



Roofing Options: Alternative Roof Systems

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Roofing Options: Alternative Roof Systems

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Description: A review of the different roof systems providing a basic examination of their strengths and weaknesses and industry statistics concerning their performance.

CSI CEU Info: Course Number - Pending; LUs - 2


State CEU Info: Contact your respective State Department of Professional Regulations

Expiration Date: May 15, 2003

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LEARNING OBJECTIVES



- At the end of this seminar, participants will be able to:
 - Identify the different roof systems
 - Have an understanding of each systems strengths and weaknesses
 - Be familiar with industry statistics concerning different roof systems performance

Roof \ 'rūf \ n: the cover of a building

-  Life Expectancy
 - Material & Workmanship quality

- Deliver Extraordinary Performance
 - Keep water out

- Aesthetics



Where do you begin?

- Environmental Issues
- Building Codes
- Insurer Regulations
- Budget

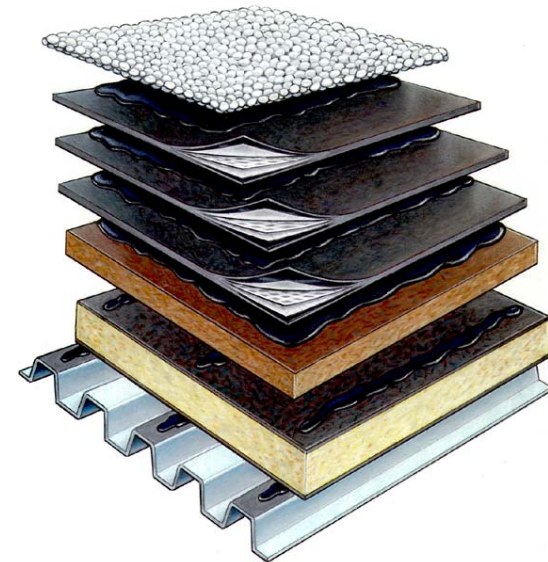
Options



- Built-Up Roofs
- Single Ply Membranes
- Modified Membranes
- Fluid Applied Membranes
- Metal Roofing
- Sprayed-in-place Urethane Foam

Option 1 - Built-Up Roofs

- Traditional Layered Roofing
- Plies-Bitumen-Surfacing
- Hot or Cold Systems



Pros & Cons of BUR



Pros

- True waterproofing
- Maintainable
- Ply redundancy
- Abuse tolerant
- Low life cycle cost

Cons

- High labor costs
- Slower installation

Hot Built-Up Roofs

- History
- Hot asphalt
(375° - 450° F)
- Tar (Coal Tar Pitch)
rarely used today
(355°- 375° F)



Pros & Cons of Hot BUR




Pros

- Relatively inexpensive
- Proven
- Long history

Cons

- Hot kettles
- Odor
- Adhesion
- Disruption

Cold Built-Up Roofs

-  New technology (20 yrs old)
- No hot kettles
- Spray applied or squeegee
- Low odor
- Excellent for sensitive environments



Pros & Cons of Cold BUR



Pros

- No kettles
- Spray/Squeegee
- Forgiving
- Not temperature dependant
- Ideal for limited roof access

Cons

- Higher initial costs
- 30 day cure

Option 2 - Single Ply

- ? Rubber or Plastic
- One ply with seams
- Usually loose-laid, fastened or glued to insulation
- Black or White



Single Ply Roofs

- Membrane Types
 - EPDM - ethylene propylene diene monomer
 - CPE - chlorinated polyethylene
 - CSPE - chlorosulfonated polyethylene
 - PVC - polyvinyl chloride
 - PIB - polyisobutylene
 - TPO - thermoplastic polyolefins
 - TPA - tri-polymer alloy

