

1. Introduction

The coating of profiled sheet roofs in order to extend the waterproofing life of such structures has long been within the realms of the liquid roof waterproofing industry. This Guidance Note highlights some of the issues that need to be taken into consideration when undertaking this type of work.

2. Fragile Materials

Profiled roofs may contain fragile materials and all works must be conducted in accordance with the requirements of the "Green Book" ACR[CP]002:2012¹.

No attempt to inspect or work on a fragile roof or walkway on the roof should be undertaken by walking along lines of fixings.

3. Roof Survey

A full roof survey will establish any problems that exist with the existing roof. Some common issues with this type of structure include;

- Loose fixings and fasteners
- Cut end corrosion of metal sheets
- Missing profile filler pieces – Ridge and Eaves
- Translucent sheet deterioration or failure
- Poor detailing to roof projections- Pipes, Vents, etc.
- Moss/lichen build up on fibre cement sheets
- Leaking gutters

There are many criteria about the existing roof construction that need to be established about the existing roof.

- Is it a metal profile sheet roof or is it an asbestos or other fibre cement sheet roof? These products present different problems when it comes to the type of treatment required as well as presenting different health and safety issues.
- Knowledge of the actual roof structure would also be an advantage when it comes to decision making about the type of detailing required on the project. Is it single skin, twin skin, or composite panel?
- What is the lining panel – metal, plasterboard, or asbestos?
- Is there any insulation between the lining panel and the outer skin?

4. Points to Consider

Condensation

Installing a seamless waterproofing skin over the existing structure may create a situation where condensation problems are going to be exacerbated. Depending on the roof structure and the building use, ventilation may have to be introduced into the structure.

Metal Profiled Sheets

When dealing with metal profile roof sheets it is important to identify the actual protective coating. Plastisol, PVF2 etc. are just some of the different types of profile sheet finishes that may need different preparation and priming products depending on the coating specification proposed.

Most metal profiled sheets when leaking will generally show in the gutter area of the roof, so good practice would be to waterproof the gutter prior to carrying out the waterproofing to the profiled sheets. Even in a twin skin structure the leaks in the roof can end up showing at the gutter area. All the faults identified in the survey need to be rectified prior to the application of the new roof coating specification.

Fixings

Fixings are probably the main reason for water ingress in this type of roof. Over the years the sealing washers (Rubber, Neoprene etc) will have deteriorated and perished. The fact that some of the washers will have perished will mean that some of the fixings will be loose which in turn will allow water ingress. Many of the fixings will also be affected by rust and will prove difficult to tighten up. All the fixings should be wire brushed and given individual treatment in accordance with the coating manufacturer's specification, this would generally involve the application of a reinforcement which would be bedded in the coating material prior to the application of the full coating specification.

The number of fixings should also be checked. If the fixing spacings are not adequate, flexing of the roof sheets can occur when operatives access the roof for maintenance or during coating. If this occurs it can be extremely difficult to properly detail over the fixings themselves and also side and end lap joints.



Lap Joints

A properly constructed pitched metal profile roof should have 150mm minimum end laps sealed with two butyl sealant strips as detailed in Metal Cladding & Roofing Manufacturers Association (MCRMA) Technical Paper No. 6 Profiled Metal Roofing Design Guide", which states "The lower run is the primary weather seal and should be positioned as close as possible to the edge of the top sheet. The upper seal is to prevent moisture entering the overlap from inside the cavity". Not all roofs have been constructed to these standards and this should be determined at survey stage.

Cut End Corrosion

The degree of cut end corrosion can vary enormously and if too prevalent the profiled sheet may need to be completely replaced. All rust should be removed by wire brush or grinding wheel to get to bright metal if possible. Rust inhibitors should be applied prior to the application of a metal primer. A flexible reinforcement is then generally applied to account for expansion and contraction between the top and bottom profiled sheet. Some specifications may need the addition of bond breaks in order to account for excessive movement at sheet end laps but this should be checked with the coating manufacturer. The roof coating specification is then applied taking care to adhere to the manufacturers priming requirements and coverage rates.

