

BUILDING ENVELOPE REHABILITATION CONSULTANT GUIDE AND OWNER/PROPERTY MANAGER GUIDE

Introduction

Building envelope failures in southwestern BC have received much coverage in the past few years. CMHC's Survey of Envelope Failures in the Coastal Climate of British Columbia identified the cause of the problems and provided a focus for the development of solutions for these problems. The Best Practice Guide - Wood Frame Envelopes in the Coastal Climate of British Columbia was prepared to provide design and construction guidance for new construction.

However, many moisture troubled buildings must still be rehabilitated. The fact that some of these moisture troubled buildings have been previously repaired and now require a second more extensive rehabilitation effort underscores the need for guidance with respect to effective repair and rehabilitation measures. Inconsistencies in the way consultants assess the performance problems, offer recommendations, detail and specify repairs and implement rehabilitation projects have underscored the need of a rehabilitation guide.

The process of rehabilitating a wood frame building has many steps, and decisions must be made at each stage. The fact that the building is usually occupied during the rehabilitation work makes the process more complicated than a new construction project.

Research Program

To address the need for strategies and procedures for cost-effective rehabilitation of moisture troubled building envelopes, two manuals were developed by a team of consultants led by RDH Building Engineering Ltd. assisted by Levelton Engineering Ltd., Morrison Hershfield Ltd.,

Neale Staniszki Doll Adams Architects, and Read Jones Christoffersen. Their work was guided by industry representatives through an 18-person committee from the Building Envelope Research Consortium (BERC) which includes representatives of industry, design and regulatory bodies.

The Building Envelope Rehabilitation Guide reflects current best practice in design and construction, and addresses the differences between new and rehabilitation construction. Two separate documents have been produced—a Consultant Guide and an Owner/Property Manager Guide. The primary focus is on moisture management but guidance on the structural and life safety issues inherent during the rehabilitation of these buildings is also provided.

Results

The Consultant Guide is mainly for consultants. It focuses on the repair and rehabilitation of building envelopes of multi-unit wood frame buildings in the coastal climate zone of British Columbia.

The Owner/Property Manager Guide is a document for Property Managers and Condominium Corporations (called Strata Corporations in B.C.). It focuses less on technical details and more on the process to help owners make informed decisions. It helps explain why buildings have failed and why different technology may be required for rehabilitation.



Both manuals follow a similar structure, laying out the principal steps in the rehabilitation process. They clarify project stages, schedules and participants. Checklists of key points are presented for each stage for both consultants and owners.

Introduction

The introduction gives a background of the problem, identifies the rehabilitation process and the roles of the various participants. It also provides the basis for a prudent and durable repair process as opposed to piecemeal short term fixes.

Guidelines are provided to help owners and property managers select appropriate consultants. Owners are cautioned that an emphasis just on the price could ultimately be detrimental to the owner. Fees should be considered in terms of what makes up best value - not least expensive.

Evaluation

Correct evaluation and analysis of the problem is important. Figure 1 lays out the principal steps entailed in the rehabilitation process. The guides do not lay out specific details, but suggest the range of questions that must be asked and issues to be considered. The evidence shows that most problems are exterior moisture penetration. Figure 2 shows typical details in wood frame buildings that may be vulnerable moisture penetration points.

