



Creative Thinking  
Practical Results

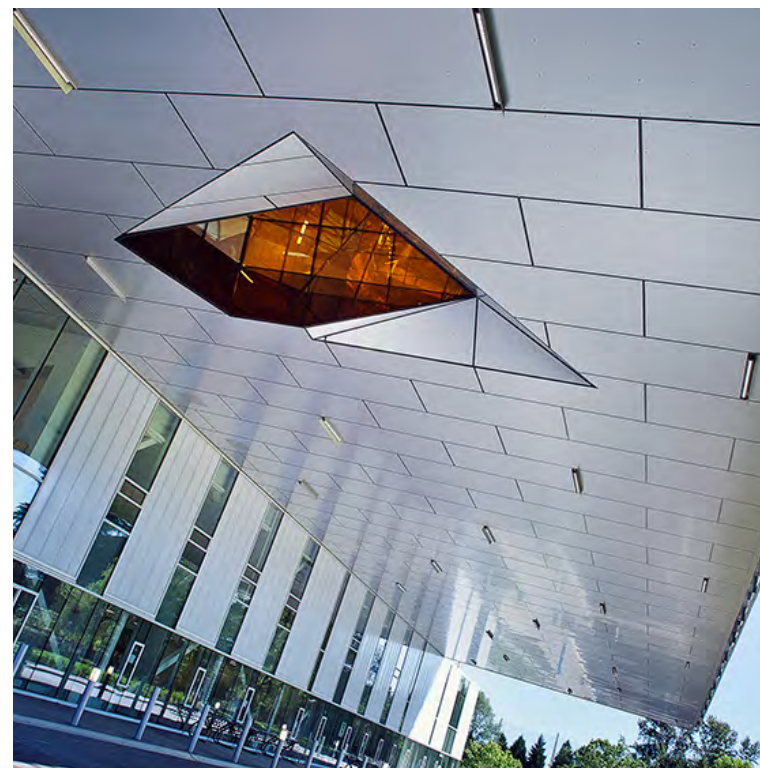
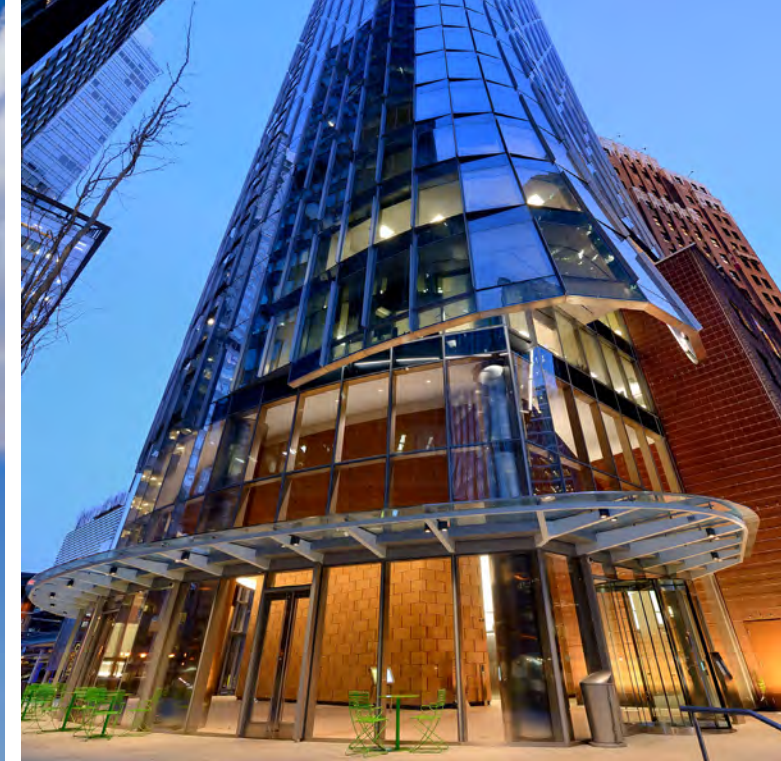
# Engineering Services **Guide**

RJC Engineers





[rjc.ca](http://rjc.ca)





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## Engineering Services Guide

Based solidly on our Structural Engineering heritage, which reaches back to 1948, RJC Engineers (RJC) has evolved over the years to suit our clients' changing needs. Our services have expanded and our practice has grown from the structural design of buildings to the design of a variety of other structures; restoring those structures; building enclosure design, maintenance and repair; structural glass and façade engineering; parking facility design and restoration; prime consulting and project management. This experience with a wide variety of buildings and structures has given us a unique insight into the many factors affecting their performance, durability and deterioration. From new design to initial assessment to cost-effective repair and protection strategies, our proactive, client-focused approach has resulted in numerous award-winning new build and restoration projects throughout Canada and beyond.

### OUR GOAL

To provide you with a comprehensive reference guide that enables you to quickly and confidently source information on a variety of engineering and building related issues.

### OUR COMMITMENT

RJC has earned its reputation for innovation by consistently delivering superior client service and outstanding work. For over seven decades, RJC has helped building developers, owners and managers, build and care for their properties through our design, maintenance and repair consulting services. It is a legacy we are proud of and it shows through our ongoing commitment to meeting our clients' needs.





