

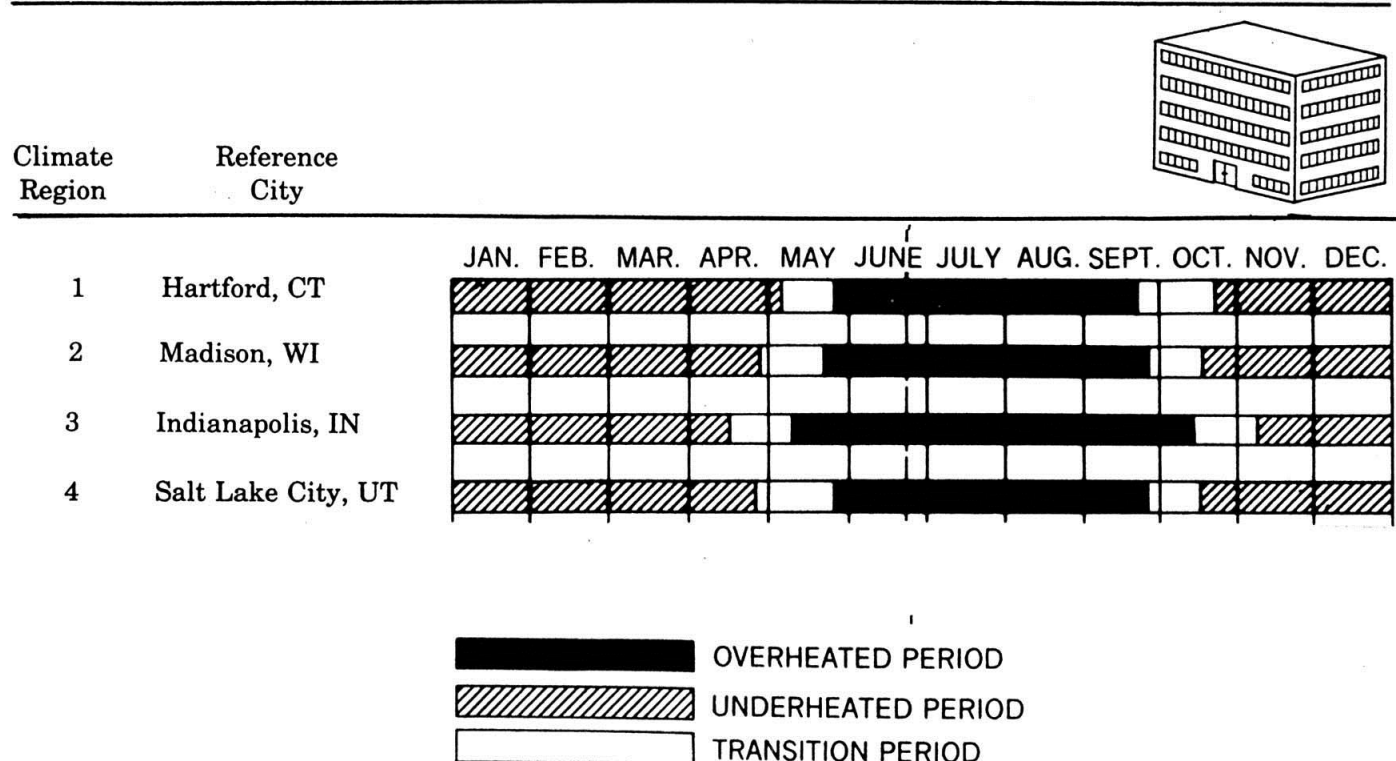
تنظیم شرایط محیطی

نمونه هایی از معماری همسو با محیط
جلسه 10

Internally Dominated Buildings

Heating/Cooling periods

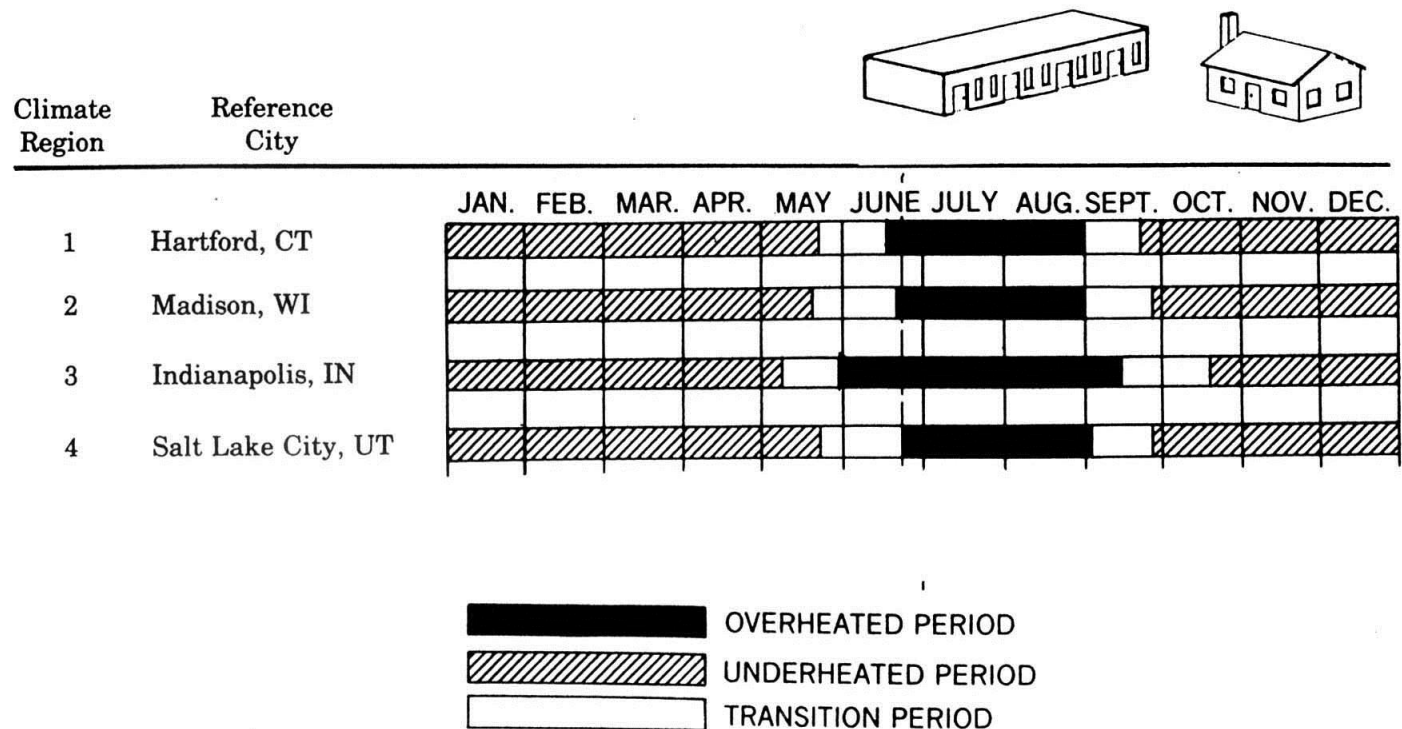
Overheated and Underheated Periods for Internally Dominated Buildings^{a,b,c}



Envelope Dominated Buildings

Heating/Cooling periods

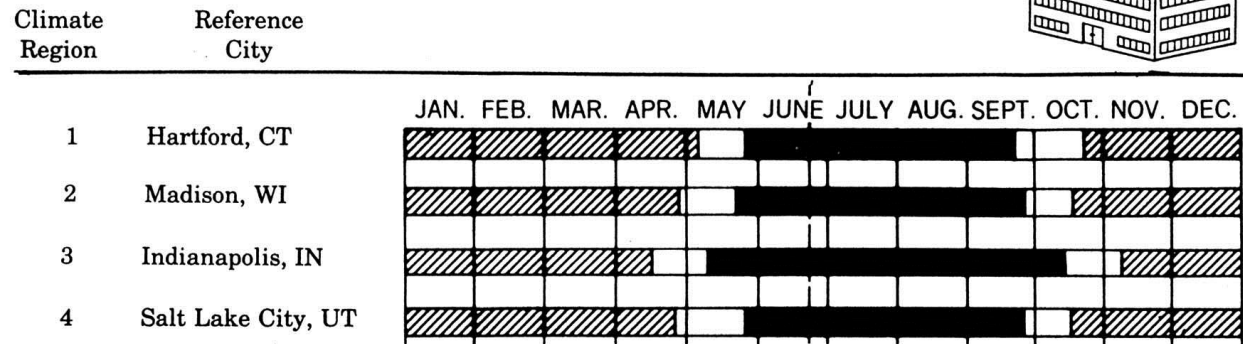
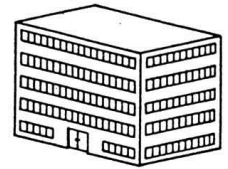
Overheated and Underheated Periods for Envelope-Dominated Buildings^{a,b,c}



