ONE

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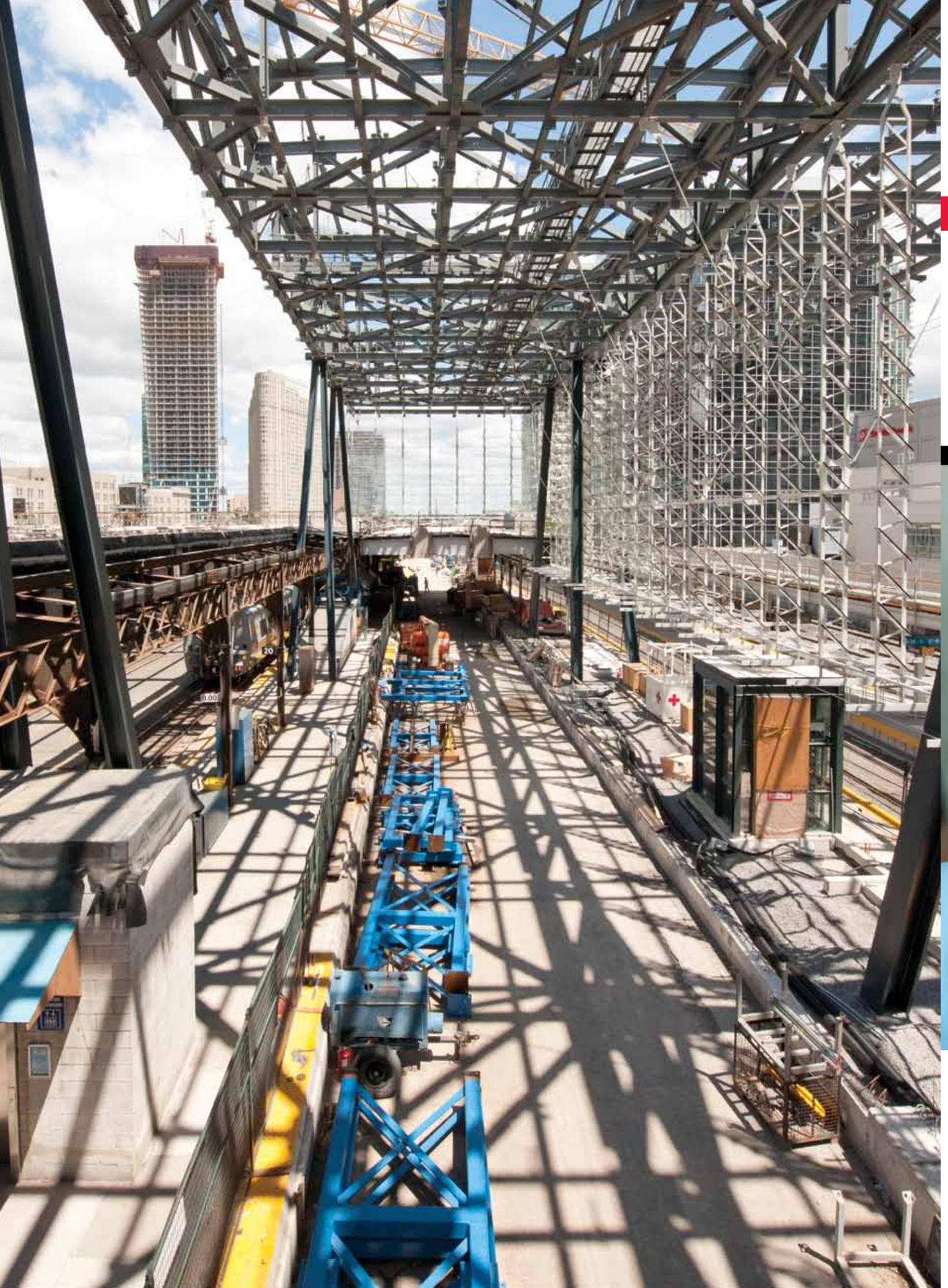

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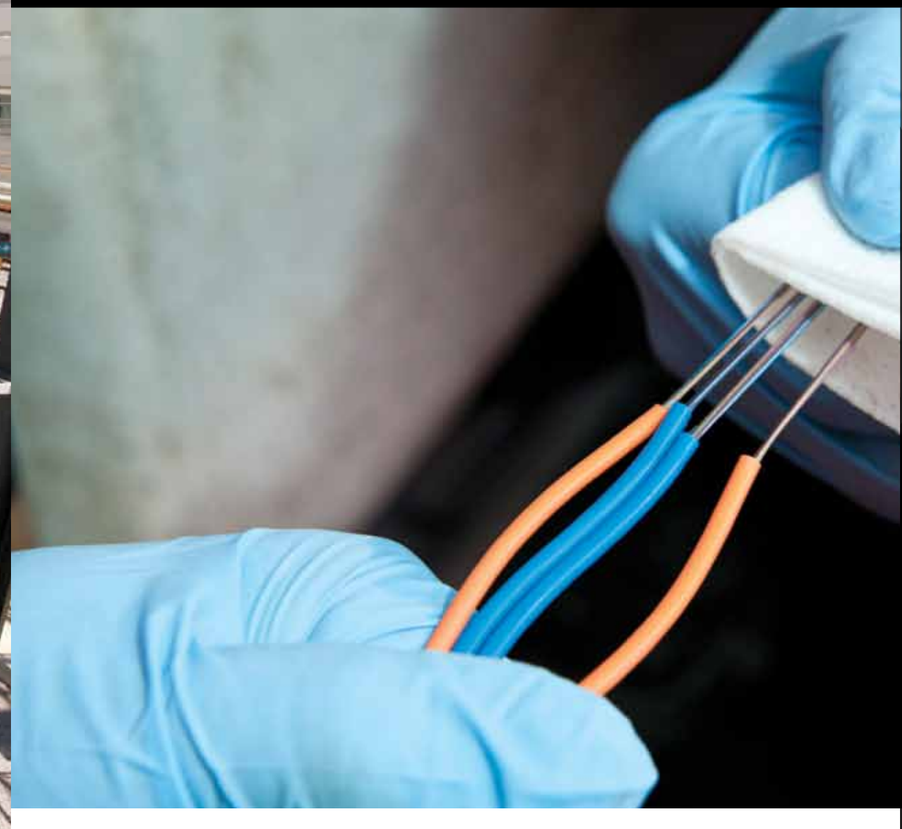


BEST EMPLOYERS IN CANADA 2012

AECON'S VISION:
To be the first company people go to for building things that matter.

ONE is a quarterly magazine published by Aecon Group Inc. for its employees and clients.
For more information about Aecon, visit our website at **aecon.com**

For more information on any of the articles published in the magazine, please contact Rob Kinnaird at 1 877 232 2677 or e-mail rkinnaird@aecon.com

COVER AND BACK:
NEW CAT 793F MINING TRUCK FOR THE OIL SANDS – FORT MCMURRAY, AB

LEFT:
CONSTRUCTION OF THE NEW UNION STATION TRAIN SHED – TORONTO, ON

ABOVE:
PREPARING FIBRE OPTIC TELECOMMUNICATION CABLE FOR SPLICING AND FUSION – TORONTO, ON

LEADERSHIP MATTERS

UNLOCKING THE EARTH'S TREASURES

By John Beck
Chairman of the Board and Chief Executive Officer

Toronto is a global hub of the mining industry, Calgary a world leader in oil and gas. It is no coincidence that Aecon has its headquarters in both cities.

The next time you sit down for a family dinner, consider this. Everything you see, from the furniture to the cutlery to the food on the table, has either been farmed or mined. These two fundamental activities have sustained the human race since the dawn of time, and it is these two fundamental activities that have made Canada one of the richest and most fortunate countries in the world.

Canada's vast fields and forests drew the early pioneers to the New World, but it has been the development of our mineral resources that has shaped our modern economy.

Home to more top 100 mining companies than any other country in the world, Canada has the technical, financial, legal, accounting and consulting services that have made Toronto a global hub of the mining industry and Calgary a world leader in oil and gas.

We are the world's leading producer and exporter of potash and uranium; the second-largest producer of sulphur; the third-largest producer of titanium, zinc and platinum; the fourth in aluminum production; and the fifth producer of copper, lead, silver, gold and diamonds.

Our petroleum resources are no less impressive. Canada has the largest deposit of oil sands in the world, making our proven reserves second only to those of Saudi Arabia.

Canada also has some powerful advantages that go far beyond our abundant resources – talented people using advanced technology, well-managed firms and a politically stable environment that is a welcome haven for the capital-intensive investments needed by modern resource industries. And those investments are impressive. The capital investment in the mining and minerals sector is expected to be about $16 billion this year; investment in the oil sands could well hit a record $20 billion.

But unlocking the earth's treasures is no easy task. It takes enormous resources, experience, expertise and knowledge, often operating in some of the most remote and hostile environments in the world – all of which bears a striking similarity to the sort of work that Aecon has been doing for more than a century. Whether building a highway in the desert, carving out a runway on a plateau in the Andes Mountains or boring a railway tunnel through the Rocky Mountains, we have built our reputation on our ability to mobilize people, equipment and resources to tackle some of the largest, most complex infrastructure projects in the world.

We have also had more than a passing involvement with the mining sector itself. We have been mining aggregate from our own pits and quarries for years. Aecon Industrial has supplied and installed process piping and equipment to oil sands upgraders, refineries and mines across Canada. Lockerbie & Hole Eastern has installed crushing and processing equipment in diamond mines in the Northwest Territories and Northern Ontario and a processing mill for Canada's only molybdenum mine in British Columbia, as well as processing equipment in New Brunswick and Saskatchewan potash mines. And Canonbie Contracting is currently at work 500 metres underground installing services in a uranium mine in northern Saskatchewan.

All the elements for a comprehensive mining and minerals services business have been in place. Whether it is earth moving, blasting, tunnelling, rock crushing, concrete pouring or industrial equipment installation, Aecon has, at one time or another, done it all. Yet, there has been one mining activity that until recently remained tantalizingly out of reach.

Unlike conventional crude oil that flows under the natural pressure of the reservoir, the bitumen in Alberta is tightly bound in the sand (about two tonnes of oil sands are required to produce one barrel of oil) and has to be processed in specially designed extraction plants. Currently, about half of all oil sands production is based on strip-mining techniques, massive earth-moving operations using the biggest mining equipment in the world. Watching a machine the height of a three-storey building with a shovel the size of a small garage effortlessly scoop up 70 tonnes of earth is an awe-inspiring sight.

Two years ago, we acquired the contracts and assets (including more than 500 pieces of heavy equipment) of one of the three largest mining and land reclamation companies in Alberta. It was the official start for Aecon Mining. Today, Aecon Mining has four oil sands contracts and has started site work at a massive potash mine under development in Saskatchewan.

But the oil sands are only part of the story. Mining touches every region of Canada, and Aecon has the resources to meet those demands. Lockerbie and Hole Eastern can mobilize equipment, trades and supervision to manage multi-trade mining projects in remote locations from Labrador to British Columbia. Leo Alarie & Sons' custom crushing and civil construction operations, a fixture of the Northern Ontario mining scene for almost 30 years, are now officially part of Aecon Mining. And Aecon's other services – Aecon Industrial's piping and module fabrication services and Aecon Infrastructure's building construction and earth-moving expertise, for example – are available for much-needed support. Put it all together, and Aecon now offers the mining sector the same sort of broad portfolio of services that it provides for infrastructure projects.

PUTTING IT ALL TOGETHER, AECON NOW OFFERS THE MINING SECTOR THE SAME SORT OF BROAD PORTFOLIO OF SERVICES THAT IT PROVIDES FOR INFRASTRUCTURE PROJECTS.

Aecon has honed its skills in the world of infrastructure. I believe that taking that expertise into the world of mining is part of our natural evolution. This is not just another activity. This will in the long term become one of the central pillars of the services that we offer.

AECON

MINING

DIGGING IN, BUILDING UP

Howard Penny clambers up the ladder on the side of the Hitachi 5500 hydraulic shovel, anxious to get out of the bone-chilling cold and into the warmth of his cab. Settled into his seat, eight metres above the ground, he pushes a button and the shovel's twin 700-horsepower motors roar to life.

The shovel, the height of a three-storey building with a bucket the size of a small garage, swings around and effortlessly scoops up more than 70 tonnes of earth with one swipe, dropping it into the waiting truck.

In one day, Penny will have shifted more than 20,000 cubic metres of earth. Any other backhoe operator would be pleased to have accomplished as much in a week. For Penny, an equipment operator with Aecon Mining, it's just another day's work in the oil sands.

These are high times for Canada's mining industry. With global-leading production of potash, nickel, and uranium production and most other mineral and energy products, our national mining industry is well positioned to amply supply the resource-hungry economies of China and India. In fact, over the next five years, a whopping $140 billion is expected to be invested in new mining development and exploration.

"Add in the enormous investment in oil sands development, and it's easy to see why the industry mood is so upbeat," says John Singleton, Senior Vice President, Aecon Mining.

"If anything, the biggest challenge the sector faces is finding and managing the resources necessary to keep up with the pace of development, which is why this is such a key sector for Aecon.

"With our open-pit mining expertise in Western Canada, our hardrock expertise in Ontario and the support of Aecon Industrial's mine site services, Aecon Mining can comprehensively provide the oil sands and mining industries with a broad range of development services."

> IF ANYTHING, THE BIGGEST CHALLENGE THE SECTOR FACES IS FINDING AND MANAGING THE RESOURCES NECESSARY TO KEEP UP WITH THE PACE OF DEVELOPMENT...
>
> –JOHN SINGLETON
> SENIOR VICE PRESIDENT
> AECON MINING

BUSINESS FILE

AECON MINING

BUSINESS:

Mining Support Services
// Overburden removal
// Reclamation
// Blasting
// Open-pit mining
// Waste rock stripping and removal
// Heavy civil construction services

Complementary Industrial Services
// Piping/module fabrication
// Equipment and piping installation
// Structural erection, electrical, instrumentation, insulation, fireproofing

HEAD OFFICE: Edmonton, Alberta

OPERATIONS: Alberta, Saskatchewan, Ontario

NUMBER OF EMPLOYEES
(combined operations):

Staff: 100
Trades: Up to 400

KEY EMPLOYEES:
John Singleton – Senior Vice President, Mining
Julian Leizerovici – General Manager, Commercial and Engineering
Demetri Koumarelas – Director, Finance
Paul Alarie – Equipment Manager
Rudy Madsen – Director, Project Controls

AECON MINING HAS ESTABLISHED ITSELF AS ONE OF THE KEY MINING AND LAND RECLAMATION COMPANIES IN WESTERN CANADA. IT'S EQUIPPED WITH SOME OF THE LARGEST AND MOST IMPRESSIVE EARTH-MOVING EQUIPMENT AVAILABLE.

SPENDING ON EXPLORATION WAS UP 30 PER CENT LAST YEAR, AND THERE'S EVERY PROSPECT THAT MINING WILL CONTINUE TO BE A GROWTH INDUSTRY... FOR SOME YEARS TO COME.

– JOHN SINGLETON
SENIOR VICE PRESIDENT
AECON MINING

Two years ago, Aecon acquired the assets and contracts of Cow Harbour Construction, one of the three largest mining companies in Alberta, giving it an immediate entry into the mining sector at a significant discount to any other approach.

The acquisition added an entirely new dimension to the company's operations. At the time, Chief Operating Officer Teri McKibbon called it Aecon's "single most important acquisition in the past five years."

Today, with the business integration into Aecon Group well in hand, Aecon Mining has established itself as one of the key mining and land reclamation companies in Western Canada. Aecon Mining has more than 400 employees and is equipped with some of the largest and most impressive earth-moving equipment available.

In addition to its initial ongoing contract for land reclamation and mining project work at the Syncrude oil sands sites, Aecon Mining now has projects under way for Suncor and ConocoPhillips, as well as its first project outside of Alberta – an $80 million contract for site work at BHP Billiton's massive Jansen Lake potash mine development 140 kilometres east of Saskatoon, Saskatchewan.

Aecon Mining has also recently become a significant player in Northern Ontario, with the integration of Leo Alarie & Sons' hardrock mining support services into the business fold.

Julian Leizerovici, Aecon Mining General Manager, Commercial and Engineering, is now actively searching further afield to Newfoundland and Labrador to expand the business.

