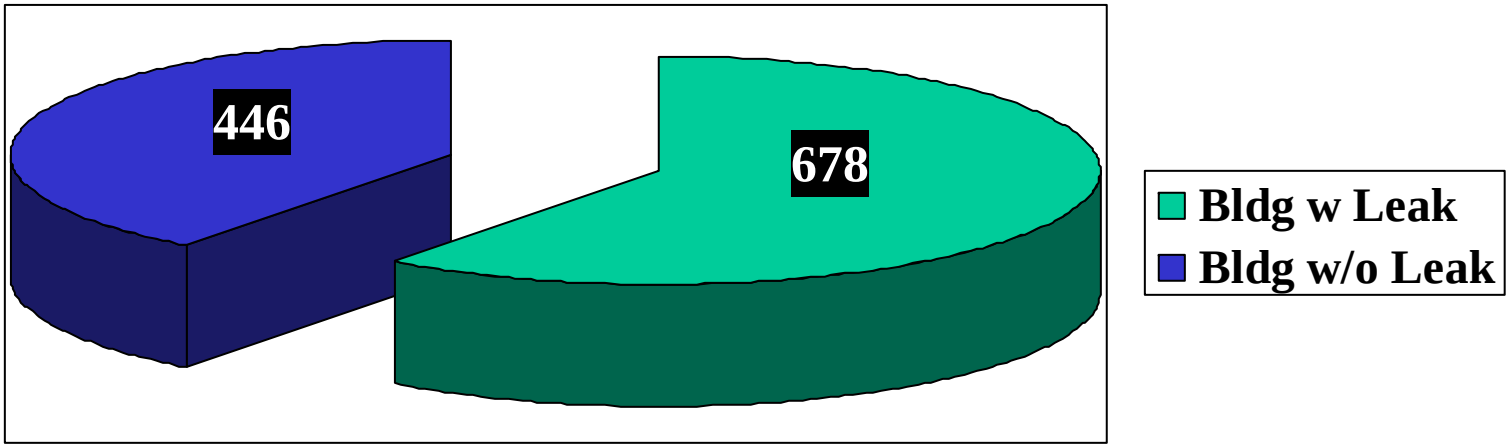
Roof Analysis 2003-2005

Is This A Problem?

