



TOTAL BUILDING
Engineering
S o l u t i o n s

Company Introduction

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Includes:

- ✓ *Our Company Commitment*
- ✓ *Company History & Experience*
- ✓ *How We Can Help You*
- ✓ *Typical TBE Solutions Report*
- ✓ *Detailed Explanations of Common Building Defects*





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Our Commitment

This booklet is designed to briefly introduce TBE Solutions to you. We run a specialist building and engineering consultancy company and pride ourselves on our commitment to professionalism and individual project care and attention. The building construction process can be riddled with difficulties — from common building concerns such as render cracking, concrete spalling and efflorescence, to total dilapidation. On top of providing detailed photographic reports on these and any other building issues, we can also handle Project Management, Tender Management and Heritage Restoration Reports.

Our company commitment is to provide you with fast, reliable and cost-effective solutions for any of your building or engineering problems. If you are not sure what the next step is to rectify your existing building concerns, we are the people to contact. Together we can create a solution which will add clarity and consolidation to your project. The TBE Solutions Team hope you find this introductory booklet helpful; as well as introducing you to the company it explains some of the common building defects which are often referenced in our reports, and finishes with a review of our performance development.

“Our commitment is to provide you with fast, reliable and cost-effective solutions for any of your building or engineering problems.”

Kind Regards,
The TBE Solutions Team



About Us

HISTORY & EXPERIENCE

TBE Solutions is a Sydney-based company able to provide solutions for residential and commercial building and engineering issues. TBE Solutions began as a small contracting business in 2007 and has been gradually expanding its client base to all of New South Wales over the past 15 years. We manage projects and clients from Newcastle all the way to Wollongong and have handled hundreds of successful projects. The team has a combined experience of 35 years in the building, civil and structural engineering field.

OUR ROLE

Both old and new buildings can be riddled with difficulties — from common building concerns such as render cracking, concrete spalling and efflorescence, to total dilapidation. On top of providing detailed photographic reports on these and any other building issues, we can also handle Project Management, Tender Management and Heritage Restoration Reports.

We have the resources to create detailed photographic reports with accompanying recommendations for any rectifications. If the defect or fault needs further specialist investigation or testing, the appropriate professional expertise or testing methodology is noted.

***“We now manage
projects from
Newcastle
all the way to
Wollongong.”***

Our recommendations strictly follow the current Australian Standards and Tolerances Guide, which means they are of a court-approved standard. If you need more detail or information, don't hesitate to call us on (02) 9693-5154, or check out our website which has PDF booklets on common building issues as well as a "Steps to Success" page, detailing the process from finding building defects, through to complete remediation.

We are also proud to be members of the following select building and engineering associations and organisations:

Engineers Australia

www.engineersaustralia.org.au



NSW Master Builders Association

www.mbansw.asn.au



National Safety Council of Australia

www.nsc.org.au



Australian Corrosion Association

www.corrosion.com.au



Strata Community Australia — NSW

nsw.stratacommunity.org.au/page



To be a member of these associations is very useful as it means all of their resources are available for the TBE Solutions Team. We receive up-to-date information on everything relevant to strata managers, and to building and engineering practices. The dedicated TBE Solutions team has a first-rate force of workers, a great deal of experience and very bright hopes for the future development of the company.



WHAT TBE SOLUTIONS CAN DO FOR YOU

BUILDING CONDITION, DEFECT & DILAPIDATION REPORTS

For a thorough explanation and examples see p. 8.

HISTORY REMEDIAL WORK SPECIFICATION

We provide specific recommendations for how to fix any issues, product recommendations and listings of any codes from the Australian Building Codes Board (ABCB) which are relevant to your project.

CIVIL & STRUCTURAL ENGINEERING

We specialise in both these fields: civil engineering deals with the design, construction, and maintenance of the physical and naturally built environment. Structural engineering primarily concerns itself with the analysis and design of structures that support or resist loads.