Glacier Skywalk, Jasper



West LRT Elevated Guideway, Calgary



Art Gallery of Alberta, Edmonton



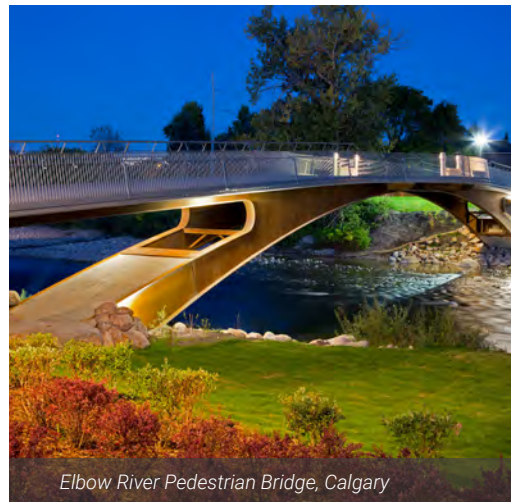
Royal Roads University Learning and Innovation Centre, Victoria



University of Alberta 87th Avenue Pedway, Edmonton



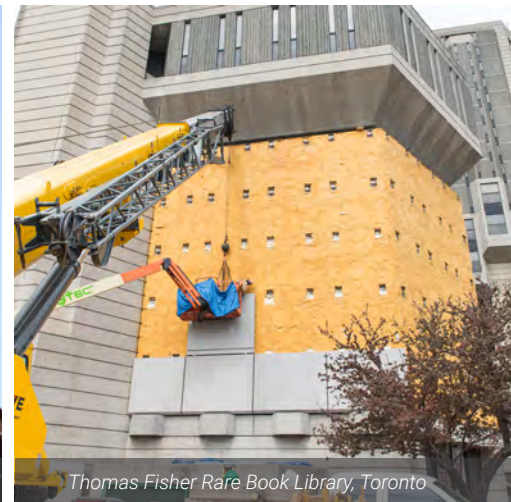
Eaton Centre Pedestrian Bridge, Toronto



Elbow River Pedestrian Bridge, Calgary



Alberta Boot Company, Calgary



Thomas Fisher Rare Book Library, Toronto



Langara College Science and Technology, Vancouver

## Bridge Design & Rehabilitation

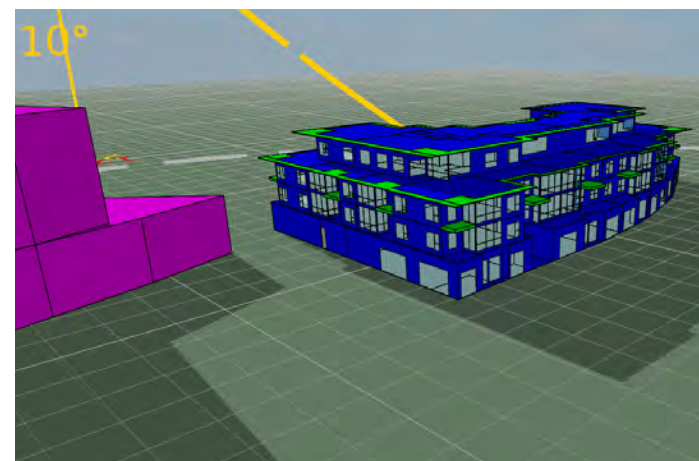
RJC's specialists seamlessly blend form and function for all types of bridge structures, from pedestrian bridges over meandering creeks to vehicular bridges over bustling highways. In addition to new structures, we assess and restore all types of bridges. Connect with RJC and we'll help you bridge any gap.

- Pedestrian bridges
- Road bridges
- Transit infrastructure

## Building Enclosures

To meet the demanding performance metrics in today's building codes, the design of building enclosures has become increasingly complex. Our team of specialists thrive on the technical challenges of meeting today's code requirements and helping clients optimize the performance, maintenance and repair of their new and existing building enclosures.

- Building enclosure condition assessment
- Building enclosure rehabilitation/design and implementation
- Cladding repairs/retrofits
- Maintenance and renewals planning
- New construction building enclosure consulting
- Building enclosure commissioning



## Building Energy Modelling

Building Energy Modelling is a versatile, multipurpose tool that can be used in both new construction and existing buildings. It can aid in design-stage decision-making, demonstrate code compliance, facilitate achievement of green building certifications, and can help to inform policy and code development. Our holistic approach means that we understand the whole picture - how all building components interact with one another.

- **Building component thermal modeling**
- **Whole building energy modeling**
- **Lifecycle Carbon Assessment**
- **Whole building air tightness testing for new and existing buildings**

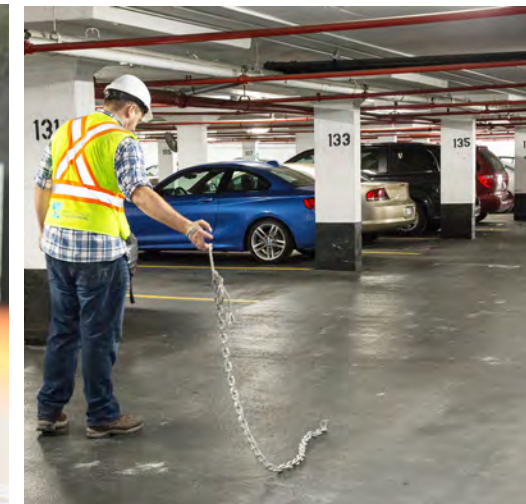
## Civil Services

Proper drainage, whether it's underground pipes or surface grading, is crucial for shedding water away from building foundations and in turn extends the life of all buildings. We have designed surface runoff solutions and underground water and wastewater systems for projects from zero lot-line buildings to large and complex overland drainage systems and parking lots. RJC has the resources to successfully complete utility and surface works projects.

- **Pavement and drainage assessments**
- **Grading and drainage design**
- **Underground utilities design**



Kelowna Four Points by Sheraton Hotel, Kelowna



## Cold-Formed Steel Design

These materials are ideal for mid-rise buildings such as hotels, assisted living or residential care facilities or residential apartments with regular framing grids. RJC's specialists provide full consulting services for cold-formed steel and floor systems and hybrid systems that integrate with other materials.

- Interior and exterior steel stud infill wall framing
- Load-bearing steel stud structural design
- Engineering and detailing seismic restraint for secondary architectural components

## Condition Assessments

Maintaining your building assets starts with knowing their condition. Whether solving specific component problems or assessing the total building condition, RJC can provide a complete understanding of the condition of your property, allowing for the scheduling and budgeting of anticipated capital expenditures for maintenance, repair and eventual replacement of building components. Our services can help extend a building's useful life and assist in reducing long-term expenditures.

