

2007 Review of the *Railway Safety Act*
A Submission to the Advisory Panel

by

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16 April 2007

Preface

I have spent the best part of my career in the federal public service¹ and as a private consultant² dealing with many aspects of railway accident investigation and railway safety analysis, under a number of political and bureaucratic regimes, since 1970.

The relevant and factually supported opinions that I hold focus mainly on the definition and quantitative measurement of transportation safety; what may improve future railway safety; and areas in the current railway safety regime, where the need for change is greatest. The following submission, which explains my opinions, is based solely on my personal experiences and the information available to me at the time of writing.

I have tried to offer positive thought on ways and means to improve safety rather than to dwell on criticism of, or praise for, the current railway safety regime's successes and failures. As well, I have taken the liberty to make suggestions on subjects the Advisory Panel may wish to examine or recommend.

Your mission is critical to the future well-being of the Canadian public and the integrity of the Canadian environment. It is my hope that the following submission may be a small help to you and your staff in the conduct of this important assignment.

Respectfully submitted by

original signed

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16 April 2007

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1.0 General Comments

1.1 Introduction

It is my opinion that the current railway safety regime lacks the following important conceptual elements:

1. comprehensive terminology specifically associated with railway safety matters, including a more comprehensive policy statement pertaining to railway safety;
2. mathematically and scientifically sound means to quantitatively measure current levels and past trends of “railway safety”;
3. clear-cut and meaningful criteria to determine when government should intervene in the railway business to ensure public safety; and
4. clear-cut and sound criteria to determine when government should subsidize the railway business in respect of ensuring adequate public safety.

A general discussion and expansion of these four points forms the basis of my general comments. More specific opinions are presented in Section 2 which deals mainly with questions posed by the Advisory Panel in its consultation guidance document.

1.2 Need for Comprehensive Terminology

The subject of railway safety is discussed usually in the vaguest of terms – perhaps with intention, but definitely to the detriment of what I think Parliament intended when the *RSA* was initially passed, and to the detriment of the public who need to know the hazards that each individual and the environment have to face as a result of railway operations.

History, I believe, supports the view that railway safety terms and phrases are measures which have been misused and/or surrounded by “spin.”

A review of the *RSA*; existing railway safety rules, regulations, and standards; and public statements made by Transport Canada, the Transportation Safety Board, the Railway Association of Canada, the railways themselves, and the media reveals that the lack of clarity is widespread when it comes to commenting on the meaning and measurement of “railway safety.”

For the Advisory Panel to be effective in meeting its mandate, I suggest that it needs to ensure that it is very clear on what it means when it uses such terms as “railway safety,” “railway safety trends,” “acceptable/unacceptable levels of railway safety,” “railway safety regulatory efficiency and effectiveness,” and such other safety-related terms as are necessary to meet the demands of the mandate. Equally important is the need to ensure that the definitions section of the *RSA* is up-dated to encompass meaningful explanation of the safety-related subjects found in the existing or potentially changed legislation.

Clarifying terminology would serve to remove the past misunderstanding and misuse of railway safety-related circumstances. It would also ensure a commonality of interpretation/understanding by not only railway, shippers, and government officials, but also by the legal and insurance communities and the public at large – particularly with respect to how the Advisory Panel has measured or quantified criteria to justify its own conclusions and recommendations.

1.3 What is Railway Safety?

General

In the broadest of terms, railway operation is an industrial activity which presents a variety of hazards to the well-being of the public and to the integrity of the environment. The hazards are not something that the public should have to quietly suffer because of, for instance, a simplistic argument that the railway was there for a long time and has the right to do business no matter what.

The public, in a modern industrialized society, should expect to be warned of and protected from the hazards posed by industrial activities. Furthermore, the public has the right to expect that the company causing the hazards will mitigate the associated risks, to at least a reasonable and prudent level, and, failing that, the public has the right to expect the government to step in on behalf of the citizens it represents and to ensure that the industrial activity is made “safe.”

