Number 8

MAINTENANCE MATTERS

BC HOUSING RESEARCH CENTRE

Cladding

Wall cladding is the material or component of the wall assembly that forms the outer surface of the wall and is the first line of protection from the exterior environment (sun, wind, rain and temperature). It is also an important part of the appearance of a building. As with all other exposed portions of the building enclosure (windows, roofs and balconies), regular review and maintenance of the cladding is important to ensure intended performance and appearance.

Types of Cladding

The type of cladding used on buildings is dictated by the architecture and by Building Code requirements related to combustibility. Wood-frame buildings (combustible) are typically clad with combinations of wood siding, vinyl siding, fibre cement board, masonry (brick) or stucco. The latter two cladding types are also commonly used on concrete frame (non-combustible) buildings. Other popular claddings for non-combustible buildings are metal panels and exterior insulation and finish systems (EIFS). The nature and extent of maintenance and renewal activities varies significantly for different cladding types.

Why Must the Cladding be Maintained?

Cladding is the first line of defence in a wall assembly. It is critical to protect the more sensitive components of the wall assembly and the interior of the building. Proper maintenance of the cladding will reduce the likelihood of water penetration and preserve the appearance of the building. Wear and tear on cladding is expected since it is continually exposed to sun, rain, wind and temperature changes. In addition, cladding is subject to damage due to accidents, vandalism and excessive vegetation growth.

Masonry veneer consists of a single layer (wythe) of masonry units (typically clay brick) and mortar. Masonry is a very durable cladding with maintenance and renewal activities focused on cleaning and occasional repointing (renewal of mortar joints).

Maintenance Matters

This series of bulletins and companion videos is designed to provide practical information on maintaining residential buildings. Produced by BC Housing, in collaboration with Polygon and the Condominium Home Owners' Association (CHOA), this bulletin was prepared by a consortium of building envelope experts.

Rain Water Penetration Control

There are three different strategies for rain penetration control in walls: face seal, concealed barrier, and rainscreen walls. Any type of cladding can be used with the three strategies. However, the performance expectations, as well as the maintenance and renewal requirements, will vary depending on the rain penetration control strategy.

Face seal wall assemblies rely on the elimination of holes through the cladding to limit water ingress. Discontinuities in the face seal (cracks and holes) can result in water entering the wall where it is unable to readily drain or dry. This can lead to premature deterioration of the cladding and the hidden components of the wall. Face seal walls are generally only appropriate when they are protected by significant overhangs and are rarely exposed to rain.

Concealed barrier walls also rely on the elimination of holes through a single layer, although in this case, the layer is protected or concealed behind the cladding. Typically, the sheathing membrane is applied as a continuous layer to control rain penetration. Since this layer is protected, it is more likely to offer better performance than a face sealed assembly.

Rainscreen walls are designed to consider that some water will likely penetrate past the outer cladding surface and, therefore, two lines of defence are provided. The cladding provides the first line of defence while the sheathing membrane provides a second line. An air space is provided between the cladding and the sheathing membrane on the back-up wall that facilitates drainage and drying. Rainscreen walls provide more reliable and durable performance due to multiple lines of defence, or redundancy, in the design. They are less dependent on maintenance to ensure adequate performance.

The durability and expected lifetime of each type of cladding will vary as will the ease and cost of maintenance. For example, masonry walls are very durable, but are difficult and costly to replace. While vinyl siding can be more easily damaged, it can also be more easily repaired and replaced. Regardless of the type, cladding must be properly maintained to retain the general appearance and performance functions of the building. Proper maintenance will also reduce the likelihood of premature failure that could result in expensive wall repair.

Wall assemblies that use a face seal water penetration control strategy require regular maintenance and repairs to the cladding. This single line of defence means that water that penetrates past the cladding can quickly lead to damage within the wall.