FORENSIC & REMEDIAL ENGINEERING

We specialise in both these areas: forensic engineering is the investigation of materials, products, structures or components that fail or don't function as intended. Remedial Engineering is a corrective branch of engineering, involved in the correction of bad engineering, and the improvement of engineering skill and work.

HERITAGE RESTORATION REPORTS

We can produce reports on any heritage-listed building, with a strong emphasis on the maintenance of the building's unique integrity, while also eliminating any building/engineering faults or issues.

Benefits for Strata Managers:

- ✓ **Fast**
- ✓ **Reliable**
- ✓ **Affordable**
- ✓ **Experienced**
- ✓ **Comprehensive**
- ✓ **Easy to understand**

TENDER MANAGEMENT

Our role throughout the tender management phase includes:

- Preparation of the tender documents and the price schedule.
- Sending of the tenders to our three preferred contractors to encourage competitive pricing.
- Attending an onsite pre-tender meeting with our three preferred contractors to discuss the building works, access and OH&S requirements that need to be fulfilled.
- Revision of the submitted tenders to ensure all contractors have agreed with the tender terms and conditions.
- Providing the strata manager and committee with a Tender Analysis for comparison and our recommendations.

PROJECT MANAGEMENT

Our role throughout the construction phase includes:

- Attending the site and carrying out inspections to remedial works at crucial stages through to practical completion.
- Ensuring compliance with quality, prototypes, inspections, and warranty requirements.
- Verifying repair quantities if accurate quantities are unavailable at tender.
- Certifying contractors claims for payment and calculating retentions.
- Delivering progress reports to you.
- Compiling a list of defects (*if any*) and submitting them to the contractor to rectify during the defect liability period.
- Certifying final completion of works.

CONTRACT ADMINISTRATION

We perform all important administrative functions — we handle any paperwork, quotes, contracts etc. that are involved. We also cover the cost of any materials, folders, paper, plans etc.



A TYPICAL TBE SOLUTIONS REPORT

Our Building Condition Reports, Defect Reports and Dilapidation Reports can be up to 600 pages, depending on the extension of the project. They begin with an introduction, a commentary on the property under inspection, details of the inspection and the navigational references for the property. They end with a Conclusion, the Report Conditions and Technical Data Sheets.

The bulk of the report is a written/photographic description which analyses each detail of the specified site (each crack, rust spot, etc.) to summarily analyse the condition of a building. It also has the recommended repair action next to the defect description and a reference photo. This is an example of what you would see in one of our reports with an explanation of each section:

Strata Plan No.....

Street Address, Suburb, NSW, Postcode

This document and its content are intended for the Addressee only it contains information and opinions held by the Author based on available facts on the day of inspection. It is for consideration by the Addressee only and is not for general publication without written consent.

Item No:	Description	Recommended Repair Action	Reference Photo
Building Entrance			
1	<p>This section gives a detailed description of the building environment at the time of inspection and describes any noticeable defects.</p> <p>It will also describe any tests carried out in the immediate area and the results such as measurements of cracks or moisture readings.</p>	<p>This section suggests repair action recommended by TBE Solutions. It also describes whether any further investigation is needed (eg. removal of floors or walls to trace any underlying issues). Sometimes it will refer to an extended explanation of remedial works which will be included at the end of the report.</p>	<p>This will usually start with a contextualizing photo from the site being discussed, then will present more close-up photos of any defects being discussed.</p>



The site inspections and creation of the report can take a while and it helps if you are prepared for this beforehand; lots of factors outside the control of the inspector can impact inspections, such as weather and difficult tenants, and the report requires time to compile as it is comprehensive. The report will contain the findings and recommendations of the inspector, and will indicate recommendations for required. The Condition Report is mainly intended to be a photographic record and identification of each individual defect. Rectification recommendations are provided for each defect, and are summarised at the end, but they do NOT constitute a detailed Scope of Works which builders require if the job is extensive.

