air Leakage Tests under Reductive Sealing for an Industrial Building.
P J Jones and G Powell (UK)

Recent Canadian Initiatives Relating to the Use of Caulks, Sealants and Weatherstrip Products.
D Eyre (Canada)

Temperature Influence on Crack Flow.
Lui Mingsheng (China)

The Estimation of Concentration Histories in Dwellings in Unsteady Conditions.
K E Siren and T Helenius (Finland)

General Feature of the Two Dimensional Isothermal Mean Flow Inside a Ventilated Room with a Wall-Mounted Obstacle — Comparison between Experimental and Numerical Conditions.
Ph Berlandier, R Rapp and J C Serieys (France)

Buoyancy Driven Air Flow in a Closed Half-scale Stairwell Model — Velocity and Temperature Measurement.
A S Zohrabian, M R Mokhtarzadeh-Dehghan

and A J Reynolds (UK)

The Simulation Model of Industrial Air Conditioning Systems.
L Heikkinen (Finland)

VAV — Duct Systems — Simulating.
P A Rantanen (Finland)

Identification Methods for Multiple Cell Systems.
B Hedin (Sweden)

An Investigation of Reentrainment of Formaldehyde via Enthalpy Exchangers.
B Andersson, K Andersson, P-A Zinomark and J Sundell (Sweden)

COMIS Review.
by COMIS Group (USA)

WEDNESDAY 27TH SEPTEMBER

SESSION 4 Chairman: Jorn Brunsell (Norway)

08.30 — 12.30

Cost Effective Ventilation in Mild Climates.
J P Lilly (UK)

Ventilation and Airtightness in Energy Balance Analyses.
A Blomsterberg (Sweden)

The Performance of Residential Ventilation Systems.
R Ruotsalainen, R Ronnberg, A Majanen and O Seppanen (Finland)

Testing of Heating and Ventilating Equipment with Duct Test Rig.
D Fugler (Canada)

Morning Coffee

The hx-Diagram as a Representation of Measurements of Ranges of Comfort.
H Trumper, K Hain and W Jansen

Ventilation by Displacement: Calculation of the Flow in a Three-Dimensional Room.
L Davidson (Sweden)

Displacement Ventilation for Office Buildings.
B Kegel (Switzerland)

Envelope Leakiness of Large, Naturally Ventilated Buildings.
MDAES Perera and R G Tull (UK)

12.30 Lunch

Free Afternoon

18.30 Dinner

SESSION 5 Posters and Demonstrations — Chairman: Martin Liddament (UK)

19.30 - 22.30

An Overview of Infiltration and Ventilation Developments in:

Belgium	— *P. Wouters*
Canada	— *M. Riley*
Denmark	— *O. Jensen*
Federal Republic of Germany	— *L. Trepte*
Finland	— *R. Kohonen*
France	— *P. Jardinier*
Italy	—
Netherlands	—
New Zealand	— *M. Bassett*
Norway	— *J. Brunsell*
Sweden	— *J. Kronvall*
Switzerland	— *P. Hartmann*
United Kingdom	— *S. Irving*
United States of America	—

Building Design and Maintenance and Indoor Air Pollution.
R H Ferahian

New Design of Central Units in Air Heating Systems for Heating and Ventilation in Domestic Buildings.
F Steimle and Th Glimpel (FRG)

Influence of Architectural Features on Ventilation Losses.
B Wiren and P Cernik (Sweden)

Airtightness of Swedish Residences.
M D Lyberg and C A Boman (Sweden)

Demand Controlled Air Ductwork.
J Laine (Finland)

Air Changes and Scatter in Mechanical Ventilation Rates in Swedish Residences.
M D Lyberg and C A Boman (Sweden)

Public Policy Considerations and the Development of a Code for the Control of Radon in Residences.
S Price and M Nuess (USA)

THURSDAY, 28TH SEPTEMBER

SESSION 6 Chairman: Peter Hartmann (Switzerland)

08.30 — 12.30

A perspective on the AIVC.
W de Gids (Netherlands)

Group Discussions:

Measurement Techniques —
Chairman: Max Sherman (USA)
Reporter: David Harrje (USA)

Standards and Codes
Chairman: Lutz Trepte (FRG)
Reporter: Peter Wouters (Belgium)

Design Guidelines
Chairman: Mike Holmes (UK)
Reporter: Johnny Kronvall (Sweden)

Discussion

Final Summing Up
Peter Hartmann, (Switzerland)

12.30 Lunch

Depart

AIVC Library and Technical Information Service

Janet Blacknell
Information Specialist
AIVC

Introduction

The AIVC Library and Technical Information service distributes information worldwide to researchers and others concerned with the field of air infiltration and ventilation.