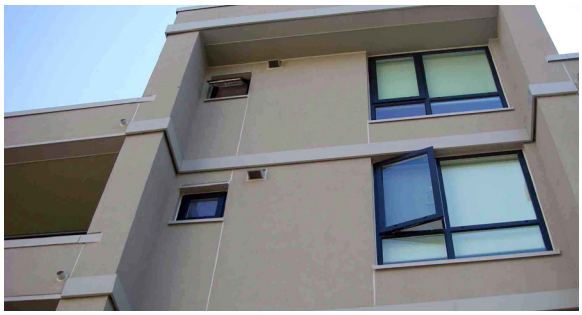
What Maintenance Must be Performed?

Cleaning of wall cladding is important to maintain the aesthetics of a building. It also helps expose any damage, such as cracks requiring review. Cleaning methods will vary for each type of cladding; the cladding manufacturer's recommendations should be followed for each case. Cleaning should be performed carefully to avoid damaging sealant joints, masonry mortar joints (brick wall) and cladding finishes. Removing organic debris will reduce moisture retention in any cladding joints. In general, cleaning of cladding should be performed with nonpressurized water. Inappropriate use of pressure washing can damage components of the wall assembly and introduce water behind the cladding and into the wall assembly, especially with face seal or concealed barrier designs.

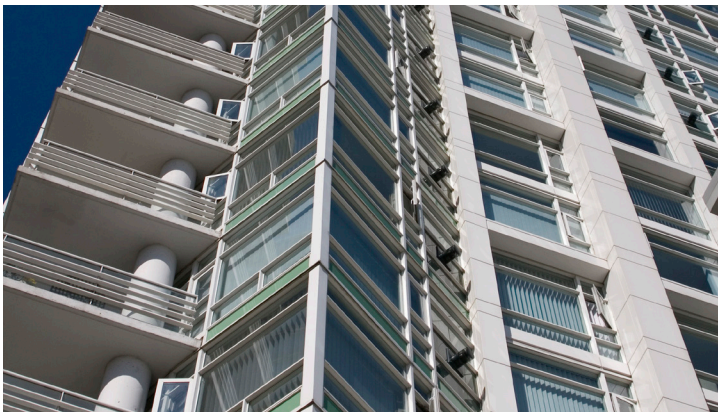
Have a someone knowledgeable in the area of building enclosure performance conduct and annual review of the cladding's condition. A maintenance contractor or trade contractor may be appropriate for this inspection. Reviewing cladding is extremely important for face seal walls as the rain penetration performance is sensitive to maintenance of an effective exterior seal.

Checklist of Common Cladding Maintenance Items

Cladding Type	Review/Maintenance Item	Frequency
All	› Review the condition of cladding, finishes and sealant by a maintenance or trade contractor.	Annually
All	› Remove any vegetation, such as trees or shrubs, that encroaches on the cladding. › Review metal flashings for corrosion and proper slope away from the building. › Review fasteners and metal connectors that attach the cladding to the walls. › Touch up paint to metal flashings. › Replace exterior sealant.	Annually 2-3 years 5 years 7 years 10 years
Wood Siding	› Clean wood siding with non-pressurized soapy water. › Review wood siding for warping, damage, loose panels and discoloration. › Touch up painting or staining of wood siding.	3 years 3 years 7 years
Vinyl Siding	› Clean vinyl surfaces with non-pressurized soapy water. › Review vinyl siding for discoloration, dislodged sections and damage.	2 years 2 years
Stucco	› Clean stucco surfaces with non-pressurized water or stucco cleaning solution. › Review stucco for cracks, staining, vegetation growth, corrosion of stucco stops and control joints, and delamination of finish coat. › Recoat acrylic stucco finish.	2 years 2 years 7-10 years
Masonry	› Clean surfaces with water or cleaning solutions for masonry. Do not use pressurized water as it could damage the mortar joints. › Review masonry for cracking, spalling and loose units. › Reseal exterior face of masonry. › Clean and repoint mortar.	5 years 5 years 6 years 15 years
Fibre Cement Board	› Review for cracking, efflorescence and damage. › Clean surfaces with non-pressurized soapy water or soft material. › Recoat fibre cement board.	2 years 5 years 7 years



Stucco is a cementitious product which is trowelled wet onto the wall and allowed to cure. Various finish coats are available to provide the desired texture and colour. Maintenance and renewal activities are focused on cleaning, painting or refinishing, and sealant replacement.



