

The EIFS Council of Canada EQI Program Value Proposition

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This article is a follow up to an earlier article on the EIFS value propositions that explores the value dynamics of the EIFS Quality Assurance Program (EQI).

In an earlier digest on the EIFS value proposition, I had concluded that a consistent quality assurance program for EIFS may well prove to be more significant than all of the other performance advantages that are provided by EIFS. Before exploring that conclusion, it is important to understand how other industries have approached the issue of quality assurance and the associated performance warranties.

The automobile industry is a good choice for seeing how the ideas of quality assurance and warranties operate. It is important to appreciate the approach taken by the auto industry has evolved over time in response to consumer concerns about the reliability and performance of their investments. Every car manufactured today is the product of a global automobile industry that sees parts made by various suppliers assembled at a large number of plants located around the world. The individual parts and components are manufactured according to engineering specifications established by the manufacturer. Each supplier must conform to various standards, protocols and demonstrate a quality assurance program supporting their products and processes. When all of these parts are brought together on the assembly line, these processes and the final automotive product are also subject to a quality assurance program that addresses every process involved in the making of an automobile. Vehicles are tested and inspected by personnel who are not involved in the assembly process, but there is invaluable feedback between the quality assurance process and the assembly line. It is the high confidence in the quality of the engineering design, each of the components, and the final assembly process with embedded quality assurance, that enables automobile manufacturers to offer a warranty.

Automobile warranties are available in a number of flavours. There is the basic warranty that every manufacturer supplies and in some jurisdiction these are specified by consumer protection legislation. Then there a number of extended warranties automobile purchasers may elect at a premium. From the automobile manufacturers perspective, the basic warranty is the cost of doing business in a competitive marketplace, or as noted earlier, mandated by legislation. The extended warranties are what pay for the quality assurance program the manufacturer deploys across its network of parts suppliers and assembly plants. It is a premium that a high proportion of new car buyers voluntarily choose for peace of mind and the avoidance of costly repairs during the warranty period.

The EIFS Quality Assurance Program (EQI) is the first of its kind for exterior wall systems in North America and it is essentially no different in concept and application than what is done in the automobile industry. As such, it is an entirely voluntary program and for building designers, constructors and owners/investors, the decision to deploy the EQI on their project involves careful consideration of its value proposition. What follows is an examination of the critical facets of the EIFS Quality Assurance Program.

Research and Development

Most innovative products in today's marketplace result from an extended investment in the research and development (R&D) process. EIFS has benefited from over a half century of R&D that has focused on materials, assemblies, details and application methods. This process is ongoing and highly interfaced with the codes, standards and materials certification process. Outcomes of this integrative R&D process include material certifications, technical guides, practice manuals, specifications, performance testing and consensus technical standards. All of these efforts ultimately advance the building science behind EIFS and it may be reasonably expected an ongoing R&D program will help maintain technical currency. But as essential as research and development may be today, it is really nothing more than confirming the building science behind the next generation of EIFS. As such it is the ante into the building products game with no guarantee of winning. Assuming the building science is sound and cutting edge, the next logical question is what about practice?

Building Industry Practice

The architecture, engineering and construction (AEC) industry we know today is the product of a complex evolution of relationships between different interests. During this transformative process, traditional materials and methods of construction were abandoned long ago in favour of technical innovation. Examples on the materials side witnessed plywood and oriented strandboard replace diagonal lumber floor and wall sheathing, drywall replace plaster, and plastic ABS and PVC piping replace cast iron pipe. Innovations in building enclosures included notable examples such as curtain walls, inverted roofs and EIFS. In all cases, both traditional and innovative, the same cast of players have been involved: material manufacturers (including distributors, suppliers and agents); designers/specifiers (including all related specialty consultants); and constructors (including all trades).

Traditionally, building designers selected materials and methods of construction for their building projects after negotiations with the owner/investor in terms of cost and quality. A set of specifications pre-qualified acceptable materials, and detail drawings provided assembly instructions to the constructor. As construction proceeded, numerous material substitutions were proposed and almost always accepted, while the fuzzy area of work "by others" was negotiated whenever it was not altogether overlooked. This arrangement was somewhat satisfactory when traditional materials and methods were deployed, but weaknesses became readily apparent as more and more innovations were introduced. Chief among these innovations was modern building science where the relationship of heat, air and moisture management to the performance of building enclosures became firmly established. This understanding has since evolved to embrace the concept of high performance buildings, which highly contrasts with the relatively inferior performance innovative building systems delivered through traditional procurement methods. A widely accepted conclusion across today's AEC industry is that innovative building technologies demand innovative building industry practices. In the same way that the automobile industry had to reinvent itself, the EIFS industry is at the vanguard of building technologies that deploy innovative approaches to deliver reliable and durable performance based on sound building science principles. This new approach is embodied in the EIFS Quality Assurance Program.

