

:

1.

1.1

(            ),            (            )  
 가            ,            ,            .  
 ,            ,            .  
 가

1.2

-            ,            .  
 -            ,            .  
 가            가            ,            .  
 가            가            .  
 -            ,            ,            .  
 -            ,            ,            .

2.

2.1

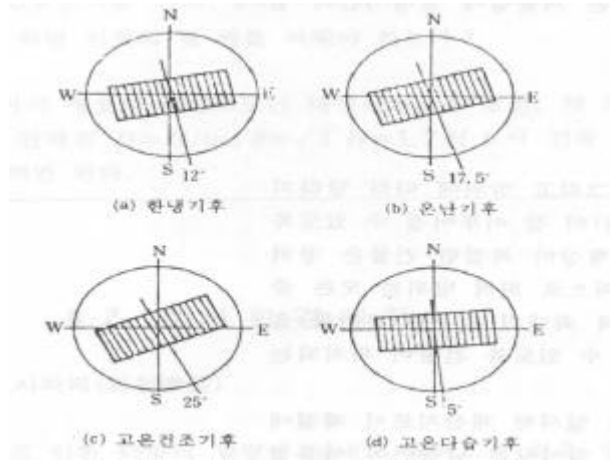
2.1.1.

,            ,            .  
 ,            ,            .  
 가

2.1.2.

,            ,            .            1

( ) 가 .  
 가 , 가 ,  
 2.1a 가 , 가  
 가 .

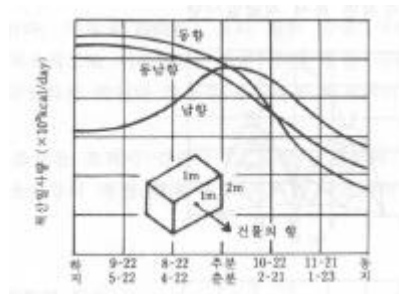


2.1a

2.2

2.2.1.

2.2a : : =1:1:2 가  
 가



2.2a

1

2.2.2

, 2

2.2.3

2.A

2.A

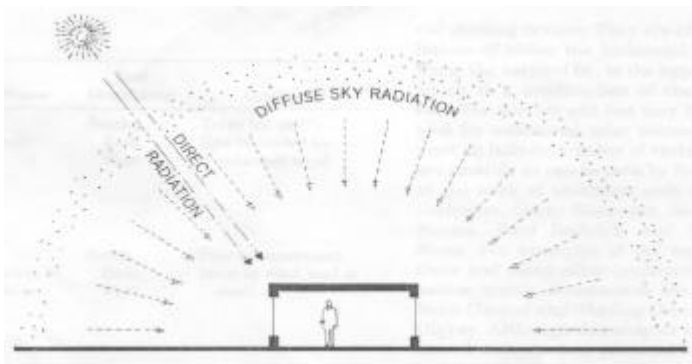
			(%)
	( )	"	90
	( )	"	83
	( )	"	75~85
	( )	"	60~70
	( )	"	85~90
	( )	"	60~70
	( )	"	60~70
	( )	"	50~75
	( )	"	40~60
	( )	"	8~20
	( )	"	30~40
	( )	"	40~70
	( )	"	5~30
		"	65~75
		"	50~60
		"	35~50
		"	20~30
		"	10~20
		"	2~5
		"	1~2
		"	65~75
		"	2~5
		"	10~30
		"	1~5
		"	0.1~1
		"	~0.00
	( )	"	70~90
"	( )	"	50~75
	( )	"	30~50
"	( )	"	1~10

### 3. Shading

#### 3.1 Shading

##### 3.1.1. Shading

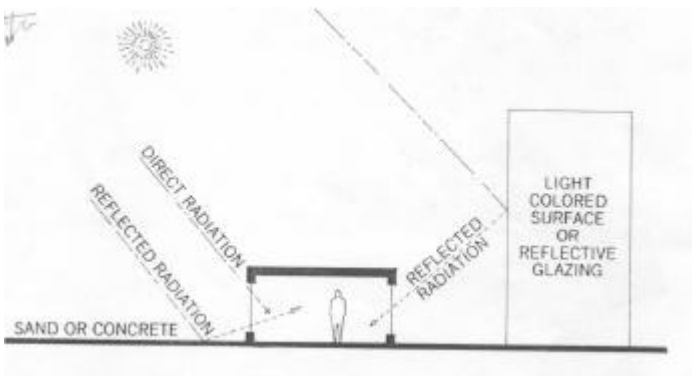
Shading  
Shading  
Passive solar heating  
( 3.1a)



3.1 a  
가

( 3.1b)

Shading  
)



3.1 b

가

가

Shading

가

Shading

Shading

## Shading








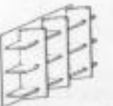
Shading

### 3.1.2 Shading Device

- Exterior / Interior
- Fixed / Movable

#### 1) Shading

Shading  
3.A 가 Shading  
overhang, fin, 가 가  
가 (Le Corbusier, Oscar Neimeyer, Richard Neutra, Paul  
Rudolph) Olgyay Solar Control and  
Shading Devices Shading 가 가  
가

		Descriptive Name	Best Orientation	Comments
I		Overhang Horizontal panel	South, East, West	Traps hot air Can be loaded by snow and wind
II		Overhang Horizontal louvers in horizontal plane	South, East, West	Free air movement Snow or wind load is small
III		Overhang Horizontal louvers in vertical plane	South, East, West	Reduces length of overhang View restricted Also available with miniature louvers
IV		Overhang Vertical panel	South, East, West	Free air movement No snow load View restricted
V		Vertical fin	East, West, North	Restricts view For north facades in hot climates only
VI		Vertical fin slanted	East, West	Slant toward north restricts view sig- nificantly
VII		Eggcrate	East, West	For very hot climates View very restricted Traps hot air
VIII		Eggcrate with slanted fins	East, West	Slant toward North View very restricted Traps hot air For very hot climates

From *Architectural Graphic Standards*, 8th ed. John R. Hoke, ed. Wiley, 1988.

### 3.A Fixed Shading Device

2) 가 shading  
가 Shading 가

Shading 가

shading

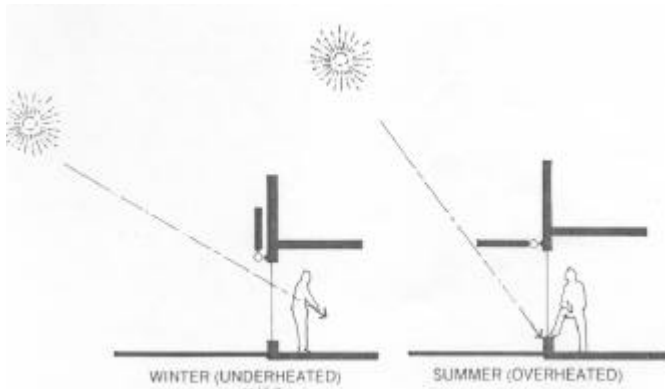
1

shading

shading

가

(fig 3.1c).



