Building Defect Analysis Report

Root Cause Analysis

Report Generated: 1/28/2026, 9:41:04 AM
Property ID: P6
Historical Data Analyzed: 3 records

Ø<ß¯ Identified Root Causes

1. Differential Foundation Settlement / Structural Movement

Confidence: HIGH

Reasoning: The observation of a 'large diagonal crack running from ceiling corner to window frame, approximately 3mm wide' with 'signs of recent structural movement' in Room R1 is a classic indicator of differential foundation settlement. Diagonal cracks originating from corners of openings (like windows) are stress concentration points that manifest when the underlying foundation settles unevenly. This is not a superficial crack but points to an active, underlying structural issue. The 'South' region can be prone to expansive clay soils or subsidence, which are common environmental factors contributing to foundation movement due to moisture changes.

Affected Systems:

- Structural System (Foundation, Load-Bearing Walls)
- Building Envelope (Walls, Ceilings)
- Finishes (Drywall, Plaster)

2. Active Plumbing Leak from Bathroom Above/Adjacent

Confidence: HIGH

Reasoning: The 'significant water staining on ceiling near bathroom area' with 'visible discoloration and paint peeling' in Room R2, coupled with 'black mold growth visible in corner where ceiling meets wall' and a pattern suggesting 'moisture accumulation over extended period,' strongly indicates an active and persistent plumbing leak. The proximity to the bathroom makes a leak from a fixture (e.g., toilet, shower, tub), a supply line, or a drain line the most probable root cause. The mold growth confirms prolonged moisture presence, which is a direct consequence of an unaddressed leak, rather than just ambient humidity.

Affected Systems:

- Plumbing System (Supply/Drain Lines, Fixtures, Waterproofing)
- Building Envelope (Ceiling/Wall Assembly)
- Indoor Air Quality (due to mold)
- Finishes (Paint, Drywall)

Ø=Ü¡ Immediate Action Recommendations

1. Immediately engage a qualified structural engineer to conduct a thorough assessment of the foundation and structural integrity of the building, focusing on Room R1 and surrounding areas. Implement all recommended structural repairs without delay.

2. Install crack gauges or markers on the crack in R1 to monitor for any further movement and provide data for the structural engineer.

3. Urgently locate and repair the source of the active plumbing leak in Room R2. This may require opening up the ceiling or accessing plumbing from the bathroom above to identify the exact point of failure (e.g., pipe rupture, failed fixture seal, compromised shower pan).

4. Isolate the affected area in R2 to prevent the spread of mold spores to other parts of the house.

5. Engage a certified mold remediation specialist to safely and thoroughly remove all visible mold and any mold-affected building materials (e.g., drywall, insulation) in R2.

6. Ensure thorough drying and dehumidification of the affected areas in R2 using professional equipment after the leak is repaired and mold is removed, to prevent recurrence.

7. Once the area in R2 is completely dry and mold-free, repair or replace all water-damaged ceiling and wall finishes.