- Building condition assessments
- Pre-purchase assessments
- Maintenance planning
- Capital expenditure planning
- Evaluation of building components
- Technical audits



## Depreciation Reports & Reserve Fund Studies

Planning for the maintenance and replacement of your building's components reduces future surprises. RJC's Depreciation Reports and Reserve Fund Studies assist with strategic planning approaches towards building maintenance and renewals, so that the future costs associated with these necessary activities can be planned and budgeted proactively.

- **Depreciation Reports**
- **Reserve Fund Studies**
- **Performance and technical audits**
- **Asset management assistance**
- **Meetings, presentations and Q&A sessions**

## Façade Engineering

Your building's "skin" needs to be attractive, durable, economical, energy-efficient and easy to maintain. Our expertise in Building Science, Structural Engineering and Structural Glass are brought together to optimize the design of building façades. Our holistic approach includes environmental and energy performance, structural integrity, materials selection and ease of construction.

- **Condition assessment**
- **Structural design and review**
- **System selection/pre-design assessment and repairs**
- **Specialty glazing**
- **Window replacement**
- **Design and implementation**
- **Onshore engineering for offshore systems**
- **Leak detection and repair**
- **Seismic design**





## Fall Protection & Maintenance Access Systems

Safety is paramount for people working on or around a variety of building types, industrial plants and structures. RJC provides full fall protection engineering services, including optimizing the layout of the system, detailed design of components, field review of new systems and annual compliance reviews. Our specialists are familiar with all building types and construction materials and have developed cost-effective systems to meet a wide variety of fall protection/travel restraint challenges.

- **Fall protection & maintenance access systems design and certification services**
- **Needs assessments**
- **Evaluation of existing systems**
- **Testing and recertification**
- **Annual inspection**
- **Design and implementation**

## Forensic Engineering

When you have a technical problem that needs accurate engineering assessment, we can help. RJC works with insurance claim adjusters, lawyers and restoration contractors, providing timely advice and solutions to property damage or loss.

- **Property damage assessments**
- **Structural collapse**
- **Failed building components**
- **Building code compliance**
- **Analysis of construction claim disputes**
- **Contract administration for building remediation**
- **Litigation technical support and consulting**



Pacific Central Station, Vancouver (Before & After)



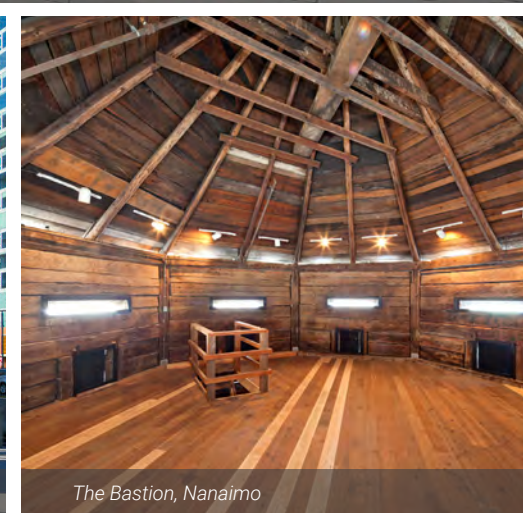
Chinook Hospital, Lethbridge



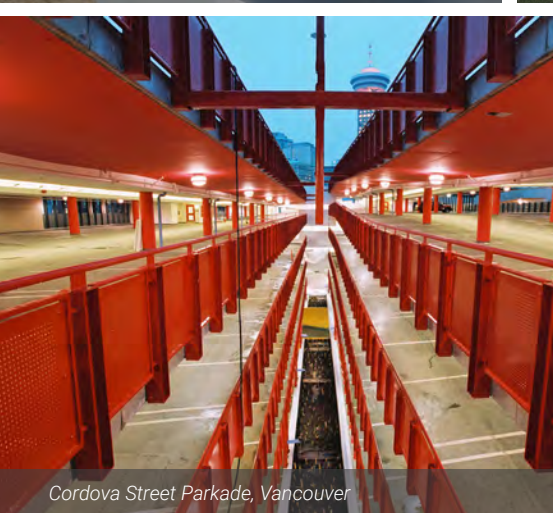
Mount Royal University, Calgary



Simmons Building, Calgary



The Bastion, Nanaimo



Cordova Street Parkade, Vancouver



GO Burlington Parking Facility, Burlington

## Heritage Conservation

Heritage properties are not only a window into the past; they are part of our country's character. Conserving your historic structure or building is a means of preserving Canada's unique history. We are very familiar with the various materials used in the construction of Canada's historic structures, and have extensive expertise with the appropriate materials and techniques for proper restoration.

- Evaluation and restoration of stone, wood, terracotta, masonry, steel, glazing, copper and slate cladding
- Façade engineering
- Energy efficiency upgrade studies and design
- Seismic restraint of features and façades
- Heritage alteration permit consultation and submissions

## Parking Facility Design

Unobstructed sightlines, easily comprehended circulation systems, intuitive wayfinding and user comfort are the hallmarks of Parking Facility design. Our team of specialists integrate design excellence, efficient functional planning and cost-effective, durable structural design to create exceptional parking facilities.

