



Retrofit Garden Roof

IRCC Meeting
January 23, 2007

Copyright Materials

This presentation is protected by US and International copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

Allana Buick & Bers, Inc. 2020



ALLANA BUICK & BERS

Making Buildings Perform Better

Best Practice

Allana Buick & Bers, Inc. (ABBAE) is a Registered Provider with the American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Karim P. Allana, PE, RRC, RWC

- **Education:** B.S., Civil Engineering, Santa Clara University
- **Registration:** P.E., Civil Engineering, California, Washington, Nevada, and Hawaii
- **Certification:** Registered Roof Consultant (RRC), Roof Consultants Institute, and Registered Waterproofing Consultant (RWC)



- **Overview:**
 - CEO and Senior Principal at Allana Buick & Bers.
 - Former Turner Construction Employee (Project Engineering and Superintendent)
 - Over 37 years experience providing superior technical standards in all aspects of building technology and energy efficiency.
 - Principal consultant in forensic investigations of building assemblies, failure analysis, evaluation and design of building infrastructure and building envelope evaluation and design.
 - Expert in all aspects of building envelope technology.
 - Completed numerous new construction, addition, rehabilitation, remodel and modernization projects for public and private sector clients.
 - Specialization in siding, roofing, cement plaster, wood, water intrusion damage, window assemblies, storefronts, below grade waterproofing, energy efficiency, solar engineering and complex building envelope and mechanical assemblies.

ABBAE Firm Overview

- Allana Buick & Bers (ABBAE) is an Architectural Engineering firm specializing in Building Envelope Systems
- ABBAE is one of the 5 largest building envelope consultants in the country
- ABBAE has over 33 years of experience & over 12,500 projects
- ABBAE is also a leading Forensic Defect firm with hundreds of forensic projects (litigation)
- Locations – 16 offices across California, Nevada, North Carolina, Oklahoma, Oregon, Texas, Virginia, Washington, Colorado and Hawaii



Staff & In-House Expertise

- Licensed Professional Engineers – Civil, Structural, and Mechanical
- Registered Architects
- Building Enclosure Commissioning Process Providers (BECxPs)
- Registered Building Envelope Consultant (RBEC)
- Registered Roofing Consultants (RRCs)
- Registered Waterproofing Consultants (RWCs)
- Registered Exterior Wall Consultant (REWCs)
- Registered Roof Observers (RROs)
- Certified Exterior Insulation and Finish System (EIFS) inspectors
- Curtain Wall Specialists
- ICC Certified Building Inspectors
- Quality Assurance Monitors
- Water Testing Experts
- Leak Investigation and Diagnosis Experts
- Infrared Imaging and Nuclear Moisture Scanning Experts

ABBAE Building Expertise

- Building Envelope Systems

- Roofing Systems
 - High-Slope/Low-Slope Roofs
 - Green/Garden Roofs
 - Drainage Systems
 - Pedestrian Plazas
- Exterior Wall Systems
 - Wall Cladding/Siding/GFRC/pre-cast
 - EIFS/cement plaster/stucco
 - Sheet Metal Flashings
- Windows and Glazing Systems
 - Punched Windows
 - Curtain Wall/Window Wall Systems
 - Sliding Glass Doors
 - Skylights

- Building Envelope Systems (cont'd)

- Roofing & Waterproofing Systems
 - Deck/Balcony/Lanai Waterproofing
 - Podium Waterproofing
 - Pool/Spa Deck Waterproofing
 - Above-Grade/Below-Grade Waterproofing
 - All types of low and steep sloped roofing
- Commissioning BECx
 - OPR/BOD/Commissioning Plan
- Mechanical/HVAC Systems
 - HVAC design
 - Plumbing systems
 - Commissioning and testing

ABBAE Core Services

- Consulting and third-party peer review services
- Engineer of record for building envelope systems
- Contract administration services
- Inspection services (usually direct with owner)
- Air and water performance testing
- Mock-up design, observation, and testing
- Building assessments and forensic investigations
- Litigation support and expert witness services
- Educational seminars with AIA credits



OVERVIEW

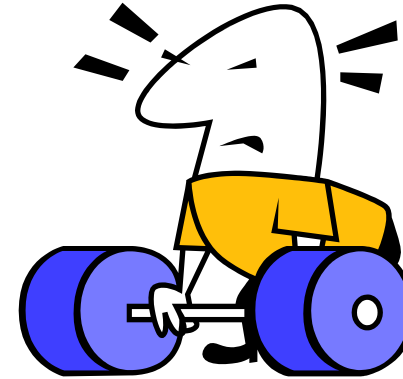
- Our Experience
- Two *BIG* Hurdles
- It is a Team Effort
- Final Thoughts...
- Q&A

Our Experience

- ABB has assisted in the design and/or construction of 18 garden roof systems.
 - 12 new construction systems
 - 4 constructed
 - 4 in construction
 - 4 abandoned during design development
 - 6 retrofit systems
 - 0 constructed
 - 0 in construction
 - 6 abandoned during design development

Two Big Hurdles

- Weight of the system
- Cost of the system



System Weight

- Extensive garden systems (including waterproofing)
 - 15 to 30 psf
- Intensive garden systems (including waterproofing)
 - 30 to 100 psf!
- Most structures are carefully constructed for only a 20 psf live load.
- Occasionally a structure is designed to sustain greater live load:
 - Later additional floors
 - Helicopter pad
 - Athletic field or playing field
 - Reinforced concrete frame and deck
- If the live load issue can be met, then the lateral load implications have eliminated a garden roof.

System Cost

- 40% up charge from a roofing system to a robust protected waterproofing membrane assembly:
 - Increased roof drainage component requirement
 - Additional testing
 - Additional membrane protection
- Added cost of garden roof system.
- Added cost of additional design team members:
 - Structural Engineer
 - Waterproofing Engineer/Architect/Consultant
 - Garden Roof Expert
 - Landscape Architect
 - Cost Estimator
- Little or no government incentives to attenuate project cost.
- Industry is still in the development phase.

Design Team

- **Project Owner**
 - Must understand project:
 - Costs
 - Challenges
 - On going maintenance requirements
 - Schedule
- **Structural Engineer**
 - Answers one of the two big questions... will the building support a garden roof
 - The project stops here if the answer is *NO*
- **Waterproofing Consultant**
 - Most important member of the team... 😊
- **Garden Roof Consultant**
 - Experience with planting systems and planting materials
 - Defines irrigation requirements
 - Works with Structural Engineer in defining the system weight
- **Landscape Architect**
 - Creates a vision of how people interact with the garden roof
 - Works with the Garden Roof Consultant in selecting appropriate plants
- **Cost Estimator**
 - Answers the other BIG hurdle question... how much will it cost
- **Manufacturers**
 - Waterproofing system
 - Garden roofing system

Final Thoughts...

- If the retrofit structure is wood or steel framed... do not bother... we have never seen a wood or steel framed structure that could take the increased live and/or lateral load.
- Reinforced concrete structures are the most likely to be appropriate... but you will still need to carefully review the structure.
- Come to the table with a realistic budget.
- Do not let the waterproofing system drive the project.
- Garden roofs can not be installed and forgotten... they are more like pets that will require care and feeding. Like a pet... you will get the most out of the garden roof when you take care of it.



Questions?