Pros & Cons of Single Ply



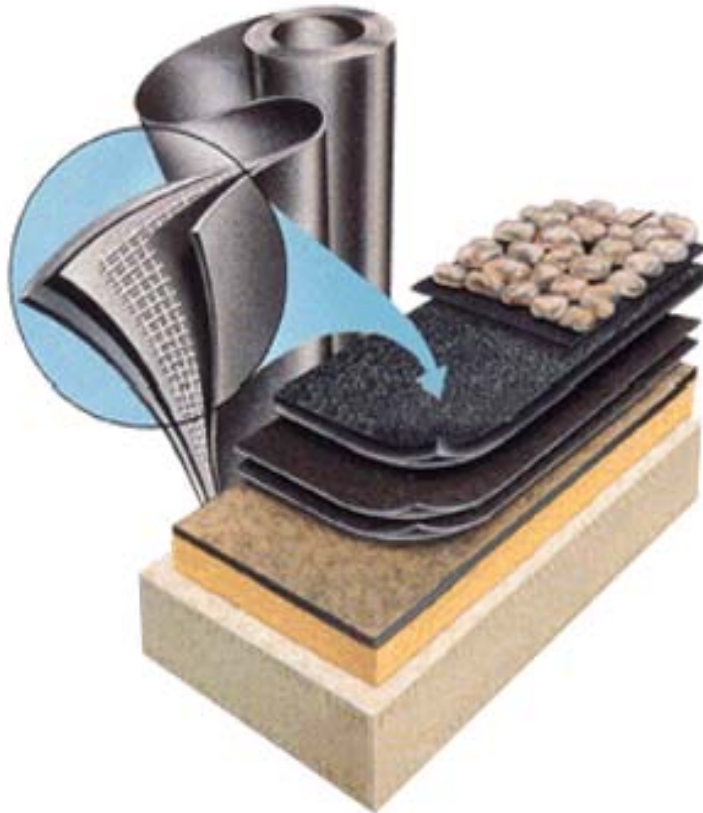
Pros

- Low initial cost
- Quick installation
- Elastomeric

Cons

- No ply redundancy
- Thin Systems
- Shrinkage/Embrittlement
- Seam problems
- Abuse intolerant
- Pond intolerant

Option 3-Modified Bitumens



- Introduction - early 80's
- SBS/APP Modified Asphalt
- Reinforced - fiberglass/
polyester/both
- Underlayment - 1 or 2 ply
- Hot or cold

Pros & Cons of MBs



Pros

- Factory surfacing
- Factory controlled thickness
- High abuse tolerance
- Low temperature flex

Cons

- Blistering
- Slower installation
- Higher initial costs
- Lap integrity
- Torches - APP

Option 4 - Fluid Applied



- PRMA/IRMA
- One part Urethanes
- SBS/SEBS modified asphalt
- Acrylic systems
- "Always covered"



Pros & Cons of Fluid Applied



Pros

- Seamless waterproofing
- Cost effective
- Elastomeric
- Excellent on high-rise construction

Cons

- Thickness control
- Pinholing
- Soft membrane

Option 5 - Metal Roofing



- History
- Medieval - lead/copper
- Modern - steel and aluminum
- Life extending developments
 - Panel production
 - Corrosion protection
 - Sealant technology
 - The Floating Roof Concept



Pros & Cons of Metal



Pros

- Maintainable
- Attractive
- Low life-cycle costs

Cons

- Higher slope requirements
- Flashing difficulties
- High installed costs
- Foot traffic trouble
- Span limitations

Option 6 - Polyurethane Foam(PUF)



