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AIR TIGHTNESS OF WHOLE
BUILDINGS

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Air tightness of whole buildings

The aim of this projekt is to develop a method of testing whole buildings for air leakage. The method should be easy to handle and suit well for field-use. It is also wished that the measured result together with certain meteorological data should give an estimation of the natural ventilation of the building. (Fig 1)

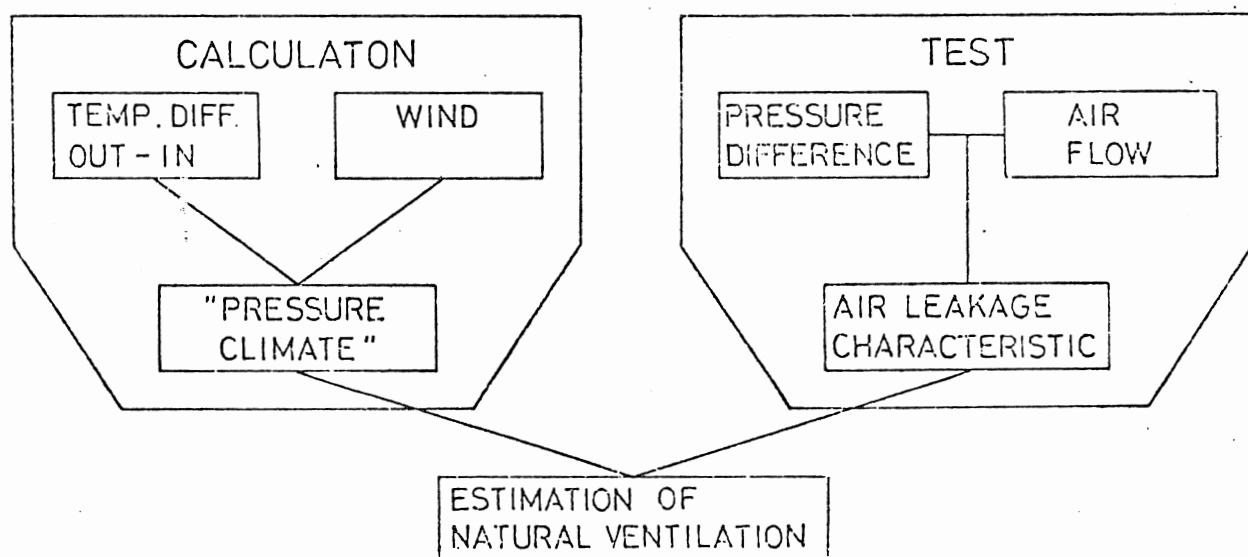


Fig 1. The principle of the method.

The testing procedure will be the following:

By using a big fan in an opening somewhere in the building enclosure the building is put under a higher or a lower pressure than the air-pressure. See fig 2!

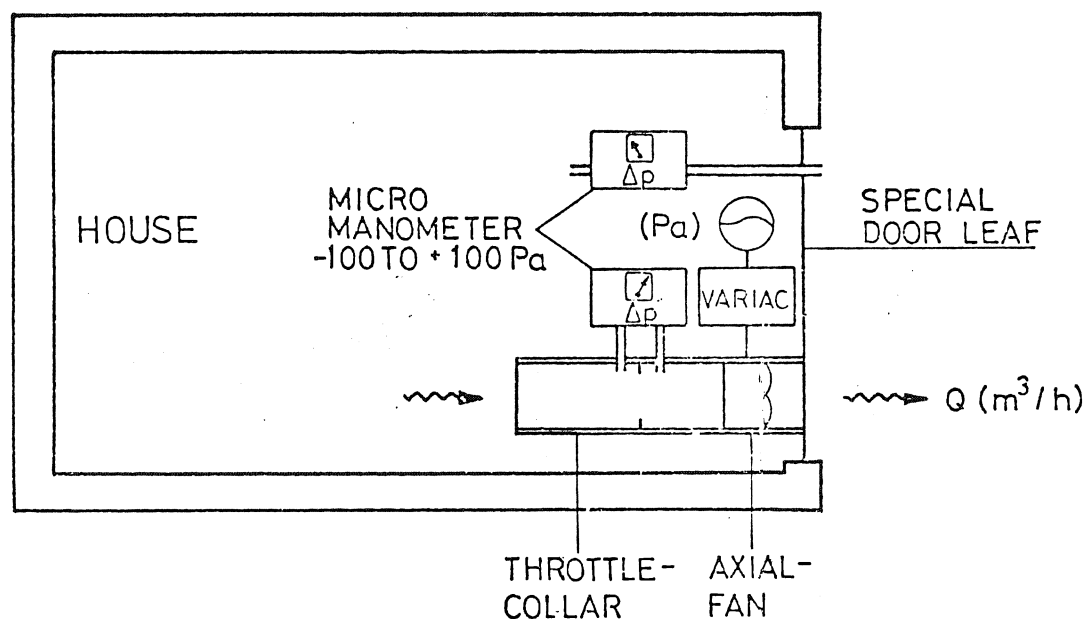


Fig 2. The test equipment.