AIRBASE

The AIVC's bibliographic database holds 3300 records and is available for searching by AIVC staff on receipt of a letter or telephone call. Printouts of searches are despatched, and source documents are available for consultation via the library service. The following is an example of an Airbase record, showing reference number, title, author, bibliographical information, abstract and keywords.

> **#NO 3280 Improving the thermal performance of timber framed walls.**
> **AUTHOR** Johnson K A
> **BIBINF** Building Technical File, Number 21, April 1988, pp31-38, 9 figs, 1 tab, 6 refs.
> **#DATE** 00:04:1988 in English
> **ABSTRACT** The thermal performance of timber framed walls is increased if the main cavity is filled with mineral wool. This also builds in a large safeguard against the risk of any interstitial condensation which may have resulted from gross damage to the vapour control layer.
> **KEYWORDS** thermal performance, wood frame, wall, interstitial condensation, vapour barrier, insulation

Recent Additions to Airbase

New publications added to the library are publicised in the AIVC's quarterly abstracting journal which is despatched with the Air Infiltration Review. Requests for library items generally follow in response to the distribution of Recent Additions. The library service despatches an average of 100 items of information per week throughout the year. A handy Subject Key is included in Recent Addition to help clients find references in their particular subject areas. The 'hard copy' of the database is currently AIVC Technical Note 25, 'A Subject Analysis of the AIVC's Bibliographic Database, AIRBASE', which is an up to date list of all records held in Airbase, and includes a subject index, author index, and thesaurus.

Technical Notes

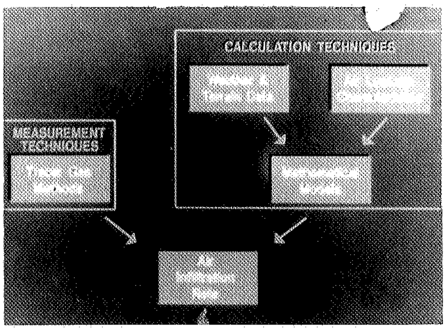
The AIVC library is also responsible for responding to requests for AIVC Technical Notes, most of which are free of charge to clients in participating countries. A full list of those Technical Notes which are in print can be found at the back of this magazine.

Journals

Since moving to Warwick University Science Park, the AIVC library has been able to begin a collection of scientific journals relevant to the subject area of air infiltration and ventilation, and currently receives 25 titles from several of the AIVC participating countries.

For more information about services, contact the AIVC.

Technical Application



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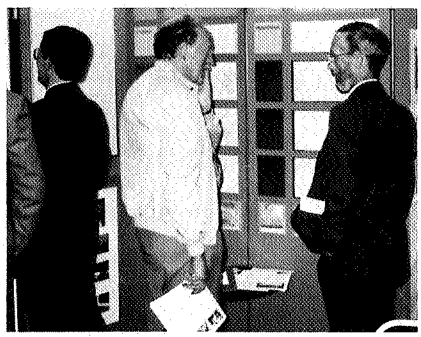
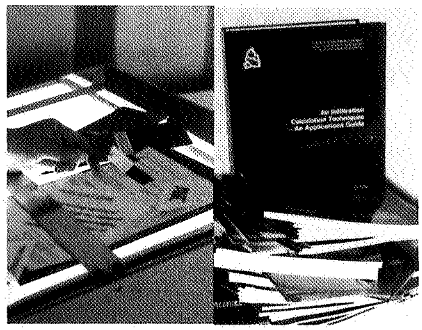