- Introduced in 1960's
- Spray applied
- Coated
- Reroofing/New construction



Pros & Cons of Spray Foam



Pros

- Low installed costs
- Inexpensive "R" increase
- Very conforming
- Lightweight

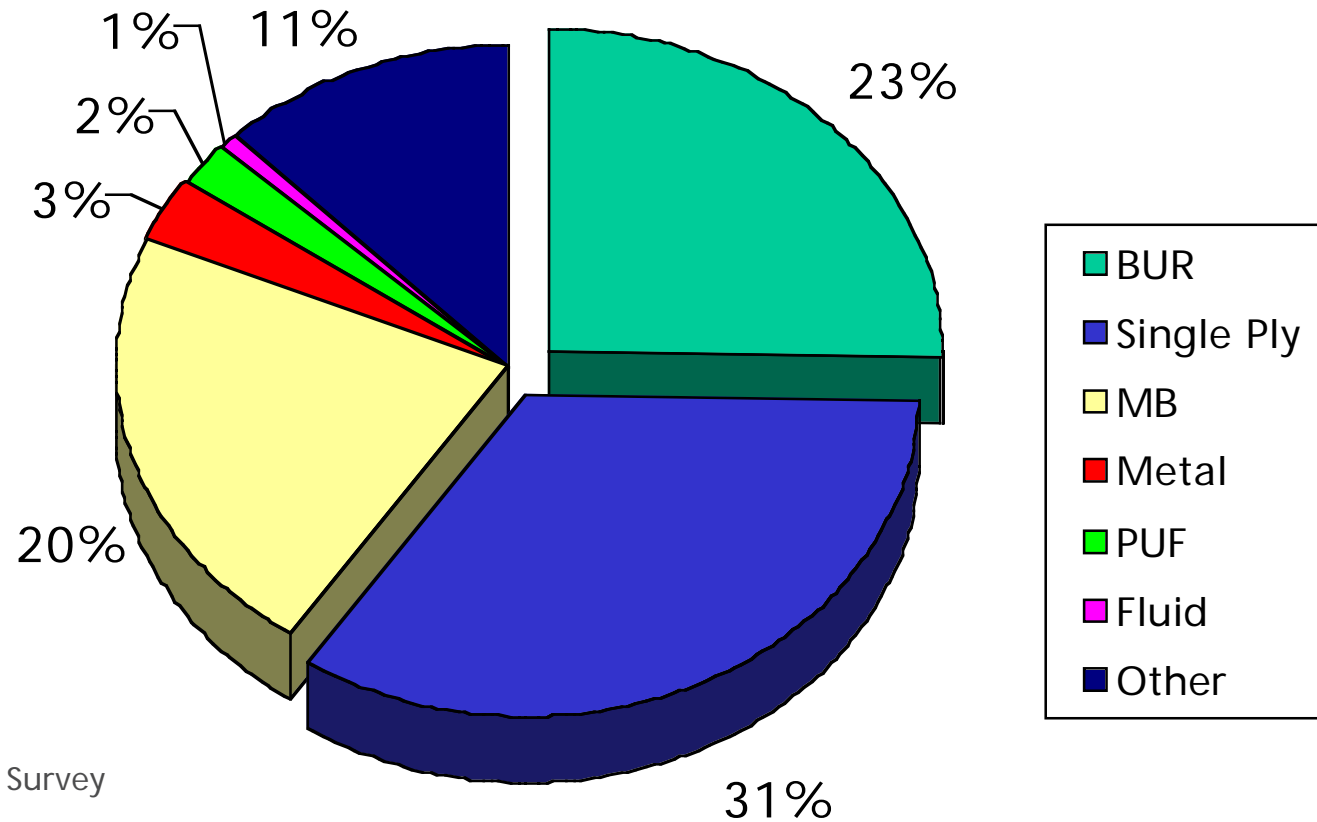
Cons

- Application sensitivity
- Puncture resistance
- Blister problems
- Poor track record
- High maintenance
- Not UV stable

The following slides depict surveys comparing some of the previously mentioned roofing systems and other important aspects of the commercial roofing industry



