SIMTReC

Centre for Structural Innovation
and Monitoring Technologies Inc.

Evaluation of One Hundred and One Instrumented Bridges

August 2017

Prepared by:

Baidar Bakht, CM, DSc, P. Eng.

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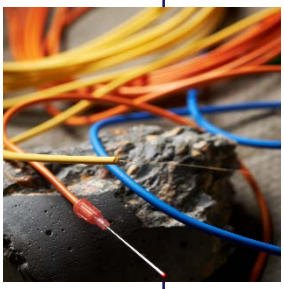

Solutions for Civil Infrastructure

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Preface

During the past forty years, the authors and their close colleagues have been involved in evaluating the load carrying capacities of bridges through instrumentation and testing. This report summarises the major outcomes of tests on 101 bridges. Most of these tests are reported in published documents, which are provided in the report. Details of the remaining few tests are stored in files that are still in the custody of the authors. Of the 101 bridges, 3 were tested for their ultimate load carrying capacities, 16 were tested to confirm their behaviour, and 82 were proof tested to determine their optimum load carrying capacities. The summaries of the various types of tests are given in Table 1.

Type of test	Ultimate	Behaviour	Proof		
			Upgrade or remove posting	Downgrade or keep posting	Repair
No. of bridges	3	16	66	12	4

Table 1. Summary of 101 tests

As can be seen in Table 1, it was found that 66 of the 82 proof-tested bridges, i.e. 75%, had higher load carrying capacities than could be predicted by analytical evaluations. This report has been compiled to suggest that the evaluation of the load carrying capacities of bridges through instrumentation and testing be formally recognised by the Canadian Highway Bridge Design Code (CHBDC), a section of which deals directly with the evaluation of bridges. According to this section, the truck loads permitted on a bridge depend upon the level of confidence on the condition of the bridge, which is currently determined mostly by visual inspection. It is proposed that another level of inspection through instrumentation be added to the CHBDC so that capacities of existing bridge are utilised optimally.

Acknowledgements

We wish to acknowledge Dr. Douglas Thomson, Dr. Huma Khalid, Dr. Basheer Algohi and Ms. Charleen Choboter of SIMTReC for their ideas, assistance and guidance in putting this document together. We would also like to thank Dr. Brian Westcott of Intelligent Structures Inc. for taking time to provide his input. Their contributions are gratefully acknowledged.

1. Exeter Bridge

Location. Ontario
Type. Steel pony truss bridge.
Posting. Not posted, but was scheduled for replacement.
Year of test. 1972 (Ultimate load test)
Outcome of test. The test verified the accuracy of computer program LATBUK.
References. Csagoly, P.F., Bakht, B. and Ma, A. 1975. Lateral Buckling of Pony Truss Bridges, Research Report 199. Ministry of Transportation of Ontario, Downsview, Ontario.

2. Coniston Creek Bridge

Location. Northern Ontario.
Type. Concrete rigid frame.
Posting. Not posted, but there was concern about the load carrying capacity of the bridge because of its advanced deterioration.
Year of test. 1975
Outcome of test. The bridge had ample capacity to carry unrestricted traffic.
References. Agarwal, A.C. 1975. File report, Structures Research Office, Ministry of Transportation of Ontario.

3. Trenton Canal Bridge

Location. Trenton, Ontario.
Type. Steel through truss.
Posting. 6 t.
Year of test. 1975
Outcome of test. The bridge was able to sustain two test trucks, each with a gross vehicle weight of 100 t.
References. Csagoly, P.F. 1975. File report, Structures Research Office, Ministry of Transportation of Ontario.

4. Perley Bridge

Location. Across Ottawa River, between Ontario and Quebec.
Type. 34 spans of various kinds. Steel construction
Size. Total length, 683m; width, 7.3 m. Area = 5,092 m^2.
Posting. 40 t.
Year of test. 1975
Outcome of test. Posting removed after suggested repairs. Bridge replaced in 2000 because of corrosion and narrow width.
References. Bakht, B. and Csagoly, P.F. 1977. Testing of Perley Bridge. Research Report 207, Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. and Csagoly, P.F. l980. Diagnostic testing of a Bridge. ASCE Journal of the Structural Division, Vol. l06, No. ST 7, pp.1515-1529.

5. North West Arm Bridge

Location. Ontario.
Type. Steel through truss.
Posting. The bridge was not posted but was scheduled for replacement.
Year of test. 1975 (Ultimate load test)
Outcome of test. The test was conducted to verify a method for in-plane buckling of trusses, but one of the trusses failed prematurely due to local buckling of the cover plate of its inclined chord.
References. Bakht, B. and Csagoly, P.F. 1979. Bridge Testing. Structures Research Report 79-SRR-10. Ministry of Transportation of Ontario, Downsview, Ontario.

6. Duck Creek Bridge

Location. Ontario (MTO Site No. 6-34).
Type. Steel girders and non-composite concrete deck slab.
Size. Span, 12.8 m; width 7 m. Area = 90 m^2.
Posting. Not posted but considered to be structurally deficient.
Year of test. 1976
Outcome of test. A triple posting of 21, 37 and 53 t was recommended.
References. Reel, R.S. and Agarwal, A.C. 1976. Field testing and suggested posting loads for Duck Creek Bridge. Draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview.

7. Stoney Creek Bridge

Location. London, Ontario.
Type. Steel girders and non-composite concrete deck slab.
Size. Span, 13.7 m; width 6.3 m. Area = 90 m^2.
Posting. Not posted but scheduled for replacement.
Year of test. 1978 (Ultimate load test).
Outcome of test. Failure test on the bridge confirmed the presence bearing restraint that reduced live load moments in girders by about 11%.
References. Bakht, B. 1988. Ultimate Load Test on a Slab-on-Girder Bridge. Structures Research Report SRR-88-03. Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. and Jaeger, L.G. 1992. Ultimate Load Test on a Slab-on-Girder Bridge. ASCE Journal of Structural Engineering. 118 (6), pp. 1608-1624.

8. Atkinson River Bridge

Location. Ontario (MTO Site No. 24-112).
Type. 7-span continuous nail laminated timber bridge
Size. Span, 32 m; width, 12.2 m. Area = 390 m^2.
Posting. Not known.
Year of test. 1978
Outcome of test. Pile bents deflect permanently under sustained live load; replace the bridge.
References. Csagoly, P.F. 1978. File report, Structures Research Report. Ministry of Transportation of Ontario, Downsview, Ontario.

9. Trout River Bridge

Location. Ontario (MTO Site No. 41-004).
Type. 11-span bridge with sawn timber stringers with transverse nail laminated wood deck
Size. Span, 148 m; width, 12.2 m. Area = 1,806 m^2.
Posting. Not known.
Year of test. 1978
Outcome of test. No need for load posting.
References. Csagoly, P.F. 1978. File report, Structures Research Report. Ministry of Transportation of Ontario, Downsview, Ontario.