2003-2005 Work Order Data for a Total of 1124 Buildings in United



Assumption

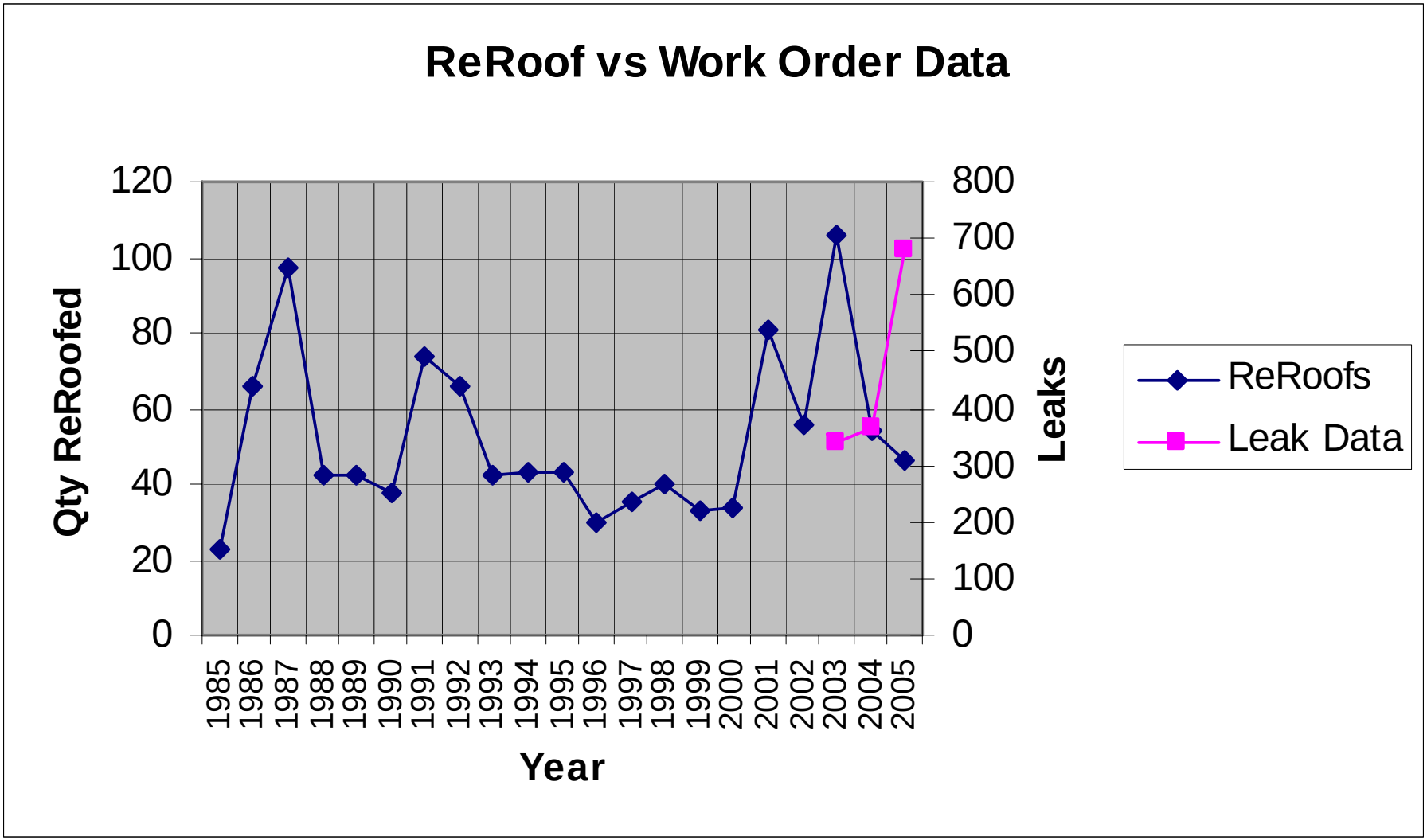
- A “Roof Leak” can be anything associated with the roof including, roof tiles, paper, flashing, downspouts, etc. If the repair requires someone to get up on the roof to make a repair, it is defined as a “Roof Leak” for this analysis.

Question?

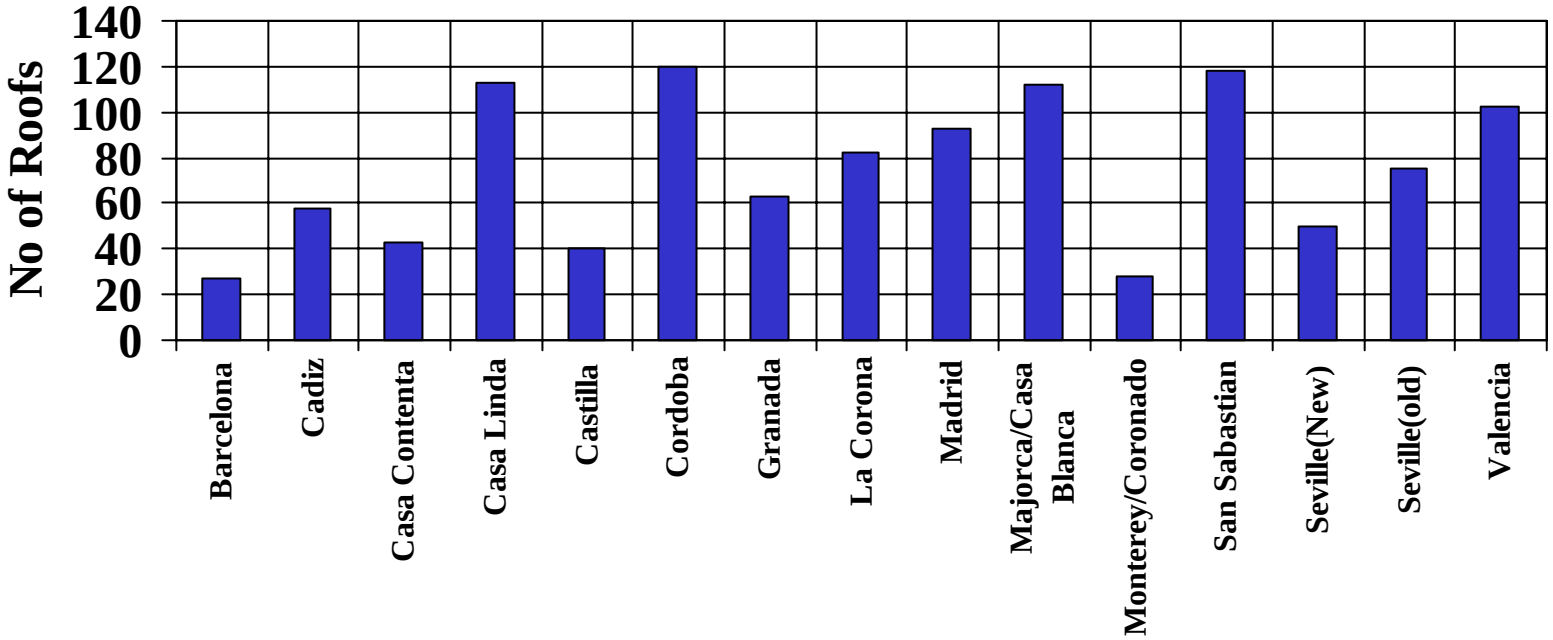
- Before looking at the following slides, please answer the following questions using your expectations (assuming we install a “20 year roof”):
  - What percent of roofs will leak within the first year after installation?
  - What percent of roofs will leak within ten years after installation?

