



TECHNICAL BULLETIN – TB0039

SUBFLOOR PREPARATION – THE KEY TO SUCCESSFUL INSTALLATIONS

22nd October 2024

INTRODUCTION & SCOPE

One of the major issues that arise during the installation of a flooring system, either on a new substrate or during the renovation of a preexisting surface, is the preparation of the floor before the new flooring being installed.

Due to pressures associated with construction schedules or the perceived cost of the preparation, subfloor preparation is either not done, or shortcuts are taken, which can compromise the floor system's final performance.

In this bulletin, we will look at some of the results of sub-standard subfloor preparation.

WHAT THE EXPERTS SAY

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“Problems with blow-ups and failures leading to total flooring replacement are increasing at an alarming rate. Sadly, many installations, covering thousands of square metres and costing millions of dollars in labour and materials (not to mention the inconvenience to the client and the loss of reputation for the contractor) totally wasted in work that has to be re-done. Most of the problems are caused by incorrect or insufficient surface preparation of the substrate to accept coatings of levelling and smoothing compounds.”

“Apart from the obvious reasons – incorrect laying procedures, poor skill levels, adhesives, whether the substrate is concrete, timber, steel, ceramic tiles or terrazzo – most of the problems are caused by incorrect or insufficient surface preparation of the substrate to accept coatings of levelling and smoothing compounds and the fact this can lead to total replacements & big dollars”

WHAT THE STANDARD SAYS

The new 2021 version of the resilient flooring standard AS1884, makes the following recommendations about the need for subfloor preparation:

3.1.1.5 Surface preparation

When subfloor repairs form part of the resilient laying contract, all grooves, holes, and other concave imperfections shall be filled with suitable material, and any ridges or protrusions likely to impair the subfloor surface shall also be removed by mechanical means to achieve the required surface quality (see Clause 3.1.1.4). Any filling or levelling materials used shall be allowed to dry before floor coverings are laid as per the manufacturers' instructions.

1.3.15 Mechanical means

‘Mechanical means’ is the process of surface preparation performed by application of applied physical forces to the substrate surfaces to remove contamination. For the purposes of installations on concrete this refers to the use of diamond grinders, scarifiers and captive shot blasters. For smaller areas, this can include chippers and nail gun-type scabblers. When installations are to be performed on timber floors ‘mechanical means’ refers to floor sanders. Regardless of the means used the final process in a mechanical preparation is vacuum cleaning.

SOME ISSUES TO CONSIDER



Naturally, the correct priming and levelling systems have to be chosen to suit the particular substrate and finish required for different floor coverings.

Often, great emphasis is placed on the surface preparation of the walls and timber panelling before the final coating of paint is applied. Not just the walls, but the floor coverings are also visible and decorative – although no one walks or drags heavy objects over the walls and ceilings. When it comes to the floor, which is expected to take all the abuse, the importance of surface preparation and quality of leveling materials and tile adhesive seems to take second place - 'out of sight, out of mind,' which often leads to failures.

We realize that it is much harder for installers today, perhaps harder than it has ever been. There are many problems to overcome, many of which are out of their control.

The demands on installers are great—changing technology, time restraints, new and different concrete, water problems in the substrate, and the demand for smoother floors, to name a few. All these problems can be resolved with correct procedures.

Installers and retail sales staff can access training facilities and information on the increasing number of new products developed to overcome problems. If used in accordance with specifications, these products, such as moisture membranes and sophisticated priming and levelling systems, will save time and money.

CASE HISTORIES

The most common problem with preparation is the failure to remove pre-existing contaminants from the floor. These typically include old adhesives, paving paints or surface treatments, and residues such as laitance, dust, or dirt. The next most common problem is failure to apply a membrane over the subfloor before the underlayment and final floor covering are installed.

A few case histories are worth examining to illustrate problems that can occur when preparation is not performed. In all cases we will look at, the subfloor was not prepared correctly or had some other problem before installation of the flooring. All these systems had to be removed and re-instated at the installers' expense.

Case Study 1 - Moisture Problems

In this application, commercial vinyl was laid over a floor with rising dampness. The floor was not checked initially for moisture levels, and a moisture barrier was not installed.

The resulting rising moisture penetrated through the ARDEX K15 leveller and was trapped beneath the vinyl, resulting in de-bonding and blistering.

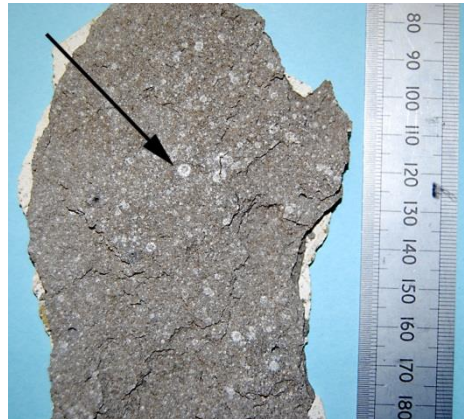
The entire installation had to be removed, a moisture barrier installed, and underlayment and vinyl re-instated



Case Study 2 - Moisture Problems causing the smoothing cement to decompose

Vinyl tiles were laid over a below-grade old concrete floor. ARDEX K55 and ARDEX WPM300 were used. After approximately 18 months, the floors erupted in large, spalled areas.