10. Pelican River Bridge

Location. Ontario (MTO Site No. 41-009).
Type. 15-span continuous bridge with wood-concrete composite construction.
Size. Span, 71 m; width, 12.2 m. Area = 870 m^2.
Posting. Not known.
Year of test. 1978
Outcome of test. No need for load posting.
References. Csagoly, P.F. 1978. File report, Structures Research Report. Ministry of Transportation of Ontario, Downsview, Ontario...

11, 12 and 13. Soil-steel bridges with shallow depth of cover (Deux River Bridge, Adelaide Creek Bridge, and White Ash Creek Bridge)

Deux River Bridge

White Ash Creek Bridge

Location. Ontario.
Type. Soil-steel bridges
Size. Circular pipe with a span of 7.77 m; horizontal ellipse with span and rise of 7.25 and 4.08 m, respectively; and circular with a span of 7.62 m.
Posting. Not posted.
Year of test. 1979
Outcome of test. Live load effects are limited to the top portion of the metallic shell.
References. Bakht, B. 1980. Live Load Testing of Soil-Steel Structures. Structures Research Report 80-SRR-2. Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. 1981. Soil-Steel Structure Response to Live Loads, l981. ASCE Journal of Geotechnical Engineering. Vol. l07, No. GT6, pp. 779-798.

14. Manitou Bridge

Location. Toronto Island.
Type. 3-span concrete arch. Original steel arches were encased in concrete
Size. Span, 40 m; 7.2 m. Area = 288 m^2.
Posting. 6.8 t.
Year of test. 1979
Outcome of test. Remove posting.
References. Bakht, B. 1980. Load Carrying Capacity of Manitou Bridge. Structures Research Report 80-SRR-1. Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. l981. Testing of the Manitou Bridge to determine its Load Carrying Capacity. Canadian Journal of Civil Engineering. Vol. 8, No. 2, pp. 2l8-229.

15. A new steel plate girder bridge

Location. Northern Ontario.
Type. 3-span bridge with steel plate girders.
Size. Span, 260 m; width, 12.8 m. Area = 3,328 m^2.
Posting. Not posted.
Year of test. 1981.
Outcome of test. Fatigue design provisions of the Ontario Highway Bridge Design Code were revised in light of the test results.
References. Radkowski, A.F., Bakht, B. and Billing, J.R. l982. Design and Testing of l25 m Plate Girder Bridge. International Conference on Short and Medium Span Bridges, Toronto, August, 8 - 12, pp.257-274.

16, 17 and 18. Concrete deck slabs of skew girder bridges (Kenny Creek Bridge, Irondale River Bridge, and East Dufferin Bridge)

Location. Ontario.
Type. 3-span, single span and 3-span steel girder bridges with concrete deck slab.
Size. 41 m, 24 m and 55 m.
Posting. Not posted.
Year of test. 1981.
Outcome of test. Design provisions for deck slabs of skew girder bridges of the Ontario Highway Bridge Design Code were revised in light of the test results.
References. Bakht, B. 1981. Tests on deck slabs of skew slab-on-girder bridges, Structures research Office, Ministry of Transportation of Ontario, file report.

19. Bank Street Canal Bridge

Bank Street Canal Bridge

Cummings Bridge

Location. Ottawa.
Type. 5-span spandrel-filled concrete arch bridge.
Size. Span, 131 m; width not known.
Posting. Not posted, but of suspect strength.
Year of test. 1981.
Outcome of test. No need for posting. The bridge still carries unrestricted traffic
References. Bakht, B. 1981. Testing of the Canal Street Bridge, Structures research Office, Ministry of Transportation of Ontario, file report.

20. Cummings Bridge

Location. Ottawa.
Type. 5-span open spandrel concrete arch bridge.
Size. Span, 131 m; width not known.
Posting. Not posted, but of suspect strength.
Year of test. 1981.
Outcome of test. No need for posting. The bridge still carries unrestricted traffic
References. Bakht, B. 1981. Testing of the Cummings Bridge in Petawa, Structures research Office, Ministry of Transportation of Ontario, file report.

21. Gelleta Bridge

Location. Ontario (MTO Site No. 3-4).
Type. 3-span concrete T-beam bridge with 7, 28 and 7 m.
Size. 113 m long, and 18.2 m wide. Area = 2,066 m^2.
Posting. Posted for 11 t because of large diagonal cracks near the supports of the middle span.
Year of test. 1981.
Outcome of test. Posting was recommended to be retained.
References. Bakht, B. 1981. Tests on the Gelleta Bridge, Structures research Office, Ministry of Transportation of Ontario, file report.
Bakht, B., Mufti, A, and Tadros, G. 2011. Chapter 14, Monitoring of Slab-on-girder bridges, in Monitoring Technologies for Bridge Management, Multi-Science Publishing Co. Ltd., UK. Edited by B. Bakht, A. Mufti, and L.D. Wegner, L.D.

22, 23, 24, 25. Steel girder bridges with transverse laminated wood decking (Barnstable Bridge, Gillis Bridge, Reed Bridge, and Henderson Park Bridge)

Barnstable Bridge

Gillis Bridge

Location. Ontario.
Type. 3-span, single span and 3-span steel girder bridges with concrete deck slab.
Size. 41 m, 24 m and 55 m long.
Posting. Not posted.
Year of test. 1981.
Outcome of test. Design provisions for the analysis of sawn timber bridges of the Ontario Highway Bridge Design Code were revised in light of the test results.
References. Bakht, B. 1988. Load Distribution in Laminated Timber Decks. ASCE Journal of Structural Engineering, Vol. 114, No. 7, pp. 1551-1570.

26. Fox Lake Bridge

Location. Forestry Road in northern Ontario.
Type. Wood deck with internal prestressing.
Size. 3 spans of 4.11, 4.72 and 4.11 m.
Posting. Not posted
Year of test. 1981.
Outcome of test. The test confirmed the validity of internal post tensioning system for wood decks.
References. Taylor, R.J. and Walsh, H. 1983. A prototype prestressed wood bridge. Structures Research Report SRR-83-07, Ministry of Transportation of Ontario, Downsview, Ontario.

27. Sioux Narrows Bridge

Location. Northern Ontario.
Type. Timber through truss with timber decking.
Size. The bridge with a span of 15.26 m was considered to be the longest span timber bridge in the world.
Posting. The bridge scheduled to be replaced because of perceived deterioration of the truss members.
Year of test. 1985.
Outcome of test. The bridge was saved from replacement; it was replaced in 2006 by a wider bridge.
References. Taylor, R.J. 1987. Load testing and rehabilitation of the Sioux Narrows Bridge, Structures Research Report, SRR-86-04, Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. and Jaeger, L.G. 1987. Behaviour and evaluation of pin-connected steel truss bridges, Canadian Journal of Civil Engineering, Vol 14, No. 3, pp. 327-335.

28. Soil-steel bridge with relieving slab

Location. Ontario.
Type. Soil-steel bridge.
Size. Horizontally with a span of 8.75 m and a rise of 4.93 m. The structure with a cover of 1.34 m has a 0.3 m thick concrete slab
Posting. No posting.
Year of test. 1983
Outcome of test. The relieving slab reduced the live load effects in the conduit wall by about 50%.
Reference. Bakht, B. 1985. Live load response of a soil-steel structure with a relieving slab. Transportation Research Record 1008, pp. 1-7. Transportation Research Board, Washington, DC.

