

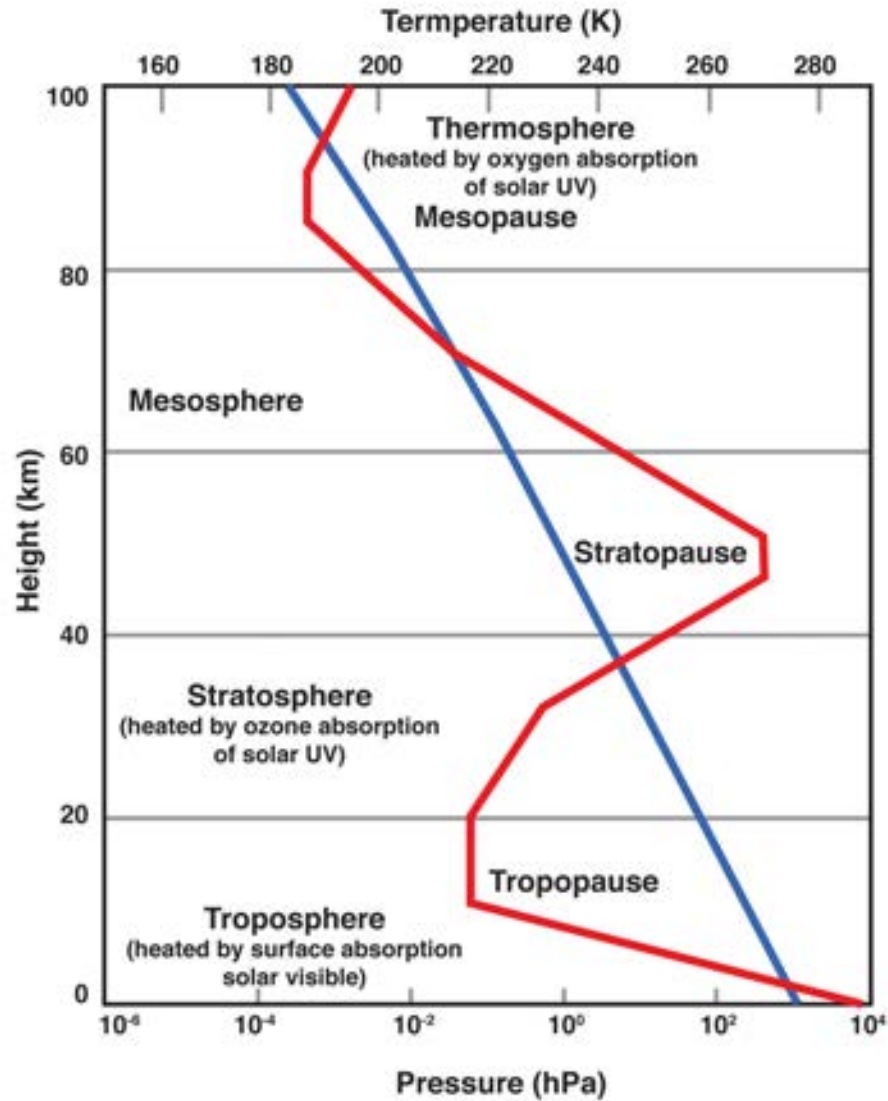
Joseph Lstiburek, Ph.D., P.Eng, ASHRAE Fellow