Information

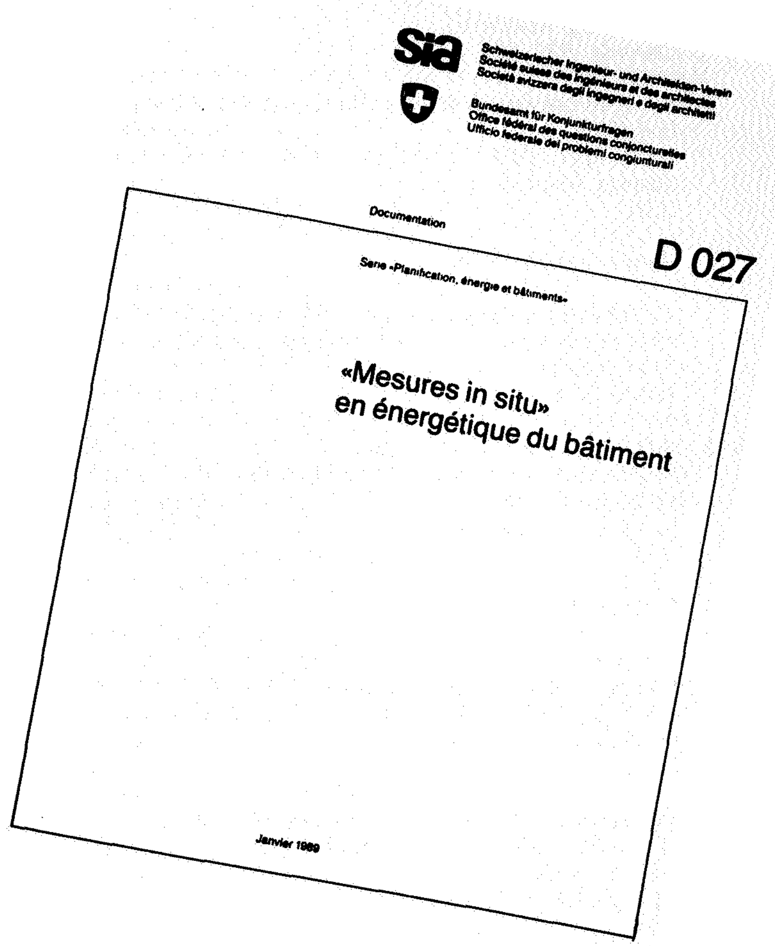
Publication



Review

"Mesures in Situ" en Energetique du Batiment (Site Measurements in Building Energy)

Editor and Main Author Claude-Alain Roulet
Published by SIA, Switzerland, January 1989



This is a wide ranging manual of measurement techniques in building energy.

The work is divided into six sections as follows:

* Generalities
* Common measurements
* Environment
* Services
* The whole building
* Building envelope
* Heating, ventilation, electricity and plumbing

The manual reviews some of the measurement techniques specifically useful for checking the functioning of a dwelling from the energy point of view. It is evaluative in the sense that only the measurement techniques that the authors judge both important and little or poorly understood, are described.

The manual is aimed at all persons wishing to carry out, interpret or understand measurements concerning energy in buildings. It is not in principal intended to be read from beginning to end. Each measurement method is described in sufficient detail so that the informed reader need only consult the chapter which interests him.

Except for chapter 6, each measurement is presented in the following form:

1. Brief description and area of application
2. Aim of the measurement
3. Definitions
4. Description of measurement method
5. Necessary material
6. Measurement protocol
7. References

A list is given of Swiss, international and foreign standards as well as some publications concerning the chapter. This list is not necessarily exhaustive but contains those works familiar to the author. Here a list is often supplied (not exhaustive) of suppliers of apparatus, particularly if the necessary instruments are not current.

The introduction to chapter 6 considers measurements of systems in general and the first section presents thermal measurements common to different systems. The other sections describe measurements which can be carried out for each type of system. Each section is completed by a paragraph describing the instruments with their characteristics and ends by the presentation of recommendations for interpretation and formulae.