3.1c

가 shading

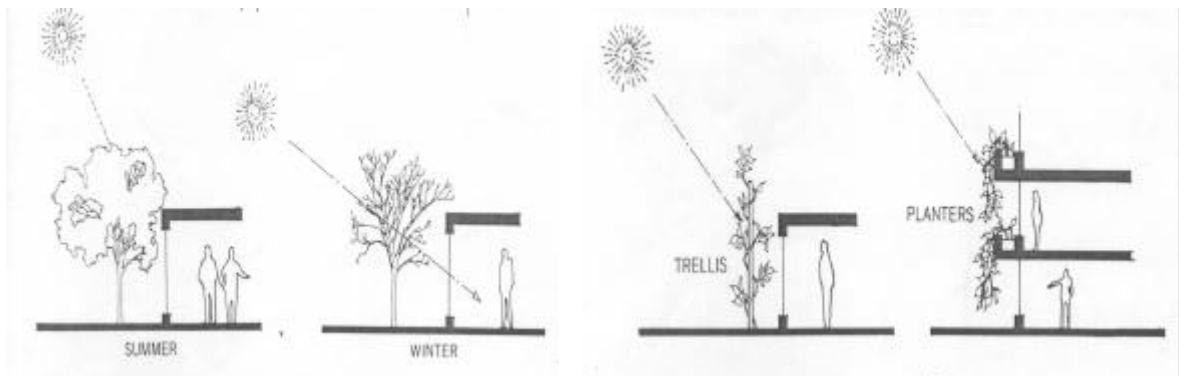
shading

( 3.1d).

가

가

( 3.1e).



3.1d

3.1e

Building shading  
가 shading  
roller shade  
shading  
가 shading  
wheel

roller shade 가 Bateson Office  
shading

3.B 가 shading


	Descriptive Name	Best Orientation	Comments
IX	Overhang Awning	South, east, west	Fully retractable for storms or winter Traps hot air
X	Overhang Rotating horizontal louvers	South, east, west	Can also restrict winter sun if desired
XI	Fin Rotating fins	East, west	Much more effective than fixed Less restricted view than slanted fixed fins
XII	Eggcrate Rotating horizontal louvers	East, west	More effective with less view restriction than fixed eggcrate For hot climates
XIII	Deciduous plants Trees Vines	East, west, southeast, southwest	View restricted but attractive Air cooled
XIV	Exterior roller shade	East, west, southeast, southwest	Very flexible from com- pletely open to com- pletely closed View very restricted at times

3.B 가 shading

### 3.1.3 shading

shading  
 envelope-dominated( ) internally dominated( )

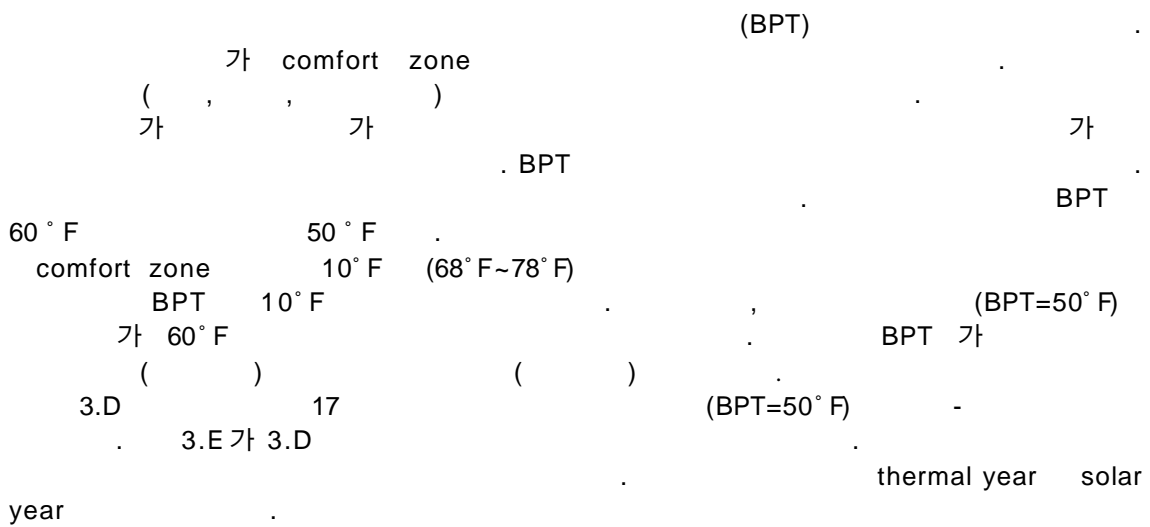
3.C



Characteristic	Envelope Dominated	Internally Dominated
Balance point temperature*	60°F	50°F or less
Building form	Spread out	Compact
Surface area-to-volume ratio	High	Low
Internal heat gain	Low	High
Internal rooms	Very few	Many
Number of exterior walls of typical room	2 to 3	0 to 1
Use of passive solar heating	Yes, except in very hot climates	No, except in very cold climates
Typical examples	Residences, small office building, some small schools	Large office and school buildings, auditoriums, theaters, factories

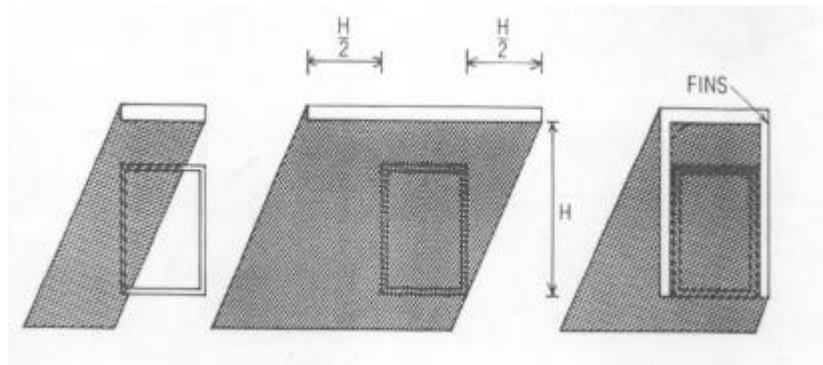
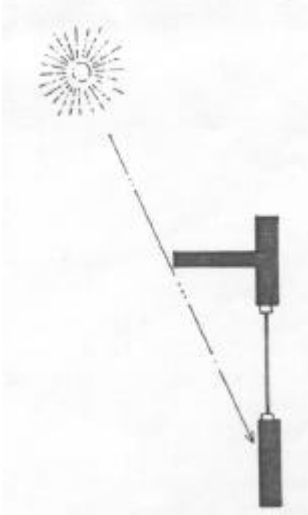
\* Superinsulated buildings tend to have a balance point temperature of about 50°F even though the other characteristics are those of an envelope-dominated building.

