SUSTAINABILITY FORUM – RECORD OF DEBATE

Topic	**This forum believes that schools and university buildings should be naturally ventilated**
Date	**22 October 2003**
	

Attendees

Chair: Roderic Bunn – BSRIA

Alastair Blyth – Blyth Consulting
Alinda Barua – Rivington Street Studio
Andrew Smith – DLE
Bob Ghosh – Kinetic AIU
Dave Worthington – Trans4m
David Johnson – MACE
David Tasker – Symonds
David Tucker – Rivington Street Studio
Dorte Jorgensen – Capita
Heinz Richardson – Jestico & Whiles
Ian Goodfellow – Penoyre and Prasad Architects
Iiona Hadhfhanaf – Todd Architects
Paul Murphy – Alan Consibee Associates
Jill Facer – Chassay and Last
John Marsh – MEB Partnership
John Palmer – Faber Maunsell
Jude Harris – Jestico & Whiles
Lei Zhou – UMIST
Malcolm Last – Chassay and Last
Malcolm Potter – DLC
Mark Hewitt – ICAX
Peter Chlapowski – PCKO
Peter Oates – Symonds
Richard Brearley – John Miller & Partners
Robert Webb – XCO2
Tim Attwood – Alan Conisbee Associates
Tim Beaven – Alan Consibee Associates
Tony O'Dowd – CSSD
Wendy Mason – Rivington Street Studio
William Potter
Kevin Burke – Pierse Contracting
Mike O'Rourke – Pierse Contracting
Jasmin Haesen – Turner & Townsend
Adrian Jackson – Robbins
Martin Brett – Austin: Smith Lord
Martyn Newton – University of East Anglia
Mike Groves – Menerga
John Thornberry – Ruddle
Wilkinson Architects
Wayne Aston – Passivent

And from Fulcrum:

Allan Homewood
Andy Ford
Ashley Bateson
Bill Ireland
Brian Mark
Brian Mark
Chris Buckley
Clare Wildfire
Dave Glanville
Gwen Mark
Henrietta Lynch
James Hepburn
Joe Pykett
Josie Winch
Kate Crawford
Martin Cooke
Natasha Eyre
Peter Mark
Peter Nissen
Richard Shennan
Susie Woollett
Victoria Caesar

The vote

Before the debate, an initial show of hands indicated that there were 33 persons in favour of the motion 'that schools and university buildings should be naturally ventilated' and 13 against the motion. The debate swung the final vote to a majority of 30 to 16 in favour of mechanical ventilation. The arguments put forward in the debate showed that mechanical ventilation is necessary in order to ensure delivery of the correct quantity and quality of air for pupils to perform well. If there had been a third option of a 'hybrid system', there may have been unanimous agreement for this.

The case for 'Schools and university buildings should be naturally ventilated'.

Speakers: John Thornberry (the architects perspective), Brian Mark (the consultants view), Wayne Aston (the technical/ commissioning perspective).