Connecting the Dots

If you want a light bulb to work, the whole circuit has to be connected and the same analogy applies to any building enclosure system. Every aspect from design and materials through to qualified trades and proper assembly must be fully integrated. This understanding is one of the most significant contributions of modern building science - the *building-as-a-system* concept. Without this understanding, each of the trades would perform their respective tasks except for the critical connections that were to be magically executed "by others" according to the specifications and drawing notes. The results of conventional practices and procedures are under-achieving buildings with mediocre performance at best, often flawed with numerous defects, and occasionally an abysmal failure that is an embarrassment to the AEC industry. To address this unsatisfactory situation, the EIFS Council of Canada focused on key elements of the building delivery system during the development of its EIFS Quality Assurance Program:

- **Proven Performance** - Ongoing program of 3rd party testing and evaluation (CCMC, NRC, Oak Ridge National Laboratory) to validate acceptable hygrothermal performance of EIFS.
- **Technology Transfer** - The translation of research and development into technical guides, practice manuals, specifications, and the ULC 716 family of standards for materials, installation, and design.
- **Competency** - Manufacturer, contractor and mechanic licensing based on training, evaluation, accreditation and certification.
- **Accountability** - A coordinated system of documentation, site audits and conflict resolution stored in an accessible data base that is tied to financial instruments underwriting a safety net of EIFS warranties.
- **Evolution** - the continuous improvement of EQI based on the experience and feedback from all stakeholders, and ongoing EIFS industry R&D.

KEY ELEMENT	CRITICAL MECHANISMS
Proven Performance	<ul style="list-style-type: none"> • Participation in the Moisture in Exterior Walls Study (MEWS) with National Research Council (NRC) • Wall performance study conducted by Oak Ridge National Laboratories in the Natural Exposure Test (NET) Facility • Research and testing program on thermal performance of EIFS drainage cavity (CCMC) (NRC)
Technology Transfer	<ul style="list-style-type: none"> • Development of Canadian Construction Materials Centre (CCMC) Technical Guide for EIFS • Development of National Standard Specifications for EIFS • Development of the ULC 716 family of Standards – Materials, Installation, Design • Development of EIFS Practice Manual • Ongoing Technical Bulletins
Competency	<ul style="list-style-type: none"> • Manufacturer Evaluation, Accreditation & Licensing • Contractor Accreditation & Licensing • Mechanic Certification & Licensing (ISO 17024) • Technical Support and Continuing Education for Designers
Accountability	<ul style="list-style-type: none"> • Documentation / ECC Data Base • Site Audits • Conflict Resolution • Financial Instrument • 3rd Party Warranty
Evolution	<ul style="list-style-type: none"> • Stakeholder Engagement and Feedback • Ongoing Research and Development

Table 1. Key elements and corresponding critical mechanisms supporting the EIFS Quality Assurance Program (EQI).

How does all of this connect with the primary players?

Let's begin with the designer, typically an architect retained by an owner/investor to prepare drawings and specifications for the building, obtain a building permit and often tender the project. With the growing quantity of new building technologies, combined with the increasing expectations of building owners/investors, it is challenging for architects to stay abreast of new developments. The EQI Program is premised on providing access to expert technical support and a library of critical details not only for EIFS, but for transitions to other enclosure assemblies such as windows and roofs. Continuing education is also available to designers in the proper application of the *CAN/ULC-S716.3 Standard for Exterior Insulation and Finish Systems (EIFS) - Design Application*. Designers who engage the EQI Program can be confident they are applying state-of-the-art details, methods and materials for their EIFS project.

For manufacturers, the EQI Program exclusively sources materials that have been CCMC listed and comply with *CAN/ULC-S716.1 Standard for Exterior Insulation and Finish Systems - Materials*. The entire notion of material substitutions no longer exists under the EQI Program, hence manufacturers can confidently extend a 5-year materials warranty on an EIFS system that is all their own. As importantly, manufacturers can be assured EIFS contractors can install their products properly.

EIFS contractors enjoy the greatest benefits under the EQI Program. First, they are only bidding against properly qualified competitors who must adhere to *CAN/ULC-S716.2 Standard for Exterior Insulation and Finish Systems - Installation of EIFS Components and Water Resistive Barrier*. The EQI requirements for the certification and licensing of mechanics helps maintain a level playing field among contractors. Further, and more importantly, EQI requirements for explicitly addressing all transition details means that contractors will not be liable for defects and performance problems created "by others" because this language is no longer permitted in the EIFS specifications. By fully delineating the scope of the building enclosure work assigned to the EIFS contractor, bidding is more clear and consistent. Requirements for documentation and site audits help keep in line everybody working for the contractor. Overall, EIFS contractors enjoy greater fairness, control and confidence under EQI.

Finally, from the owner/investor perspective, the combination of a 5-year materials warranty, a 5-year installation warranty, and a 3rd party warranty provider for an EIFS system that has been properly designed, installed and inspected under the EQI Program, represents real value and peace of mind.