Metal panels are more common on high-rise buildings, rather than low-rise wood-frame buildings. Maintenance activities are focused on cleaning.

seal. Strong stain marks on cladding is an indication of high amounts of water runoff, and may raise concerns of water ingress into the wall assembly.

Recoating the cladding is particularly important for wood siding, but is also necessary for fibre cement boards and stucco cladding.

The durability of wood cladding is dependent on the coating as wood itself is quite vulnerable to weathering when used in exposed conditions. Poor maintenance of exposed wood products can result in irreparable and permanent damage such as cracking and warping.

Fibre cement boards and stucco are made from compositions that rely on paint for protection and to reduce the effects of staining. Recoating may also seal any minor cracks that develop in the cladding. However, do not rely on re-coating to repair a crack and prevent water ingress.

Sealants are typically used at joints between the cladding and penetrations, such as windows, doors, lighting fixtures, and vents. The vast majority of water ingress occurs at these locations. Therefore, properly maintaining and repairing sealant joints is highly recommended. Joint profiles, preparation of substrate, and selection of an appropriate sealant product are important variables in determining the effectiveness and durability of sealant joints. Help from an experienced contractor or consultant is recommended.

Metal flashings and fasteners also form part of the cladding and are susceptible to deterioration over time. While corroded fasteners can sometimes be replaced with minimal disruption to the cladding, this is not usually possible with metal flashings. Repainting of flashings is usually a very short-term measure to improve appearance. When renewal of the cladding becomes necessary, highly corrosion resistant fasteners and metal flashings should be used. These elements need to be at least as durable as the cladding itself.

How Often Does the Cladding Need to be Reviewed and Maintained?

The checklist on page 3 lists a number of relevant items that should be performed as part of the maintenance plan.

Renewal or Replacement of the Cladding

Proper maintenance will prolong the life of the cladding and reduce renewal costs over the long term. Eventually the cladding will need to be renewed either because maintenance is no longer cost-effective or the performance or appearance of the cladding is not acceptable.

Vinyl siding is made from plastic (mostly polyvinyl chloride) and is intended to simulate the appearance of wood siding. A variety of colours and textures are available. Maintenance is focused on cleaning.

Fibre cement board is a composite material comprised of wood fibre, sand, and cement. The product is painted, and is available as a panel, siding or shingles. Maintenance and renewal activities are focused on cleaning and repainting.

Renewals projects should involve building enclosure consultants to examine alternatives for cladding renewals, help ensure that appropriate construction details and appropriate materials are used, and to verify the quality of the construction. Enclosure consultants can also assist in selecting qualified contractors to perform the renewal work.

Life expectancies of the various types of cladding can vary depending on exposure conditions and the level of maintenance undertaken. Cladding renewals programs should, therefore, be integrated with plans for windows, balconies and decks as well as an overall building maintenance and renewals plan for the building.

Action Plan Tips

- Report any water ingress at exterior wall locations immediately to your building manager.
- Cladding condition should be reviewed every year by a knowledgeable person, and every 2 to 3 years by a building enclosure consultant.
- Develop a review and maintenance plan for the cladding and walls. Keep a record of all cladding warranties and a record of any review or maintenance activities.
- Retain a building enclosure consultant to develop a renewal program for the cladding.

More Information

- Maintenance Matters No. 7: Building Envelope Maintenance and Renewals Plaining, available at www.bchousing.org
- Building Envelope Guide for Houses: Part 9 – Residential Construction, available at www.bchousing.org
- Maintenance Matters No. 1: Paints, Stains and Coatings, available at www.bchousing.org
- Maintenance Matters No. 5: Sealants, available at www.bchousing.org
- Vinyl Siding Installation Manual, available at www.vinylsiding.org
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