SCOPE OF WORKS

If your job necessitates significant rectification, we will suggest that you get a Scope of Works included with your report. We will indicate this in our initial free quote and include it in the breakdown of costs. The Scope of Works lists every specific step to be taken by the builders in the process of rectification to adhere to Australian and Environmental standards. It will generally include, for example: WH&S precautions to be carried out prior to commencement, safety precautions during the stages of rectification, specific materials and quantities that are required, the exact building codes and standards which must be met at each step, technical drawings and engineering specs that are necessary, etc. As a very separate and technically-specific document, the Scope of Works is an additional cost on top of the Condition Report. If you already know that you will require a detailed Scope of Works at the outset, you can request it, otherwise the consultant will suggest one based on the project size. If the job is small, you may not need a Scope of Works but can proceed with the Recommendations from the engineer/building consultant included in the Condition Report.





Common Building Defects Moisture Ingress

This and the next seven pages detail nine of the most common building defects including: moisture ingress, bubbling plaster, slab edge dampness, mould, concrete spalling, drummy render/drummy tiling, render cracking, efflorescence and magnesite flooring. This guide will help to explain what they are, how they occur and how they can sometimes be prevented. If you see the signs of any of these defects, consult our “Steps to Success” guide on our website (www.tbcsolutions.net.au) to see the step-by-step process from how to go through the building remediation process.

MOISTURE INGRESS

Moisture ingress is when water penetrates a product and it can be a factor, cause or significant contributor in nearly all of the building defects which will be examined in this section. When water gets into a product, its structural integrity is at risk because many ingredients in building materials can loosen in water.

To determine moisture ingress in a specific area, TBE Solutions Inspectors use a moisture meter (see image to left) which measures the percentage of water in a given substance. The tested area is usually considered fine if the reading is less than 10%, however anything above this percentage is usually indicative of water ingress.

Often, surfaces can have different readings at different points which is why our Inspectors always take multiple readings across whatever surface is being examined to find the highest moisture percentage which often reveals the originating area.

DEFINITION

Moisture ingress literally means “moisture entry”. A technical term for when water penetrates a product.





Bubbling Plaster & Slab Edge Dampness

BUBBLING PLASTER

This is a sign of water ingress and it means the moisture has travelled from one side of the substrate (usually brick) through to the other side of the render which absorbs the moisture like a sponge — this causes the bubbling. This often happens on the other side of a wall which backs onto a bathroom or shower, and on the outside of a building where the moisture in the soil makes its way into the outer walls causing bubbling there. This is often also called “rising damp”, which is when the ground moisture containing salts rises up through the masonry or brick wall through capillary action and absorbs into the render which can cause bubbling.

SLAB EDGE DAMPNESS

Slab edge dampness is as simple as it sounds: it is when a concrete slab edge becomes damp. Most slab edges are occasionally damp due to rain, garden watering, or by contact with the ground. In some cases, when this dampness is able to permeate from the outside to the inside it can affect the internal walls and/or finishes of a building. Indications of slab edge dampness include persistent dampness of the exposed face of the concrete slab/footing, efflorescence (see p. 23), drummy render (see p. 21), pungent odours in floor coverings (ie. damp carpets), watermarks, mould growth (see p. 17), rusting and external paint blistering/peeling/bubbling. All aspects of planning, site excavation, construction and post-construction landscaping must be considered to minimise the risk of slab edge dampness and moisture ingress.





Mould

Moulds are found everywhere — both inside and outside, and they reproduce by spores which can be carried by air currents. There are only two conditions which must be met to allow their growth: the presence of nutrients and moisture. Because common building materials (such as drywall, carpets, and wood) provide the nutrients which moulds feed on, indoor mould growth is typically related to the introduction of water. Flooding, leaky roofs, building maintenance problems, or indoor plumbing problems can all lead to mould growth.

