Volume 2 January 2009

Keystone Bridge Management Corp.

Keystone News

Keystone Optimistic for 2009!

Infrastructure spending is expected to increase substantially in 2009 as a measure to invigorate a faltering economy. Savvy municipalities will no doubt be nominating their infrastructure projects to take advantage of stimulus spending. Fortunately it is recognized by most economists that strategic investment in infrastructure contributes greatly to long-term prosperity. When could be a better time to take advantage of surplus skilled labour and reduced commodity prices then now?

Two very notable bridge collapses in 2007 highlighted the need to better monitor and maintain the condition of bridge assets. Equally it was recognized there has been under investment in bridge assets that must be redressed. Clearly 2009 should be a banner opportunity to recapitalize our bridge stock.

Keystone Bridge Management Corp. is the only business in Canada dedicated solely to helping bridge owners maximize their return on investment in their bridge inventory. **Keystone's** mission is to apply engineering, economics, and risk management principles to achieve enduring benefit from bridge assets at lowest overall life-cycle cost.

Keystone invites you to consider their specialized services to help strategize your bridge infrastructure spending.

Adversity gives rise to opportunity. These are very opportune times for public investment in bridge infrastructure. Hence **Keystone's** optimism!

Keystone Bridge Management offers:

- Specialized bridge asset management services
- Municipal bridge inspections
- Bridge management software solutions
- Training in bridge asset management and bridge inspection
- Bridge rehabilitation or replacement planning services
- Bridge load testing
- Design services

The Golden Ears Bridge over the Fraser River near Langley, BC nearing completion in November 2008.

KBMS Evaluation Software

Keystone Bridge Management now has available an evaluation copy of its proprietary **B**ridge **M**anagement **S**ystem software, **KBMS**.

This software is an elegant solution to helping municipalities maintain up-to-date information on the condition of their bridges and large culverts. The software features very convenient image handling and storage, and can easily be maintained in-house or by external parties.

KBMS is based on a "**Triple-D**" approach of modeling a bridge in terms of **D**epreciation, **D**efects and **D**amage. Depreciation is completely non-subjective as it is calculated based on the age and life expectancy of individual bridge components.

The KBMS software may be configured to stand alone or operate on a network. It is compatible with Windows XP or Vista. The software runs in either MS Access 2003 or 2007 or it can be set up in run-time mode.

Inside this issue:

Bridge Asset Management Training

Seminar comments:
"Excellent presenter with a wealth of knowledge and experience!

"The course was very informative and interactive and there was good discussion."

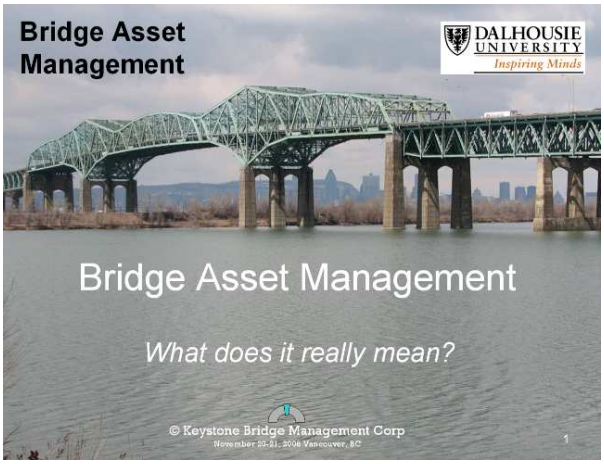
The Dalhousie University College of Continuing Education retains **Keystone Bridge Management** to provide a two day seminar on Bridge Asset Management. This seminar has previously been hosted in Halifax, Mississauga, and Vancouver. The next seminar will be held in Ottawa March 2-3, 2009.

The seminar includes identifying and screening vulnerable bridges, risk management, life-cycle costing, and the direct application of bridge asset management principles.

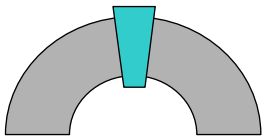
The seminars attract both provincial and municipal bridge engineers and consultants. All three seminars have received excellent reviews from participants.

Contact Sheila Gallagher of Dalhousie University at 1-800 -565-1179 for additional information or to obtain a registration form.

Alternately, check the Keystone web site for a PDF version of the registration form: www.keystonebridge.ca



The Trouble with Trusses



Keystone is your Bridge Asset Management Specialist!

