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# Evaluation of the Grade Crossing Closure Program

Transport Canada  
Evaluation and Advisory Services

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## Evaluation of the Grade Crossing Closure Program

The Grade Crossing Closure Program (GCCP) is a low-materiality program that underwent a full evaluation in 2008; because of this, it was selected as the first of a series of small grant or contribution programs to undergo a streamlined, 'update' evaluation. While Section 42.1 of the *Financial Administration Act*, requires departments to assess the relevance and performance of ongoing non-statutory programs of grants and contributions every five years, Treasury Board Secretariat has been encouraging the evaluation community to take a more risk-based approach for a number of years now. While every evaluation needs to address the core issues outlined in the *Directive on the Evaluation Function*, Evaluators are now encouraged to expend more time and resources on high-risk, high-materiality programs, and less time and resources on low-risk, low-materiality programs. In this instance, the strategy was to leverage our earlier interviews, surveys, site visits and background analysis to reduce the time and cost of the evaluation. For each of the issues outlined in the Directive, we began with the findings of the 2008 evaluation, and then focused the discussion on what has changed since then.

### PRINCIPAL FINDING

Closing grade crossings is recognized as an effective way to manage the risks inherent to road-rail interaction. Since 2003-04 the GCCP has funded the closure of 124 crossings and has spent 56 percent of its annual appropriation (50.3 percent between 2008-09 and 2012-13). Considering that Transport Canada has documented more than 31,000<sup>1</sup> federally regulated grade crossings, and that there were 749 grade crossing accidents in the last decade that killed or seriously injured 702 people, this suggests one of two possible issues: either demand for the funding from the Program is limited, or a genuine need exists, but due to Program design or delivery issues, this need has not translated into signed funding agreements. Because closures that were funded were not selected on a risk basis, it is difficult to demonstrate that by closing an average of 12 crossings per year, the Program is having a significant impact or contributing to Transport Canada's rail safety objectives.

### BACKGROUND

The GCCP has been in place since 2003-04. The Program provides grants to compensate private land owners and public road authorities that have rights under Part III of the *Canada Transportation Act* to cross a federally regulated railroad track at a specified location for the relinquishment of their crossing rights. Applicants can receive \$20,000 for an unrestricted crossing, typically a public road, or \$5,000 for a restricted or private crossing, typically a farm crossing or a crossing on private land. Since 2005-06, the GCCP's annual voted appropriation has been \$300,000. The Grade Crossing Closure Program runs in tandem with the larger Grade Crossing Improvement Program (GCIP). While the GCCP offers grants to rights holders to give up their crossing rights, the GCIP uses contributions to reimburse up to 50 percent

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<sup>1</sup>Transport Canada has detailed records on more than 20,000 federally regulated level crossings, and is aware of an additional 11,000. It is not the intention of the program to close all 31,000 federally regulated crossings as many of these crossings support the urban and rural transportation requirements of Canadians.

of the eligible costs associated with upgrading, physically closing or relocating public crossings in the interests of safety.

From 2003-04 to 2011-12, the Program was delivered from Transport Canada's head office by the Rail Safety Directorate with the support of Rail Safety Inspectors in the regions. As of April 1, 2012, the management and delivery of the GCCP was transferred to Transportation Infrastructure Programs, in accordance with Transport Canada's *Policy-Program Continuum*. The Program is delivered using shared, rather than dedicated resources; from 2008-09 to 2011-12, Rail Safety estimates that the human resources requirement for the GCCP was approximately 0.8 Full Time Equivalent (FTE) staff (0.3 headquarters FTE and 0.5 regional FTE). In 2012-13, Programs Group estimated it would require 0.75 FTE to deliver the GCCP (0.25 headquarters FTE and 0.5 regional FTE).

## EVALUATION FINDINGS

### Relevance

In the 2008 evaluation, the GCCP was deemed to be relevant to needs with respect to rail safety based on Canadian and international evidence that grade crossings were inherently dangerous, and that closing these crossings was an effective way to neutralize such dangers. Evaluators also noted that the federal government, rather than their provincial or municipal counterparts, was best placed to deliver this Program, and that there was significant private sector involvement – a survey of program participants found that almost half had been approached by a railway company official.