In ordinary houses and flats it is preferable to substitute the ordinary door - leaf of the outer door with a special one to which the fan is attached. It should be possible to vary the capacity of the fan and for these types of buildings the maximum capacity of it should be about 3 - 4 000 m³/h at 50 - 60 Pa. These values are strongly dependant of the air tightness of the house tested and they have proved to be suitable for Swedish houses and flats.

The air - flow through the fan is measured by using for example a throttle - collar calibrated for the range 0 - 3 500 m³/h.

When a house is tested graphs like the typical graph in fig 3 are obtained.

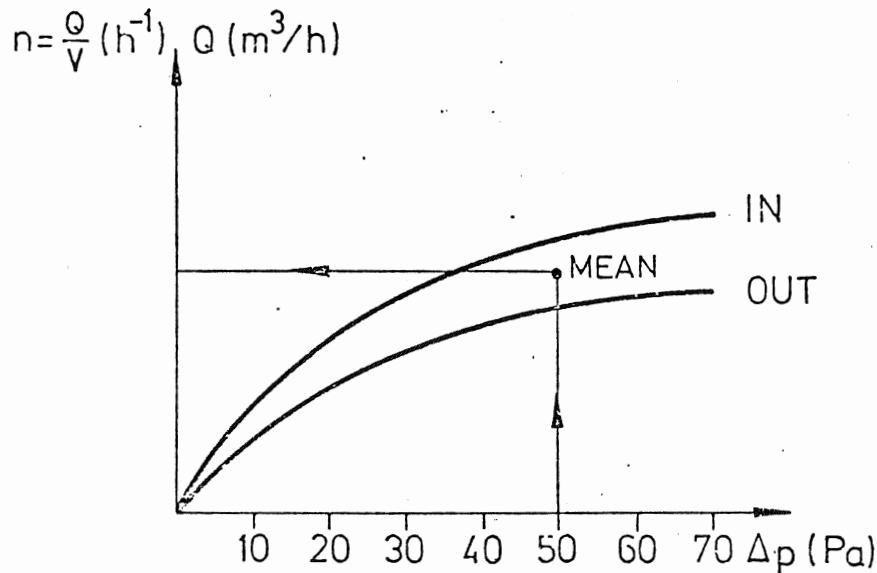


Fig 3. Air leakage characteristic of a house.

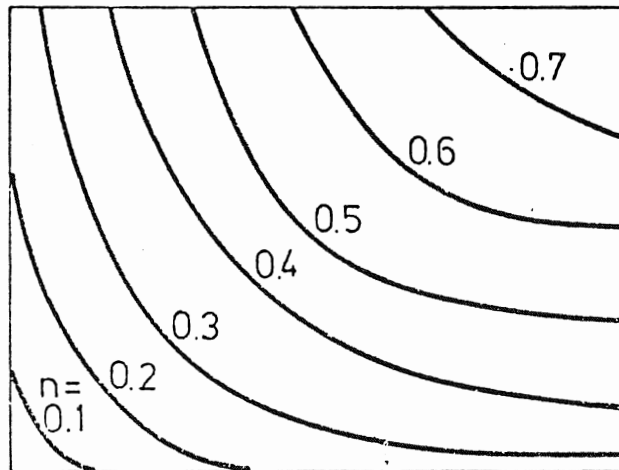
Say that the mean of the flow-values from the curves of super- and underpressure at 50 Pa is chosen to represent the air-tightness of the house. This single value can be compared with a value of the natural ventilation intensity under some specified outer conditions (temperature and wind speed) obtained by using a tracer-gas method. Thus it would be possible to calibrate the fan-method against the tracer-gas method. Subsequently the fan-method could replace the more sophisticated tracer-gas method especially for routine tests of air tightness of houses.

Meteorological data concerning wind and temperature could be put together to some kind of wind-temp number for different shapes of buildings and thus give information of the "pressure-climate" for any particularly situated and shaped building.

The "pressure-climate" and the air-tightness would give an estimation of the intensity of the natural ventilation of any house anywhere.

Inversely a certain demand of maximum natural ventilation intensity could for any place give an equivalent demand for air tightness according to the fan-method. See fig 4.

PRESSURE CLIMATE



AIR LEAKAGE
CHARACTERISTIC

Fig 4. Estimation of natural ventilation intensity.