Process

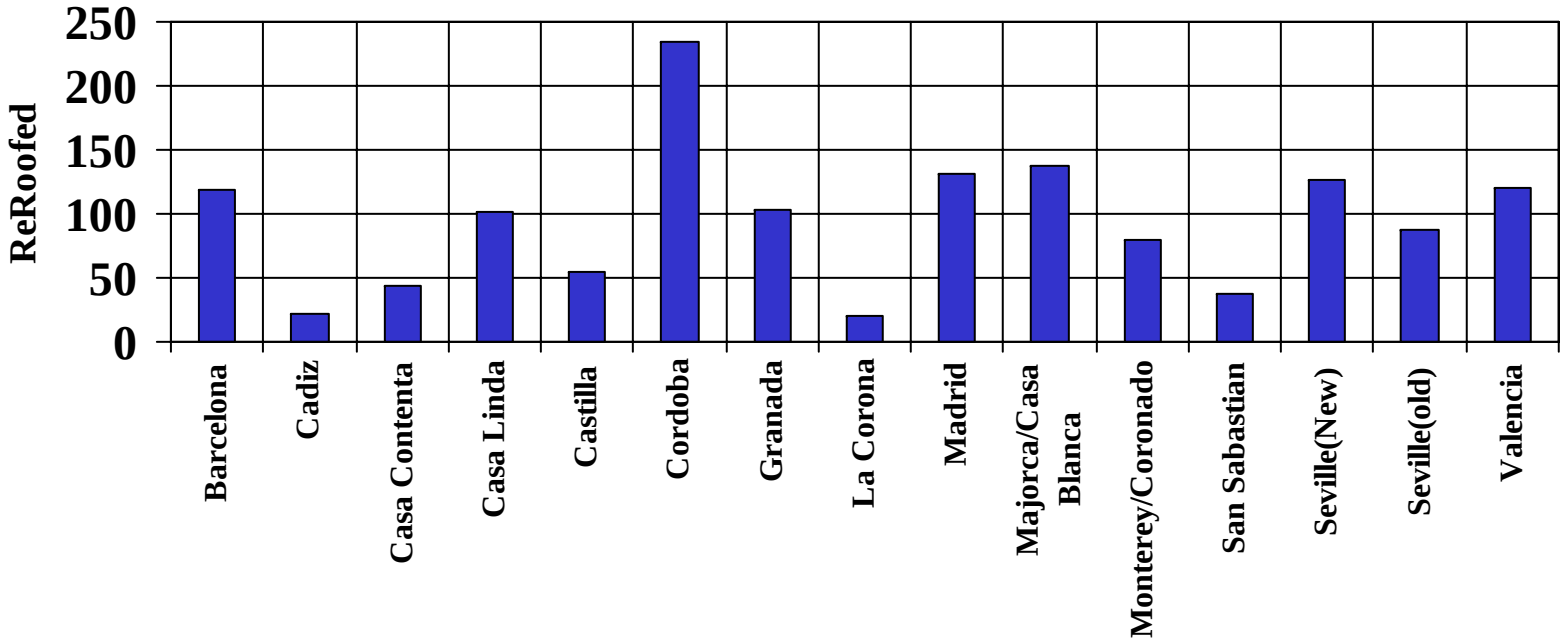
- Source Data:
  - Roofing History from Erik Schneekluth (1/1/85-1/1/2006).
  - Work Order Data from Cynthia Grace (2003-2005).
- Due to the limitations of the Work Order Data, the analysis was both “Right” and “Left” censored. Result will be more conservative than actual.