- Parking planning
- Durability consulting
- Prime consulting
- Parking evaluation
- Parkade corrosion protection
- Structural design, construction and prime consulting
- Review and repair of existing facilities



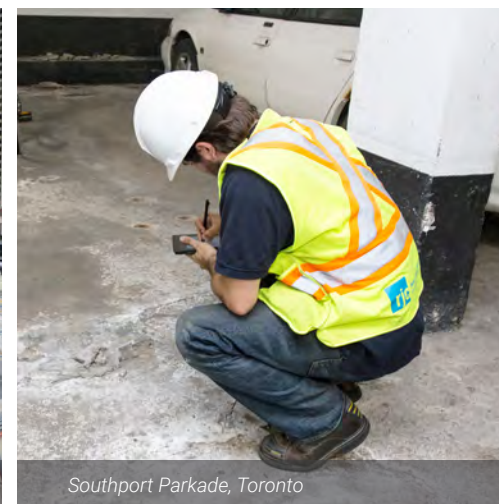
Kitchener City Hall Parkade, Kitchener



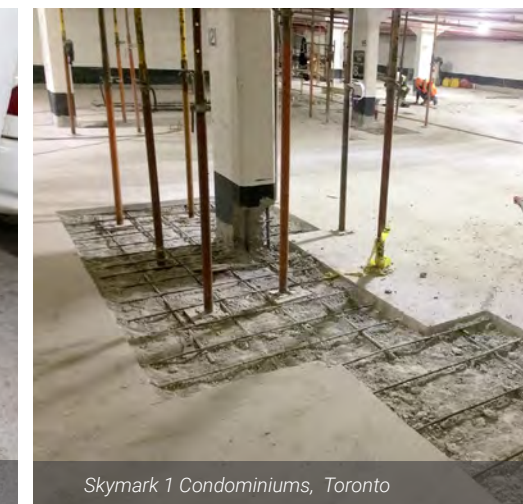
First and Jasper Parking Deck, Edmonton



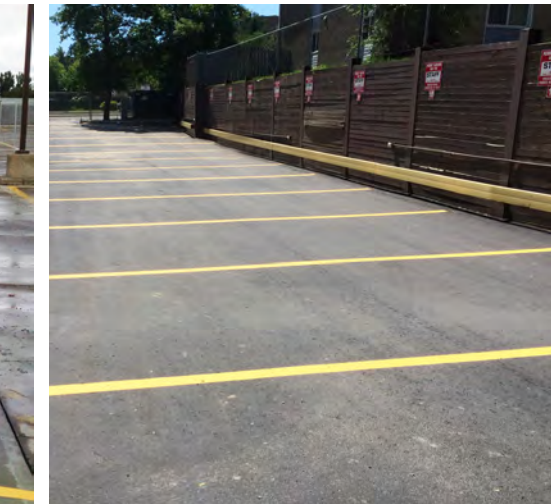
City Centre Parkade, Calgary



Southport Parkade, Toronto



Skymark 1 Condominiums, Toronto



## Parking Structure Restoration

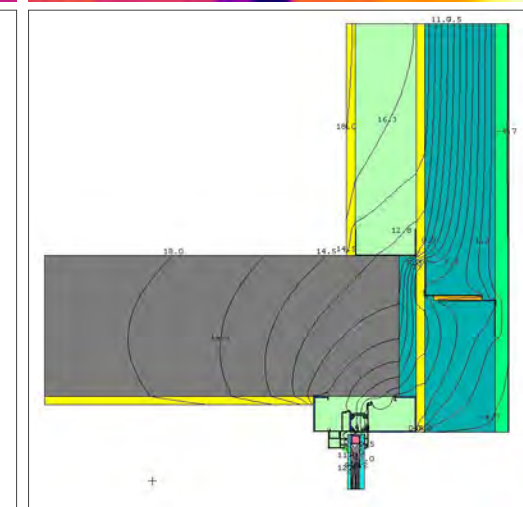
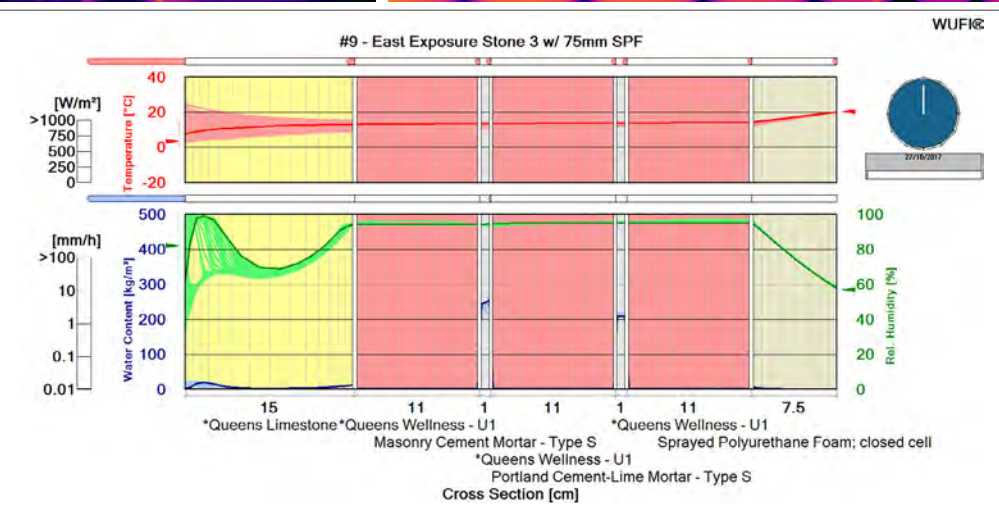
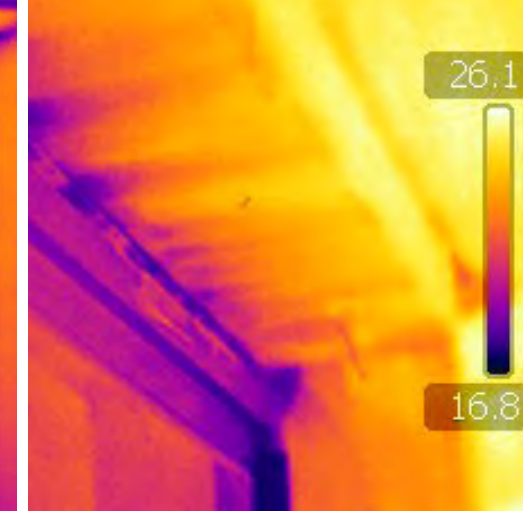
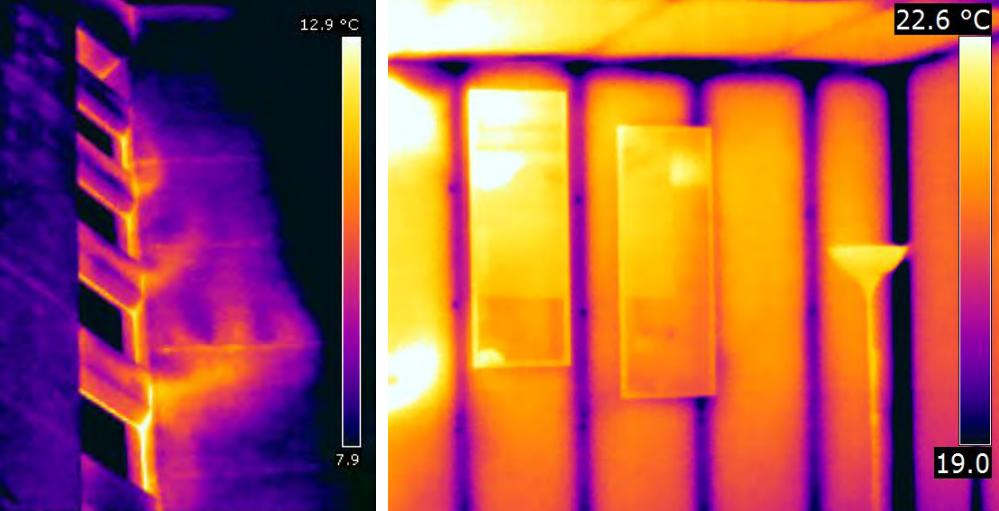
RJC has been providing a full spectrum of restoration solutions for parking structures since the 1980s. Our expertise provides owners with long-lasting, cost-effective repairs, tailored to meet their unique restoration needs. Our experts investigate, test and assess parking structures to determine their current condition and provide technically sound solutions to address any potential performance issues that can be caused by the ravaging effects of salt induced corrosion. Furthermore, RJC provides the technical and contract administration services necessary for the implementation of your restoration program.