29, 30. Laminated wood deck bridges rehabilitated by prestressing (Kabigon River Bridge and Pickerel River Bridge)

Location. Ontario.
Type. Stress-laminated wood deck bridges.
Size. The Pickerel River Bridge has 9 spans with a total length of 37.81 m and a width of 10 m.
Posting. No posting.
Year of test. 1983.
Outcome of test. Despite substantial prestress loss, both bridges had adequate strength to carry unrestricted traffic.
References. Taylor, R.J. and Patel, N.J. 1986. Load testing and analysis of wood rehabilitated by transverse post tensioning. Structures Research Report SRR-86-08, Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. and Jaeger, L.G. 1994. Revisiting prestress losses in stress laminated wood decks. Proceedings, Annual Conference of CSCE held in Winnipeg.

31. Keele Street Bridge

Location. Toronto (MTO Site No. 37-94)
Type. Steel girder bridge with concrete deck slab.
Size. 3-span continuous bridge with spans of 40.8, 42.1 and 40.2 m, and a width of 14.3 m. Area = 1,760 m^2.
Year of test. 1983.
Outcome of test. The purpose of the test was to calibrate it for a weighing-in-motion study.
References. Grouni. H. 1983. Calibration tests on the Keele Street Bridge. Report on file, Structures Research Office, Ministry of Transportation of Ontario.
Harman, D.J. 1984. A study of commercial vehicles and their multi-presence, Phase III, Faculty of Engineering, The University of Western Ontario, Report submitted to MTO.

32. McIntyre River Bridge

Location. Thunder Bay, Ontario.
Type. Concrete rigid frame.
Size. Span of 15.24 m and width of 7.62 m.
Posting. No posting.
Year of test. 1983
Outcome of test. Strains in the reinforcement were much smaller than expected. To date, the cause for low strains in the reinforcement has not been established.
Reference. Kryzevicius, S. Testing and evaluation of the McIntyre River Bridge, Structures Research Report SRR-84-07, Ministry of Transportation of Ontario.

33. Morton Creek Bridge

Location. Ontario.
Type. Reinforced concrete T-beam construction.
Size. 3 continuous spans, 9.14, 15.24 and 10.67 m; width, 10.67 m.
Posting. No posting, but the analytical evaluation had shown that the bridge was only marginally safe to carry unrestricted traffic.
Year of test. 1983.
Outcome of test. Despite its appearance, the bridge was shown to have adequate capacity to carry unrestricted traffic.
Reference. Tharmabala, T. 1984. Test and evaluation of the Morton Creek Bridge, Structures Research Report SRR-84-01, Ministry of Transportation of Ontario.

34. Mattawa River Bridge

Location. Ontario.
Type. Two steel pony truss spans.
Size. Two spans, each 32.9 m long; width, 5.1 m.
Posting. No posting, but the bridge was considered to be marginally deficient.
Year of test. 1983.
Outcome of test. Any doubt about the structural adequacy of the bridge was removed by the test.
Reference. Tharmabala, T. 1984. Structural evaluation and testing of Mattawa River Bridge, Structures Research Report SRR-84-02, Ministry of Transportation of Ontario.

35. Ausable River Bridge

Location. Ontario (MTO Site No. 19-27).
Type. Steel plate girders with non-composite concrete deck slab.
Size. One main span with two cantilever spans, 7.62, 32.00 and 7.62 m; width, 7.31 m.
Posting. No posting, but the ends of the cantilever spans experienced substantial upward deflections.
Year of test. 1984.
Outcome of test. Upward deflection of 6 mm was observed at the tip of a cantilever span under a 70 t test vehicle. It was concluded that the tip deflections will be reduced after the deteriorated deck slab is replaced by a composite deck slab.
Reference. Tharmabala, T. 1984. Tests on the Ausable River Bridge, Structures Research Office report on file, Ministry of Transportation of Ontario.

36. Flack Bridge

Location. Ontario.
Type. Steel pony truss bridge.
Size. Span, 21.3 m; width, 7.3 m.
Posting. No posting, but the trusses were considered to be structurally deficient in their top and bottom chords.
Year of test. 1984.
Outcome of test. The bridge did not require strengthening.
Reference. Tharmabala, T. 1984.Structural evaluation and testing of Flack Bridge, Structures Research Report SRR-84-08, Ministry of Transportation of Ontario.

37. Irvine Creek Bridge

Location. Ontario.
Type. Steel pony truss bridge.
Size. Span, 31.7 m; width, 7.3 m.
Posting. No posting, but the bridge considered to be structurally deficient.
Year of test. 1984.
Outcome of test. The bridge had adequate capacity to carry unrestricted traffic.
Reference. Patel, N.J. 1984. Testing and evaluation of Irvine Creek Bridge, Structures Research Report SRR-84-11, Ministry of Transportation of Ontario.

38, 39. Pin-connected steel truss bridges

Location. Ontario.
Type. Steel through truss bridges.
Size. Span, 40 M, each; Width, 4.65 m, each.
Posting. 9 t.
Year of test. 1984.
Outcome of test. Retain the posting as is.
Reference. Bakht, B. and Jaeger, L.G. l987. Behaviour and Evaluation of Pin-Connected Steel Truss Bridges. Canadian Journal of Civil Engineering, Vol. 14, No. 3, pp. 327-335.

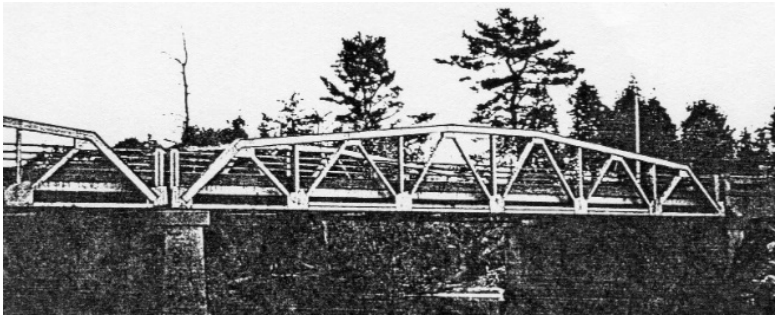
40. Driftwood River Bridge

Location. Ontario (MTO Site No. 39E-13).
Type. Reinforced concrete T-beam construction with haunches near intermediate supports.
Size. Five spans of 12.2, 18.3, 18.3, 18.3 and 12 m. Width = 10.1 m. Area = 800 m^2.
Posting. No posting, but the bridge was considered to be structurally deficient.
Year of test. 1984.
Outcome of test. The cracks near the intermediate supports were in compression under live loads, because of which the bridge was considered to have adequate strength for unrestricted traffic.
Reference. Bakht, B. 1984. Test on Driftwood River Bridge, Structures Research file report, Ministry of Transportation of Ontario.