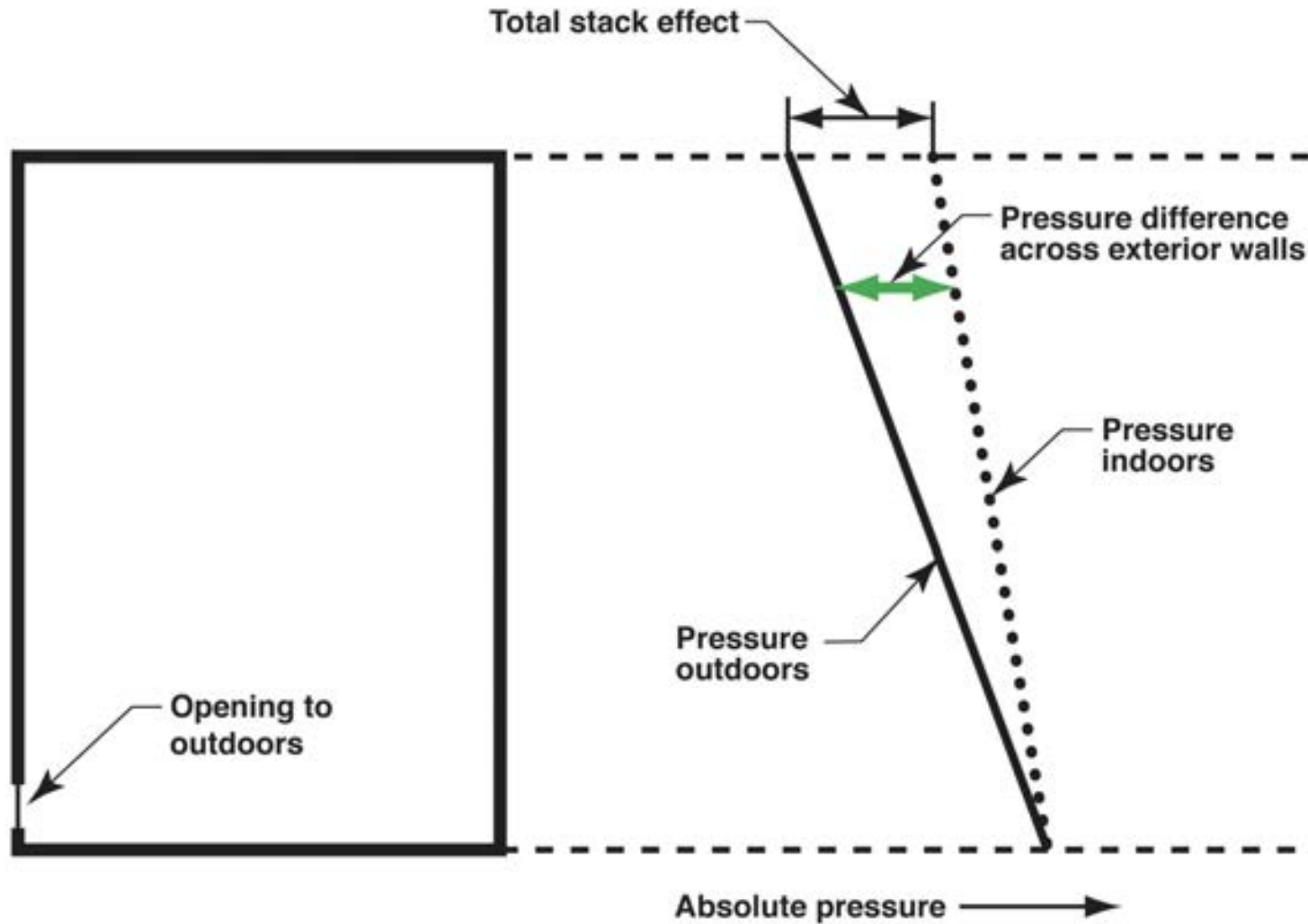
Building Science

Compartmentalization

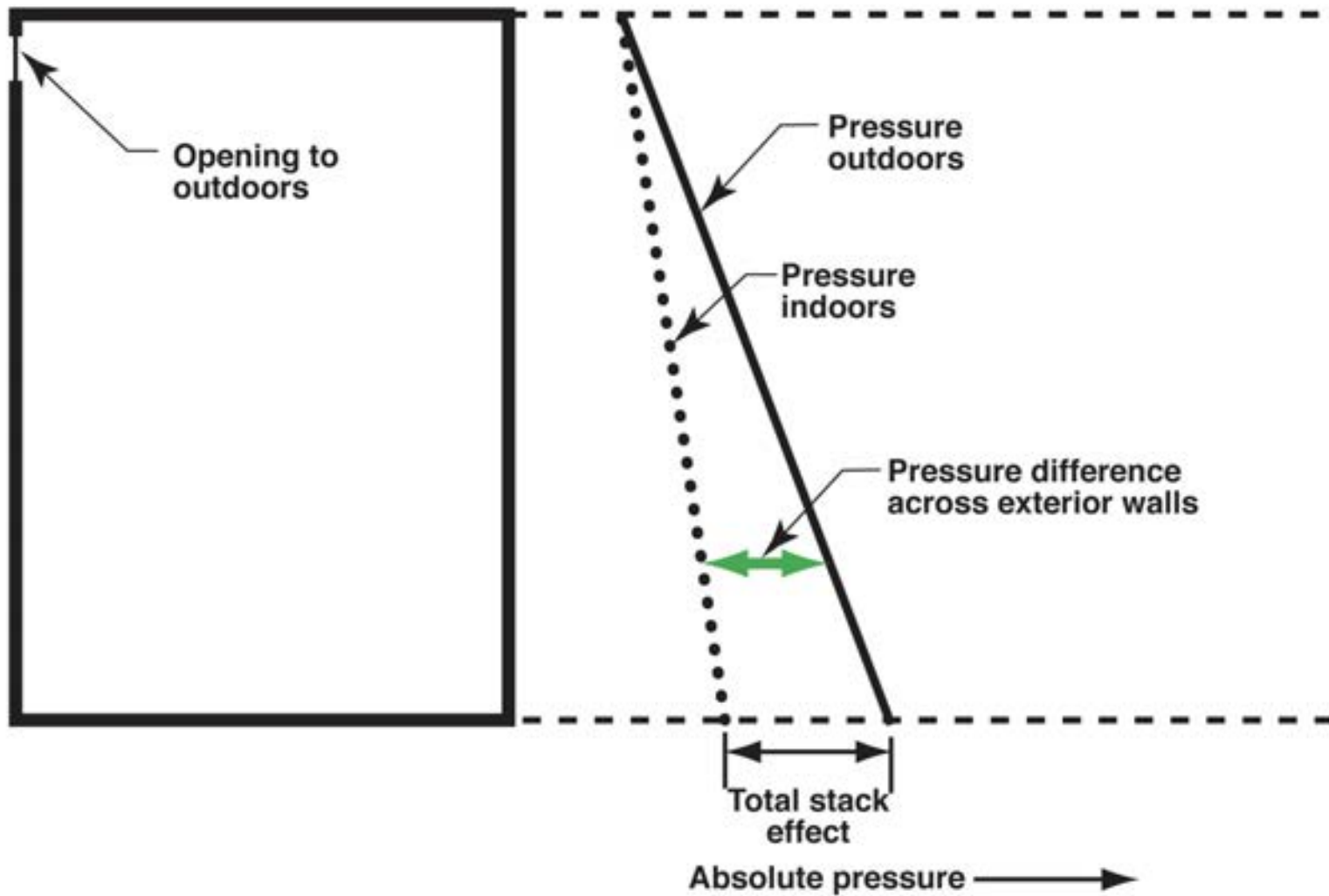
Lapse Rate

U.S. Standard Atmosphere (1976)