**Finding: Grade crossing accidents continue to result in fatalities and serious injuries, and while it is unlikely that all accidents could be eliminated, a program to close unnecessary or unsafe road/rail crossings on federally regulated railroads continues to be in-line with federal rail safety responsibility and government priorities.**

The *Railway Safety Act Review* final report noted that the most obvious way to reduce the number of accidents at grade crossings was to reduce the number of crossings. Recent consultations with the Railway Association of Canada indicated that there are 31,401 federally regulated crossings in Canada: 16,771 public crossings, 8,398 private crossings and 6,232 farm crossings. While it does not have data on all of these, the Rail Safety Directorate maintains an inventory of rail/road crossings using the Integrated Rail Information System (IRIS) crossing database. IRIS currently documents the location and characteristics of 20,394 federally regulated crossings and 4,899 provincially regulated crossings (see Table 1).<sup>2</sup> On a monthly basis, the IRIS database is cross referenced with the Transportation Safety Board's accident database to highlight the frequency and severity of incidents at each crossing. In conjunction with the University of Waterloo, Rail Safety developed an MS Excel module called Gradex that further analyzes this information, and provides an estimate of the relative risk of each crossing, and the probability of an accident at each of these sites in any given year. From the data in IRIS, it is clear that the vast majority of level crossing accidents, 92 percent, occurred at federally regulated public crossings.

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<sup>2</sup> Additional crossings are added to the IRIS database once their exact location and details are made available to Transport Canada in order to fully document all of the 31,000 federally regulated crossings.

**Table 1:** Grade Crossings Listed in Transport Canada's IRIS Database

Crossings	Public Crossings	Private Crossings	Farm Crossings	Total Crossings
<b>Federally Regulated Crossings</b>	<b>16,236</b>	<b>2,459</b>	<b>1,699</b>	<b>20,394</b>
Sites with Accidents	1,381	92	20	1,493
Number and percentage of Accidents	2,353 (92%)	119 (4.7%)	24 (0.94%)	2,496 (97.6%)
<b>Provincially Regulated Crossings</b>	<b>3,832</b>	<b>371</b>	<b>696</b>	<b>4,899</b>
Sites with Accidents	39	0	1	40
Number and percentage of Accidents	61 (2.4%)	0 (0%)	1 (0.04%)	62 (2.4%)
<b>Other Crossings</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>7</b>
Sites with Accidents	0	0	0	0
Number and percentage of Accidents	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Total Crossings</b>	<b>20,075</b>	<b>2,830</b>	<b>2,395</b>	<b>25,300</b>
Sites with Accidents	1,420	92	21	1,533
Number and percentage of Accidents	2,414 (94.4%)	119 (4.7%)	25 (0.98%)	2,558 (100%)

Source: Transport Canada, IRIS Database

As Figure 2 outlines, while there have been fluctuations in the volume of rail traffic in Canada since 2002, overall, it has remained fairly constant at an average of 81.3 Million Main Track Train Miles (MMTTM). The *Rail Safety Act Review* noted that since the 1980s, the number of crossing related accidents has been declining quite significantly. Over the last 10 years, there has been a notable decline in both the overall number of crossing accidents, and in the number of crossing accidents per MMTM. However, it is important to note that the proportion of rail accidents that occurred at grade crossings has remained constant at about 18 percent, and over the last ten years, crossing accidents have consistently been the most common cause of rail related serious injuries, and a significant cause of rail related fatalities, second only to trespassing related incidents. From 2007 to 2011, the average number of serious injuries from crossing accidents was 25 per year, and the average number of crossing-related fatalities was 24 per year.