The simplest way to counteract mould, then, is to reduce the moisture levels which facilitate its growth — allow air and sun to penetrate your building daily. Aeration, cleanliness and sunlight are the simplest ways to dry up water and reduce the stability of the temperature and humidity of the environment (as a stable environment is particularly attractive to moulds). If a building or area already has the presence of moisture and is left in the dark it is likely to produce mould.

The presence of mould is only visible to the human eye when mould colonies grow. Mould can be present in spore form, invisible to the naked eye, or it can grow inside walls after a water damage incident and be dormant and concealed until the right conditions—such as high humidity—reactivate it. This is how mould often appears suddenly, and possibly long after an incident of water damage which did not seem to create a problem at the time.

DEFINITION

Moulds are a type of fungi and do not get energy through photosynthesis but from the organic matter on which they live.





Concrete Spalling

When concrete is used in construction, steel bars or steel mesh is often used as reinforcement. But when exposed to air or water, steel can corrode, which causes it to expand and often cracks the concrete it is in. It is also called “concrete cancer” due to the progression of the corrosion. Once the concrete has cracked, it further exposes the steel to water and air, speeding up the erosion of the reinforcement.

Concrete spalling is a common building condition, and is especially prevalent in buildings which are close to saline environments, such as ones along the coastline, because there is more salt in the air to corrode the steel. Some of the most common causes are:

- ⇒ Poorly treated reinforcing steel being used in the original pour of the slab (ie. having rust in the slab to begin with).
- ⇒ Porous concrete, or concrete which doesn't sufficiently cover the steel reinforcements.
- ⇒ Fractures in the concrete which allow moisture and salt to penetrate it.

DEFINITION

The cracking or breaking down of concrete due to the corrosion and expansion of the inner steel reinforcements.

If the spalling has affected the integrity of the concrete, remedial action usually includes demolition of the entire affected section and rebuilding of the structure. If there are parts of the steel reinforcements that are unaffected, then only the affected parts (if more than approximately 20% corroded) need to be removed and replaced, but it will depend on the severity of the corrosion.





Drummy Render/ Tiling

DRUMMY RENDER

Drummy render is when the cement or plaster render coating becomes loose. When tapped with the plastic handle of a screwdriver, or sometimes just your knuckles, it produces a hollow, weak sound (ie. it sounds like a drum, or it sounds “drummy”).

There are many different causes for drummy render and these have been debated by many plasterers. These possible causes include: water ingress, heavy vibrations, not having enough cement in the mix, putting the render on too thick, or it may be that when the plumbers and electricians chase up the walls the dust left behind formed a membrane on the wall separating the render from the substrate.

Drummy render can be a dilemma — it could indicate cracking in the walls behind or may simply be due to slight movement and breaking of the bond to the brickwork. It may stay there for many years or fail within the hour. If you find you have drummy render the common solution is to remove the drummy section and re-render.

DRUMMY TILING

Drummy tiling is caused when the adhesive bond between the tiles and the wall or floor breaks down. This can break down if water gets in behind the tiles. In modern homes with large tiled areas, drummy tiles often result from floor tiles being installed without expansion joints. As tiles expand with age, the stresses cause the adhesive to fail. Depending on how extensive the break-down is, the best solution is usually to totally re-tile the area.

DEFINITION

When the render or tiles are pulling away from the wall creating a hollow space behind it.





Efflorescence

Efflorescence is generally harmless and can become less extensive over time. It is also known to become more obvious in winter but may be observed throughout the year after heavy rain and a drop in temperature. It is more a surface issue than a deeper problem.