"That province is relying on resource development to drive its economy forward," notes Singleton. "It has six metal mines (most notably, nickel and iron ore) and seven non-metallic operations, with more than 100 advanced active exploration projects under way. Spending on exploration was up 30 per cent last year, and there's every prospect that mining will continue to be a growth industry there for some years to come."

AECON MINING PROJECTS

Client: Syncrude
Location: Fort McMurray, Alberta
Scope: Overburden removal and land reclamation
Employees on site: 300
Timing: 2010–14

Client: ConocoPhillips
Location: Fort McMurray, Alberta
Scope: Road and drill pad construction
Timing: 2012

Client: Syncrude
Location: Fort McMurray, Alberta
Scope: Three-kilometre EarthZyme road construction
Timing: 2012

Lake Jansen Potash Mine
Location: Lake Jansen, Saskatchewan
Scope: Potash mine site preparation
Employees on site: 100
Timing: 2011–12

Client: Xstrata Copper
Location: Timmins, Ontario
Scope: Cover construction and soil remediation
Employees on site: 50
Timing: 2012

Client: Barrick
Location: Hemlo, Ontario
Scope: Waste rock and secondary ore crushing
Employees on site: 15
Timing: Ongoing

Client: Imerys
Location: Timmins, Ontario
Scope: Waste rock and secondary ore crushing
Employees on site: 15
Timing: Ongoing

The Oil Sands and Beyond

"They say to get these projects done, you have to move mountains," notes Alexis Klimack, Aecon Mining Regional Manager, Alberta. "Well, we have the people and the equipment to do just that."

Mountains may be a bit scarce in northern Alberta, but the task of mining its oil sands is no less monumental.

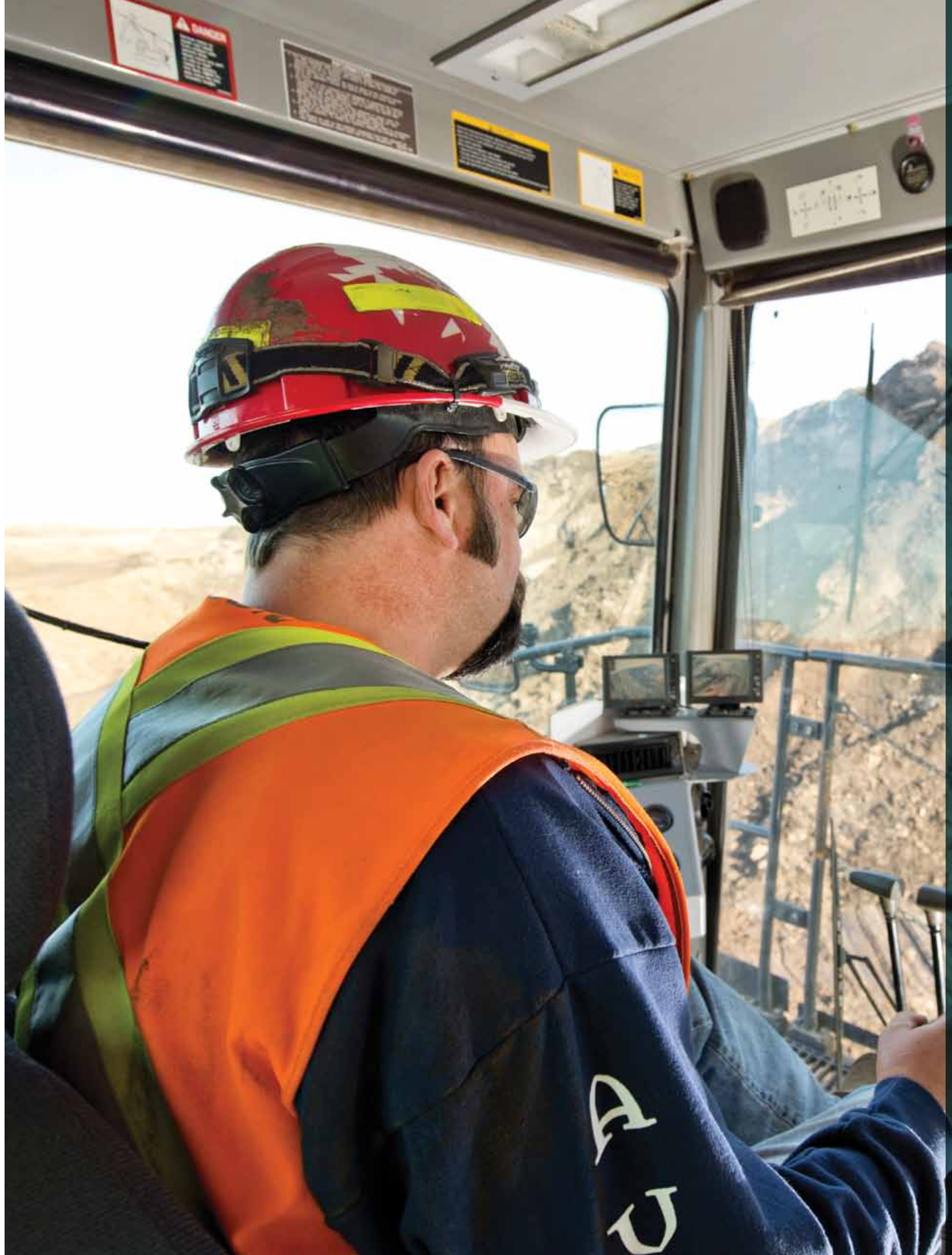
With 170 billion barrels of reserves in an area that roughly equals the size of the state of Florida, the Alberta oil sands holds the third-largest oil reserves in the world – more than enough to provide Canada with a plentiful and secure supply of energy for the foreseeable future. That said, getting these resources out of the ground and ready for refining is a challenging proposition. Unlike conventional oil reserves, which, once tapped, flow relatively unimpeded, the bitumen in the oil sands is trapped in ore bodies up to 70 metres thick, buried below layers of silt, clay and muskeg.

> WE HAD TO MAKE SURE WE CHOSE THE APPROPRIATE EQUIPMENT FOR THE AREA, PROVIDED GOOD DRAINAGE AND MADE THE PITS ACCESSIBLE.
>
> – ALEXIS KLIMACK
> REGIONAL MANAGER
> ALBERTA

Currently, about half of the oil produced in northern Alberta is recovered by surface mining. The overburden, typically up to 30 metres thick, is stripped away and the saturated sand hauled away for processing and upgrading. The overburden is stockpiled and then used to restore the land to its original condition once the area has been mined out.

Extracting the oil from this rugged landscape takes equally rugged equipment that's powerful enough to haul huge payloads of earth, strong enough to break through frozen tundra when temperatures plummet to –40°C and tough enough to power through the soft, sticky mud of summer. Given that the work can only be economically carried out using the largest surface mining equipment in the world, it's also not an enterprise that comes cheaply. The largest hydraulic shovel can cost more than $10 million, haul trucks up to $5 million. Replacement parts are equally expensive, with a single tire for one of these behemoths weighing in at almost four tonnes and costing upwards of $100,000.

Buying and maintaining this type of advanced earth-moving equipment is so significant and carries such a long lead time that it is virtually impossible to create this sort of business from the ground up, which is why, in 2010, Aecon acquired the assets and contracts



OPERATIONS FILE

AECON MINING (WESTERN OPERATIONS)

OPERATIONS:
Overburden, reclamation and project support for oil sands development & production, potash mining and other surface mines

REGIONAL OFFICE: Fort McMurray, Alberta

CLIENTS:
// Syncrude
// Suncor
// Shell
// ConocoPhillips

FOUNDED: 2010

EQUIPMENT:
Backhoes – 63 (45-tonne to 190-tonne)
Face shovels – 4 (360-tonne to 550-tonne)
Articulated trucks – 23 (40-tonne capacity)
Haul trucks – 35 (90-tonne capacity)
Haul trucks – 17 (134-tonne capacity)
Haul trucks – 16 (174-tonne capacity)
Haul trucks – 27 (227-tonne capacity)
Bulldozers – 56 (up to D11 size)
Graders – 8 (up to 24M size)

NUMBER OF EMPLOYEES:
Staff: 70
Trades: 380

KEY EMPLOYEES:
Alexis Klimack – Regional Manager, Alberta
Scott Ryan – Engineering Manager
Keith McGrath – Director, Business Development
Clayton Tucker – Regional Manager, Saskatchewan
Don Dow – Safety Director
Wally Herritt – General Manager, Maintenance
Cara Singleton – Chief Estimator, Western Canada
Patrick Maillet – Senior Estimator
Arminda Lovell – Controller
Ashley Aalders – Senior Administrator
Mohamed Alzabidi – Senior Project Coordinator

BY THE TIME THE PROJECT IS DONE,

2 million

CUBIC METRES OF EARTH WILL HAVE BEEN MOVED.

of Cow Harbour Construction, one of the three largest mining companies in Alberta. But while the acquisition gave Aecon a head start, it was hardly clear sailing. Aecon Mining had to modernize the business, upgrade the equipment, introduce new management controls and establish itself in the market – and all of this with just one project contract on the books: reclamation work at two Syncrude sites. An important footnote was the fact that other contractors had previously passed on the contract due to its level of difficulty.

When you're using big, heavy equipment, working in cold temperatures can actually be an advantage, explains Alexis Klimack. "The frozen ground may be difficult to dig, but it provides good support and is more forgiving than the summer mud." Klimack says using the big equipment and keeping costs down called for creativity and strategic decision-making. "We had to make sure we chose the appropriate equipment for the area, provided good drainage and made the pits accessible. The site can get really crowded, and we didn't want to paint ourselves into a corner."

Fortunately, Klimack adds, the experienced workforce, buoyed by the prospects of a revitalized business, was more than willing to take on the challenge.

The equipment, however, was another matter. Aecon Mining had acquired more than 500 pieces of equipment, from bulldozers and haul trucks to the giant excavators that roam across the oil sands like prehistoric creatures – more than enough to satisfy present-day requirements. But after years of neglect, much of the rolling stock required serious attention. Enter Equipment Manager Paul Alarie, previously with Timmins-based Leo Alarie & Sons, Aecon's Northern Ontario business unit specializing in mining and heavy construction. Under Alarie's direction, Aecon Mining soon had Wally Herritt, General Manager, Maintenance, working his team of 80 mechanics, welders and servicemen around the clock to bring the equipment back to peak operating condition.

"Only about 30 per cent of the equipment was in good working condition," reports Alarie. "We've since injected about $90 million into a maintenance program to bring the fleet back up to snuff. With the new preventive maintenance program on schedule, we've just about caught up."

With the help of Celerant, one of the world's leading consultants in performance improvement, Aecon Mining introduced its workers to new management processes last summer in order to better track and control maintenance and operations. They also adopted Aecon Group's health and safety programs to further solidify their success rates.

To complement the ongoing contract for land reclamation and mining project work at Syncrude oil sands sites, Aecon Mining is now engaged in new projects with Suncor and ConocoPhillips and is currently building a three-kilometre-long, 40-metre-wide EarthZyme road for Syncrude. EarthZyme is a non-toxic enzyme soil stabilizer that improves the compaction and strength of clay-based roads.

> BY THE TIME THE PROJECT'S DONE, WE WILL HAVE MOVED ABOUT TWO MILLION CUBIC METRES OF EARTH AND BROUGHT IN AN ESTIMATED TWO MILLION TONNES OF AGGREGATE.
>
> – CLAYTON TUCKER
> REGIONAL MANAGER
> SASKATCHEWAN

The Aecon business unit has also been awarded its first project outside of Alberta for site works at the massive Jansen Lake potash mine development, 140 kilometres east of Saskatoon, Saskatchewan.

"It's a big job," reports Clayton Tucker, Regional Manager, Saskatchewan, of this project, which got under way in September 2011. "We're doing a lot of the site preparation work, building the access roads and the containment ponds. By the time the project's done, we will have moved about two million cubic metres of earth and brought in an estimated two million tonnes of aggregate." Just like strip mining, Tucker explains, this work is all about moving huge quantities of material quickly and efficiently. In fact, some 60 pieces of earth-moving equipment are currently at work doing just that.

"We've spent the last couple of years integrating the business into Aecon Group, setting up new systems and establishing ourselves in the market. We've taken on some pretty tough assignments and shown that we can compete with the best. Given the expansion plans on the books, Aecon Mining is certainly in a good position to provide the support these oil sands producers are looking for," concludes Alexis Klimack.

Ontario Hardrock

For almost 70 years, Leo Alarie & Sons has called Ontario's hardrock home, refining its mining expertise in its company-owned pits and quarries.

Today, as part of Aecon Mining, the business offers the breadth of resources and services required to grow right along with the province's booming northern mineral resources economy.

Mining has been the bedrock of the Ontario economy since 1866, when the first miners made the arduous journey north in search of gold. While gold still glitters, today it's just one of 30 different metal and mineral products emerging from the province's pits and mines. With new diamond mines taking their place alongside nickel, copper and zinc, Ontario is Canada's leading minerals and metal production province, with an industry worth more than $10 billion a year – and growing.

MINING HAS BEEN A MAJOR FOCUS FOR LEO ALARIE & SONS FOR MORE THAN A QUARTER OF A CENTURY. AS A PART OF AECON MINING, WE NOW HAVE THE OPPORTUNITY AND THE RESOURCES TO PLAY AN EVEN BIGGER ROLE IN THE MINERAL RESOURCE BOOM IN NORTHERN ONTARIO.

– GREG VAILLANCOURT
AECON MINING REGIONAL MANAGER
ONTARIO

The Ring of Fire, a region roughly the size of Lake Ontario in the muskeg swamps of the James Bay Lowlands, currently holds the only known large-scale deposit of chromium in North America. Development of the Ring of Fire carries with it the potential of transforming this remote northern region in much the same way the oil sands have transformed Alberta.

Leo Alarie & Sons knows the area well. Headquartered in Timmins, Ontario, the company honed its mining expertise crushing rock in Alarie-owned pits that supported an Alarie-owned road construction business. In 1985, almost 50 years after the company was founded, Alarie took on its first commercial mining support job at the Williams open-pit gold mine in Marathon, Ontario.

"We bought a complete crusher spread, along with a fleet of 35-tonne rock trucks," recalls Greg Vaillancourt, now Aecon Mining Regional Manager, Ontario. "It was our first real taste of what rock work is all about."

Today, with many of the biggest names in mining on its client roster, Alarie, now part of Aecon Mining, provides custom crushing operations and civil construction support to some of Northern Ontario's largest mining projects.

OPERATIONS FILE

AECON MINING (ONTARIO OPERATIONS)

OPERATIONS:
Civil support for mining operations

// Open-pit stripping
// Tailings pond construction, liner installation and capping of ponds
// Mine decommissioning
// Civil works – Foundations, pads, structures, piling

REGIONAL OFFICE: Timmins, Ontario

MAJOR CLIENTS:
// Xstrata Copper
// Apollo Gold
// Lakeshore Gold
// Barrick
// Imerys
// Vale
// Liberty Mines

NUMBER OF EMPLOYEES:
Staff : 20 to 30
Trades: Up to 100

KEY EMPLOYEES:
Carson Dixon – Division Manager, Mining and Crushing
Paul Konulainen – Chief Estimator
Greg Vaillancourt – Regional Manager, Ontario
Mark Leavoy – Senior Contracts Manager
Bill Sampson – Shop Supervisor
John Pollak – EHS Director

From 1999 to 2004, for instance, it stripped about three million tonnes of phosphate ore, till and clay per year at the Agrium Phosphate Mine. In 2008, it removed overburden and built four waste-water ponds at the Apollo Gold Mine. Last year, it built tailings ponds for Lakeshore Gold and, in a separate contract, drove 288 steel I-beam piles (up to 30 metres in length) in less than two weeks. It also extended the tailings ponds at the Liberty nickel mine in Timmins.

The most challenging project to date, says Vaillancourt, was the civil construction support work in 2006 at the De Beers Victor Mine, the first diamond mine in Ontario. "The mine is located near Attawapiskat, about an hour-and-a-half flight north of Timmins. It's virtually inaccessible during the winter. We had to move equipment and materials by train to Moosonee and then use a temporary winter ice road to get to the mine."