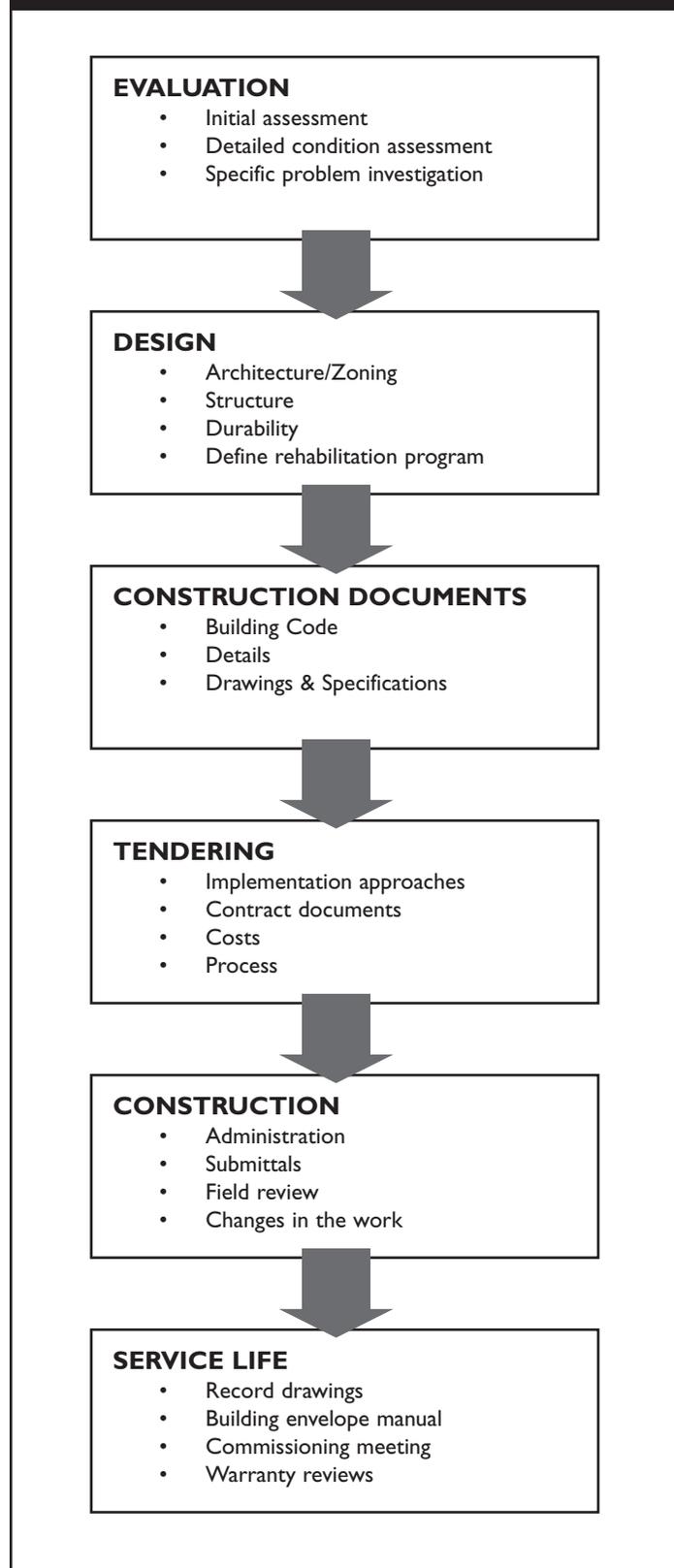
The underlying consideration is that the work be done cost-effectively. What is cost effective may be viewed differently by the different stakeholders, so consultants must present a range of alternatives. Each alternative should include the associated costs and performance risks associated, so that owners can understand the levels of risk associated with each option.

A detailed assessment will:

- describe the building's exterior and interior environmental conditions, and identify areas of high humidity or unusual indirect conditions
- determine the extent and severity of damage or symptoms of moisture problems
- determine the causes of moisture related problems
- list each of the envelope failures and describe the mechanisms involved
- determine appropriate conceptual rehabilitation work strategies
- outline approximate construction cost estimates and implementation plans

Guidance is given to owners on how to interpret the evaluation report, so that reasonable decisions to continue with required rehabilitation can be made.

Figure 1: Building Envelope Rehabilitation Process



Pre-Construction

Design and tendering procedures differ from new construction. Attention has to be given to the details to ensure they convey all required information. The Guide offers suggested areas for special consideration.

The Consultant Guide provides guidance and check lists on the nature of documents required, and how they vary from new construction. It also gives information on dealing with deficiencies in the original construction uncovered during the work, review of applicable codes, bylaws and regulations that must be done during the design stage. It is also suggested that good practice should assume that the windows will leak, so a continuous moisture barrier under the window to carry moisture out of the wall assembly should be detailed.

