# ‘Toolbox’ of Solutions

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The ***Toolbox of solutions*** is a schedule of maintenance products Moisture Detection Company has developed since 2004. Owners can chose from these to improve weathertightness performance and retain structural durability.

***Toolbox of Solutions***

| The Solutions | Explanation |
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| ***Permanent moisture monitoring system:*** Purpose is to provide a simple and cost-effective way to invasively test and monitor the external wall framing for moisture, so any leaks are discovered early for repairs, before damage is done or becomes worse.<br><br>Probing involves drilling holes principally in through the skirting, to obtain timber samples from bottom plates, and allow installation of permanent moisture probes in the holes. This is called ‘invasive testing’.<br><br>Regular reading of the moisture levels at the probes guide future maintenance decisions and becomes a record of your house. This process supports weathertightness reports including moisture testing as required by Banks and purchasers. Read about moisture probes here | New Zealand house construction is based on a ‘performance-based building code’. Builders omitted installing tools for owners to formally test their homes to find out whether they are performing as required by the building code. Moisture probes are the tool homeowners now use to test their homes regularly for moisture problems. Claddings are required to keep water out but particularly during the ‘leaky building crisis’ years, construction materials, methods, regulations and inspections were deficient and let water in. Monitoring provides owners with feedback to detect hidden moisture so maintenance can be undertaken early before costs to repair become prohibitive. Owners now have the probes to prove they have a dry home |
| ***RotStop timber treatment:*** Purpose is to treat or retreat timber framing to protect it against decay and insect attack. Essential for framing that is or could become intermittently wet.<br><br>Also essential for timber which has experienced some early decay in the past, to sterilise dormant decay spores and support durability.<br><br>RotStop is applied through holes in the external cladding, internal wall linings, or directly to exposed timber.<br>Read more about RotStop treatment | Since 1992 NZ’s building regulators have allowed framing to be used in external walls that is not resistant to decay when it becomes wet.<br>The allowable timber treatments have changed over time, dates are approximate:<br>Pre 1992 – Treatment C8 – high resistance to decay. Some plants continued C8 but labelled H1 through to mid 1990’s.<br>1992 – 1998 – Treatment H1 – low to moderate resistance depending on the treatment plant. H1 Permethrin has no decay resistance.<br>1998 – 2005 – Untreated Kiln Dried permitted – no resistance to decay or insects<br>2003 – 2005 H1 Plus available but used sparingly – moderate resistance |

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| RotStop breaks the cycle of damage. RotStop is a multispectrum fungicide to control and manage all forms of decay in wooden framing that is above ground.<br><br>NB: Leaks must still be attended to. | 2005 – H1.2 moderate resistance |
| ***Drying Skirts and/or Concrete Nibs:*** Purpose of Drying Skirts is to introduce ventilation to dry framing along the bottoms of walls. Particularly relevant for absorbent claddings like stucco and Harditex where ground levels are at, or close to the base of the cladding. Breaks the passageways of wicking and encourages natural ventilation.<br><br>Concrete Nibs lift the bottom plate up out of danger of wetting. Often used if the bottom plates are already rotten and too close to the ground so new timber would still get wet.<br><br>Sometimes both are needed. | Absorbent claddings close to wet ground absorb moisture, allowing it to wick up and wet the framing. Decay can develop, especially where the framing is direct-fixed and/or untreated or undertreated.<br>The bottom of the cladding should be 100mm clear of concrete paths and 175mm from gardens and wet ground. Often after construction ground lines are changed to be too high, without regard for the required clearances. Gardens seem to creep higher and higher. Often it is less disruptive and cheaper to RotStop the framing if it is still in good condition, and install Drying Skirts or Concrete Nibs than lowering ground and paths.<br>Where these are not feasible owners may need to consider recladding or rebuilding these walls. |
| ***Window flashing upgrade:*** Purpose is to install metal windowsill flashings to deflect water out and away from the wall.<br><br>Particularly relevant for claddings like Insulclad, Rockcote and similar polystyrene cladding systems, as well as stucco/solid plaster with reveals that failed to include reliable flashing systems.<br><br>Some cladding systems did not even have window flashings. | Windows were eventually tested to the weathertightness standards in 2002 but failed, meaning that all of these windows leaked to some extent. Water entered and decayed framing. Some windows are complex and require full undersill trays. Often mitres fail. Some windows relied on PVC strips or embedded Tee sections relying heavily on sealants to maintain weathertightness.<br>As buildings age, the windowsill weathertightness flashings begin to fail, allowing water into the framing.<br><br>Water becomes trapped inside walls with direct fixed claddings and without adequate treatment, it decays.<br><br>The first step is to framing moisture contents below windows with Mdu probes and find out whether the window flashings are working and to what extent. Often visual inspections of wall |