ReRoof vs Work Order Data
Qty ReRoofed
Leaks
Year
ReRoofs
Leak Data
0
20
40
60
80
100
120
0
100
200
300
400
500
600
700
800
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005

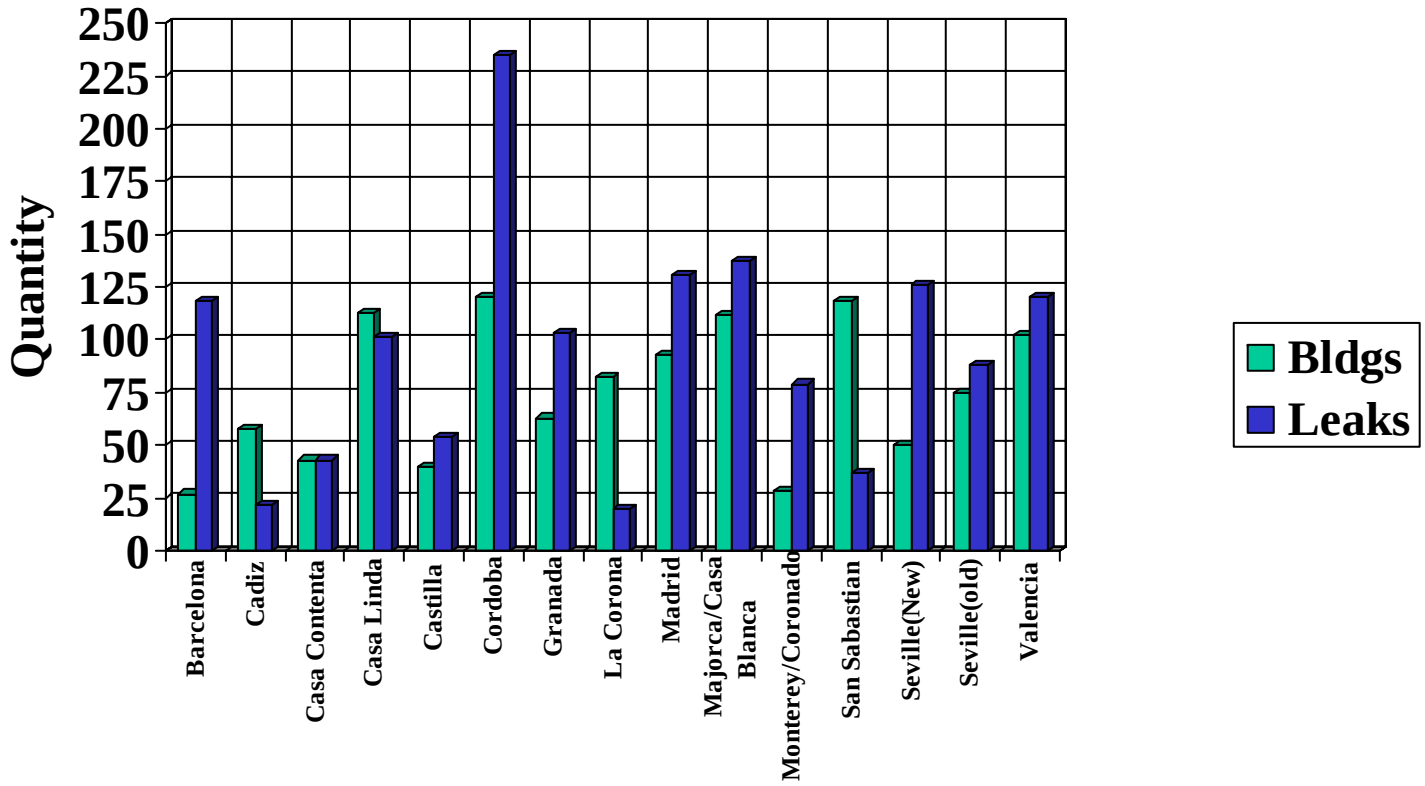
Number of Roofs by Model (1124 Bldgs)