Reverse side corrosion

Over the last 20 years, some cut edge corrosion systems have been routinely used on PVC plastisols, including many based on silicone technology. If the repair system used is not breathable, it is possible that condensation will have occurred on the underside of the roof sheets. Liquid can then collect just above the cut edge sealed joint detail and reflux as the sheet heats and cools from direct sunlight. There is then a possibility that corrosion can be promoted from the reverse side of the roof sheet. This is potentially impossible to treat as there is no way of accessing and preparing the sheet reverse side. Tell-tale signs are as follows:

1. Existing cut edge repair is visible but rust staining is weeping from the repairs
2. Corrosion blisters are seen in the sheet above the joint (usually before the first fixing above)
3. In extreme cases, the sheet will be visibly corroded.

For safety's sake, if any of the above signs are noted, then this roof area should not be approached as there is a danger of the roof sheet giving way under loading.

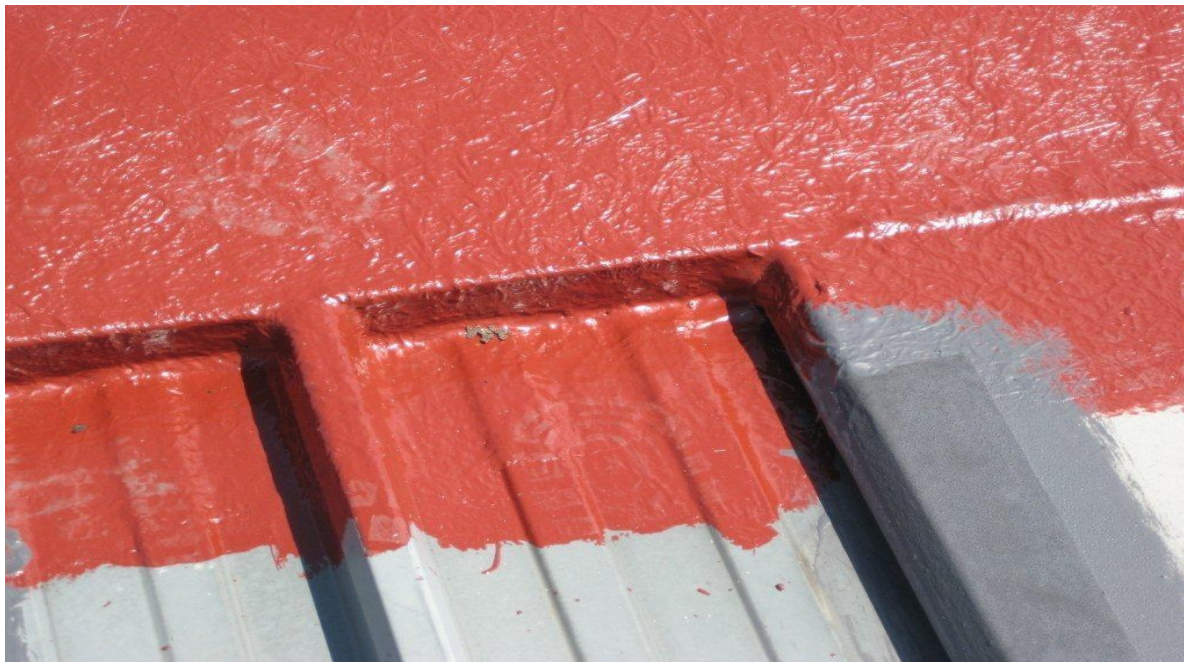
The only options for treating this defect is either re-sheeting or removal and replacement of the bottom edge of the profile metal sheeting.

When approaching this type of work, it is important to clarify the objectives. Is the client wanting a protective treatment for the cut end corrosion – if so, use a system that doesn't seal the joints. If the client is expecting a full waterproofing treatment, then the potential issue above needs to be referred to.



Loose and missing profile fillers

Many profiled sheet roofs suffer from problems that affect the profile filler pieces at ridge and eaves details. They may have either perished, worked loose over the years or have been removed by birds. This allows wind driven rain to blow under the capping and into the structure, eventually showing as water ingress at sheet laps or the gutter area. The other reason for water ingress in this area is that the fashion for low pitched roofs again allows wind driven rain to penetrate the detail once the sealants or filler pieces have passed their useful life. There are two options available when dealing with this problem, either fix a new larger profile ridge capping over the existing ridge flashing (this will also allow for the fixing of new filler pieces) or allow for complete encapsulation of the ridge detail with the coating system specification. This will also probably need some form of gap filling to provide a suitable backing for the liquid coating.