**Table 2:** Reportable Rail Related Accidents, Serious Injuries and Fatalities in Canada

Accidents	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Rail Volumes</b> (Million Main Track Train Miles)	<b>81.3</b>	<b>80.6</b>	<b>82.6</b>	<b>85.8</b>	<b>86.9</b>	<b>84.5</b>	<b>83.1</b>	<b>72.2</b>	<b>77.6</b>	<b>78.3</b>
<b>Rail Accidents</b>	<b>1,332</b>	<b>1,352</b>	<b>1,413</b>	<b>1,476</b>	<b>1,371</b>	<b>1,320</b>	<b>1,179</b>	<b>1,043</b>	<b>1,076</b>	<b>1,023</b>
Serious Injuries	73	81	93	78	71	58	64	50	62	51
Fatalities	96	79	101	103	95	84	74	71	81	71
<b>Crossing Accidents</b>	<b>260</b>	<b>250</b>	<b>236</b>	<b>269</b>	<b>243</b>	<b>218</b>	<b>221</b>	<b>188</b>	<b>181</b>	<b>169</b>
Per Million Main Track Train Miles	3.1	3	2.8	3	2.7	2.5	2.6	2.5	2.3	2.1
percentage of total	20%	18%	17%	18%	18%	17%	19%	18%	17%	17%
<b>Crossing Injuries</b>	<b>42</b>	<b>52</b>	<b>50</b>	<b>55</b>	<b>29</b>	<b>21</b>	<b>36</b>	<b>21</b>	<b>28</b>	<b>21</b>
percentage of total	58%	64%	54%	71%	41%	36%	56%	42%	45%	41%
<b>Crossing Fatalities</b>	<b>46</b>	<b>28</b>	<b>25</b>	<b>37</b>	<b>28</b>	<b>25</b>	<b>26</b>	<b>19</b>	<b>24</b>	<b>25</b>
percentage of total	48%	35%	25%	36%	29%	30%	35%	27%	30%	35%

Source: Transport Safety Board of Canada, Railway Statistics

## Achievement of Expected Outcomes

Overall, the 2008 evaluation concluded that former users of closed crossings had adopted safer, alternate routes, but were unable to determine the extent to which the GCCP had resulted in a reduction in road/rail accidents. While the Evaluators noted that the crossings that received funding were eligible based on the Program's criteria, they also indicated that the GCCP was not risk-based and did not have an inventory of eligible crossings. Also, the Evaluators recommended that Transport Canada play a more active role in the promotion of the Program to eligible crossing owners.

**Finding: Between 2008-09 and 2013, the GCCP funded the closure of 78 grade crossings, all of which were validated through an on-site inspection.**

Since its creation in 2003-04, the GCCP has facilitated the closure of 124 crossings: 58 public and 66 private or farm crossings (see Table 3). GCCP funds are intended to compensate recipients for extinguishing their rights rather than funding the work needed to close those crossings; however, before issuing payment Transport Canada requires that Rail Safety Inspectors in the regions conduct an onsite inspection to verify that the crossing has in fact been closed. Program staff indicated that the practice of using Transport Canada Inspectors to validate closures was costly, and often unnecessary, as the railways companies or the grant recipients are often able to document that the crossing has been closed.

Providing grants for the relinquishment of crossing rights has a number of unique benefits that distinguish it from the contribution-based GCIP; specifically, it allows recipients to be financially better off in a way that they would not be if they were being reimbursed for expenditures through a contribution program, thus creating an incentive to close nonessential crossings. Further, the GCCP is available to fund the closure of private and farms crossings; while GCIP funding can be used to pay for work related to the closure of public or de facto public crossings, it cannot fund work related to private or farm crossings.

**Table 3:** Approved Projects 2003-04 to 2012-13

Year	Available Funds	Public Crossings		Private/Farm Crossings		All Crossings		Unused Funds	
		Projects	Value	Projects	Value	Projects	Value		
2003-04	\$100,000	4	\$80,000	0	\$0	4	\$80,000	\$20,000	20%
2004-05	\$250,000	3	\$60,000	4	\$20,000	7	\$80,000	\$170,000	68%
2005-06	\$300,000	9	\$180,000	4	\$20,000	13	\$200,000	\$100,000	33%
2006-07	\$300,000	6	\$120,000	4	\$20,000	10	\$140,000	\$160,000	53%
2007-08	\$300,000	5	\$100,000	7	\$35,000	12	\$135,000	\$165,000	55%
2008-09	\$300,000	6	\$120,000	0	\$0	6	\$120,000	\$180,000	60%
2009-10	\$300,000	7	\$140,000	3	\$15,000	10	\$155,000	\$145,000	48%
2010-11	\$300,000	13	\$260,000	1	\$5,000	14	\$265,000	\$35,000	12%
2011-12	\$300,000	1	\$20,000	36	\$180,000	37	\$200,000	\$100,000	33%
2012-13	\$300,000	4	\$80,000	7	\$35,000	11	\$115,000	\$185,000	62%
<b>Total</b>	<b>\$2,750,000</b>	<b>58</b>	<b>\$1,160,000</b>	<b>66</b>	<b>\$330,000</b>	<b>124</b>	<b>\$1,490,000</b>	<b>\$1,260,000</b>	<b>46%</b>