TODAY, WITH MANY OF THE BIGGEST NAMES IN MINING ON ITS CLIENT ROSTER, ALARIE, NOW PART OF AECON MINING, PROVIDES CUSTOM CRUSHING OPERATIONS AND CIVIL CONSTRUCTION SUPPORT TO SOME OF NORTHERN ONTARIO'S LARGEST MINING PROJECTS.

Aecon Mining's Ontario operation is currently working on a rock-crushing project for Imerys and a mine closure and reclamation project for Xstrata Copper. It has also returned to the site of its first mining project, crushing rock and secondary ore for Barrick at the Williams open-pit gold mine.

"Mining has been a major focus for Leo Alarie & Sons for more than a quarter of a century," concludes Vaillancourt. "As part of Aecon Mining, we now have the opportunity and the resources to play an even bigger role in the mineral resource boom in Northern Ontario."

Buried Treasure

THE UNDERGROUND ECONOMY

Diamond mines in the North accessible only by plane or ice road, iron ore mines in Labrador hundreds of kilometres from the nearest town, gold mines in the northern reaches of the Canadian Shield, and salt mines that extend several kilometres under the Great Lakes.

Moving equipment, materials and manpower thousands of kilometres to remote locations to install the industrial processes that support these mines is a daunting task. It is also key to Lockerbie & Hole Eastern's success.

"More often than not, our most valuable mineral resources are located in some of the most difficult, remote and inhospitable regions imaginable," says Lionel Coleman, Vice President and General Manager of Lockerbie & Hole Eastern (LHE).

> THERE ARE LOTS OF COMPANIES THAT CAN INSTALL INDUSTRIAL PROCESSES, NOT MANY THAT CAN DO IT THOUSANDS OF KILOMETRES AWAY FROM THE COMFORT OF THEIR HOME BASE.
>
> – LIONEL COLEMAN
> VICE PRESIDENT AND
> GENERAL MANAGER
> LOCKERBIE & HOLE EASTERN (LHE)

"There are lots of companies that can install industrial processes, not many that can do it thousands of kilometres away from the comfort of their home base."

Canada is a land of enormous resources, but it is the treasures buried deep within that have made this country one of the leading mining nations of the world.

With more than 600 mines, Canada ranks first in the world in the production of potash and uranium; is the third-largest diamond producer; and ranks in the top five for nickel, cobalt, titanium and aluminum production. And the future appears to be even more promising, say mining experts. In the last three years, mining investment has almost doubled to about $15 billion a year, a boom that is benefiting just about every region in the country – from iron ore and gold in the East, to diamonds in the North and potash in the West.

It is a prospect that pleases Lionel Coleman, Vice President and General Manager for Lockerbie & Hole Eastern. The more the mining industry invests, the more opportunity LHE, one of the country's leading mine industrial service providers, has to market its services. In mining, getting the ore out of the ground is only the first step of a complicated industrial process, explains John Salter, LHE Vice President.

Once the ore is brought to the surface, the mining company has to process it, typically separating and concentrating the ore (it takes, for example, about 10 tons of ore to extract an ounce of gold) so that

BUSINESS FILE

LOCKERBIE & HOLE EASTERN – MINING OPERATIONS

BUSINESS:
Installation of mineral processing and mine support equipment

// Crushers, scrubbers, mills
// Silos, tanks, conveyors
// Process piping
// Process mechanical
// Electrical distribution
// Controls and instrumentation
// Water treatment systems
// Air control and ventilation

RECENT PROJECTS:

// Picadilly Project – Potash (New Brunswick)
// Victor Diamond Mine (Ontario)
// Voisey's Bay – Nickel (Labrador)
// Endako Mine – Molybdenum (British Columbia)
// Diavik Diamond Mine (Northwest Territories)
// Ekati Diamond Mine (Northwest Territories)

HEAD OFFICE: Brantford, Ontario

NUMBER OF EMPLOYEES:

Staff – 40
Trades – Up to 1,000

KEY EMPLOYEES:

Phil Ward – President and
Chief Operating Officer
Lionel Coleman – Vice President and
General Manager
John Salter – Vice President
Roger Archambault – Senior Project Manager
Craig Cook – Project Manager
Carl Baron – Project Manager
Ron Micetick – Project Manager
Ian Pocock – Project Manager
Graeme Morris – Assistant Project Manager
Jamie Prince – Assistant Project Manager
John Kerr – Estimating Manager

LHE'S MINING PROJECTS CAN INCLUDE AS MANY AS

1,000

TRADESMEN, CARRY A ONE- TO TWO-YEAR COMPLETION DATE AND OFTEN REPRESENT JUST ONE OF SEVERAL CONCURRENT PROJECTS ON THE SCHEDULE.

it can then be shipped to market. And that, says Salter, is where LHE comes in.

"Most mines have a processing plant nearby to concentrate and process the ore," he explains. These are typically large, complex and highly sophisticated industrial operations.

"We install the crushers, scrubbers and mills; the conveyors, hoists and storage systems; the electrical distribution networks; the controls and instrumentation; and all the other industrial processing requirements."

Not much different from countless other industrial processes in manufacturing plants around the country, admits Lionel Coleman, but there is a catch.

"Most industrial plants are in large urban centres, with all the resources they need relatively close at hand. Not so with mining. Our largest and most valuable mineral deposits are often located thousands of kilometres away from home base. And for us, that's a good thing; if it was easy, everyone would do it."

Lockerbie & Hole Eastern began working in the mining sector in the 1970s when it was still known as Adam Clark but, recalls President Phil Ward, it was in the late 1990s when the business really hit its stride.

"When I became the chief operating officer in 1994, our revenue was about $15 million and the future was shrinking. So, we took a hard look at what we were good at and realized our biggest strength was our strong supervisory skills." Ward says that knowledge offered up a different mindset. "We didn't have to stay where we were comfortable. We could travel farther afield and take on riskier ventures because we had the people with the skills and initiative to manage those projects with minimal supervision."

LHE started looking at industrial work away from the Hamilton/Toronto hustle and bustle. The business ended up in places like the Northwest Territories and Russia. "In 1997, our revenue was $60 million. By 2003, two years after we were acquired by Lockerbie & Hole, we were at $120 million."

Over the last few years, that new mindset has taken LHE across Canada, working at a nickel mine in Voisey's Bay, Labrador, diamond mines in the Northwest Territories and Northern Ontario, and potash mines in Saskatchewan and New Brunswick.

LHE's mining projects can include as many as 1,000 tradesmen, carry a one- to two-year completion date and often represent just one of several concurrent projects on the schedule. The planning, logistics and coordination required to manage these projects can be intimidating to all but the most experienced companies.

"The farther away you get from your home base, the riskier it gets," maintains LHE Estimating Manager John Kerr. "When you're dealing with jobs in the Far North, for example, you have to think about accessibility, setting up camps for the workforce, weather conditions, shipping costs and a whole host of other factors. But that is our niche – and we've done very well at it."

Supported by head office staff in Brantford, Ontario, LHE has three dedicated core project teams and five project managers that move from project to project, managing the transportation, scheduling, costing, logistics and supervision that are required of multi-trade projects like these.

"It's not an easy life," offers John Salter, a project manager himself for 20 years before shifting into the role of vice president. "If you're on a project team, you typically spend four weeks at the project, living in a camp and working long hours under what can be some pretty

harsh conditions, after which you get two weeks off to spend some really important family time back home." Salter adds that although the schedule can be demanding, the work does have its appeal. "It's challenging, and there's an enormous sense of accomplishment when things go well."

While LHE is currently on project sites at the Endako molybdenum mine in British Columbia and the Picadilly potash mine in New Brunswick, it is also in the throes of beginning its biggest project to date: installing a wet and dry mill at Potash Corporation of Saskatchewan's mine in Rocanville, Saskatchewan. The Rocanville project, the largest single project Aecon has undertaken to date without a partner, is expected to be completed by October 2013.

"When Aecon acquired Lockerbie and Hole a few years ago, it gave us the financial wherewithal to tackle larger and more complex projects," notes Lionel Coleman. "Now, with Aecon's growth, especially in mining out west in the oil sands, we also have a lot more resources and expertise to draw from." In fact, he adds, the biggest challenge the business currently faces isn't a lack of prospects, but rather a lack of skilled trades to do the work, as is the case with so many contractors. "It's definitely going to be a strain on our recruitment and training programs, but with Aecon's reputation as one of the top employers in the country, we are in an enviable position to compete for the best employees out there. Compared to the alternative, which is a downturn in the mining sector, it's a challenge we'll quite happily accept."

LOCKERBIE & HOLE EASTERN MINING VENTURES

ROCANVILLE POTASH MINE
Client: Potash Corporation of Saskatchewan
Location: Rocanville, Saskatchewan
Scope: Wet and dry mill installation, piping, electrical systems and building construction
Completion: Q4 2013

PICADILLY POTASH MINE
Client: Potash Corporation of Saskatchewan
Location: Picadilly, New Brunswick
Scope: Existing mill refurbishment, completion of compaction plant, electric feeders and new substation, pipe trestle, new wet mill
Completion: Q4 2012

ENDAKO MOLYBDENUM MINE
Client: Thompson Creek Mining
Location: Endako, British Columbia
Scope: Mill installation (the largest SAG mill in the world at 12 metres in diameter), piping (27,000 metres), electrical and mechanical systems
Completion: Q1 2012

LONG HARBOUR PROCESSING PLANT
Client: Vale Canada
Location: Long Harbour, Newfoundland and Labrador
Scope: Site services for nickel processing plant
Completion: Q2 2013

DIAVIK DIAMOND MINE
Client: Diavik Diamond Mine
Location: Lac de Gras, Northwest Territories
Scope: Water treatment plant, power plant, warehouse and process mill installations
Completion: 2009

VICTOR DIAMOND MINE
Client: De Beers
Location: James Bay, Ontario
Scope: New mill, mechanical equipment installation, recovery and bulk sampling plant, electrical power, piping
Completion: 2008

EKATI DIAMOND MINE
Client: BHP Billiton Diamonds
Location: Lac de Gras, Northwest Territories
Scope: Underground conveyor systems, underground sizer room
Completion: 2007

VOISEY'S BAY NICKEL MINE
Client: Vale Newfoundland & Labrador
Location: Voisey's Bay, Labrador
Scope: Crusher building, coarse ore storage, conveyor galleries, concentrator complex, powerhouse
Completion: 2005

500 METRES UNDERGROUND

THE CAMECO CIGAR LAKE PROJECT

In April 2012, a Canonbie Contracting crew began pouring concrete for an equipment pad. It's the sort of job Canonbie has undertaken hundreds of times over the years. What made this go-round so unique, however, was the location of that pad. The concrete was being pumped down a pipe to where the pad rested – 480 metres underground. It was an exceptional start to Canonbie's latest mining project, installing industrial services in a massive new mining development in northern Saskatchewan.

IMAGE COURTESY OF CAMECO

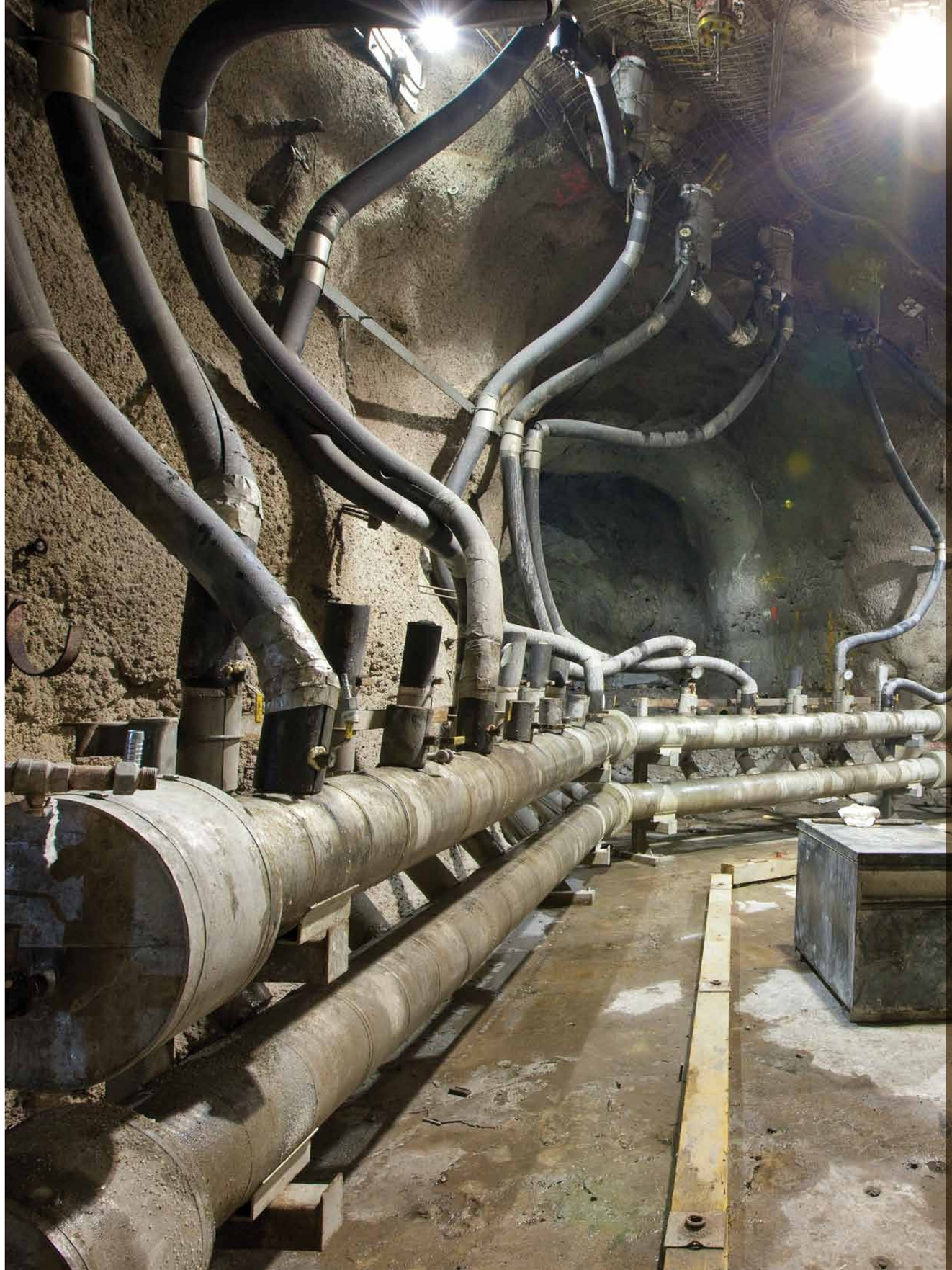
Saskatchewan is well known as the leading potash-producing region in the world. Less well known is the province's standing as one of the world's largest producers of uranium. With an estimated 300,000 tonnes of uranium reserves – and more being discovered all the time – Saskatchewan is sitting on reserves equivalent in energy value to about 19 billion barrels of oil, or four times as much as all conventional oil reserves in the country.

> YOU QUICKLY REALIZE THIS IS NOT LIKE OTHER CONSTRUCTION JOBS. EVEN GETTING SOMETHING AS SIMPLE AS CONCRETE IS AN EXERCISE IN ITSELF.
>
> – MARIUSZ JUSZKIEWICZ
> PROJECT MANAGER
> CANONBIE

Saskatchewan-based Cameco, one of the world's leading uranium producers, is currently developing a new mine at Cigar Lake. It is considered to be the second-largest deposit of high-grade uranium in the world. The mine is scheduled to start production by the end of 2013, and Cameco, the operating partner of the joint venture that owns the mine, expects to extract more than 90,000 tonnes of uranium over the mine's 15-year lifespan.

Unlike some mines where the ore bodies are relatively close to the surface, the uranium ore at Cigar Lake is buried about 500 metres underground. Miners will use high-pressure water – known as a "jet boring system" – to carve out the ore. This, in turn, will be sent to underground processing rooms for grinding and thickening before being pumped to the surface as a slurry. Final processing will be done at a mill about 70 kilometres northeast of Cigar Lake.

Cameco awarded Canonbie Contracting a contract for the mine's underground support services. Over the next year and a half, Canonbie will install tanks, piping, pumps and uranium processing equipment, as well as provide the electrical, distribution network, instrumentation, concrete foundations/pads and structural steel for the project. Cameco is supplying the materials along with the cranes, skid steers and lifts the trades will use during the installation work.