41, 42. Finney Bridge and Stevenson Townline Bridge

Location. Ontario (MTO Site Nos. 31-236 and 42-62).
Type. Steel through truss.
Size. Finney Bridge, span 51.2; width, 4.7 m. Stevenson Bridge, span, 40 m, width, 5.2 m
Posting. Finney Bridge, 9 t. Stevenson Bridge, 9, 14 and 18 t.
Year of test. 1984.
Outcome of test. The posting was not changed.
Reference. Bakht, B. 1986. Testing of Two Pin-Connected Truss Bridges. Structures Research Report, SRR-86-06. Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. and Jaeger, L.G. l987. Behaviour and Evaluation of Pin-Connected Steel Truss Bridges. Canadian Journal of Civil Engineering, Vol. 14, No. 3, pp. 327-335.

43. Mississippi River Bridge



Location. Ontario (MTO Site No. 15-53).
Type. Steel pony truss with concrete deck and steel beams.
Size. Span, 29.9 m; width, 10.1 m. Area = 301 m^2.
Posting. No posting, but the bridge was considered to be structurally deficient.
Year of test. 1985.
Outcome of test. The bridge could not take unrestricted traffic in both lanes, but required no posting if only one vehicle at a time was permitted on the bridge.
Reference. Holowka, M. and Taylor, R.J. 1985. Test on Mississippi River Bridge, Structures Research file report, Ministry of Transportation of Ontario.

44. Keewatin Channel Bridge

Location. Ontario (MTO Site No.41S-45).
Type. Steel deck truss with concrete deck and steel beams.
Size. Spans of 104 m. Width = 10.1 m. Area = 1,049 m^2.
Posting. No posting, but the floor beams connecting the two trusses considered to be structurally deficient.
Year of test. 1985.
Outcome of test. No strengthening was required.
Reference. Tharmabala, T. 1985. Performance studies of Keewatin Channel Bridge, Structures Research Report SRR-85-05, Ministry of Transportation of Ontario.

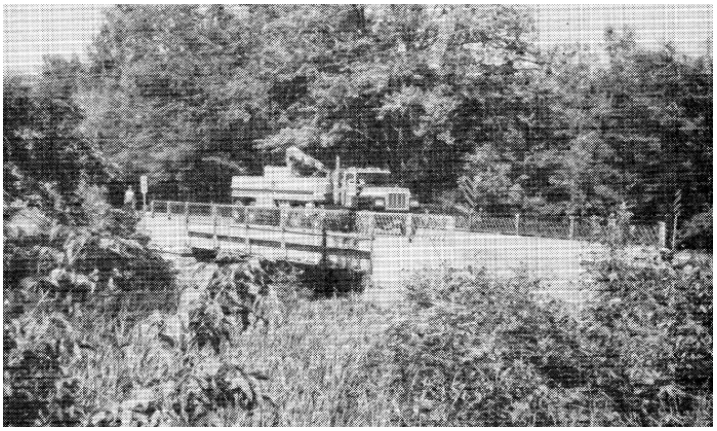
45. McLeod Bridge

Location. Ontario (MTO Site No. 31-124).
Type. Steel pony truss with concrete deck and steel beams.
Size. Span, 26.1 m; width, 4.3 m. Area = 112 m^2.
Posting. 8 t.
Year of test. 1985.
Outcome of test. Posting was upgraded to a triple posting of 10, 15 and 30 t.
Reference. Tharmabala, T. 1985. Tests on McLeod Bridge, Structures Research Office, file report, Ministry of Transportation of Ontario.

46. Belle River Bridge

Location. Ontario (MTO Site No. 6-89).
Type. Steel pony truss with metal decking topped with asphalt.
Size. Span, 28.0 m; width, 5.5 m. Area = 154 m^2.
Posting. Not posted, but considered to be deficient.
Year of test. 1985.
Outcome of test. The bridge needed load posting.
Reference. Grouni, H. 1985. Tests on Belle River Bridge, Structures Research Office, file report, Ministry of Transportation of Ontario.

47. Belle River Bridge



Location. County of Essex, Ontario (MTO Site No. 6-94).
Type. Steel girders and non-composite concrete deck slab.
Size. Span, 16.3 m; width, 9.1 m. Area = 148 m^2.
Posting. Not posted, but considered to be deficient
Year of test. 1985.
Outcome of test. The bearing restraint forces reduced live load moments in girders by about 15%.
Reference. Bakht, B. 1988. Testing of an Old Short Span Slab-on-Girder Bridge. Structures Research Report SRR-88-01. Ministry of Transportation of Ontario, Downsview, Ontario.
Bakht, B. and Jaeger, L.G. l988. Bearing Restraint in Slab-on-Girder Bridges. ASCE Journal of Structural Engineering, Vol. 114, No. 12, pp. 2724-2740.

48. McLeod Bridge

Location. Ontario (MTO Site No. 31-124).
Type. Steel pony truss with concrete deck and steel beams.
Size. Spans of 26.1 m; width = 4.3 m. Area = 112 m^2.
Posting. 8 t.
Year of test. 1985.
Outcome of test. Posting was upgraded to a triple posting of 10, 15 and 30 t.
Reference. Tharmabala, T. 1985. Tests on McLeod Bridge, Structures Research Office, file report, Ministry of Transportation of Ontario.

49. Belle River Bridge

Location. Ontario (MTO Site No. 6-94).
Type. Steel pony truss with metal decking topped with asphalt.
Size. Spans of 16.3 m. Width = 9.1 m. Area = 148 m^2.
Posting. Not posted, but considered to be deficient.
Year of test. 1985.
Outcome of test. The bridge needed no load posting.
Reference. Grouni, H., B. 1988. Testing of Belle River Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

50. XIII & XIV Side Road Bridge

Location. Township of Egremont, Ontario (MTO Site No. 8-275).
Type. Reinforced concrete T-beam.
Size. Span, 10.7 m; width, 5.8 m. Area = 62 m^2.
Posting. 14 t.
Year of test. 1985.
Outcome of test. The bridge needed no load posting.
Reference. Leach, G. 1985. Load testing of XIII & XIV Side Road Bridge, Township of Egremont, File report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

51. 20th Side Road Bridge

Location. Township of Egremont, Ontario.
Type. Steel pony truss.
Size. Span, 23.6 m; width, 4.6 m. Area = 108 m^2.
Posting. 15 t.
Year of test. 1985.
Outcome of test. Posting weight was recommended to be increased.
Reference. Leach, G. 1985. Load testing of 20th Side Road Bridge, Township of Egremont, File report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

52. Erion Road Bridge

Location. City of St. Catharines, Ontario (MTO Site No. 21-011).
Type. Reinforced concrete slab bridge.
Size. Span, 5.5 m; width, 4.3 m. Area = 24 m^2.
Posting. 2 t.
Year of test. 1985.
Outcome of test. The posting was increased to 10 t.
Reference. Bakht, B. 1985. Test on the Erion Road Bridge in the City of St. Catharines, File report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