3.C

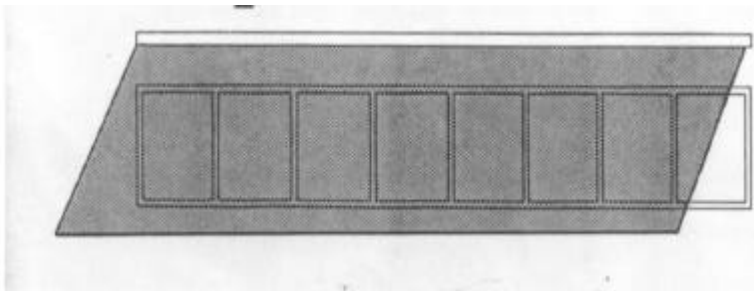




( 3.A ) 가  
 가 overhang  
 overhang overhang overhang  
 ( 3.2b). 가 3.2c fin 가



. 3.2b



. 3.2c  
 가  
 overhang

3.2.1 Shading

가 overhang overhang 가

- # shading
1. shading passive heating overhang
  2. passive heating shading ( -  
 ) 가 overhang
- overhang . 3.A 3.B

Shading

shading

3.2.2

Overhang

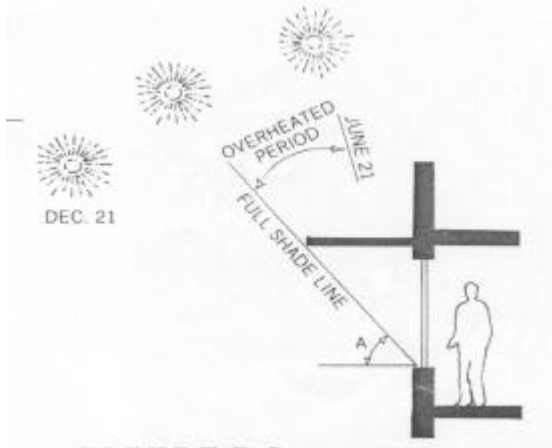
overhang

passive solar heating

가

Overhang

shade

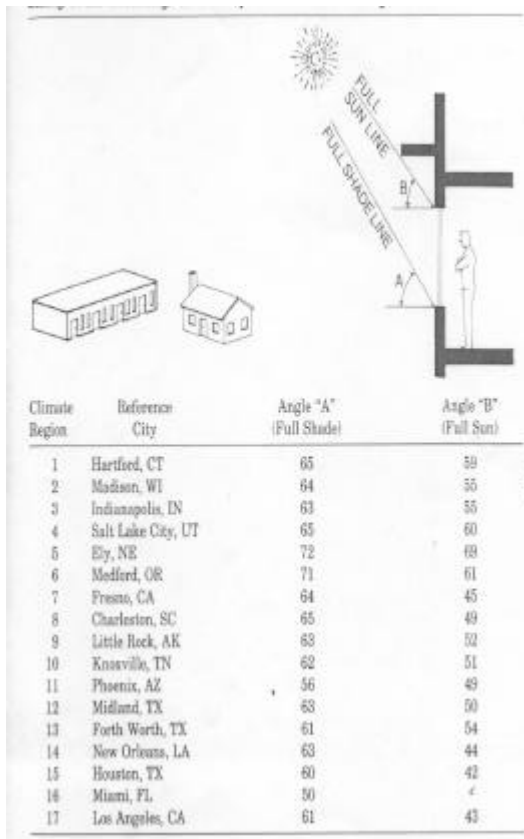


3.2d

shade

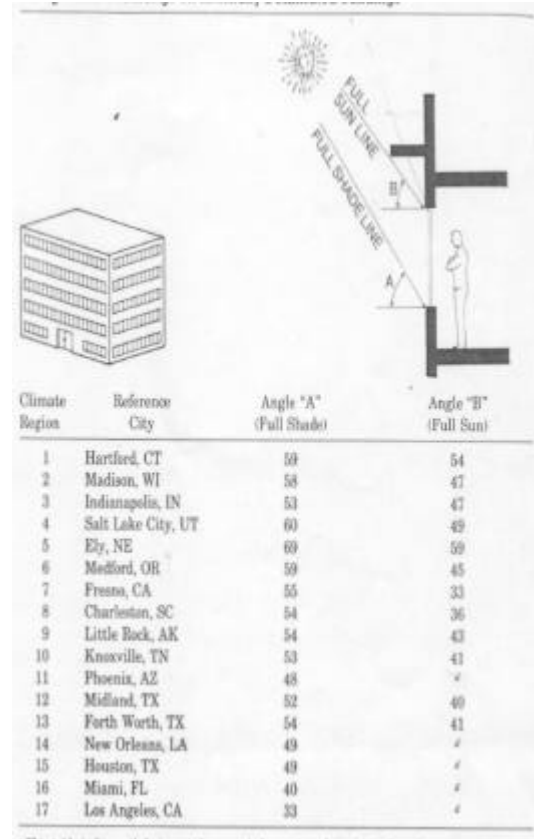
angle 'A'

3.F  
3.G



3.F

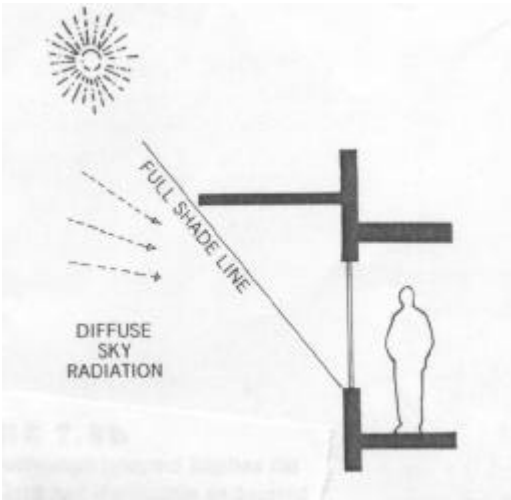
overhang



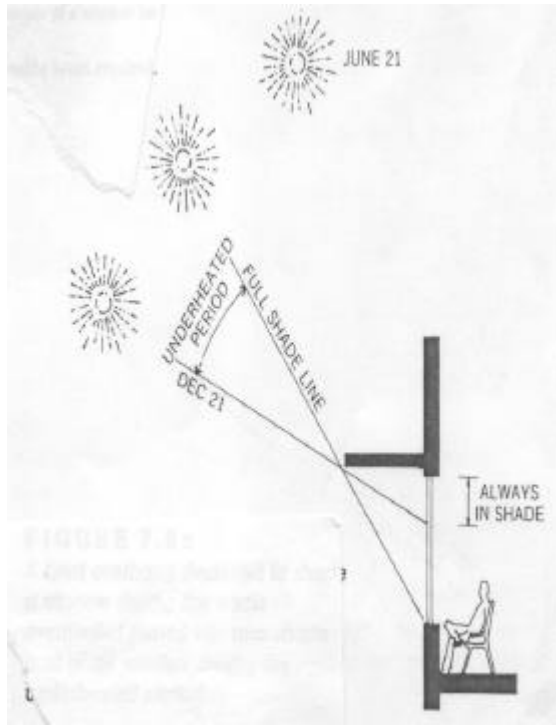
3.G

overhang

Overhang , “full shade line”  
 가  
 overhang 가 가 ( .3.2e). 가 3.2d  
 Overhang 50% 가  
 “full shade line”  
 가 ( . 3.2f)  
 overhang passive heating