Truss type bridges present a unique set of challenges for bridge managers. They are structurally complex, usually predate the 1950's, and require closer vigilance.

The biggest enemy of trusses is soiling. Trusses tend to invite dirt. Dirt is funneled by the diagonal truss members and will pile up at panel points. Dirt will collect on the horizontal bottom chord surfaces from traffic spray. It will find its way to the bearing corners through wind vortexing and leaking joints.

When dirt and debris accumulation is allowed to remain, it holds moisture and de-icing salt. The bottom chords of pony and through trusses is a natural repository for dirt. The bottom chords are also the primary tension members of a truss and can least afford to be structurally compromised by section loss.

Ideally, truss bridges should be thoroughly washed at least annually. The most favourable timing is immediately after winter operations. Washing should concentrate on the bottom chords, panel points and bearings. If the floor beams and stringers become contaminated due to an open deck, they should also be completely cleaned.

Often bottom chord truss members do not have drainage details. If water tends to accumulate on these members, it is a good practice to provide drainage. Only a qualified engineer can advise on altering truss members to improve drainage.

Keystone Presents Paper in Seoul

Keystone Bridge Management was represented at the International Association for Bridge Maintenance and Safety (IABMAS) conference in Seoul, South Korea in July 2008. The five day conference attracted several hundred bridge engineers from every continent.

A highlight of the conference was a visit to the construction of the Incheon Bridge. The 12.3 km long bridge includes a 1480 m cable stayed bridge over a shipping channel.

Keystone introduced to a world stage the "**Triple-D**" approach to Bridge Asset Management. This revolutionary concept models a bridge in terms of the **D**epreciated worth of its components, modified by **D**efects and **D**amage. Defects are essentially non-threatening cosmetic changes that may be precursors to Damage. Damage is any change to a bridge component that effects its strength, serviceability, or function.

Fundamental to the "Triple-D" concept is the ability to directly measure Return on Investment when assessing various bridge rehabilitation alternatives. The Keystone approach to Bridge Asset Management features strategizing bridge investment by maximizing ROI.

Incheon Cable-Stayed Bridge under construction in South Korea.

Steel-Free Bridge Deck Fails in SW Ontario

An 8.1 m span steel girder bridge in the Municipality of Chatham-Kent failed suddenly under the weight of a loaded grain truck. The municipality advised the bridge was constructed in 1945. It collapsed on April 8, 2008.

Close inspection of the failure revealed the concrete deck had no reinforcing steel. It is remarkable this bridge lasted as long as it did!

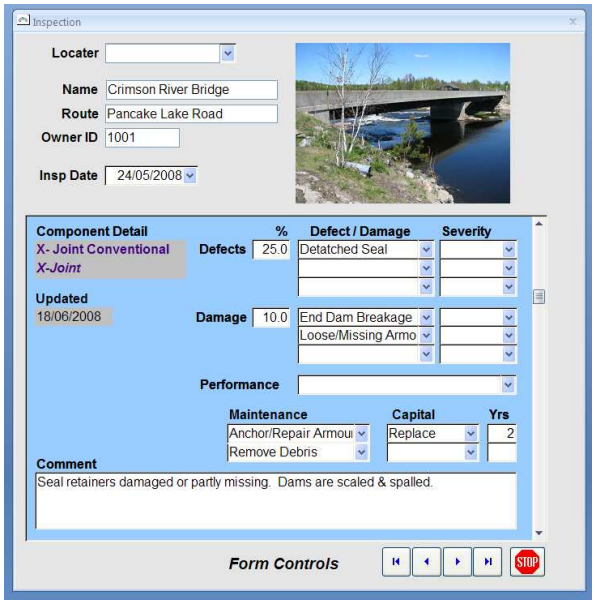
KBMS Evaluation Software Cont'd

Continued from Page 1…..

The evaluation copy of the software features include:

- Superior image handling
- Multiple reports
- Unlimited flexibility and customization.
- Smart-choice logic
- Handles bridges and large culverts separately
- Capital project estimating tool
- Adding a new bridge or culvert
- Editing bridge information
- Updating inspection information
- Reports bridge stock depreciation individually and for entire inventory.

To obtain your evaluation copy please contact Keystone Bridge Management Corp.



