

Strata and Community Title in Australia for the 21st Century 2015 Conference

Building Defects

How can they be avoided?- a builder's perspective

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September 2015

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Summary:

Defects have plagued buildings for decades if not centuries, and even more so in the post war era of the private developer and with the emergence of the 'design and construct' project- the sister act of development as a private system of creation of our titled buildings. Although many D&C projects are created with minimal defects, the practice of D&C and its evolution out of the previous Architect and Master Builder era, has a large part to play.

This paper takes us through a brief history lesson including the emergence of private property development and D&C in the post-WWII era, and the associated vulnerability of standards of construction across professions and regulatory systems. The erosion of the regulatory process, both professional and authority-based, is also revealed in the emergence of private certification and the dilemma of the slippery deal. The end product of such a system is illustrated with a 'horror' case example of one of its offspring. Finally a 'Defects Scenario Matrix' is put forward for ways to keep a handle on defects on the D&C project based on a review of the horror case example and then a case example with a low defects regime.

About Dr Jonathan Drane

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Introduction: The Drowned Building

In 2014 after being involved in commercial construction and property development on major high rise projects for 35 years, I was asked to advise on a leaking apartment block in the inner west of Sydney in a prime growing residential area close to the city. Apartments prices were heading beyond the million dollar mark in that area. Nothing was to prepare me for what I saw.

The apartment block was nearly a decade old and looked like a drowned beast, every apartment owner was demoralised and in a state of resignation. The building had rooms which were mould-affected from continuous leaking and damp intrusion. The roof was very low quality, gutters were installed back the front, planters sat on balconies that leaked into apartments below. Precast panels were not joined properly and allowed water to flow in. The car park had flooded several times. Owners joked nervously about having internal water features when there was a storm. An insurance claim had provided some relief but nothing that could handle the enormity of the issue. Some apartment residents were second owners, some were playing the market in the hope that remediation work would lift the value of the apartment and others had been there since 'the beginning'.

The 'beginning' meant that they had bought the apartment 'off plan' from a developer who had supposedly provided all the necessary representations and certifications that the building was 'fit for purpose', high and dry and a joy to live in!

Upon closer inspection the building was like a poorly fitting, lego-block, precast structure that had not included any waterproofing between the joints and there was no 'outer skin' which would normally be included in an integral design for the building. To use the term 'design' is actually a misnomer because there was no outer design, and in fact no prevalent professional designer for the project. There was however a property developer who had disappeared with a tail stream of stories and innuendo. The developer was a novice as a developer and as a builder. He had taken over all the design, administration, quality supervision and construction activities. The latter he subcontracted to mates and other unfortunates who fell under his spell. Upon further investigation the building had also been privately certified. This was the only fact that did not come as a surprise.

The deeper investigations were all shocking, and attempts to resurrect documents and to liaise with Council were met with a vacuum of information and tired response. As I moved forward with the body corporate, there were tensions related to my discoveries. Along the way I learned how endemic this situation was in this growth area of the city and how one developer had 'had his way' on a community across several projects and for a larger community than the apartment block I was advising on.

So how did it come to this? The surface answer lies in poor design details and their implementation, but the deeper answer lies in a little history lesson.

A Little History- The Genesis of the Erosion of Design

In the beginning there was the architect, the all-powerful creator of edifices and monuments that would seemingly last forever. We still gaze upon these marvels as we roam the tourist circuits and admire wonders from the Tower of London to the Eiffel Tower. The architect of this era was artist and ultimate creator, the buildings were commissioned and assembled under his [sic] watchful eye with artisans, trades people and labourers- lots of labourers.

In more modern times the system evolved with the architect remaining as the artist, designer, administrator and quality supervisor with the 'Master Builder' acting as the coordinator of the artisans and trades. In the 20th century, this system came under attack through the advent of modern economy the evolution of financial systems and the rise of private property development. The role that received most of the critical attention due to these events was the act of 'administration' and 'quality supervision' of the Master Builder's work. Traditionally this was the architect's role but then a conflict of interest arose. Where did the architect's allegiance lie, with artistry, quality or administration? This question still plagues our modern construction industry even to this day.