Source: Program Files

**Finding: The Grade Crossing Closure Program has never concluded enough agreements to spend its voted appropriation.**

The 2008 evaluation observed that program uptake appeared to be weak, but noted that the number of closures funded through the GCCP did appear to be accelerating. Since then however, the Program's growth has stabilized. In retrospect, the GCCP has always been undersubscribed, and has since its creation, surplused 46 percent of its voted authorities. During the period of this evaluation, these surplus funds were most often lapsed or transferred to the Grade Crossing Improvement Program which received \$145,000, \$180,000 and \$140,000 in 2007-08, 2008-09 and 2009-10 respectively.

The 2008 evaluation recommended that Transport Canada play a more active role in the promotion of the GCCP. In response, Rail Safety produced a brochure that could be distributed at trade shows and other venue's promoting the Grade Crossing Improvement Program and the Grade Crossing Closure Program, and a project to engage with selected municipalities was piloted in Prairie and Northern Region. In parallel, the *Rail Safety Act Review* also recommended that "Transport Canada, with the railways and other relevant stakeholders, should develop a program to: identify where crossings can be closed; limit the number of new crossings; and improve safety at existing crossings." This work culminated in the negotiation of a Memorandum of Understanding with the Canada Transportation Agency to align the organization's respective processes and activities related to crossings. Transport Canada agreed to keep industry informed of any new railway works applications.

Despite this, active outreach has never been central to the GCCP. In 2010-11, the Program did experience a surge in applications, but this was largely a result of the efforts of one of the railway companies to reduce the number of crossings on one of its subdivisions; in this instance, railway company officials physically visited rights holders at their premises, explained the Program to them, and provided them with application form letters that they could sign and send to Transport Canada. Although in principle there are safety benefits to closing any crossing, there are a variety of commercial and operational reasons why a railway may want to reduce the number of crossings on its subdivisions, the most common being the desire to run trains faster and more frequently, or to expand existing sidings.

**Finding: Transport Canada does not use risk data when considering GCCP applications; The Department has this information, and actively uses it to rank GCIP applications, but does not do so for the GCCP because that program currently has more money than applicants.**

Evaluators reviewed 78 successful applications that resulted in grant agreements between 2008-09 and 2012-13. As Table 4 outlines, the most common rationale given for closing a crossing was the dangers associated with high train or road traffic volumes or high train or road traffic speeds. Three of the crossings closed had been the site of earlier accidents. Although the file review provided evidence that specific safety criteria were central to the application and approval process, it was also clear, and Program staff confirmed that they were not using the GradeX risk data or any other regional risk model as part of the application or approval process.

**Table 4:** Safety Issues Identified in GCCP Applications (2008-09 to 2012-13)

<b>Crossing Closure Rational</b>	<b>Percentage of Applications</b>
<b>Diversion to a safer nearby crossing (exclusively)</b>	<b>10.3%</b>
<b>Diversion to a safer nearby crossing as well as specific safety concerns</b>	<b>89.7%</b>
High train or road traffic volumes	75.6%
High train or road traffic speeds	70.5%
Multiple track crossings	9.0%
Severely restricted sightlines	9.0%
Unfriendly angle of approach	12.8%
History of accidents	3.8%

**Source:** Program files

## **CONCLUSION**

Both the 2008 evaluation and the *Rail Safety Act Review* recommended that Transport Canada take a more active approach to selecting crossings for closure; at present, the GCCP remains applicant-driven and undersubscribed, and is in the practice of approving all eligible applications, regardless of risk level. Further, to achieve measurable results, the GCCP needs to pay greater attention to the relative risk posed by individual grade crossings when making funding recommendations. The GCCP is rooted in the assumption that there are risks inherent to any crossing, and that every closure makes the public safer. Although there may be some truth in this, it is difficult to conclude that by closing 124 of 31,000 federally regulated crossings over the last 10 years, this program has had a discernible impact on the safety of the Canadian transportation system.