- **Condition assessments**
- **Structural restoration**
- **Waterproofing consulting**
- **Tendering to qualified contractors**
- **Contract administration and construction review**
- **Maintenance planning**
- **Capital planning**
- **Post-tensioning system evaluation, repairs and alterations**

## Pavement Rehabilitation

Extending your pavement life involves a feasible design, a quality construction program and a well-timed maintenance plan. RJC understands the route to a practical pavement rehabilitation is an effective method of assessment, preventative maintenance and a design that extends service life. Whether the project is a localized repair, overlay, or reconstruction, our specialists are well versed in the materials and methods involved.

- **Asphalt pavement rehabilitation**
- **Concrete pavement rehabilitation**
- **Pavement assessment**



## Performance Assessment

A building enclosure's performance must be measured so that it can be improved. RJC utilizes software suites and field diagnostic tools, such as thermal imaging, leakage testing and structural tests to properly understand your building's unique behaviour. Calibrating our software suites with field diagnostic results allows us to create a computer model of your building's existing conditions from which the optimal performance level can be achieved.

- Performance audits
- Infrared thermography
- Thermal modelling
- Hygrothermal modelling

## Post-Tensioned Concrete

Post-tensioned structures at risk require periodic assessment, preventative maintenance, creative repair and a practical protection program. Since the mid-80s, when issues with deterioration of post-tensioned structures became evident, RJC has led the development of investigation, maintenance and repair techniques. Furthermore, RJC uses this knowledge and experience in the design of new post-tensioned structures as well.

- Post-tensioning system evaluation
- Post-tensioning system repairs and monitoring
- Post-tensioning alterations
- Slab cutting and coring planning and review
- Design of new post-tensioned structures



## Prime Consulting

As your Prime Consultant, our focus is on delivering a project that meets your definition of success. In this role, RJC treats the building or structure as if it is our own. We conduct Prime Consulting services on a variety of projects with small to large construction budgets, from small repairs to building modernizations to new parking structures.

- Coordination of design team
- Preparation of multi-discipline tender packages
- Construction review, contract administration and project management
- Coordinating registered professional services
- Coordination of tenant improvement projects
- Interior retrofits and elevator modernization
- Mechanical/electrical upgrades
- Demolition projects
- Rooftop units
- New construction services for parkades

## Rendering & Interactive Visualization

We bring your project to life through forward-thinking design technology. As building complexities increase, the efficacy of a 2D design approach decreases. Advanced 3D rendering and interactive visualization enable our clients to vividly see the designs proposed early in the design process.

- Interactive visualization
- Animation
- Still image rendering



815 West Hastings, Vancouver



UBC Asian Library, Vancouver



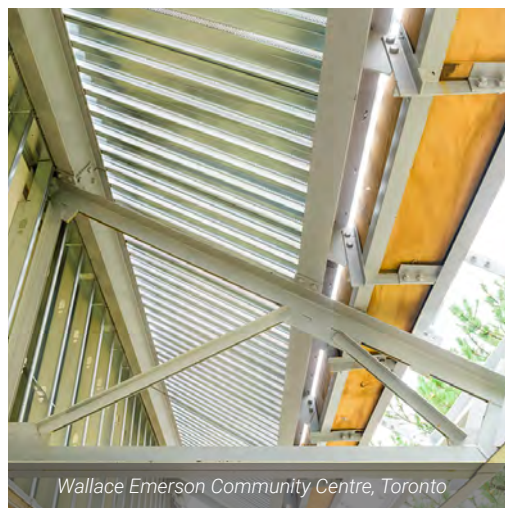
The Exchange Tower, Vancouver



The Janion, Victoria



52 Division Police Station, Toronto



Wallace Emerson Community Centre, Toronto



The Hudson, Victoria



Queen Elizabeth Theatre, Vancouver



Queen Mary Elementary School, Vancouver



UBC Biological Sciences, Vancouver

## Roofs & Plaza Decks

A roof may be largely out of sight; but its design, construction, and maintenance are critical to your building's operation and life cycle. RJC provides roof and plaza deck consulting services for commercial, institutional, industrial and residential clients throughout Canada. Our team actively participates in the roofing community through provincial roofing associations and consultant institutes such as RCI, Inc.

