

PRENDOS Limited

# **RISK EVALUATION**

# **BUILDING WEATHERTIGHTNESS**

# **Risk Evaluation**

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What factors increase the likelihood of failure?

Where is leakage most likely?

What are the consequences of failure?

# **Pilot Study of Weathertightness Failures**

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Data collected from 50 residential sites, mostly  
in Auckland.

250 household units

Age between 0 and 12 year with average age of  
5.2 years

Total value \$90 million

Median value \$450,000

Unitec study, median value of post-1990 houses  
\$354,000

# **Pilot Study of Weathertightness Failures**

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Average height – 2.38 storeys

Average wind zone – 30% above medium (NZS  
3604)

1420 leaks at an average of 5.7 leaks per unit

39 of 50 sites had balconies

39 of 50 sites had balconies that leaked

# **Repair Statistics**

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Total cost of repairs - \$8 million

Average repair cost - \$32,654

Worst case justified demolition and  
reconstruction

Four of the sites involved significantly  
'repaired' buildings that have failed  
again

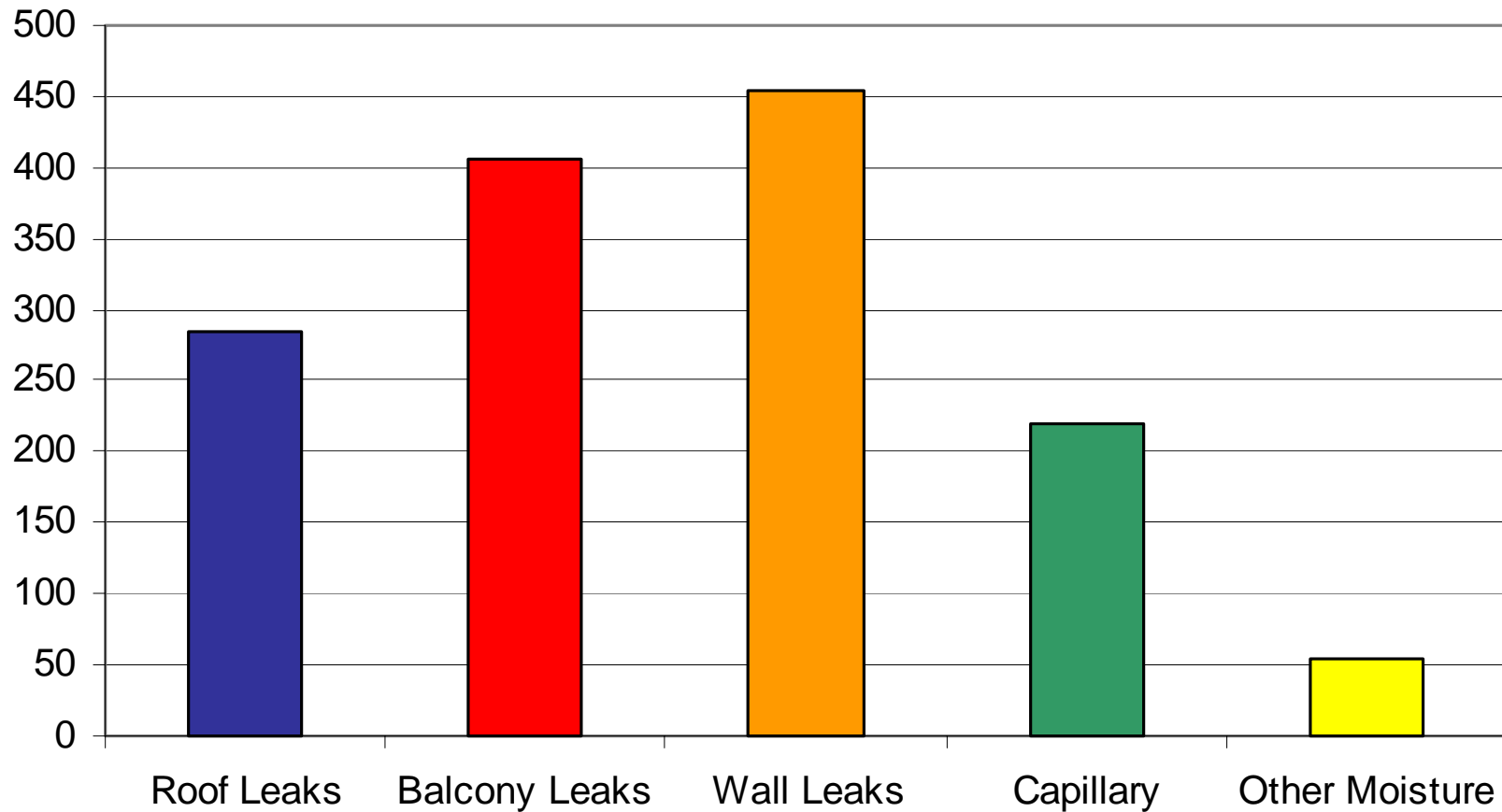
# Examples of 'Leak' Definitions

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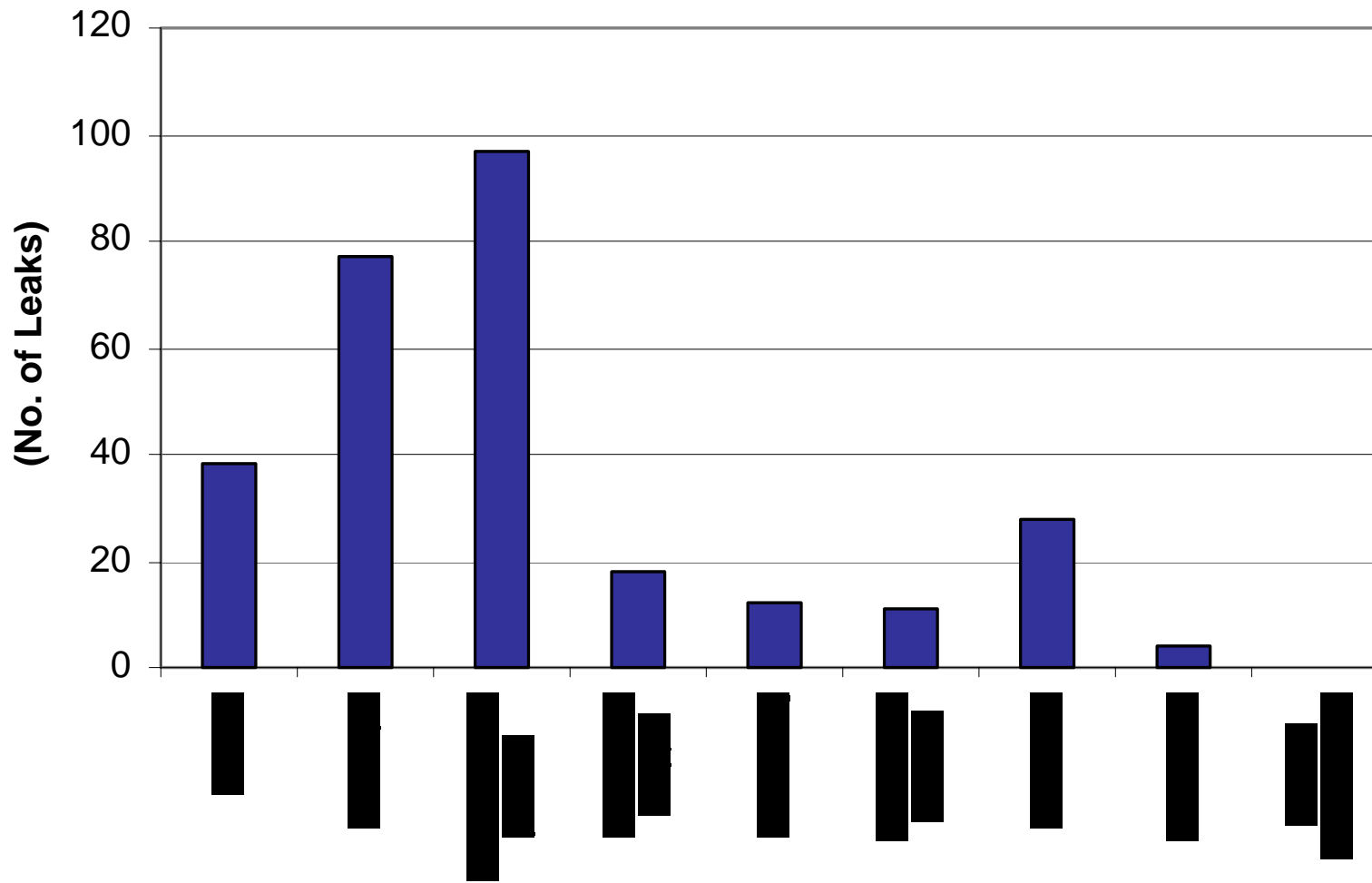
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Leak thru' parapet	1 per wall length up to max of 10 m
Balcony membrane	1 per deck up to 10m <sup>2</sup> of area
Window installation	1 leak per window
Cladding to ground	1 per wall length up to 10 m of wall
Subfloor ventilation	1 per elevation and 1 for missing dampcourse if adequate ventilation not possible
Shower leaks	1 per shower unit leaking

