Does conserving modern heritage merit an approach that is different from that of conserving earlier heritage? More particularly, when confronted with a significant curtain-wall building with envelope problems — moisture and air infiltration, poor energy-conservation performance, bowing or detaching exterior panels, discolored or warped glazing, or simply an outmoded or shabby appearance — do the considerations made in decisions about conserving envelopes of earlier buildings apply?

How does one decide if the replacement option so often taken for granted by building owners and promoted by curtain-wall fabricators is really the wisest approach? Is it true, as some experts claim, that the “material authenticity” of curtain walls does not matter because modern materials were intended to be replaced after a limited lifespan? Does the new use of an otherwise functionally obsolescent curtain-wall building justify changing the appearance and performance of its envelope? Do present-day standards for energy conservation mean that curtain walls of the 1950s and 1960s should automatically be replaced with more efficient assemblies?

These and other authenticity-related questions were the subject of lively discussions during the curtain-wall symposium. They led to the development of four statements that will help to guide decisions involving the repair, rehabilitation, and replacement of curtain walls. This article summarizes the introduction to these discussions and their results.

Introduction to Discussion:
Authenticity and Modern Heritage

Authenticity — or integrity¹ — can be defined as “the ability of a property to convey its significance.”² It is one of the factors that can be used not only to identify and assess the heritage significance of a cultural resource, but also to develop a strategy for its conservation. Although the concept of authenticity is certainly not new,³ it has been subjected to an increasingly open interpretation as the definition of cultural heritage has widened over the last 15 years. More recently, it has also been the object of much discussion at the international level, particularly in relation to World Heritage. According to the 1993 “Operational Guidelines,” a World Heritage resource is required “to meet the test of authenticity in design, material, workmanship, or setting and in the case of cultural landscapes their distinctive character and components.”⁴

In 1994, following expert meetings in Bergen, Norway, and Nara, Japan, aimed at clarifying this requirement, the “Nara Document on Authenticity”⁵ was produced. Among other conclusions, it states that authenticity may be considered in terms of “form and design, materials and substance, use and function, traditions and techniques, location and setting, and spirit and feeling, and other internal and external factors.”⁶

Although these qualities of authenticity provide a useful checklist for assessing the integrity of a building, ensemble, or site, their relative importance varies with the heritage character and significance of the resource being assessed. In the United States, where integrity is addressed in terms of seven aspects — location, design, setting, materials, workmanship, feeling, and association — the necessity to consider authenticity in a resource-specific manner was recognized in 1990, when National Register Bulletin 15, which deals with the nomination off heritage properties to the National Register, stipulated that:

To retain historical integrity, a property will always possess several, and usually most, of the aspects. The retention of specific aspects of integrity is paramount for a property to convey its significance. Determining which of these aspects are most important to a particular property requires knowing why, where, and when the property is significant.⁷

In 1997, when criteria for commemorating Canadian modern resources were adopted by the Historic Sites and Monuments Board of Canada, it was recognized that such an open-minded approach to integrity is particularly important when dealing with the heritage of the recent past. The study prepared for the Board concluded that, “insofar as is possible, the assessment of the state of integrity of a building, ensemble or site of the Modern era should be based on a clear understanding of both the intentions of those responsible for its design and the conditions that have affected its evolution over time, based on a realistic approach of its ongoing use and its relationship with its environment.”⁸ In addition to meeting specific criteria, a Canadian modern resource of “national significance” is thus required to be in a condition that respects the integrity of its original design, materials, workmanship, function and/or setting, insofar as each of these was an important part of its overall intentions and its present character.⁹

How can these approaches to assessing the authenticity of internationally and nationally significant heritage resources be applied to decisions about the rehabilitation, repair, and replacement of curtain walls on buildings that may or may not have such status?

Summary of Discussion:
Authenticity and Curtain Walls

The description of a particular curtain-wall building-rehabilitation project that addressed a number of technical and philosophical challenges¹⁰ sparked a lively discussion that provided a basis for identifying authenticity-related principles to guide decisions regarding curtain walls. Although there was not complete consensus among all present, four statements emerged from the discussion on the first day of the symposium. Reviewed and refined during the closing discussion on the second day, these principles, it was generally agreed, merit consideration in decisions regarding the repair, rehabilitation, or replacement of the envelopes of curtain-wall buildings:
1. **Consider modern buildings as part of our heritage:** Decisions regarding interventions should be made according to accepted principles of heritage conservation, and they should be based on a clear understanding of heritage character and significance. Although repair and rehabilitation treatments may differ from those used for earlier heritage, the same conservation methodology should be applied.

Although it seems obvious to some of us that buildings of the recent past constitute part of our cultural heritage, modern resources are still not considered “heritage” by all decision-makers involved in their repair and rehabilitation. Many architects, building scientists, and engineers who are called upon to “fix” curtain-wall envelopes have limited conservation training and experience, and it does not occur to them to consider heritage character or significance as part of the decision-making equation. Repair options for curtain walls (which are generally more complicated to design, cost, and supervise than new curtain-wall installations) are often neglected in favor of replacement (which is easily quantifiable and usually involves more straightforward, time-efficient construction techniques).