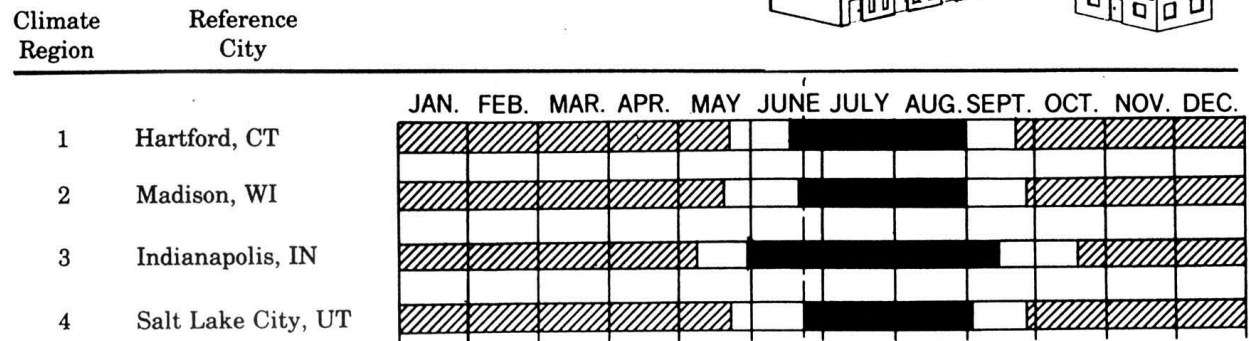
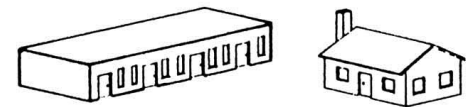
Heating and Cooling Cycles

Comparison of heating and cooling cycles

Overheated and Underheated Periods for Internally Dominated Buildings^{a,b,c}



Overheated and Underheated Periods for Envelope-Dominated Buildings^{a,b,c}



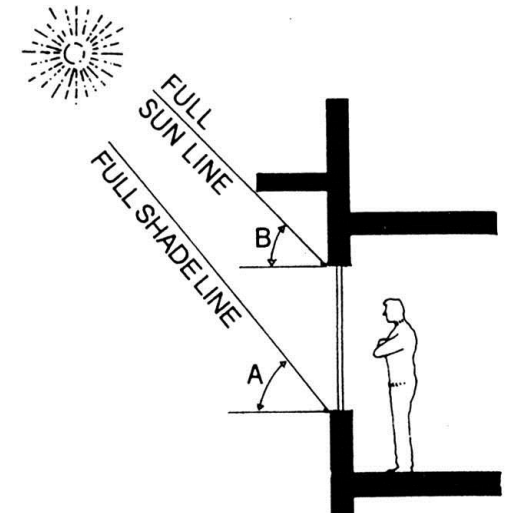
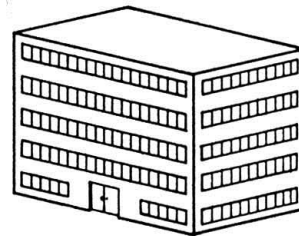
Passive Thermal Control

- Sun Control
- Wind Control
- Evaporative Cooling
- Earth Cooling
- Radiant Cooling
- Dehumidification

Sun Control

South Façade Overhangs

Sizing South Overhangs on Internally Dominated Buildings^{a,b,c}

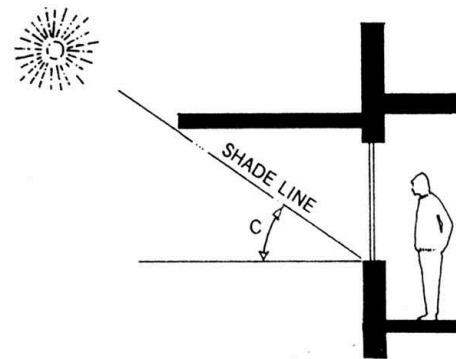


Climate Region	Reference City	Angle "A" (Full Shade)	Angle "B" (Full Sun)
1	Hartford, CT	59	54
2	Madison, WI	58	47
3	Indianapolis, IN	53	47
4	Salt Lake City, UT	60	49

Sun Control

East/West Façade Overhangs

Sizing East and West Horizontal Overhangs^{a,b}



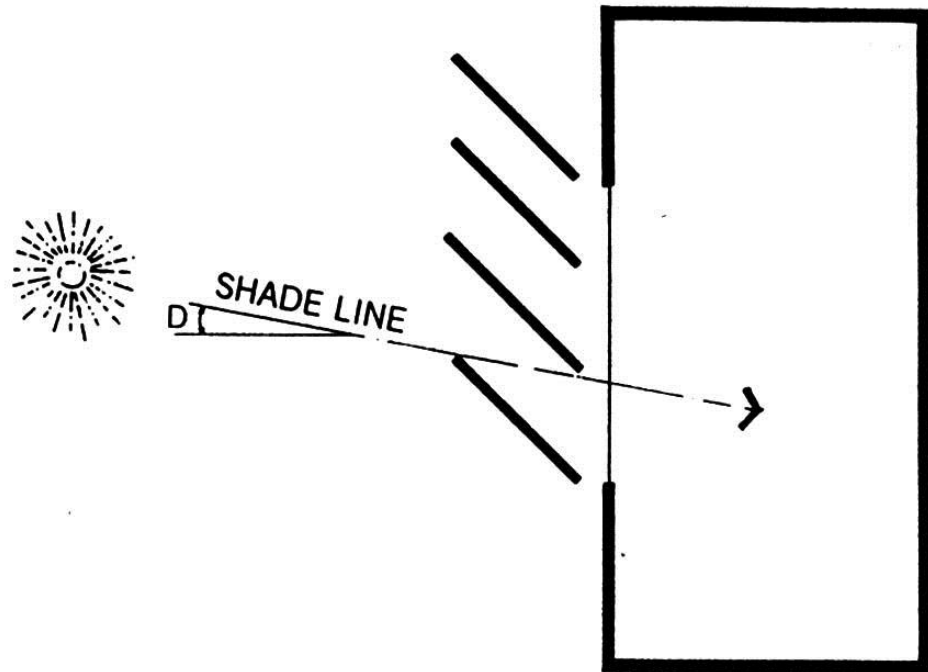
Climate Region	Reference City	Angle "C"	
		Internally Dominated	Envelope Dominated
1	Hartford, CT	30	34
2	Madison, WI	30	34
3	Indianapolis, IN	25	32
4	Salt Lake City, UT	30	33