PROJECT FILE

CIGAR LAKE URANIUM MINE

AECON DIVISION: Canonbie Contracting

CLIENT: Cameco Corporation

PROJECT: Cigar Lake Underground Process Area Construction

SCOPE:
// Installation of concrete foundations and structural steel supports for equipment and piping
// Underground fabrication and installation of tanks, piping, pumps and uranium processing equipment
// Installation of HVAC, electrical distribution and instrumentation

LOCATION: South of Waterbury Lake, Saskatchewan

TIMING: Q1 2012 to Q3 2013

NUMBER OF EMPLOYEES: 140 (at peak)

KEY EMPLOYEES:
Mariusz Juszkiewicz – Project Manager
Yvon Ouellet – General Superintendent
Mark Touchette – General Superintendent
Vernon Sollid – Site Manager, QA/QC
Kevin Nguyen – Site Manager, Technical Specialist
Tommy Bruha – Safety Manager
Edward Weidhaas – EHS Advisor Adviser

IMAGE COURTESY OF CAMECO

ONCE YOU GET OVER THE FACT THAT WORK IS TAKING PLACE AT A DEPTH ROUGHLY EQUIVALENT TO THE HEIGHT OF THE CN TOWER, THE INDUSTRIAL INSTALLATION WORK IS RELATIVELY STRAIGHTFORWARD AND THE CONDITIONS SURPRISINGLY FAVOURABLE.

UNDERGROUND...

Once you get over the fact that work is taking place at a depth roughly equivalent to the height of the CN Tower, the industrial installation work is relatively straightforward and the conditions surprisingly favourable, says Canonbie Project Manager Mariusz Juszkiewicz. The drifts are about five metres high and the equipment rooms up to 30 metres high, so there's plenty of room to work. It is also surprisingly comfortable. Whether it's the coldest day in winter or the hottest in summer, the temperature underground never varies, staying at a steady 17°C, complemented by a constant flow of fresh air from the ventilation system.

That said, Juszkiewicz quickly adds, that doesn't mean the project isn't without its challenges.

"You quickly realize this is not like other construction jobs," he says. "Even getting something as simple as concrete is an exercise in itself. You can't just pick up the phone and order a ready-mix truck. We put in a request to Cameco's on-site concrete plant. The concrete is pumped down a pipe to two small concrete mixers at the 480-metre level and then brought through the tunnels to the work site."

Working underground also calls for extra vigilance, and safety is always a priority. Cameco has frozen the ore body prior to mining in order to improve ground conditions, prevent water inflow and improve radiation protection.

The company also employs an intriguing early warning system. With workers scattered throughout the mine and unable to hear sirens, Cameco sends a harmless but extremely pungent gas through the ventilation system as an emergency alert. If the workers smell the gas, they immediately go to one of two retreat stations on each level, which are equipped with enough supplies to sustain 150 people for 72 hours.

...AND FAR AWAY

If getting to the job site underground is difficult, getting to Cigar Lake is no easier. It takes trucks about 16 hours to deliver materials and equipment from Cameco's staging point to the mine site. Most trade workers access the site via one of the Cameco planes that land regularly at a nearby private airstrip. The Cameco construction camp, where all workers reside, provides complete catering facilities, a movie theatre, music club, full-sized gym and games room. All amenities are well utilized by workers looking to unwind after completing a 12-hour shift. They spend two weeks at a time at the camp, followed by two weeks off.

INITIATED

Canonbie mobilized on site in February of this year and began construction at the end of March.

"By July, we had 17 staff and almost 50 tradespeople working two shifts around the clock," explains Juszkiewicz. "We started with the carpenters so that we could get the concrete foundations and pads ready. Once that's done, we'll start bringing in the electricians and millwrights. By the end of this year, we should have a full complement, with 60 employees on each shift."

While Canonbie initiated work on the grinding mill and both the underground lab and control room on the lower level, most of its efforts are concentrated on an important safety priority: the contingency pump room, which has an automatic system to pump water up to the surface in case of any flooding in the mine.

"The whole key to this project is what we call 'work face planning,'" concludes Juszkiewicz. "It is a process we use to break down the construction package into individual tasks, each one with its own associated scope, materials list and quality and safety requirements. If we are going to meet the schedule and use the workforce efficiently, every task has to be staged and planned meticulously."

MEET:

PEOPLE MATTER

IAN TURNBULL

PRESIDENT, AECON INDUSTRIAL – CENTRAL DIVISION

When Ian Turnbull graduated from university with a degree in geological engineering, he thought he would be happy exploring mineral resources in the bush for the rest of his career. Little did he suspect that, 25 years later, he would be president of a major industrial contractor.

From his Cambridge, Ontario, office, Ian Turnbull reflects on his career, the development of Aecon Industrial's business and plans for future prospects.

You have been President of Aecon Industrial's Central Division for almost two years. Perhaps we should start by talking about the history of the division and what it does.
Our history goes a long way toward explaining who we are. Our roots go back to a small mechanical-electrical trade contractor called Nicholls Radtke Ltd., which was started by two tradesmen here in Cambridge in 1975: Dave Radtke, an electrician, and Bill Nicholls, a pipefitter.

Nicholls Radtke provided industrial services to clients such as TransCanada PipeLines, Union Gas, Ontario Hydro, Ford, GM and Toyota. They also got into pipe prefabrication to support the work they were doing on site.

The company prospered, and others took note. In 1995, Banister Foundation acquired the business and then, a few years later, Armbro, which ultimately became Aecon, acquired BFC.

IST, Aecon Industrial West and Aecon Fabco all have their roots in the same place as we do!

So what does Aecon Industrial Central do today?
There are two basic aspects to our work: pipe fabrication and site services. Site services covers the construction, installation and maintenance of industrial facilities. A lot of it is conventional work at heavy industrial plants – power plants, gas compression facilities, automotive plants and large manufacturing plants, for example. In fact, we still work for some of the clients that helped Nicholls Radtke establish itself in the first place.

We have an Engineer Procure and Construct (EPC) group that looks after turnkey developments of small- to medium-sized electrical power plants in the $100 million range and also looks after our nuclear group, which does maintenance and refurbishment work at Canadian nuclear power plants.

We self-perform as much of the work as possible, primarily piping, electrical and work performed by boilermakers and millwrights. We're signatory with 14 unionized building trades. We tend to only subcontract out specialty work, like sheet metal work, painting and insulation.

Our fabrication business produces specialty piping, piping assemblies and custom steel fabrication for a variety of industrial clients, sometimes to support our site services and sometimes quite independently. We have one of the largest heavy pipe fabrication facilities in Canada – a 120,000-square-foot shop that includes our own sandblasting facilities, paint barn and furnace for pre- and post-weld heat treatment.

We work on projects across Canada but, historically, most of our work has been in Ontario.

How big is the division?
Our revenue fluctuates, depending on the scale of the projects we're working on at any specific time. Typically, we do about $200 million a year although we have been as high as $350 million in the past.

We have a staff of 100-plus people in Cambridge, over 100 tradespeople working in the shop, and have had more than 1,000 people working in the field.

When did you join Aecon Industrial?
In 1994, when it was still Nicholls Radtke.

Did you have a background in mechanical or electrical engineering?
No. I am not even from a technical family. My father was in the publishing business (by coincidence, so is my wife), and my mother was a teacher. But I liked science and math and really enjoyed geography, so I enrolled in geological engineering at the University of Toronto. I loved the outdoors. I thought I'd be happy doing mineral exploration in the bush, but when I graduated there were no exploration jobs, so I ended up working in the Toronto area for a geotechnical firm. It didn't work out quite the way I expected.

What happened?
I was doing geotechnical inspections, but the contractors were having

much more fun, so, after a few years, I joined a company called Deep Foundation. They taught me a lot about construction, which would prove useful in later years when I joined Aecon Industrial.

How did you end up in the industrial contracting field?
In 1990, I joined SNC-Lavalin on an energy-to-waste project in Brampton [Ontario]. I started as a field engineer and by the end of the project, two and a half years later, I was doing the work of the site manager. Unfortunately, by the time the project was over the economy was in a downturn. SNC pulled out of Ontario, and I was laid off. Having got a taste for industrial construction, I wanted to keep going in the field, so I landed a job with US Turbine as a contract engineer on the construction of a small cogeneration facility in Brantford [Ontario].

While I was working in Brantford, I saw an ad for a position at Nicholls Radtke. I knew of them by reputation and I couldn't think of a better place to work.

I arrived for the interview early on a Saturday morning, and even though it was the weekend, the office was far from empty. It was pretty intense. I was there for five hours, but Bob Lanza, one of the vice presidents, made it so interesting that he had me "hook, line and sinker." He was managing the design and construction of a big power plant in Windsor (Ontario) and needed a project engineer. I accepted, and it turned out to be everything he said it would be, which is why I am still here today.

How long were you working in Windsor?
The West Windsor project was under way when I started, so I was only there for a year. With all the travel between head office and the site, I got to know Highway 401 really well! It was a crash course in every aspect of the execution of an EPC contract, from travelling across North America to meet with various suppliers to working with our lawyers on the contract. The best way to learn is to actually live it.

After West Windsor, I moved on to power plant construction for TransCanada in North Bay and Kapuskasing [Ontario]. I moved to North Bay while my wife, Alison, who was pregnant at the time, stayed in Toronto, but we had an enjoyable six months together while she was on maternity leave.

That must have been about the time BFC acquired Nicholls Radtke.
I went to North Bay in a truck that said "Nicholls Radtke" on the side and came back in one that said "BFC." It was a company in transition, for sure.

What changed?
It was a period of instability with a revolving door of presidents throughout the late 1990s. With fragmented leadership, we weren't doing too well, and BFC took a step back from anything risky. It wasn't as exciting, and the opportunities were limited.

I wasn't looking for a new job, but a recruiter approached me. A company called Earth Tech was setting up a North American group to build, own and operate water and waste-water plants, the very early steps in the public-private partnership that we now call a P3. I liked the vision so in 2000 I signed on as a project manager. Over the next year and a half, we did several projects across Canada. Unfortunately, Earth Tech decided to run the build/own/operate business out of Boston, and I didn't want to move.

By coincidence, I happened to run into Jake Berg [who became president of Aecon Industrial's Central Division in 2004] at a bidders meeting, and the next thing I knew I was back at BFC, or, to be more precise, Aecon.

What was your new job?
I was an account manager, although not in the way that people traditionally view that position. Aecon Industrial account managers are responsible not just for working with the clients but for managing the projects as well. I was working with clients like Stelco, Northland Power in Kirkland Lake and TransCanada Energy at the Irving Oil refinery in New Brunswick.

Four years later, I was promoted to the position of Vice President, Construction. It was the last time in my career that I spent a lot of time in the field. It's the sort of intense work that engages our field staff and, I must admit, I miss it.

So, as Vice President, Construction, you were in charge of all the field operations?
John Ferland looked after the fabrication side of the business, and I was in charge of the construction. There are areas where the two businesses overlap, where we benefit from the skills and resources and contacts that we share, but one business doesn't rely on the other.

What were some of your most memorable projects?
The biggest project was the return to service for Units 1 and 2 at Bruce Power's nuclear power plant, which we did as part of a joint venture with SNC-Lavalin. We also built a $100 million cogeneration power plant in Windsor [Ontario] and installed a paint line at the Toyota plant in Woodstock [Ontario]. You can see it's a diverse sort of business!

It can also be pretty intense. Everyone focuses on the construction phase but they forget about how much time is spent on project development. Meeting clients and negotiating the contracts can go on for months.

A lot of this work coincided with the construction boom from 2006 to 2008. Our biggest challenge was hiring well-qualified people, providing them with the training they needed and then getting them out to the projects.

When did you become president of the division?
In 2010. Jake Berg retired a few years earlier than we expected, so it took me by surprise! But he's still here part-time and has been enormously helpful, especially in the Darlington Retube and Feeder Replacement project negotiations.

Tell us a bit about the Darlington RFR project.
This one is a real feather in our cap! Beginning in October 2016, Ontario Power Generation [OPG] will take the first of four nuclear reactors off-line in preparation for a multi-year refurbishment that will allow each reactor to operate safely for another 25 to 30 years.

Aecon – along with our JV partner, SNC – was awarded the largest of the refurbishment contracts – the retube and feeder replacement work. This isn't just open-heart surgery on a reactor… it's a multiple organ transplant all at once!

The initial phase, called the Definition Phase, is worth about $600 million and involves the preparation of specialty tools, construction of a full-scale reactor mock-up, procurement of reactor components and the development of the schedule and budget.

But Darlington's not our only nuclear work. We've just been awarded a contract to replace fuel channels in the Bruce Power plant, which is like performing open-heart surgery on a nuclear reactor in a heavily radioactive environment. We've built a mock-up of the reactor components in Cambridge [Ontario] and will spend six months refurbishing specialized tools, training our team and carrying out full dress rehearsals for what we anticipate will be less than eight days of work in each outage. Aecon Industrial is one of the few companies with the skills, background and training to do this kind of highly specialized work.

Is this the way of the future for the Central Division?
Even though the Ontario manufacturing economy has been hit hard by the recession, there's still plenty of conventional industrial service work. I don't see that changing. On the other hand, our nuclear industry work certainly seems promising.

With concerns about the impact of fossil fuel generating plants on global warming and climate change, there's been a renaissance in the nuclear power industry internationally. Our Cambridge facility has just been awarded its N-Stamp, which is the internationally recognized standard in quality assurance for the construction, inspection and maintenance of nuclear facilities. It's the stamp of approval for nuclear-power-related work around the world and opens the door to all sorts of opportunities.

But we don't have to look too far afield. Ontario is one of the leading nuclear power generating regions in the world. I also think that there are a lot of opportunities within Aecon Group where we can prove the whole is greater than the sum of the parts. As president of a large business, you are called on to play a lot of different roles.

What do you enjoy the most?
I get a great deal of satisfaction seeing people grow. We provide a lot of high-level training and have hired some smart young people who are doing a really good job. I had a lot of opportunities and a lot of help early on in my career. It's very satisfying to be able to pass that on to the next generation.

EMPLOYEE FILE

IAN TURNBULL

CURRENT POSITION: President
Aecon Industrial – Central Division

EXPERIENCE:

1987–89	Haddad Geotechnical – Field Engineer
1989–90	Deep Foundation Contractors – Field Engineer
1990–93	SNC-Lavalin – Field Engineer
1993–94	US Turbine – Project Manager
1994–97	Nicholls Radtke – Project Engineer
1997–00	BFC Industrial – Project Manager
2000–01	Earth Tech – Senior Project Manager
2001–04	Aecon Industrial – Account Manager
2004–10	Aecon Industrial – VP Construction
2010–Present	Aecon Industrial – President, Central Division

EDUCATION:

B.Ap.Sc. – Geological Engineering, University of Toronto

BORN: Birmingham, England

HOME: Toronto, Ontario

FAMILY: Married to Alison; two sons and one daughter

HOBBIES AND INTERESTS: "Sports Dad," skiing, cottage

SHEDDING NEW LIGHT

THE UNION STATION PROJECT

With almost 70 million passengers passing through its doors every year, Toronto's Union Station is Canada's busiest and, some might say, most important transportation hub.

While the building itself makes a grand architectural statement, the accompanying train shed, which hovers over the multiple platforms, never matched the grandeur of the rest of the station and has remained a dark, dingy, unwelcoming gateway to the city.

Now the past is meeting the future: Aecon Buildings is under way on a $250 million contract that will transform this busy train shed into a 21st-century landmark for the city's skyline.

IT'S A HUGE CHALLENGE. WE HAVE TO MAINTAIN PASSENGER SERVICE AT ALL TIMES, SO ALL OF THE WORK HAS TO BE DONE WHILE THE TRAINS ARE STILL OPERATING.