- Roofing assessment and surveys
- Roofing system design and implementation
- Plaza decks and green roof design
- Warranty and maintenance reviews
- Infrared thermography
- Registered Roofing Consultants (RRC)
- Registered Roofing Observers (RRO)

## Seismic Risk Mitigation

We can reduce your risk through detailed assessments and targeted upgrades – a custom seismic solution. For buildings or structures in parts of Canada subject to the threat of earthquakes, RJC can provide a range of engineering services to help mitigate seismic risk. These include building structure upgrades, seismic restraint of building contents, seismic risk assessment and post-disaster planning.

- Assessment of seismic risk
- Seismic restraint of building content and critical building equipment and fixtures
- Post-disaster structural evaluation manuals
- Building structure upgrading



Guildford Town Centre Green Wall, Vancouver



University of Michigan, Ann Arbor



Calgary Zoo, Calgary



YYC Calgary International Airport, International Facilities Project, Calgary



The ONE, Toronto



Humber College Building F, Toronto



Holt Renfrew, Vancouver



Emerald Hills Aquatic & Wellness Centre, Edmonton



Vancouver Island University, Cowichan

## Specialty & Supplementary Engineering

We can help with specialized services for a variety of assignments. By leveraging our broad base of in-house expertise, we provide contractors and owners with specialty and supplementary engineering services for a diverse range of projects.

- Commissioning of buildings
- Structural design and seismic engineering of support for architectural, mechanical and electrical building components
- Integrated design services provided for contractors, consultants, and building owners
- Engineering review of structural loading changes on existing buildings
- Preparation of shop drawings for fabrication.
- Cold-formed light gauge (steel stud) design
- Structural design of unique structures
- Feature stairs

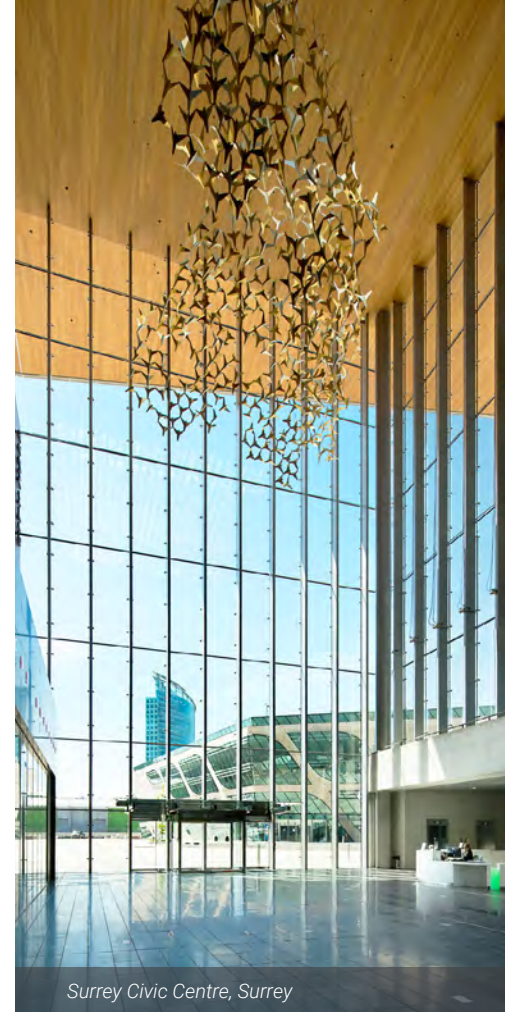
## Structural Engineering

We integrate creativity and practicality into our designs to optimize results for our clients. We are leading the practice of Structural Engineering, with many of our innovations commonly used in construction today. Our Structural Engineering services include feasibility studies and design/drafting/field review of virtually all building types, with significant expertise in concrete, structural steel, cold-formed steel, timber, masonry and glass.

- Structural engineering analysis and design
- Contract document preparation and administration
- Seismic design and upgrades
- Feasibility studies
- Alternative framing scheme analysis
- Creation of structural concepts
- Construction review
- Structural modifications/retrofits
- Post-disaster assessments
- Tenant improvement fit out related work



Eaton Centre Pedestrian Bridge, Toronto



Surrey Civic Centre, Surrey



Robson Square, Vancouver



Kravis Center, Claremont, CA



## Structural Glass Engineering

Let your glass stand apart from the rest. RJC's glass specialty engineers are leading the industry in advancements to achieve the full potential of glass as a structural material. In addition to collaborating with visionary architects and owners to create unique structural glass elements and enclosures, we also often work directly with specialty glazing contractors.

- **Structural glass engineering analysis and design**
- **Contract document preparation and administration**
- **Creation of structural glass concepts**
- **Holistic design approach (complete package)**
- **Integrated steel/aluminum/timber and glass solutions**
- **Custom façade, skylight, stair and bridge designs**
- **Engineer of Record (EOR) services in Canada and US**
- **Rendering and interactive visualization**

## Structural Restoration

Your building is a significant investment that requires ongoing maintenance and repair to protect and improve it as an asset. We know how structures are built and function. We know how they deteriorate and fail, and how to most effectively maintain and repair them for lasting value. For decades, clients have trusted us to provide valuable advice and services on evaluating, maintaining and restoring their structures.