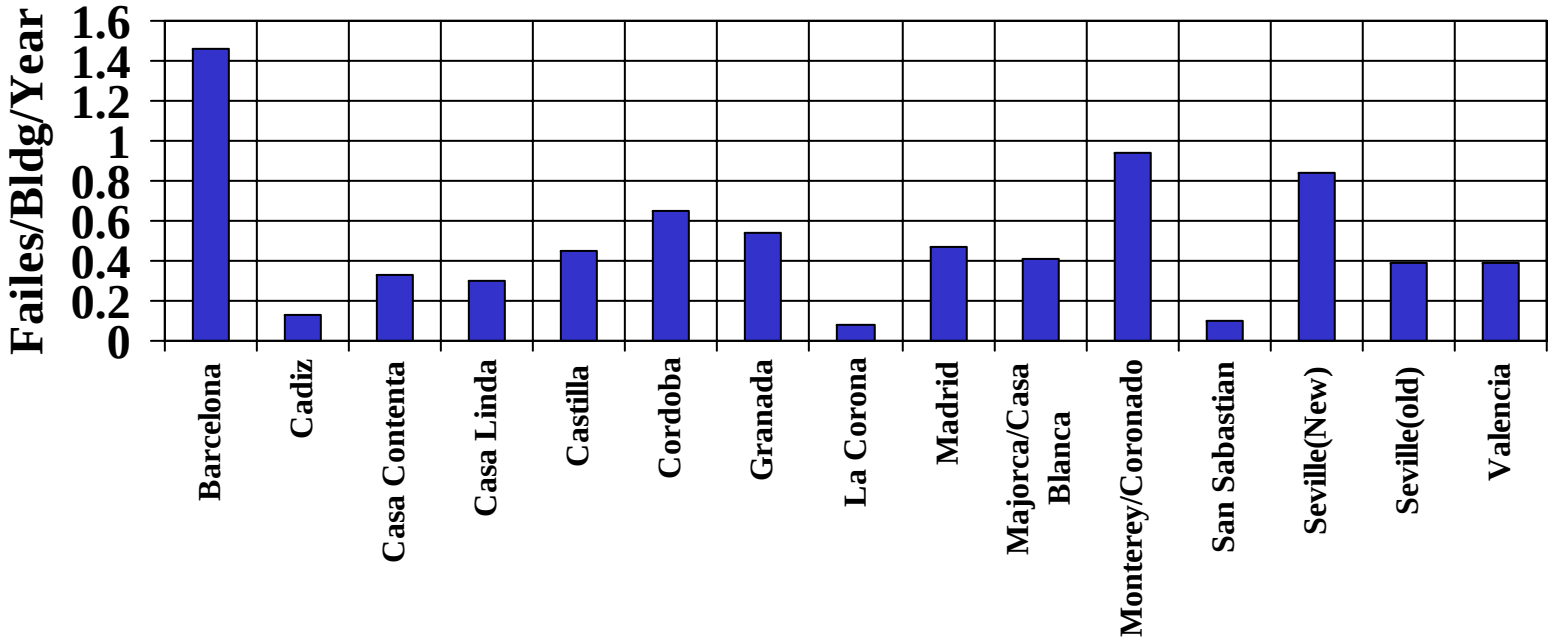
2003-2005 Total Leaks by Bldg Model (1154 Roofs)



2003-2005 No. Bldgs vs Leaks



2003-2005 Leak Rate/Bldg/Year by Bldg Model (1154 Roofs)