–WAYNE UPITER
SENIOR PROJECT MANAGER

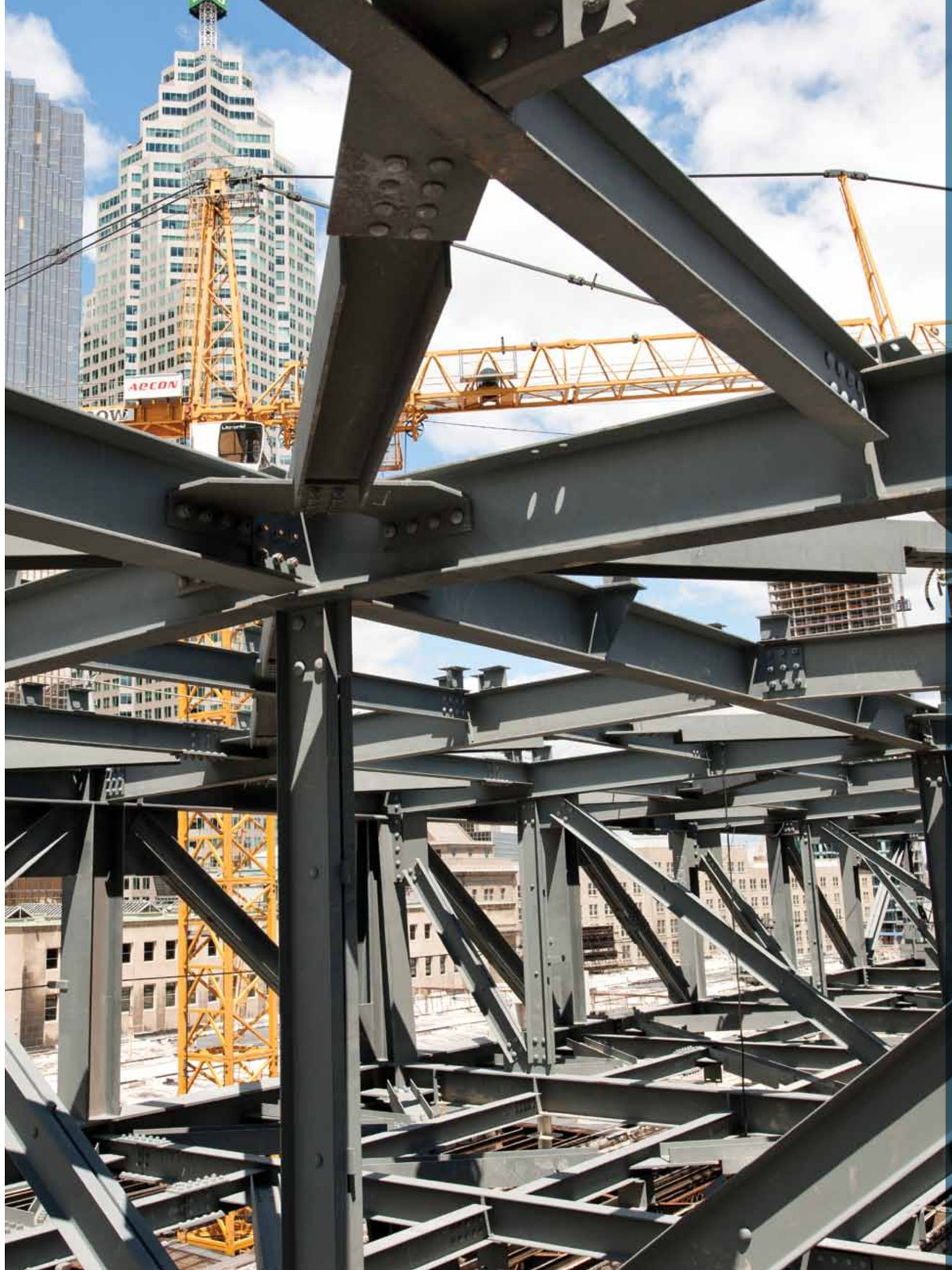
When Prince Edward (later to become King Edward VIII) opened Toronto Union Station in August 1927, it was considered an architectural marvel, one of the largest and most opulent beaux-arts-style stations in North America. Even today, entering the Great Hall, with its soaring barrel-vaulted ceiling and marble floors, leaves passengers in no doubt that they are in a building of monumental importance.

From a functional perspective, it's altogether a different matter. Unlike European train stations, where the train sheds covering the platforms are typically large, lofty structures, the train shed at Union Station remains true to its original design of almost one hundred years ago: It is low, dank, dismal and decidedly unwelcoming.

Until now. In 2016, more than a century after construction of Union Station began, travellers will have a train shed worthy of this landmark station. Metrolinx, the owner of the train shed and operator of GO Transit, is spending millions to restore the shed roof and create a new sense of identity and destination.

It is a project that combines restoration, renovation and revitalization.

The original steel and wood roof, designed by American architect Abraham Lincoln Bush (the roof is still known as a "Bush roof"), is a designated historic structure, and while most of it will be renovated, one section will be restored to preserve its heritage ranking.



PROJECT FILE

TORONTO UNION STATION TRAIN SHED

GENERAL CONTRACTOR: Aecon Buildings

CLIENT: Metrolinx

SCOPE: Renovation of the train shed and construction of a new atrium

ROOF DIMENSIONS:
(covers 13 tracks and 26 platforms)
Total area – 35,000 square metres
Length – 366 metres
Width – 94 metres
Height – 8 metres

ATRIUM:
Area – 5,500 square metres
Length – 79 metres
Width – 71 metres
Height – 19 metres

ADDITIONAL WORK:
// Nine new passenger elevators
// 50 new glass-enclosed stairwells
// Restoration of heritage features on Platform 12/13
// Removal and repair of 4,200 metres of track
// Waterproofing at track level
// Installation of new signalling systems and track switches
// Upgrade of public communications equipment
// Installation of new roof drainage and snow-melting systems

TIMING: Q1 2010–Q4 2016

NUMBER OF AECON EMPLOYEES: 12

KEY EMPLOYEES:
Wayne Upiter – Senior Project Manager
Silvia Manuchian – Assistant Project Manager
John Imbeault – Senior Superintendent
Denis Toigo – Day Superintendent
Joe Rebelo – Night Superintendent
Adrian Cheng – Project Accountant
Emanuel Vento – Project Coordinator
Val Kukovskyy – Estimator
Mohammed Yaser – Mechanical and Electrical Coordinator
Lynda Doiron – Administrative Assistant
Mageed Ishak – Scheduler
Brent Jones – EHS Adviser

IMAGE COURTESY OF GO TRANSIT

TORONTO UNION STATION

// The busiest transportation hub in Canada

// A designated historic site

// Opened: August 1927

// Station Owner: City of Toronto

// Train Shed Owner: GO Transit

// Railways:
Via Rail
Ontario Northland
GO Transit

// Tracks: 13

// Platforms: 26

// Number of Passengers Per Year:

43 million GO Train and Bus passengers

20 million TTC subway passengers

2.4 million Via Rail passengers

Balancing preservation with a desire for a modern landmark shelter, Metrolinx approved the design of a new glass atrium, the jewel in the crown of the project. Cut into the middle of the shed, the towering atrium will float 19 metres over the tracks, flooding the bustling platforms with natural light and creating an expansive and welcoming space.

In October 2009 it as announced that Metrolinx awarded Aecon Buildings the contract to renovate and restore the train shed. Work started in 2010 and is expected to be completed by the end of 2016.

AN ORCHESTRATED DANCE

Wayne Upiter is getting to know Union Station well. Not only is he Senior Project Manager for the train shed restoration project, he, like 250,000 other commuters who pour into the station every day, is finding it the most convenient way to get to work. It also gives him a much better appreciation for what the station's restoration will mean for Toronto commuters.

"It's a huge challenge," says Upiter. "We have to maintain passenger service at all times, so all of the work has to be done while the trains are still operating."

Upiter notes this would be a difficult enough project even if the station were closed. Trying to coordinate material handling, delivery, storage and construction while maintaining the flow of trains and keeping commuters and railway workers safe at all times takes it to a whole new level.

"We're conducting an orchestrated dance around the trains," he explains, "which is why this project will take about twice as long to complete, compared to working on a greenfield site."

In fact, Upiter notes, the only way to avoid disrupting commuter traffic is to do the work in seven separately staged segments so that no more than two of the 13 tracks will require closure at any one time. First stages of construction began at the south end of the platforms and will progress over the next several years to the north side of the building, where the shed connects to the rest of the station.

While construction work is ongoing, the platforms, stairs, doors and tracks are cordoned off. When the rebuilding of each area is complete, the track is reinstated and the work shifts to the next two tracks and adjacent platform.

"While we have occupancy of a segment, we can shut down the area and use it as a construction zone. It's a bit like paving a major expressway: Much of the work is done at night so that the station can be reopened for commuters in the morning," explains Upiter.

Adding to the complexity (some might call it "organized confusion"), this Aecon project is not the only one competing for attention at Union Station. The City of Toronto is currently renovating the GO concourse, and the Toronto Transit Commission is expanding the adjoining subway station, all of which adds up to more than $650 million in construction for the venerable station.

"The whole station is undergoing a makeover, and everything that we do has to be carefully coordinated with the other contractors," notes Upiter. "It's another layer of dynamics to what is already an incredibly complicated and challenging project."

THE JEWEL IN THE CROWN

While the restoration of the roof will add immeasurably to the comfort and appearance of the shed, it is the atrium that is receiving jewel-in-the-crown attention as the promised new downtown Toronto landmark.

"It will be an amazing space when it's finished," maintains Upiter. "During the day, the atrium will be flooded with light. Lit up at night, it will be visible for miles around, like a giant beacon against the skyline."

Covering an estimated area of 5,500 square metres (79 metres deep x 71 metres wide), the three-metre-deep steel truss roof will be encased top and bottom with opaque glass panels to provide a translucent ceiling. Each panel will have a slight variance in translucency to mimic natural light so that the roof, according to atrium designers Zeidler Partnership Architects, "will be like a floating cloud."

Curtain walls of transparent glass complete the atrium, offering natural light to the train shed and an unobstructed view of the structure. Ferguson Neudorf Glass, one of Canada's largest curtainwall contractors, will be installing the 4,500 glass panels – each one about two metres square – that will enclose the atrium. Each of the 30-centimetre-thick panes will be reinforced with two laminated layers of vinyl for added strength.

Hidden with the trusses, out of sight of the passengers, will be service platforms, lighting and electrical and communication cables.

The roof will be supported by six rows of steel columns, each row featuring eight columns. The 19-metre-wide flange columns will be canted at an angle of 15 degrees to the vertical, adding to the sense of movement within the structure, as well as the impression of the roof gently hovering overhead.

The first set of columns was installed in November 2011, with each column, weighing between six and 12 tonnes, lowered on to the platform by a 26-metre-tall tower crane that sits in the middle of the train shed. In January 2012, the steel subcontractor (Walters Inc. of Hamilton, Ontario) started installing the framework for the glass. The entire superstructure should be completed by 2014.

"Commuters will have a unique view of the transformation of the train shed," says Upiter. "They will see the atrium take shape stage by stage until it finally covers the entire area. Once the structure is in place, they will really be able to appreciate the magnitude of this project and the excitement it is going to create." All of which, he hopes, will be enough compensation for the disruptions this project has caused in their already-too-long daily commute.

ONE DOWN, SIX TO GO

While the atrium is undoubtedly the most spectacular aspect of this project, about three-quarters of the contract involves more mundane, but equally necessary, restoration and renovation work.

The "Bush" shed's original wood and steel structure will be restored over Tracks 1 and 2. The remainder of the roof will be stripped and replaced with a new steel deck over the existing trusses. Aecon will also be installing nine new elevators and 50 new glass-enclosed stairwells, as well as restoring the platform stairwells on Tracks 12 and 13 to their original heritage configuration.

The entire train shed will be rewired, with high-level lighting installed and public communications equipment upgraded. Photovoltaic panels, which will generate enough solar-powered energy to light the entire train shed, will be installed on a portion of the roof, and much of the rest of the shed will be fitted with a green roof to reduce the heat island effect.

Other contract deliverables include replacement of the tracks (two at a time), the introduction of new switching gear to help manage the flow of trains into and out of the station and waterproofing of the entire area to eliminate any leaks seeping through to the new GO concourse being built below the platforms.

Aecon Buildings is currently completing phase one of the project at Tracks 11 and 12. The roof has been renovated and a new platform built. The project team expects to turn over the tracks to GO Transit this fall, after which the group will continue on to the next phase.

Now I See It!

3D GRAPHICS IN DESIGN AND CONSTRUCTION

COURTESY OF
ZEIDLER PARTNERSHIP ARCHITECTS

Incredibly accurate and so detailed you can see the passengers waiting on the platform for the trains to arrive, the views of Union Station are, indeed, "just like being there" but, as Clark points out, virtual design and construction (VDC) is about much more than just creating beautiful images. It is part of a process builders use to plan with confidence, streamline the design process and construct and manage projects more reliably. It is, says Clark, "an intelligent way to look at things before they go together."

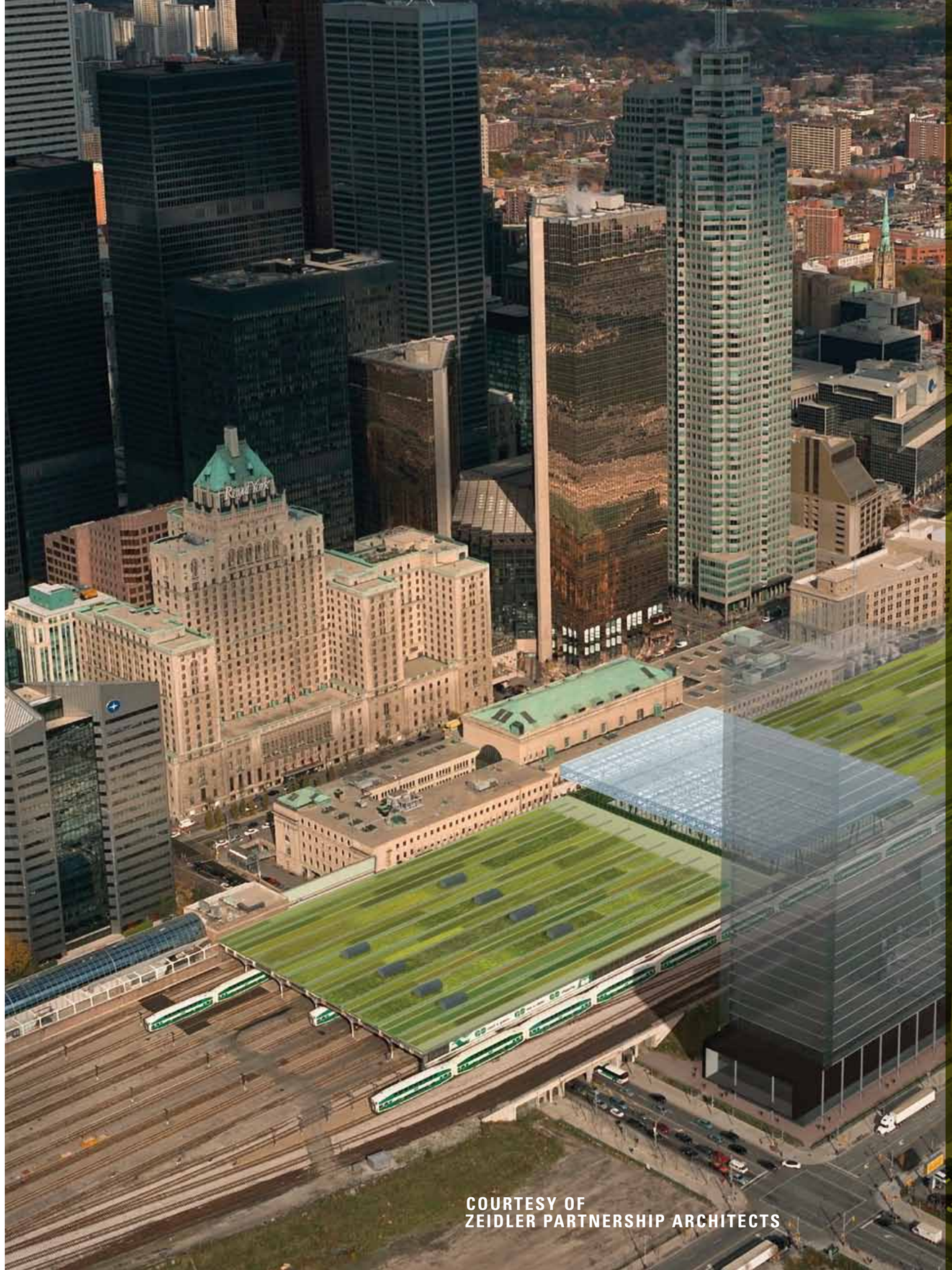
> IT IS AN INTELLIGENT WAY TO LOOK AT THINGS BEFORE THEY GO TOGETHER.
>
> –TANNER CLARK
> VIRTUAL DESIGN AND CONSTRUCTION TEAM MANAGER

Over the years, Union Station has often been a popular destination for movie producers, serving as backdrop for several Hollywood movies. Yet, in the latest clip currently playing on a laptop near you, it is the station itself that takes centre stage as the star of a vignette that might best be dubbed, "Union Station: The Next Generation."