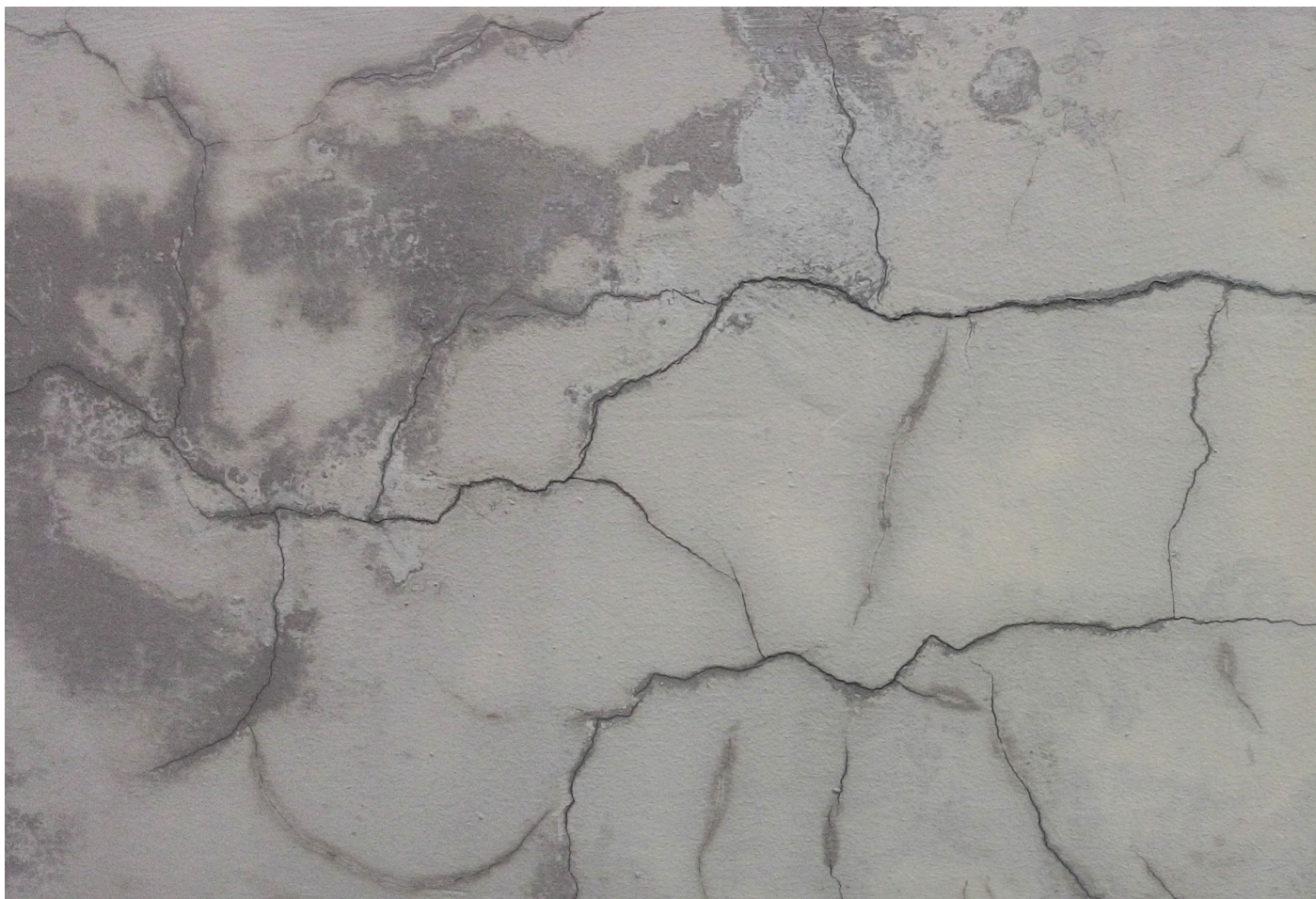
There are *many* different ways efflorescence can occur including both chemical processes (a reaction between the concrete and carbon dioxide and/or sulphurous gases) and physical processes (involving the transfer of salt and water in and out of concrete or masonry). There are also a number of factors in combination with climatic and environmental conditions which can cause it including: the constituents of concrete (cement, aggregates, salts and water), the quality of the concrete, how the concrete was cured, and the surrounding environment (temperature, moisture levels and external sources of salt).

