



Australia's First Active Chilled Beam Project



Project Name:	Pier 8&9 Walsh Bay, Sydney, NSW
Date Completed:	August, 2002
Building Size:	12,000 m ²
Designed By:	Adamus Consulting
Installed By:	J L Williams (NSW)
System Used:	ACB10 Active Chilled Beams
Number of Units:	177
<u>Design Criteria:</u>	
Room Temperature:	22.5°C / 50%RH
Installed Sensible Capacity:	335 kW
Primary Air Temperature:	13.5°C
Secondary Water Temperature:	12.4°C
Maximum Available Air:	12,483 L/s Total

Refurbishment,

sustainability

+ efficiency



View of Active Chilled Beam installed between ceiling joists

Pier 8 & 9 Walsh Bay project involved refurbishing a derelict 3 level 1912 wool store heritage wharf into a modern 5 level A-Grade commercial office space for Murdoch Magazines.

The design target was not achievable with conventional HVAC designs due to low floor to floor heights and restrictions on available space for ductwork, services and plantrooms.

Solution must deliver best practice air quantities and cooling capacity for occupancies of up to 400 people using non-traditional means and on-floor terminals capable of being installed between existing floor beams in keeping with the industrial character of the building.

Active Chilled Beam

Perimeter system

Inffuser cold air solution



Active Chilled Beam
Perimeter system
Infuser cold air solution

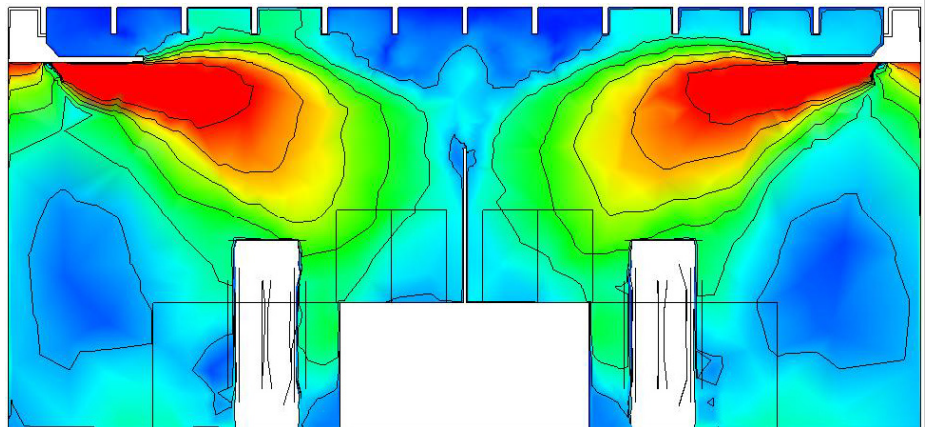
The Challenges

- Heritage building with no existing HVAC system or infrastructure
- Extreme limitations on available ductwork space and locations between existing joists
- Terminal devices must fit between existing floor joists/beams
- Sufficient reduction in supply air temperature to solve capacity problems with conventional all-air systems would result in air diffusion and comfort problems
- Ideal primary air quantity limited to 12,500 litres/second maximum
- Latent loads must be satisfied with minimum amount of primary air

The Solution

- Develop custom Active Chilled Beams with side supply air discharge and 'Coanda' wings to promote air distribution
- Custom Active Chilled Beams with minimal primary air and high sensible capacity
- Minimise primary air requirements by utilising 'Induction' principles to increase on floor sensible capacity through localised entrainment of secondary air.
- CFD analysis used to model performance prior to final design and manufacture

Image at right shows air velocity profiles achieved between two Active Chilled Beams with 'Coanda' wings under design conditions



- Install 177 custom designed Active Chilled Beams throughout the building
- Design Primary Air temperature of 12.4°C to achieve sensible cooling capacity target and satisfy latent loads for minimal primary air

The Benefits

- ✓ Design concept proven with CFD analysis prior to manufacture of Active Chilled Beams
- ✓ Achieved conventional air distribution rates of >5.0 L/s/m² throughout the building
- ✓ Satisfied heritage considerations
- ✓ Delivered 335 kW of cooling capacity for 12,483 L/s of primary air
- ✓ Delivered 182 kW of secondary sensible cooling for **NO ADDITIONAL FAN POWER** through the induction process of the Active Chilled Beams
- ✓ Delivered finished Active Chilled Beams for installation within 8 weeks of finalising design