Defining “railway safety” and related trends in a meaningful way is not a simple matter. In theory, railway operation would be “safe” if it were devoid of the chance of occurrence resulting in human, environmental, and/or physical damages. Such a nirvana does not exist and is not reasonable to expect.

More practically, and in the most general of terms, a railway operation can most probably be classified to be “safe” when the risk of occurrences causing damage to humans, property, and/or the environment is reasonable, prudent, and otherwise acceptable to those who would potentially bear the consequences.

Occurrence Classification and Frequency

The risk posed by railway operations is a result of the frequency and consequences arising from occurrences, such as are categorized in the following table which also shows their respective annual frequency (e.g., the number of times reported to the Transportation Safety Board):

Reported Occurrence Classification	Frequency in 2005	Frequency in 2006	Average Frequency in 2001-2005
Non-Main Track Derailments	540	480	422
Crossing collisions	269	248	260
Main Track Derailments	194	133	148
Dangerous Goods Leaker	123	86	153
Non-Main Track Collisions	93	108	102
Movement Exceeds Limits of Authority	89	101	94
Collisions with Persons on the Right of Way	83	92	80
Fires/Explosions	17	25	23
Derailments/Collisions Involving Track Units	19	16	19
Runaway Rolling Stock	16	13	13
Main Track Switch in Abnormal Position	10	7	10
Employee/Passenger Injury/Death	8	15	8
Main-Track Train Collisions	6	3	6
Other	23	39	33
Total Occurrences	1,490	1,366	1,374

Source: 2006 Transportation Safety Board annual railway statistics

It should be noted that Transportation Safety Board categorizes these occurrences as accidents or incidents; however, as incidents can have physical or financial consequences (e.g., dangerous goods releases, train delays, etc.) this distinction is not really needed here. It should also be noted that these data do not include information pertinent to railways not under federal jurisdiction.

Railway Occurrence Consequences

As noted earlier, railway safety is a function of railway occurrence frequency and consequences.

The types of actual and potential consequences of railway occurrences are numerous and include the following physical and financial outcomes:

1. Death
2. Serious injury (i.e., injury requiring at minimum hospitalization)
3. Railway Property Damage (i.e., to track, equipment, bridges, buildings)
4. Environmental Damage
5. Public or Private Property Damage
6. Clean-up Costs
7. Personal Injury and Wrongful Death Claims Paid
8. Property and Environmental Damage Claims Paid
9. Related Social Costs
10. Train Traffic Delay and
11. Reduced Railway Profit.

Railway occurrence data pertaining to consequences (with the exception of fatalities and serious injuries) are rarely collected, collated, or published, although they should be readily available to the railways involved. The reason for this is unclear. Personal fatality and injury rates are as follows, which shows that the risk of death and serious injuries to the public, associated with railway operations, is centered on collisions at railway crossings and with persons along the railway right of way and is rarely associated with any of the other occurrence types. Although not usually involving serious property damage, these types of occurrences are also prone to serious legal claims against the railway.

Reported Occurrence Classification	Average Annual Frequency of Deaths in 2001-2005	Average Annual Frequency of Serious Injuries in 2001-2005
Crossing Collisions	35	49
Collisions with Persons on the Right of Way	57	23
Other	4	11
Total Fatalities and Serious Injuries	96	83

What is Railway Risk?

Railway risk is synonymous with railway safety. Railway risk to the public and the environment is a function of the frequency of occurrences and the direct and indirect physical and financial consequences of those occurrences *ceteris paribus*.

Railway risk can be categorized as risks specifically associated with each main occurrence type and by so doing, the relative importance of taking safety action to reduce the causative factors associated with each type of railway occurrence can be placed in priority *ceteris paribus*.

Because railway traffic, infrastructure and other factors are not constant from year to year, those changes are needed to be taken into account to ensure that annual trends in measured risk are reasonably comparable. This requires the normalization of occurrence-based risk measurements. For instance, risks associated with train derailments and collisions may be normalized by the magnitude of train traffic (i.e., million train-miles), whereas risks associated with crossing collisions could be normalized by the number of crossings, and risks associated with so-called trespasser³ occurrences could be normalized by length of track operated. The process of occurrence data normalization is largely judgmental.