The short animated feature opens with a shot of a GO Train arriving at Union Station, the camera following alongside as the train pulls up to the platform in the new soaring, light-filled atrium. The camera pulls back to provide a panoramic view of the station and the hundreds of commuters patiently waiting to board their trains for the ride home. The final dramatic shot takes place back in the daylight, the new train shed now in the distance, light glistening off its glass roof, all set against the spectacular backdrop of the Toronto skyline.

"It's just like being there," says Tanner Clark, with evident satisfaction and pride, flicking off the monitor.

There's no denying what computer graphics can accomplish today. Some of today's blockbuster video games boast production qualities that are on par with the latest movie release. But there's a lot more to computer graphics than just entertainment. Detailed, accurate and realistic three-dimensional renderings (the pictures of Union Station by Zeidler Partnership Architects and the Union Station video by Aecon's VDC department,



COURTESY OF
ZEIDLER PARTNERSHIP ARCHITECTS

SERVICE FILE

VIRTUAL DESIGN AND CONSTRUCTION (VDC) DEPARTMENT

VIRTUAL DESIGN AND CONSTRUCTION

// The use of computer graphics and modelling to improve construction processes

BUILDING INFORMATION MODELLING (BIM)

// Digital representation of buildings and facilities

// Supports decision-making from concept to construction and operation

3D BIM:
three-dimensional structural, mechanical and architectural models

4D BIM:
the addition of time to the creation of building and construction animation

5D BIM:
the addition of cost and supplier elements to show construction progress

6D BIM:
the addition of as-built animation provided to building owners for operation and maintenance

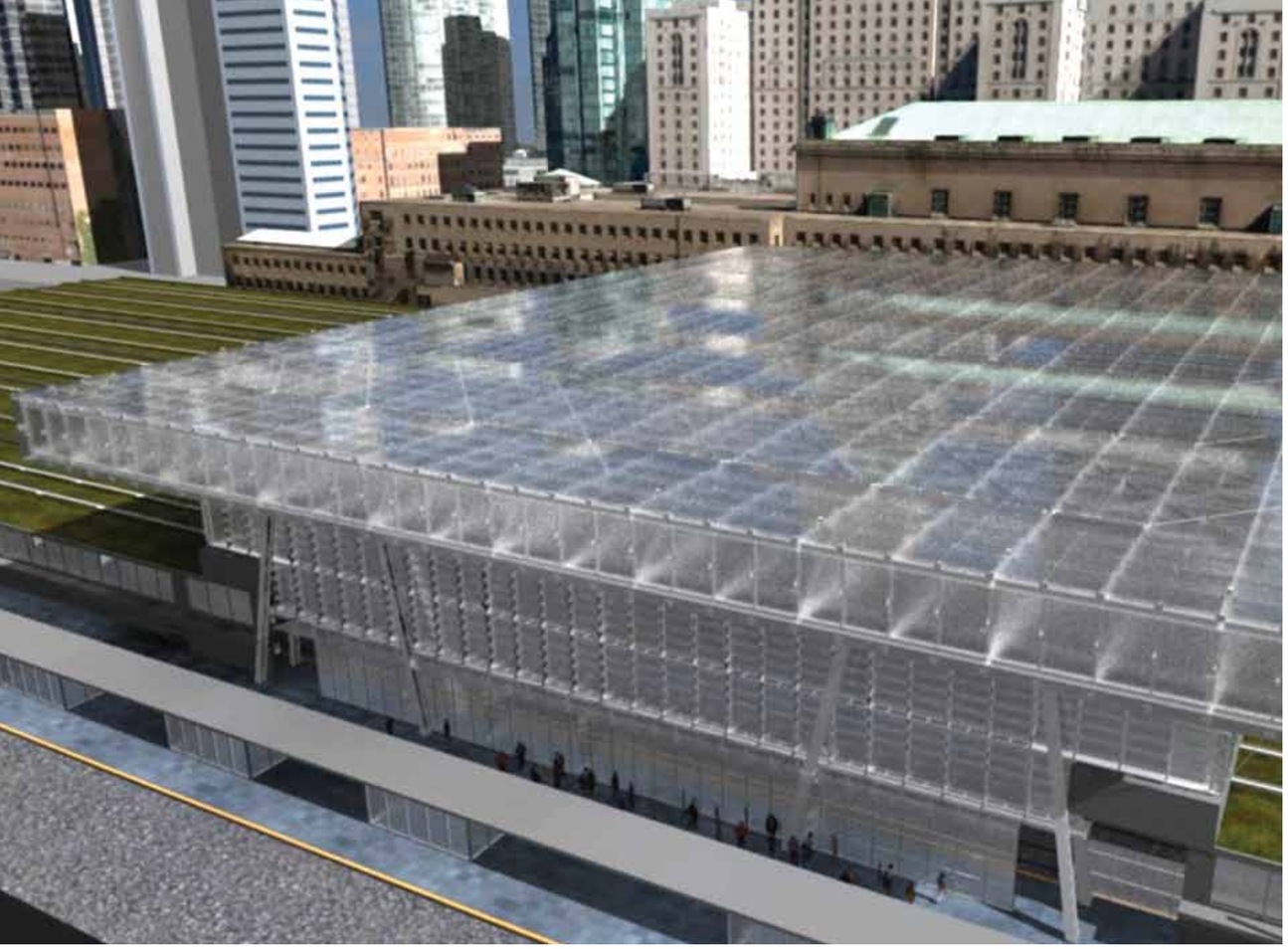
BENEFITS

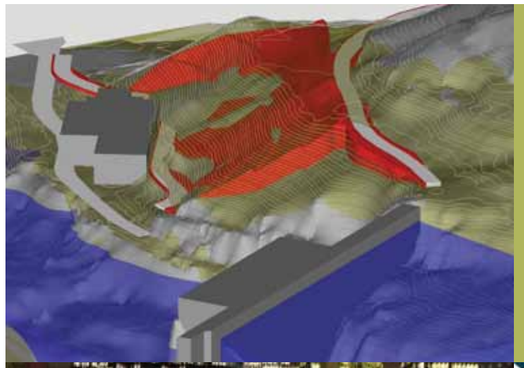
// Improved visualization
// Improved productivity due to easy retrieval of information
// Reduced construction conflicts between trades and change orders
// Better coordination of construction documents
// Increased speed of delivery
// Reduced costs

SERVICE STARTED: 2011

KEY EMPLOYEES

Tanner Clark – VDC Manager
Graham Hyde – VDC Manager





To see Aecon's animated film of the new Union Station train shed, go to www.aecon.com/UnionStationVideo

COURTESY OF
ZEIDLER PARTNERSHIP ARCHITECTS

for example) are also very powerful tools when it comes to design and construction.

For the last two years, Aecon Buildings' virtual design and construction team of Tanner Clark and Graham Hyde has been producing that same level of amazingly detailed, realistic three-dimensional images – but for Aecon building projects.

"Even the best-trained engineers and architects can have difficulty translating two-dimensional plans and drawings into a finished design," explains Clark, who, along with Graham Hyde, designed and produced the Union Station animation. "You can argue over whether duct work goes here or a column goes there for hours because we don't have the ability to visualize all the elements as they go together. Show them a three-dimensional rendering, and all of a sudden it's, 'Now, I see it!'"

Clark adds that the better the view, the better the opportunity for the project team to resolve problems before they are set in concrete.

Commonly referred to as building information modelling, or BIM, the virtual design process is a powerful tool for sharing information and making decisions at every step of the building process from concept to construction to operation. The process begins with 3D BIM, which translates standard architectural and engineering drawings into a realistic model.

"We can produce a three-dimensional digital picture of every major building element – the structural components, the mechanical system, the electrical distribution – as well as the progress from the earliest foundation work to the interior design of the finished building," explains Clark. "You can look at the building from all angles, walk down corridors, peer into rooms and, with every new view, you can see how everything goes together."

Clark adds 3D BIM offers the opportunity to identify mistakes, resolve issues, plan logistics and review safety plans. "Best part is you can make changes with just a few keystrokes."

Add in the next dimension – 4D BIM – and time-lapse animation condenses months of work into a few minutes. The building emerges from the foundations to the final brush strokes, providing new insights into how to coordinate the project and compress the construction schedule.

Shifting up to 5D BIM introduces cost and supplier elements and shows the budget and construction schedule over time. Construction changes are rampant in the industry and can quickly cause a project to spiral out of control, Clark says. With 5D BIM, builders can simulate the changes and provide owners with a realistic estimate of how those determinants will affect the project – and the final bill.

> YOU CAN LOOK AT THE BUILDING FROM ALL ANGLES, WALK DOWN CORRIDORS, PEER INTO ROOMS AND, WITH EVERY NEW VIEW, YOU CAN SEE HOW EVERYTHING GOES TOGETHER.
>
> –TANNER CLARK
> VIRTUAL DESIGN AND CONSTRUCTION TEAM MANAGER

The last of the BIM processes, known as 6D BIM, provides the finished maintenance and operational drawings. With a click of a button, the owner can look at any building element, such as the mechanical pumps or elevator switch gear, for example, and see who installed the equipment, how much it cost, details about the warranty and even operational and maintenance requirements.

Since Aecon Buildings began integrating virtual design and construction in 2011, Tanner Clark and Graham Hyde have brought their expertise to more than 50 projects. In turn, through this process they've contributed to both project cost savings and improved project completion times.

The Ontario Leadership Data Centre project in Barrie, Ontario, is a prime example, says Graham Hyde.

"Using the 3D model, we discovered a conflict between one of the major electrical duct banks and the foundations. If we hadn't spotted it, we would have had to dig up the foundations and then re-pour them after the electrical installation was done. Working with the electrical contractor, we were able to avoid a significant delay in the construction schedule and thousands of dollars in additional costs."

While the VDC team has concentrated on building projects, the process can be applied with just as much validity to virtually any complex construction project.

"It could be the demolition and reconstruction of a bridge, the staging and logistics for a mining project or an intricate industrial installation," explains Clark. "A three-dimensional model can help identify problems, test ideas and coordinate the construction process for any complex project with a large number of potentially conflicting elements."

Using a mix of Autodesk and Bentley software, the VDC team can produce a detailed three-dimensional model of a typical standard building in just a few days. More complex projects, such as the Union Station train shed, take somewhat longer.

"The construction modelling took about two weeks and another two months working with the construction team to address project coordination and scheduling," recalls Clark. "Because the train shed is being built in stages and tens of thousands of commuters a day are still using the train shed, the sequencing is incredibly important. Being able to show GO Transit how the construction would take place really helped the communications process."

Of the two weeks it took to create the animation, one week was solely dedicated to the computer processing that was required to handle the enormous amount of digital information. Even so, says Clark, it was well worth the effort.

"It's a delightful little vignette...a bit short on plot, maybe, but it more than makes up for that with its visual impact. This is the future of train travel in Toronto and the future of design and construction at Aecon. It won't be long before every construction project is done this way and we can say goodbye to blueprints forever."

Low-Level Bridge, High-Level Interest

CORNWALL'S INTERNATIONAL CROSSING

For 60 years, the Three Nations Crossing's North Channel Bridge has been a landmark: a soaring, graceful steel arch bridge dominating Cornwall, Ontario's skyline. Four years from now, it is expected the bridge will be nothing more than a memory, having been replaced by two smaller bridges currently under construction by Aecon Construction and Materials Limited (ACML).

First opened in 1962, the North Channel Bridge formed part of a two-bridge system that served as the first international crossing between Canada and the U.S. along the St. Lawrence, west of Montreal. The North Channel Bridge carries traffic between Cornwall and Cornwall Island, while the South Channel Bridge spans the St. Lawrence Seaway and connects Cornwall Island to Massena, New York. An estimated two-and-a-half million vehicles use this international crossing annually.

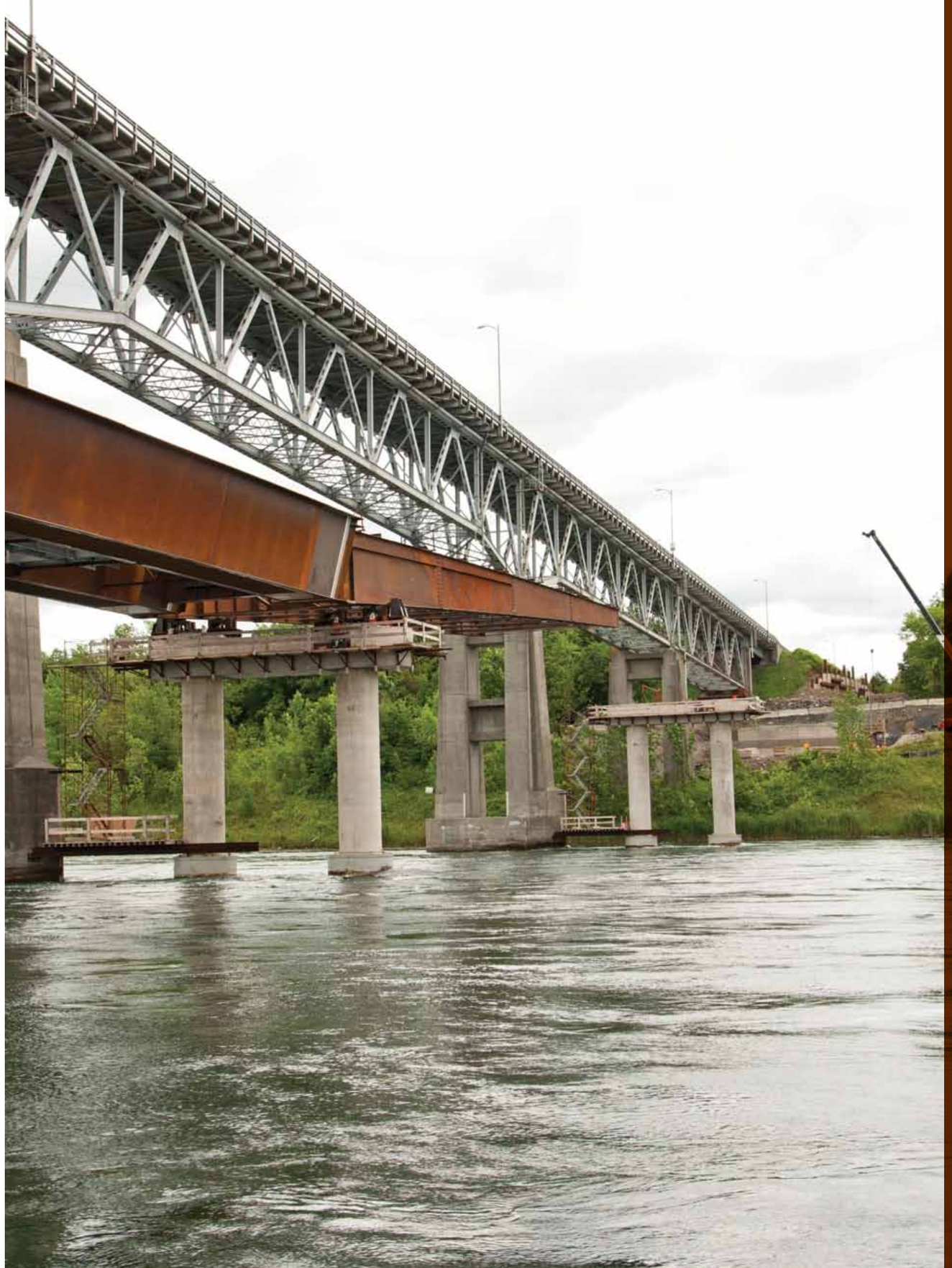
> THIS IS ACTUALLY A VERY COMPLEX PROJECT. THE BRIDGE MAY BE SHORT, BUT IT'S VERY WIDE – 26 METRES...
>
> –JOHN ALMEIDA
> SENIOR CONTRACTS MANAGER
> ACML

At 1,625 metres long and about 50 metres high, the North Channel Bridge is a monumental structure. As it turns out, it is also far bigger than it needed to be. The north channel was never expanded as originally intended, and seaway traffic, which the bridge was designed to accommodate, utilizes the channel to the south.