. 3.2.e  
 overhang



. 3.2.f

- # overhang #
- 1.
- 2. 3.F , 3.G angle 'A'
- 3. “full shade line”
- 4. overhang “full shade”
- 5. overhang 가

3.2.3 가 Overhang 가

가 overhang overhang overhang passive shade  
 solar heating overhang overhang shade

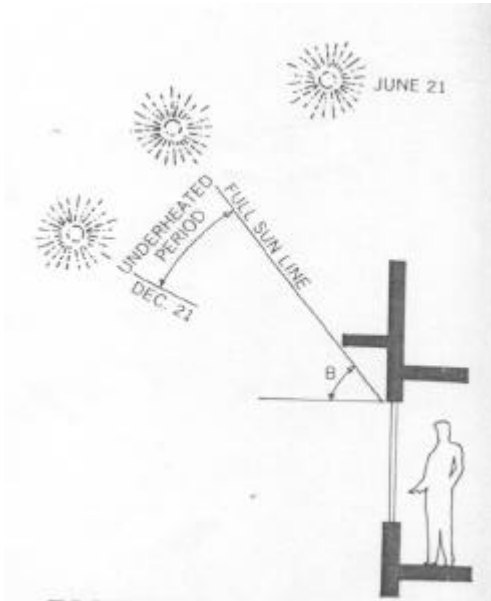
( ) 가 가  
 1 overhang , 가

가 , 가 shading

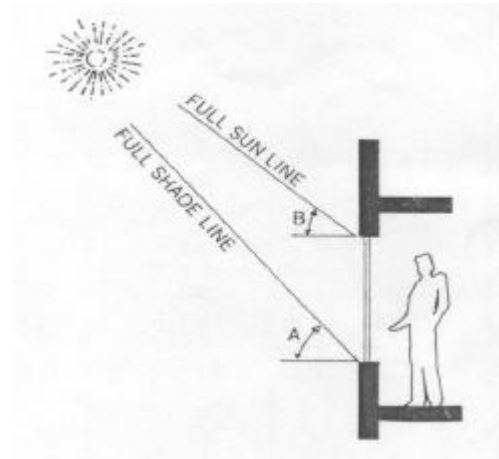
( )

“full sun line” (fig.3.2g).  
overhang

“full sun line” angle 'B'  
3.F 3.G

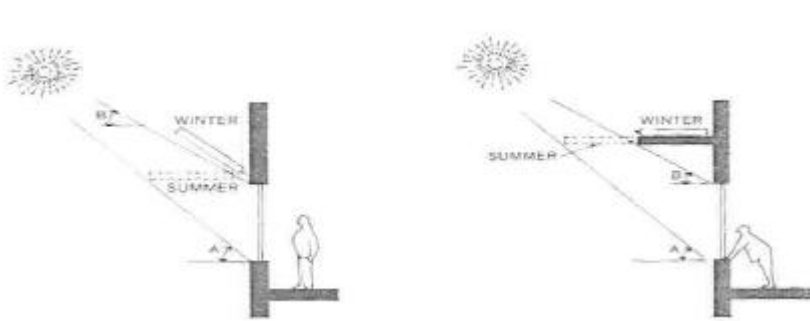


.3.2g



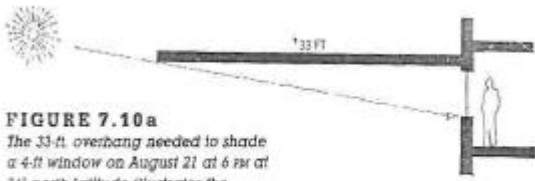
.3.2h

- # 가 overhang #
- 1.
  2. 3.F , 3.G angle 'A' angle 'B'
  3. “full shade line”(angle 'A') “full sun line”(angle 'B') .( .3.2h)
  4. “full shade line” “full sun line” .( .3.2i )
  5. overhang , 가 overhang 3.D( ) 3.E( )



.3.2i

### 3.3 Shading

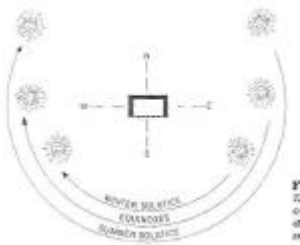


**FIGURE 7.10a**  
The 33-ft overhang needed to shade a 4-ft window on August 21 at 6 PM at 36° north latitude illustrates the futility of trying to fully shade east and west windows with horizontal overhangs.

[ 3.3 a]

가 가  
가  
3.3a

shading 가 가



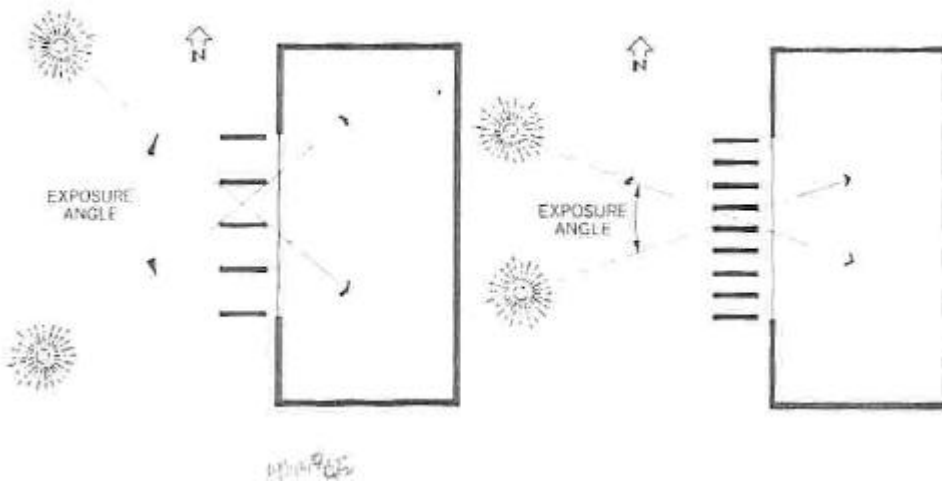
[ 3.3 b]

shading

fin overhang 3.3b  
( 3 21 9 21 )

fin  
( )  
3.3c) fin

6 ( ) 가  
, fin 가  
, fin 가



[ 3.3 c]

fin ( 3.3e).