What Railway Safety Is Not

Clearly, the mathematical relationships to quantitatively determine risk in this context are complex and are therefore the domain of professional risk analysts. The main point here is that railway safety is not what it is commonly portrayed to be. In this respect, I contend that variations in the frequency of railway occurrences reported to the Transportation Safety Board or occurrence frequency changes per million train-miles rarely equates to risks or variations in risks posed by train operations to the public and/or the environment. To use normalized or non-normalized railway occurrence frequency data alone to signify safety or safety changes is highly misleading even though it is in widespread use.

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I suggest with respect and subject to the applicable law and legal interpretation thereof, that persons who may access railway right of way unintentionally because of the lack of fencing or warning signs, or those who are too young or too challenged to know the difference, may in fact not be trespassing.

In order to reinforce the need to rethink how railway safety/risk is measured, consider a very simple situation where the number of main track derailments reported to the Transportation Safety Board declined over a year by say 30%. Current practice would result in a claim being made that risk of main track derailment has been reduced by 30%, as a result of corporate safety action, for instance. However, if the consequences in terms of lives lost, serious injuries, environmental clean up costs, property damage costs, personal injury and property damage legal claims paid, and social costs associated with the reduced number of derailments increased by 50%, the traditional simplistic claim, based on occurrence frequency trends alone, becomes meaningless. Indeed, the risk could be argued to have increased rather than declined over the subject year. In short, the only time that a variation in occurrence frequency accurately reflects a variation in risk is when all else is equal and in particular when there was a proportional change in the magnitude of the occurrence consequences.

From another perspective, if the number of railway crossing accidents declined by 10% over a decade with commensurate reduction in lives lost and serious injuries, the claim would traditionally be that there was an improvement in safety, as a result of government-funded programs, for instance. However, if during that decade, the number of crossings had declined by 10%, the residual risk to the public at the existing crossings could be argued to be the same as 10 years ago (all else remaining equal).

There are many more examples, but I suggest that the railways have data which, in combination with information held by Transportation Safety Board, Transport Canada and Statistics Canada, could be used by the Advisory Panel to better and to more realistically measure railway risk and past trends thereof in total and even in sufficient detail to identify risk to the public and the environment according to the major categories of railway occurrences (main track derailments, crossing collisions, etc..). Although this may require considerable work to do, the reliability and credibility of the Advisory Panel's recommendations would suffer if the effort was not made to more realistically measure safety and safety trends in other than the past practice of citing occurrence frequency trends alone.

What is Acceptable Risk?

As noted before, railways cannot be expected to operate risk-free. There should, however, be a level of railway risk that dictates the line between what is acceptable and what is not acceptable to the federal government (for each major category of railway occurrences) – a set of lines set by federal government technical experts on behalf of the public and the environment, impacted by the consequences of railway risk, with input from the stakeholders but without political or vested interest intervention or veto.

These measures of acceptable risk could not only serve as targets for railway self-regulation, but also as a trigger when government railway safety regulatory intervention is necessary.

In the past, and in very general terms, what is acceptable and what is not has been dictated essentially by the setting and compliance enforcement of rules made by the railways and approved by government, and regulations and standards set by government in lengthy consultation with stakeholders – many of whom have strong vested interests – with occasional checks on compliance by Transport Canada staff and occasional suggestions by Transportation Safety Board, as a result of occurrence investigation findings (which are sometimes studied for years without implementation by Transport Canada). This could be improved.

If a realistic, mathematically and scientifically correct system of railway occurrence risk measurement were adopted by government, and the government defined what it considers to be an acceptable level of railway risk and set up a means to monitor railway risk changes, initiating safety regulatory action and mandatory safety action orders when the measured railway risk rose above the acceptable level, I suggest that railway safety would be improved and the safety performance of railways and the efficiency and effectiveness of government intervention could be much more easily and realistically measured.

