# The Time is Now: Structural Issues Building Envelope Components

Eugene Buick, PE

Principal, Allana Buick & Bers, Inc.

ECHO Maintenance Seminar

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# Best Practice

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# 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

# Firm’s Background

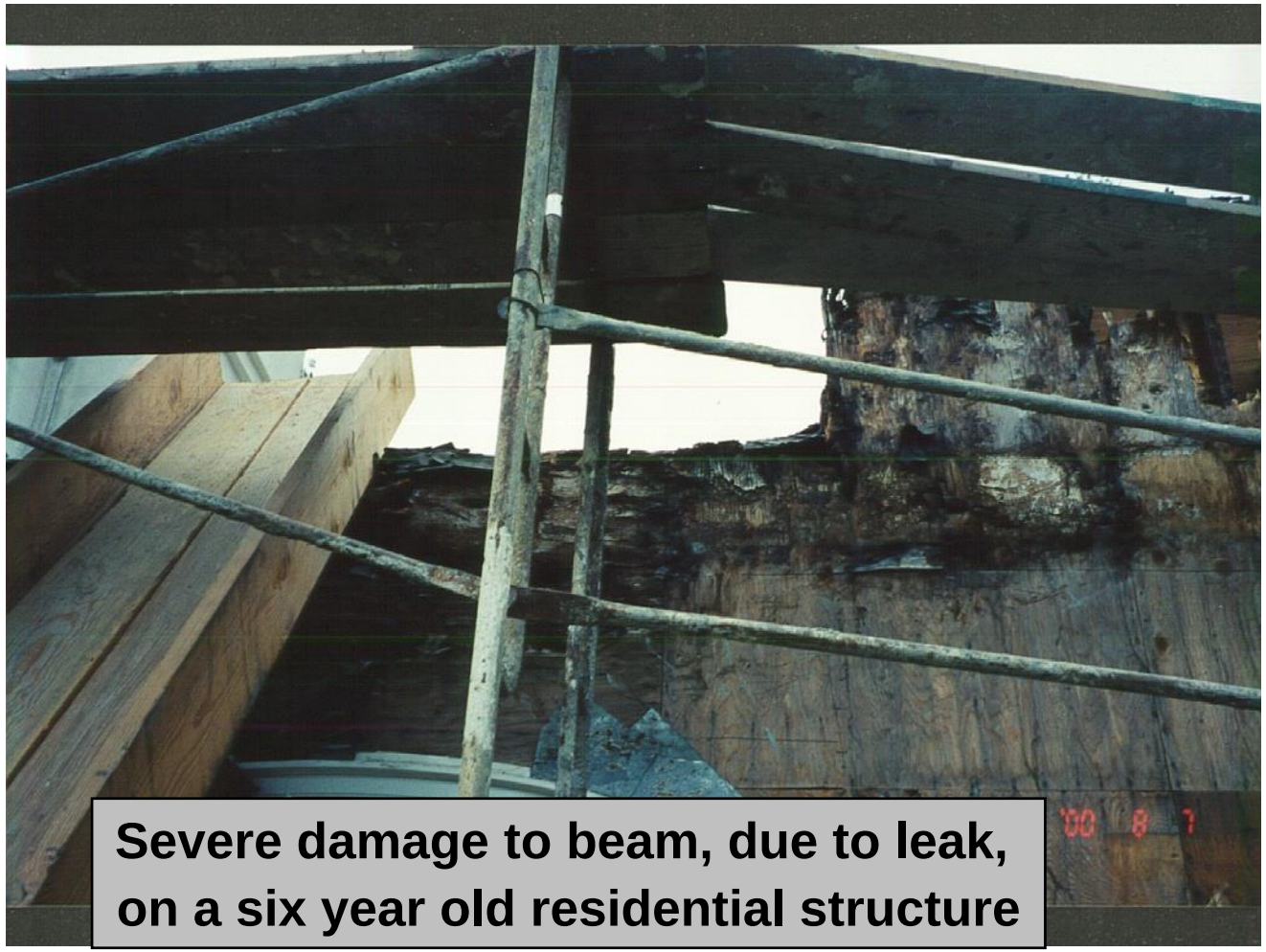
- Design of new construction
- Peer review of other designers
- Monitoring construction
- Forensic investigation
- Determining maintenance requirements
- Determining cost effective solutions

# Overview

- We will address the causes of structural damage to building envelope components
- We will address cost effective solutions to building envelope component repair, including structural repairs
- We will show component lives