## **UPDATED RECOMMENDATIONS**

- 1. Transport Canada should consider reducing the GCCP's appropriation to more closely align with its average annual spending, or develop a strategy to spend its current appropriation to achieve the Program's objectives.**
- 2. Transportation Infrastructure Programs, in conjunction with Rail Safety, should develop a scaled, risk- based, approach for validating crossing closures that would allow lower-risk closures to be validated by means other than an onsite inspection.**
- 3. Programs, (...) with Rail Safety, should give greater attention to the relative risk posed by individual grade crossings when making funding recommendations, and ensure that the incentives provided are adequate to make the program attractive the road authorities and individuals with rights to higher-risk crossings.**

## MANAGEMENT ACTION PLAN

Recommendations	Proposed Actions	Forecast Completion Date	OPI
<p>1. Transport Canada should consider reducing the GCCP's appropriation to more closely align with its average annual spending, or develop a strategy to spend its current appropriation to achieve the Program's objectives.</p>	<p>A. As part of the GCIP renewal (required by March 31, 2015), Transportation Infrastructure Programs and TC Rail Safety will review and amend as necessary the terms and conditions for the GCIP and the GCCP to address this issue. These amendments may include increases to the grant amounts (see action below) in addition to combining both of these programs into a single program to allow for funding to flow between crossing improvements and closures to ensure funds are not lapsed.</p>	<p>March 31, 2015</p>	<p>AHSE</p>
	<p>B. Limits on the funding available per project (currently set at \$5,000 and \$20,000) will be reviewed with the goal of maximizing participation of at risk crossing in this program. Consultation with stakeholders will begin this summer.</p>	<p>July 2014</p>	<p>AHSE/ASR</p>



	<p>C. Quarterly meetings with the major railways (CN and CP) to include specific discussion item on the GCCP. Semi-annual communication with other stakeholders to further inform potential recipients about the GCCP and the benefits of this program. Liaison with Rail Safety’s Education and Awareness Branch to ensure that GCCP information is provided as part of education campaigns.</p>	On-going	AHSE/ASR
<p>2. Transportation Infrastructure Programs, in conjunction with Rail Safety, should develop a scaled, risk- based, approach for validating crossing closures that would allow lower-risk closures to be validated by means other than an onsite inspection.</p>	<p>Transportation Infrastructure Programs will work with internal and external parties (the Canadian Transportation Agency, Railways, TC Legal Services and TC Rail Safety) to implement measures to ensure that the level of inspection for crossing closures is based on risk. Actions include:</p>		
	<p>A. Each crossing project will be assessed using TC’s Project Operations Risk Tool (PORT) to determine the level of federal oversight required for each project.</p>	Effective Immediately	AHSE
	<p>B. Where feasible, based on the PORT results, have the railways provide a solemn declaration of</p>	January 1, 2014	AHSE

	completion following the completion of any physical crossing closure work rather than inspecting in person.		
	C. Work with the CTA, TC Rail Safety and TC Legal services to develop a system to ensure that there is a registry of all recipients that have closures closed under this program.	March 31, 2014	AHSE/ASR
3. Transportation Infrastructure Programs, in conjunction with Rail Safety, should give greater attention to the relative risk posed by individual grade crossings when making funding recommendations, and ensure that the incentives provided are adequate to make the program attractive the road authorities and individuals with rights to higher-risk crossings.	A. In conjunction with the funding level review noted in 1.B., Transportation Infrastructure Programs working with Rail Safety will develop a simplified risk tool to evaluate projects with consideration given to funding closures with documented accident histories at a higher level than the base \$5,000 and \$20,000 grant.	July 2014	AHSE/ASR
	B. In conjunction with 1.A. and 1.B., Transportation Infrastructure Programs will revise the Terms and Conditions for the GCCP to allow for increased funding for closures with a higher risk rating.	March 31, 2015	AHSE