, fin

, 가 fin

가 fin

( 3.3d )  
3.3d

fin

fin

fin

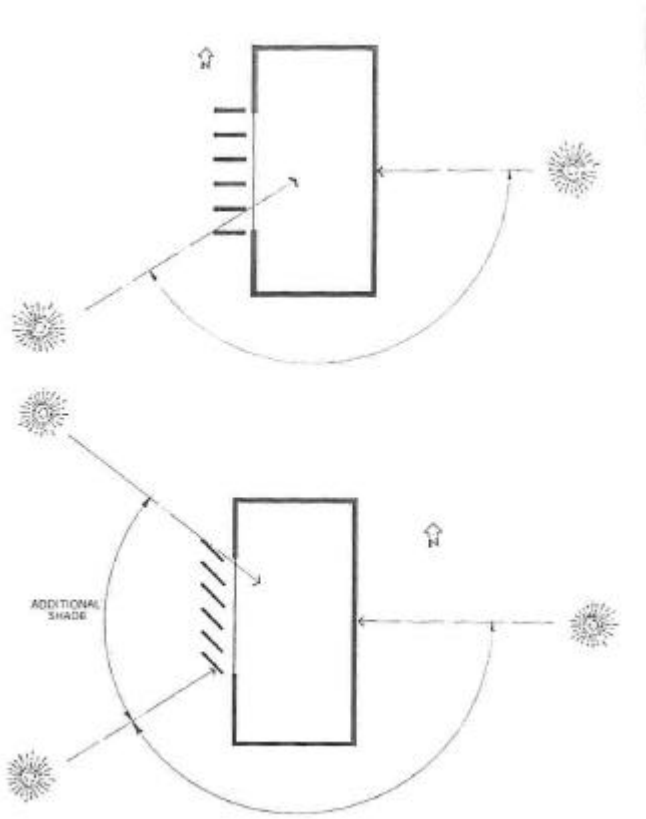
overhang ( fin

3.2b)

fin 가  
fin overhang

overhang fin  
가

eggcrate ( 3.5a -d)  
shading



[ 3.3d]


### 3.3.1

1. 가
- 2.
3. 가 overhang
4. 가 overhang(louvers) fin
- a. fin.
- b. fin.
- 5.

### 3.3.2 Overhang

가 , overhang 가 가 .  
 overhang , fin .  
 overhang ,  
 fin .  
 overhang fin ,  
 ( 가 ) .  
 3.G1 가 8 4 (solar  
 time)  
 overhang .  
 overhang 가 가 .  
 3.G1 overhangs가  
 가

**TABLE 7.H**  
 Sizing East and West Horizontal Overhangs<sup>1,2</sup>



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
5	Ely, NE	34	36
6	Medford, OR	30	37
7	Fresno, CA	25	30
8	Charleston, SC	23	29
9	Little Rock, AR	24	29
10	Knoxville, TN	23	29
11	Phoenix, AZ	19	24
12	Midland, TX	22	28
13	Fort Worth, TX	23	28
14	New Orleans, LA	19	27
15	Houston, TX	19	25
16	Miami, FL	14	19
17	Los Angeles, CA	9	28

# Overhang  
 ( )  
 1.  
 2. 3.G1 "C"  
 3.  
 "shade line"  
 4. overhang  
 8 4  
 shading  
 overhang

[ 3.G1]

3.3.3

Fin

7

5 (solar time)

shading

fin

1

5

가

shading

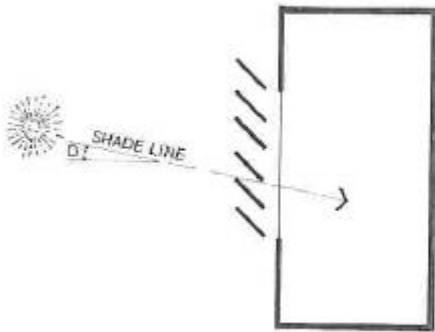
**TABLE 7.1**

Shade Line Angle for Slanted Vertical Fins<sup>a</sup>

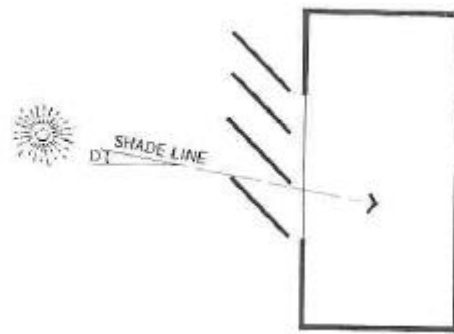
Latitude	Angle "D"
24	18
28	15
32	12
36	10
40	9
44	8
48	7

<sup>a</sup> This table is for vertical fins slanted toward the north on east or west windows. Designs based on this table will provide shade from direct sun for the whole year between the hours of 7 AM and 5 PM (solar time). This table can also be used to design vertical fins on north windows for the same time period.

[ 3.H]



↑  
N



↑  
N

[ 3.3 e]

# fin

1.

2. 3.H "shade line" "D"

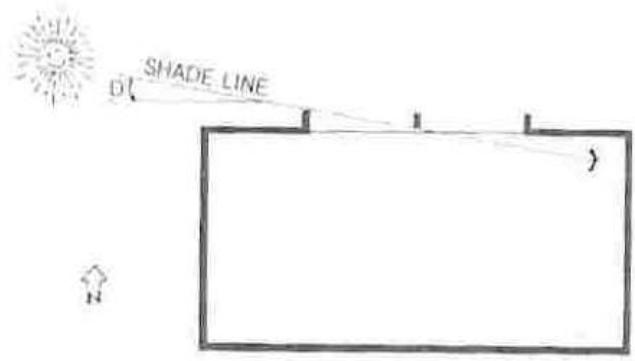
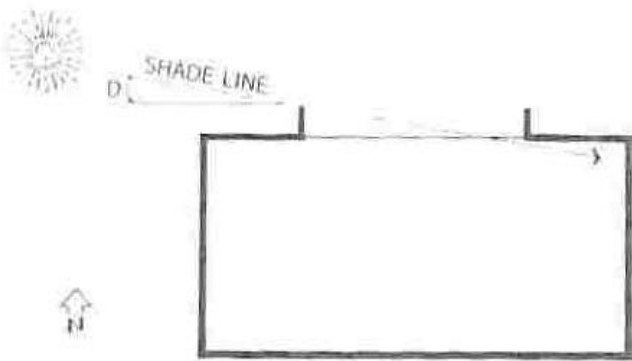
3. "D" "shade line" . (

3.3e. )

4. fin "shade line" ( 3.3 e  
fin  
fin  
가 .