# Decks and Wood Structures

**Severe damage to OBS Decking, due to leaks and condensation**



**Severe damage to beam, due to leak, on a six year old residential structure**

# Decks and Wood Structures Repair Rather Than Replace

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# Wood to wood contact traps water and promotes decay

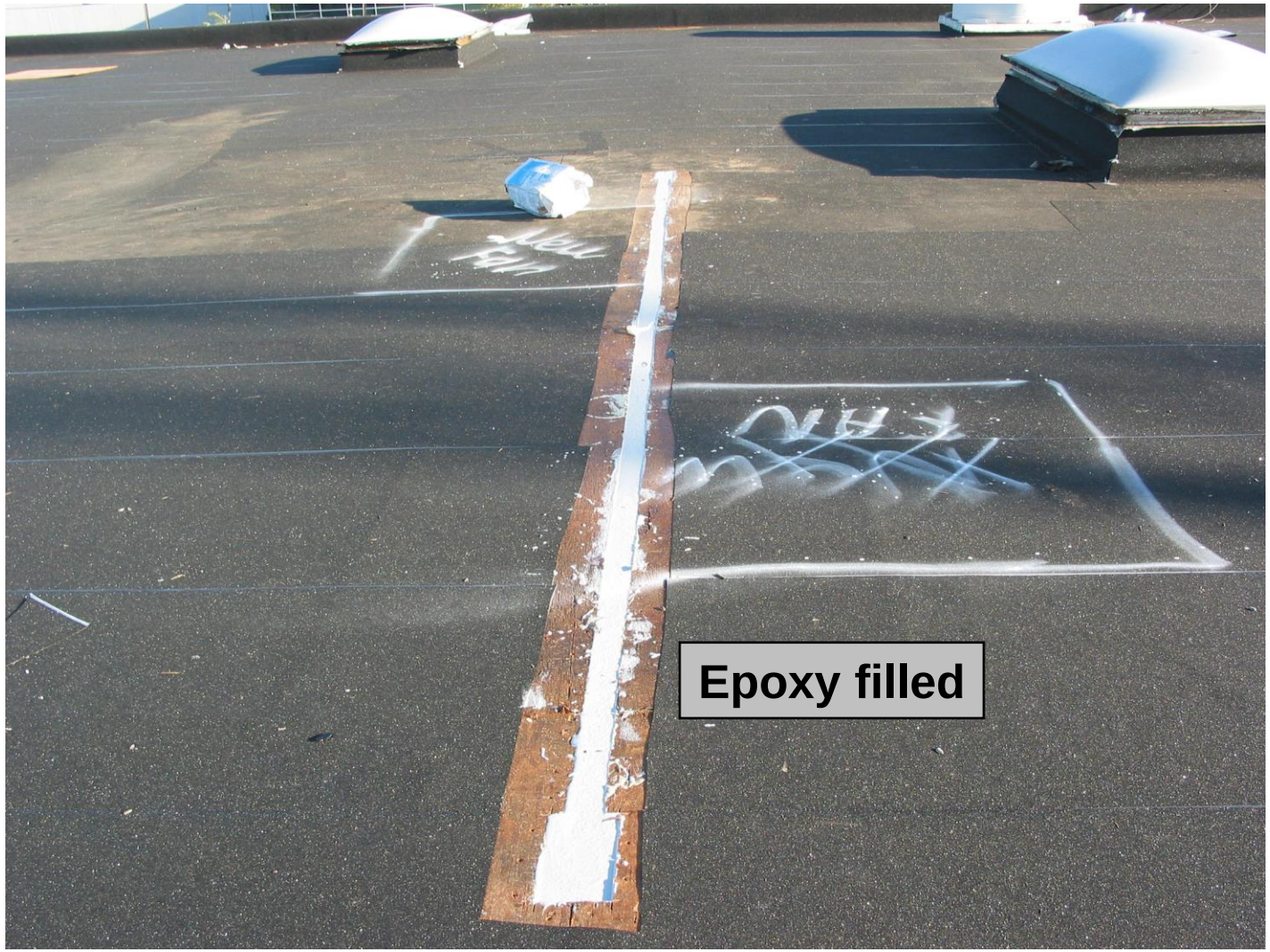
DECKS

# Wood bands over wood beams, plus landscaping on deck…….. bad idea!

DECKS

**Large commercial roof, concept applicable to residential**

**Routed beam, #6 bar laid in groove**

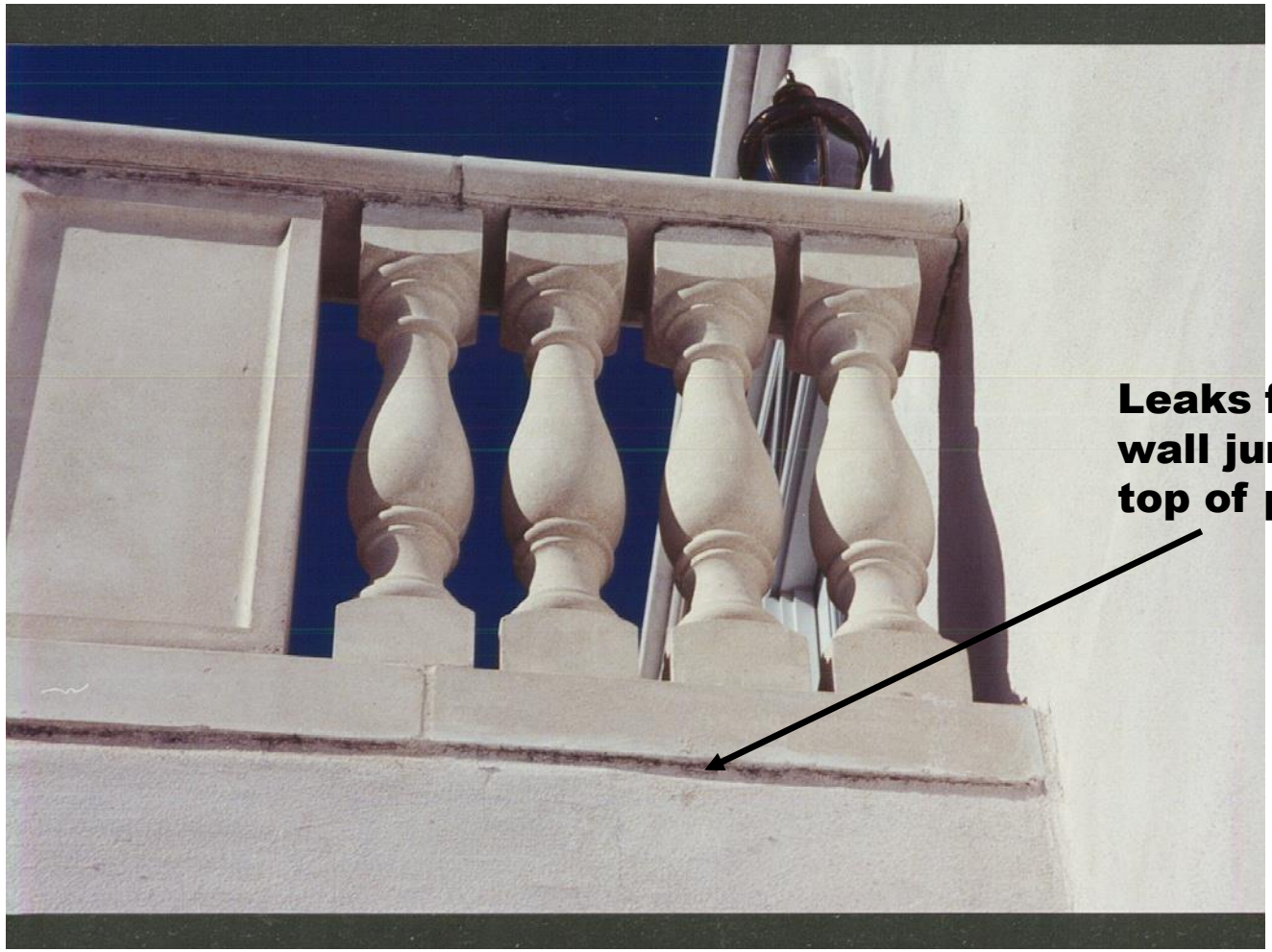