## Water Sources and Frequency



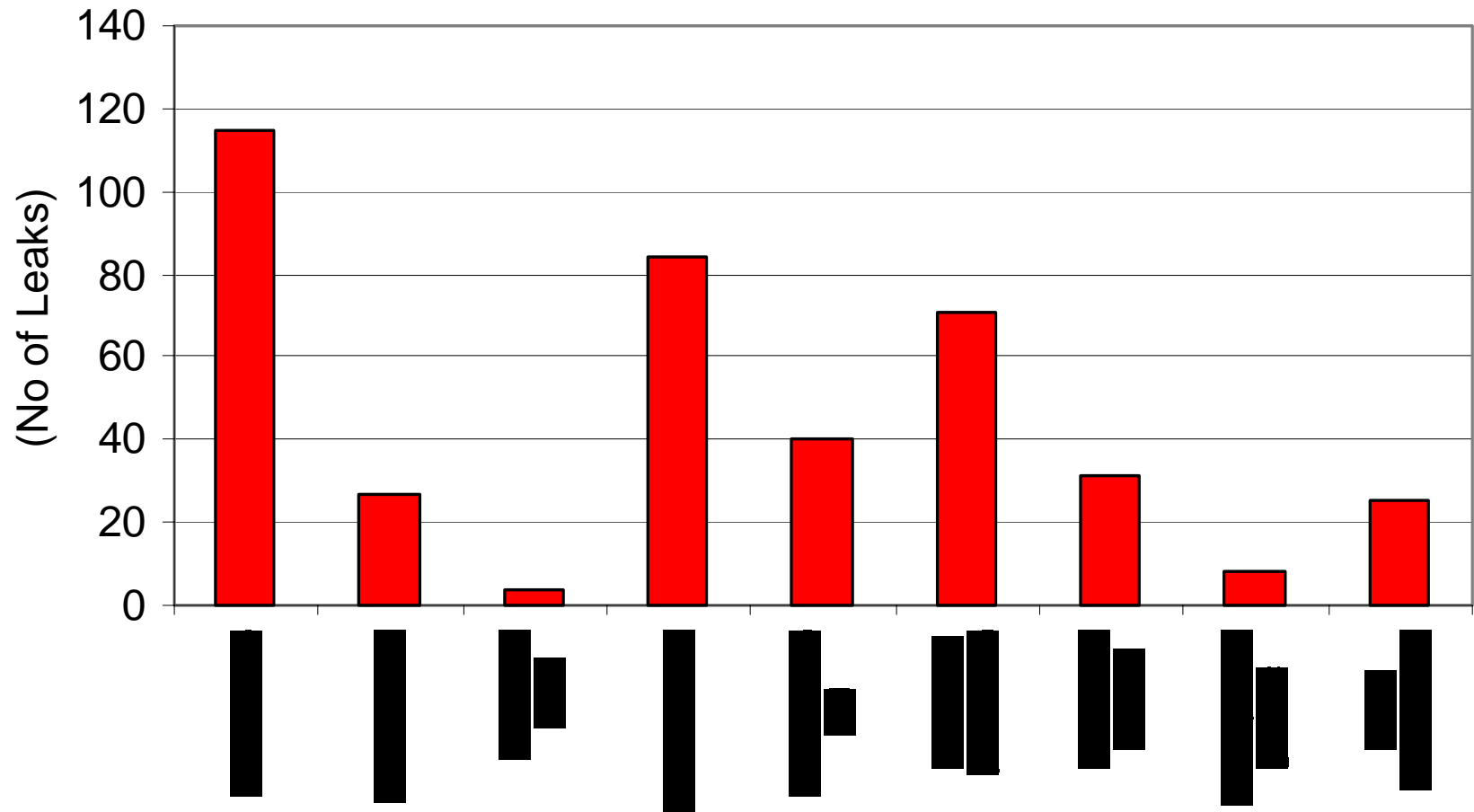
# Roof Leaks







# Balcony Leaks





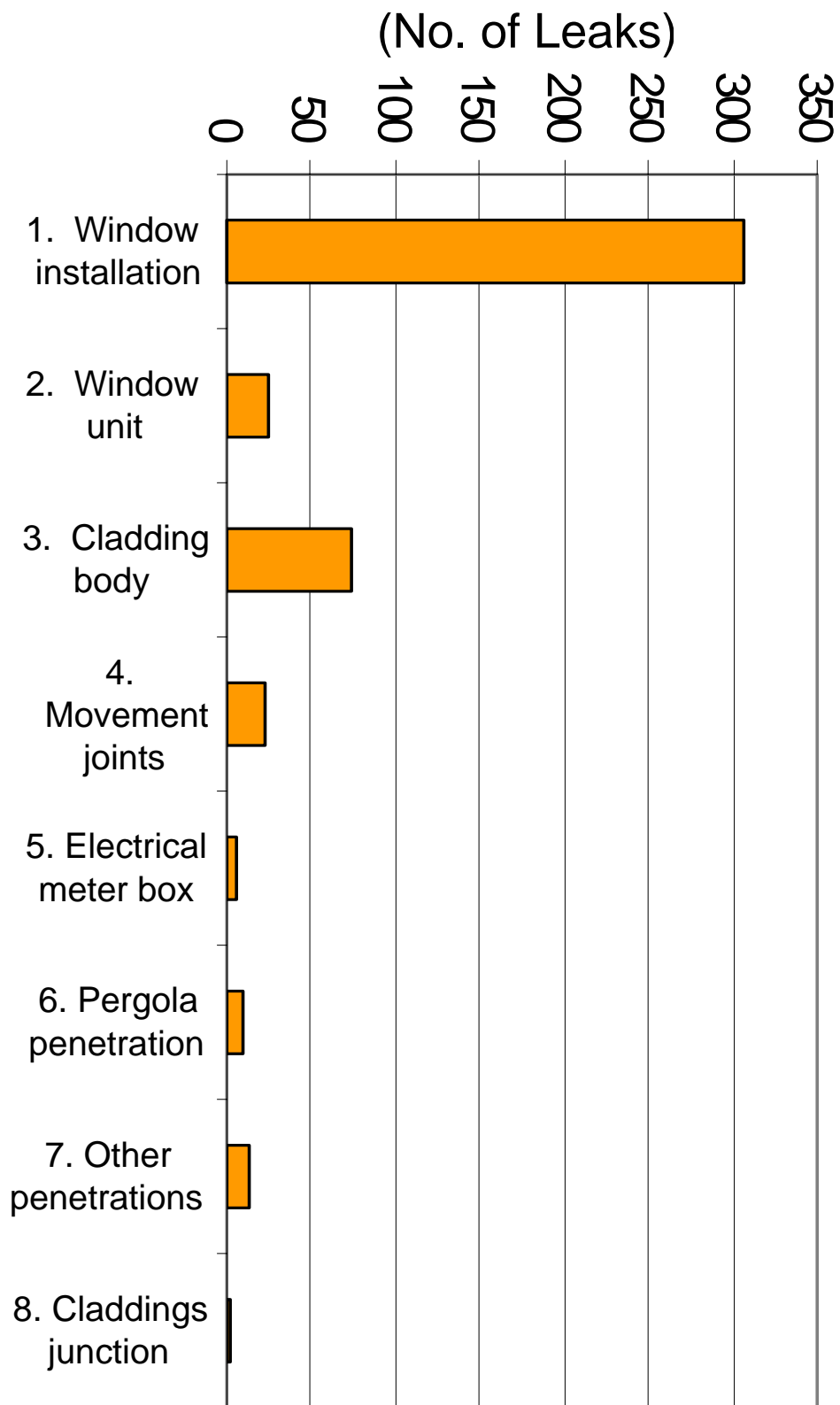




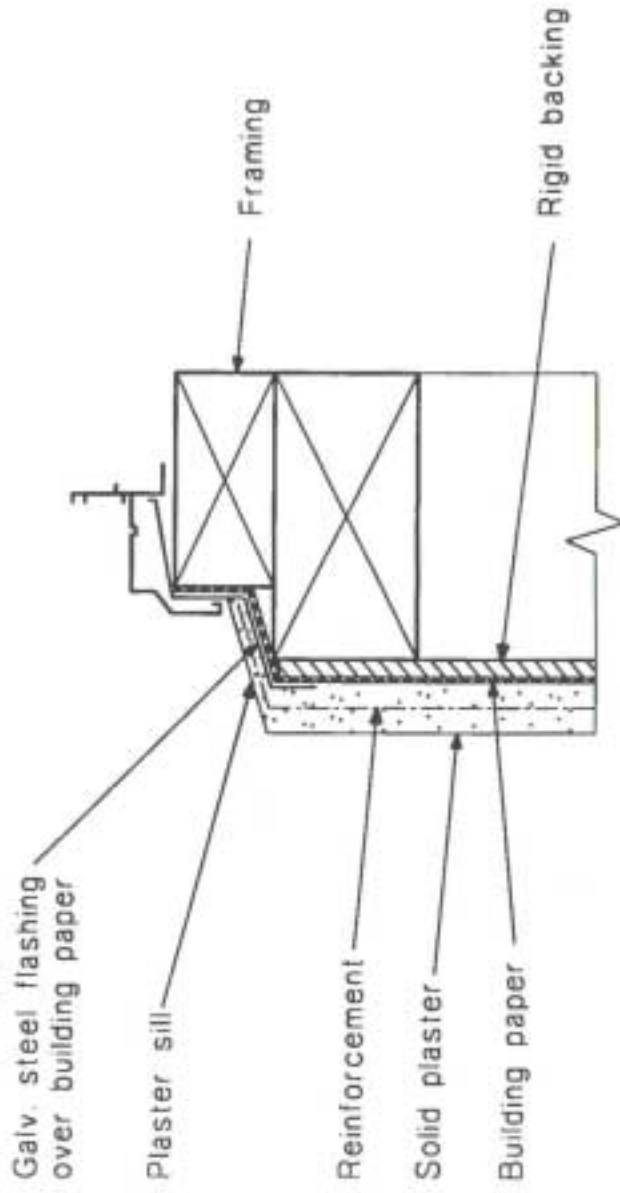




# Wall Leaks



**NZS 4251:Part 1:1998**

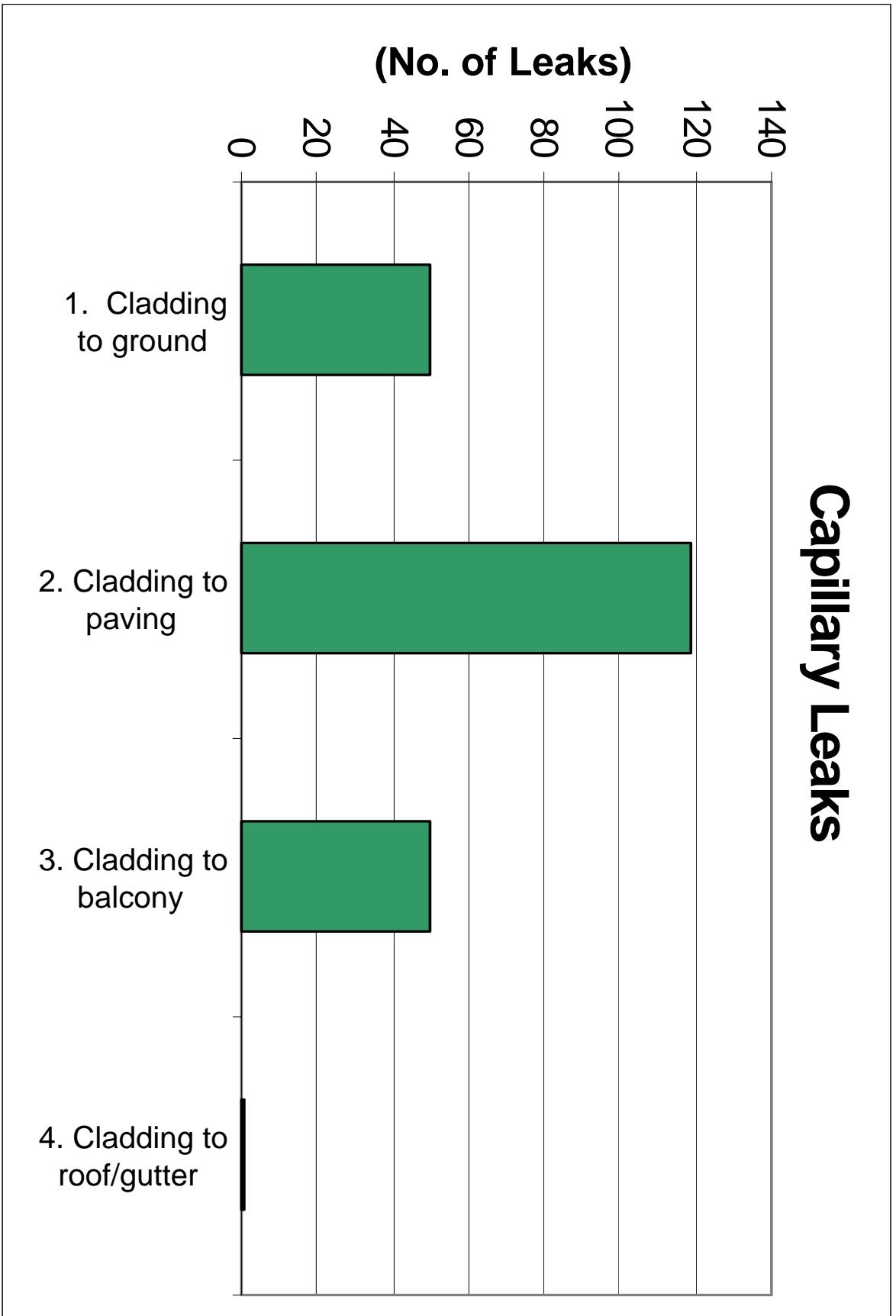