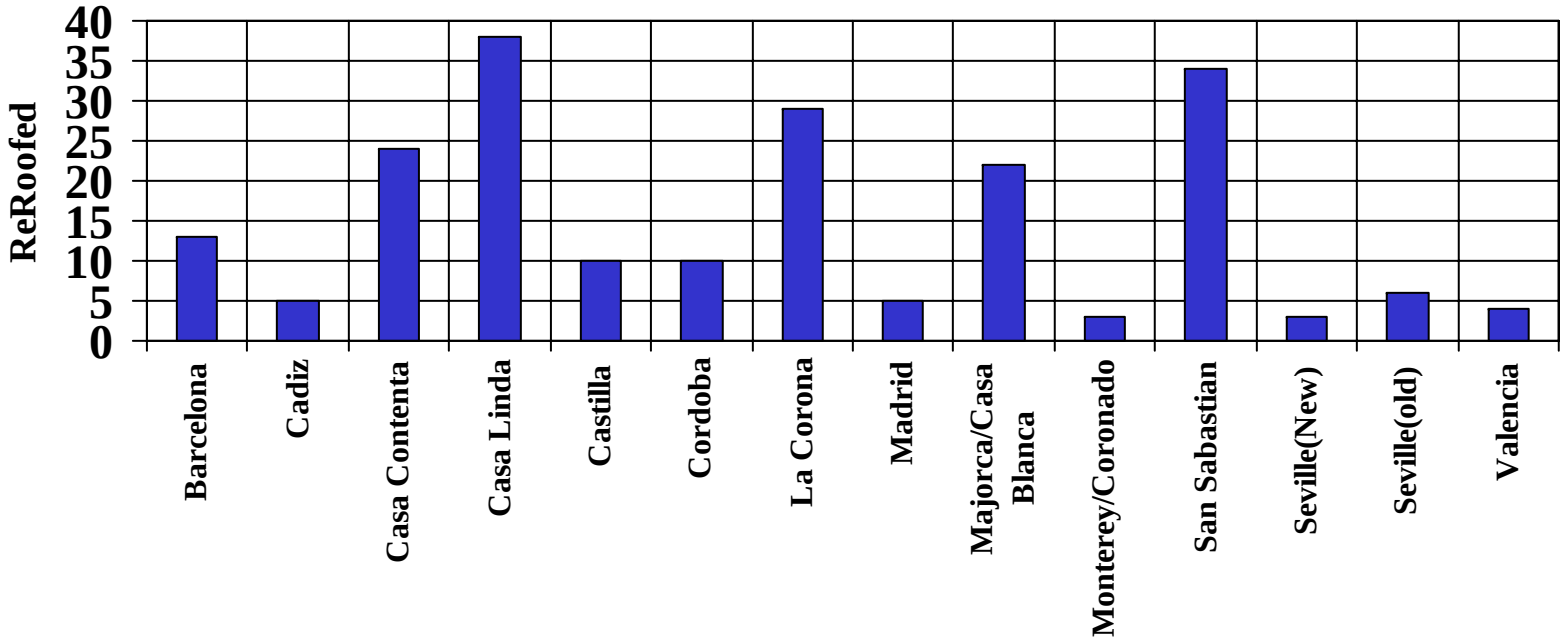


Some Statistics

- There are 1124 Buildings in United.
- There were 1414 Leak Work Orders written between 1/1/2003-12/31/2005.
- This is a yearly failure rate of 0.42 Leaks/Bldg/year.
- Equates to 1 leak for every 2 buildings, or, 1 building had 1414 Leaks.

ReRoof Analysis 2003-2005

2003-2005 No. ReRoofed by Bldg Model (206 Roofs)