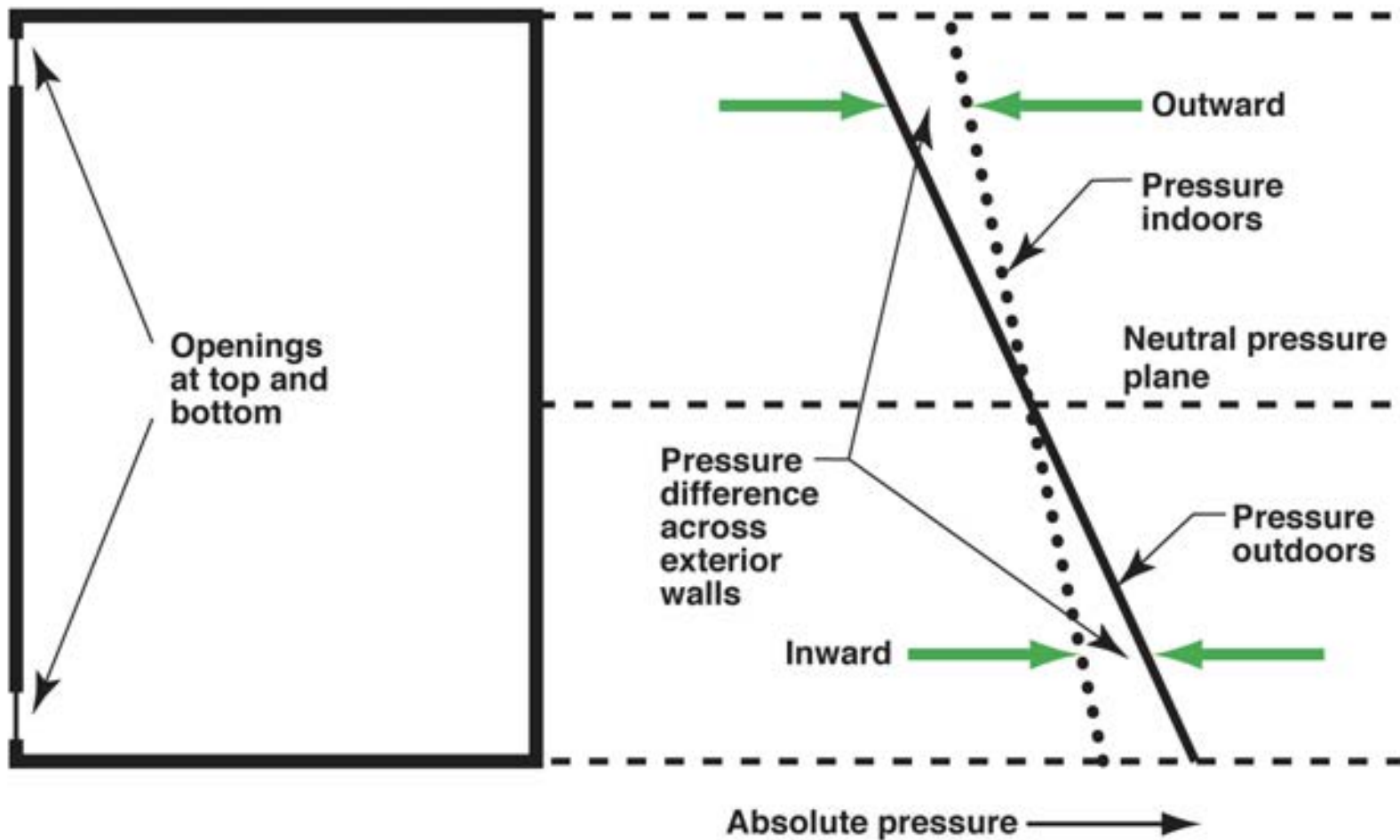




**Figure 11.1: Building with no internal separations with opening at the bottom
(Adapted from G.O. Handegord, 1998)**



**Figure 11.2: Building with no internal separations with opening at the top
(Adapted from G.O. Handegord, 1998)**



**Figure 11.3: Building with no internal separations with openings at top and bottom
(Adapted from G.O. Handegord, 1998)**