In addition, many owners and managers consider their curtain-wall buildings as revenue-generating properties whose basic components should be replaced as soon as they present performance defects, start to wear out, or look out of date. Furthermore, municipal authorities who approve major curtain-wall-replacement projects seldom consider conservation principles because such projects are generally exempt from review by heritage experts. Finally, advocacy groups, who often succeed in preventing inappropriate interventions to earlier heritage, are not always sensitive to modern heritage.

Once our local jurisdictions consider modern buildings part of our heritage, we will be able to identify the most significant curtain-wall structures, those of average significance, and those of lesser significance. To do this, inventories and heritage evaluations have to be carried out so that we not only know what we have but also identify the heritage character of each building, ensemble, or site and assess its position on the significance scale. As is the case with earlier heritage, proposed interventions to resources possessing high levels of significance may require a more rigorous review than those involving properties of less importance, but this should not prevent equally sensitive interventions to the latter.

2. **Consider the building as a whole:** Understanding modern buildings in general, and curtain-wall structures in particular, requires a full understanding of design intent, form and design, construction technology, historical and sociological context, relationships between interior and exterior spaces and finishes, use and function, location and setting, and so on.

As is the case with earlier heritage, the conservation process should involve understanding both the building component that poses a problem and the larger context underlying this problem. For curtain-wall buildings, it is advantageous to be familiar not only with the composition and performance of the envelope, but also with the design intentions of the building, how it was constructed, how it has been used over time, how it has been or will be modified to meet new requirements and uses, and so on. The different aspects of authenticity provide a useful checklist for ensuring that all of the important considerations are made.

In addition to helping to identify the heritage character and significance of the building as a whole, this kind of analysis may make appropriate solutions to its curtain-wall problems more evident. Shop drawings may reveal the sources of a technical problem or explain a construction detail that is not evident from site conditions. Project correspondence and minutes of meetings, or a discussion with a member of the design or construction team, may shed light on why certain decisions were made or clarify the original design intentions. Interviewing the building’s occupants and those responsible for its maintenance may explain why particular problems have arisen or may clarify their symptoms. Sometimes this kind of investigation leads to a simpler, more straightforward, and economical solution than were originally expected, such as the replacement of parts of the curtain wall rather than complete replacement, or changes that have nothing to do with the building envelope (different maintenance procedures, modifications to the mechanical system, among others).

3. **Consider present-day values as well as original intent:** Although the designers of curtain-wall buildings may not have been particularly concerned with extended service life or durability, and although materials and assemblies may have a limited lifespan, we should apply present-day cultural values, conservation ethics, and concerns about sustainability in making decisions about their future.

Postwar propaganda — advertising and articles in architectural and engineering journals, trade catalogues, and writings of professionals — suggests that some designers, curtain-wall fabricators, and builders of the 1950s and 1960s were not particularly concerned about the long-term durability of their curtain walls, or their buildings for that matter. Although it is important to understand such attitudes of the progressive postwar age, it is critical not to fall into the trap of using them to justify decisions that are inappropriate according to present-day conservation philosophy. Over the past 15 years, our definition of heritage has widened to include, in addition to well-known monuments and works of renowned designers, modest, commonplace buildings, ensembles, and sites that are testimonies of their time. We are also more conscious than we used to be (although perhaps still not enough) of the long-term ecological impact on our environment of the disposal of building materials.

Today, many curtain walls require attention. Some decision-makers opt for the replacement option without even analyzing repair and rehabilitation possibilities. Even if they accept that their modern building is part of our heritage, they justify replacing its curtain wall by contending that “material authenticity” is not important to modern heritage because modern building components were “not intended to last.” Thus replacing one glass curtain wall with another of different color, reflectivity, proportions, and performance is, in their view, acceptable because the overall “glass-wall effect” has been respected. But if the original curtain wall was one of the features that defined the heritage character of the building, a more-appropriate approach might be to try to replicate those aspects of the glass curtain wall that define this character (such as color, reflectivity, proportions, and performance), or better still, if conditions permit, to retain as much as possible of the original fabric, replace only the deficient components, and repair the rest.

Partial replacement also merits careful consideration of the heritage character of the building and the particular qualities of the curtain wall that contribute to this character. Replacing clear glass with tinted or reflective glass will drastically alter both the character of a building and its relationship to its environment. Replacing marble veneer with precast concrete panels will
change the appearance of a building and probably diminish its appeal. Replacing opening windows with fixed lites may have a somewhat less significant impact on a curtain wall’s appearance, but it will have a major effect on how it is used by its occupants which may or may not be appropriate. When replacement of curtain-wall components is necessary, it seems logical to try to respect the original building’s character defining features if possible.

