



KGM | **ENGINEERING**

THE BRIDGE BETWEEN CONSTRUCTION AND ENGINEERING

BRIDGE JACKING SPECIALIST

SECTION

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SECTION 1: COMPANY DESCRIPTION

KGM ENGINEERING was co-founded by Tamas Kalenda and Katia Gauthier in 2011. They have worked in the construction industry for nearly 20 years and they bring to KGM the knowledge and experience required in both engineering and management to assist in the overall success of any construction projects. Certified in Canada to practice in Ontario, British Columbia, Yukon, Northwest Territories, Alberta, Saskatchewan, New Brunswick, Nova Scotia and Newfoundland/Labrador.

In the construction industry of today we understand that success is not only a major team effort but also very dependent on design, engineering deliverables, precision, and meeting schedule deadlines. We also believe in design innovation that allows our clients to utilize all of their available resources and experience. We don't believe in reinventing the wheel. We believe in sharing strength and knowledge with one main goal - "finding the best and most cost-efficient solution". We make business personal.

KGM Engineering has many combined expertise, all related to structural engineering.

- Bridge Rehabilitation
- Structural Analysis, Design and Evaluation
- Construction Engineering and Constructability
- Geotechnical Engineering

KGM Engineering has expanded internationally, certified and operating in Europe and Africa. KGM Europe located in Budapest, Hungary, providing structural engineering services for bridge engineering, tower engineering and various other specialty projects. KGM Africa located in Kigali, Rwanda, specializing in the field of renewable energy, geotechnical engineering services, slope stability R&D and community development and sustainability.

OUR MISSION:

- ❖ To provide clients across Canada and worldwide with quality, innovative and efficient structural engineering services for all Construction Industries.
- ❖ To work safely, maintain the highest quality of workmanship, and continuously improve and develop our people to serve and adhere to our core values.
- ❖ To give back and support community development and sustainability

CORE VALUES:

Trust, Professionalism, Innovation, Excellence, Respect & Integrity

SECTION 2: TEAM OVERVIEW

The KGM Engineering experience is not only supported by both the co-founder's years of construction experience but also supported with our "A"-Team. Their knowledge and various level of education and training is one of our most diversified qualities. We don't build on just one strength, we all share and join forces to find key solutions even when presumed impossible. These various levels include, PhD's and master's degrees in structural engineering, geotechnical and geostructural engineering, construction engineering specialist, senior project management and certified engineering technologist experience.

The engineering industry has never been more challenging, with greater responsibilities, schedule restrictions and trying to keep up with limitless expectations. This has shaped a generation of designers to become accustomed to achieving more with less within shorter deadlines and maintain and satisfy clients demands. It is for this reason that building the right team is one of our top priority.

KGM takes great pride in our TEAM. We focus on building and supporting both strengths and weaknesses to create equilibrium. It is in this balance that we become stronger and more efficient, resulting in limitless innovation that brings all of our client's the expected success.

Our Team has demonstrated over and over the following skills and achievements. They continue to deliver work with the highest quality by continuously:

- ❖ Proving leadership, inspiring, and motivating each other as a team
- ❖ Being self-aware, knowing each other's limitations and strengths and capitalizing on this self-awareness for efficient task sharing and innovating solution
- ❖ Being self-motivated and able to work well with each other under all types of pressure
- ❖ Showing confidence, assertiveness, and self-assurance with management team for overall company development
- ❖ Being resilient, optimistic, open to change, showing openness, and honesty in all dealings

We also believe in joining strengths with other engineering companies by creating a structure that allows all companies to join forces, share the work and be that much more diversified in various disciplines. This also guarantees that any schedule deadline-no matter the unforeseen obstacles, are fulfilled. We as a team, either internal or external will find that ground-breaking solution that will meet satisfaction on all levels.