### 3.4 Fins

가 shading  
 , fin 7 5 (solar time)  
 shading 3.3 f fin fin  
 "D"  
 - fin

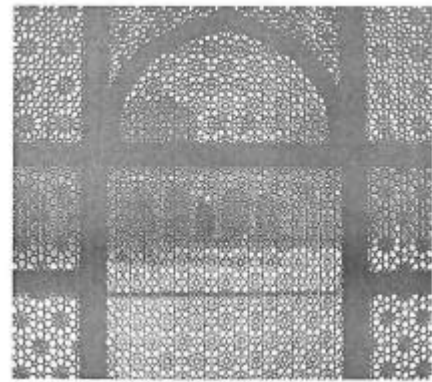


[ 3.4 a ]

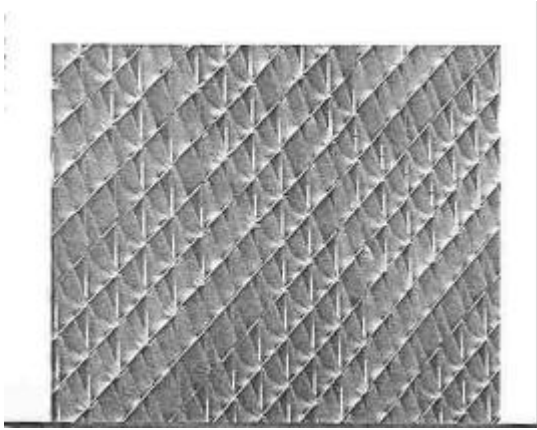
- 1.
2. 3.H "D"
3. "D" "shade line" . ( 3.4 a )
4. fin "shade line" , fin ,  
fin ( 3.4 a )
5. fin

### 3.5 EGGCRATE 가

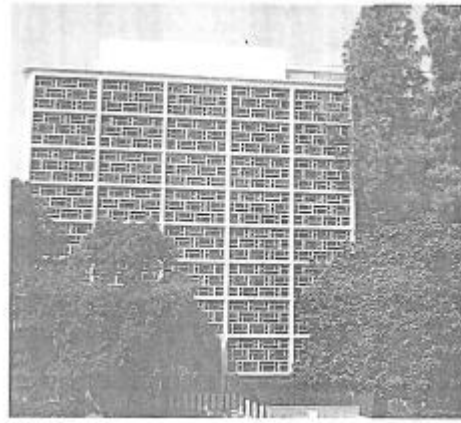
Eggcrate  
 ,  
 가  
 eggcrate overhang ( ) fin  
 ,  
 ( )



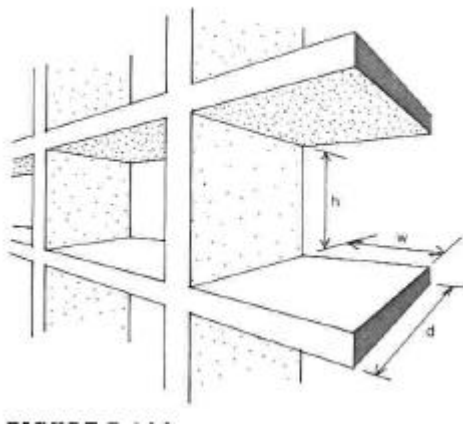
[ 3.5 a ]



[ 3.5 b]



[ 3.5 c]



[ 3.5 d]

Le Corbusier 가 “brise-soleil”  
(room) eggcrate

shading

, eggcrates

a)

( 3.5

( 3.5 b)

( 3.5 c)

eggcrate

7.14d) 가 eggcrate

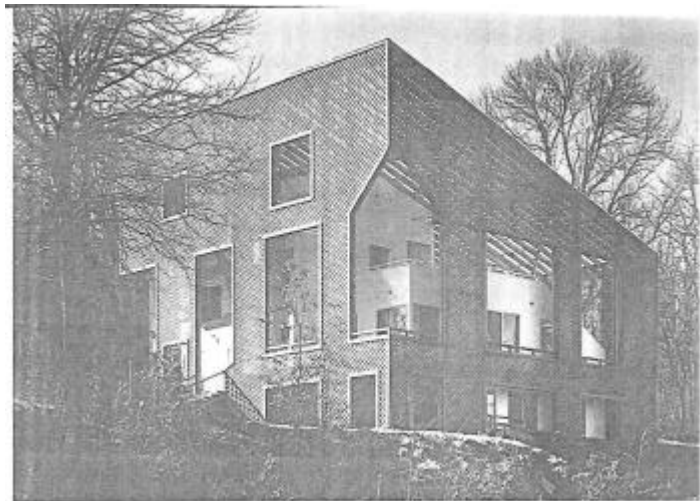
,  $h/d$   $w/d$

, eggcrate

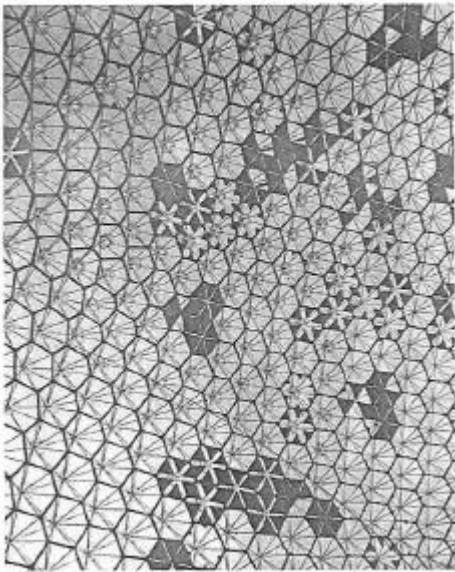
### 3.6 Shading

#### 3.6.1 shading

fin shading  
overhang  
eggcrate



[ 3.6 a]



shading envelope  
MLTW/Turnbull

[ 3.6 a]

shading

[ 3.6 b]  
U.S. (EXPO '67) Buckmin -  
ster Fuller가

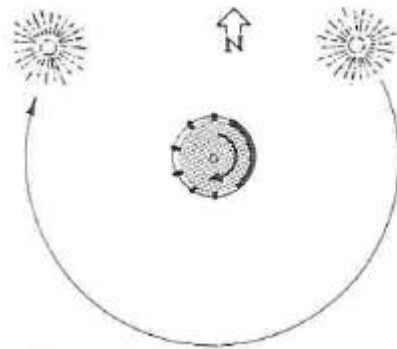


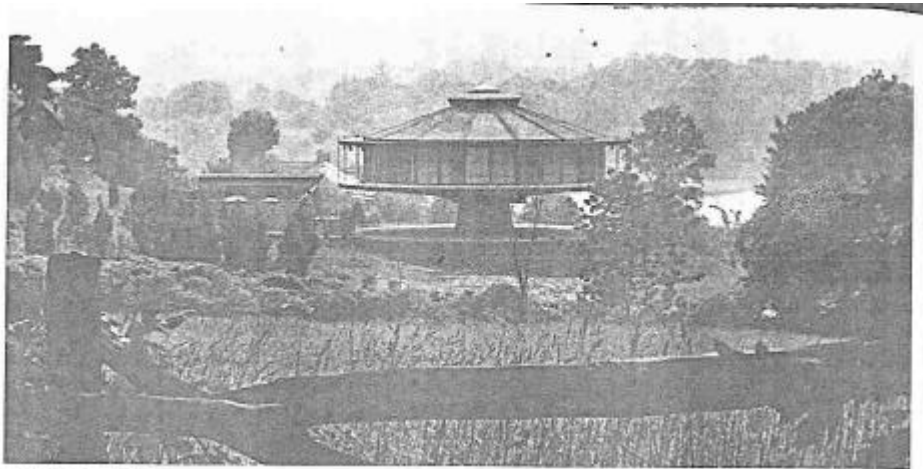
FIGURE 7-15a

[ 3.6 c]

