

# THE IMPORTANCE OF ROOT-CAUSE DIAGNOSIS BEFORE COMMENCEMENT OF REPAIR WORKS

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## INTRODUCTION

In many residential and commercial buildings, repair decisions are often driven by visible defects rather than a clear understanding of their origin, such as paint peeling on a condominium wall that reappears despite repeated repainting. When defects recur, conflicting explanations from different contractors, ranging from workmanship issues to waterproofing failure often create confusion for owners and managers. In many cases, the true cause remains hidden until detailed investigation reveals concealed plumbing leaks, material degradation, or structural discontinuities that allow moisture to migrate unseen through the building fabric. This highlights how surface symptoms can be misleading and how assumption-based repairs frequently fail. Addressing visible defects without identifying the underlying cause commonly results in recurring failures, wasted expenditure, and prolonged disruption. Correct root-cause diagnosis before commencing repair works is therefore essential to achieve durable outcomes, prevent repetitive damage, and reduce long-term maintenance costs <sup>[1]</sup>.

## WHAT “ROOT-CAUSE DIAGNOSIS” MEANS IN BUILDING REPAIR

Root-cause diagnosis in building repair refers to a structured and systematic process of identifying the fundamental reason a defect or failure has occurred rather than focusing solely on its visible effects <sup>[2]</sup>. This process involves analysing how and why a problem developed, whether it is related to structural behaviour, waterproofing systems, plumbing networks, material performance, or maintenance practices, before any corrective work is undertaken. The scope of root-cause diagnosis extends beyond simple visual inspection and includes data collection, condition assessment, failure pattern recognition, and logical evaluation of contributing factors. In complex building systems, failures are rarely isolated events and are often the result of multiple interacting causes that accumulate over time. Without proper diagnosis, repair strategies tend to focus only on symptoms, such as repainting, patching, or replacing finishes, which may temporarily improve appearance but do not resolve the mechanisms driving deterioration. This symptom-based approach commonly leads to recurring problems, inefficient use of resources, and accelerated degradation of building components, ultimately increasing maintenance burdens and lifecycle costs.

## SURFACE SYMPTOMS VS HIDDEN CAUSES

Surface symptoms are typically the first indicators that prompt building owners or occupants to seek repairs, as they are easily observable and directly affect comfort and aesthetics. Common visible defects include damp patches, water stains, bubbling or peeling paint, cracking plasterwork, and discoloration of walls or ceilings, all of which signal that something within the building system is not functioning as intended. With regards to this, troubleshooting is on diagnosing and resolving immediate issues quickly and accurately <sup>[3]</sup>. However, these surface manifestations are often only the outward expression of deeper, hidden causes that cannot be resolved through cosmetic repair alone. Hidden causes may include failures in waterproofing membranes, leaks from concealed plumbing lines, poor joint detailing, material fatigue, or systemic issues related to maintenance and usage patterns. In many cases, water or stress migrates through building elements before becoming visible, meaning the apparent location of damage may be far removed from its true source. When repairs are carried out without identifying and addressing these hidden causes, the same defects tend to reappear, often with greater severity, leading to repeated interventions and escalating long-term repair costs that could have been avoided through proper diagnosis. But if we don't actually diagnose the real root cause of a problem, we'll likely have the same exact problem over and over again <sup>[2]</sup>.

## COMMON CAUSES AND RISK FACTORS

Many recurring building defects can be traced back to common causes and risk factors that are identifiable through systematic root-cause analysis. Poor or defective workmanship during installation or repair is a frequent contributor, as incorrect application methods, inadequate sealing, or inappropriate material selection can introduce vulnerabilities that only become apparent over time. Aging and wear also play a significant role, as building components naturally degrade and require periodic inspection and maintenance to ensure continued performance. When maintenance is reactive rather than proactive, minor issues can escalate into major failures before they are addressed. Design-related factors, such as system complexity, poor accessibility, or inadequate consideration of operational conditions, further increase the likelihood of hidden defects developing within building systems. Environmental and usage conditions, including heavy use, moisture exposure, and operational stresses, can exacerbate these vulnerabilities and accelerate failure if not properly managed.

## WARNING SIGNS AND EVIDENCE TO MONITOR

Effective root-cause diagnosis begins with recognising warning signs that indicate underlying issues within building systems. Visible indicators such as repeated damp patches, peeling finishes, unusual odours, or recurring failures in the same location should be treated as signals that deeper investigation is required rather than isolated incidents. Root-cause diagnosis actually begins as a reactive process that takes place after an event occurs [4]. After performing that initial analysis, it becomes a proactive process that can assist with the prediction and mitigation of similar problems. Less obvious clues, including performance fluctuations, increased maintenance frequency, or defects that reappear under specific conditions, often provide valuable insight into underlying causes. Identifying traceable patterns, such as defects that worsen after certain activities or environmental conditions, supports more accurate diagnosis and targeted intervention. Maintaining thorough records through photographs, inspection notes, and repair histories is essential for building an evidence base that supports professional assessment and informed decision-making. Such documentation not only improves diagnostic accuracy but also strengthens accountability and transparency in maintenance management.

## CONCLUSION

What initially appears to be a minor and easily repairable defect can develop into a significant technical, financial, and operational issue if the underlying cause is not properly identified. Root-cause diagnosis provides the foundation for effective repair works by ensuring that interventions address the real source of failure rather than its superficial symptoms. A diagnosis-first approach reduces the likelihood of recurring defects, minimises wasted resources, and supports the long-term performance and reliability of building systems. It is also important to recognise that root-cause diagnosis may not always be immediately apparent and, in some cases, requires progressive investigation or multiple stages of rectification before the true source of failure can be conclusively identified. Property owners, managers, and maintenance professionals should therefore prioritise systematic diagnosis, regular assessment, and informed decision-making before commencing any repair works. By embedding root-cause analysis into maintenance practices, stakeholders can achieve more sustainable outcomes, protect asset value, and reduce risk throughout the building lifecycle.

### References:

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