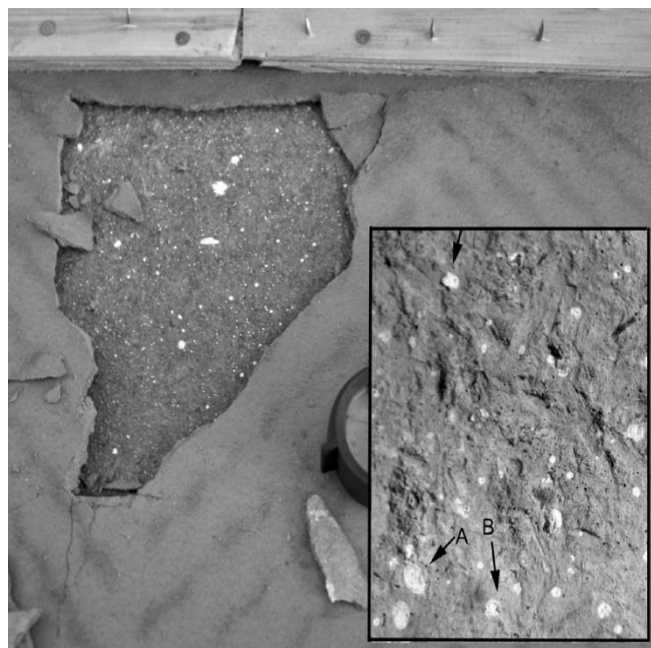
Investigation of the site indicated a problem with subfloor moisture due to a below-grade slab and leaking roof. The moisture barrier was not applied thick enough to prevent progressive water penetration.



Case Study 3 – Surface contaminants and weak surface layer

A second-storey renovation installed a particle board floor to be covered with carpet. The surface was smoothed with ARDEX Ardite NA. After approximately 6 years, the customer noticed drummy spots under the carpet.

Investigation revealed that the subfloor was contaminated with building residue, including paint or plaster (A-B). The particleboard was also subject to water damage, and the weak surface layer with the water seal was not removed. The ARDEX Ardite NA pulled this weak layer off the floor.



Case Study 4 – Poor surface preparation and thin moisture barrier

Smoothing cement with a coarse finish epoxy coat was applied over a smoothing cement on old terracotta tiles.

Investigation revealed that the moisture barrier was present on only ¼-½ of the required application. The tiles also had a weak surface after grinding.

This led to de-bonding under the



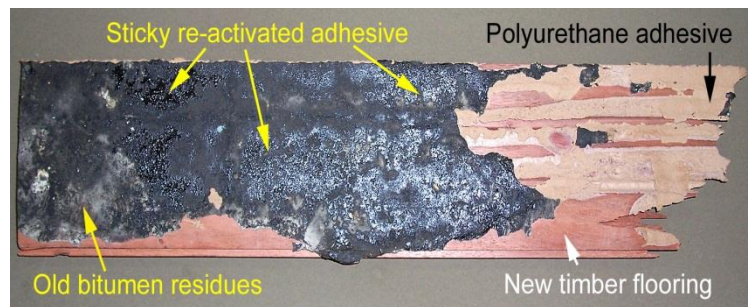


subjected floor loading.
Regardless, ARDEX does not recommend this system.

Case Study 5 – Old adhesive not removed

The vinyl was removed from an old concrete floor, but the old 'Blackjack' adhesive was left in place. A 1.5mm ARDEX Ardite NA skim coat was applied, and then strip timber was fixed with polyurethane adhesive. After a short time, the floor de-bonded.

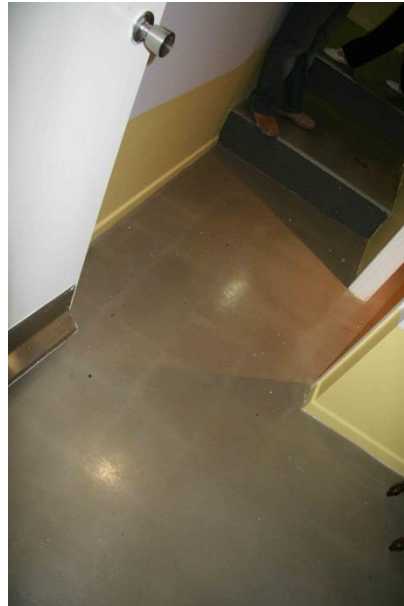
Analysis shows that the polyurethane adhesive contained aggressive solvents, which penetrated through the wafer-thin ARDEX Ardite NA and reactivated the old adhesive, which de-bonded from the floor.



Case Study 5 – ‘Feature floor’ applied over existing tiles

An existing tiled floor in a restaurant was over-coated with ARDEX P82, then ARDEX K12, and a sealer. The grout lines developed show through.