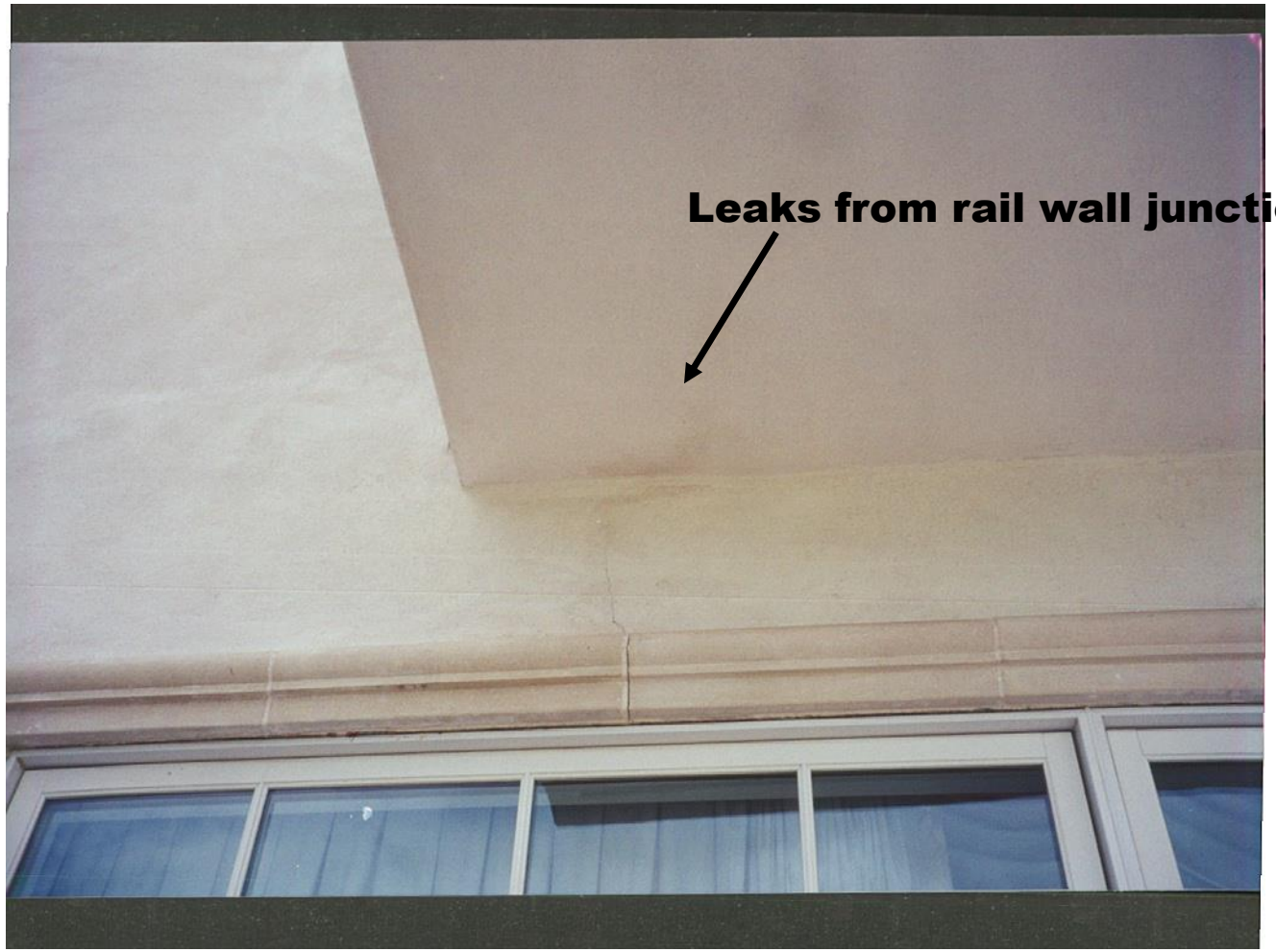
# Cement Plaster

# Look for water stains or unusual cracks in cement plaster

# Typical window frames in cement plaster allow water intrusion. Seal edges of window and exterior plaster


***CEMENT PLASTER***





# This innocent looking leak caused a lot of damage

**Stucco leak from top of rail wall**

# EIFS cornice, low slope, algae and split

# EIFS cornice (lack of slope) allowed this water intrusion

# Maintenance and Repair Strategies

# The Secret to Good Design

- Detail difficult conditions in clear construction drawings
- Provide “Belt and Suspenders”
- Design for geographical specific condition
- Design for occupancy, abuse, etc.
- Do not rely on ongoing maintenance, alone

# The Secret to Maintenance

- Understand the structural dynamics of the building
- Provide alternative methods of maintenance and repair

# Life Expectancies…

- Sealants: 10 to 25 years
- Painting: 5 to 7 years
- Hardboard siding: 25 years
- Roofs: 20 to 30 years
- Below grade waterproofing: Life of the building.
- Windows: Life of the building.
- Stucco: Life of the building.