Percentage of low-slope roofing systems

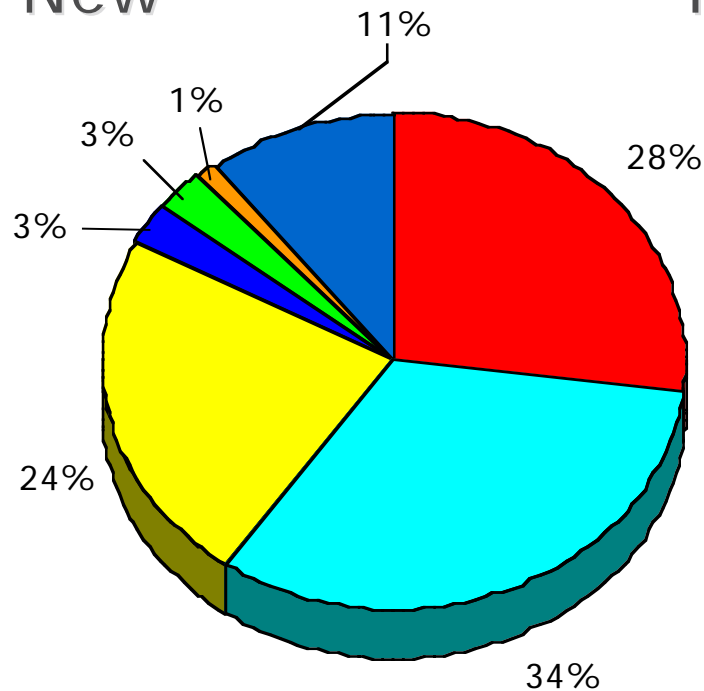


*1999 NRCA Market Survey

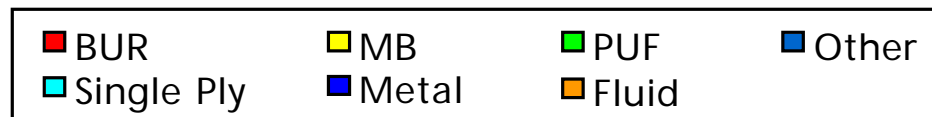
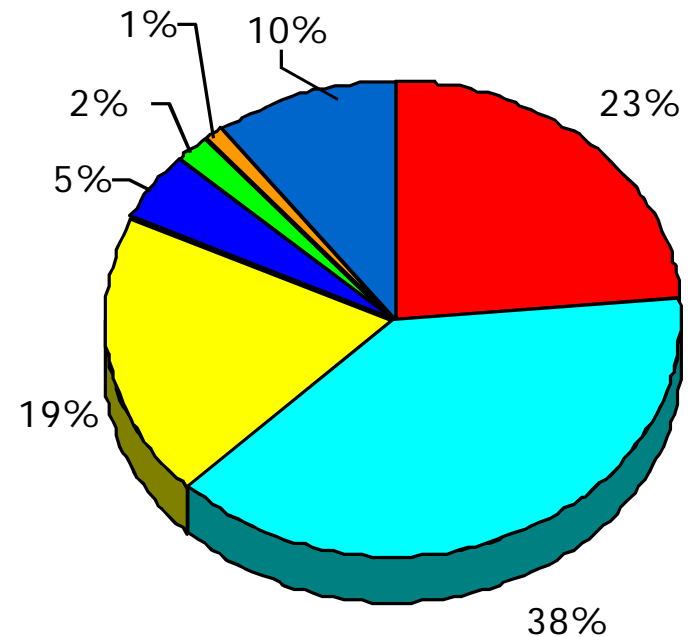
Products installed by average contractor, 2000