Some Conclusions

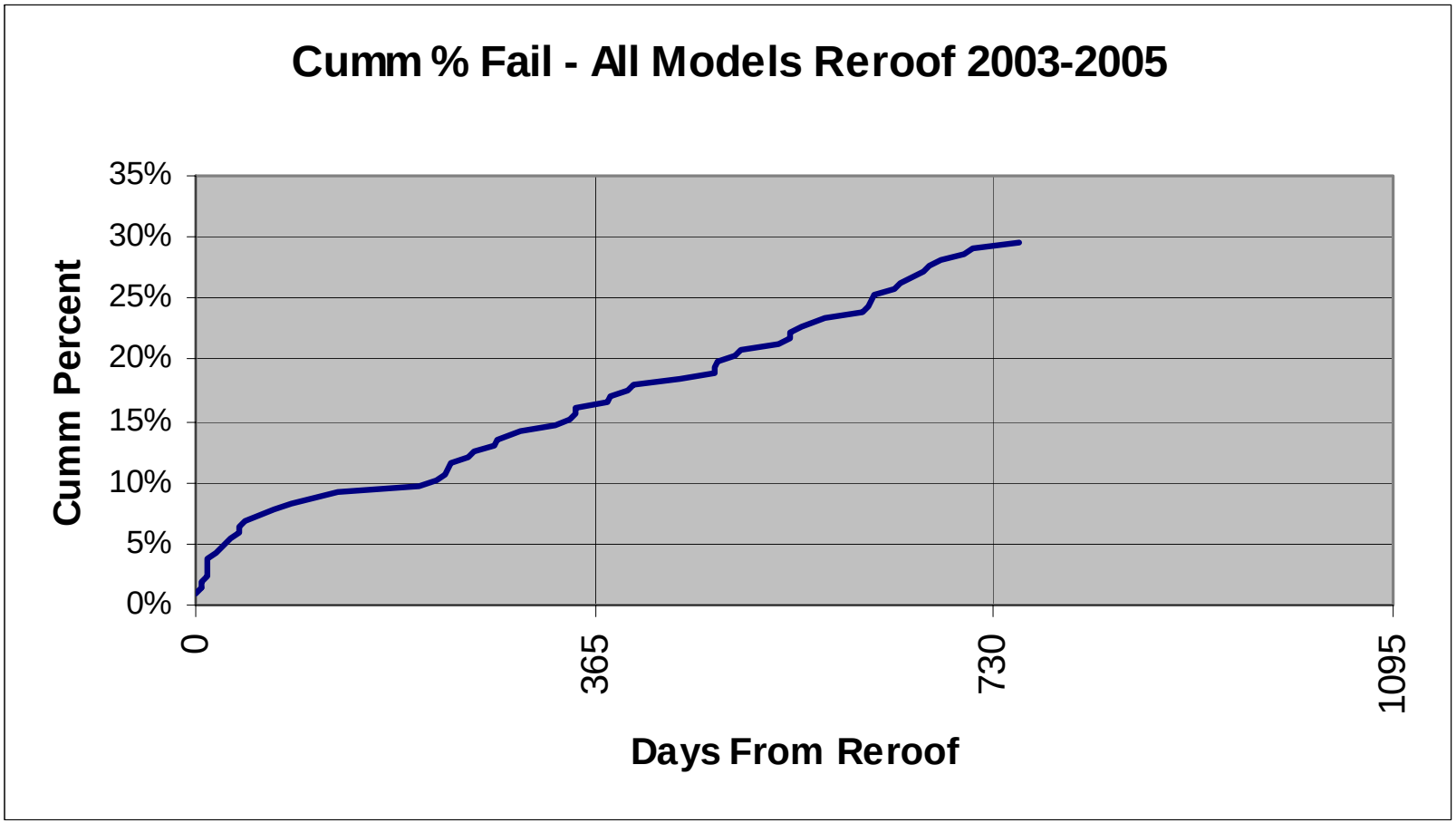
- A New Roof can have a higher probability of failure than an old roof.
- Staff analysis is necessary to extend this analysis to roofs going all the way back to 1985 to determine if there is a wearout factor.
- Need better understanding of why a new roof has such a high probability of failure.
- Need to determine if this can be resolved!

Final Questions

- What is the rate by “failure mode?”
- What is the rate by “building model?”
  - Do certain models have predictable failures?
  - If so, what action can we take to eliminate those?
- Can we expect a “zero” percent failure rate?
  - If not, why not?
- When does the “wearout” portion of the failure rate begin?
- Are we using the correct algorithm for replacing a roof?

Data

- Data for Reroofing and Work Orders for 1/1/03 thru 12/31/5.
- Included 206 manors that were reroofed during this period.
- Of these, 61 manors had a leak work order written against them.
- Average age of the roofs in the sample was 1.2 years.


Cumm % Fail - All Models Reroof 2003-2005
Cumm Percent
35%
30%
25%
20%
15%
10%
5%
0%
0
365
730
1095
Days From Reroof