NOTE -  
Intermediate solid plaster coats  
not shown for clarity.

**Figure 1(c) – Alternative sill detail**

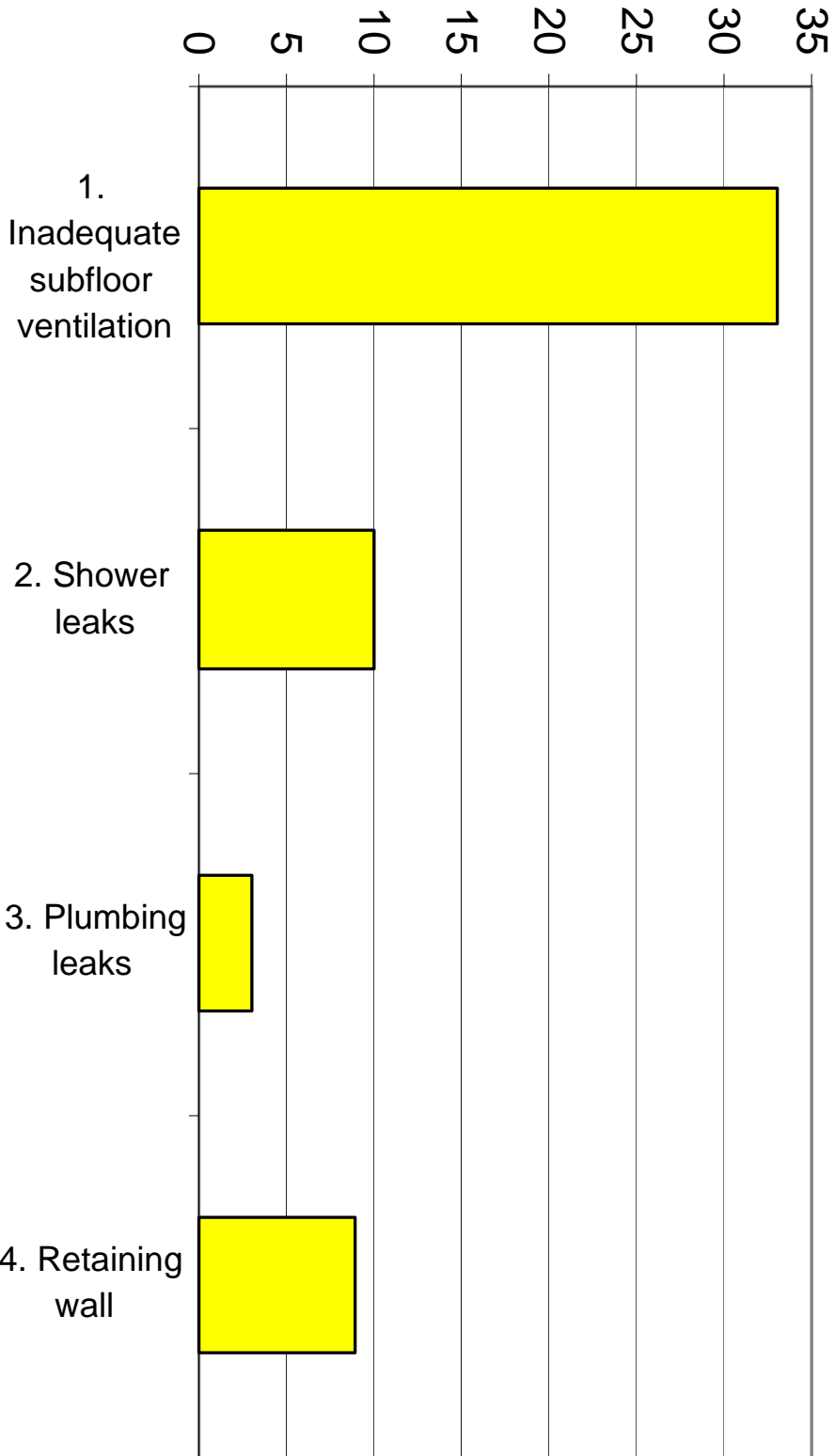


# Capillary Leaks





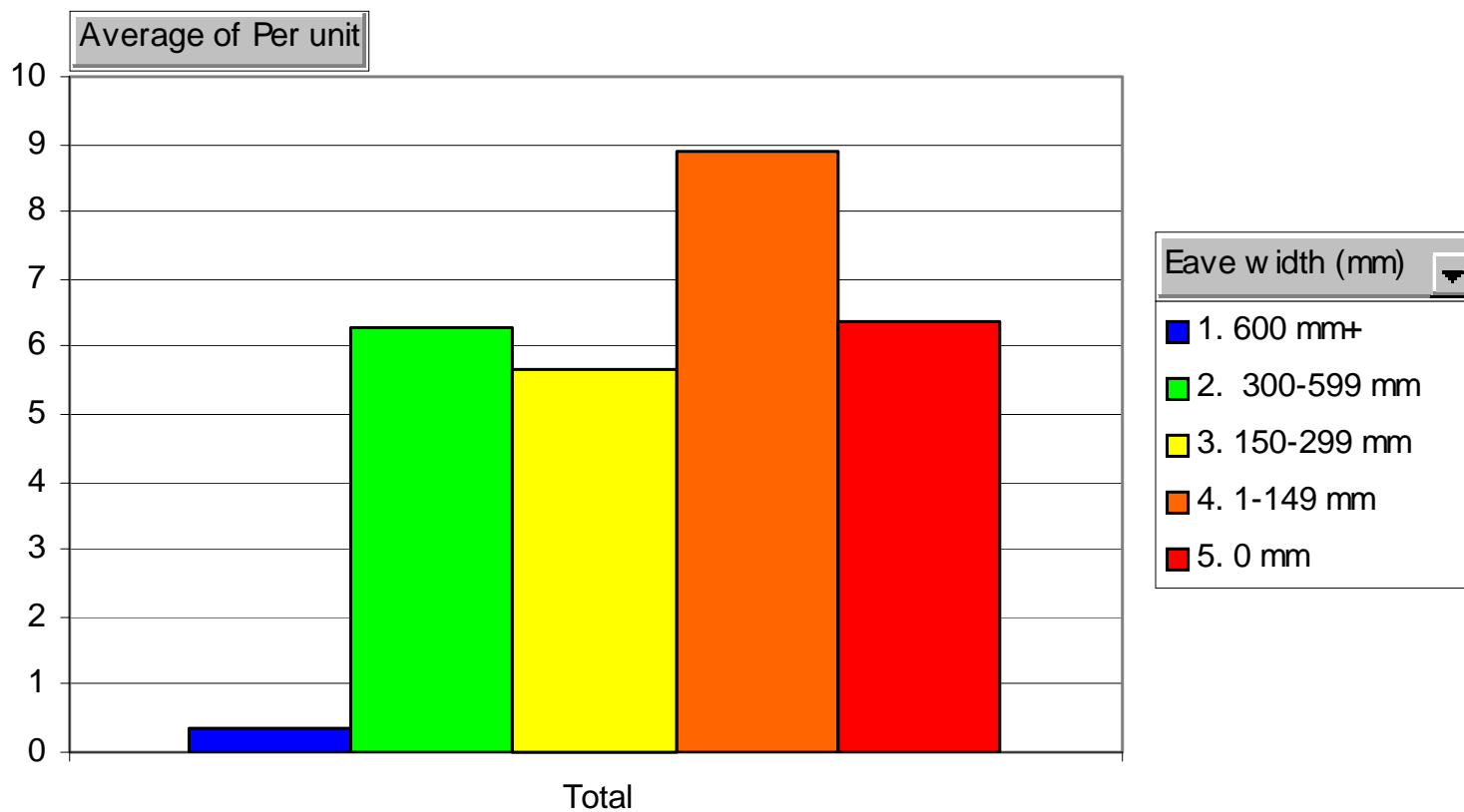
# (No. of Leaks)