When the Federal Bridge Corporation Limited decided to replace the aging structure, the bridge owner chose a much more modest crossing: a low-level bridge, just seven metres above the water. And, since the bridge is lower, it is also shorter, at just 355 metres long.

In October 2011, the Federal Bridge Corporation awarded Aecon a contract for the second phase of construction on the new crossing. ACML is building the Low-Level Bridge over the channel, as well as two other bridges: the concrete Canal Bridge, which spans the canal on the north side of the channel, and the prefabricated Pedestrian Bridge, connecting the trail network over the spillway. ACML will also be carrying out some intersection improvements for the access roads.

But this is an integrated Aecon effort and, as such, both Miwel Construction and Aecon Buildings are also involved in the scope of work to be completed. Miwel will replace a combined sewer (which currently sits in the path of the new bridge) with storm and sanitary sewers, at depths of up to 11 metres, while Aecon Buildings



PROJECT FILE

THREE NATIONS CROSSING – NORTH CHANNEL BRIDGE

SCOPE:

// Construction of three bridges: Canal Bridge, Low-Level Bridge and Pedestrian Bridge
// Completion of minor road work: Brookdale Avenue interchange at International Drive
// Deep sewer replacement
// Storm overflow structure rehabilitation

OWNER: Federal Bridge Corporation Limited

LOCATION: Cornwall, Ontario

AECON DIVISIONS:
ACML – General Contractor
Miwel – Sewer work
Aecon Buildings – Structural rehabilitation

TIMING: Q3 2011 to Q4 2013

BRIDGES:

Low-Level Bridge
Span: 335 metres
Width: 15 metres (four lanes)
Height above water: seven metres
Supported on three in-water piers
Construction: concrete arch bridge

Canal Bridge
Span: 30 metres
Width: 26 metres
Height above water: 2.5 metres
Supported on three in-water piers
Construction: concrete deck, steel box girders

Pedestrian Bridge
Span: 40 metres
Width: three metres
Height above water: two metres
Construction: prefabricated steel

NUMBER OF EMPLOYEES: 40 (at peak)

KEY EMPLOYEES:
John Almeida – Senior Contracts Manager
Alexandre Clouthier – Project Manager
Angelo Cornacchia – Senior Structures Superintendent
Gary Kmith – Senior Grading Superintendent
Al Verch – Senior Superintendent (Miwel)
Peter Malek – Project Coordinator
Kate Vaillancourt – Project Administrator
Peter Markes – Student Engineer

WEBSITE: pontcornwallbridge.ca

will rehabilitate a nearby storm overflow structure.

Construction began in September 2011 and is expected to be completed by September 2013. The existing North Channel Bridge will be demolished by 2016 under a separate contract.

THE CANAL BRIDGE – A CONCRETE SOLUTION

At first glance, the 30-metre-long Canal Bridge may not appear to be much of a structure beyond its simple concrete arch. Not so, says John Almeida, ACML Senior Contracts Manager.

"This is actually a very complex project," he maintains. "The bridge may be short, but it's very wide – 26 metres, all told, to accommodate broad pedestrian walkways and turn lanes for access to the customs plaza. It also has four separate concrete arches on each side of the bridge, compared to a typical arch bridge of this size, which may have one or two."

But the most challenging part of this project, notes Almeida, is the concrete itself. It's a new experimental formulation that has never before been used in Canada.

Developed by Dr. Daniel Cusson, Senior Research Officer at the National Research Council's Institute for Research in Construction, this high-performance concrete is designed to minimize shrinkage while maintaining all of its structural properties. It is also designed to be less prone to cracking. Since fewer cracks mean less chloride from road salt seeping into the concrete and corroding the reinforcing steel, this new product could also potentially increase the lifespan of concrete bridges by up to 40 years.

Yet it's not as easy as merely substituting out one type of concrete for another, explains Angelo Cornacchia, ACML Senior Structures Superintendent.

"This is what is known as a high-slump concrete, which means that it flows much more freely than normal concrete. We tried several different trial batches before we were comfortable enough with its performance to start pouring the concrete for this bridge."

Work started on the piles supporting the bridge in February 2012, using a technique known as "duplex drilling" technology. Hollow steel casing, measuring 300 millimetres in diameter by 18 metres long, is drilled into the ground, while, at the same time, an auger removes the dirt from the inside of the casing. The bridge has 21 piles – seven for each of the three bridge piers. Once the casings are in place, they are filled with concrete, after which the concrete pile caps supporting the bridge deck are formed and poured.

Concrete work began in May 2012. The Canal Bridge is expected to be completed by September 2012. The entire bridge will be wired with temperature and strain gauges so that the National Research Council can monitor the performance of this experimental concrete.

THE LOW-LEVEL BRIDGE – COUNTDOWN TO LAUNCH

When ACML arrived at the job site to start its portion of the contract, the first phase of the project – the construction of the three bridge piers in the channel – was already completed.

"Building the piers is known as the 'in-water' phase of the project," notes Almeida, "so I guess we could call our work the 'over-the-water' phase – and getting over the water was definitely a challenge!"

The design of the Low-Level Bridge called for two parallel rows of 11 box girders, supported at either end by a concrete abutment on the bank of the channel and the three concrete piers in the channel. The box girders, in turn, support the bridge deck.

The box girders, made with steel plate up to 60 millimetres thick, measure 3.6 metres wide, 3.2 metres high and about 30 metres long and weigh as much as 85 tonnes. Given the size of the structural elements and the limited room to manoeuvre, Aecon's subcontractor, Structal-Bridges, which fabricated and erected the box girders, chose to push the girders across using what is known as a "launch" technique.

"Basically, the girders are pushed across the gap, rather like pushing a series of box cars in a freight train," explains Almeida. "The only difference is that freight cars have wheels and the girders glide over rollers. After you launch the first girder, the second girder is brought into position and then the third and so on, until the entire assembly has been pushed into place. You then remove the rollers and fasten the assembly to the bearings."

Aecon's first task was to build the concrete bridge abutments on the banks. Its second task was to set up the rollers for the box girder. It was at this stage, Almeida notes, that things got a bit tricky.

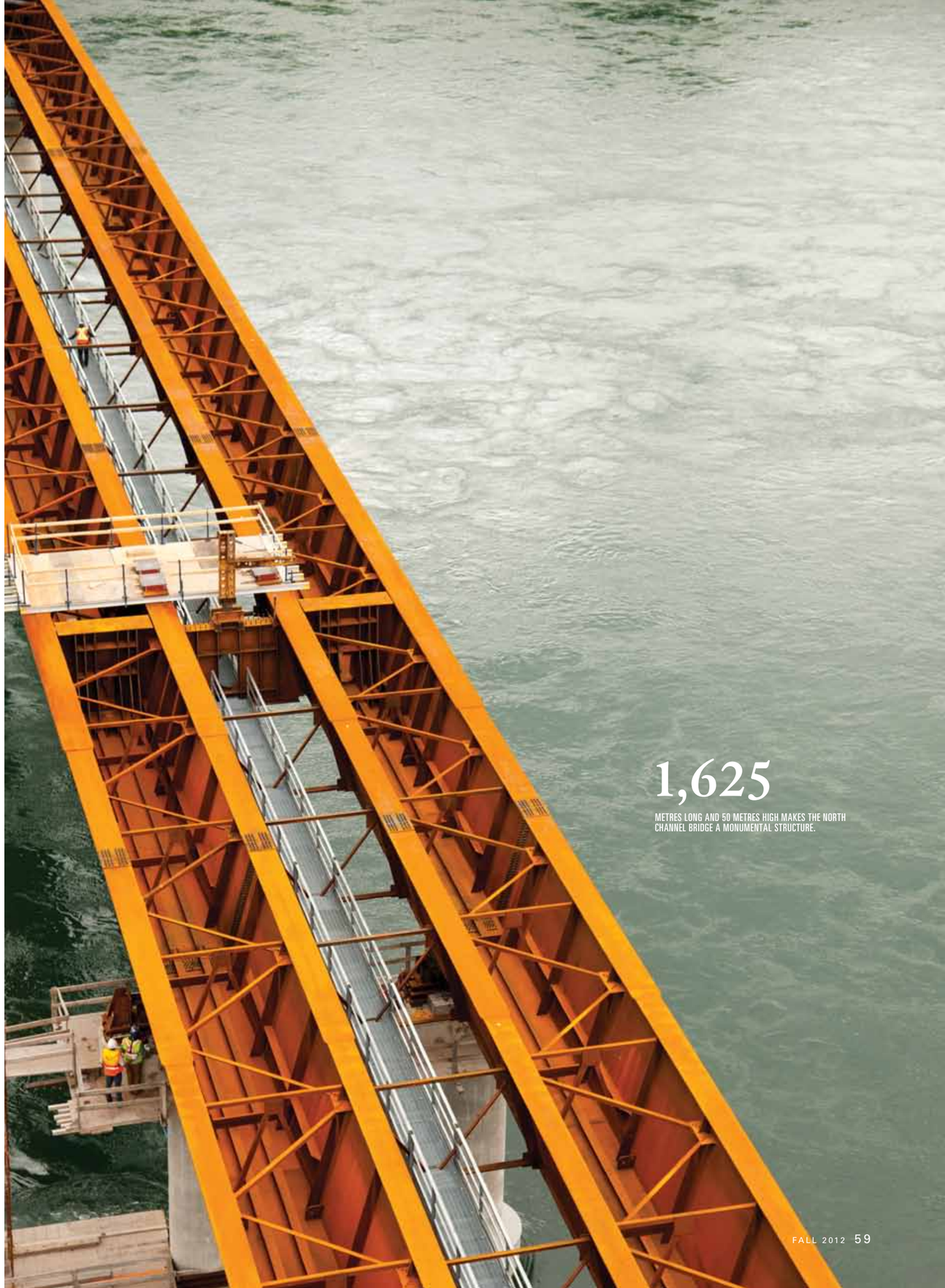
"We had to get across the water to the piers to install the rollers," he explains. "What we didn't count on was how fast the water was flowing through the channel. Without overly exaggerating, I would say it was a bit like whitewater rafting!"

Almeida says Aecon had to bring in a powerful tug in order to build a platform between the piers and the bridge – and then build a staircase from the platform to the top of the pier. "Once we had access to the top of the pier, we carried a small crane, by hand, up to the top so that we could haul up all the components we needed."

Since this was "over-the-water" work, all employees wore life jackets, and a safety boat was on patrol at all times. Signs and channel markers were placed in the river to guide boaters to temporary marine traffic routes well away from the construction.

The launching mechanism was put into place in April 2012, and the first two girders – one for each side of the bridge, tied together by a horizontal catwalk – were launched in mid-June. Launching girders may be similar to building up a freight train, but not when it comes to speed. It took up to one-and-a-half weeks for the hydraulic cylinders to push each set of girders into place. The entire bridge assembly should be in place by the end of August.

Plans call for the concrete bridge deck to be poured next year, after which the deck will be paved and lighting and safety barriers installed.



1,625

METRES LONG AND 50 METRES HIGH MAKES THE NORTH CHANNEL BRIDGE A MONUMENTAL STRUCTURE.

QX SPLICING

MAKING THE CONNECTION

How difficult can it be to connect two pieces of copper wire together? More difficult than you might expect, says QX Splicing's Kim South.

Splicing the wire together is only a small part of the job. Finding the right two pieces of wire in a large splice with up to 4,500 connections is where the skill really comes in.

"It can take up to five years before a cable splicing technician is fully qualified to do the work," says South, QX Splicing Manager. "It's delicate work that takes enormous precision and care, often under less-than-ideal conditions. But it's also a very satisfying job. These technicians are one of the most important links in keeping the information highway moving."

It's 6:30 a.m. when the QX Splicing truck pulls up to the curb in downtown Toronto. Al Harkness and Jon D'Abadie get out and take a look around. It's raining and the traffic is already starting to build, but it could be worse. It could be –10°C and the terminal could be on a telephone pole, nine metres off the ground. There are some compensations for working in a manhole.

> THESE TECHNICIANS ARE ONE OF THE MOST IMPORTANT LINKS IN KEEPING THE INFORMATION HIGHWAY MOVING.
>
> – KIM SOUTH
> SPLICING MANAGER

Over the next nine weeks, Al, Jon and the rest of the crew will increase the length of the copper cable in the recently enlarged manhole so that the cables can be rearranged and racked for easier access. There are only 15 cables to splice, but that's a bit like saying there are only 15 walls to build without counting the bricks. There are, within those 15 cables, more than 25,000 telephone lines, and each line has to be connected to a new line in the cable the QX team is installing. A bad connection and a customer loses phone service.

As the crew gets the site ready – setting out signs and cones to warn the oncoming traffic – Jon heads down to the switching centre a few blocks away, where he can test the new connections. Adam Barker, the "top man," takes atmospheric readings in the manhole to make sure there are no toxic gases. For the next two months, he will stand by, ready to winch Al out of the manhole at the first sign of trouble.

Al suits up, clambers down the manhole and carefully opens the existing splice on one of the main cables, peering at the 3,600 pairs of wires, each one of which has to be tested and identified before the new splice can be made. It is a task that would test the most

BUSINESS FILE

QX SPLICING

AECON BUSINESS UNIT:
Utilities – QX Technologies

SERVICES: Telephone cable splicing (joining telephone lines to create new connections)

HEAD OFFICE: Markham, Ontario

CLIENTS:
// Bell Canada
// Private networks (universities, hospitals, business campuses)

FOUNDED: 2007

GEOGRAPHICAL MARKET:
Area codes 905/416

NUMBER OF JOBS PER YEAR: 1,000

NUMBER OF EMPLOYEES:
5 staff
25 splicers

KEY EMPLOYEES:
Steve Oikawa – Director Telecommunications
Kim South – Splicing Manager
Jacob Barber – Supervisor
Herwig Eber – Supervisor

AN ESTIMATED

80%

OF CANADIAN HOUSEHOLDS AND VIRTUALLY ALL BUSINESSES STILL RELY ON THE THOUSANDS OF MILES OF COMMUNICATIONS CABLES STRUNG BETWEEN TELEPHONE POLES AND BURIED UNDER THE GROUND TO PROVIDE THEIR TELEPHONE, INTERNET AND TELEVISION SERVICE.

experienced electrician. For Al, a veteran splicing technician with more than 15 years of experience, it's just another day at the office.

By the end of the project, the QX Splicing team will have transformed this tangled web of cables into a smooth, orderly communications highway without a single disruption to service.

If it weren't for the truck parked by the curb, the Bell customers would never know that QX Splicing was there.

From toddlers to grandmothers, just about everyone has a cellphone today. By the end of 2010, less than 20 years after the technology was first introduced, some 26 million Canadians were wireless subscribers and half of all phone connections in this country were wireless. But we are not an entirely wireless nation yet. An estimated 80 per cent of Canadian households and virtually all businesses still rely on the thousands of miles of communication cables strung between telephone poles and buried under the ground to provide their telephone, Internet and television service. And every time the network grows or moves, a skilled cable splicer makes those essential connections.

Five years ago, Bell Canada asked QX Technologies if it could provide some additional technicians to supplement Bell's cable splicing workforce.

"We've had an ongoing relationship with Bell for more than 40 years," notes Steve Oikawa, QX Splicing Director of Telecommunications and a 29-year Bell veteran who was, at one time, Bell's director of network planning and provisioning in charge of overseeing all network engineering and construction for the entire province of Ontario. "Aecon Utilities is Bell's primary construction contractor, placing cables and field equipment and doing some of the associated civil work. QX Technologies also does a lot of work with Bell, installing a variety of communications systems. In fact, we're the largest satellite TV installer in the country. So, with all this work we were doing with Bell, cable splicing was just a natural extension."

It was, however, an entirely new business for QX and one that had to be built from the ground up. Kim South, a former inspector and splicing manager with Expertech (Bell Canada's construction arm), was named the new QX Splicing Manager. She was also its first employee.

"That first year was enormously difficult," recalls South. "We had to buy the trucks and tools that we needed, hire cable splicers and manage the subcontractors we were using while we got established. By the end of the year, we had eight employees and an annual revenue of about half a million dollars."