Sun Control

East/West Façade Vertical Fins

Shade Line Angle for Slanted
Vertical Fins^a

Latitude	Angle "D"
24	18
28	15
32	12
36	10
40	9
44	8
48	7

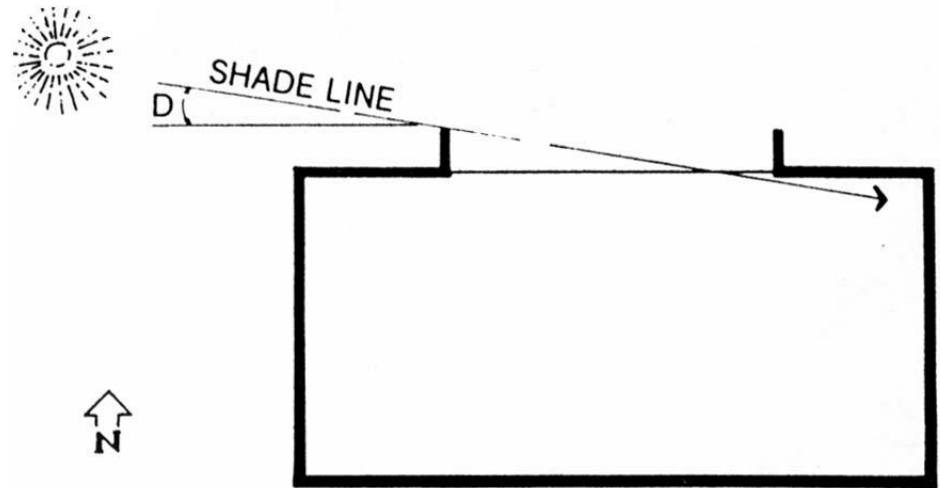


Sun Control

North Façade Vertical Fins

Shade Line Angle for Slanted Vertical Fins^a

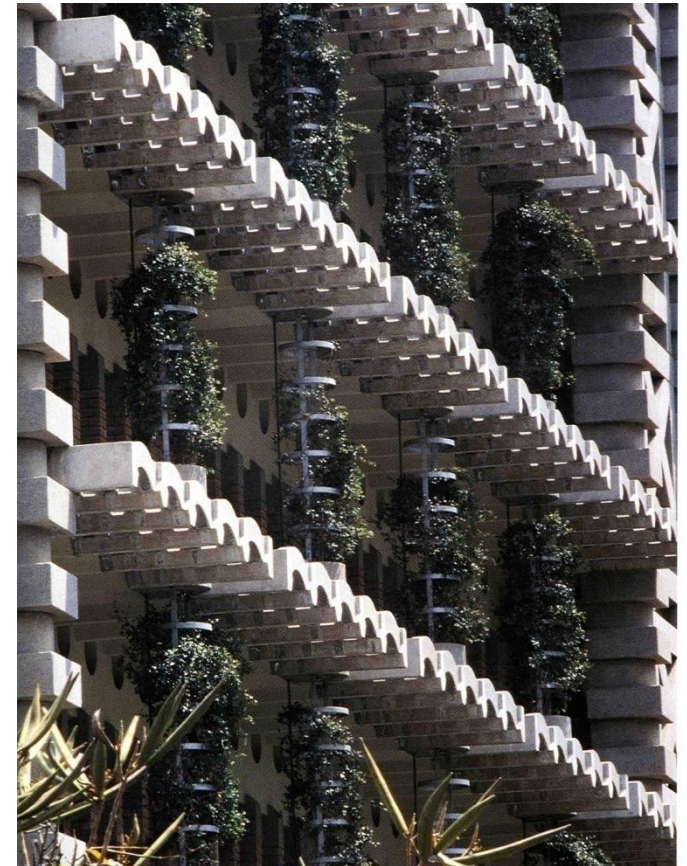
Latitude	Angle "D"
24	18
28	15
32	12
36	10
40	9
44	8
48	7



Sun Control

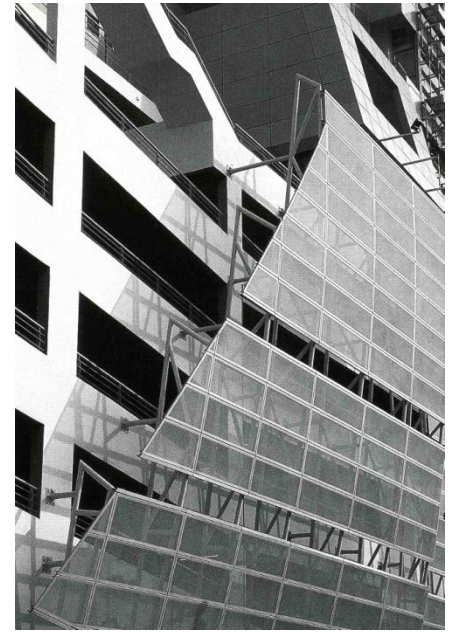
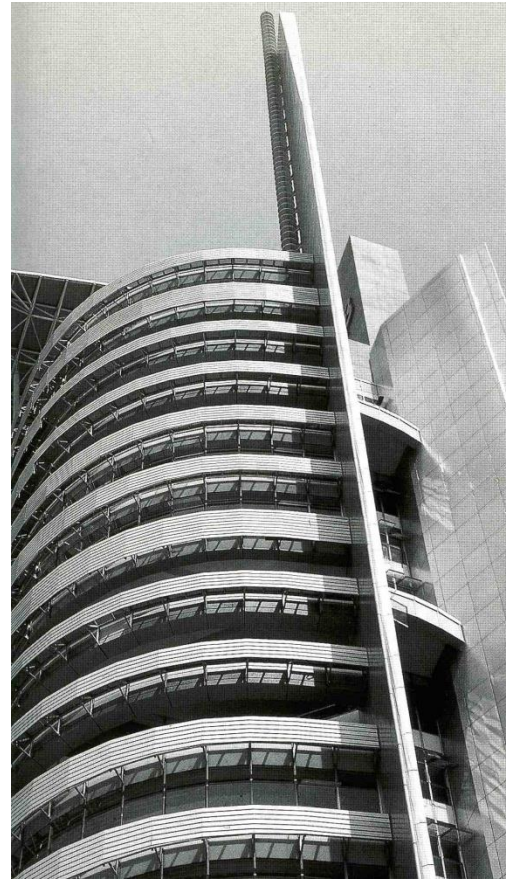


Lycee Polyvalent; Frejus France, Norman Foster, 1993



Eastgate; Harare, Zimbabwe, Pierce Partnership, 1996

Sun Control

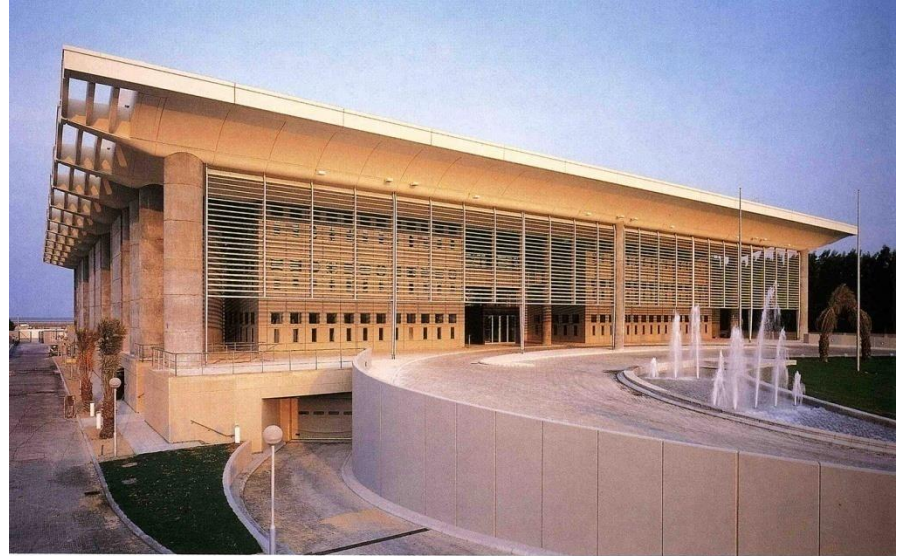


**Sun Control
Details**

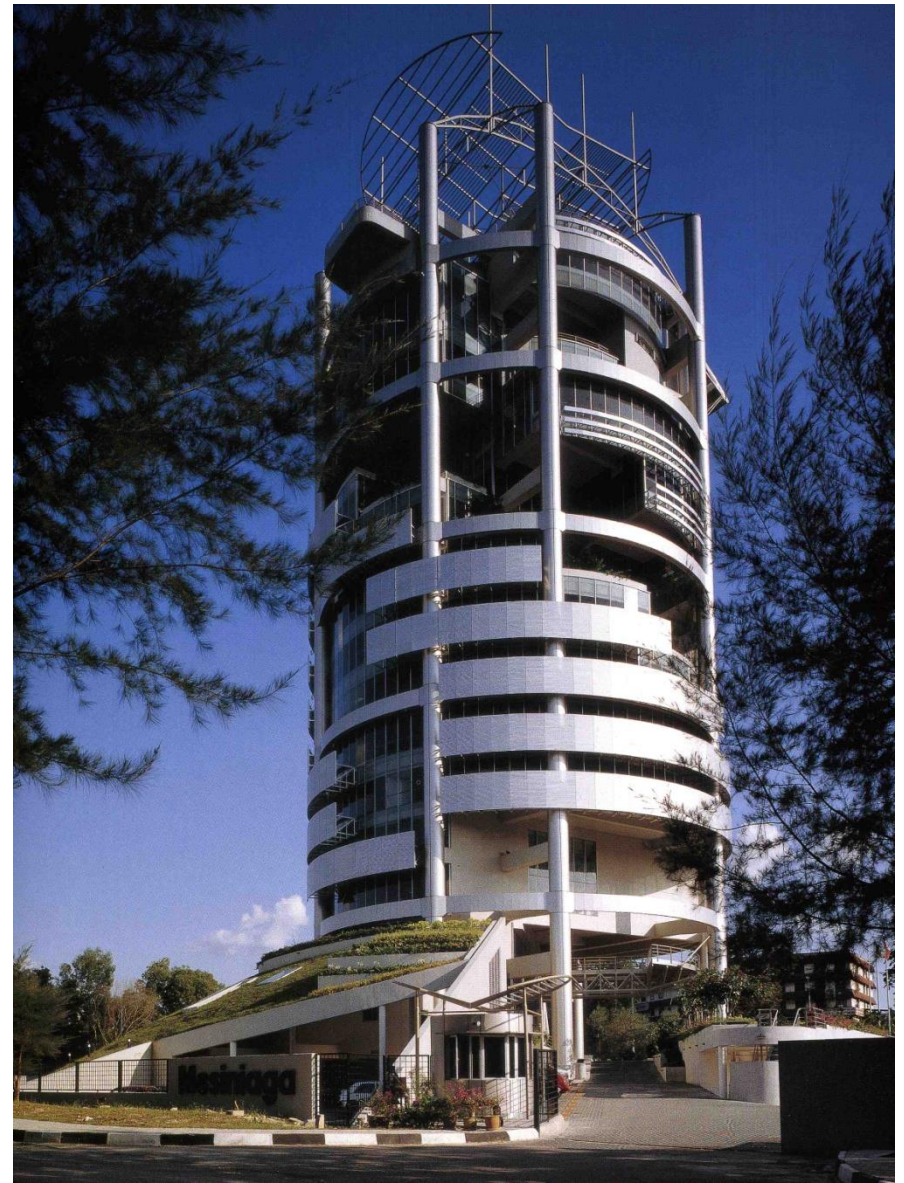
**Menara UMNO; Penang,
Ken Yeang, 1998**