I therefore suggest that the development of an acceptable railway risk standard (for each major category of occurrences) to act as a performance target for the railways and a trigger for future rigorous regulatory action with mandatory safety action orders is a sensible initiative.

The determination of acceptability is admittedly a judgmental matter but is one that I believe has had a common place in law – that being the determination of negligence and what is prudent and reasonable. More specifically, acceptability of risk should be dictated by what constitutes reasonable and prudent mitigation of well-known and repetitive safety deficiencies, considering:

1. availability of applicable risk mitigation appliances and technology/procedures;
2. presence of sound and frequent inspection/maintenance practices; and
3. adequate number of well-trained and supervised employees to meet management's apparent expectation for high productivity/profitability while operating safely; as well as

4. top-down management commitment to proactive mitigation of known deficiencies rather than the simple reaction to catastrophic or newsworthy consequences of a recent occurrence(s).

In brief, acceptable risk should therefore be the risk that the federal government determines to be reasonable and prudent in the circumstances.

Railway Safety Summary

Considering the foregoing, I respectfully suggest that “railway safety” can best be defined as follows:

“railway safety is a quantitative measure of the risk posed by railway operations to the public and to the environment;” and

“that risk is expressed as a function of both frequency and consequences of railway occurrences, normalized by measures of railway train activity (e.g., train-miles) and/or size of infrastructure (e.g., miles of track operated, number of railway crossings, etc..) as may be appropriate;” and

“where that risk is the sum of risks to the public and the environment associated with each of the major railway occurrence types (e.g., main track train derailments, main track train collisions, crossing collisions, collisions with persons on the right of way, runaways, fires, release of dangerous goods, passenger and employee injury, and other major categories of railway occurrences);” and

“where those consequences include all direct and indirect physical and financial consequences of railway occurrences (e.g., fatalities, serious injuries, environmental damage, property damage and clean up costs, personal injury and property damage legal claims paid, social costs associated with such consequences, and other such consequences);” and

“where the risk is acceptable when the federal government has determined that it is reasonable and prudent in the circumstances.”

In this respect, I suggest that the Advisory Panel may wish to have its research staff or an expert risk analyst calculate the trend in railway operation risk to the public and the environment each year for 10 years before the proclamation of the *RSA* to present. Thereby and, I suggest only this way, the true overall impact of the *RSA* regime on railway safety, its efficiency, and effectiveness would be able to be seen. By doing the same according to major occurrence category, the relative risk of such categories can be determined and the influence of the *RSA* on same can also be estimated.

1.4 When Should the Federal Government Intervene

The federal government should intervene by taking rigorous railway safety regulatory action when it determines that a particular railway is beginning to operate with a risk in excess of the predetermined acceptable level.

1.5 When Should the Federal Government Subsidize Railways to Improve Safety

The railways, in some cases in combination with road authorities, should be solely responsible to make the expenditures necessary to achieve an acceptable risk level. The federal government should subsidize railways to improve safety above the acceptable risk level if and when it or the public shows cause why such an elevation of safety is justified.

1.6 Thoughts On the Mandate/Objectives of the Advisory Panel

The mandate of the Advisory Panel is stated⁴ to be “...to assess the working and overall efficiency of the *Railway Safety Act* to improve railway safety, including possible amendments to the *Act* ...” The objective of the Advisory Panel’s review is stated differently however: “...to further improve railway safety in Canada and promote a safety culture within the railway industry, while preserving and strengthening the vital role this industry plays in the Canadian economy” (underlining added). And, this is a matter of some concern.

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in the Consultation Guidance Document

With respect, if the gist of the review's objective is rigorously adhered to, the Advisory Panel's mandate may not be met. This is because under the provisions of the *RSA*, railway safety improvement is clearly and primarily the responsibility of railway companies, and improving railway safety will, no doubt, have a net cost to railway companies and possibly to its shareholders and shippers. I therefore strongly suggest that the Advisory Panel should neither ignore nor remain silent about potential justifiable safety improvement changes (or the changes to the *RSA* that would bring them about) that it believes, if implemented, will also impact negatively on railway productivity or profit.