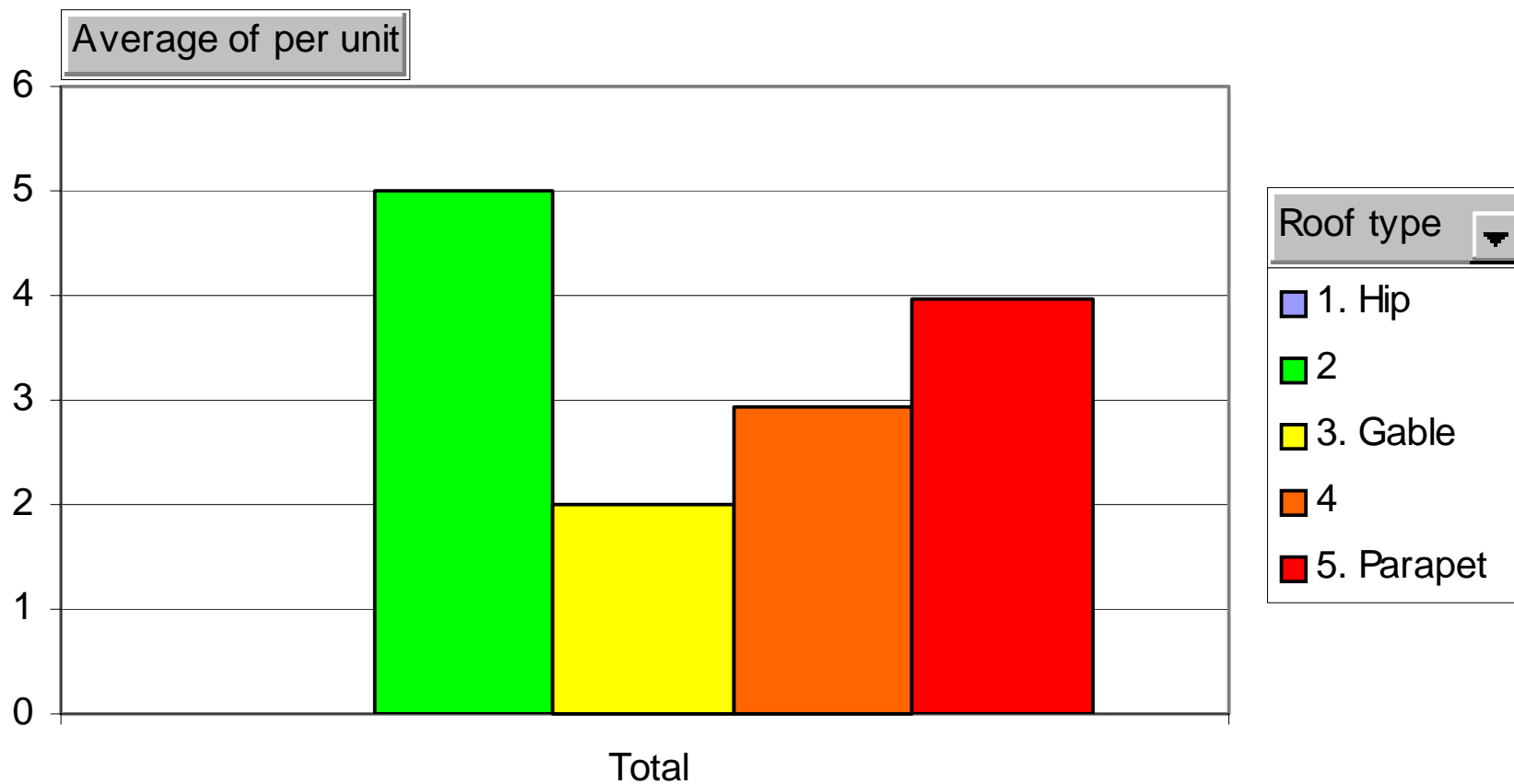
## Other Leaks



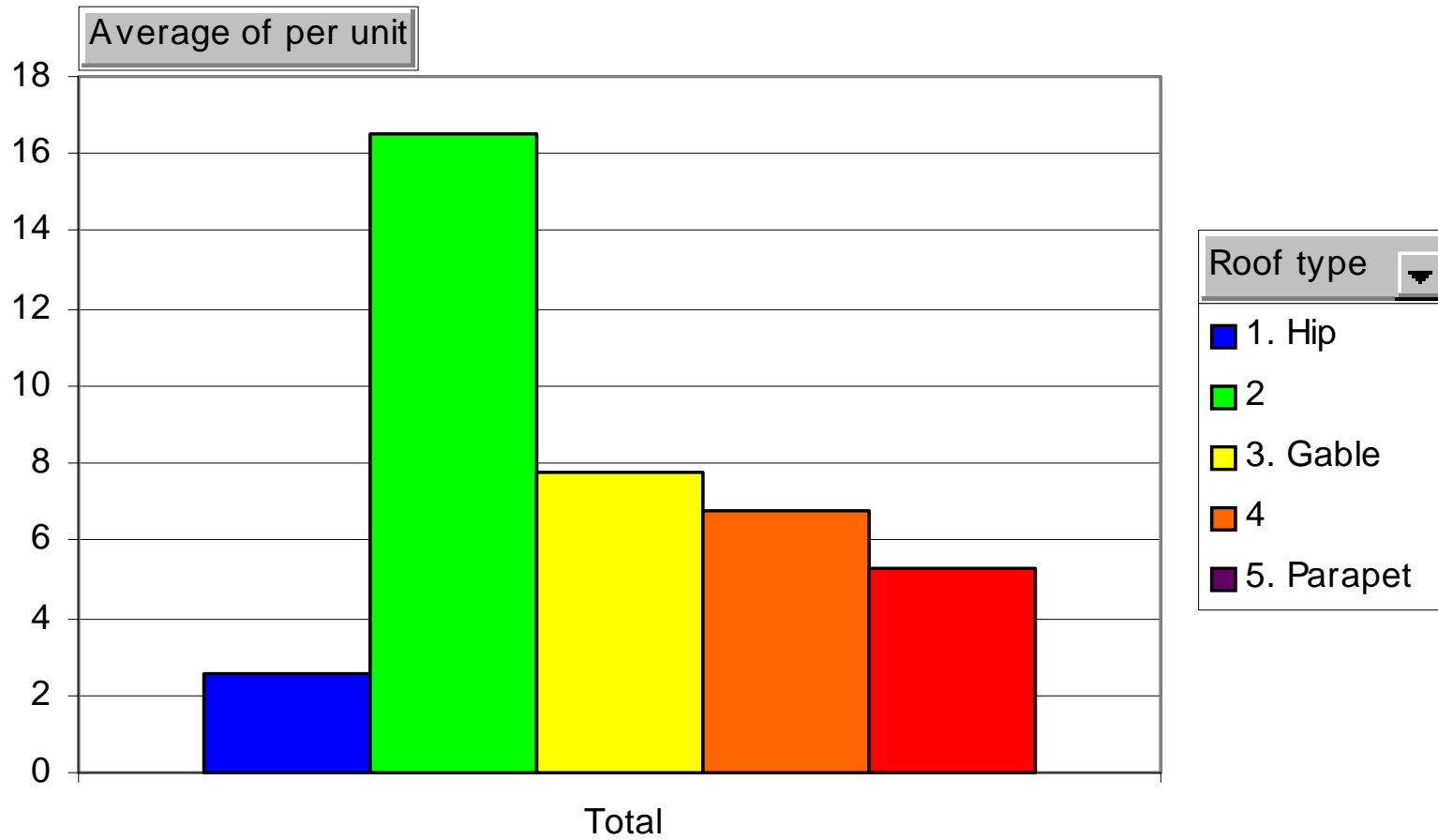
# Roof Eave Width vs Wall Leaks Per Unit



