

MATERIAL PERFORMANCE – PAST, PRESENT AND FUTURE

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An understanding of the performance of materials is essential for their correct specification in the construction of new buildings. The basis of 'understanding' is experience – experience of the past-performance of materials (the good, the bad and the ugly), and experience to anticipate the future-performance of new material compositions (belief, reasoning and hypothesis). When 'understanding' becomes detached from selection criteria – through a lack of experience or inadequate supplementary research – the risk of failure in performance increases. The performance of some natural materials exceeds that of manufactured ones, whilst some manufactured materials perform functions that natural ones are incapable of, hence there is a role for both in the future of New Zealand building. Our present understanding of these past-performance-standards provides an essential palette of future-performance-indicators. These performance characteristics have a fundamental bearing on cost – both initial investment and life-cycle cost. Long lifespan rather than short-termism, maintainability rather than expendability, and function rather than failure, should be the key performance requirements.

This paper provides an over-view of the performance of materials over the last fifty years, framed around the most significant period of transition for traditional-modern materials during the mid-twentieth-century, and identifies how an understanding of their efficacy over time can benefit the decision making process for the future use of traditional and new materials. The shift from a revivalist style-driven malaise to the functional design rationale of Modernist architecture between 1940 and 1970 in New Zealand saw the honest use of materials replace the material excesses of neo-classical and neo-gothic buildings of the previous decades. The performance of building materials was fundamental to the intention of international Modernist ideals.

With the present, and no doubt future emphasis on the use of systems based on the combination of differing material types that seek to provide the solution to perceived inadequacies in the construction process have, in some cases, resulted in performance failures and the significant complication of uncommon patterns of failure and unfamiliar maintenance requirements. Failure of these systems is wasteful of materials and resources, and knowledge from the past has an important part to play in the decisions of the future.

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The basis of this paper draws upon both industry experience as a Chartered Building Surveyor and current doctoral research being undertaken by the author at the University of Auckland School of Architecture and Planning.

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