The Advent of Project Management

The industry actually made its own decision. It invented the role of 'project manager' (PM) which usurped the architect's place at the top of the tree. Under project management arrangements the architect was commissioned by the PM on behalf of the client and the builder was appointed based on tender and competitive quotations. In this systemic development the design was undertaken by the architect, and the question of administration was somewhat solved as it was handled by the new PM profession. However quality supervision became an Achilles heel, for suddenly the previous 'full role' of the architect (design, administration, quality supervision) was disseminated with the PM taking over the administration, emphasising the roles of 'expediting and programming' and some of the quality supervision (in some cases). The architect's 'full fee' arrangement was eroded, and his position in the project diminished. So also was the potential for the quality of outcomes at design level and due to commercial pressures.

The Advent of D&C Building Contracts

Another development of this era was the advent of the 'Design and Construct' building project. The same role demarcation principles applied as with project management but the builder stepped forward as the primary contractor for the project under a fixed (or guaranteed) price arrangement and he then commissioned the architect and undertook the administration, construction and quality supervision of construction. The architect was sometimes commissioned for a reduced quality supervision role called 'attendance'. This role was to cover the builder for areas of technical inspection that was beyond his scope. The brief vignette below sources the first D&C project in Australia to a Civil and Civic project in 1955.

Vignette: The First D&C Project

Civil and Civic had their origins in Australia in providing prefabricated housing to the Snowy Mountains scheme in the early 1950's. Their first design and construct project using what they called 'the better way' and probably the first of its kind in the commercial sector of the Australian building industry was a small gatehouse (Murphy 1984, p.7) built in 1953 for The Commonwealth Oil Refinery.

The first recognised high rise building (and the first in concrete) in the city of Sydney (besides the Amalgamate Wireless buildings steel tower) was also built (and developed) by Civil and Civic in the form of Caltex House in October 1957. (Murphy 1984, p.16, 27).

Extracted from Drane 2015, p341.

Further erosion occurred with the diminishment of the architect's role from the original 'full design and detail documentation' to just 'concept design' or 'DA design'. Here, the 'detail documentation' was done by the builder through their own technical designers and subcontractors. By this time the original full design role of the architect was a remnant of its former self.

In the analysis of these developments, there are aspects that were commercially driven and made good sense. If the architect for example, was not suited to administration or programming of the project and preferred to stick to design this was a good development. I know this will possibly rile some architects in the audience who see it as an affront to their original, integrated professional role.

Other aspects however led to systemic abuse of quality outcomes in favour of cost and time expedition. The original architect controlled system had its own checks and balances as an integral system that ensured that buildings were built under a quality control protocol. The overall budget may have suffered, but the building was well built and held its value, if not improved value due to architectural attention, concept and brand.

The Mercurial Institution: The Advent of Delivery Systems

The new 'industry system' as a whole worked like a mercurial institution, which disseminated the roles, and created many parts which were distributed across many players and parties based on primarily commercial and time based criteria. The institution would morph and change with the different project needs. Sometimes a traditional architect-builder system, sometimes project managed, sometimes builder led with a design and construct protocol. These became called 'delivery systems' tailored and designed in themselves to meet the overall time, cost and quality balance (or lack thereof) of the projects.

The vulnerability of this system lay in parties with inadequate expertise undertaking roles that they were not suited to and could not provide warranties or indemnities for.

The other vulnerability lay in a role that has not been mentioned to now in this paper.-Authority approval and regulatory regimes.

The Regulator: Emergence of The Private Certifier

My regulatory jargon here is based on my predominant involvement in the NSW and Queensland systems, however many of the principles are the same with different names. The explanation is a reduced version of the process for assistance of the audience.