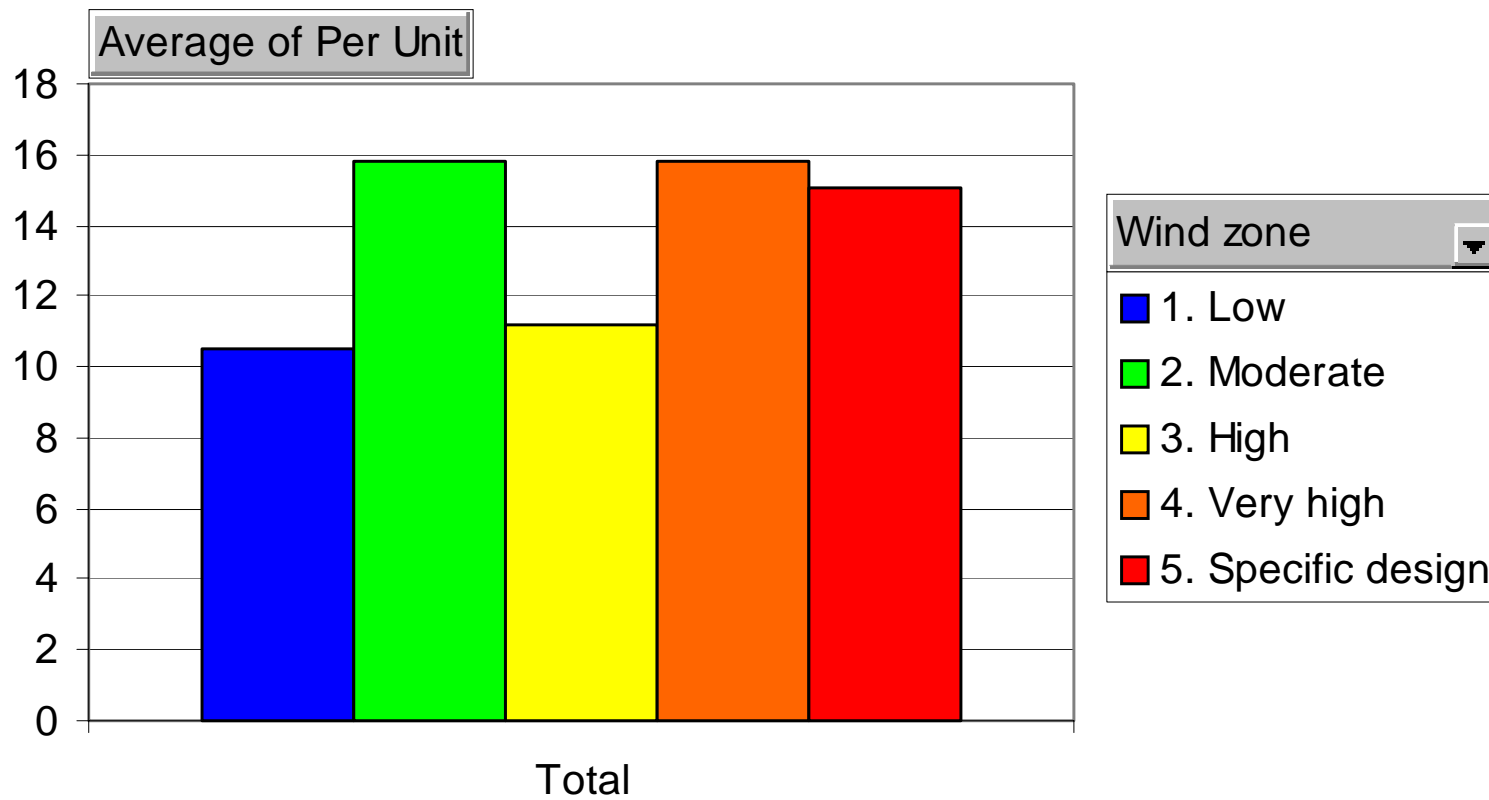
# Roof Type vs Wall Leaks Per Unit



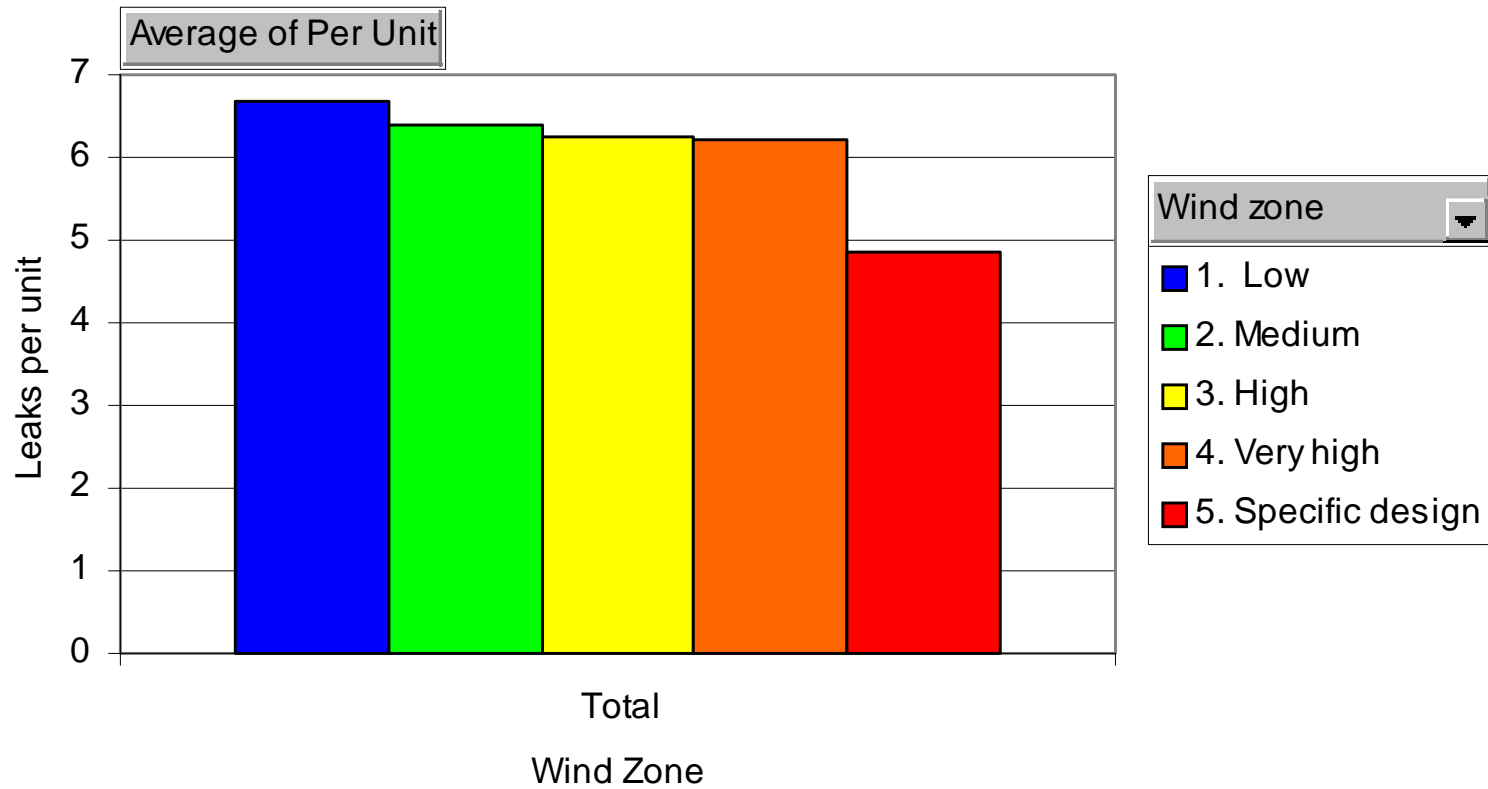
# Roof Type vs Leaks Per Unit



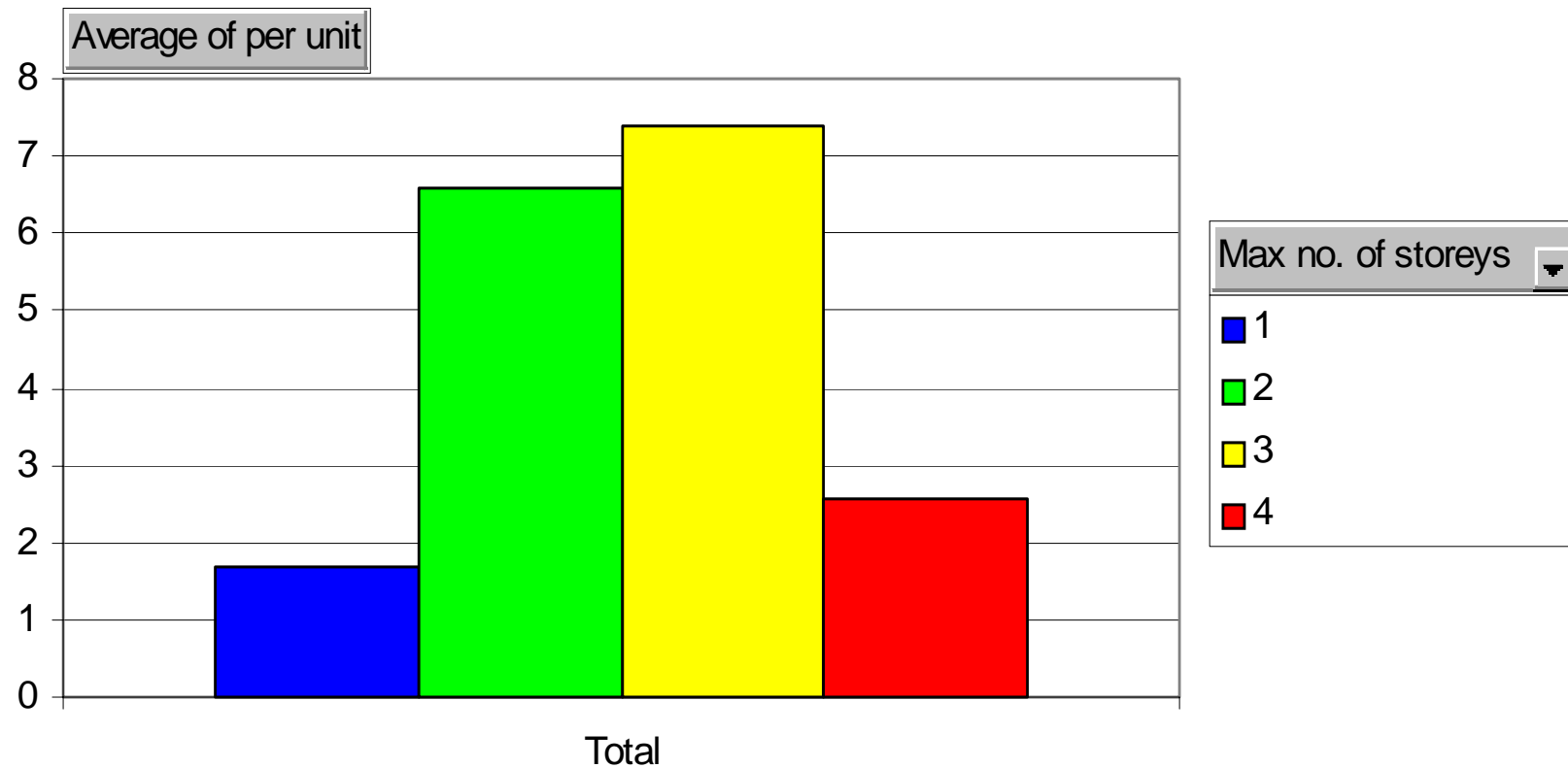
# Wind Zone vs Wall, Roof and Balcony Leaks Per Unit