The publication is currently available in German or French from Dr Peter Hartmann at the following address:

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Forthcoming Conferences

1. Excellence in Housing '89
2-4 March, 1989
Fort Garry Place
Winnipeg, Manitoba
Canada

Further details from:

Manitoba Energy and Mines
Tom Akastream
555-330 Graham Avenue
Winnipeg, Manitoba
Canada, R3C 4E3

2. Symposium on Air Change Rate and Air Tightness in Buildings
17-18 April, 1989
Atlanta, Georgia
USA

Further details from:

ASTM Publications Division
1916 Race Street
Philadelphia
19103 USA

3. IAQ'89: The Human Equation:
Health and Comfort
17-20 April 1989
San Diego, California
USA

Further details from:

Jim Norman
Manager of Technical Services
ASHRAE, 1971 Tullie Circle
NE Atlanta, GA 30329
USA

4. Measurement of Toxic and Related Air Pollutants
EPA/APCA International Symposium
2-5 May 1989
Raleigh, North Carolina
USA

Further details from:

Seymour Hocheiser
Environmental Monitoring Systems Laboratory
U.S. Environmental Protection Agency
Research Triangle Park
NC 27711
USA

5. Renewables a Clear Energy Solution
15th Annual Conference of the Solar Energy Society of Canada
19-21 June 1989
Penicton, B.C. Canada

Further details from:

Natalie Gallimore
Solar Energy Society of Canada Inc.
Suite 3, 15 York Street
Ottawa, Ontario
Canada K1N 5S7

Tel: (613) 236-4594

6. Building Simulation '89: Technology Improving the Energy Use, Comfort, and Economics of Buildings Worldwide
23-24 June 1989
Vancouver, Canada

Further details from:

Dr. Marianne McCarthy Scott
MCC Systems Canada Inc.
30 Wellington Street East
202 Toronto, Ontario
Canada, M5E I53

Tel: (416) 368-2959

7. Symposium on Biological Contaminants in Indoor Environments
16-19 July 1989
Boulder, Colorado
USA

Further details from:

Staff Manager
Subcommittee D22-05 on Indoor Air
ASTM, 1916 Race Street
Philadephia
PA 19103
USA

Tel: (215) 299-5400

8. CLIMA 2000, Second World Congress on Heating, Ventilation, Refrigeration and Air Conditioning
28 August - 1 September 1989
Sarajevo, Yugoslavia

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Emil Kulic
CLIMA 2000, Mascinski Fakultet
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9. XXI International Symposium
Heat and Mass Transfer in Building Material and Structure
4-8 September 1989
Hotel Libertas, Dubrovnik
Yugoslavia

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10. Progress and Trends in Air Infiltration and Ventilation Research
AIVC 10th Anniversary Conference
25-28 September 1989
Hotel Dipoli, Finland

Further details from:

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11. Blueprint for a Healthy House Conference
11-13 October 1989
Cleveland, Ohio, USA

Further details from:

Housing Resource Centre
1820 W. 49 Street
Cleveland, Ohio 44102
USA

Tel: (216) 281-4663

12. The Sick Building Syndrome
16-20 October 1989
Schafergarden, Copenhagen
Denmark

Further details from:

Nordic Institute of Advanced Occupational Environment Studies
C/o Institute of Occupational Health
Topeliuksenkatu 41a
ASF-00250 Helsinki
Finland.

Tel: 358-0-47471

13. Urban Climate, Planning and Building
IFHP/CIB/WMO International Conference
6-11 November 1989
Kyoto, Japan

Further details from:

IFHP/CIB/WMO International Conference on Urban Climate, Planning and Building
c/o Assoc. Prof. Yasuto Nakamura
Department of Architecture
Sakyo-ku, Kyoto 606
Japan

Tel: 075-753-5739

14. System Simulation in Buildings
Third International Conference
3-5 December 1990
Liege, Belgium

Tel: 32 0 41 52 01 80 Ext. 311

15. Thermal Performance of the Exterior Envelopes of Buildings IV
4-7 December 1989
Crowne Plaza Hotel
Orlando, Florida
USA

Further details from:

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Oak Ridge National Laboratory
PO Box 2008, Oak Ridge
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16. Science and Technology at the Service of Architecture
Second European Conference on Architecture
4-8 December 1989
Unesco Centre, Paris

Further details from:

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D-8000 Muenchen 70
Federal Republic of Germany

17. Roomvent '90
Engineering Aero-and Thermodynamics of Ventilated Rooms
Second International Conference
13-15 June 1990
Oslo, Norway

Further details from:

Room Vent
c/o Norway VVS Teknisk Forening
PO Box 5042 Maj.
N-0301 Oslo 3
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18. Indoor Air Quality And Climate
5th International Conference
29 July - 3 August 1990
Toronto, Ontario
Canada

Further details from:

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223 College Street
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19. Energy, Moisture, Climate in Building
International Symposium
3-6 September 1990
Rotterdam, Netherlands

Further details from:

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Tel: 3110 4309414

Book Reviews

The Householders' Guide to Radon

UK Department of the Environment, June 1988

This guide is a follow up to the leaflet "Radon in Houses" which was issued previously by the Department of the Environment. It is intended for people who live in areas with high levels of radon. It is written particularly for householders whose homes have already been tested and found to have an appreciable level of radon. It explains what radon is, how it gets into houses and what the effects on health may be. It also outlines some of the ways of reducing the level of radon and gives guidance both on how to get the work done and on likely costs. The guide is in two parts. Part 1 answers some questions about radon itself, including how it can be measured. Part 2 tells you what you can do if you have a high level of radon in your home. If you live in an area which might be affected by radon, and want to have your home tested, UK residents can write to Radon Survey, National Radiological Protection Board, Chilton, Didcot, Oxon OX11 0RQ. They will send a short questionnaire and from the answers will advise whether the level of radon in the house should be measured. If they think it should because of the nature of the area and of the house, they will carry out the test free. This is an informative guide in an area of some concern.

Energy Use and Energy Efficiency in UK Commercial and Public Buildings up to Year 2000

UK Energy Efficiency Office, 1988

This study commissioned by the Department of Energy is a disaggregated analysis of the pattern of energy use, and the scope for improvements in energy efficiency, in the UK service sector. The purpose is to provide background information on possible future patterns of energy use, and the potential for energy efficiency measures. The sector covers commercial and public buildings. Energy consumption at 760 PJ in 1985, is about half that of the other three major energy using sectors (domestic, industry and transport). The energy bill is about £5 billion a year in 1985 prices, an eighth of national energy expenditure.

The study is reported in two parts: Volume 1 outlines the methodology, assesses the current potential for energy efficiency, analyses historical trends in energy use, and estimates energy consumption and the potential for savings. Volume II, the Annexes, contains the detailed analysis of energy use.

The major item of work (contained in Volume II) has been to gather disaggregated data on the number of premises, floor area, energy consumption and fuel use patterns. A detailed data base has been built up of energy consumption by fuel type and end use for a wide variety of buildings. For the commercial sector the results are grouped into seven sub sections: offices, distribution, retail, catering, public houses, and clubs, residential and commercial services. For the public sector there are five sub sectors: national government, defence, local government, education and health. The 12 sub sectors are further divided into over 40 building categories.

Environmental Design Manual: Summer Conditions in Naturally Ventilated Offices.

by P Petherbridge, N O Millbank, J Harrington-Lynn

UK Department of the Environment, Building Research Establishment, 1988

At an early stage in the building design procedure, when window size and type, building weight, mode of ventilation and the need for daytime electric lighting and for air conditioning have yet to be finalised, the designer requires a rapid check on the environmental consequences of alternative design solutions. Guidance is needed especially on the avoidance of summertime overheating, particularly where the passive use of solar energy is a feature of the building design. The BRE Environmental Design Manual has been produced with this kind of requirement in mind.

This manual presents a method of assessing the effect of the window size and type, the kind of construction and the rate of ventilation on summertime comfort conditions and daylighting in offices in the British Isles.

The method is intended for use early in the design procedure together with other guidance to help set design parameters — such as window size — or to check a preliminary design proposal when most design options are still open.

The method can also be used to help to decide remedies for summertime overheating in existing buildings as well as identifying when acceptable working conditions can be achieved without recourse to mechanical air conditioning or ventilation.

This manual deals with rooms with one external wall, primarily offices. It does not deal with rooms with more than one external wall or with top lit rooms. The principles contained in this manual have been incorporated in the design of the Property Services Agency's Low-Energy Office at the Building Research Station, Garston. In new building the designer will need to check that the aggregate area of windows in the whole building conforms to the requirements of the Building Regulations Part L3, Resistance to the passage of heat.

3rd fold (insert in Flap A)

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