- **Parking garage restoration**
- **Entrance/exit ramp and loading dock restoration**
- **Plaza/podium deck restoration**
- **Building façade and balcony restoration**
- **Heavy industrial restoration**
- **Structural delamination**
- **Structural reinforcement/sub-framing**
- **Load reviews**
- **Tenant improvement related work**
- **Timber and steel restoration**
- **Wastewater treatment restoration**





Ralph Klein Environmental and Education Park, Calgary



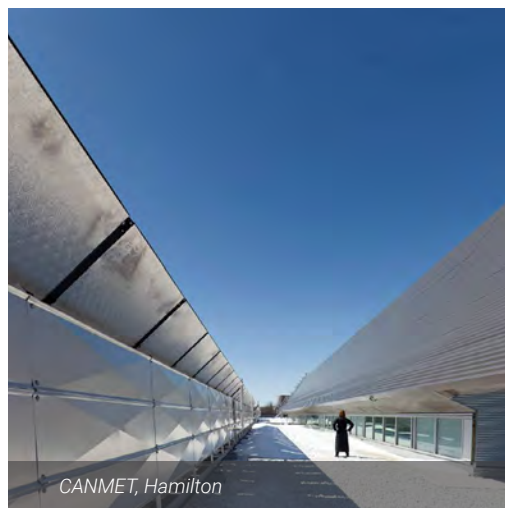
745 Thurlow Tower, Vancouver



Charles & Benton Parking Structure, Kitchener



Dockside Green, Victoria



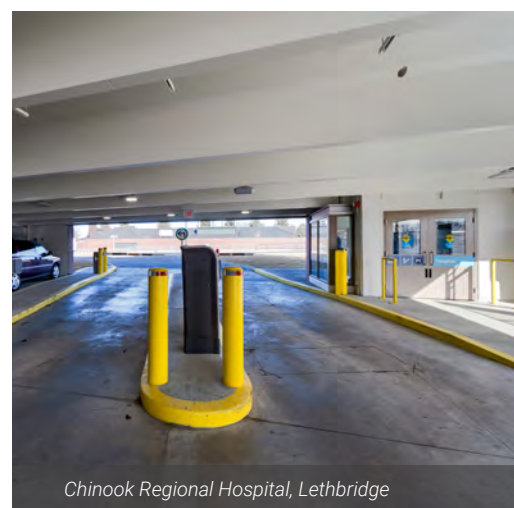
CANMET, Hamilton



Des Poilus Shelter, Yoho National Park



Sewell-Carlton Parking Garage, Saint John



Chinook Regional Hospital, Lethbridge

## Sustainable Design

Sustainable design considerations are embedded into all our construction projects, as our industry moves to a more sustainable future. Working with integrated design teams, our staff actively participate in design charrettes to explore project-appropriate sustainable strategies. Our sustainable design specialists are knowledgeable in all current sustainability standards in North America, including LEED®, Built Green, NetZero and Passivhaus.

- **Integrated design (in-house sustainable design framework)**
- **Durability consulting including CSA S478 and planning for service life and system renewals**
- **BOMA BEST® (Building Owners and Managers Association)**
- **Green Globes**
- **Living Building Challenge**
- **LEED® BD+C (new construction)**
- **LEED® EB: O&M (existing buildings)**
- **Net Zero and Passivhaus**

## Traffic Deck Protection & Replacement

RJC has been testing, specifying and evaluating the in situ performance of traffic deck protection systems for over three decades. We draw on our extensive experience and demanding quality control process to select the best traffic deck protection system for a given set of criteria and conditions. RJC then applies our unique combination of expertise in parking structure durability, structural engineering, parking facility design and parking garage restoration to design and detail an overall system that will safeguard your parking structure for years to come.

- **Design detailing and specifications based on the actual environmental and/or service load conditions**
- **Design coordination and assistance with other design disciplines**
- **Engineering oversight during construction**
- **Preparation of the post-construction maintenance and inspection manuals**