53. South River Bridge

Location. Township of South Himsworth, Ontario (MTO Site No. 44-37).
Type. Steel pony truss bridge.
Size. Span, 24.4 m; width, 4.1 m. Area = 100 m^2.
Posting. 5 t.
Year of test. 1985.
Outcome of test. The posting was recommended to be increased.
Reference. Tharmabala, T. 1985. Test on the South River Road Bridge in the Township of South Himsworth, File report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

54. Groundhog River Bridge

Location. Ontario.
Type. Steel through truss bridge.
Size. Span, 75.6 m; width, 10.4 m. Area = 786 m^2.
Posting. The bridge was not posted but there was concern about the strength of some components.
Year of test. 1985.
Outcome of test. Sources of weakness were identified and the weak components were recommended for strengthening.
Reference. Green, R. 1985. Testing and evaluation of the Groundhog River Bridge, draft report, University of Waterloo, submitted to the Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

55. Burlington Skyway Bridge

Location. Ontario.
Type. Steel through truss bridge.
Size. Main span of 149.4 m.
Posting. The bridge was not posted but there was concern about the strength of the castellated stringers of the main span.
Year of test. 1985.
Outcome of test. The stress range under live loads at the corners of the hexagonal openings in the stringers was found to be about 2.25 times the stress range at the bottom flanges...
Reference. Bakht, B. 1985. Tests on the castellated stringers of the old Burlington Skyway Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

56. Pine River Bridge

Location. Ontario.
Type. Main span of steel deck truss and several approach spans, each with two steel girders.
Size. Main span of 25.0 m. Width = 4.6 m.
Posting. 5 t.
Year of test. 1986.
Outcome of test. Sources of weakness were identified and the weak components were recommended for strengthening.
Reference. Green, R. 1987. Testing and evaluation of the Groundhog River Bridge, draft report, University of Waterloo, submitted to the Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

57. Chaplain Bridge

Location. Across Ottawa River, in Ottawa.
Type. Steel deck truss bridge.
Size. About 700 m long.
Posting. The bridge was designed for only car traffic, but was required to carry concrete mix trucks for a construction project.
Year of test. 1986.
Outcome of test. The deck slab of the bridge was found to have adequate capacity to carry the construction trucks.
Reference. Bakht, B. 1985. Testing of the deck slab of the Champlain Bridge in Ottawa, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

58. Ragged Chutes Bridge

Location. Ontario Hydro Structure.
Type. Steel girders with transversely laminated wood deck, rehabilitated by longitudinal prestressing.
Posting. Not posted.
Year of test. 1986.
Outcome of test. The timber decking was tested for its load distribution characteristics.
Reference. Taylor, R.J. 1986. Tests on Ragged Chutes Bridge of Ontario Hydro, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

59. Princess Elizabeth Bridge

Location. Township of Peel, Ontario (MTO Site No. 35-242).
Type. Steel through truss.
Size. Span, 49.4 m; width, 8.8 m. Area = 435 m^2.
Posting. 16 t.
Year of test. 1986.
Outcome of test. The posting was increased to the triple posting of 20, 23 and 25 t.
Reference. Agarwal, A.C. 1986. Testing of Princess Elizabeth Bridge in the Township of Peel, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

60. Glen Allan Bridge

Location. Wellington County Road 45, Ontario (MTO Site No. 35-240).
Type. Steel through truss.
Size. Span, 48.8; width, 5.0 m. Area = 244 m^2.
Posting. 9 t.
Year of test. 1986.
Outcome of test. The posting was recommended to be increased to the triple posting of 15, 22 and 28 t.
Reference. Taylor, R.J. 1986. Tests on the Glen Allan Bridge in Wellington County, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

61. North Muskoka River Bridge

Location. Ontario.
Type. Steel girder, concrete deck slab.
Size. Span, 45.7 m; width, 14.6 m. Area = 667 m^2.
Posting. Not posted.
Year of test. 1986.
Outcome of test. Unexpected restraint in neoprene bearings reduced live load moments in girder by about 10%.
References. Bakht, B. and Jaeger, L.G. 1990. Observed Behaviour of a New Medium Span Slab-on-Girder Bridge. Journal of the Institution of Engineers (India). Vol. 70, January, pp. 164-170.
Bakht, B. 1988. Observed Behaviour of a New Medium Span Slab-on-Girder Bridge. Structures Research Report SRR-88-02. Ministry of Transportation of Ontario, Downsview, Ontario.

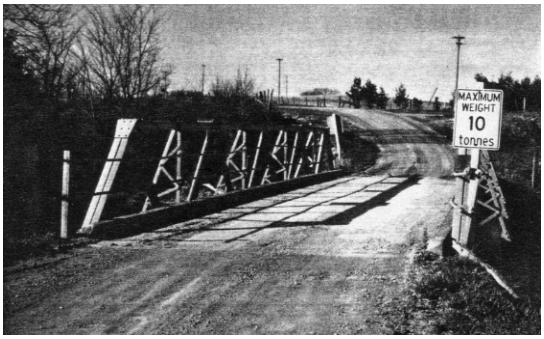
62. Hurontario Street Bridge

Location. Ontario (MTO Site No. 4-82).
Type. Concrete slab bridge with monolithic concrete walls.
Size. Span, 11.0 m; width, 5.5 m. Area = 6q m^2.
Posting. 16 t.
Year of test. 1986.
Outcome of test. Posting was recommended to be removed.
References. Maheu, J. 1988. Load test and evaluation of the Hurontario Street Bridge. Structures Research Report SRR-88-06. Ministry of Transportation of Ontario, Downsview, Ontario.

63. Turner's Bridge

Location. Bruce County, Ontario (MTO Site No. 2-066).
Type. Steel through truss.
Size. Spans, 48.8 and 45.7 m; width, 4.5 m. Area = 425 m^2.
Posting. 10 t.
Year of test. 1986.
Outcome of test. The posting was recommended to be increased to the triple posting of 18, 30 and 32 t.
Reference. Taylor, R.J. 1986. Test on the Turner's Bridge in Bruce County, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

64. Priebe Bridge

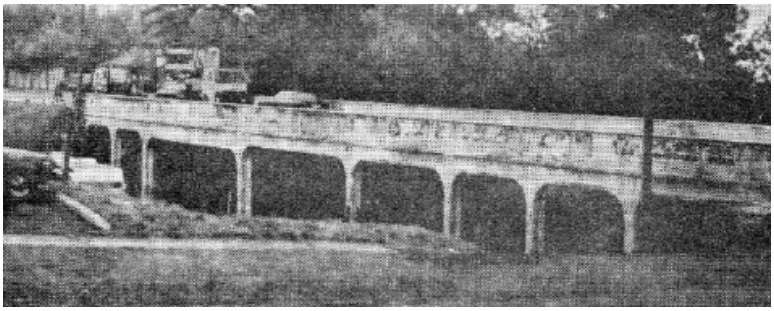


Location. Ontario (MTO Site No. 2-141).
Type. Steel pony truss.
Size. Spans, 23.9 m; width, 5.2 m. Area = 124 m^2.
Posting. 10 t.
Year of test. 1986.
Outcome of test. The posting was increased to the triple posting of 12, 18 and 26 t.
Reference. Agarwal, A.C. and Chouinard, K.L. 1988. Testing of the Priebe Bridge, draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