- Natural ventilation is not just about single or double sided opening windows but a wide range of techniques involving thermal mass, using the building elements as giant ducts (atria, basements etc), earth tubes, thermal labyrinths and the use of low and high level controlled openings.
- An understanding of the natural environment, both local and historical is essential for good ventilation design. Let the natural elements do the work- wind and the fact that hot air rises.
- Whereas it is true that the architecture has to accommodate the movement of air through the building, it is not true that the architecture is limited by the requirements for natural ventilation. A wide range of solutions can be used to ensure that all aspects of building requirements can be fully achieved.
- A low-tech approach is essential for ease of use. Reliance on teachers to fiddle with controls is not feasible.
- Natural ventilation is more robust. Failure in maintenance of a mechanical system, so often the case in practice, leads to total breakdown of ventilation.
- Its not just about ventilation, acoustics considerations are also important. Less noise is generated with natural ventilation.
- A direct connection with the external environment is achieved with natural ventilation
- In practice, clients can't afford the space for mechanical plant and controls.
- Consider whole life costing. Providing natural ventilation ducts or a basement plenum can have a dual function that can displace capital costs.
- In the difficult hot months, schools are not occupied so the extreme situations where natural ventilation may not perform well do not need to be considered.
- Contrary to popular perception, the products required for high quality natural ventilation, e.g. wall filters, actuators for dampers etc. are in fact readily available and proven technologies.
- The problems associated with natural ventilation can be overcome with good holistic design and user education. Recovery of heat loss is diminished as a problem if heat is supplied cheaply. (aquifer/ ground energy storage, passive annual heat storage etc). Heating is not a driving issue. Building users and IT equipment produce heat. It is the use of electrical energy that is the issue and that is what is consumed in mechanical systems.
- External air pollutants can be deposited or 'stuck' with ionisers & electrostatic agglomeration filters.
- Draughts are diminished with improved dispersion of air via attenuated air intake at low level and exhaust openings at high level.
- Indoor air quality, to comply with the 'Education Act' can be improved through limiting unhealthy pollutants in the building fabric and developing a method of measuring dilution with fresh air (CO_2 monitors).
- Security risks and carriage of 'noise' (BB93) through openings can be overcome with good, careful design.

The case against 'Schools and university buildings should be naturally ventilated, not mechanically ventilated'.

Speakers: Martyn Newton (the clients perspective), Andy Ford (the consultants view), Mike Groves (the technical/ commissioning perspective).

- Mechanical systems are perceived as large unwieldy, high maintenance plant. This is far from the present reality. Modern mechanical equipment is designed to be easily maintained, compact and quiet in operation.
- The architecture is not constrained by locality. All is possible leading to more interesting buildings. Natural ventilation dominates the architecture.
- The intake of outside air is fully controlled and monitored. Easily adjusted for occupant levels and seasonal variations. The building can be comfortably used 24 hours a day, throughout the year.
- Clean, fresh, correctly humidified, filtered air can be guaranteed to be delivered at the required temperature, when and where its needed at the rate it is needed. Entirely compliant with the 'Education Act'.
- Urban areas are dirty. Filters between outside and inside air are essential.
- Natural ventilation wastes heat.
- Naturally ventilated buildings rely on windows which conflict with pupil comfort when cold and create a security risk during night-time purging when hot.
- Natural ventilation openings, however well designed, are open to abuse.
- Natural ventilation buildings become dirty and mould growth is an issue.
- Advanced naturally ventilated buildings do need maintenance. Actuators, controlling openings, are dispersed throughout the building and can be difficult to access.
- With sealed buildings and increased IT use in the classroom, cooling and humidity are the design drivers. This can only be effectively achieved with mechanical ventilation.
- In the exemplar mechanically ventilated Termodeck building, Elizabeth Fry at the University of East Anglia, occupant satisfaction to the level of traditional air conditioned buildings was achieved for an energy usage of 26 kW/m2/annum. The centrally controlled design ensures that maintenance is simple and all kit is easily accessible. Heat recovery is so efficient (90%) that heating is rarely required. Only electrical power is required for the ventilation system.

Interesting questions & points of discussion from the audience:

There is a need to understand which system is the most efficient when making a construction cost plan. A lot of figures were thrown around but comparisons are almost impossible since the end products are not comparable in terms of comfort levels.

Is it true that British teachers are incapable of intelligent interface with simple controls? They manage it in Norway. A case for education maybe?

A question on whether natural ventilation could cope with heat produced from IT equipment, sparked Andy Ford into ideas of using that heat to drive a natural ventilation effect. Who knows what hybrid systems may develop in the future? Combining mechanical and natural forces is a way forward. The trick is to understand the way that air moves around buildings, letting nature work where it can and not getting 'hung-up' about the use of fans and filters.

The debate was brought to a close with the realisation that for the rapid purging of 'anthropomorphic methagenic emissions' there was nothing quite like opening a window!

Any more views /ideas?

The debating forum remains open …….