The business, she says, has since grown exponentially. QX Splicing today carries 25 technicians and a fleet of 20 trucks and posts annual revenues in the order of $3 million.

It is, South says, a business that relies more heavily than most on the skills and dedication of its field staff.

"Creating the actual physical splice for the wires is a relatively small part of the job. Knowing what to splice and where is the trick," she explains. "Small neighbourhood boxes have 50 pairs of wires feeding the local residences. Large underground manholes can have up to 30 cables. The older copper cables can have up to 3,600 cable pairs, and the fibre optic cables have up to 864 individual fibres. A splicing technician may end up having to go to three or four locations just to complete a job."

For all those reasons, South says, QX Splicing doesn't consider their technicians to be fully qualified until they have had at least five years on the job. "Even then, we rely on our more experienced technicians to lead them through their apprenticeship."

It is also extremely demanding work, requiring patience and precision in often compromising situations. "The cables may be in splice boxes on the boulevard, in manholes, in buildings, even up telephone poles, so our technicians not only have to deal with the weather but also traffic, working in confined spaces and with the occasional less-than-friendly dog," explains South. "Most importantly, we always have to remember that we're seen by the public and Bell customers as being representatives of Bell Canada."

While the increase in wireless technology has definitely had an impact on the demand for land lines, the changing technology for broadband communications has actually increased the demand for QX's splicing services.

"About 20 years ago, Bell Canada started to roll out its fibre optic network," notes Steve Oikawa. "In the broadband environment, Bell wants to get the new fibre optic network closer to its customers, so we have been very involved with the program as Bell expands its network."

PEOPLE AND BUSINESSES RELY MORE ON TELECOMMUNICATIONS TODAY THAN THEY HAVE EVER DONE IN THE PAST.

– ORLANDO ANGEL
DIRECTOR OF NETWORK
PROVISIONING
BELL CANADA

Fibre optic cables are bundles of thin strands of pure glass, not much thicker than a human hair, that use light, rather than an electrical current, to carry signals. They are less expensive and lighter and provide a more reliable signal than copper wires. But splicing the glass strands together, notes Kim South, is quite a different proposition.

"Some of our trucks are solely dedicated to copper splicing, others to the fibre optic network. Most of our copper splicing work is done outside, although our technicians do have a portable tent they can use as a temporary shelter." By comparison, South explains, the fibre optic splicing is completed inside the truck or in a building. If it is in the truck, the technicians pull the cable through an opening in the door and then use a special piece of equipment that aligns the fibres and fuses them together at temperatures of about 600°C, the melting point of the glass. It is a very precise system and, given the high-tech nature of the work, requires some extremely sophisticated and expensive equipment operating in a controlled environment. Each truck has two fusers, each of which costs about $25,000, along with special testing equipment, which costs about $15,000, to verify the integrity of the splice.

While QX Splicing does carry out work for hospitals, universities and business campuses with their own private telecommunications networks, the vast majority of the business continues to be with Bell Canada.

"People and businesses rely more on telecommunications today than they have ever done in the past," says Orlando Angel, Director of Network Provisioning for Bell Canada. "It's our connection to the world. Whether we're calling friends and family, downloading the latest movie, watching TV, moving vast amounts of business data or calling for help in an emergency, we can't be without a phone line.

"Working with QX Splicing has proved to be a true strategic partnership. QX is more than a supplier to us. They are an extension of our business and every bit as dedicated as we are to providing our customers with the most reliable telecommunications service in the country."

MEET:

PEOPLE MATTER

FRANK TRAUZZI

BUSINESS & LABOUR RELATIONS MANAGER

For more than 40 years, Frank Trauzzi's job as a project business manager has taken him across Canada, offering him the opportunity to work on some of Aecon Constructors' biggest projects. He's played a key role on job sites as far afield as the longest railway tunnel in North America and a kilometre-long bridge across the Peace River in Alberta. It has been an immensely rewarding career, he maintains, highlighted by memorable moments and unlikely events.

You have been a project business manager since you joined Aecon in 1971. What does your job involve?
The best way to describe it is the backroom support for the project team. We're the guys in the trailer, working behind the scene to keep everything operating smoothly and under control. We're typically the first ones on the job and the last ones to leave.

I am responsible for setting things up – bringing in the trailers and making sure we have all the equipment and communication lines that the on-site office needs. I'll meet with the local unions and the suppliers, set up the accounts and get all the agreements in place.

After that, my staff and I keep the books and the records. We do the purchasing, accounts payable and payroll, and generate the cost and equipment reports.

It's the same basic job I did when I first started on a road project in Toronto. The only difference is that the jobs today are bigger and more complex, and so is the work.

Has the work become routine?
That's the beauty of this work. Each project is different. Each one has its own unique challenges. It's also given me the opportunity to work all across Canada. It's always fresh and new.

What types of projects have you worked on?
Everything from dams in British Columbia to bridges in Alberta to electrical generation stations in Toronto. I've worked on subway tunnels in Toronto, a rail tunnel in the Rocky Mountains and another one under the St. Clair River between Ontario and Michigan. These were big projects that took years of heavy construction to complete.

Is this a job that you trained for?
If you looked at the qualifications needed to do this job today, I wouldn't make the short list. I studied accounting at Western Tech and Commerce. It had a good reputation as a commercial high school. When you graduated you could get a job the next day. I didn't have to go to university.

The rest was learning on the job.

Did you join Aecon right out of high school?
My first job was in a stockbroker's office, but I didn't fit in with the white shirts. I preferred playing baseball and hanging around the pool with my buddies. I knew the writing was on the wall when they told me if I didn't cut my hair I needn't bother coming in the next day, so I left.

My father and uncle both worked in construction. My cousin was a superintendent with [Aecon predecessor company] Kilmer Van Nostrand (also known as KVN). He offered me a job for the summer as a labourer, and I took it. At the end of the summer, the field accounting office asked if I wanted to stay on, and I have been here ever since.

What were some of the first projects you worked on?
Mostly sewer and water main tunnelling projects in the Toronto area, which worked out well. Joanne and I got married in 1974 and we bought a small farmhouse just north of Toronto. The last project I did in the Toronto area was a bridge construction project on Burnhamthorpe Road in Mississauga. It started in 1978 and took two years to complete.

Where did you go next?
In 1981, KVN started a dam project in Spruceview, Alberta. I'd been in Toronto all my life and I didn't want to move, but Joanne was a bit more adventuresome. She told me to take the job, so we moved to Alberta and rented a farmhouse near the project. That was the start of my travels.

I stayed in Alberta until 1984, when Foundation Company [later, Aecon]

"WE HAVE A COMMON GOAL AND A COMMITMENT TO GET THE PROJECT DONE. I MAY BE THE BUSINESS MANAGER BUT, OVER THE YEARS, I'VE ALSO DONE A BIT OF SURVEYING, OPERATED BACKHOES AND LOADERS AND TESTED CONCRETE. I'VE EVEN HELPED SHOVEL THE CONCRETE. YOU DO WHAT YOU HAVE TO DO TO GET THE JOB DONE."

– FRANK TRAUZZI

bought KVN. Fortunately everyone kept their jobs, and I was sent to Rogers Pass in the Rocky Mountains, where we were building a tunnel for CP Rail – the longest rail tunnel in North America, 15 kilometres through solid rock. It was the biggest job I had been on and since I now had some help with the accounting, I got to call myself office manager. The next year we bought a house in Revelstoke, about 50 miles from the project, and we have lived here ever since.

What are some of the other projects you have worked on?
That project finished in 1989, which was coincidentally when Banister Pipelines bought the Foundation Company, so once again, without changing jobs, I had a new employer.

Our next project was back in Alberta, building a bridge over the Peace River. There are two things I remember about that project: the cold and the flood. Being cold in Alberta during the winter is not unusual. We would have the heat cranked up, the oven on and be wrapped in blankets, and you could still feel the chill! But the flood was definitely unusual. There had been a huge rainstorm in B.C., and they had to open the spillway at the Bennett Dam. The crest must have been 24 feet high. It hit us six hours later, sending a lot of our equipment floating down the river. I rented a helicopter, and we found our barges a few miles away. We managed to get a crane and enough trucks to get the equipment back.

Were all your jobs out west?
No. In fact, most of my projects have been a long way from home. I was in Sarnia [Ontario] for three years, building a rail tunnel under the St. Clair River. The thing I remember best about that job was getting some special grease we needed in a hurry. The only problem was the supplier was in France. We ordered a planeload of grease on Thursday and it arrived on Sunday, which was quite amazing.

In 1995, I went to India to help sort out the books on a hydroelectric joint-venture project. I was supposed to be there for a few weeks but I stayed there for three months. Then I came back to Toronto to work for a joint venture doing the subway extension. I remember the alarm at the project kept going off during the night and I was the one that got called out. Turned out it was a raccoon!

In 2000, I moved to Arizona. We were trying to expand the business but, although we put in a number of bids, we weren't being successful. Alberta was cold. Arizona was hot. So, for the next two years, I went from an air-conditioned condo to an air-conditioned office to an air-conditioned casino, which proved to be quite enjoyable.

After that, it was a light rail tunnel project in Edmonton (under the Aecon banner) and then back to Toronto for the Portlands Energy Centre project, a gas-fired electrical generating station we were building down by the lake.

It wasn't until last year that I finally ended up on another project in British Columbia: the Waneta Dam. It's been the first time since 1989 that I could work from home.

With all this travelling, how did you balance work and family life?
Joanne and the kids joined me on the Peace River project but, after that, we decided that the children were getting too old to move around. We wanted them to have a stable life at home in Revelstoke. I went back as often as I could, and Joanne would occasionally come out to visit me at the projects. It does get lonely. I never missed Christmas at home, but I did miss some of the other big events. You have to give the husbands and wives of construction workers a lot of credit. We wouldn't be where we are today if it weren't for them.

You said you did your learning on the job. What do you think makes a good project business manager?
You have to be a team player. As an avid sportsman, it's the way I was brought up. The LA Kings may not have been the best team this year but they have won the Stanley Cup and they did it with the right attitude and the commitment to go all the way. It's the same with a project team: We have a common goal and a commitment to get the project done. I may be the business manager but, over the years, I've also done a bit of surveying, operated backhoes and loaders and tested concrete. I've even helped shovel the concrete. You do what you have to do to get the job done.

Now that you're back home, do you intend to stay there?
I still enjoy the work and the people. I don't feel 65. I'm as healthy as I have ever been. I keep arguing with the calendar but eventually I'm going to lose!

Much of this project will be finished by next spring, so I'd like to see it through. On the other hand, I do enjoy playing golf in the summer and will I really want to shovel the driveway in winter to get to work? Guess I'll just have to wait and see.

EMPLOYEE FILE

FRANK TRAUZZI

POSITION: Business & Labour Relations Manager

DIVISION: Aecon Constructors

EXPERIENCE:

1967–70	Clearing department in a stockbroker's office
1971–84	Field Accountant/Project Office Manager, Kilmer Van Nostrand
1984–89	Project Office Manager, Foundation Company
1989–01	Office Manager, Banister Pipelines
2001–Present	Business & Labour Relations Manager, Aecon

BORN: Toronto

HOME: Revelstoke, British Columbia

FAMILY: Married to Joanne; two children, one grandchild – and one on the way

HOBBIES AND INTERESTS: Anything to do with sports; avid golfer

SAFETY MATTERS

BETTER TO LEAD THAN TO TRAIL

By Mike Archambault
Vice President, Safety and Insurance

If you notice a slow leak in your tire, that's a trailing indicator. It tells you something has happened and you need to fix it. If you look at your tire and see signs of wear, that's a leading indicator. It tells you action needs to be taken before you have a problem.

Both forms of indicator are key components of a safety program, and both are directly connected to our new safety reporting system, the Aecon Incident Management System (AIMS).

With 12,000-plus employees, Aecon conducts more than 30 leading activities a year. AIMS give us the ability to collect and analyze the root causes and trends associated with incidents that support a safety program dedicated to performance excellence. Ultimately, our goal is to have live, immediate and accurate information so that we can act, rather than react.

We can't change the past; what's happened has happened. What we want to do is change the future – do whatever is needed today to make sure our workers are safe tomorrow. The question then becomes: "What do we need to do?" From that, we then ask: "What measures do we need to take to ensure a safe working environment?" and "How do we measure the results to know we're making the right choices?" The answers involve what are known as leading and trailing indicators.

Indicators are anything we use to predict future trends, and you see them everywhere. We analyze atmospheric conditions to predict the weather. We look at economic trends to make investment decisions. We gather information about social conditions to develop public health policies. And, here at Aecon, we use safety statistics to develop effective safety programs. Yet, as it turns out, some indicators are more useful than others.

Take, for example, the general manager of a hockey club trying to build a winning team. As he looks at his roster, he can refer to several statistics to gauge a particular player, such as number of goals scored, number of assists made, body checks completed and so on. Which players do you pick? Probably the ones who played well over the past few seasons, based on the assumption that if they performed well in the past, they will continue to do well in the future. However, as we all know, that's not always the case.

The challenge rests in the fact that these statistics are all trailing indicators; they occur after the event, and past performance is not always a reliable indicator of what will happen in the future. However, such markers as strength, reflexes, endurance, attitude and speed are all leading indicators of the qualities needed to be a good goal scorer in the future.

Here at Aecon, our Safety group's trailing indicators would include such things as number of hours worked, number of safety incidents reported, type of incident, number of hazardous spills, etc. That is not to say that these sorts of statistics aren't useful. An increase in a particular type of safety incident is a pretty good indication that there is a problem that needs to be fixed. But trailing statistics are reactive. It's like driving a car down the road. You don't get to your destination by staring in the rear-view mirror. We don't want to solve problems after they occur. We want to eliminate them before they occur.

We want to be in a position to measure and analyze activities such as workplace inspections, audits, safety committee participation, behavioural observations and hazard assessments. These leading indicators not only help us to determine the strengths and weaknesses of our safety systems, they position us to react proactively so that we can make the necessary changes to prevent future events from ever occurring.

Trailing indicators confirm we are making steady improvement over time. Leading safety measures focus on improving safety performance. Both are essential and both equally important for developing a safety program that strives for performance excellence.

Of course, knowing what you want to measure is only the first step; gathering meaningful data comes next, and that can be a monumental task. With more than 12,000 Aecon employees, the Safety group gathers and analyzes an enormous amount of data each month. However, by the time this process is complete each cycle, even the leading indicators have lost some of their predictive power.

That's where the new Aecon Incident Management System (AIMS) comes in. This new database system has been specifically designed to meet our needs. It will centralize all of our health and safety information and will allow us to collect and analyze leading and trailing indicator data much more quickly. It will also allow us to gather the leading indicators we need to consistently better our safety performance.

Without a doubt, this is a major initiative – a real process. These sorts of systems can't be put in place overnight, but we're convinced that, over the next few months, as we gradually introduce AIMS, its value will become self-evident to all of us.

ALL IN THE FAMILY

Three generations. More than 60 years of combined service. And, at the end of every day, the Rigitanos have headed home to their families, as safely and securely as they had arrived at work that morning.

With a company the size of Aecon, it would be easy to think in terms of numbers rather than what's really important: the family members behind those numbers. For the Rigitanos, keeping it safe and within the family has been their mantra since the 1960s.

Antonio was the first Rigitano to work for Aecon. He joined Armstrong Construction as a carpenter in 1965 and retired 33 years later. His son, John, started working for Armbro as a summer student and became a full-time Aecon employee in 1990. In 2006, Antonio's grandson followed in their footsteps. Anthony currently works for Aecon Construction and Materials Limited.

"This is the only company any of us has worked for," says John Rigitano, currently an EHS adviser with Aecon's transportation group, "and Aecon has always looked after us."

John says the Rigitanos believe there's an unspoken agreement between employer and employee. "We give the company years of service and dedication, and the company, in turn, gives us a safe and rewarding career. Aecon has always lived up to that bargain. I can't see myself working anywhere else."

Safety has always been a priority with Aecon, he says. "People cared just as deeply about safety when my father joined, but construction was a much riskier proposition 40 years ago. They didn't have the sophistication, the training or the tools we have today. We have the best safety procedures in the industry."

"I am glad to say that in 33 years my father never had a safety issue and, thanks to the company's diligence, neither I nor my son have either."

And that, he maintains, is what it's all about. "You come to work, you do your job and you go home – every day."

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