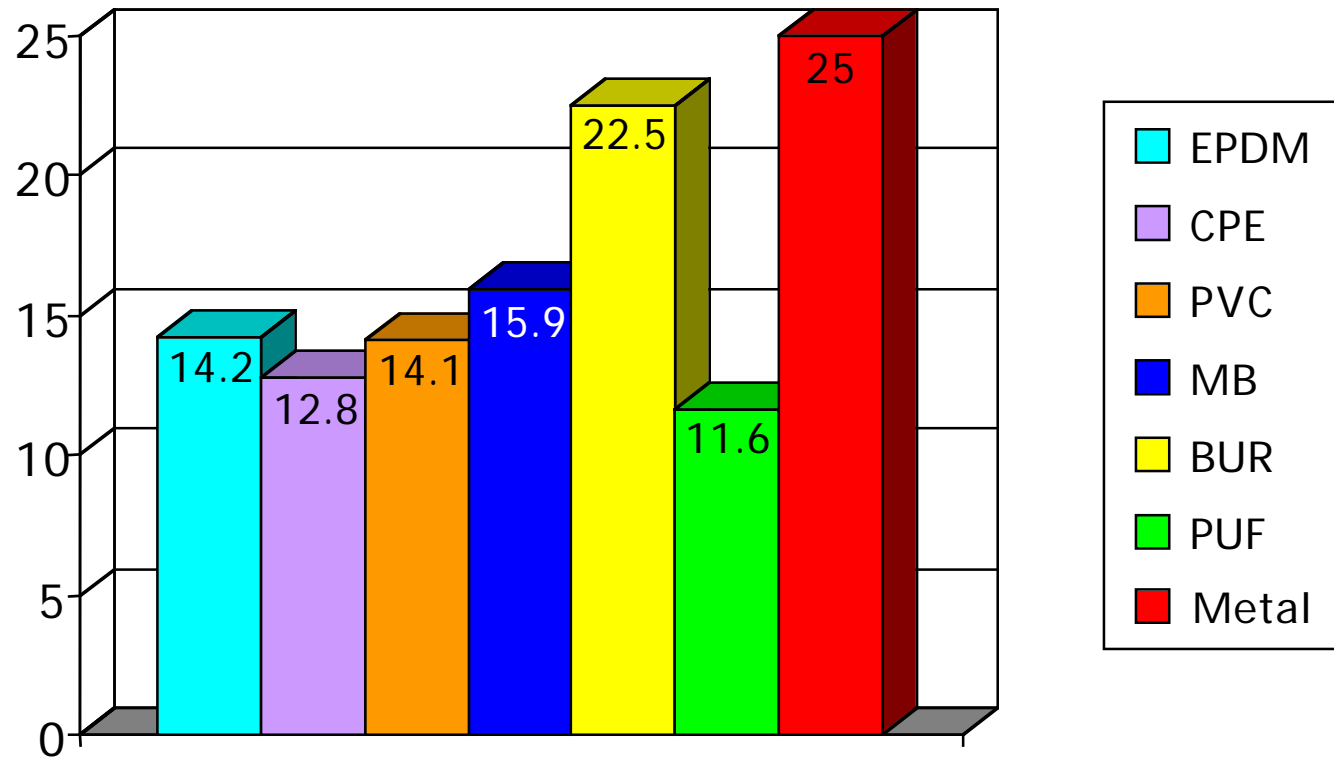
New



Re-roofing

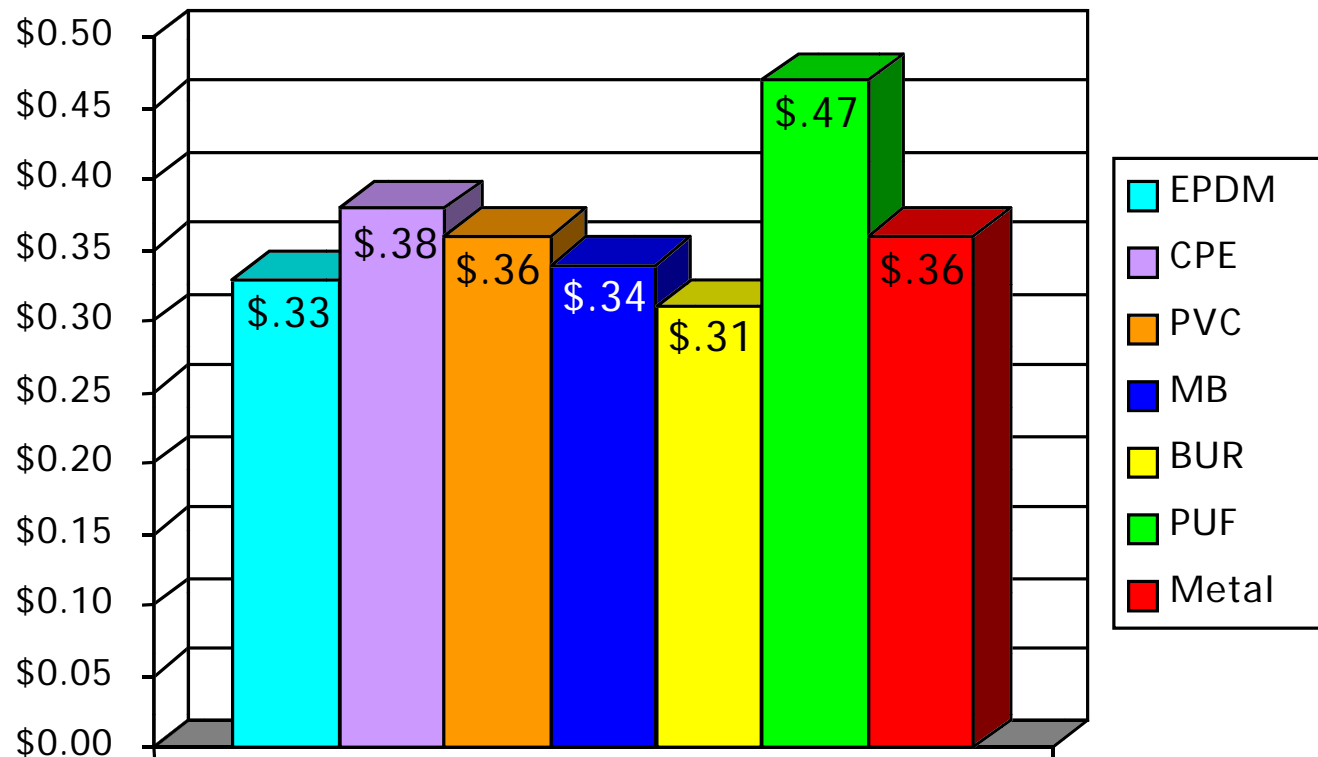


Average Life