Prior to the advent of private certification in the early 2000s , a developer would be required to submit a Development Approval (DA) for the specific change in use in the project (put simply) and then submit a Building Approval (BA) for the actual construction of the project. The DA and BA approval were handled by the local authority or council. The DA established the conceptual design of the project in accordance with planning requirements. The BA set out the parameters for the construction of the project including environmental protocols, construction times, noise, etc. It also required that detailed plans be submitted for the Building Approval process and a series of inspections of the building during the project period to ensure the project was built to plan and to code. The code used to be called Ordinance 70 but morphed into the BCA or Building Code of Australia. This included fire safety and ventilation together with egress and overall access amongst many other things.

The builder would appoint a 'Clerk of Works' who was qualified to overview the works and the Clerk would liaise with the council inspector. The architect had a direct interest in this relationship as did the other consulting engineers.

This small team in unison would ensure that the building was constructed to code and to the quality required by the architect and council's architects. When the project was completed there was a completion certificate for the construction contract and this included a 'certificate of occupancy' issued by the Council that the project was fit for occupancy and its intended purpose.

These certifications in turn allowed for the building to be 'registered for title' and change from a construction site to a titled property ready for sale and occupancy.

Such a certification would not allow a building to be registered for title if it leaked like a sieve, was not 'fit for purpose' or had not been built to code standards.

With the advent of private certification the BA process was able to be outsourced by private certifiers who in the earlier days had set up shop after working in the same role at council. The actual ability to choose between a council process or a private certifier was left in the hands of the developing party. All this was exacerbated by the rise and rise of the private property developer.

The Rise of the Private Property Developer

With the rise of private property development in the post WWII era, and the later ability of developers to tailor their own delivery and regulatory systems, the perfect storm was about to descend upon the industry. A brief vignette of the rise of private property development is shown below.

Vignette: Caltex House the first integrated Private Property Development Deal

The first recognised high rise building (and the first in concrete) in the city of Sydney (besides the Amalgamate Wireless buildings steel tower) was also built (and developed) by Civil and Civic in the form of Caltex House in October 1957 (Murphy 1984, p.16,27).

This project was also the first large scale commercial development deal, not only for Civil and Civic, but also for the city. Post war rent controls, which stopped profiteering were to be lifted in 1957 (Murphy 1984, p.16) and make way for what would be called the anchor or long term tenancy. This would become a pre-requisite as a covenant on lending for development of commercial offices in years to come. The deal was between Civil and Civic (developer), Caltex Oil (long term tenant- forty years) and AMP (financier and end owner) (Murphy 1984, p.18). Lend Lease, which did not exist at this point was formed the year after, out of a Tahitian visit and vision by Dusseldorp in 1958 (Clark 2002, p.81)

Extracted from Drane 2015, p341, 342

For the unscrupulous developer with the even more unscrupulous private certifier this was a license to bypass the certification processes from the previous era.

Taking this into account along with the latitude for the developer to design their own 'delivery and regulatory system' it was open slather. This marked a new era, a collision of historical laxation: the advent of D&C delivery systems, the advent of a privatised regulatory environment and the overall rise of the all-powerful unscrupulous, inexperienced developer and the expedient certifier.

Returning to the Drowned Building


This collision of conditions were at play when in 2014 I witnessed the leaking sieve of an apartment block- 'the drowned building'. In that case there was the ultimate combination:

- The unscrupulous inexperienced developer who also acted as builder.
- The unscrupulous certifier
- The absence of an architect.
- A D&C design created internally by the developer.

- The ‘self design’ of the building and construction details.
- The absence of a structural/water resistant design
- The lack of supervision of quality
- The lack of duty of care to end owners
- The complicity of the real estate agent in accepting the standard of building
- The misrepresentation of the building design and quality in the sales documents
- The lack of education of the buyers

A Good Case Example: Gateway Apartment Tower Townsville

But let us not take this as an endemic example of the whole industry for there are many other examples of projects that have been undertaken based on traditional delivery systems and also with D&C to good effect. I have included a vignette of a multi-apartment tower I was involved with as co-private developer, project manager and superintendent in Townsville’s burgeoning eat street- the Palmer Street precinct. It had a low defects level due to an integrated approach to outcome controls.