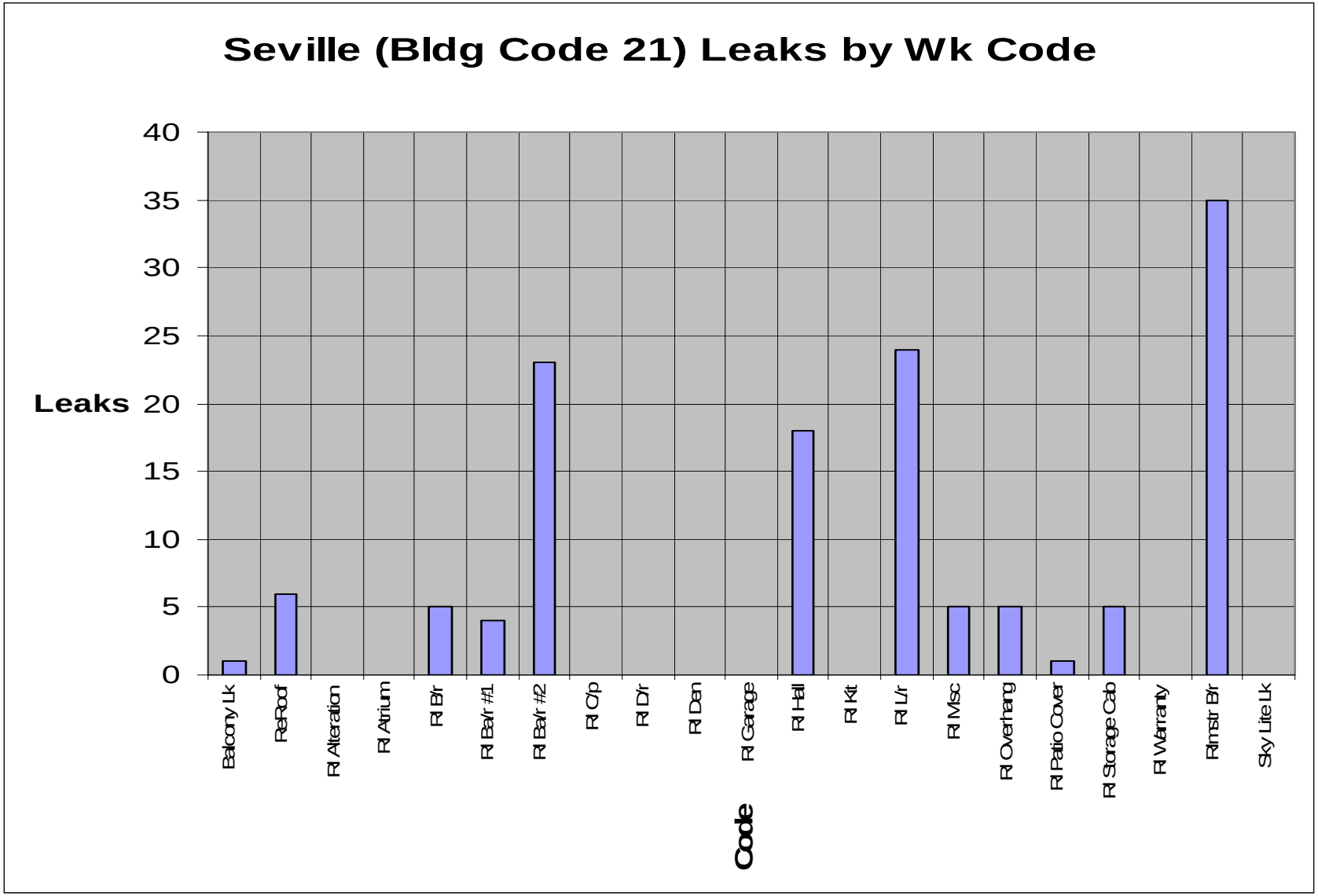
Some Statistics

- 30% of the roofs failed during this average 1.2 year life.
- This equates to 24% of the roofs fail per year.
- At this rate 100% of the roofs would fail in 5 years.

Observations

- Not all roof leaks are due to the “Roof”
- Many are due to flashing, gutter, etc.
- HOWEVER, all roof related work MUST be performed any time someone goes up on a roof.
- There is no current measure of quality of the roof and this is a critical multimillion dollar cost to the Mutuals.

Rain Leak Analysis
by Work Code


Seville (Bldg Code 21) Leaks by Wk Code
Leaks
0
5
10
15
20
25
30
35
40
Balcony Lk
ReRoof
Rf Alteration
Rf Atrium
Rf B/r
Rf Bal/r #1
Rf Bal/r #2
Rf C/p
Rf D/r
Rf Den
Rf Garage
Rf Hall
Rf Kit
Rf L/r
Rf Misc
Rf Overhang
Rf Patio Cover
Rf Storage Cab
Rf Warranty
Rimstr B/r
Sky Lite Lk
Code

The End

2003-2005 Roof Data