Sun Control

**Offices for Apicorp;
Al Khobar, Saudi
Arabia, DEGW, 2000**

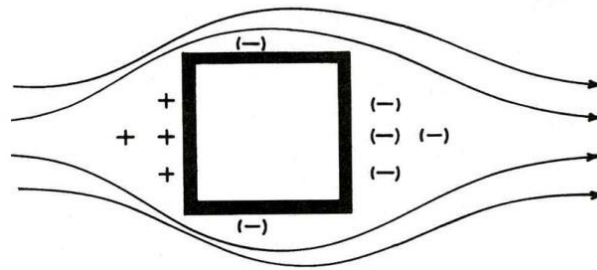


Sun Control

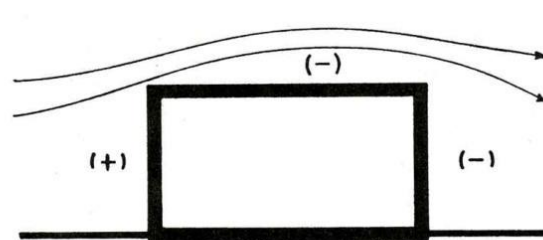
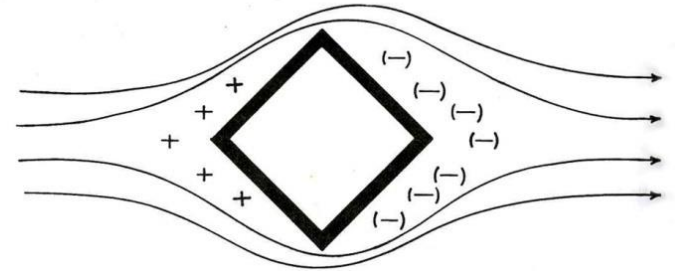


**Menara Mesieniaga; Subang Jaya,
Malaysia, Ken Yeang, 1992**

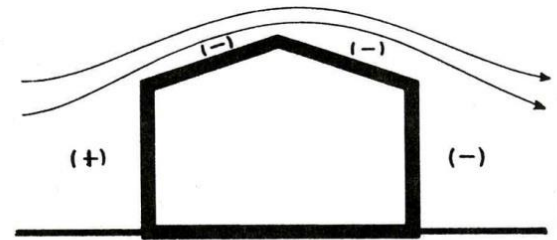
Wind Control- Exterior



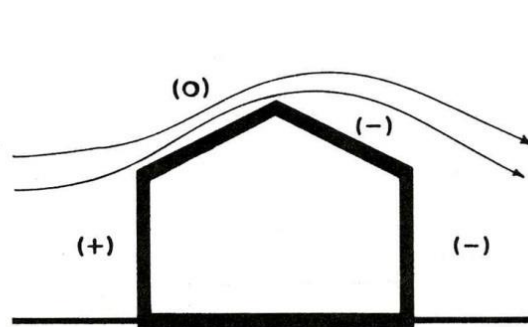
PLAN



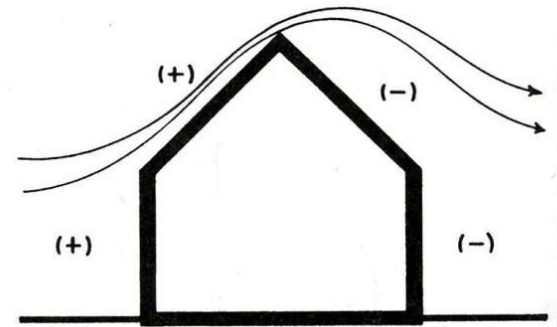
FLAT ROOF



1:4 SLOPE



1:2 SLOPE

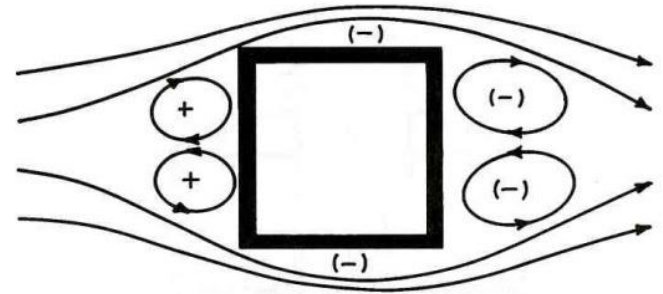
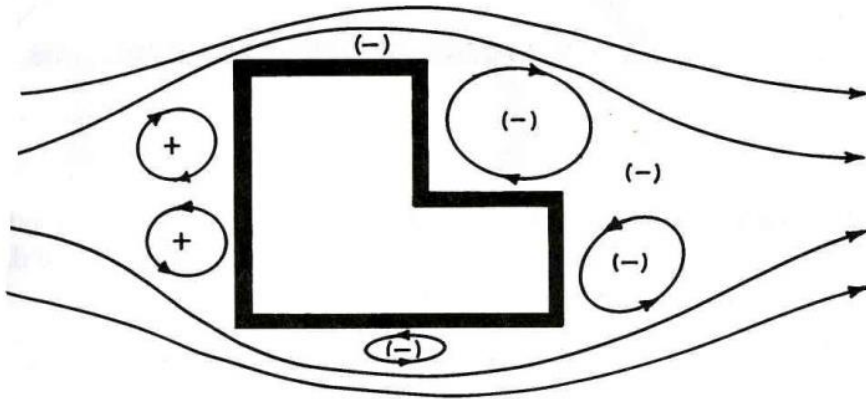