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| | and sill linings do not show whether windows are leaking. |
| ***Framing replacement:*** Purpose is to replace decayed framing to return structural integrity where framing is a required part of the structural bracing or loading design.<br><br>Non-structurally important framing can also be replaced for aesthetic or practical reasons. Stopping the leak and treating in place with RotStop may be a viable and cost-effective alternative, even if its purpose is to delay larger remediation decisions.<br>Note: Section 3 of the Building Act requires owners to keep homes safe and healthy. This does not require owners to automatically replace decayed timber unless it is serious and required for structural integrity. | Where leaks are not repaired, timber which is undertreated, or untreated, decays and loses structural strength. Eventually, the integrity of the building is compromised, and this timber must be replaced.<br><br>Decay is a gradual process and takes time to develop to the point where replacement is required. Monitoring for leaks with a moisture monitoring system and carrying out appropriate maintenance using the "Toolbox Solutions" can prevent decay progressing to the stage of structural concern. |
| ***Taylor Fascia gutters replacement and overflows:*** Purpose is to reduce the incidence of heavy rainfall overloading gutters, downpipes and roofing systems and wetting soffits and walls causing mould, decay and damage. Ideally these gutters should be replaced with conventional external gutters however installing overflows is a lower cost alternative that can often relieve the problem. Read more about Taylor Fascia | The fascia style gutter systems are defective (no longer available) because by design they allow water to overflow into walls when overloaded, blocked, or rusting through. The risk of walls becoming wet is increased when there is little or no soffit or the gutters have other defects, including ends being embedded into walls. The consequences are serious if the framing is undertreated or untreated and claddings are direct fixed. Serious decay and mould can grow inside the walls, chipboard floors and cabinetry blows and carpets go mouldy. |
| ***Ponding boards:*** Purpose is to support the roof underlay around the roof perimeter to direct accumulated water from condensation and tile joint leakage out into the gutter. When the underlay sags, it leaks rainwater onto soffits and into walls. This is a common source of moisture entering walls that goes undiagnosed. | The roof underlay collects water from minor leaks, cracked tiles and tile joints that get overloaded in rain and wind and directs it into the gutter. Over time, the wet paper-based underlay sags between the bottom and first battens. Eventually the ponding water breaks the underlay down and it holes and tears allowing water to run into the walls. Retrofitted ponding boards supports the underlay and prevents leaking. |
| ***General maintenance including flashing upgrades:*** Includes maintenance to windows, penetration sealing, crack repairs, painting, window upgrading, control joints, and others. | NZ Building Code B2 Durability clause provides for 'normal maintenance' to retain durability. Maintenance includes regular washing, painting, sealing and timely replacement. The premise of maintenance is that |

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| | weathertightness details have been designed/built correctly and made of compatible/durable materials. This is not always the case. Before maintenance can be effective, defects must first be made good. Otherwise, owners' good intentions to maintain (e.g. painting and sealing) adds to the problem because wet timber will be even harder to dry out. Always monitor before painting. |

Owners can start this journey by getting the Mdu probes and invasive tests done. This reveals both the problems and where the building is performing. That way maintenance can be directed to where it's needed by tailoring the right solutions from the toolbox. We then follow up by monitoring the moisture contents to quantify whether enough was done or more solutions are required.

Every building is unique and presents problems in different ways. Every owner has different goals and aspirations so should be at liberty to plan when they want to apply the Toolbox solutions to balance cost and consequence if repairs are delayed.

Our 'Toolbox' solutions are diverse to correct most types of claddings. Some weathertightness issues are more complex and may require several Toolbox solutions at a time. Some walls may need further Toolbox solutions as repair results become known and as they continue to age.

Maintenance is an ongoing requirement for ALL homes. Some require more than others. Maintenance can include cladding replacement. These decisions are the owners to make.