<p>Vignette: A successful D&C project with low defects.</p> <p>The project was initiated by a private project developer who had industry knowledge about delivery systems.</p> <p>Apartments: 112 in a mix of managed and residential apartments.</p> <p>Developer: Private developer with design and construct knowledge.</p> <p>Project Manager: The developer was (client-side) PM and superintendent.</p> <p>Architect: Appointed for concept, DA, by developer.</p> <p>Certifier: Private certifier with reputable track record.</p> <p>Builder: A reputable D&C builder with strong history in D&C was (construction side) project manager.</p> <p>Design Team: Appointed by builder, the architect continued their commission for design documents, BA and relevant detail design.</p> <p>Construction Team: Local subcontractors and suppliers under fixed price D&C arrangements appointed by builder. The subcontractors participated in detail design and workshop level drawings.</p> <p>Dr Jonathan Drane, 2015</p>	 <p>Gateway on Palmer Project 2007, Palmer Street Townsville.</p> <p>Defects Outcomes:</p> <p>Strong shared client/builder management with continuous approach to defects with 5% defect level (approx.) at completion and 1% at registration of title.</p>
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The Gateway tower was an example of a private development group which had industry knowledge of the various delivery systems. The developer chose a D&C system based on an experienced and reputable builder (Matrix Constructions) who had established understood, demarcated D&C relationships with their architects over many years. Each party knew what part of the design and detailing was done by whom and who would be responsible for quality supervision of the constructed element or detail.

The architect (MPS) took the design from concept and DA stage through to detailed documentation but handed over specific construction details where Matrix or their subcontractors were better equipped to resolve or implement these details.

The Gateway tower was privately certified by a reputable certifier and who had a good relationship with the architect, builder and local council.

So how do we build on both of these case examples 'the drowned building' and the 'Gateway Tower'. The next section analyses these two projects through a conceptual matrix for the creation of project delivery systems that ensures developers, clients, certifiers and professionals are on the same page with a possible good end outcome with the minimisation of defects.

A Way Forward- A Defects Detection Matrix

The matrix over page plots a polar scenario from left to right. On the left is the highest risk scenario and on the right the lowest risk as it relates to 'likelihood of defects'. In this case the most risky scenario is shown as 'developer led' and the least as 'traditional scenario'. The two case examples are then plotted graphically as a rough fit within the matrix. Please note that the developer led scenario is based on an inexperienced, unscrupulous developer and their certifier, and does not reflect respectable developer groups/certifiers with mature delivery systems designed to minimise defects and maximise quality.

From the matrix it can be seen where each case example lies graphically. The 'drowned building' lies to the far left with the highest risk and least desirable outcomes whilst the Gateway tower lies toward the right in the third quartile. The right end suggests the imaginary perfect project where traditional delivery systems are employed with the architect providing the design, an independent administrator, respectable certifier and a tendered building contract. To industry buffs the choice of this delivery system as the perfect one will be the subject of debate which is welcomed by the author.

This matrix can be used before and after the project completion. Before the project it can be used to divine a 'defect minimised' outcome and after the project it can be used for forensic purposes as an explanation of how and why defects occur in our modern building projects.

Likelihood of Defects			
High ←————→ Low			
Developer Scenario	Drowned Building Project	Gateway Project	Traditional Scenario
Developer led design			Client/Architect led design
Inexperienced Developer			Experienced Team & Leader
D&C Delivery System			Traditional Architect /Master Builder
Private Certifier			Council Certifier
No project management			Project management
Developer is builder			Separate Builder
No quality supervisor			Clerk of Works
Detail design by subcontractors			Detail design by architect
Unscrupulous arrangements			Independent arrangements

Defects– Scenario Matrix

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Conclusions

This paper has illustrated how historically, the overall system of construction/development delivery of titled buildings to apartment owners has been corroded by the corrosive mix of private development, inappropriate D&C systems, a mercurial approach to delivery across the industry and the advent of private certification. Two case studies at opposite ends of the ‘defects risk spectrum’ were given as examples of how the overall system can work or be completely corrupted. The rest is up to the industry to embrace this holistic understanding and move forward with an integrated solution to the problem.

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