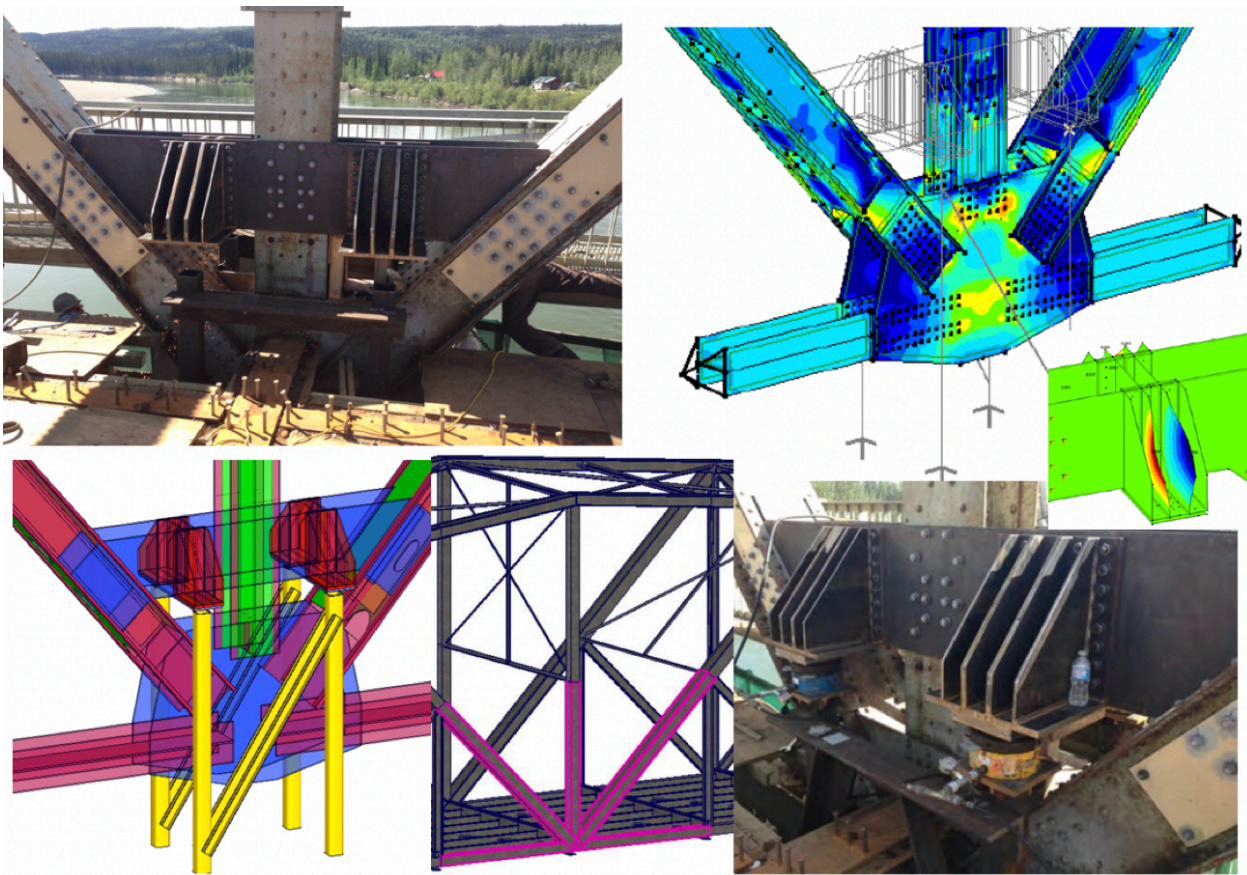
SECTION 3 : PROJECT PORTFOLIO

JACKING DESIGN SPECIALIST

- Hydraulic Bridge Jacking Design Consultation
- Bridge Modeling & Analysis
- Lateral Jacking & Support Design
- Hydraulic Design Relocation of Superstructures
- Temporary Jacking Support Design
- Custom Design in Both Bridge & Building Hydraulic Lifting
- Volumetric Jacking Design System
- Inspection & QVE Certifications