Another aspect of curtain walls is that they do not age as gracefully as traditional masonry-clad exterior walls. Although we are prepared to accept patina as a testimony of time that often adds value to earlier heritage, signs of ageing and wear-and-tear on modern materials are thought to diminish the value of the sleek modern building of which they are part. Whereas our respect for the “material authenticity” of earlier heritage makes us favor minimal intervention when dealing with cracks, stains, or signs of weathering on traditional buildings, we tend to not think twice about replacing, rather than simply leaving untouched or repairing, metal panels that are discolored or rusted, concrete panels that are chipped at the corners, or thin-stone veneer panels that have bowed. In addition, we have yet to develop an expertise in dealing with the deterioration of these materials due to environmental conditions (pollution, acid rain, ultraviolet light), other factors outside the control of building owners (de-icing salts), lack of maintenance, or simple neglect.

Although it is important to understand the forward-looking spirit and progressive attitudes of the postwar era, we should not use them as an excuse to ignore comparatively conservative present-day approaches to making decisions that affect our built heritage and our environment. Most of us accept that the adaptive reuse of structurally sound buildings should be favored over their demolition on the basis that the latter is wasteful both from an economic and an ecological perspective. The same applies to building components: why not repair and reuse curtain walls that are reparable rather than add to the proliferation of inorganic building materials that are disposed of each year?

4. Consider the impact on heritage character and significance in addition to performance and durability: Deficiencies in the original design warrant the same approach as that used for earlier heritage; potential benefits or modifications to improve performance and durability should be balanced against their impact on heritage character and significance.

Among the most difficult challenges that must be addressed when dealing with curtain walls is performance. Designed before the energy crisis in the 1970s, most early curtain walls are far from efficient according to present-day energy-conservation standards. As is the case with windows in buildings dating to earlier eras, owners often feel that they will drastically reduce the heating costs (and thus save enormous amounts of energy) if they replace inefficient building components. Not surprisingly, those who sell new windows and curtain walls are eager to support this hypothesis. However, when complete and realistic cost-benefit analysis calculations are carried out, they often show that replacing the curtain wall leads to savings that are much lower than expected, both in terms of cost and energy consumption.11 Add to this the reduction of the heritage character and significance of the building and the environmental impact of discarding the curtain wall, and repair or partial replacement options inevitably emerge as more balanced and appropriate solutions.

Durability and structural stability is another major performance challenge when dealing with curtain walls. Because fabrication processes, materials, and fittings were often experimental or custom-designed for specific projects, many curtain walls, or major components of their assembly, have started to fail after a number of years and do not meet present-day safety-code requirements. Lack of ongoing maintenance has also presented durability problems or has added to them. In some cases, solutions are as simple as replacing white steel attachments with stainless steel fittings and removing and replacing the old sealant with an appropriate new one. In other instances, the problem is so far advanced that the assembly has to be redesigned and entire panels or glazing units have to be replaced, either on a selective basis or across the entire envelope.

Conclusion

Decisions regarding the repair, rehabilita-

1. These terms will be used interchangeably
tion, partial replacement, or full replace-

tion of curtain walls merit the same carefulmenent of curtain walls merit the same careful

consideration as those involving the conserva-
tion of envelopes of earlier heritage

buildings. Appropriate solutions depend on

balancing a number of factors, including

the heritage character and significance of the
curtain wall and the building as a whole,
the original intentions of the design-

ers of the envelope and the building, energy
efficiency, structural stability, durability, a
realistic approach to short-term and long-
term impacts and costs, as well as current
conservation ethics and concerns about
environmental sustainability.

Consideration of authenticity helps to
tackle these challenges. Although the four
statements outlined above provide a point
of departure for decisions about curtain walls,
they do not attempt to provide hard-and-fast
rules or recipes. Clearly, each building has its
own parameters and requirements, as well as
its particular heritage character and signifi-
cance, and these will influence which solu-
tion is most appropriate.

It is hoped that APT will encourage the
examination of case studies that will help to
refine these four principles and promote
their application. Continued discussion of
how authenticity applies to modern heritage
in general, not just to curtain-wall buildings,
will also help to advance the thinking on
this complex but fascinating theme.

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and David Yeomans.

Notes

1. These terms will be used interchangeably
throughout the article.

2. U.S. Department of the Interior, National
Park Service Interagency Division, National
Register Bulletin 15: How to Apply the National
Register Criteria for Evaluation (Washington,


8. Ibid. The criteria also addressed three cultural phenomena: changing social, political and/or economic conditions, rapid technological advances, and new expressions of form and/or responses to functional demands.

9. The case study used to introduce the discussion was the 1995 conversion of the 1957 BC Electric office tower in Vancouver into a residential building. This involved major changes to the original curtain wall, including the replacement of most of its original fabric and alterations to its window design and proportions. For more information, see Marco D’Agostini, “Modern Landmark Recharged,” in ARQ: la revue d’architecture 91 (June 1996): 30-31.


11. During the symposium, Mark Lawson presented examples of complete cost-benefit analyses.