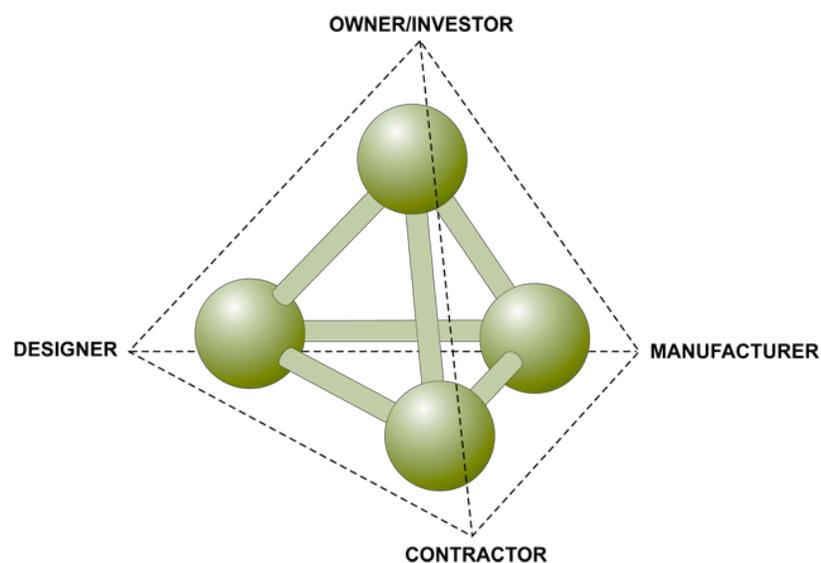


Figure 1. The EIFS Quality Assurance Program connects the interests of the key stakeholders in building projects.

Understanding the EQI Value Proposition

Does the EQI Program cost more? Let's take a look back at the automobile industry. Does the extended warranty cost more? Yes it does if there is never a warranty claim, but in the event of some major unforeseen deficiency it may prove to be a highly cost effective investment. And if there is never a claim, it still provides peace of mind - something that may be difficult to monetize, but carries an intrinsic value.

For designers, the continuing education, technical support and documentation available through EQI should reduce the amount of work and risk. For manufacturers and contractors, there is now a level playing field with less exposure to liability for materials and methods provided by unqualified sources. And for the owner/investor, while it does cost more, it may be a recoverable cost through increased valuation of the building, possibly reduced property insurance rates. Regardless, better design, materials and workmanship have been incorporated in the EIFS system under EQI than would have been the case otherwise.

From my perspective, the EQI Program is the cost of doing it right - doing it wrong is never a bargain. Every element of the program embodies best practices that have been successfully employed and validated in other industry sectors. It raises the entire bar for the building industry, but particularly for the building enclosure, because it focuses on the critical elements that influence performance as it is understood from a 21st century building science perspective. The AEC industry may still have a long way to go to catch the aerospace, automobile and electronics industries, but EQI is definitely a solid step in the right direction.

What's the Better Value - EIFS or EQI?

Looking back at my first building science digest on the EIFS value proposition, I am finding what I thought to be a difficult question much easier than expected.

From a classic building science perspective, EIFS do all the right things. They comply with the correct arrangement from outside to inside of cladding, control layers and structure. Building science tells us the benefits of having continuous insulation outside of the structure are manifold. There is definitely a higher probability of superior airtightness and effective thermal resistance than for almost any other competing wall system alternative. Fully-adhered cladding systems also have much greater resistance to wind damage and the lightweight nature of EIFS imposes insignificant penalties on the sizing of the building structure. And in terms of maintenance, repair and makeover, EIFS is straightforward, economical and can be painted to dramatically change the appearance of the building. So based on all of these advantages, a prospective designer or owner/investor may conclude EIFS is the way to go.

Now that I have had the opportunity to examine in depth the EIFS Quality Assurance Program, I would have to say EIFS may definitely be the way to go, but only if it is accompanied by EQI. EIFS without EQI is not necessarily any better than any other wall system, and not necessarily any worse. It is the element of the unknown that worries me as a building scientist about any type of wall system or building enclosure technology. Reducing uncertainty through quality assurance reduces risks while assuring a predictable level of performance and service life. For me, EQI reduces uncertainty by specifying and delineating the design, materials and installation of an EIFS system that is fully integrated at its transitions with the building enclosure.

Here's another way to understand the EQI value proposition. I have tried to make a lot of the favourite foods my Mom used to make but often without much success. Sure, I bought the best of ingredients and there's nothing wrong with my tools (stove, pots, pans and utensils), but I've often discovered, much to my disappointment, that I was missing her recipe and the dish did not turn out as I so fondly remembered. Anybody who has been in my culinary position can appreciate what they are going to get when they have great ingredients but a poor or incomplete recipe. While it may be better than poor ingredients and a great recipe, either situation is to be avoided when the dish is a building project because nobody wants the leftovers.

Across North America we have a lot of great building materials but very few reliable recipes for delivering high performance buildings. EIFS is a great materials system, but if you want it to achieve its full potential, you have to put it together using the EQI Program. That's how to achieve synergy and a product that is more than the sum of its parts. Bon appetit.