Reinforce Existing Truss to Allow Bridge Lifting

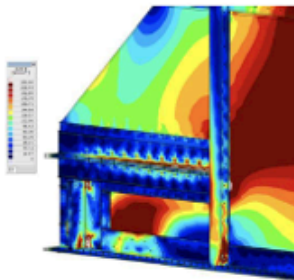
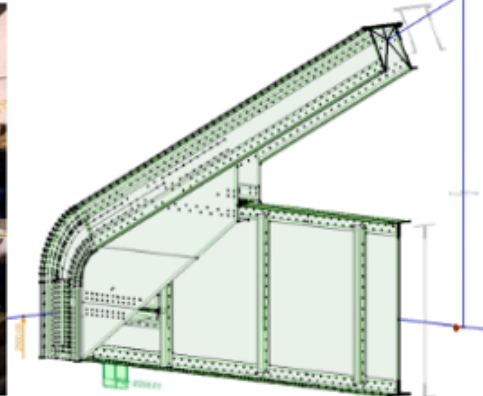
Two 90 m. span truss bridge built in mid twentieth century. Bearing replacement at abutments and pier while maintain single lane traffic. Complete structural design analysis and finite element modeling of truss bridge. Design new members, post tension existing pier, design shoring for lateral and vertical loads and hydraulic lifting. 4 X 250T jacks used to lift at piers.



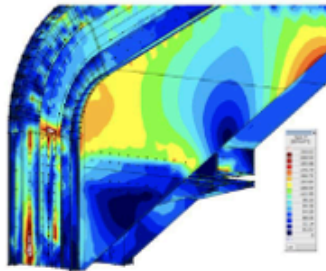
Job: YK- Highway & Public Works: Upper Liard River Bridge

Pier Jacking using existing Diaphragms

Synchronized jacking operation lifting both spans of a truss bridge at the pier using the existing diaphragms and the bottom chord. Limited jacking force has been applied to diaphragm to prevent any damages. Bridge was closed to traffic during overnight work on bearing replacement at each roller bearing location. 8x250T Enerpac locknut hydraulic cylinder has been utilized to allow 20mm lift. Cylinders have been positioned to allow bearing removal and installation of new 900x850x220mm elastomeric bearings. Total jacking force was registered as 10,000kN.



