

Hay St Perth Art Deco Heritage; Carbonation And Chloride Observations; Restoration And Adaptive Re-use

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Abstract: Art Deco architecture of Hay St Perth includes the Bank of NSW Building (1935), Dynon's China Hall Building (1920) and Walsh's Building (1921). Façadism is not always a commercial (or arguably desirable) retrofit option; yet glamorous ground floor tenancies may belie deterioration of the levels above.

Assessing condition is key to alternative remedial strategies. At Walsh's Building, an interior and façade concrete survey (22 cores) found 0-100% carbonation present with influences from render and coating type, orientation, consolidation method (voids) and exposure for any given strength and age. Agreement was found at Walsh's Building and Bank of NSW Building on the minimum corrosion threshold requirements; at the latter a spalled dentil piece featured red rust; examined in two through-sections 0.01% detectable chloride at rebar level was found with 100% carbonation throughout. At Walsh's Building a uniform minimum concentration of 0.01% chloride was found throughout all samples supporting a high initial calcium chloride accelerator dose; 100% carbonated areas subjected to leaks were associated with rusting. The results support acidification by carbonation to be key in reinforcement corrosion initiation. Carbonation from the underside of horizontal surfaces, buffering by lime renders (many still only partially carbonated) and retardation of chloride by render were noteworthy.

Strategies allowing continuous ground floor occupancy are critical enablers to finance restoration works. Some innovative remedial strategies are reported, revitalising and preserving heritage in the most practical way by returning the property to a fully lettable state on all structural levels.

Keywords: Heritage, later-age carbonation, chloride, corrosion threshold, durability, restoration, re-use.

1. Introduction

1.1 Typical Approaches to Art Deco Structures

It is reported that the vacancy rate of heritage¹ structures above the retail (ground) level of the Perth CBD is 42% (1). In smaller structures, this is reported due to retrofit concerns with regard to access with staircases and escalators consuming valuable square meterage of retail which supplies 5 x the rental potential of office space (Table 1). Similar ratios exist in other capitals.

Table 1: Rental Returns before Outgoings, Perth CBD (refs 2a, 2b)

Year	Prime Retail Hay St Mall Precinct \$AUD/m ² /annum	Average Retail Hay St Mall Precinct \$AUD/m ² /annum	Prime Office (St George's Tce, Central Location) \$AUD/m ² /annum	Peripheral Office CBD \$AUD/m ² /annum
2013	Good: 1500-2000	800-1250	700-850	400-500
2019	Good: 1500-2000	800-1250	550-775	250-325

Additional concerns are the structural durability of the upper levels to the satisfaction of renovating Engineers and Council. With new concrete very cheaply installed² at \$274.60/m³ and the cost of remediating concrete varying from \$500-1000/m² (electro-osmotic treatments)-\$2400/m² (traditional repairs)³ a typical approach to remedying concrete beyond its design life of this era has been façadism. Noteworthy heritage structures flanking the Hay St Mall area incorporating skyscrapers include 108 St George's Tce Bankwest Tower and the recently completed Treasury Building. Use of

¹ The term heritage is used throughout without necessarily referring to its listing status.

² A reinforced suspended slab 150 mm thick = \$40/m² in Perth, WA (ref 2c)

³ Dependent on complexity, access costs and inclusions such as galvanic anodes (3).