65. Middlemiss Bridge

Location. Elgin County, Ontario (MTO Site No. 5-45).
Type. 4-span bridge, with the main span being a steel through truss; the other spans are with steel girders and concrete deck slab.
Size. Information not available.
Posting. 18 t (one truck daily at a time).
Year of test. 1986.
Outcome of test. Three vehicles with GVW of 53, 39 and 22 t were observed to pass over the bridge.
Reference. Agarwal, A.C. 1986. Load survey through testing the Middlemiss Bridge in the County of Elgin, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

66. Algoma Street Bridge



Location. Ontario.
Type. Concrete T-beam bridge monolithic with columns.
Size. Seven spans, from 4.6 to 9.8 m.
Posting. 10 t.
Year of test. 1986.
Outcome of test. Although it had adequate load carrying capacity, the bridge was recommended to be replaced because of excessive deterioration.
References. Tharmabala, T. 1987. Algoma Street Bridge Test. Structures Research Report SRR-87-03. Ministry of Transportation of Ontario, Downsview, Ontario.

67. Parkway Garage (used as a bridge)

Location. 66 Scadding Avenue, Toronto, Ontario.
Type. Concrete slab.
Size. Spans, 5.1 m.
Posting. Not posted, but slab was designed for only garage loading.
Year of test. 1987.
Outcome of test. The bridge could be used for occasional trucks.
Reference. Agarwal, A.C. 1987. Load testing of Parkway Garage slab, draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

68. Structure No, 00801

Location. Ontario (MTO Site No. 18-002).
Type. Concrete rigid frame.
Size. Spans, 10.7 m; width, 10.0 m. Area = 107 m^2.
Posting. 10 t.
Year of test. 1987.
Outcome of test. The posting was recommended to be removed.
Reference. Agarwal, A.C. 1987. Test of Structure 00801, draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

69. McNeely Bridge

Location. Ontario (MTO Site No. 27-70).
Type. Concrete T-beam rigid frame.
Size. Span, 10.7 m; width, 5.9 m. Area = 63 m^2.
Posting. 7 t.
Year of test. 1987.
Outcome of test. The bridge was recommended to be posted for 12, 14 and 26 t.
Reference. Maheu, J. 1987. Test on McNeely Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

70. 8th Line Bridge

Location. Cumberland Township, Ontario (MTO Site No. 27-18).
Type. Concrete T-beam rigid frame.
Size. Spans, 10.7 and 10.7 m; width, 5.9 m. Area = 126 m^2.
Posting. Not posted but considered to be structurally deficient.
Year of test. 1987.
Outcome of test. The bridge was recommended to be posted for 17, 23 and 33 t.
Reference. Maheu, J. 1987. Test on 8th Line Bridge in Cumberland Township, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

71. Malone Bridge

Location. Cumberland Township, Ontario (MTO Site No. 11-230).
Type. Concrete T-beam rigid frame.
Size. Span, 12.2 m; width, 5.6 m. Area = 68 m^2.
Posting. 25 t.
Year of test. 1987.
Outcome of test. The bridge was recommended to be posted for 10 t.
Reference. Agarwal, A/C. 1987. Test on Malone Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

72. Ballantyne Bridge

Location. Ontario (MTO Site No. 25-248).
Type. Steel girders, concrete deck slab.
Size. Span, 13.3 m; width, 4.6 m. Area = 61 m^2.
Posting. 9 t.
Year of test. 1987.
Outcome of test. The bridge was recommended to be posted for 18, 26 and 34 t.
Reference. Taylor, R.J. 1987. Test on Ballantyne Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

73. 400/89 Underpass

Location. Ontario (MTO Site No. 30-256).
Type. Concrete rigid frame with cellular construction.
Size. Spans, 10.7 and 10.7 m; width, 5.9 m. Area = 126 m^2.
Posting. Not posted but considered to be structurally deficient and in need of strengthening.
Year of test. 1987.
Outcome of test. No strengthening was required.
Reference. Agarwal, A.C. 1987. Test on 400/89 Underpass, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

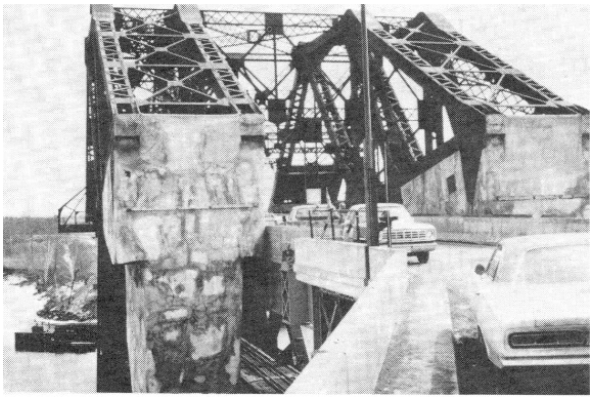
74. Waubaushene Bridge

Location. Ontario (MTO Site No. 30-373).
Type. Steel pony truss.
Size. Spans, 19.5, 22.6 and 22.6 m; width, 5.9 m. Area = 381 m^2.
Posting. 11 t.
Year of test. 1987.
Outcome of test. Posting was recommended to be lowered to 8 t.
Reference. Agarwal, A.C. 1987. Test on Waubaushene Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

75. Jones Bridge

Location. Ontario (MTO Site No. 24-58).
Type. Concrete T-beam.
Size. Span, 12.8 m; width, 5.8 m. Area = 74 m^2.
Posting. Not posted but considered to be structurally deficient.
Year of test. 1987.
Outcome of test. Not structurally deficient.
Reference. Taylor, R.J. 1987. Test on Jones Bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

76. Kamantistiqua Bridge



Location. Ontario.
Type. Approach spans of twin steel girders and main span of bascule bridge.
Size. Tested approach spans, 26.5 and 18.3 m.
Posting. Speed limit of 15 mph.
Year of test. 1988.
Outcome of test. The speed limit was recommended to be removed.
References. Tharmabala, T. 1988. Structural evaluation and load testing of Kamantistiqua Bridge. Draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

77. 12th Brant Line Bridge

Location. Ontario.
Type. Steel through truss bridge.
Size. Two spans, 34.7 and 48.8 m. Width = 5.3 m. Area = 442 m^2.
Posting. 2 t.
Year of test. 1988.
Outcome of test. The bridge was recommended to the triple posting of 13, 20 and 27 t.
Reference. Agarwal, A.C. 1988. Testing of the 12th Line Bridge, draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

78. 18th Avenue Bridge

Location. Ontario.
Type. Reinforced concrete T-beam.
Size. Span, 9.1 m. Width = 5.6 m. Area = 51 m^2.
Posting. 8 t.
Year of test. 1988.
Outcome of test. The bridge was recommended to the triple posting of 16, 20 and 29 t.
Reference. Maheu, J. and Agarwal, A.C. 1988. Testing of the 18th Avenue Bridge, draft report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