1:1 SLOPE

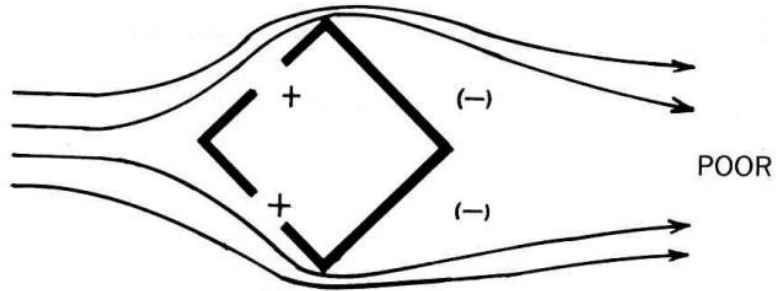
SECTION

Wind Control-Exterior

جابه جایی هوا از طریق خاصیت گردباد



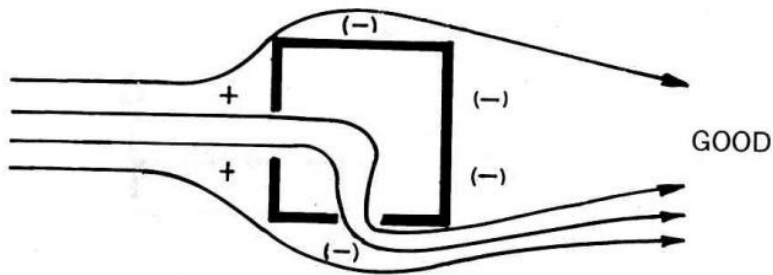
Wind Control-Interior



○ تهویه عرضی

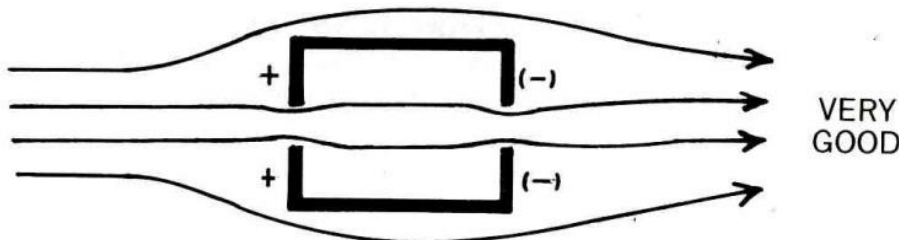
○ جهت باد

○ پیوستگی مسیر وزش

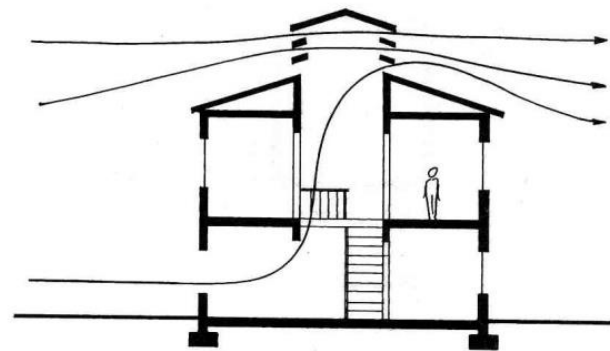
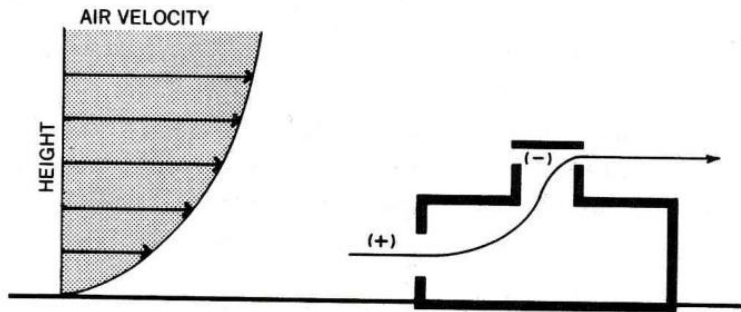
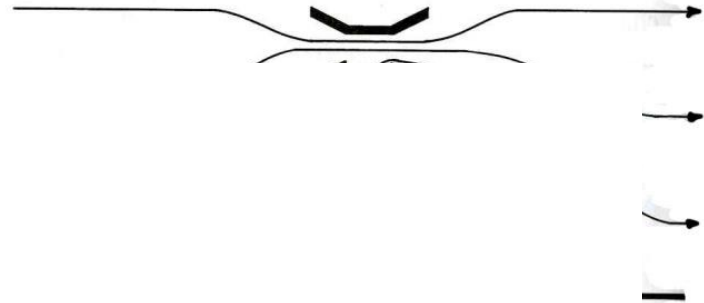
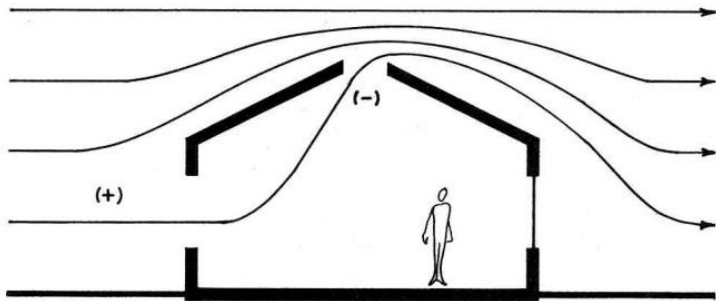


○ شکل بدنه

○ اثر ونتوری (افزایش
سرعت حرکت سیال با با
کاهش قطر مسیر).