Von Mises Stresses at the
Chord part of the connection



Von Mises Stresses at the
Arch Part of the connection



Job: BC, Creston, Kootenay River Bridge

Bridge Rotation Jacking Design

Job: AB, Trans-Canada Highway, Banff National Park

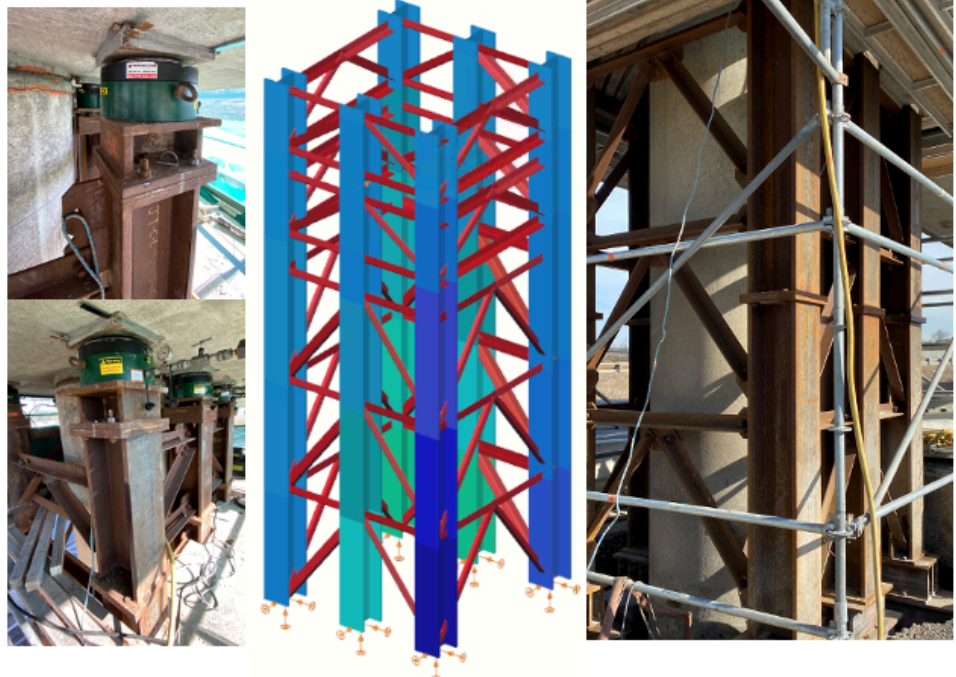


Structure rotation has been designed using two independent jacking system. Traditional pump and hydraulic system #1 have been used to achieve deflection of the header beam and provide equal lift on all girders while system #2 rotated the header beam (and the deck) to its desired position. High accuracy digital gauges have been utilized with blue tooth connection to a computer to monitor and record movement.

Structural Support Single Column Jacking Design

Structural support design for a jacking and replacement of bearing over single column. Calculated jacking force of 15,200kN with minimum required jacking capacity of 22,800kN, while provided jacking and temporary support capacity of 30,700kN. Support tower designed to accommodate removal of the concrete and existing bearing pad on top of the column and allow new bearing installation.

Job: Hwy 401/Alan Road, Bridge # 23



Structure Jacking, Deck Rotation

Precision precast concrete bridge rotation. Volumetric jacking system has been utilized to perform precision rotation of the structure at the abutment. Different types and models of hydraulic jacks has been selected to allow continuous smooth rotation of the deck all across the abutment while equal volume of hydraulic was delivered to each cylinder. Successful rotation has been completed within 3x15mins road closure. Lift values were ranging between 0mm to 85mm across the abutment.



Job: NS
Point Tupper

Structure Jacking, Rocker bearing reset

Poste tensioned concrete corbel built on the face of the pier-cap to provide support for 2x400T hydraulic cylinders. Each of the anchor rod tensioned to 720kN. Continuous steel girder lifted and supported at 25mm height under live load conditions while over-rotated rocker bearing being reset. Actual lifting force was recorded as 3,000kN/side. Successfully completed procedure took 12 hours including post tensioning of the concrete corbels



Job: SK North Battleford Bridge

Re-Designed Steel diaphragm Temporarily supporting main span

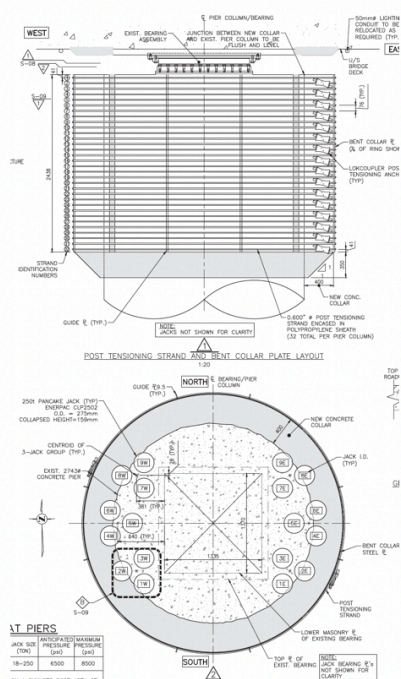


Structure lifting over a pier including re-designed steel diaphragm temporarily supporting main span under live load conditions allowing significant daily longitudinal movement. Main span of the bridge is made of steel plate girders while approach span is precast concrete girders. 8x250T Enerpac locknut hydraulic cylinder has been utilized for lifting and supporting the steel girders while 100T jacks were used on separate synchronized system to lift and support concrete girders at the same time. Bearing repair at both spans were completed simultaneously.

Job: SK. Nipawin Bridge over Hwy No 55

Design Post Tension Collars for Bridge Lifting

Bearing replacement at abutments and on top of existing concrete columns using post tension collars to support 39,000kN SLS jacking load. Extremely tight job site between East and West bound of Hwy. 407, 32 post tension strands used around concrete collar to widened exiting columns.