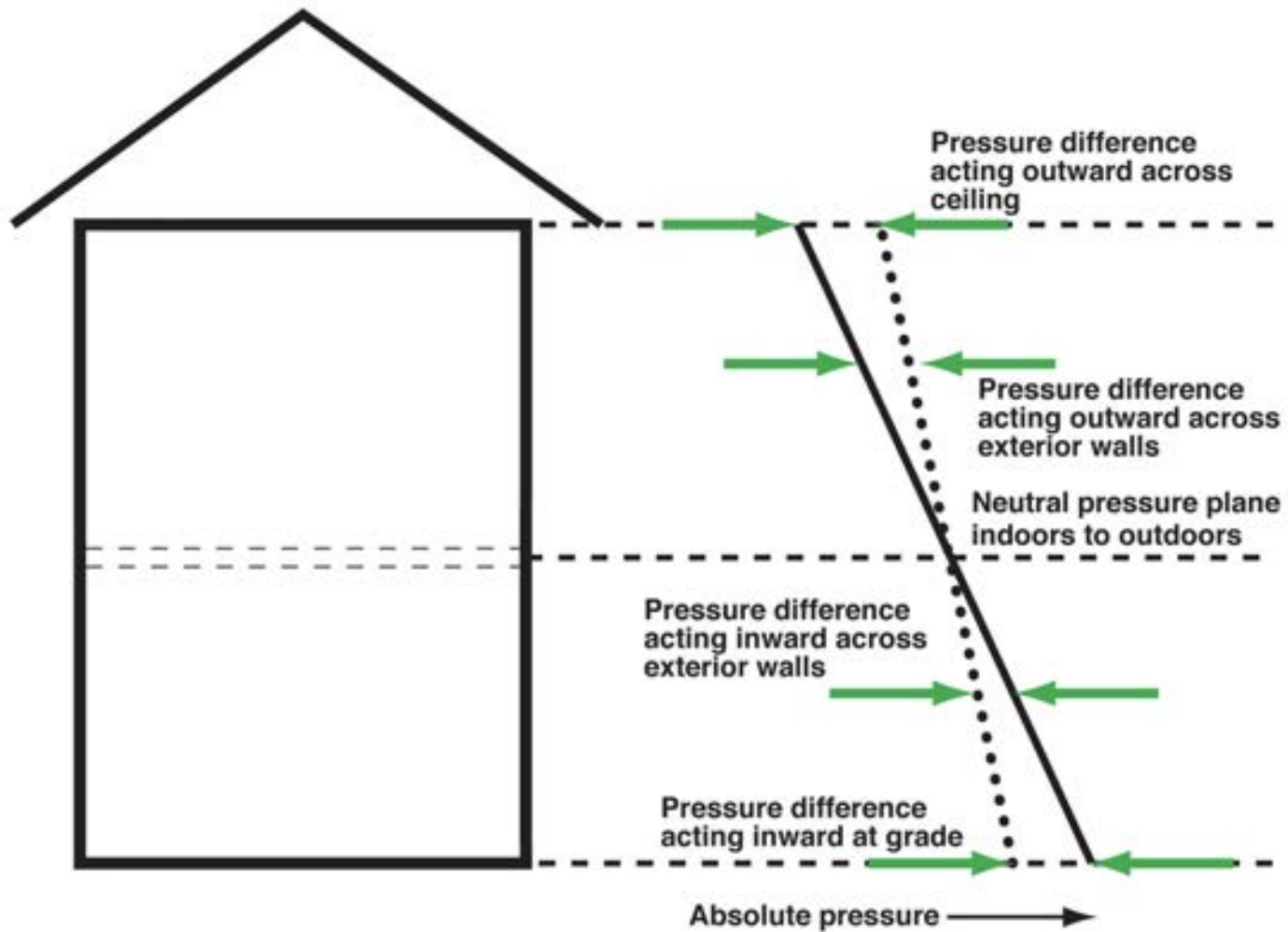
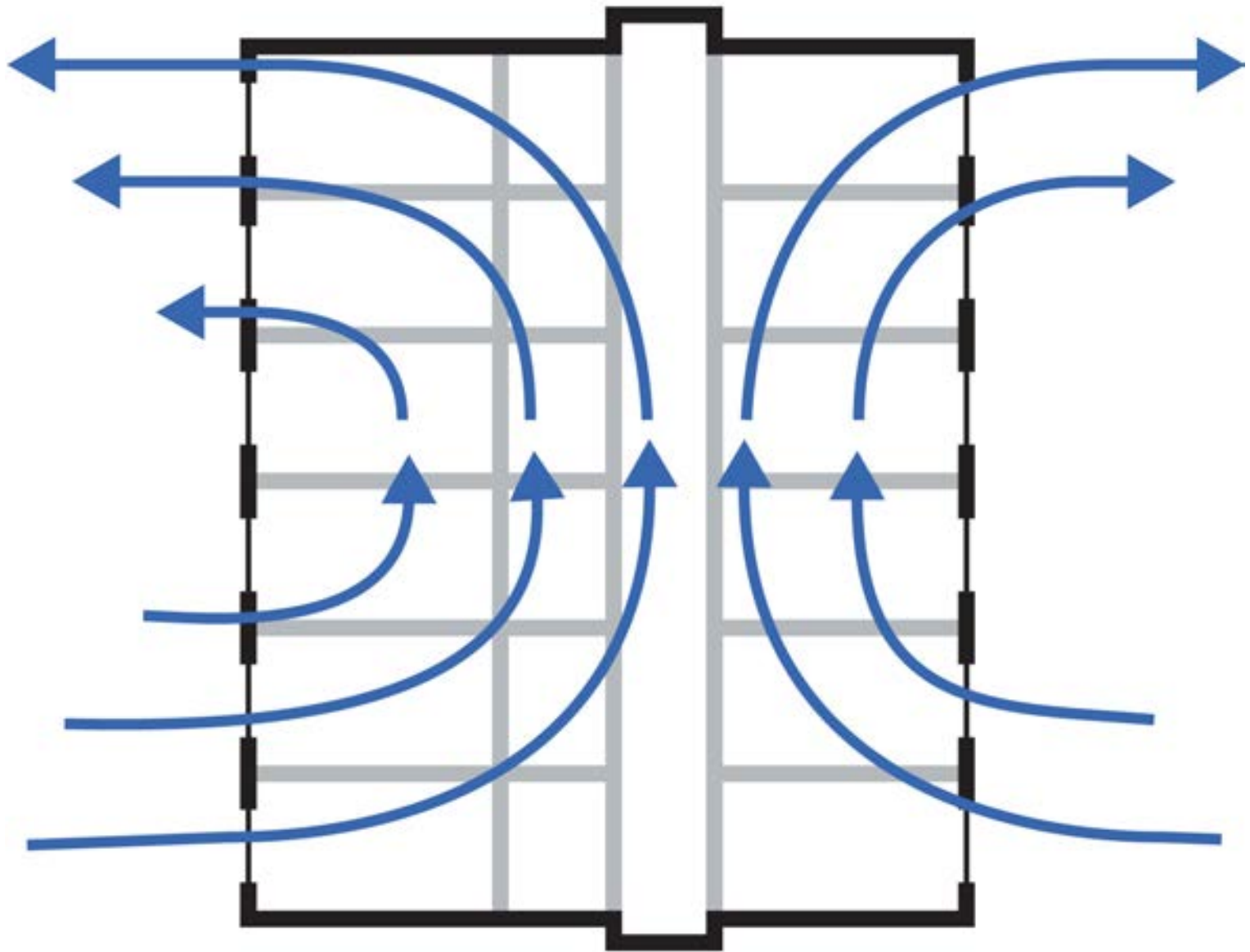