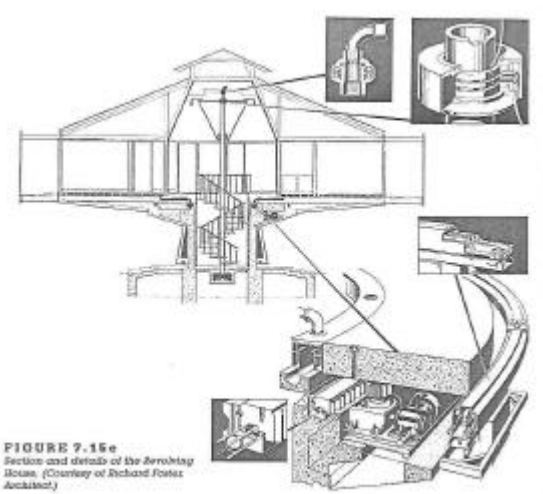
가  
,  
가 shading

6  
가 3.6 b

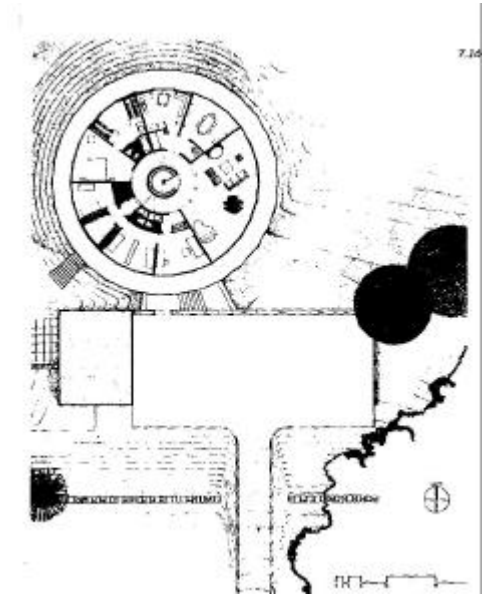
shading



[ 3.6 d]



[ 3.6 e ]



[ 3.6 f ]

( 3.6 c )

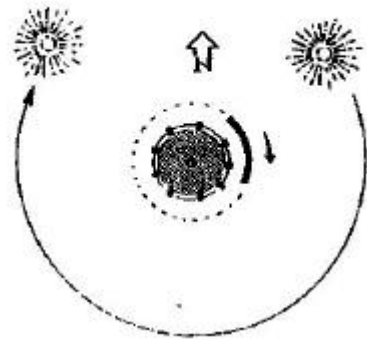
( 3.6 d )

Richard Foster

가

shading

( 3.6 e f )



[ 3.6 g ]

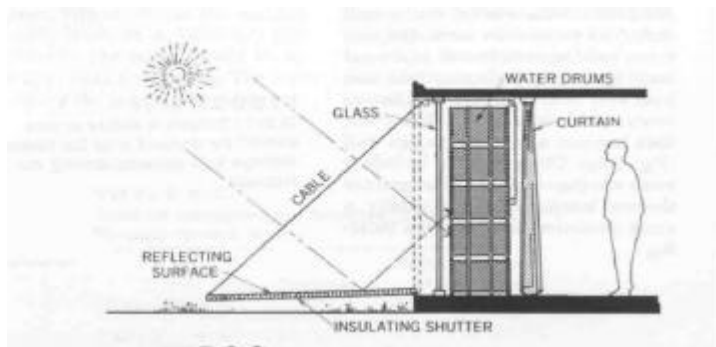
( 3.6 g )

가

shading

3.6 h

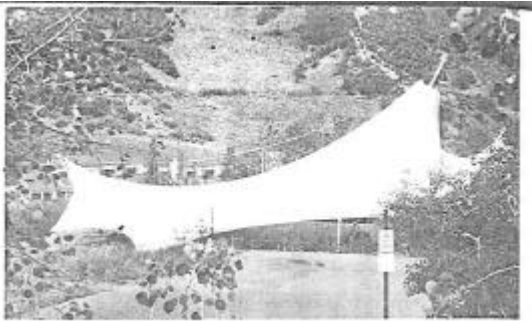
Baer



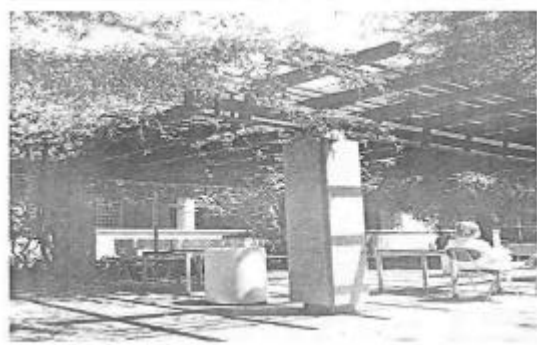
3.6 h

3.6.2 shading

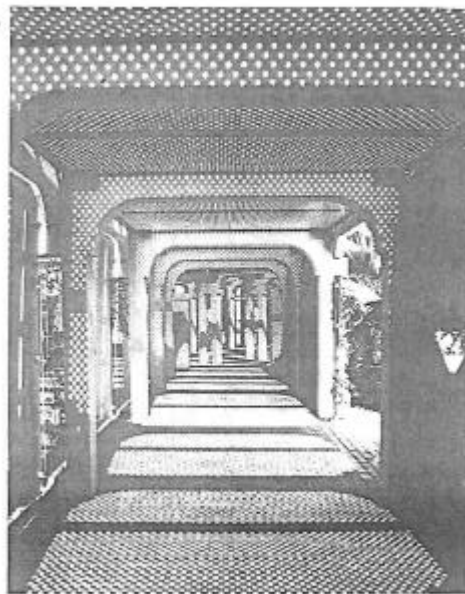
shading shading  
가 가 ( 3.6 i )  
가 가  
3.6 j  
shading  
( 3.6 k) shading 가 3.6 l shading  
shading



[ 3.6 i ]



[ 3.6 k ]



[ 3.6 l ]

