

Ontario Building Code

Part 5 Environmental Separation - Durability

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Summary

The Ontario Building Code (OBC) requires under Part 5 “Environmental Separation” that the building envelope of a Part 3 building be designed in compliance with this part of the OBC.

This Practice Tip briefly outlines some of the ‘durability services’ that are set out in the Guideline. Architects should update their knowledge and practice in relation to providing ‘durability services’ by reviewing the Guideline and their current procedures. It is recommended that a letter based on the attached sample letter be utilized to obtain the client’s acknowledgement and sign-back to you, for your records.

Background

OBC Part 5 Clause 5.1.4.2 (3) states:

“Design and construction of assemblies separating dissimilar environments and assemblies exposed to the exterior shall be in accordance with good practice such as described in CSA S478, “Guideline on Durability in Buildings”.

Clause 5.1.4.2 (3) applies to all Part 3 buildings and is an alternative in Part 9 Clause 9.27.1.1. for cladding materials or systems used on buildings designed under OBC Part 9.

In effect, clause 5.1.4.2 (3) requires that design assemblies meet the standards of good practice with respect to environmental separations. CSA S478-95 is a reference standard for compliance.

CSA S478-95 “Guideline on Durability in Buildings” (Guideline) was published by the Canadian Standards Association (CSA) in 1995, reaffirmed in 2001 (subtitled R2001) and again in 2007 (subtitled R2007). The Guideline is 17 pages with a 76 page Appendix. Guideline R2007 is available at the [CSA Group](#) (formerly the Canadian Standards Association or CSA) and at 1-800-463-6727, or 416-747-4044.

The Guideline was also available free of charge to all OAA members as part of the 10 CSA documents accessible through the OAA Website for several years (Search term: “durability”).

In 2019 the Guideline was replaced with the second edition CSA S478:19 Durability in buildings. The second edition is 129 pages and was developed as a standard so it can be referenced in the National Building Code (NBC). At the time of writing, it is the Guideline that is still referenced in the OBC.

Architects must design to the document referenced in the OBC. It is important to be current not only with the current guidelines or standards, but also, where possible, to access and review the latest information on proposed updates. Note however that new editions of referenced standards do not have any legal force until they are referenced in legislation such as through an amendment to the NBC or OBC.

The Guideline defines certain terms, including:

“durability – the ability of a building or any of its *components* to perform its required functions in its service environment over a period of time without unforeseen cost for *maintenance* or repair.

design service life – the *service life* specified by the designer in accordance with the expectations (or requirements) of the owners of the building. For given materials and constructions exposed to identical loads, the *design service lives* for similar buildings are adjusted depending on the amount and nature of the *maintenance* that the owners commit to carry out during the lives of the completed buildings.

predicted service life – the service life forecast from recorded performance, previous experience, tests, or modeling.

service life – the actual period of time during which the building or any of its components performs without unforeseen costs or disruption for *maintenance* and *repair*.”

While architects understand that their construction drawings and specifications need to comply with all applicable building code requirements, architects should remind their clients that a building owner is also responsible for the building’s compliance, as set out in the Ontario Building Code Act, 1992, as follows:

“1.1.(1) It is the role of every person who causes a building to be constructed,

- (a) to cause the building to be constructed in accordance with this Act and the building code and with any permit issued under this Act for the building;”

Complying with OBC Div B 5.1.4.2.(3) is not optional or negotiable, it is a requirement.

Designing a project in compliance with the OBC in all aspects including Clause 5.1.4.2.(3) requires substantial time and effort. Appropriate time allocation should be included when calculating fees.

Suggested Procedures

Pre-design Discussion

Discuss with the client that the Durability Guideline applies to the design, construction and maintenance of assemblies that:

- (i) are wholly exposed to the exterior such as balconies and exterior stairs, guards, posts, beams, etc., that are attached to the building, and
- (ii) separate the exterior from the interior such as roofs, exterior walls, foundation walls and the lowest floor, and
- (iii) separate dissimilar interior environments such as indoor pools, ice rinks, refrigerated storage rooms, solariums, greenhouses, storage garages, warehouses, etc.

Discuss with the client the options for achieving affordable durability, maintenance and the future replacement of the building’s envelope components.

Based on these discussions, a client may choose less durable components and more frequent maintenance and replacement costs during the project’s design service life. Or the client may choose more durable components that cost more to construct and less to maintain.

Design Phase Services

Based on the client’s requirements:

- (i) determine with the client the *design service life* of each building envelope *component*,
- (ii) design and notate each *component* to provide for its *design service life*,
- (iii) review the designs, notations and *design service lives* with the client for the client’s approval, and
- (iv) implement *durability* design principles.

One 'durable design' principle is to design components with short-life components to be above, or in front of long-life components in order to facilitate replacement or *maintenance*. For example, design an underground storage garage with a *design service life* that exceeds the *design service life* of the building above it. Similarly, design and specify cladding fasteners, connectors and supports with *design service lives* that exceed the *design service lives* of the claddings they support.

Another 'durable design' principle is to design easy access to concealed short-life *components*. For example, where shorter-lived *components* must be concealed by longer-lived *components*: design for easy economical *maintenance* and replacement of the short-life *components*.

For instance, many roofing and deck membranes including their perimeter base flashings should be replaced after approximately twenty years. Cladding units that conceal the vertical part of a base flashing should be no higher than the vertical part of the flashing plus the recommended 'working room' above it and they should be easy to remove. This minimizes the disruption and cost of exposing the base flashing for *maintenance* or replacement of the roof or deck membrane.