Job: ON, Hwy 407/400

SECTION 3: PROJECT REFERENCE LIST

MTO CONTRACT - JACKING DESIGN & SUPERVISION EXPERIENCE			
CONTRACT DESCRIPTION		CONTRACT DESCRIPTION	
MTO 2019-6080	Bertrand Creek, West White River Bridge Rehabs	MTO 2015-2039	Jordan Road Overpass & 9 Bridges
MTO 2019-5099	Skunk River Bridge Rehabilitation	MTO 2014-4040	Mountaiview,Victoria, Ontario &Tufford Bridges
MTO 2019-5038	Driftwood River Bridge Rehabilitation	MTO2014-2025	Third Ave, Bridge # 9,10,11,12,13,14, 15,18
MTO 2019-5037	Marten River Bridge Rehabilitation	MTO 2014-2013	Highway 403 from Mavis Road to Eglinton Avenue
MTO 2019-5009	Highway 572, Pike River Bridge Rehabilitation	MTO 2013-5126	Burloak, Appleby & Trafalgar Bridges
MTO 2019-5006	Hwy 35 Gull River Bridge Rehabilitation	MTO 2013-2030	Hwy 403 - Eastgate Parkway Extension.
MTO 2019-2025	Hwy. 401 EB, Neilson to Whites Central Rehabs	MTO 2013-2023	Shadow River/Magnetawan Bridge Rehab.
MTO 2019-2011	Highway 401 Neilson Rd to Warden Ave Rehabs	MTO 2013-2014	QEW Niagara, -6 Bridges Rehabs.
MTO 2019-2003	QEW Bowen Rd. to Gilmore Bridge Rehabilitation	MTO 2013-2003	Glendale Ave Bridge Replacement Rehab.
MTO 2019-2001	Hwy 401- Rentforth D, Carlingview Bridge Rehabs	MTO 2012-4017	Hwy 8 W-E Ramp underpass Hwy 401, Rehab.
MTO 2018-5714	Centre Line Road BridgeRehabilitation	MTO 2012-2036	Richmond St & Pine St Overpass Rehab.
MTO 2018-5117	Highway 141, Shadow River Bridge Rehabs	MTO-2011-4035	CNR HWY 401Bridge Rehabilitation
MTO 2018-5007	Highway 17, Bernt Gilbertson St. J.Island Bridge	MTO-2011-2049	Bridge Rehab Grays Rd to Winona Rehab.
MTO 2018-5000	Hwy 11 , Muskoka Road Bridge Rehabilitation	MTO-2011-2001	Palace Rd Bridge Rehabilitation
MTO 2018-4019	Ramsayville Rd. Overpass , Bridge Rehabs.	MTO-2010-2006	QEW- 6x Bridges Bridge Rehabilitation
MTO 2017-5107	Hwy 69 & Hwy 529 - Hwy 69 - Bridge Rehabs	MTO-2010-2020	Burlington Skyway Bridge Rehabilitation
MTO 2017-5008	Highway 118, Black River Bridge Rehabilitation	MTO-2009-4013	St-Vincent Overpass-Barrie Bridge Rehabilitation
MTO 2017-4017	Highway 401 Mallorytown Road,Maitland-Shaprs	MTO-2009-4012	Hwy 403 -Burlington CNR 401Rehab.
MTO 2017-3012	Big Otter Creek Bridge Rehabilitation	MTO-2009-5135	Moirs River Bridge / CNR 401 Rehab.
MTO 2017-3009	Mill Road Underpass, CNR Bridge Rehabilitation	MTO 2009-5004	CNR 401/ Hwy 62 & 37 Rehab.
MTO 2017-2037	Twelve Mile Creek Bridge Rehabilitation	MTO-2009-4010	CPR- Swing Sudbury Bridge Rehabilitation
MTO 2017-2036	Highway 401/403/410 Int. - 5 Bridges Rehabs	MTO 2008-4004	Bracebridge Bridge Rehabilitation
MTO 2017-2030	Highway 401 W.C. - Allen Road - 7 Bridge Rehabs	MTO 2008-4006	5th Line Overpass Bridge Rehabilitation
MTO 2017-2004	Highway 400/401 Interchange, 4 Bridge Rehabs.	MTO 2008-4019	Peterborough Bridge Rehabilitation
MTO 2016-6027	Black River Bridge -Hwy 17 -05-372 Rehabs.	MTO2008-4020	Trent River Bridge Rehabilitation
MTO 2016-6016	Neebing Rive, Thunder Bay Bridge Rehabs.	MTO 2008-2010	Garden City Skyway Bridge Rehabilitation
MTO 2016-5131	Spanish River Bridge Rehabilitation	MTO 2007-2029A	County Rd 17 - Hawkesbury Bridge Rehabilitation
MTO 2016-2042	First, Geneva, Hwy 406, CNR Hwy, 140 Rehabs.	MTO 2007-5107	Garden City Skyway Bridge Rehabilitation
MTO 2015-6002	Noden Causeway EBL Bridge Rehabilitation	MTO 2007-3051	Tilsonburg Bridge Rehabilitation
MTO 2015-5106	Hwy 69 Over French River Bridge Rehabilitation	MTO 2006-2021	Garden City Skyway Bridge Rehabilitation
MTO 2015-4188	Hay 401 -Wyman Road Underpass Bridge Rehab.	MTO-2002-2001	HWY 420 - NF 5 Bridges- Bridge Rehabilitation
MTO 2017-2034	Norris Whitney Skyway Bridge Rehabilitation		