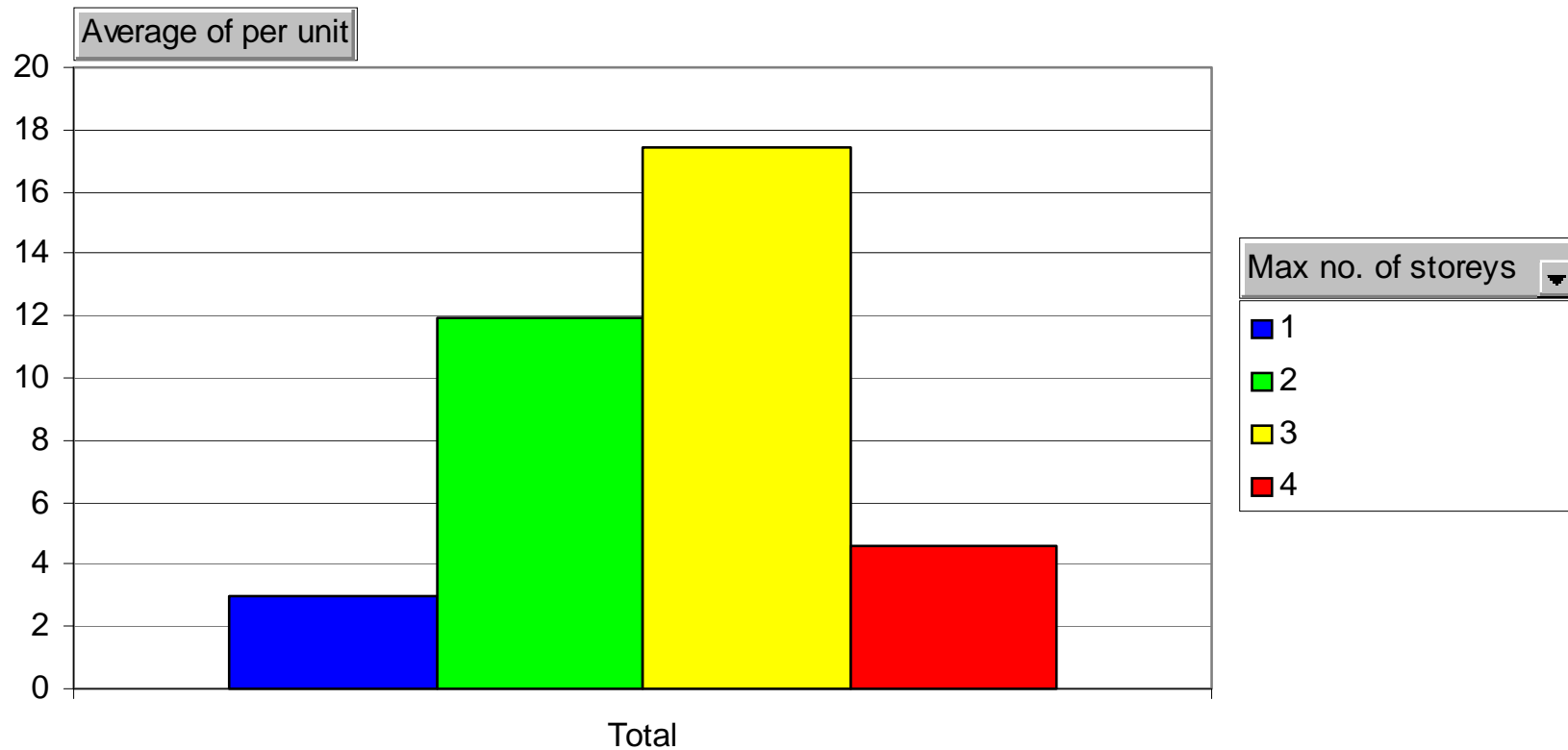
# Wind Zone vs Wall Leaks Per Unit



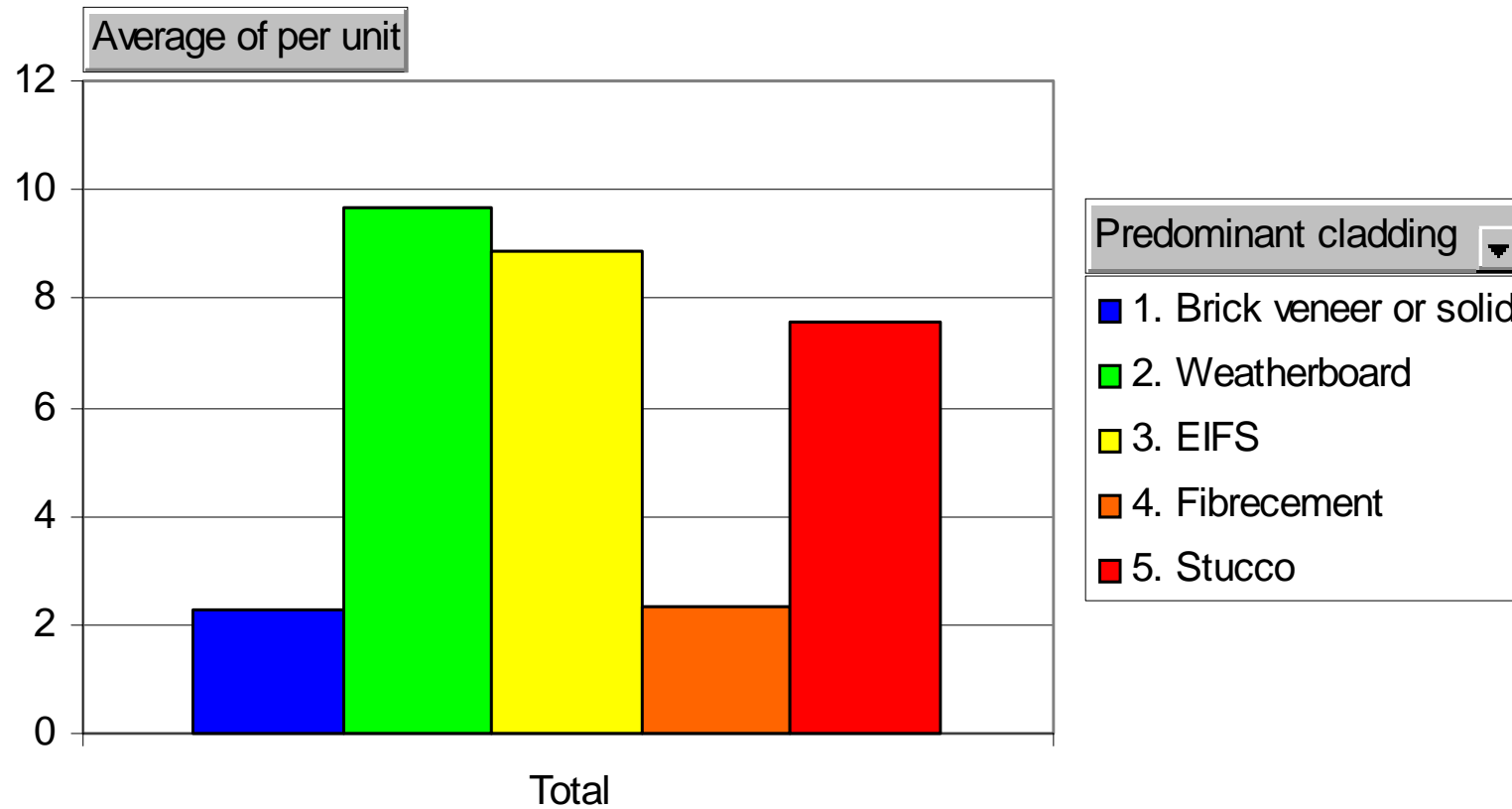
# No. of Storeys vs Wall Leaks Per Unit



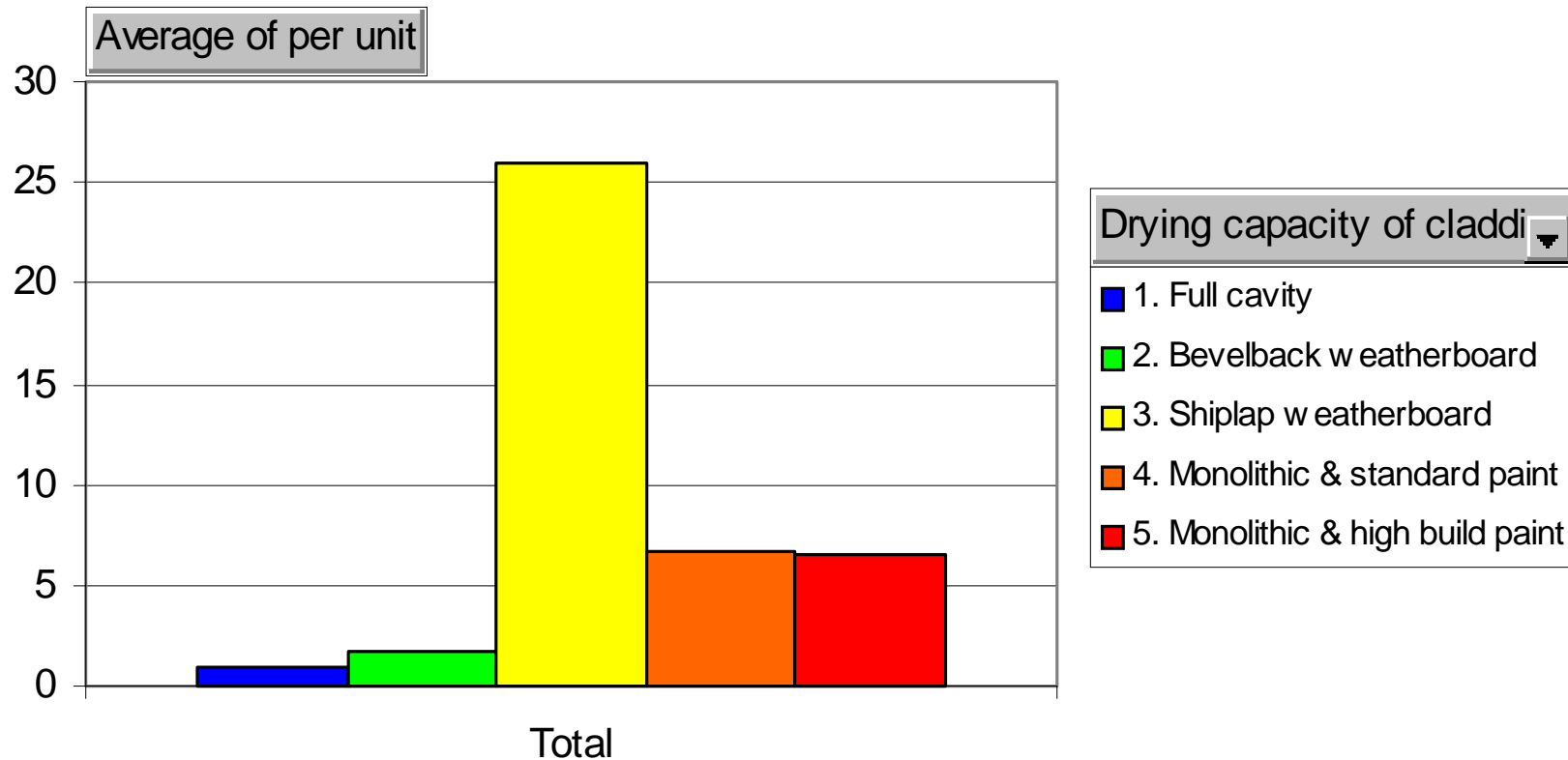
# No. of Storeys vs Roof, Balcony and Wall Leaks Per Unit