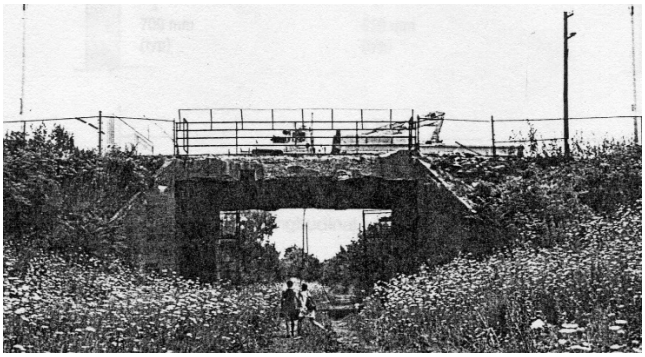
79. Small Suspension Bridge

Location. Scarborough, Ontario.
Type. Suspension bridge.
Posting. 5 t.
Year of test. 1989.
Outcome of test. The bridge was able to sustain safely a gross vehicle weight of 40 t.
Reference. Bakht, B. 1989. Testing of the Scarborough suspension bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

80. Sandy Creek Bridge

Location. Ontario (MTO Site No. 31-14EN).
Type. Reinforced concrete T-beam, with voided slab extension.
Size. Span, 9.8 m. Width = 10.8 m. Area = 106 m^2.
Posting. 9 t.
Year of test. 1992.
Outcome of test. The bridge was recommended to the triple posting of 14, 24 and 34 t.
Reference. Bakht, B. and Jaeger, L.G. 1997. Evaluation by proof testing of a T-beam bridge without drawings. The Structural Engineer, Vol. 75, No. 19, pp. 339-344.

81. Wyandotte Street Bridge



Location. Windsor, Ontario.
Type. Reinforced concrete T-beam.
Size. Span, 9.8 m. Width = 20.1 m. Area = 197 m^2.
Posting. Two lanes closed, other lanes posted for 5 t.
Year of test. 1992.
Outcome of test. The bridge was recommended to the triple posting of 19, 26 and 35 t.
Reference. Bakht, B. and Mufti, A.A. 1992. Evaluation of a deteriorated concrete bridge by testing. Proceedings, 4th International Colloquium on Concrete in Developing Countries, Kingston, Jamaica, February. Canadian Society for Civil Engineering, pp. 391-404.

82. Cornwall International Bridge

Location. Bridge at Cornwall between Canada and USA.
Type. Suspension bridge with two-girder approach spans.
Posting. Not posted but analytical evaluation showed the floor system to have inadequate load carrying capacity.
Year of test. 1992.
Outcome of test. The floor system of the bridge was found to have adequate capacity.
Reference. Bakht, B. and Mufti, A.A. 1992. Behaviour of Floor Beams of Bridges with Two Main Components. Proceedings of the CSCE Annual Conference. Quebec City, pp. 217-221.

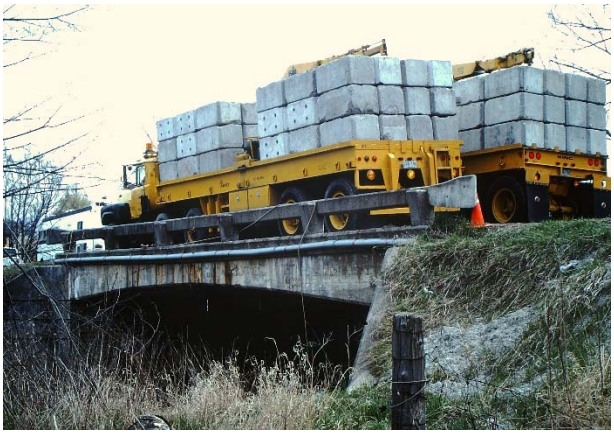
83. Adair Bridge

Location. Windsor, Ontario.
Type. Steel girders, non-composite deck slab.
Size. Span, 13.7 m; width, 4.9 m. Area = 67 m^2.
Posting. 10 t.
Year of test. 1992.
Outcome of test. The bridge was recommended to the triple posting of 19, 26 and 35 t.
Reference. Bakht, B. and Jaeger, L.G. 1993. Analytical and observed responses of steel girder bridges. IABSE Colloquium on Remaining Structural Capacity, Copenhagen, Denmark, March 17-19, pp. 261-272.

84. North Pagwachewan River Bridge

Location. Northern Ontario.
Type. Steel girders, composite timber deck.
Size. Span, 50.0m; width, 12.4 m. Area = 6290 m^2.
Posting. New bridge.
Year of test. 1992.
Outcome of test. The testing confirmed the validity of the new concept of steel-wood composite bridges.
Reference. Bakht, B. and Krisciunas, R. 1997. Testing of a steel-wood composite prototype bridge. Structural Engineering International. 1/97, pp. 35-41.
Bakht, B. 1996. Recent developments in timber bridge engineering in Canada. Nordic Timber Bridge Symposium, held in Helsinki, Finland, September. (Published as conference notes).

85. A deteriorated Bridge



Location. Ontario.
Type. Concrete T-beam with rigid frame construction.
Posting. Not posted but was considered structurally suspect.
Year of test. 1995.
Outcome of test. The bridge was able to sustain safely two test trucks, each with a gross vehicle weight of 100 t.
Reference. Bakht, B. 1995. Testing of a rigid frame bridge, file report, Structures Research Office, Ministry of Transportation of Ontario, Downsview, Ontario.

86. Salmon River Bridge

Location. Nova Scotia.
Type. Steel-free deck slab on steel girders.
Posting. New bridge with novel concrete deck slab.
Year of test. 1996.
Outcome of test. The novel concept was verified.
Reference. Mufti, A.A., Jaeger, L.G., and Bakht, B. 1997. Field performance of steel-free deck slabs of girder bridges. Proceedings, US-Canada-Europe Workshop on Bridge Engineering, held in Zurich, Switzerland, July 14-15, pp. 243-250.

87. Chatham Bridge

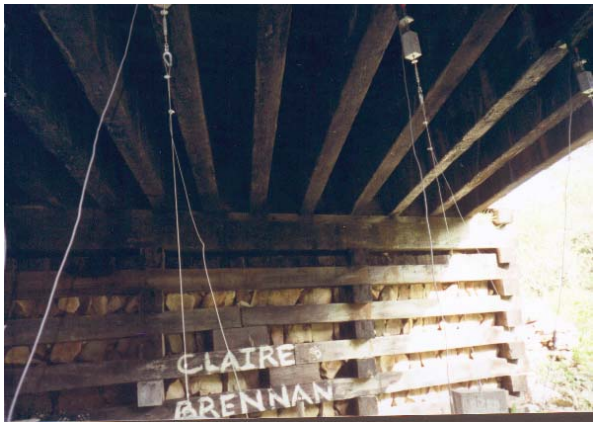
Location. Ontario.
Type. Steel-free deck slab on steel girders.
Posting. New bridge with novel concrete deck slab.
Year of test. 1997.
Outcome of test. The novel concept was verified.
Reference. Mufti, A.A., Jaeger, L.G., and Bakht, B. 1997. Field performance of steel-free deck slabs of girder bridges. Proceedings, US-Canada-Europe Workshop on Bridge Engineering, held in Zurich, Switzerland, July 14-15, pp. 243-250.

