

SCONUL Buildings Visit 2005

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Imagine you are pitching to your Vice-Chancellor for the new LRC you have been planning for the last xxx years. Imagine being able to tell her/him that

- The whole building will cost 5% less than the equivalent modern buildings elsewhere on campus
- That the annual running costs for heating and ventilation will be 45% less than the 1990s building next door.

The secret? Fresh air ventilation.

The Buildings Visit 2005 was a tale of two cities, Coventry and its castellated Lanchester Library followed by the Open University in Milton Keynes. Both libraries have at their heart fresh air ventilation. But why bother with this at all? What's wrong with conventional air conditioning?

SAVING THE PLANET

By 2080 if current CO² emissions continue at current rates, Birmingham and Manchester will have the climate currently enjoyed by Barcelona or Nice. It will be common for temperatures to peak at 32°C. That sounds nice until you realise the south of France will have the climate of north Africa. Those of us familiar with the London tube in the summer will realise how awful London is going to get in the summer. Indeed London is now a heat 'island' with temperatures around 6°C hotter than the suburbs. It is now impossible to build a fresh air ventilated building in central London which does not have a chilling system to cope with the hottest summer days. (Go see the School of Slavonic and Eastern European Studies as an example of how to get round this.)

Like building more roads to cope with traffic, installing air conditioning is not the solution as, the energy used to run air conditioning merely adds to the problem. I was surprised to learn that whilst some 30% of CO² is down to cars, 50% is created by buildings.

In addition, energy costs are increasing rapidly. Coventry faces an increase in gas prices of 65% in 2006. Electricity is going up 55%. So on the basis of 2006 prices, the Coventry library will be costing the university £120,000 less per year than an equivalent conventional building.

BASIC DESIGN PRINCIPLES

Fresh air ventilation is really a modern computer controlled reworking of hypocaust system the Romans used to heat floors. Modern fresh air ventilated buildings are sealed like air conditioned buildings and rely on controlling natural flows round the building. Coventry has 4m high ceilings making for a nice light filled environment and aiding air flow up from the basement, where you will be pleased to know we didn't find a casual student library shelver stoking the fires. At the top of the building the rather curious looking stacks (effectively chimneys) create draught to get the air up and out without air flowing the wrong way. (See picture used as a theme on the Coventry library web at <http://corporate.coventry.ac.uk/cms/jsp/polopoly.jsp?d=208>) The roof also has 200 mm of insulation to keep the heat in or out.

In the summer, at night cold air is allowed to flow through the building reducing temperatures and cooling down the concrete floors to act as cold stores during the warmer day. Air flows are controlled by flaps at floor level to let in cold air and at ceiling level to release hot air. Each room has sensors monitoring temperature and CO² levels, so as the speeches went on and hot air filled the room, flaps opened and cool air came in. It's actually quite impressive to see and feel and much nicer than the whirring fans of air conditioning. And it costs only 50% of a conventional air conditioning system. Or put this another way, over the 40 year life of the Coventry building, the university will save £6.4M on running costs.

COVENTRY VISIT – RADICAL DESIGN

The first day of the two day tour at Coventry was part library information and part high level physics and fluid mechanics, hence the details above. The importance of this was that the group got a very detailed understanding of how fresh air ventilation works and why it is so important. Amongst the more conventional library design issues noted during the visit were:

- Toilets located in spurs off the main building, so any flood will not come down into any book stock area.
- Plenty of circulating space and group work space but also 10% silent study. This was seen as essential by students but is in reality little used.
- Flexible floors to the same pattern to aid orientation. We did note that the staffing of the subject floors is becoming harder as the numbers of staff needed are costly.
- Furniture is modular and there are no fixed benches.
- Lighting is diagonal to allow shelves to be arranged irrespective of the lighting grid. Of course the high ceilings help too. The photo shows this and also the windows into the internal light and ventilation wells.

Coventry University LRC

The building has been a major success. Use is up and the library is seen as the best building on campus, useful as it is not centrally located. It gets high ratings in user surveys and the awards won by the design have been very politically useful too.

OPEN UNIVERSITY VISIT - PARTNERING

The OU library is also fresh air ventilated, but with much more conventional raised floors and lower ceilings. Indeed, from the outside, the building is a much more conventional box. The layout is designed to take air through a raised floor and out via the central atrium. Design details to help included putting offices (which are a source of heat due to computers) on the north side and stock, which doesn't generate heat to the south. Each storey has a high ceiling with no suspended ceilings to impede air flow.

Open University LRC atrium

What made their build interesting was the partnering approach to the management of the project. What this means is that instead of going to separate architects, builders, surveyors and others, the university asked for bids from consortia to design and build the whole project. This method saves money as the consortia bid to do the job for a fixed sum of money. It also saves money on the costs of contracts between the different companies involved, for example, cutting down on the numbers of letters between the consortium members by 50%. As each letter costs £100, that's £500,000 off the project costs.

However, key to this is getting all the parties together as a team. So the cost savings were offset by spending on regular team building events led by a client adviser who acts as a mediator and mentor throughout the project. This cost an additional £120,000. The payback is in much better communication and mutual understanding leading to fewer delays and errors due to misunderstandings. For example, gaining a common understanding between the parties as to exactly what was meant by 'floor loading' allowed redesigns which saved £650,000. And the project came in on time and on budget in an industry where 80% of buildings are late and most costs overrun by 5%.

Open University LRC chairs

Some of the other features we noticed included:

- The use of coloured carpet to zone the building
- Brightly coloured furniture, such as these chairs
- Art pieces round the building (1% of the costs)
- Movable library stacks, to allow space to be cleared for events.

As with Coventry, good design has lead to increased use, up 120%. Indeed the Vice-Chancellor is so pleased she is a regular user.

Thanks are due to the staff at Coventry University and Open University, the Working Group on Space Planning, SCONUL Secretariat and all the professional experts for a very interesting and informative two-day event.