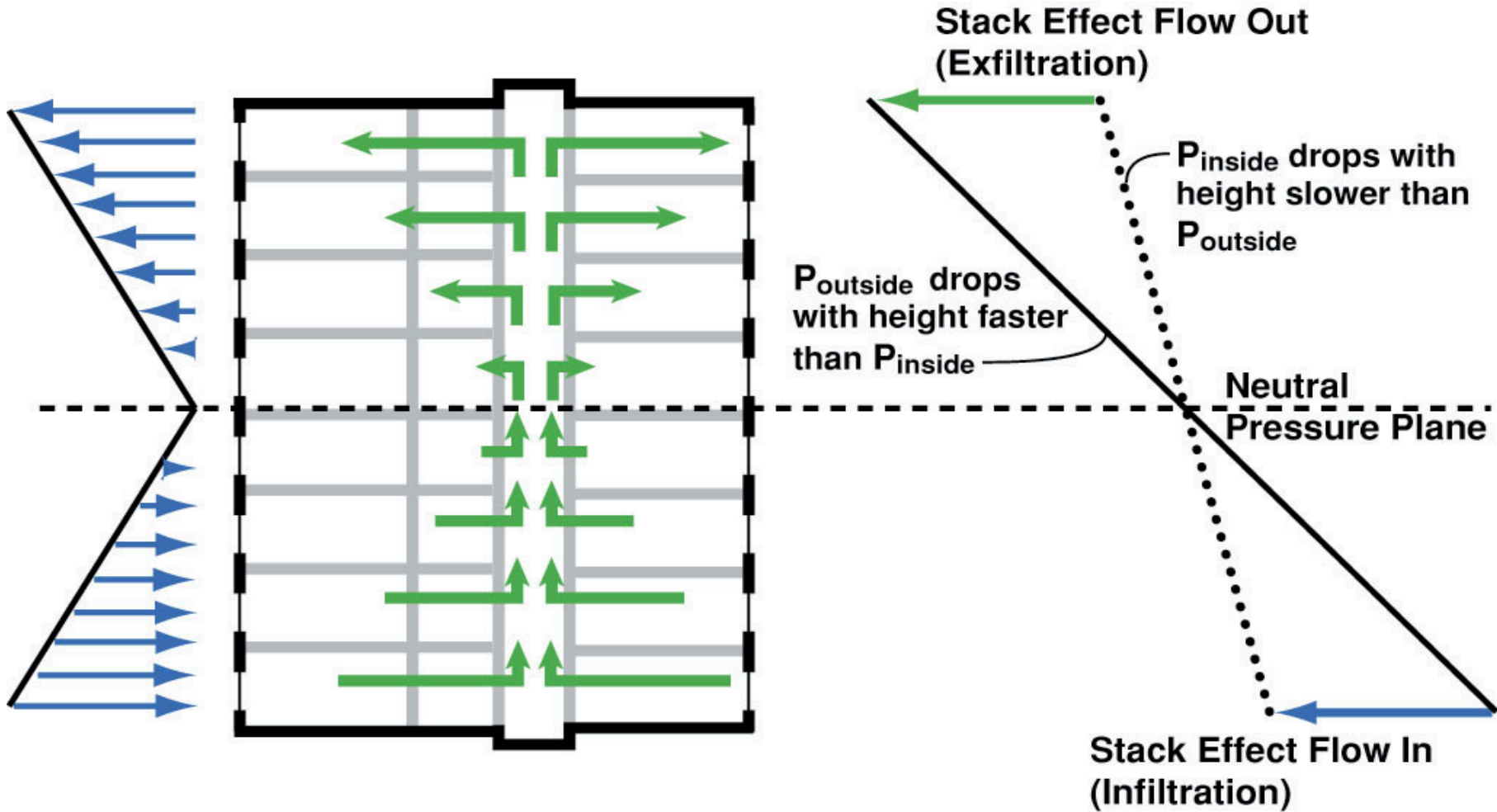