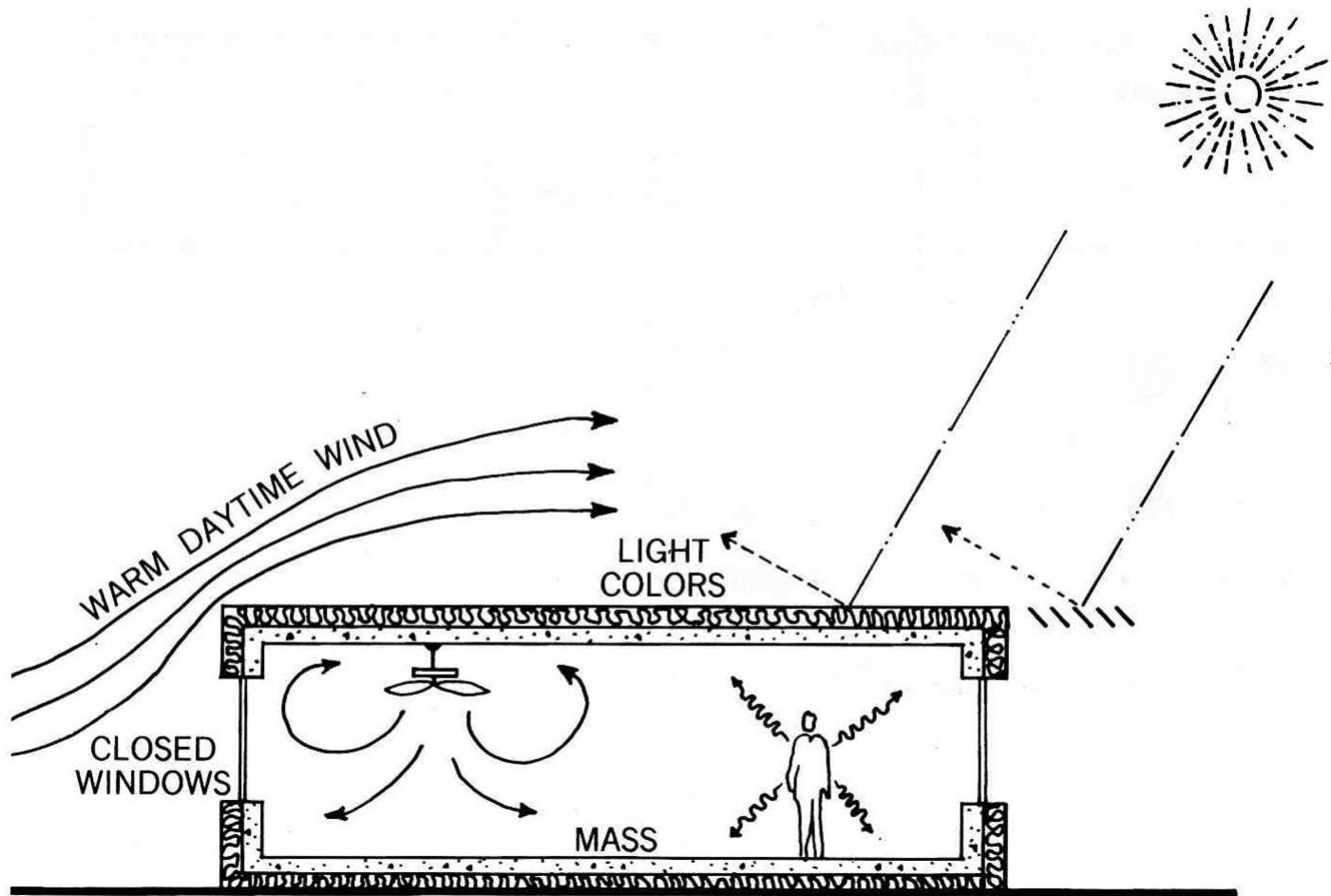


Wind Control-Interior



SECTIONS

Wind Control-Interior



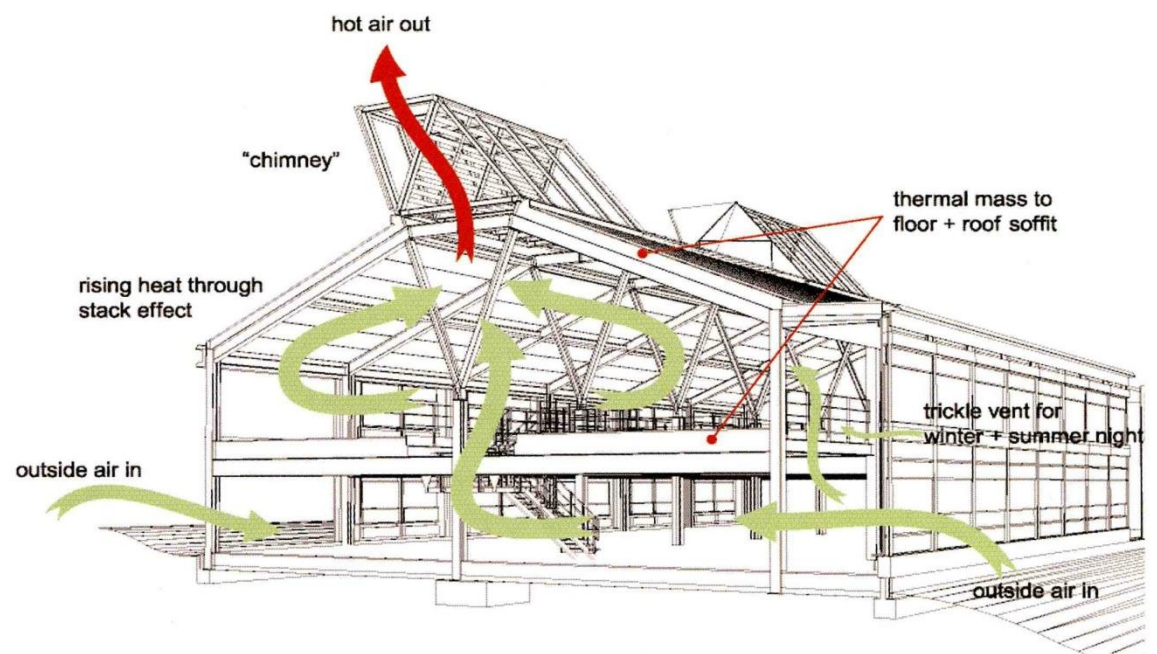
daytime mode

Wind Control

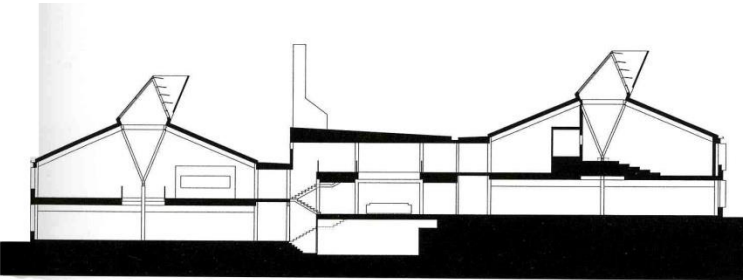
**ARUP Campus; Solihull, UK,
ARUP Associates, 2001**



Wind Control

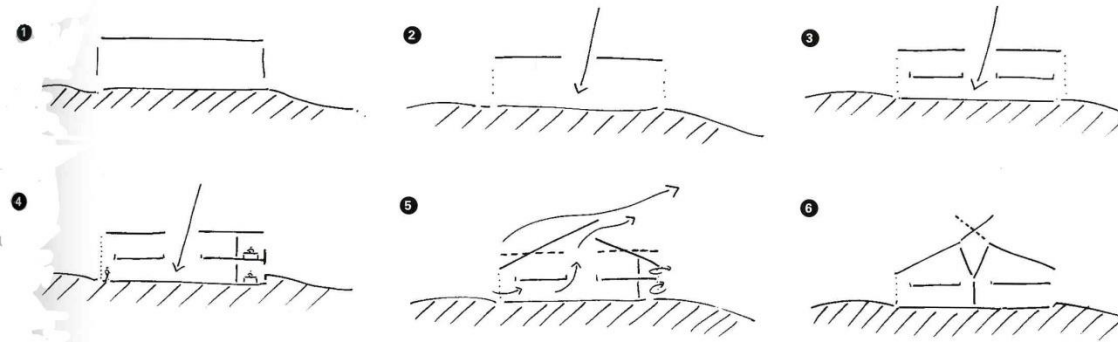


↑
Stack-assigned
natural ventilation.



←
Section through
auditorium and office
floor.

**ARUP Campus; Solihull, UK,
ARUP Associates, 2001**

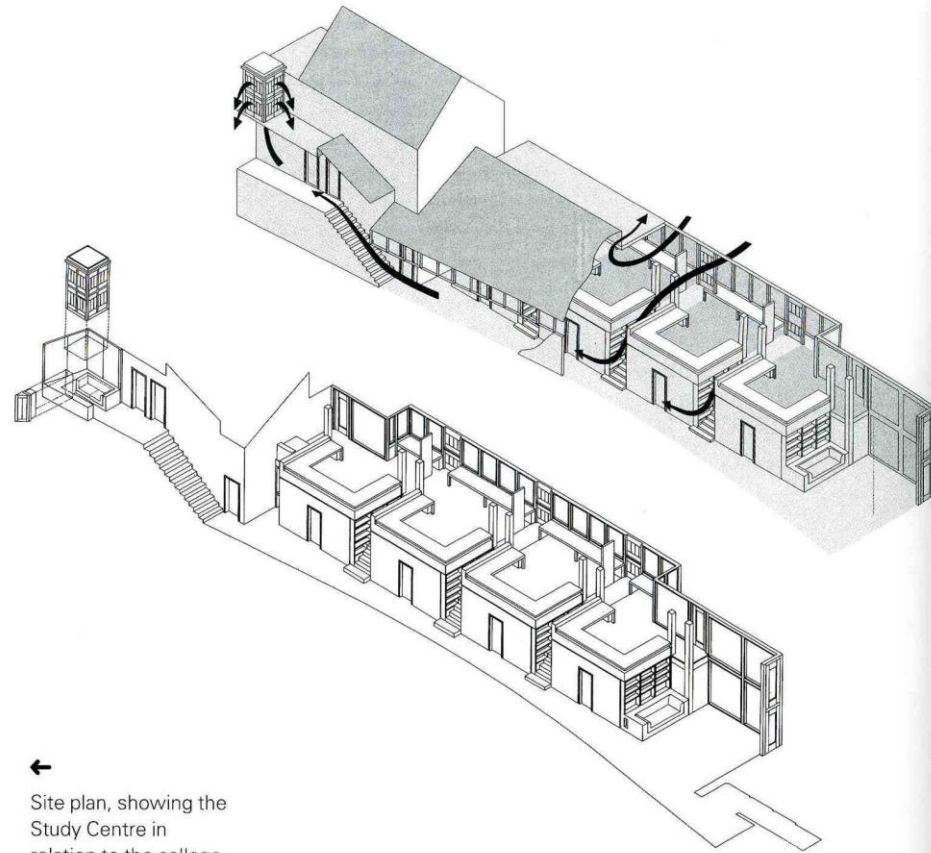
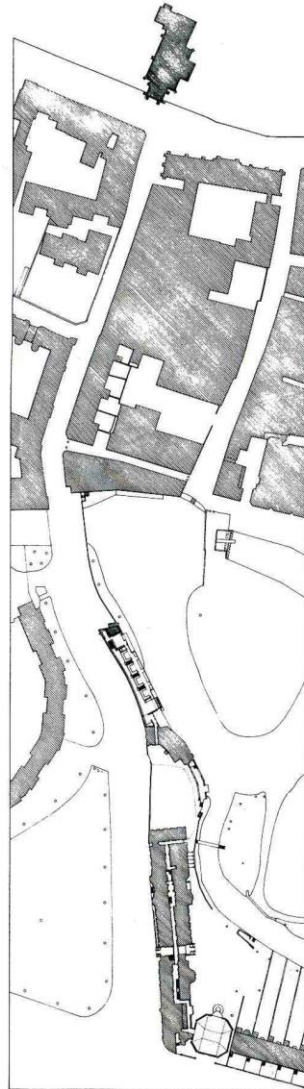


Wind Control



**Study Center Darwin College; Cambridge, UK,
Jeremy Dixon and Edward Jones, 1994**

Wind Control



Site plan, showing the Study Centre in relation to the college, the River Cam and the historic fabric of Cambridge.