More specifically, I respectfully suggest that the Advisory Panel, at minimum:

- first, identify all the changes that, if implemented, would reduce the current risk posed by train operation to individuals and the environment irrespective of the impact on railway productivity and profit, and then,
- second, identify those changes that the Advisory Panel believes would, if implemented, result in an acceptable, reasonable, and prudent risk posed by train operation to the well-being of the public and to the integrity of the environment, and then,
- third, identify what portion of such changes should be paid for by the railways, along with the estimated impact on railway productivity and profit, and then,
- finally, recommend how the residual portion of the identified changes should be financed (e.g., through government subsidy, safety tax, or other means), if at all.

That way, those responsible for considering the Advisory Panel's recommendations and deciding what changes need to be made will be made aware of the full implications of their ultimate decision.

This would in no way preclude sensible decisions that certain safety improvements do not make economic sense, recognizing of course that safety improvement can also have an overall economic benefit to the railways, through the reduction of often extremely costly accidents with large physical damage repair costs, environmental clean-up costs and claims, and personal injury claims. This approach would ensure that such considerations would be transparent.

As well, the Advisory Panel may wish to structure or rank its recommendations in terms of the relative degree of risk reduction that may occur if its recommendations were implemented. Thereby, those responsible for decisions to implement the recommendations would be able to judge the importance of each recommendation.

2.0 Comments on Advisory Panel Questions

2.1 General

The Advisory Panel's Consultation Guidance Document presents a number of questions that the Advisory Panel intends to address through the review. The following are comments on those question areas on which I have an opinion.

2.2 Roles, Responsibility, and Accountability

I would suggest that the current railway safety regime is reasonably clear with respect to the role, responsibilities, and authorities of the Canadian Transportation Agency and the Transportation Safety Board. However, I would also suggest that the role, responsibilities, and accountability of Transport Canada are somewhat clouded, perhaps by complexity of its functions.

Areas of concern are the apparent lack of specifics related to Transport Canada's:

1. responsibility and accountability to ensure the regulations and technical standards required by *the RSA* are expeditiously developed and proclaimed;
2. responsibility and accountability to ensure that safety action is expeditiously taken in response to Transportation Safety Board recommendations pertaining to systemic safety deficiencies;
3. standards to ensure that Transport Canada railway safety inspections are carried out systematically and comprehensively with results made public; and
4. responsibility and accountability of Transport Canada to require expeditious safety action to mitigate safety defects found during Transport Canada railway safety inspections.

With respect to accountability, there is a need for all parties to be aware of the objectives; what constitutes success and failure; the reward for success and the penalty for failure; and, most importantly, who is responsible and accountable for what and by when.

In the case of accountability with respect to railway safety, I suggest that the Advisory Panel consider the merits of including the following concepts:

1. the objective should be that the risk of train operation on each railway company be at or less than the acceptable level of risk, as set independently by government (a performance standard if you will);
2. success should be when the acceptable level of risk is maintained by each railway company, without government safety regulatory action;
3. failure should be when the acceptable level of risk is not maintained by each railway company;
4. the penalty for failure should be independent government safety regulatory action against the railway company that is operating at a level of risk higher than acceptable with mandatory ordered remedial safety action, plus possible personal injury or property damage claims paid to the grieved parties through the normal legal system;
5. each railway company⁵ should be responsible/accountable for maintaining operations at or less than the acceptable risk level and should most likely be held liable for all consequences arising from occurrences happening while operating at higher than the acceptable risk level;
6. the safety regulator (Transport Canada) should be responsible/accountable for requiring remedial safety action when the risk level on a particular railway is less than acceptable, and Transport Canada should be liable, along with the railway, for all consequences arising from occurrences happening while that railway operates at higher than the acceptable risk level, as a result of inaction by Transport Canada; and
7. the Transportation Safety Board should be independently responsible/accountable for the collection of all information necessary to assess the level and acceptability of railway operational risk by railway company. It should also be independently responsible/accountable to conduct analyses of such data to evaluate train operation risk levels and to independently, quickly, and regularly make all such data and analytical results public as well as to further undertake regular studies into the trends of risk posed by railway operations by major occurrence categories with recommendations on possible remedial safety action.