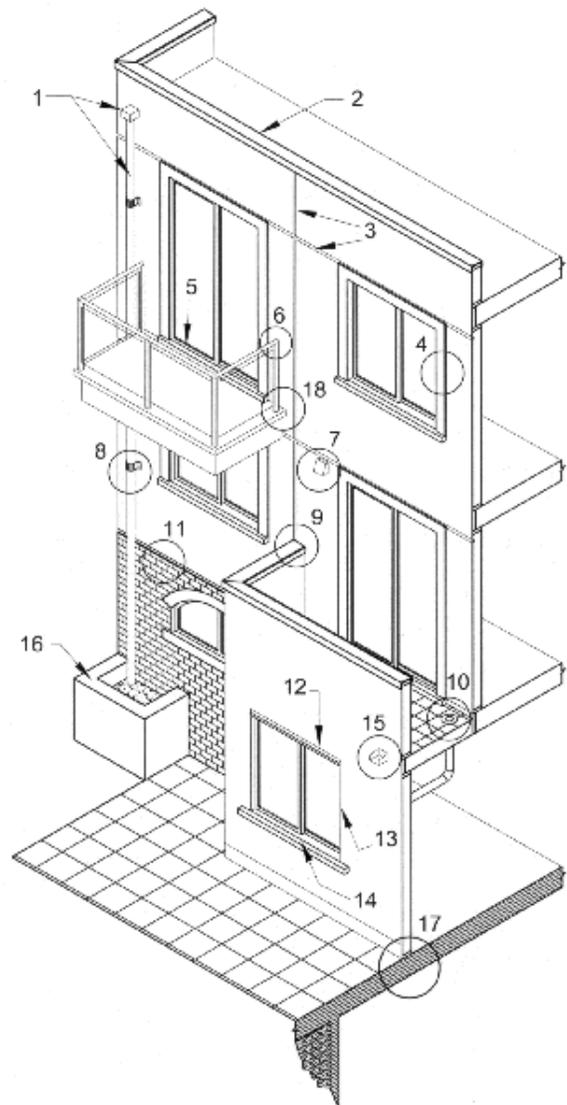
The Owner/Property Manager Guide explains the pre-construction and design steps that must be taken, and what alternate repair options are available. Technical aspects of remedial work are discussed to help owners understand the work that may have to be done. The guide also explains the role of the municipality in a rehabilitation project. Guidance is provided owners on how to balance risk, capital cost, durability, maintenance and renewal expenditures, appearance, and cash flow.

Various construction contract options and their features are presented. When selecting a contractor, they must be pre-qualified for their ability to do the work. While competitive selection is customary, price should not be the only factor considered in making the selection. Value is much more important than the cheapest price.

Figure 2: Typical details for wood frame envelopes

Key to Details

1. Scupper & rainwater leader
2. Parapet cap flashing
3. Control joint
4. Wall / Window interface
5. Balcony door threshold
6. Balcony rail attachment
7. Vent hood
8. Rainwater leader attachment
9. Saddle detail
10. Deck drain
11. Junction between different materials
12. Window head
13. Window jamb
14. Window sill
15. Overflow scupper
16. Planter
17. Wall / concrete slab interface
18. Balcony / wall interface



The Consultant Guide provides guidance on warranties, project administration, and quality assurance that must be done in a rehabilitation project, including the use of mockups of important or difficult assemblies and details and tests. The Owner/Property Manager Guide also reviews the construction process.

Service Life

The building envelope will require ongoing maintenance to perform its function and be serviceable for the long term. Near the end of the construction stage, a building envelope manual should be prepared. This will include a recommended maintenance plan.

Implications for the Housing Industry

The Building Envelope Rehabilitation Guides provide a manual on building envelope repair, maintenance and renewal. They will help owners and property managers retain the services of professionals and contractors for envelope remediation work. Through the Owner/Property Manager Guide, owners and property managers will better understand the scope of services that consultants should be providing.

Through the Consultant Guide, consultants will better understand the scope of their role in the rehabilitation process.

The Guides will help to build a level of accountability in the building rehabilitation industry.

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Housing Research at CMHC

Under Part IX of the *National Housing Act*, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This fact sheet is one of a series intended to inform you of the nature and scope of CMHC's research.

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