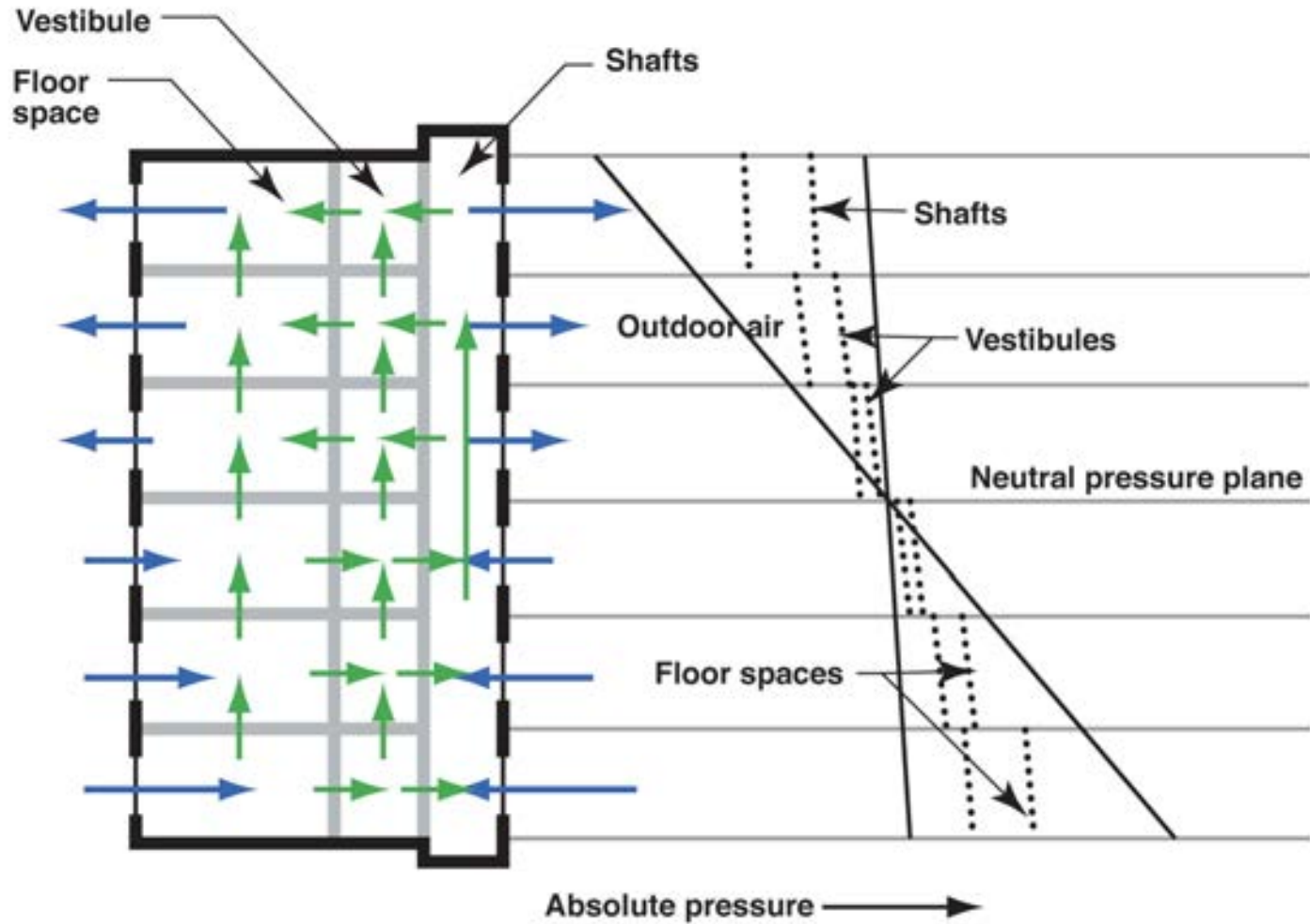
Figure 11.4: Basic two storey house with vented attic
(Adapted from G.O. Handegord, 1998)



