Building Defect Analysis Report

Root Cause Analysis

Report Generated: 1/28/2026, 8:51:12 AM
Property ID: P6
Historical Data Analyzed: 3 records

Ø<ß¯ Identified Root Causes

1. Differential Foundation Movement

Confidence: HIGH

Reasoning: The large, diagonal crack (3mm wide) originating from a ceiling corner to a window frame, coupled with explicit signs of 'recent structural movement', is a classic indicator of differential settlement or heave in the foundation. This is a primary structural failure that induces stress in the superstructure, leading to visible cracking in rigid finishes. The 'South' region can be prone to expansive soils (which swell and shrink with moisture changes), inadequate compaction, or localized bearing capacity issues, all of which can cause differential foundation movement. This is a root cause because it describes the fundamental instability leading to the observed structural distress, rather than just the crack itself.

Affected Systems:

- Foundation
- Structural Framing
- Building Envelope

2. Active Plumbing Leak or Waterproofing Failure in Bathroom

Confidence: HIGH

Reasoning: The significant water staining (2 sq meters, discoloration, paint peeling) on the ceiling 'near bathroom area' directly points to a persistent source of bulk water. The subsequent black mold growth, described as accumulating over an 'extended period', confirms an ongoing moisture problem. This pattern is highly indicative of a leak from a supply pipe, drain pipe, or a failure in the waterproofing system (e.g., shower pan, tub surround, floor membrane, or grout/caulking) within the bathroom located directly above or adjacent to the affected ceiling area. This is a root cause as it identifies the source of water ingress, which then leads to the symptoms of water damage and mold.

Affected Systems:

- Plumbing System
- Building Envelope
- Interior Finishes
- Health & Safety

Ø=Ü¡ Immediate Action Recommendations

1. Immediately engage a qualified structural engineer to perform a comprehensive assessment of the foundation and overall structural integrity of the building. The 'recent structural movement' and high severity crack in R1 demand urgent professional evaluation to determine the exact cause of movement and prescribe appropriate remediation strategies (e.g., underpinning, soil stabilization).

2. Install crack monitors on the crack in R1 to track any further movement and provide quantitative data for the structural engineer's assessment.

3. Promptly investigate and locate the exact source of the water leak in R2. This will likely require opening up the affected ceiling area and thoroughly inspecting all plumbing fixtures, supply lines, drain lines, and waterproofing systems (e.g., shower pan, tub surround, toilet seal) in the bathroom located directly above or adjacent.

4. Once the leak source is identified, take immediate action to stop the water ingress, which may involve professional plumbing repair or waterproofing system replacement.

5. Isolate the water-damaged and mold-affected area in R2 to prevent further spread of moisture and mold spores to other parts of the building.

6. Engage a certified mold remediation specialist to safely and thoroughly remove all mold growth and replace severely damaged, non-salvageable building materials (e.g., drywall, insulation) in R2, following industry best practices.

7. Ensure thorough drying and dehumidification of all affected building materials in R2 after the leak is stopped and mold is remediated, using professional drying equipment if necessary, to prevent recurrence and further structural degradation.