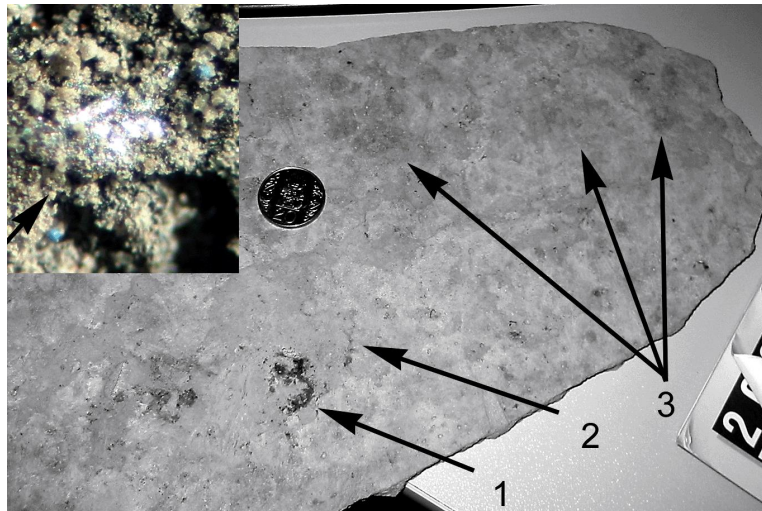
There was no real need to investigate this complaint as it was a non-recommended application. It occurs because of the porosity differences between the grout and tiles. A similar problem can result from ARDEX Feather Finish over tiles before applying vinyl flooring when not enough Feather Finish is applied.



Case Study 6 – Oils and metallic residues on floor

An old aluminium foundry floor was to be used as a sporting complex. It was flood-coated with ARDEX Ardite NA. Sections of the floor subsequently de-bonded.

Examination of the ARDEX Ardite NA revealed the presence of several contaminants, including oil (1), old, weak surface concrete (3), and metal slag (2-inset picture). These indicated the floor had not been mechanically prepared and cleaned





Case Study 7 – High-strength concrete, moving slab, and product too thick

Concrete floors in a multi-level building were smoothed up to 30mm with ARDEX K12, then cracked and debonded.

Examination of the floor showed it to be ground, but the topping only cracked above 12mm thick and around the building perimeter. The complex investigation revealed that the slab was post-tensioned and off-specialized, leading to high strains. Also, the concrete was of unusual mix design. ARDEX E25 polymer-modified ARDEX K12 and normal ARDEX K15 did not crack.

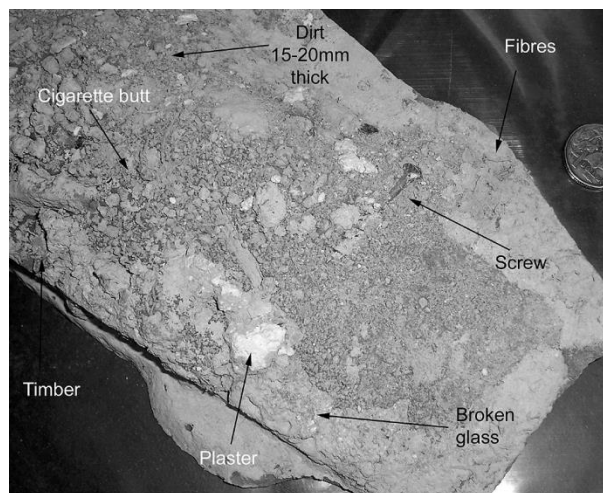


Case Study 8 – Extreme subfloor contamination.

This sample is one of the worst seen by ARDEX to date.

A concrete floor has been 'filled' and 'smoothed' for tiling. Subsequently, the topping cracked and debonded.

The installer had swept the building residues on the floor into the floor's low spots and then poured 15-20mm of smoothing cement over the top!!! No attempt had been made to clean the floor at all.



ARDEX Technical Services is available to discuss subfloor problems and explain the difficulties an installer will face if the floor is not laid on a correctly prepared substrate. ARDEX will also explain the costs of cutting corners, which can lead to total replacement and big dollars.

There is no immediate resolution for the problems floor layers experience, including the pressures put on them by the end user. It is disappointing to see installers running the gauntlet and cutting corners to in an effort to win a contract.

The industry is experiencing one of the worst periods in its history, with each market sector blaming the other for its problems. ARDEX sees a lot of jobs and talks to all areas of the industry – too often, the



horse has bolted. Most of the problems we investigate, and all the money spent on rectifications, could have been avoided with very little extra effort and money in the first place when the job is commenced.

Typically, the costs to replace a faulty installation exceed 3 times the original placement cost, and in a recent industry survey, it was estimated that it would take the profit from the next 30 projects to pay for 1 faulty installation (based on an average 100 m² project).

It is amazing that people are prepared to use cheap alternatives and risk losing thousands of dollars in pull-ups for an initial savings of a few hundred dollars.

For further information, contact ARDEX and speak to Technical Services about issues you have with a floor.

IMPORTANT

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition, specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations, contact your nearest ARDEX Australia Office.

DISCLAIMER

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

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DOCUMENT REVIEW REQUIRED

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