CONTRACTS -JACKING DESIGN & SUPERVISION EXPERIENCE

CONTRACT		CONTRACT	
VARIOUS PROVINCES -DESCRIPTION		OTHER ONTARIO -DESCRIPTION	
SK- North Battleford	Bridge #40 over Battle River	ON - City of Sudbury	Bowland's Bay Bridge
SK- North Battleford	Hwy #16 over Hwy #4	ON-City of Sault St Marie	Bridge #30 - Sault St Marie
SK- North Battleford	Hwy #4 over Hwy #16	ON-County of Brant	Drake Bridge Rehabilitation
SK- North Battleford	Hwy #4 over Battle River	ON-County of Brant	McKay Bridge Rehabilitation
AB - Red Deer	Edgar Industrial Drive	ON Sarnia	Donohue Bridge Rehabilitation,
NS- Port Hawksbury	Point Tupper Bridge Rehabilitation	ON City of Cornwall	Brookdale CNR Overpass Rehab,
SK- Nipawin	New Nipawin Bridges over Hwy No 55, Rehab.	ON Town of Arnprior	Madawaska River Bridge - County Rd, Rehab.
BC- Creston	Kootenay River Bridge Rehabilitation	ON, Hamilton	Bridge 458 - York Boulevard, Rehab.
SK- North Battleford	Hwy 4 over North Saskatchewan River Rehab.	ON, Town of Lasalle	Front Road Bridge over Turkey Creek Rehab
AB- Coosa County	Hwy 2 SBL & NBL over Hwy 53 Rehab.	ON- Oxford	Bridge #784331 Rehab Oxford Rd 33 Rehab.
AB-Medecine Hat	Finlay Bridge Rehabilitation	ON- Kenora	Keewatin Channel Bridge Rehabilitation
AB-Banff National Park	Animal underpass Bridge Rehabilitation	ON - Hwy 401	Wilton Rd Bridge Rehabilitation
AB-Infrast. Transportation	Peace River Bridge Hwy 88 Bridge Rehab.	ON- CBR & CPR	CBR & CPR Overhrad Bridge Rehabilitation
AB-Infrast. Transportation	Redwillow River Bridge Rehabilitation	ON- Milton	Laurier Bridge Rehabilitation
AB-Infrast. Transportation	Gleichen Bridge Rehabilitation	ON - NOTL	Queenston Street Bridge Rehabilitation
AB- Public Works	Bow River Bridge Rehab. / Banff National Park	ON - Bancroft	Bridge Street Bridge Rehabilitation
AB-Regional M.of Wood Buffalo	Hangingsone River Bridge Rehabilitation	ON-County of Renfrew	Bonnechere Bridge Rehabilitation
AB-Infrast. Transportation	Paddle River Deer foot Bridge Rehabilitation	ON-City of Mississauga	Cooksville Bridge Rehabilitation
AB-City of Edmonton	James McDonald Bridge Rehabilitation	ON-City of Mississauga	Derry Rd Bridge Rehabilitation
AB-City of Edmonton	Fox Drive Overpass Bridge Rehabilitation	ON-City of Mississauga	Mullet Creek Bridge Rehabilitation
AB-Infrast. Transportation	Athabasca River Hwy 63- Bridge Rehab.	ON- Peterbrough	Davidson Street Bridge Rehabilitation