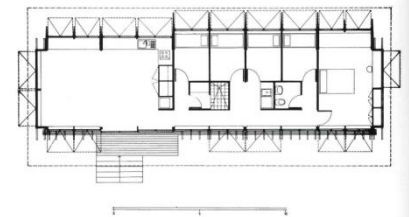
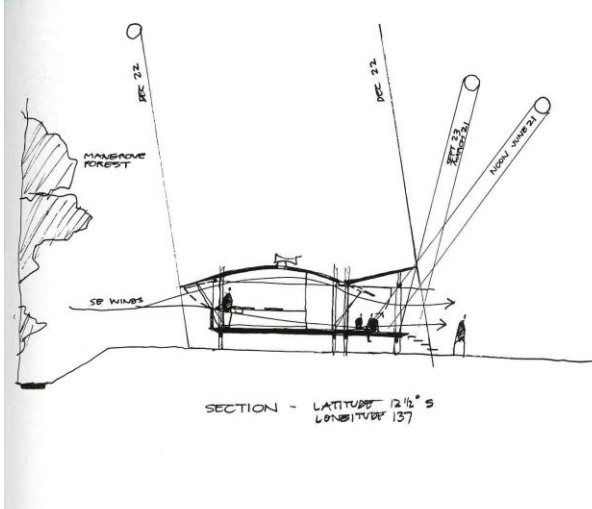
The exploded axonometric shows the disposition of the principal spaces of the

building and the primary flows of the natural ventilation system.

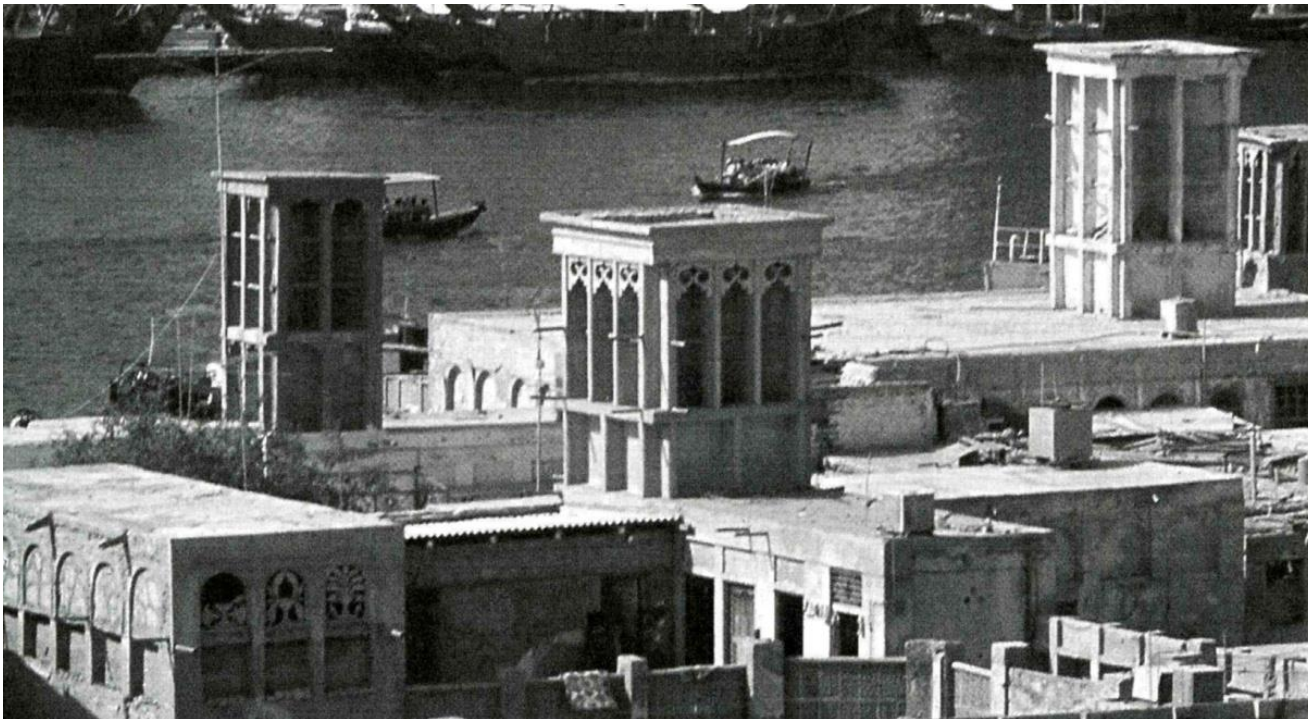
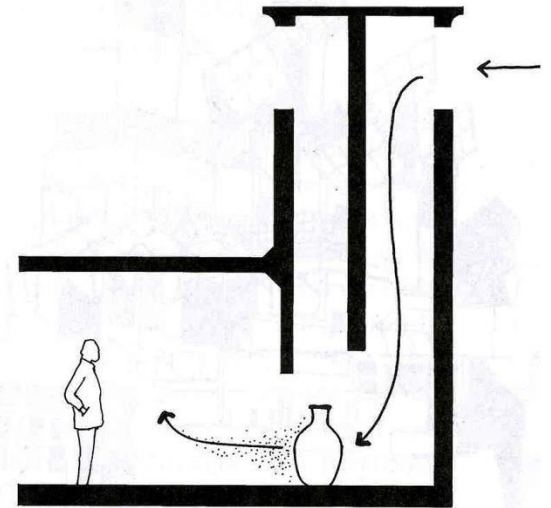
**Study Center Darwin College; Cambridge, UK,
Jeremy Dixon and Edward Jones, 1994**

Sun & Wind Control

**Marika Alderton House;
Arnhem Land, Australia, Glenn
Mercutt, 1994**

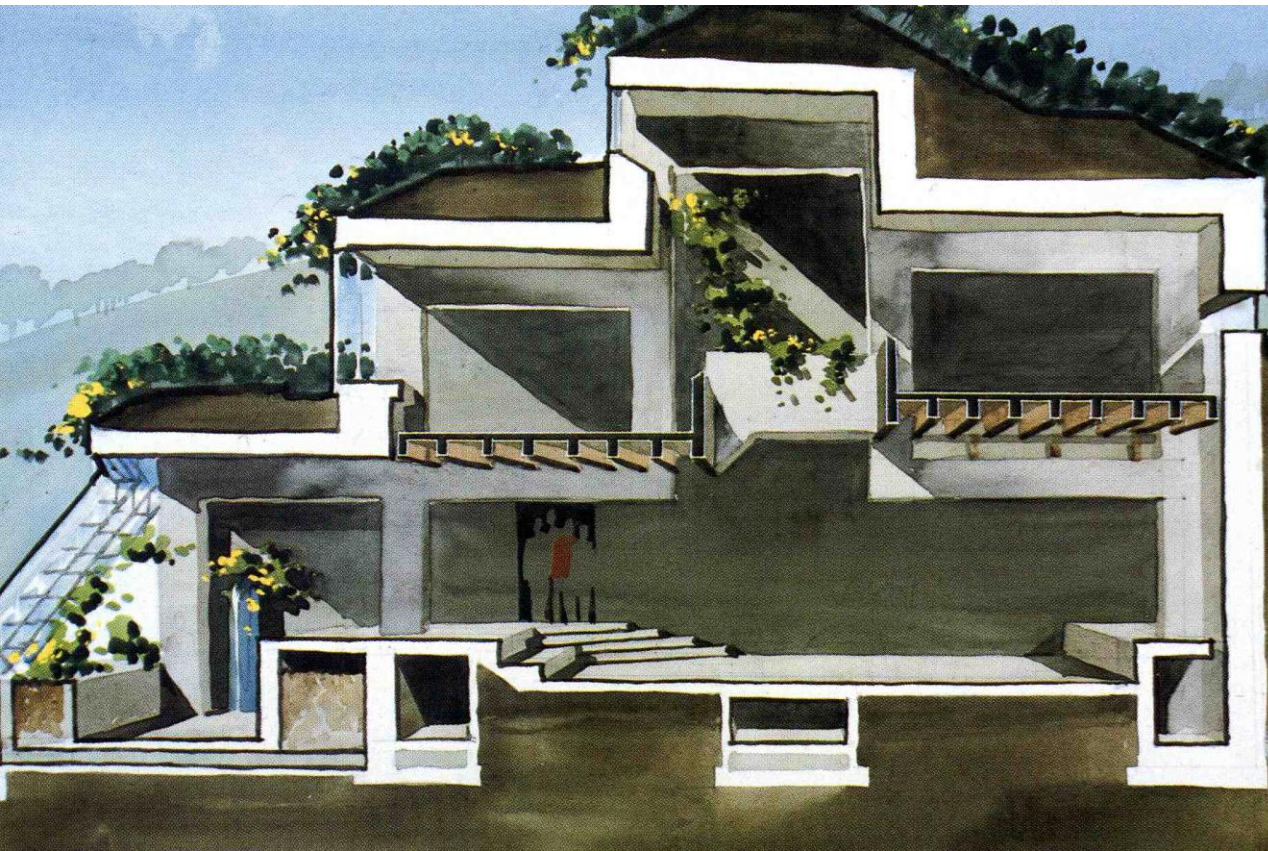
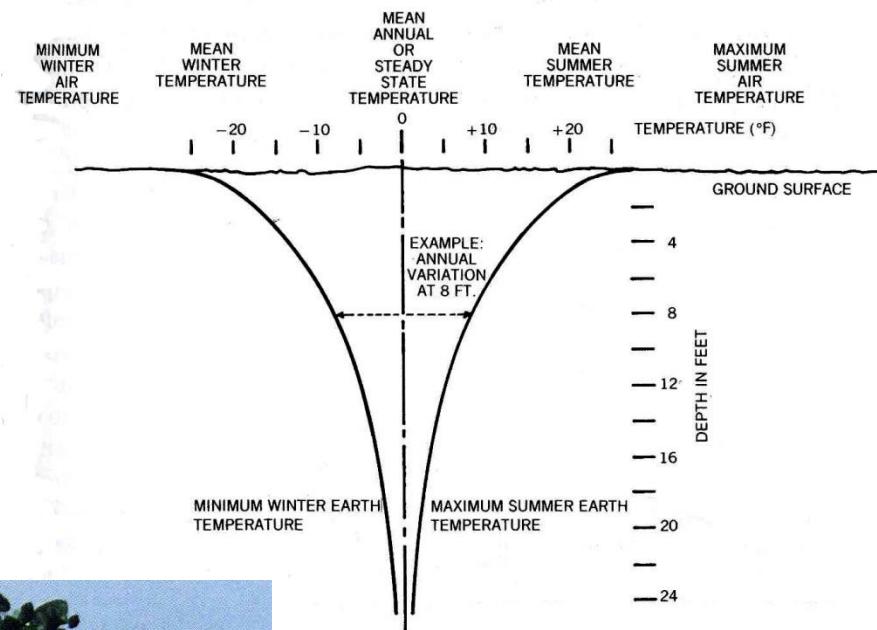