There is no guaranteed solution for efflorescence but prevention can be achieved by using a few different methods: select ingredients for making the concrete or mortar with the least possible soluble salts, use tools which are clean and free of rust, salt or other harmful materials, keep water out, avoid premature drying of the concrete, treat the surface of newly finished concrete with water-repellent materials.

DEFINITION

The formation of salt deposits, usually white, on or near the surface of concrete causing a change in appearance.

NB: Calcification is a type of efflorescence which is mainly composed of calcium deposits.





Render Cracking

The easiest way to understand how and why rendering cracks so often is by explaining the process of cement rendering:

1. Cement render, no matter how it is formulated (usually a ratio including sand, lime, cement and water) is highly alkaline and extremely rigid.
2. After being mixed it is applied to the building and is then left for 28 days to cure. This allows the alkaline to stabilise before it is painted.
3. Sometimes, if the builders are concerned with money, they can use traditional decorative paints (roll on) which are low-film build and lack flexibility.
4. After being painted, the render is usually exposed to extreme variations in temperature which causes it to expand and contract. The ongoing stress on an inflexible product is what causes the render to crack. These cracks appear first as hairline cracks and become more obvious when the render is wet.

DEFINITION

To render is to coat a surface (often brick) with plaster or cement. Due to the inflexible nature of a render, it commonly cracks due to stress.

While hairline cracking can be patched up with many different products, this does not deal with the underlying problem, it only provides a temporary solution. The recommended action (albeit the expensive one) is to demolish any affected areas and prepare and re-render them. As soon as there are cracks in any render this allows water penetration which will worsen the issue at hand and can lead to drummy render (see p. 21).



Magnesite Flooring

DEFINITION

A cork-like type of flooring material which is light brown, porous, and associated with water-damage issues.

Magnesite flooring was commonly used as a finishing surface on concrete floor slabs in the 1960s and 70s, and in some buildings before and after this time, to make the concrete level and provide insulation. It also provided quite a soft finishing for the flooring. It is composed of calcined magnesite, magnesium chloride, sawdust, ground quartz or silica, and fine powdered wood waste. Because it is very porous and readily absorbs water it is associated with water-damage problems. These include:

- ⇒ The magnesite flooring can become soggy and rot away in damp patches because it retains the water it absorbs; in extreme cases the floor can noticeably lift.
- ⇒ If damp, it lets the water seep easily into the concrete slab below which can cause concrete spalling (or concrete cancer, see p. 19).
- ⇒ If damp, it can make the chlorides contained in the topping leach into the concrete slab below which also encourages and speeds up the concrete spalling process.

To prevent the above, regular airing and sunlight on the floor is very important. However, most water-damage issues are unavoidable, especially in bathrooms and kitchens (even if you get your carpet steam-cleaned the magnesite flooring will absorb the water), and most remedial works suggest it be removed. It has generally stopped being used in contemporary building construction.





Training & Development

TRAINING

TBE Solutions greatly believes in the power of education and training which is why it employs the best engineering and building people, merging their combined knowledge and skills. Just as important is keeping our employees up to date with all the latest developments in the remedial building and engineering fields.

Here at TBE Solutions we learn much from each other and know that experience combined with education is the key to success. There is nothing like actually being on-site and examining a



building first-hand to teach people how we do what we do. We are invested not only in the success of our client's projects, but in the success of our individual team members.

DEVELOPMENT

We have ongoing performance management procedures such as objective setting, reviews and performance feedback which ensure we are continually developing our skills. In the future, we hope to continue expansion of TBE Solutions into a NSW leading building and engineering consultancy company. We truly believe in our team and it's dedication to excellence and constant desire to reach higher, and go better.



For more information see our website:

www.tbolutions.net.au



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