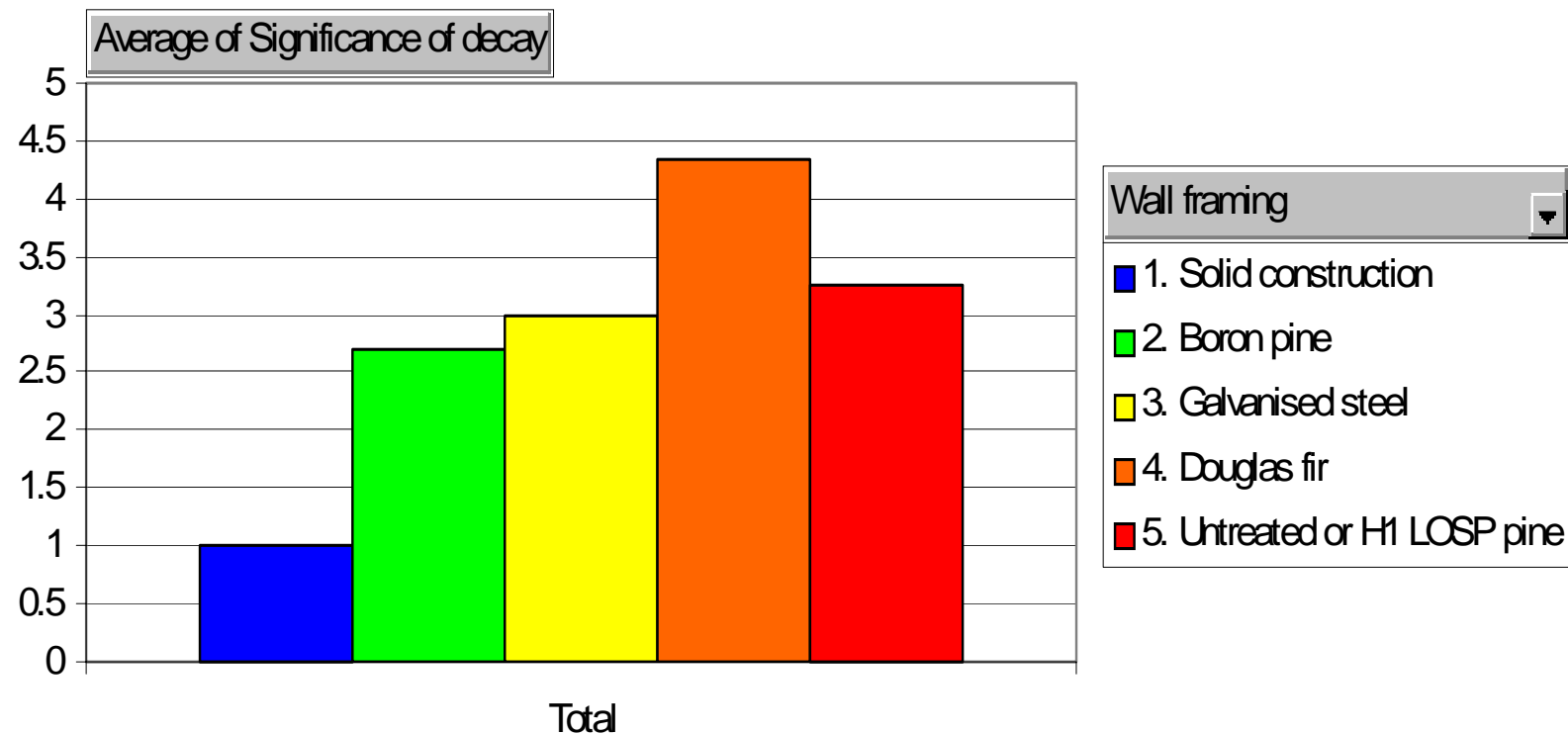
# Predominant Cladding vs Wall Leaks Per Unit



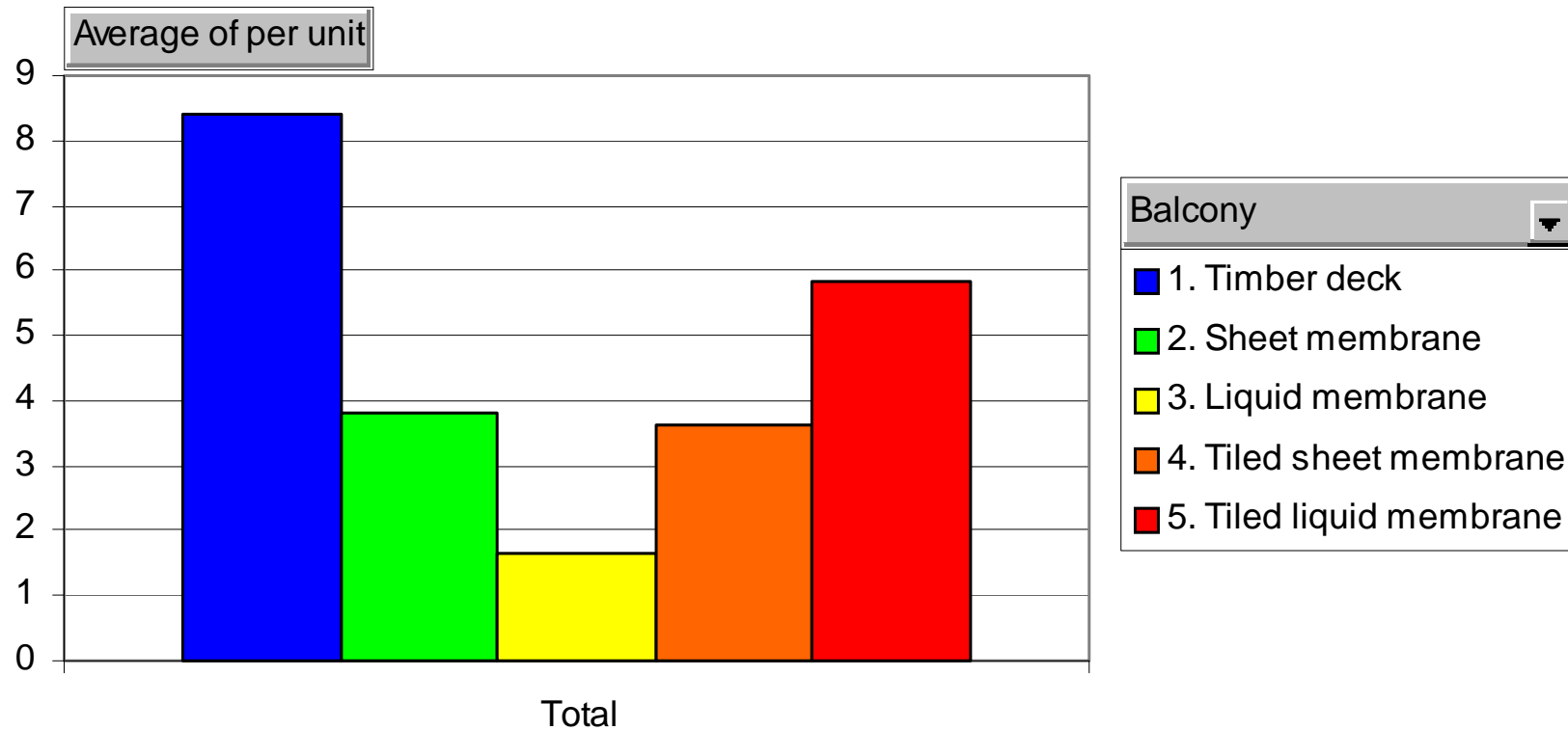
# Cladding Drying Capacity vs Wall Leaks Per Unit



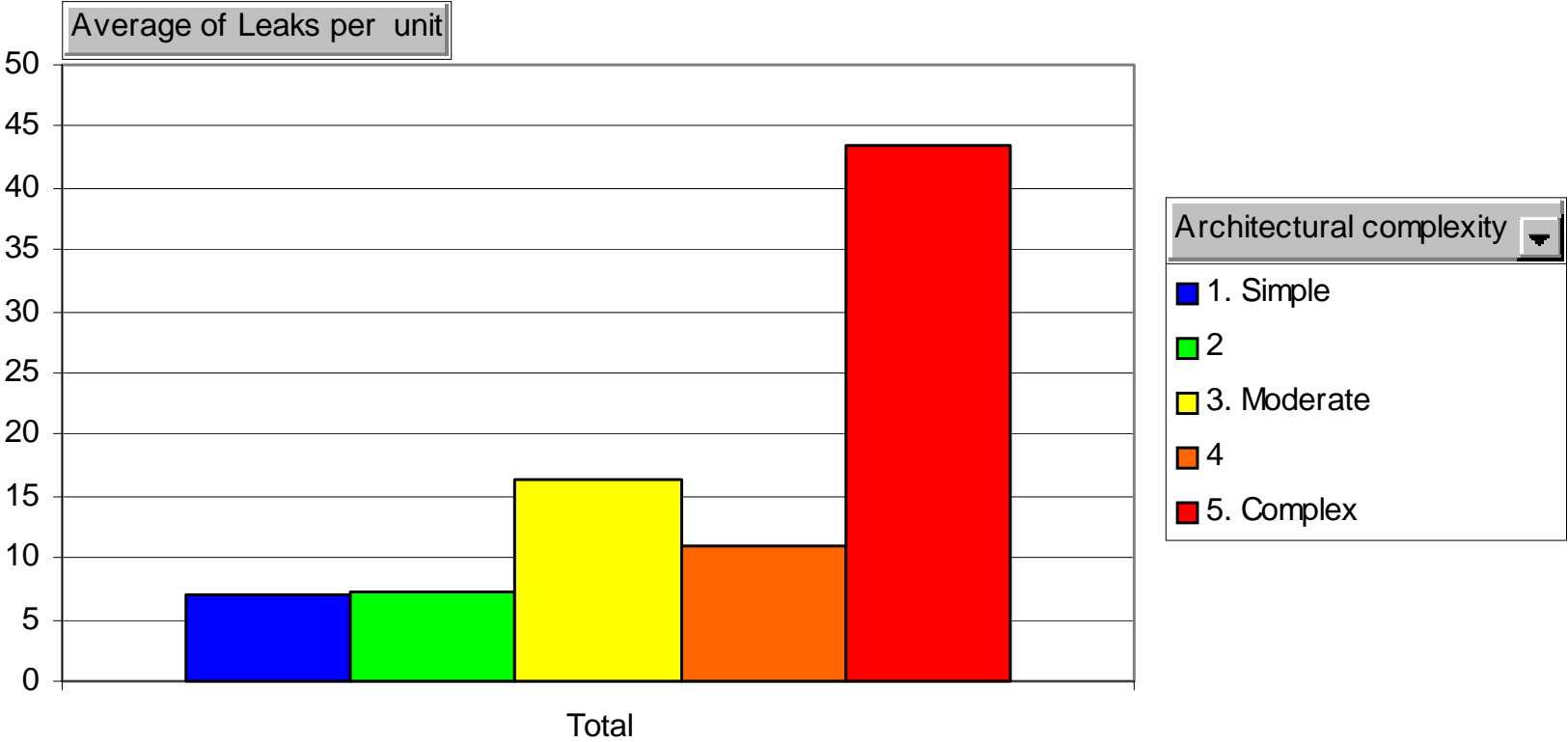
# Framing vs Significance of Corrosion Decay (Average)