Evaporative Cooling

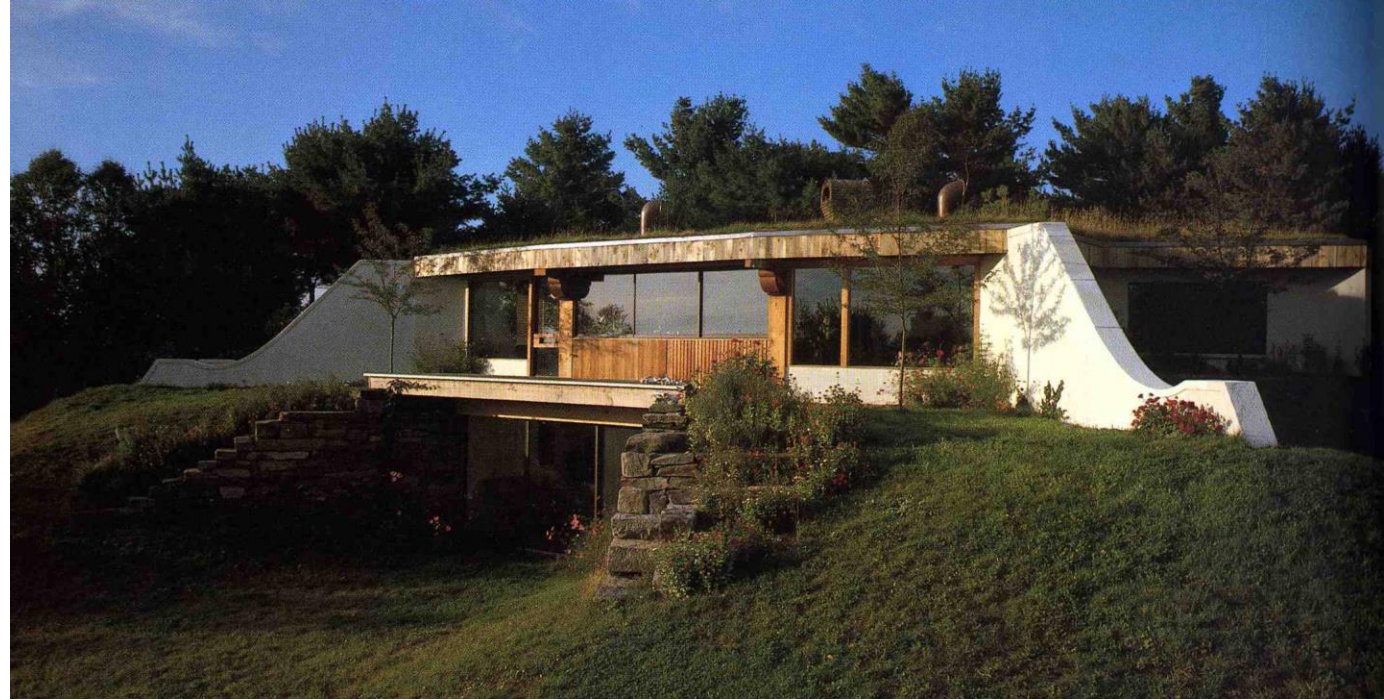


Latent heat of vaporization...only works efficiently in dry climates

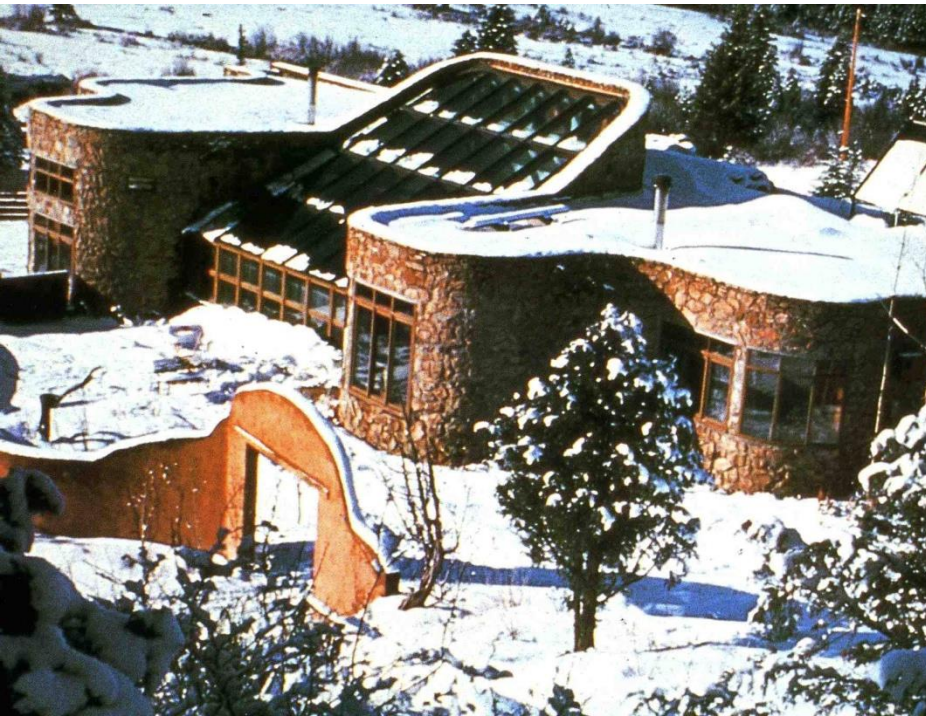
Earth Cooling



Earth Cooling



**Winston House; Lyme, NH,
Donald Metz, 1972**



**Rocky Mountain Institute;
Old Snow Mass CO,
[Amory Lovins], 1984**

Earth Cooling

Green Roof

California Academy of
Science, San Francisco, CA
Renzo Piano, 2008

<http://www.archdaily.com/6810/california-academy-of-sciences-renzo-piano/>



Composite Strategies



**Beyeler Foundation Museum; Basel,
Switzerland, Renzo Piano, 1997**

Composite Strategies



The Guthrie Pavilion; Shah-Alam, Malaysia, Ken Yeang, 1998