Screenshot of Inspection Input Form from KBMS

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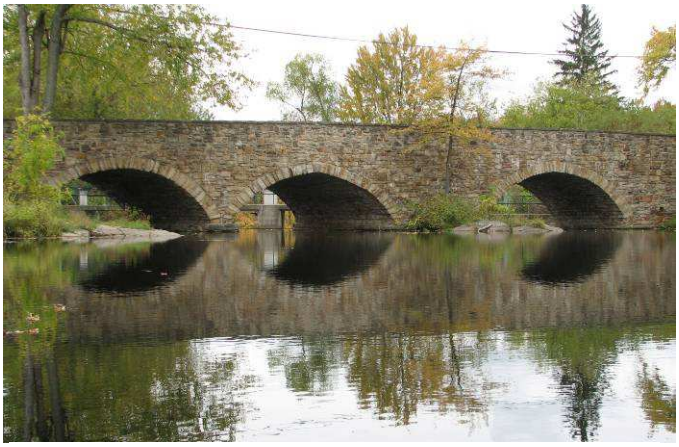

Lyndhurst Bridge Fall 2007

Check out the web site at:
www.keystonebridge.ca

"Bridges give flight to the ground."

Bridge Accounting 101

The PSAB 3150 initiative is a bold and positive step in accounting for publicly owned tangible capital assets. The Ministry of Transportation Ontario (MTO) Bridge Condition Index (BCI) is really an accounting measure that depreciates a bridge based on the quantity of five key bridge components in four categories of Excellent, Good, Fair, or Poor. (EGFP)

The EGFP approach to assessing a bridge's condition is highly subjective. This subjectivity erodes the confidence in BCI numbers.

Keystone Bridge Management accounts for bridges in a highly deterministic manner that eliminates the subjectivity associated with field rating bridge components in terms of EGFP. The **Keystone** approach assigns a worth and deemed life to every bridge component. For example, a 20 square metre abutment wall valued at $1000/m^2 that has a deemed life of 80 years has a straight-line depreciated value of $15,000 after 20 years of service. In this manner every bridge component is depreciated to determine the overall depreciation of the structure.

The structure depreciation is modified by field evaluation of the percent of defects and damage observed for each component. The combination of **D**epreciation, **D**efects, and **D**amage referred to as the **Triple-D** approach is rolled up to provide a realistic picture of the depreciated value of any bridge inventory.

For a normally distributed bridge inventory, the goal is to maintain the average level of depreciation above 50%. The measure of efficacy of capital expenditure is the return on investment based on the net improvement to the depreciated value of the inventory.

Parabolic & Straight Line Depreciation

Name	Built	Value (New)	Damage/Defects		Present Val (Parab)		Present Val (S/L)	
ABC Overhead (Westbound)	1955	1526303	13.3%	203014	24.3%	370159	14.0%	213495
Bathurst Street Bridge	1940	37047	25.9%	9613	0.0%	0	0.0%	0
Big Monty Bridge	1986	134202	3.1%	4140	70.2%	94162	47.0%	63067
Craig Road	1930	16776	69.7%	11688	0.0%	0	0.0%	0
Crimson Lk Rd	2006	147478	0.0%	0	99.7%	147021	94.9%	139893
Crimson River Bridge	1983	1286077	3.0%	38726	71.9%	925044	51.5%	662044
DEF Overhead (Eastbound)	1969	386586	2.9%	11259	27.3%	105722	16.6%	63985
France Street Bridge	1960	23224	8.6%	1992	5.4%	1247	2.9%	683
Laundry Street Bridge	1981	18512	3.0%	558	49.4%	9149	30.6%	5658
Laverne Interchange	1975	452842	9.1%	41239	61.6%	278926	42.5%	192263
Lawning Road Bridge	1987	207354	2.1%	4355	73.3%	151916	51.1%	105929
Low Falls Road Bridge	1960	162858	53.5%	87081	7.1%	11545	2.7%	4383
Main Street Bridge	1967	229631	18.6%	42718	31.6%	72522	14.7%	33823
Makula Road Bridge	1976	328125	18.1%	59444	51.3%	168470	32.5%	106742
Moxy Creek Bridge	1988	213688	3.1%	6586	75.8%	161985	53.1%	113500
North Road South	1930	7114	15.7%	1117	0.0%	0	0.0%	0

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Example of Depreciation Report from KBMS