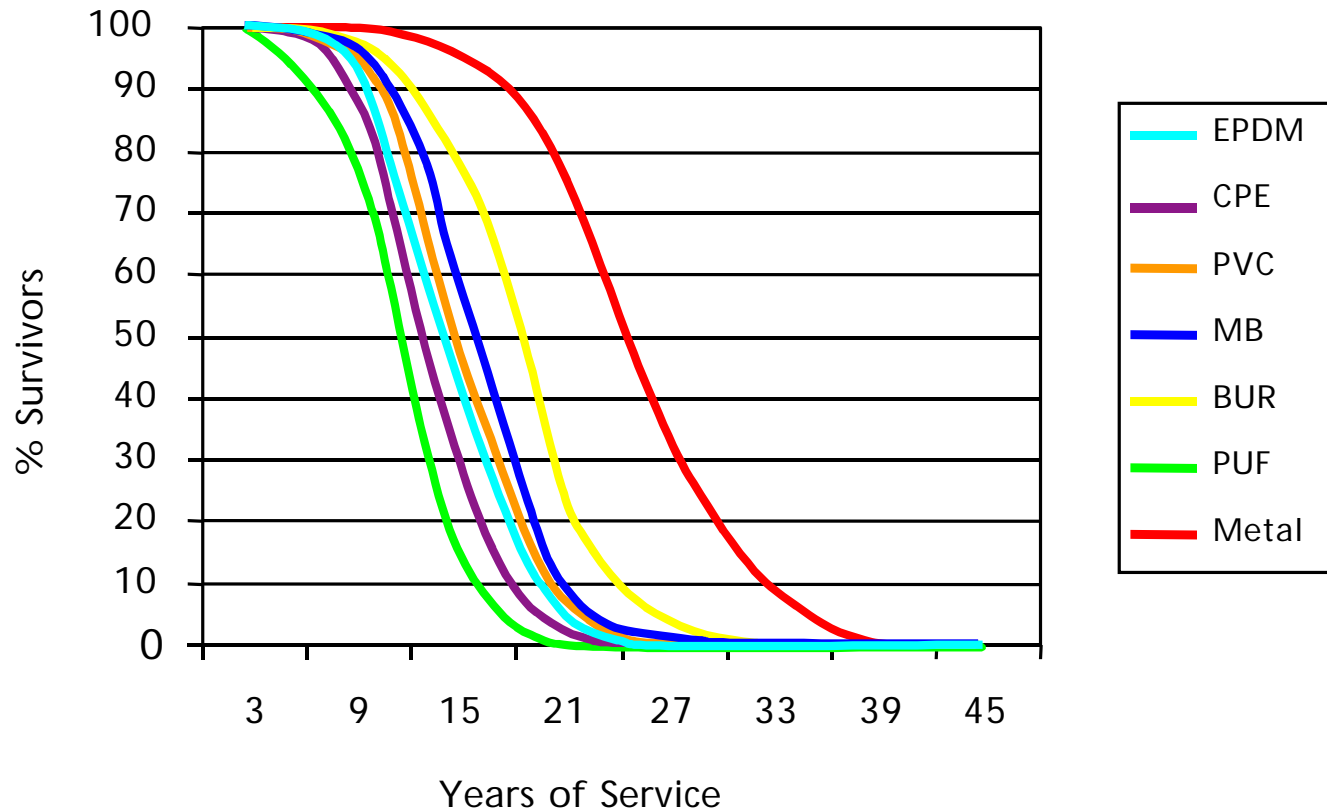
Fourth International Symposium on Roof Technology -Carl Cash Study