Poor Detailing to Roof Projections

This type of problem usually occurs when plant (ventilation or refrigeration equipment) and pipe projections have been fitted after the completion of the original roof. This type of problem is generally a design fault and needs to be rectified prior to the application of the coating specification. The best method to detail such penetrations is to insert an apron cover sheet on top of the profiled sheets, extending under the ridge capping down past the penetration. This arrangement will prevent ponding behind the penetration.

Gutters

Gutters will generally need to be cleared of all accumulated dirt, debris and any other deleterious material and then power washed as part of the surface preparation. All rust and flaked metal would have to be removed and wire brushed to provide a good clean surface. A rust inhibitor should be applied where necessary prior to the application of a suitable metal primer. All gutter joints need to be treated in accordance with the coating manufacturer's recommendations which generally involve the use of a flexible reinforcement and bond breaks to allow for expansion and movement between the different gutter sections. The waterproofing specification should then be applied to the correct coverage rates recommended by the coating manufacturer. Where possible the gutter should be treated independently from the main roof with the coating material terminating under the profile sheet or under the gutter cover flashing. It is important to note that it is difficult to fully seal the upstand and flashing details in this type of construction. This may lead to water ingress if the gutter were to flood.



Translucent Sheet Failure

The treatment of translucent sheets is probably the area within profiled fibre cement sheet roofs that contributes to the greatest number of failures when it comes to the coating of profiled fibre cement sheet structures. Failures should not happen providing simple guide lines are followed.

If the translucent sheet has deteriorated to such an extent that the glass fibres are free or the sheet has lost its structural integrity the sheets should be renewed and replaced. Replacement translucent sheets should meet Class C or Class B non-fragile ratings in accordance with the "Red Book" ACR(M)001:2011ⁱⁱⁱ.

The coating of any translucent sheets should be carried out with extreme caution with regards to health and safety. Some manufacturers do not recommend this at all so individual manufacturers should be consulted.

The pattern of the translucent sheets is important when it comes to the decision of what treatment is required. Depending on the individual roof and the manufacturer's specification, if the translucent sheets run from ridge to eaves and if the translucent sheets are in good condition it may be possible to clean the translucent sheets and finish the profiled sheet coating on the down slope of the translucent sheet profile.

If the translucent sheets are laid in a checker board pattern they could be coated with a pigment free coating in order to both maintain the translucent quality of the sheets and also to ensure that the whole roof maintains the seamless feature of a liquid coated roof. Even if the translucent sheets have been replaced consideration should be given to coating the sheets to maintain the continuity of seamless coating. Detailing the joints between inline rooflight panels and the surrounding profiled sheets can be problematic and the individual manufacturer's recommendations should be followed.

The lap of downward facing edge should be checked as excessive movement caused by a lap that is too big can cause movement greater than that of the coating's capabilities. The maximum recommended lap is no greater than 150mm with 50mm beyond the furthest fixing point being preferred.

5. Applying the Coating

Please note that these instructions are for guidance only. If in doubt, please refer to individual manufacturer's instructions

Inspect all metal roofing sheets, wire brush or mechanically abrade to remove rust/scale or oxidation. Return to a clean, bright metal wherever possible. Sheets which are structurally unsound due to total corrosion, particularly around fixings, must be replaced.

Note: Use equipment with deference to safety and where necessary, check suitability with the equipment provider.

Tighten bolts as necessary and cut back to approximately 5mm above the nut.

Remove and kill off all signs of moss and algae growth by applying fungicidal wash.

Undertake an adhesion test to determine if the roof area and associated details require priming, the test area should be a minimum 300mm square area. The test area should be allowed to cure, prior to the test being undertaken. The adhesion test should be undertaken at locations throughout the roof to ensure all areas are covered.

Apply the coating as specified, usually, by airless spray. If more than one coat is required it is recommended that contrasting colours are used to ensure correct coverage.

LRWA was founded in 1979, and consists of the UK's leading manufacturers of liquid roof coatings and related material suppliers. It aims to raise awareness about the technical and financial benefits of specifying liquid applied roofing systems and to establish both product and installation standard to ensure optimum performance is achieved; to this end LRWA has been involved in the writing of European Technical Approvals as the official body in conjunction with the BBA and EOTA.

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