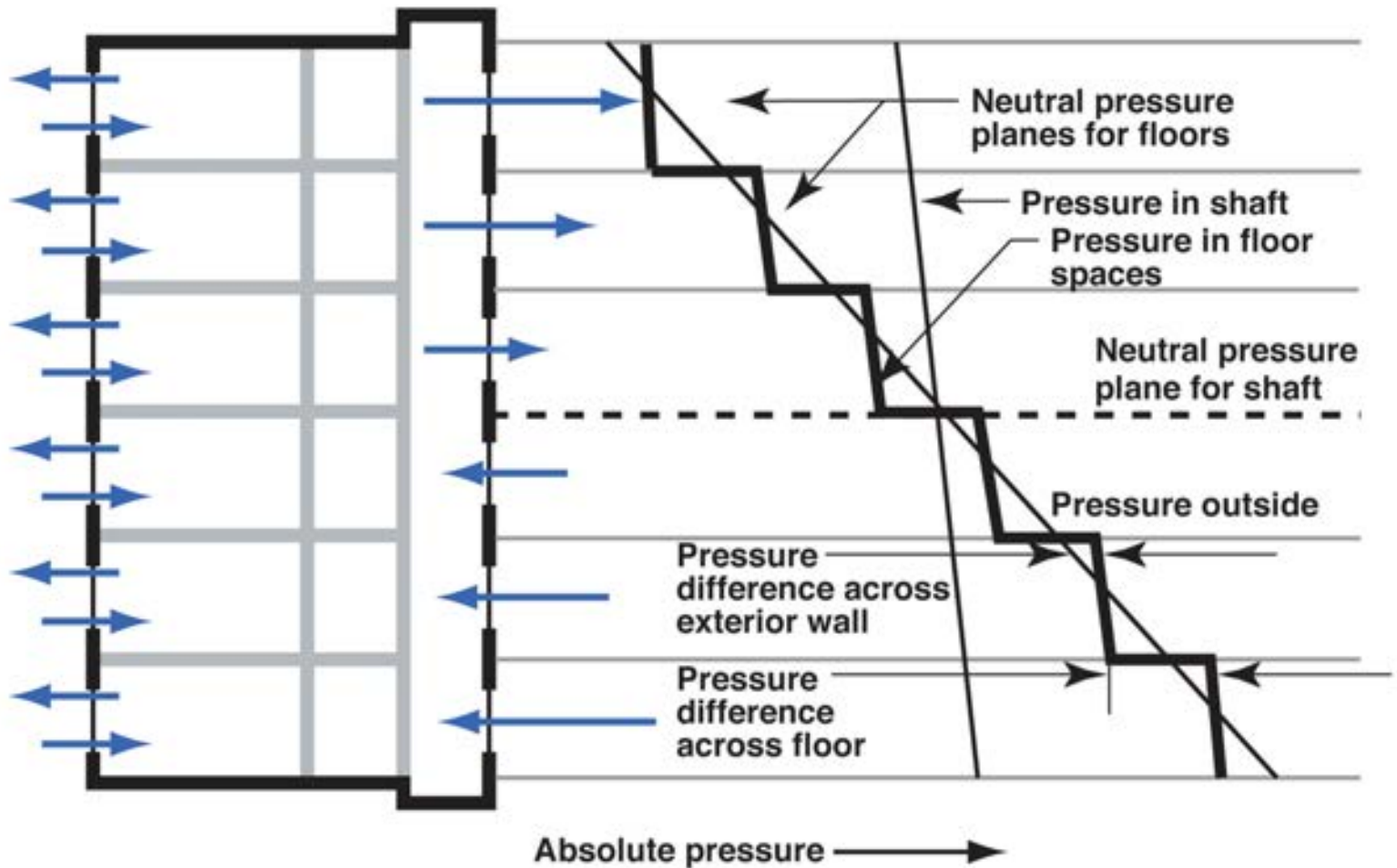




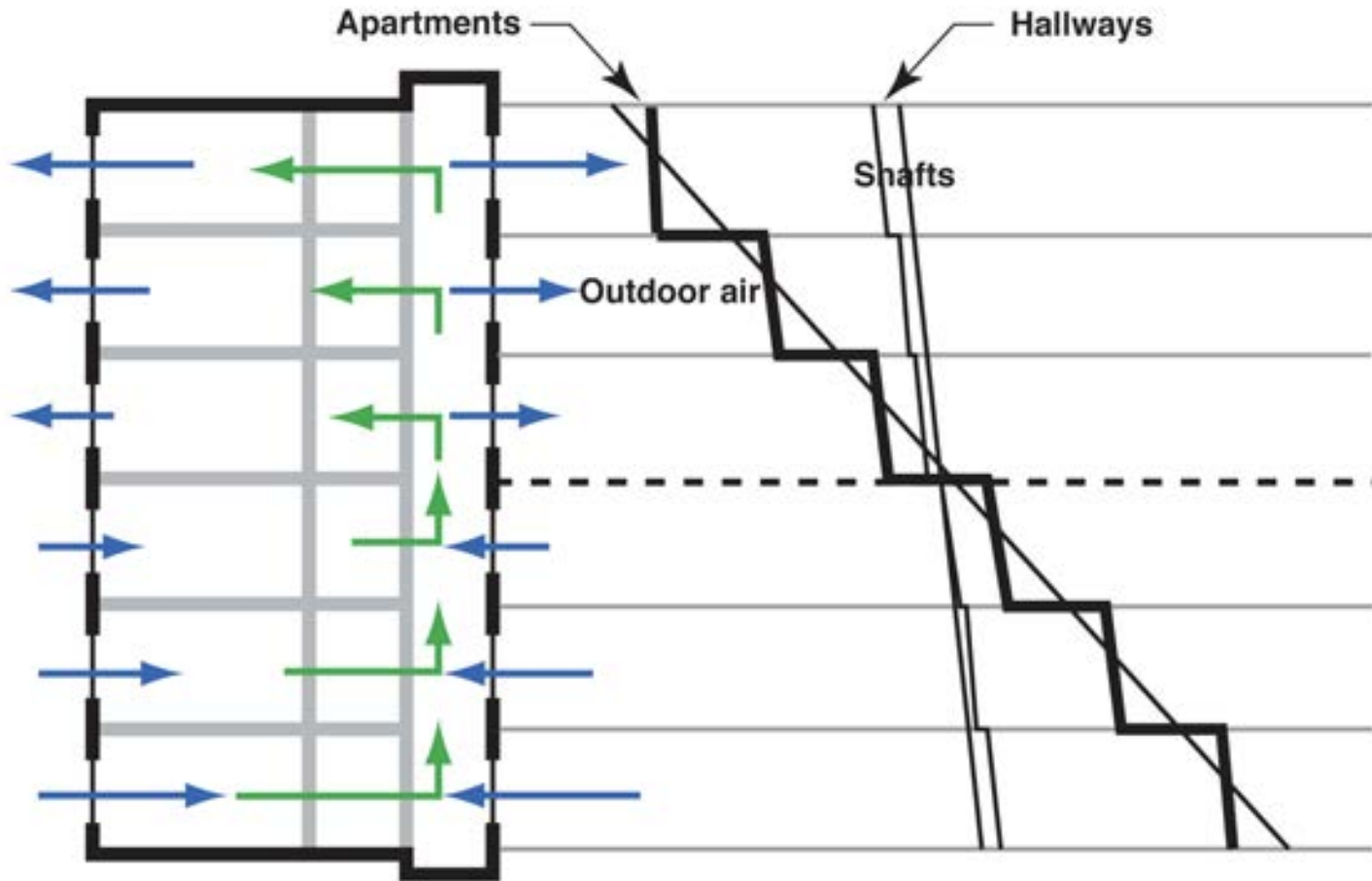




**Figure 11.8: Stack effect pressures in high rise office building
(Adapted from G.O. Handegord, 1998)**

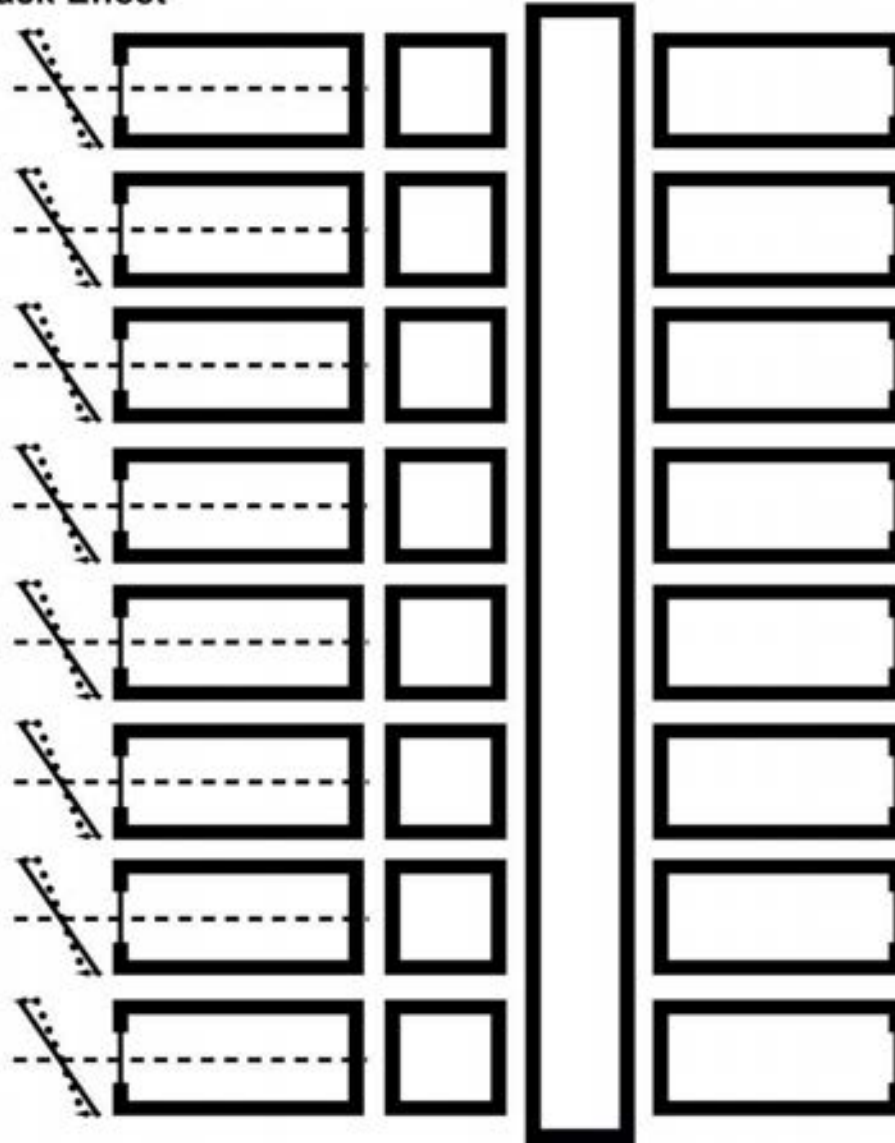


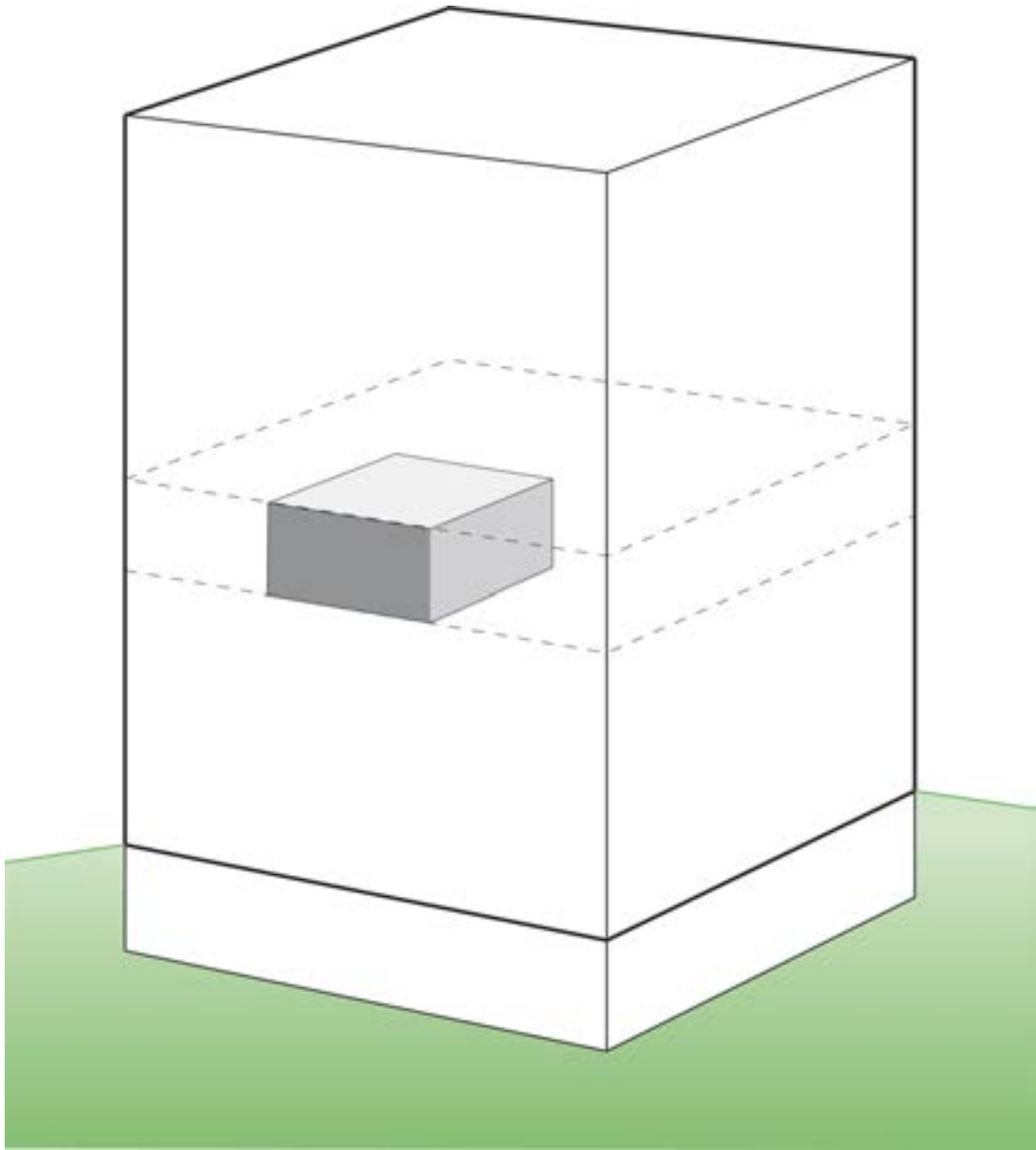
**Figure 11.9: Multi-storey building with floor spaces isolated from vertical shafts
(Adapted from G.O. Handegord, 1998)**



**Figure 11.12: Apartment building with tighter apartment entry doors
(Adapted from G.O. Handegord, 1998)**

Reduced Individual Unit Stack Effect









Build Tight - Ventilate Right

Build Tight - Ventilate Right
How Tight?
What's Right?

Air Barrier Metrics

Material	0.02 l/(s-m ²) @ 75 Pa
Assembly	0.20 l/(s-m ²) @ 75 Pa
Enclosure	2.00 l/(s-m ²) @ 75 Pa
	0.35 cfm/ft ² @ 50 Pa
	0.25 cfm/ft ² @ 50 Pa
	0.15 cfm/ft ² @ 50 Pa

Getting rid of big holes	3 ach@50
Getting rid of smaller holes	1.5 ach@50
Getting German	0.6 ach@50

As Tight as Possible - with -

Balanced Ventilation

Distribution

Source Control - Spot exhaust ventilation

Filtration

Material selection

Energy Recovery