AB-Infrast. Transportation	196th Ave Bridge over Hwy 2 Bridge Rehab.	ON-The District of Muskoka	Paint Lake Bridge Rehabilitation
Government of Saskatchewan	Lloydminster -Hwy 17 Bridge Rehabilitation	ON-The District of Muskoka	CP Overhead Bridge Muskoka Rd
Government of Saskatchewan	Petrofka Bridge Bridge Rehabilitation	ON-Town of Kapuskasing	O.N Rail Bridge Over Mattawishquia River
Government of Saskatchewan	Maymont Bridge Bridge Rehabilitation	ON-City of Kenora	Winipeg River Arch Bridge Rehabilitation
NB-Dept. of Transportation	Regent Street Bridge NBTI Fredericton	ON- Ontario Northland	Bridge Over Abitibi River Bridge Rehab.
YK- Highway & Public Works	Upper Liard River Bridge	ON-County of Simcoe	Severn Reiver Bridge Replacement
BC-Glacier National Park	Trans-Canada Highway C.P.R. Overpass	ON-City of Peterborough	Hunter Street Bridge Rehabilitation
Government of Saskatchewan	Lloydminster -Hwy 17 Bridge Rehabilitation	ON-Region of Waterloo	Main St. Cambridge Bridge Rehabilitation
Government of Saskatchewan	Petrofka Bridge Rehabilitation	ON-Region of Ottawa	O-Train Bridge Rehabilitation
Government of Saskatchewan	Maymont Bridge Rehabilitation	ON-Ottawa Maclan County	Ottawa Dwyer Hil Bridge Rehabilitation
NB-Dept. of Transportation	Regent Street Bridge NBTI Fredericton	ON-Region of Kitchener	Maclan Bridge Bridge Rehabilitation
NWT- North West Terrotories	Buffalo River Bridge Rehabilitation	ON-Region of Niagara	Welland Main Bridge Rehabilitation
ON-Wallaceburg	Walpole Island SwingBridge Rehabilitation	ON-City of Ottawa	Mackenzie King Bridge Rehabilitation
AB-Infrast. Transportation	Peace River Brodge Hwy 88	ON-Region of Waterloo	Cambridge Main St. Bridge Rehabilitation
AB-Infrast. Transportation	Wandering River Bridge	ON-Hwy 407 Toll Route	Hwy 400 & Brant St. Bridge Rehabilitation
AB-Infrast. Transportation	Hwy 27 Over Ghostpine Creek	ON-Trent-Severn Waterway	Bolsover Swign Bridge Rehabilitation
AB-Infrast. Transportation	West Nose Creek Bridge	ON-Trent-Severn Waterway	Carrying place Swign Bridge Rehabilitation
AB-Infrast. Transportation	Hwy 779 Over Hwy 16A Stony Plain	ON-Trent-Severn Waterway	Rainny Falls Swign Bridge Rehabilitation
BC-City of Kemloops	Overlanders Bridge Rehabilitation	ON-Trent-Severn Waterway	Rainny Falls Swign Bridge Rehabilitation