Design matters. Overly high cladding units along the base of walls deter timely *maintenance* and replacement by increasing the disruption and cost of removing and reinstalling them. *Maintenance* and replacement of roofing and deck membranes are less affordable and sometimes unaffordable when the cladding units are overly high or difficult to remove.

Roofing and deck membranes and their base flashings are a building's first defense against precipitation ingress. The Guideline reminds us that "Moisture, with or without contaminants, is the most important environmental *agent* causing premature deterioration." Design for the easy and economical *maintenance* and replacement of the building's defenses against moisture ingress.

And, where perimeter material or cladding units around window and door frames will be removed in the future for *maintenance* or replacement: design these perimeters to be easily removed and replaced without disrupting adjacent field areas of cladding.

Construction Documents

Based on the *design service life* your client requires for each building envelope component:

- (i) determine the *predicted service life* of each component, and
- (ii) detail and specify each component to provide for its *predicted service life*.
- (iii) review the details and specifications with the client for the client's approval.

Bidding/negotiations

Review proposed substitutions. Check if the detail and specification of the proposed component provides for the specified *predicted service life*. If not, discuss with the client the impact of the proposed substitution. Withhold acceptance until an acceptable compliant substitution is proposed or the client changes the durability requirement.

Contract Administration

Review proposed changes. Check if the detail and specification of a proposed component provide for the specified *predicted service life*. If not, discuss with the client the impact of the proposed change and revise it after receiving the client's approval to issue it.

Conduct site visits to determine if the construction or assembly of components conforms with the drawings and specifications. Identify nonconformance that will jeopardize a component's *predicted service life*. Afterwards, confirm that the nonconformance was corrected before advising others that the construction is in general conformity with OBC requirements.

Project Close-out

The Guideline sets out that the client should obtain a maintenance and inspection database after construction including:

- (a) record drawings
- (b) shop drawings
- (c) Comprehensive Design Life and Maintenance Summary Table (see the Guideline's Appendix A, Table A3).
- (d) warranties and maintenance manuals
- (e) information about training
- (f) recommended schedules of inspection, preventative and corrective maintenance identifying tasks, and required resources (time, personnel, tools, materials, etc., and
- (g) appropriate forms for recording histories of maintenance and inspections conducted.

Architects are accustomed to preparing (a), and reviewing and forwarding (b) and (d) above and are well suited to provide (c) because it is best prepared before construction begins. An architect could provide (e), (f) and (g) or they can be provided in coordination with other Consultants.

References

CSA S478-95, Guideline on Durability in Buildings (R2007).

CSA S478:19, Durability in buildings

Attachment

A Pro-Demnity letter titled Sample Durability Letter is attached. It indicates recommended content.

The OAA does not provide legal, insurance or accounting advice. Readers are advised to consult their own legal, accounting or insurance representatives to obtain suitable professional advice in those regards.

Sample Durability Letter

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Summary

The following is an indication of the recommended content of a possible letter to a client at the commencement of a project introducing the OBC requirements respecting "Durability" and the need for a Maintenance Plan.

Objectives

1. Advise the Client about the OBC requirement respecting CSA S478-95 that envelope design "...shall be in accordance with good practice, such as described in CSA S478-95 Guideline on Durability in Buildings".
2. Affirm that maintenance of the building is an Owner's responsibility.
3. Provide written confirmation that Architect has discussed maintenance, the value of a Maintenance Plan, and the availability of additional expertise and services to the client.
4. Advise that the Architect can assist with Maintenance Plan as an Additional Service.

Confirmation of delivery of such a letter and communication about maintenance implications with a client may prove invaluable in the event of a claim.

Important

1. The draft Sample Durability Letter is provided by Pro-Demnity Insurance Company as a possible risk management tool for Ontario architects. It is an attachment to OAA Practice Tip 38.
2. The Sample Durability Letter from an architect to a client is generic and cannot be assumed to apply to every project or situation that may arise. Architects must assess the suitability of the content for their own purpose, on each project, and amend it accordingly.
3. Architects are cautioned to review the content of their durability letter carefully, and consult their own lawyer respecting any subsequent changes in applicable law and legal considerations impacting the Architect's procedures.

Sample Durability Letter:

Re: *Project Name*

Dear *Client*,

Satisfactory maintenance of a building envelope (exterior walls and roofs) is critical for the long term performance of the building including the life safety of the occupants.

Under the Ontario Building Code, Article 5.1.4.2 (3), the design for the building envelope for the above project:

"...shall be in accordance with good practice, such as described in CSA S478-95 Guideline on Durability in Buildings".

Included in the CSA guideline is recognition of the importance of maintenance on the long-term durability of the building, including recommendation of a Maintenance Plan incorporating the maintenance needs of various elements.

Upon completion of the building, the responsibility for the on-going maintenance and replacement of various components and systems rests with the Owner.

It is important to recognize that each building is unique and will require specific consideration of the level and type of effort required for maintenance of the various systems and components over the building's life.

The service life of the various elements that provide environmental separation, structural adequacy and other life safety aspects can vary significantly.

Accordingly, we strongly recommend that you invest in the preparation of a comprehensive Maintenance Plan for the building, as recommended by the CSA Guideline, to supplement and complement our design services. This will assist your understanding of the requirements and plan for the maintenance of the building upon completion.

We will be pleased to assist in identifying (*and coordinating?*) suitable expertise to prepare the Maintenance Plan.

or perhaps ...

We will be pleased to assist you identify and retain suitable expertise for provision of a Maintenance Plan in accordance with the principles outlined in CSA S478-95, Guideline on Durability in Buildings, as an additional service.

Yours truly,