Life Cycle Cost: $\$/(\text{ft}^2 \times \text{year})$



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Mean Durability of Low-Slope Roof Systems



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Most Common Problems Associated with All Roofing



Flashings



1996, NRCA Project Pinpoint

Most Common Problems Associated with BUR Roofing

Cracking/Splitting



1996, NRCA Project Pinpoint

Most Common Problems Associated with BUR Roofing



Slippage & Wrinkling



1996, NRCA Project Pinpoint

Most Common Problems Associated with Modified Bitumen Roofing

? Blisters



1996, NRCA Project Pinpoint

Most Common Problems Associated with MB's & Single Ply Roofing

? Seam Defects



1996, NRCA Project Pinpoint

Some Questions to Ask



- Cost
- Warranty
- Manufacturer history
- Wind, fire insurance requirements



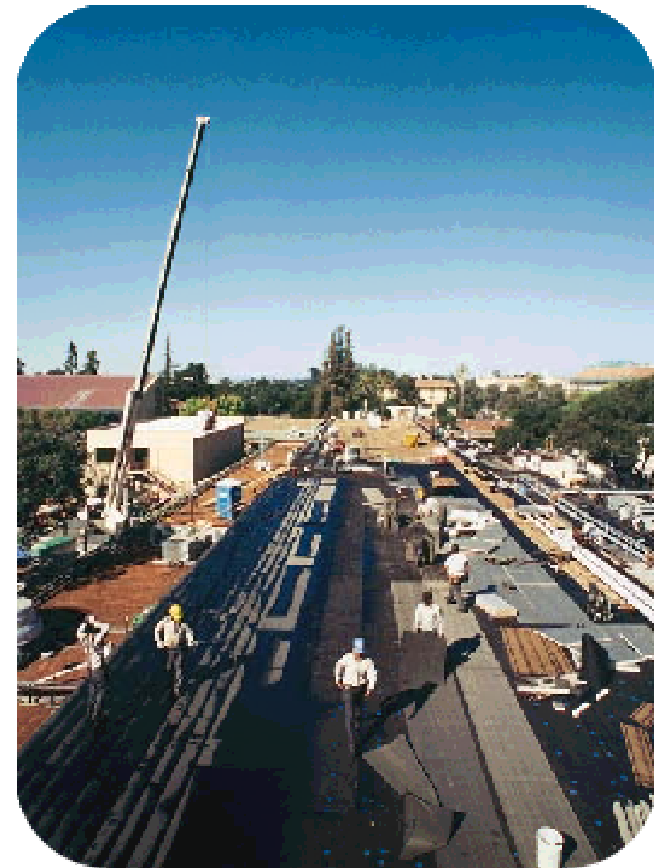
The selection can be confusing

- Over 100 manufacturers
- Many choices
- Guarantees with coverages and exclusions
- All have success stories and failures



Make an Educated Choice

- Built-Up Roofs
- Single Ply Membranes
- Modified Membranes
- Fluid Applied Membranes
- Metal Roofing
- Sprayed-in-place Urethane Foam



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