### 3.7 shading

가 shading  
 , roller shade, shading  
 .( 3.7 a) shading, shading  
 가, , ,

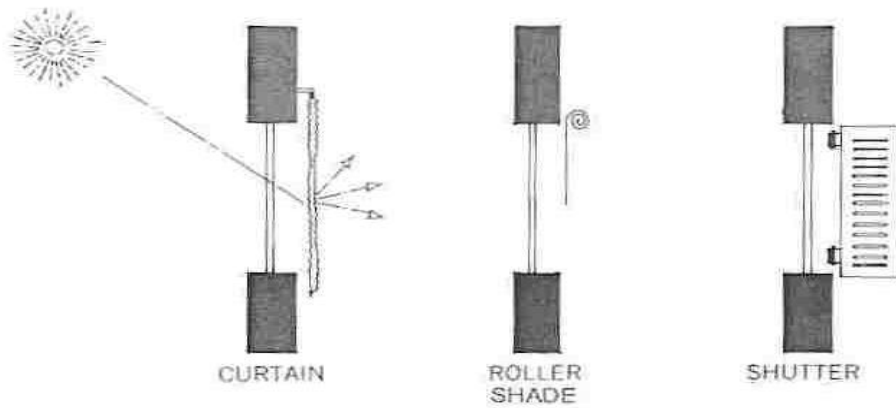
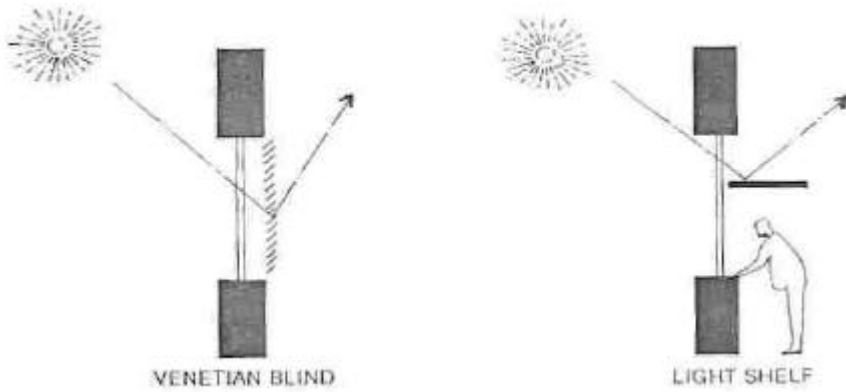


FIGURE 7.19a

[ 3.7 a]



[ 3.7 b]

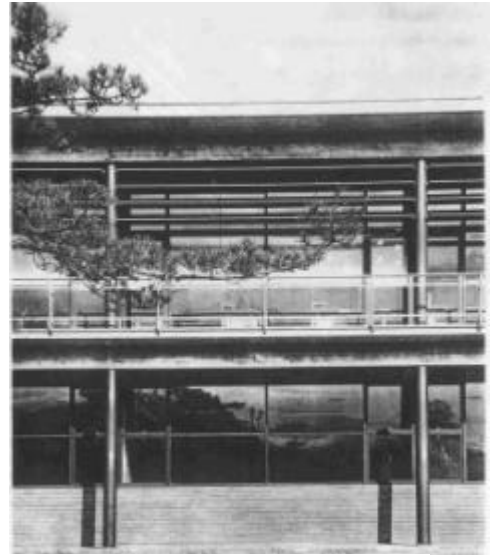
4.

#### 4.1 Overhangs

4.1.1 Reader's digest building, Tokyo, Japan ,  
Raymond & Rado

overhang , 18

louver



4.1.2 Rio Grande School, Rio Grande, Texas  
Cocke, Bowman, York

overhang



4.1.3 Shopping center, Baldwin Hills,  
California, Robert E. Alexander

가

overhang



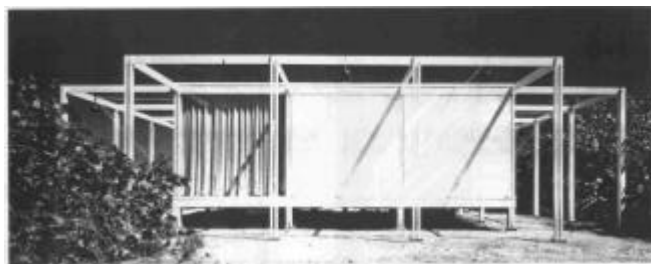
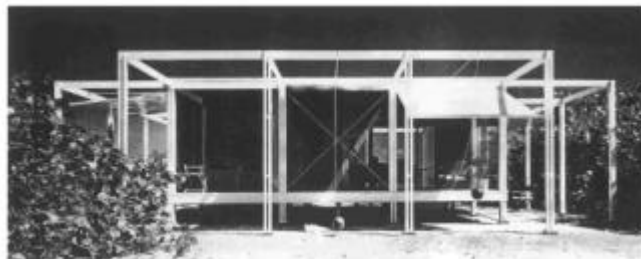
4.1.4 Sunshine School for Cerebral Palsied,  
Fresno, California, Horn & Mortland

가 overhang  
가  
가 가  
overhang



4.1.5 Guest House, Sanibel Island, Florida, Paul Rudolph

( ), 가  
flap( )



## 4.2 Fins

### 4.2.1 Caterpillar Industrial Building, Rio de Janeiro, Brazil, M. M. M. Roberto

가 가 . , 가 가  
12 가  
가 fin 가 .



### 4.2.2 School Building, Phoenix, Arizona, Guirey & Jones

fin  
fin ,  
4 , 45 ,



4.2.3 Apartment (Neighborhood Unit), Habana, Cuba, P. L. Wiener, J. Sert, P. Schultz

10,000

가

Quinta Palatino"

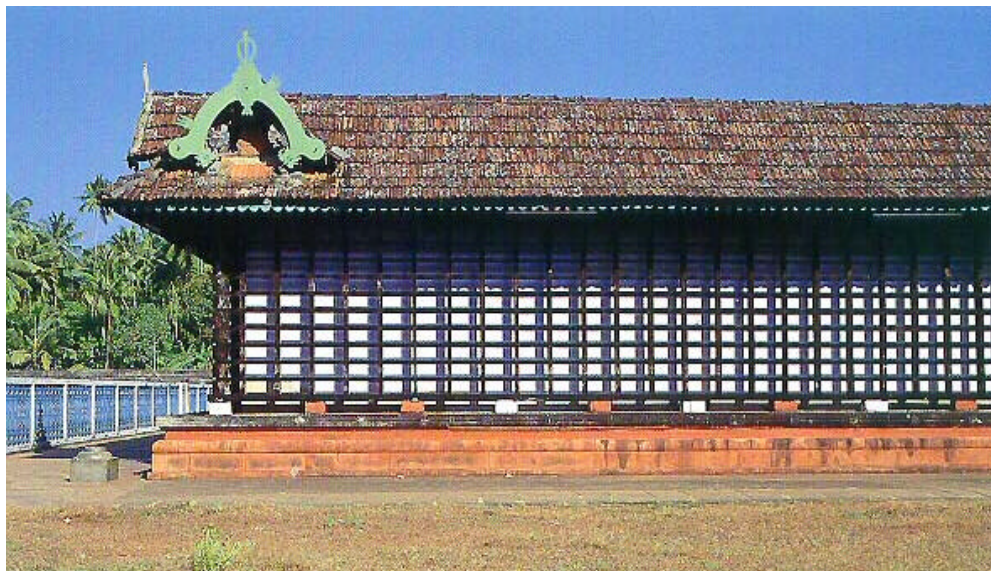


### 4.3 Eggcrate Shading Devices

4.3.1 [http://www.ijer.in](#), [http://www.ijer.in](#), 1956 .



4.3.2 ( )



4.4

Shading





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