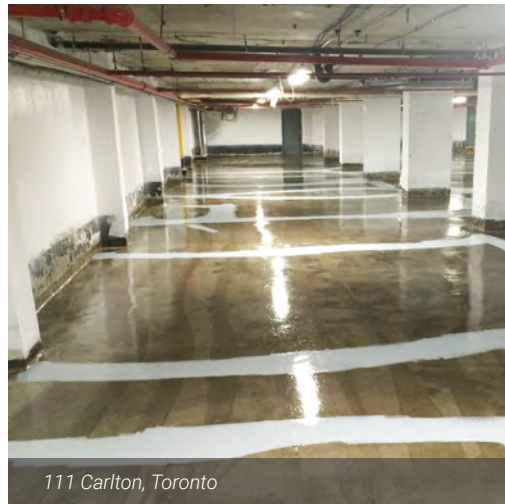
680 Queens Quay West, Toronto



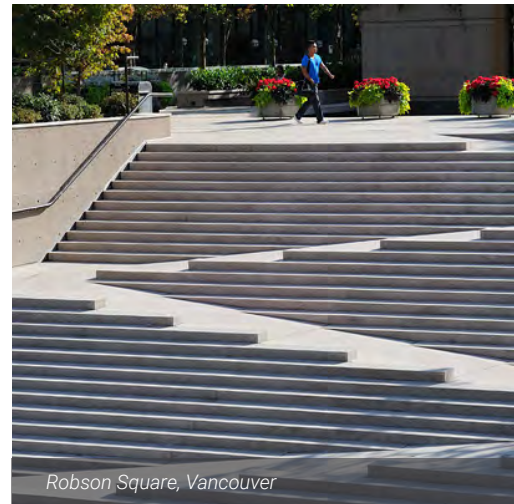
WinSport, Calgary



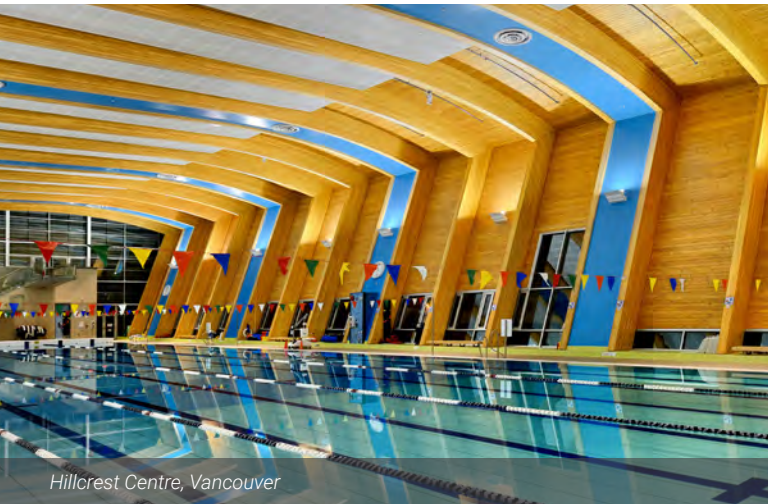
UBC Student Union Building, Vancouver



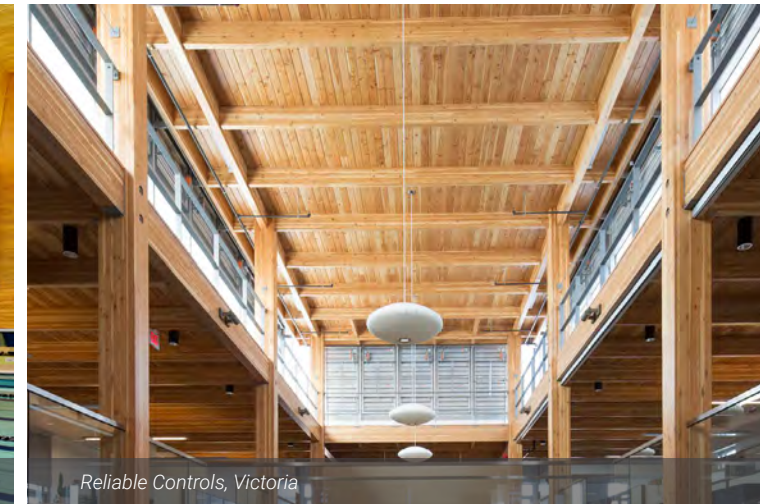
111 Carlton, Toronto



Robson Square, Vancouver



Hillcrest Centre, Vancouver



Reliable Controls, Victoria

## Waterproofing

Protecting your structure from the damaging effects of water is about obtaining the right advice from the right specialist. Whether your project involves a leak investigation of an existing assembly or the design of a new system, our specialists are proficient in the technological advances in waterproofing materials and systems.

- Plaza waterproofing
- Expansion joints
- Bituminous waterproofing
- Surface preparation
- Thin traffic deck coating
- Hot applied rubberized waterproofing
- Sealants and caulking
- Pools

## Wood Design

RJC is proud of our long history of pursuing environmentally friendly and innovative uses of building materials. Our dedicated wood specialists across Canada enable us to provide local expertise backed by industry leaders with specialized knowledge in all aspects of wood design. We are passionate about bringing our client's vision to reality through creative structural solutions, while at the same time fostering a philosophy of environmental stewardship.

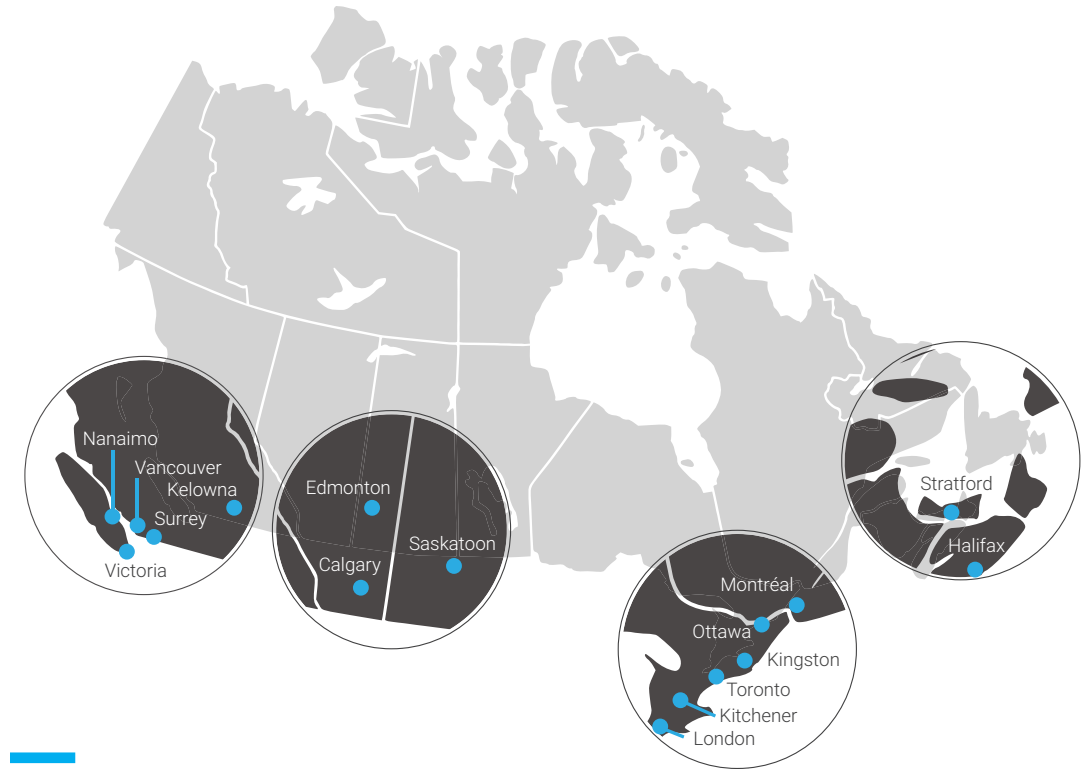
We are currently active with the following organizations shaping the future of wood in Canada.

- Canada's Wood Code
- NEWBuildS
- FPInnovations
- Canadian Wood Council
- National Building Code of Canada
- BC Advisory Group on Wood-Based Advanced Building Solutions



RJC Engineers is committed to delivering outstanding results, value and service excellence to our clients.

1515 Douglas, Victoria



## Contact Us



Creative Thinking **Practical Results**  
rjc.ca