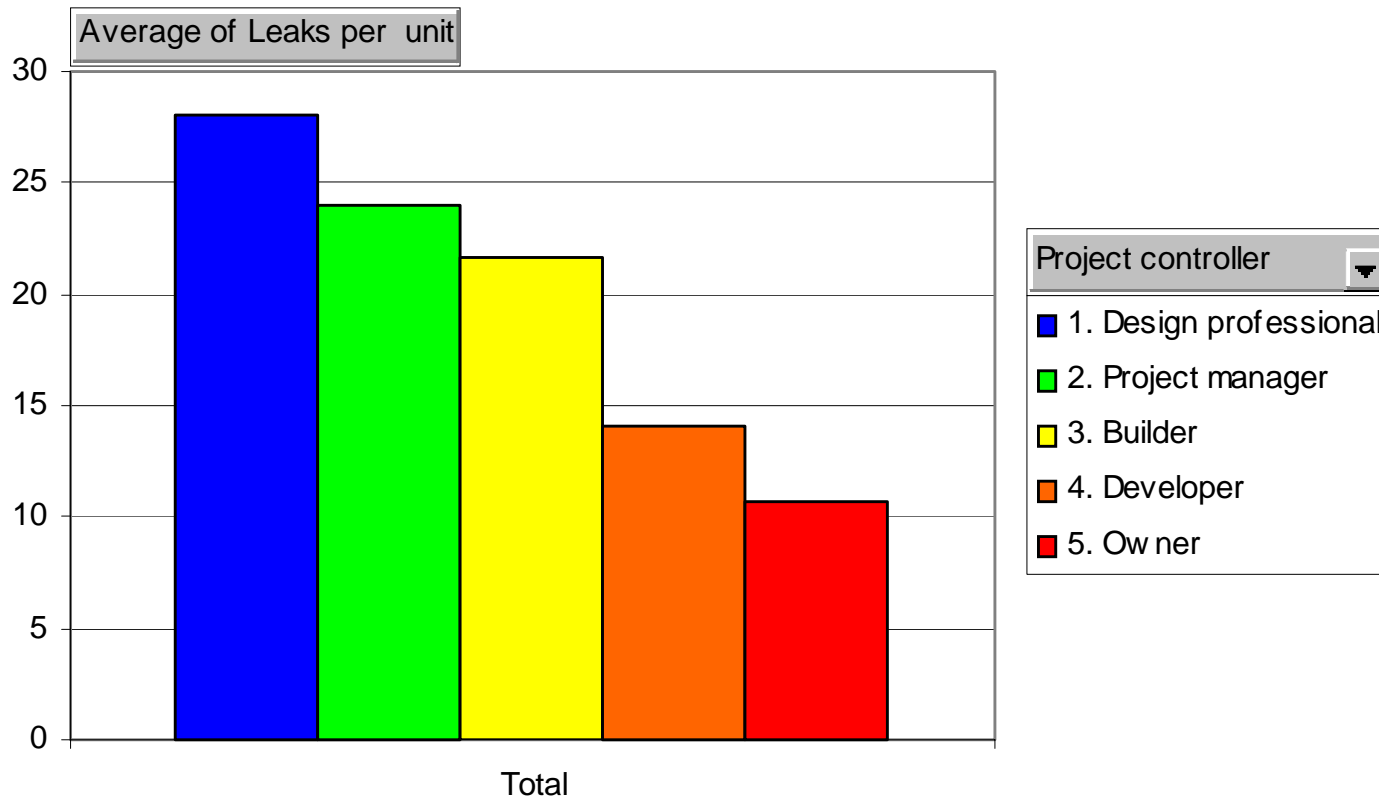
# Balcony vs Balcony Leaks Per Unit



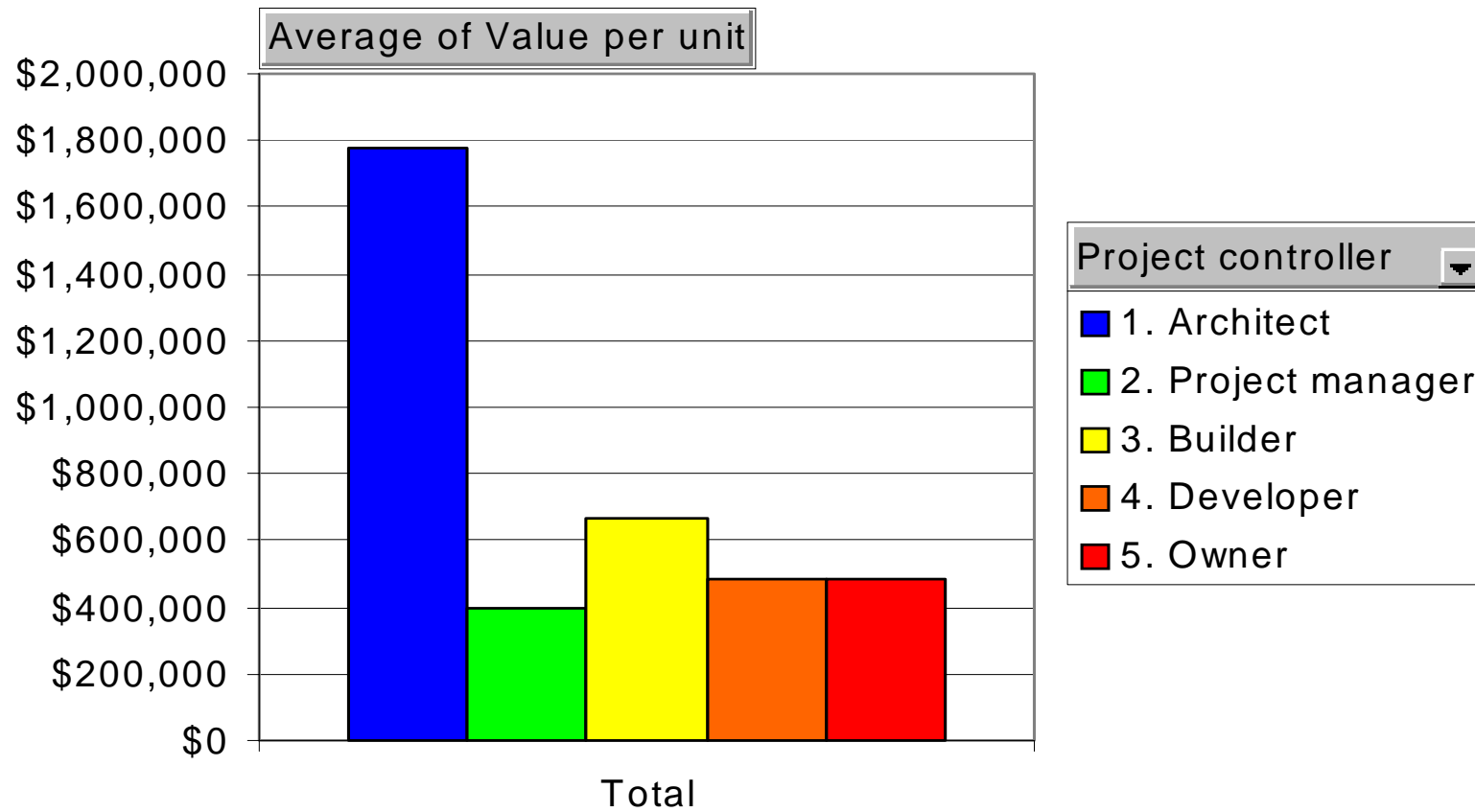
# Architectural Complexity vs Leaks Per Unit



# Project Controller vs Leaks Per Unit



# Project Controller vs Value



Weathertightness Risk Evaluation											
Risk Levels	Low		Medium low		Medium		Medium high		High		
Climate	Central Otago	0	Canterbury	1	Auckland	2	Otago	3	West Coast	5	
Wind zone (NZS3604)	Low	0	Medium	1	High	2	Very high	3	Specific design	5	
No. of storeys	One	0	Two	1	Three	3	Four	5	Five or more	7	
Architectural complexity	Simple	0	Moderately simple	1	Moderate	2	Moderately complex	3	Complex	4	
Roof type	Hip	0	mix	1	Gable	2	mix	3	Parapet	4	
Eave width (ignore if parapet)	600mm +	0	300 - 599mm	1	150 - 299mm	2	1 - 149mm	4	0mm	5	
Balcony over habitable space	None	0			Sheltered by roof	2			Open	5	
<b>TOTALS &gt;&gt;</b>			+		+		+		+	=	
<div style="display: flex; align-items: center; justify-content: flex-end;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"><b>GRAND TOTAL</b></div> <div style="font-size: 2em;">↓</div> </div>											
<b>No treatment or ventilation required</b>										←←←←←	<b>0 to 5</b>
<b>H3 treatment <u>OR</u> ventilation required</b>										←←←←←	<b>6 to 12</b>
<b>H3 treatment <u>AND</u> ventilation required</b>										←←←←←	<b>13 plus</b>