88. Lindquist Bridge

Location. Forestry Roads, British Columbia.
Type. Precast concrete slab of two steel girders.
Size. Span, 23.1 m; width, 3.3 m.
Posting. Not posted but the novel precast concrete slab had no tensile reinforcement, requiring confirmation by testing.
Years of test. 1997 and 2007.
Outcome of test. The tests confirmed that the novel design was ok.
References. Sargent, D.D., Murison, E.R., Bakht, B. and Mufti, A. 2007. Structural health monitoring of Lindquist Bridge. Proceedings (on CD) of the 3rd International Conference on Structural Health Monitoring & Intelligent Infrastructure, ed. by B. Bakht and A. Mufti, held in Vancouver, November, International Society for Structural Health Monitoring & Intelligent Infrastructure, Winnipeg, Canada.

89, 90, 91, 92, 93, 94. Sawn timber Stringer Bridges (Sandy Gillis, Captain Gillis, Little River, Margaree Harbour, McLeod, Grand Etang)

Location. Nova Scotia.
Type. Sawn timber stringers with transversely nail laminated wood decks.
Size. Sandy Gillis, 4 spans, 4.6, 1.2, 8.3, 8.8 and 4.5 m; width, 9.0 m. Captain Gillis, spans, 3.8, 7.0, 1.7, 7.0 and 4.0 m; width, 12.4 m. Little River, 5 spans, 4.0 m each; width, 12.4 m. Margaree Harbour, many spans, each 7.6 m. McLeod, single span, 9.3 m. Grand Etang, 2 spans, 5.2 m each.
Posting. Live load rating factors (LLRFs) Sandy Gillis, 0.84; Captain Gillis, 1.28; Little River, 1.07; Margaree Harbour, 0.91; McLeod, 0.73; Grand Etang, 0.87.
Year of test. 1998.
Outcome of test. Live load rating factors (LLRFs) Sandy Gillis, 1.30; Captain Gillis, 1.57; Little River, 1.49; Margaree Harbour, 1.75; McLeod, 0.87; Grand Etang, 1.06.
Reference. Bakht, B. and Mufti, A. 1998. Diagnostic testing of six sawn timber stringer bridges in Nova Scotia, JMBT Structures Research report submitted to Nova Scotia Transportation and Public Works.



Margaree Harbour Bridge

Little River Bridge

Grand Etang Bridge

95. Shear-connected Concrete Plank Bridge

Location. Forestry roads, British Columbia.
Type. Reinforced concrete plank bridge.
Size. Harris Creek Bridge. Span, 10.63 m; width, 5.84 m.
Posting. Not posted, but the stresses in welds in shear keys between the concrete planks were suspected to be high.
Year of test. 1999.
Outcome of test. The testing confirmed that the welded stresses were not high.
Reference. Bakht, B., and Mufti, A. A. 1999. Testing of two shear-connected concrete plank bridges. Report prepared for BC Ministry of Forests.
Bakht, B., Mufti, A.A., and Sargent, D.D. 2001. Assessment of stresses in welds of shear-connected concrete plank bridges. CSCE Annual Conference, held in Victoria, BC (proceedings on CD ROM, hardcopy, without pagination).

96. Maryland Bridge

Location. Winnipeg, Manitoba.
Type. Prestressed concrete slab-on-girder bridge.
Size. Span, 5.8 m; width, 3.7 m.
Posting. Not posted but broken strands in deck slab were reinforced by steel bars.
Year of test. 2006.
Outcome of test. The testing confirmed that the repair method was effective.
Reference. Bakht, B. Mufti, A., and Tadros, G. 2006. Testing of Maryland Bridge, Submitted to Bridges Planning and Operations, Public Works Department, City of Winnipeg.

97. Concrete channel bridge

Location. Manitoba.
Type. Prestressed concrete bridge with shear-connected channels.
Size. 3 span, 19.9 m each; width, 17.6 m.
Posting. Considered sub-standard mainly because of corrosion.
Year of test. 2007.
Outcome of test. Components of the decommissioned bridge were tested in lab and found to have sufficient strength for AASHTO HS-20 loading.
Reference. Mills, B. 2007. Masters thesis, Department of Civil Engineering, University of Manitoba.

98. Bowater Bridge

Location. Crosses over a penstock of Nova Scotia Power Inc., carrying a private road.
Type. Reinforced concrete slab bridge.
Size. Span, 5.8 m; width, 3.7 m.
Posting. In the absence of drawings, the bridge was considered to be unsafe for normal traffic.
Year of test. 2008.
Outcome of test. The testing confirmed that the bridge had adequate strength.
Reference. Bakht, B., Mufti, A., Newhook, J. and Tadros, G. 2008. Evaluation by testing of a slab-on-girder bridge in Nova Scotia by proof testing, Submitted to Mr. Paul Currie, P.Eng., Nova Scotia Power Inc., Halifax NS B3J 2W5.

99. CP Railway Bridge

Location. Belleville, Ontario.
Type. Steel plate girder.
Size. Six spans, each 26.1 m; width, 5.3 m.
Posting. Speed of trains was restricted because of some perceived weaknesses.
Years of test. 2009 and 2014.
Outcome of test. Bottom flanges of plate girders and stringers had substantially smaller live load stresses than calculated.
References. Bakht, B., Mufti, A., Sheikh, S. and Tadros, G. 2011. Sample of a report on testing of a railway bridge, Chapter 17 of Monitoring Technologies for Bridge Management, ed. by B. Bakht, A.A. Mufti and L.D. Wegner, Multi-Science Publishing, UK.
Bakht, B. and Mufti, A. 2016. Bridge 92.18 over the Moira River, load re-monitoring, submitted by Parsons to Canadian Pacific.

100. Paradise Island Bridge East

Location. The Bahamas.
Type. Concrete deck slab on prestressed concrete girders.
Size. 18 spans with a total length of475 m; width, 11.0 m.
Posting. 15 t, and a speed of 25 mph. A major UK consulting firm had recommended that the bridge should be replaced.
Years of test. 2014.
Outcome of test. The bridge was recommended to be kept and posted for 25 t.
References. 2014. Bakht, B., Mufti, A., Helmi, K. and Murison, E. Proof Testing of the Paradise Island Bridge East. Reviewed by Delcan and Engineering and Technical Services. Submitted to: Ministry of Public Works and Transport Commonwealth Government of the Bahamas.

101. Desjardins Canal Railway Bridge

Location. Hamilton, Ontario.
Type. Steel plate girder.
Size. Six spans, each 26.1 m; width, 5.3 m.
Posting. Speed of trains was restricted because of some perceived weaknesses.
Years of test. 2014.
Outcome of test. The test identified a major source of weakness, which was repaired.
References. Bakht, B. and Mufti, A. 2016. Desjardins Canal Bridge, load re-monitoring, submitted by Parsons to Canadian Pacific. The tested bridge is on right:

For more information, please contact:
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