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In the case of railway crossings, the municipal road authority should be accountable for providing a roadway and advance warning systems to permit safe vehicle and pedestrian approach to the tracks and thereby share responsibility/accountability with the railway that owns the tracks and operates the trains.

Whether all participants are fulfilling their roles and responsibilities is an issue which is difficult to assess, unless one has the information on availability of funds and human resources and the nature of political or technical direction made to staff, which I do not, but to which the Advisory Panel would surely have access. What is evident to me, however, is the following:

1. The regulations and technical standards for railway crossings and right of way access have remained in draft form for an inordinate amount of time without there apparently being an explanation made to the public.
2. Railway safety inspections of railway crossings and right of way have not apparently been sufficiently detailed or frequent enough to ensure that glaring safety deficiencies are quickly found and mitigated (as evidenced by recent Transport Canada safety audit reports).
3. Transportation Safety Board recommendations with respect to second train risks at railway crossings have been studied for many years by Transport Canada, but little has apparently been done to mitigate this systemic risk to the public and particularly to children who need to traverse multiple track railway crossings.
4. Railways are not as “proactive” in respect of risk mitigation as they would claim to be (as evidenced by recent Transport Canada safety audit reports).

2.3 Monitoring, Audit, Inspection, and Enforcement

The Advisory Panel has stated that “... the modern, flexible and efficient regulatory scheme of the *RSA* is intended to be better coordinated and more transparent, and also forward thinking and accountable to the citizens it serves.” This is a laudable hope.

In this respect, I would suggest that the following questions need to be answered by Transport Canada staff:

1. What proportions of each of the railway system main components⁶ are, in fact, inspected each year and, when safety deficiencies are found, how are they dealt with and what proportion are, in fact, verified as having been rectified?
2. To what standard are railway crossings and right of way fencing and signage inspected and why are there so many blatant safety deficiencies still present at these locations?⁷

⁶ track, bridges, yards, equipment, crossings, right of way fences, locomotives, employees, supervision, training, etc..

⁷ as determined through recent Transport Canada safety audits

3. What level of staffing and budget would be required to perform a comprehensive annual safety inspection of railways under federal jurisdiction compared to the currently available resource level?
4. What official and unofficial restrictions are there in respect of the release of railway inspection and audit results to the public on a regular publication basis or on a freedom of information basis?
5. How is the current railway inspection and audit function accountable to the individual citizens of Canada, given, for instance, the large number and high proportion of safety defects found when audits are undertaken?

The answers to these questions would, I suggest, be helpful to the Advisory Panel in assessing how well its stated hope has materialized.

2.4 Modal Competition

The Advisory Panel has stated that "...the regulatory scheme of the *RSA* is intended to be transparent, and accountable to the citizens it serves, but also neutral between modes of transport."

This statement indirectly appears to advocate the concept of government employing risk benefit/cost ratio analysis in determining what should be done to advance railway safety and that railway safety *per se* should not be required to be more or less than the level of safety required or exhibited by other modes of transport. Here, I suggest that the main issue is, as mentioned previously. First and foremost there is a need for a mathematically and scientifically valid measurement of the risk posed by each mode of transport and then secondly a measure of the risk benefit/cost ratio for incremental safety improvements for each mode of transport. Without that, current simplistic comparisons and related "We are better than the other guy" or "we are number one" comments are without much meaning.

There is clearly a major difference between modes when it comes to improving safety and government involvement in same. It may in this respect be instructive for the Advisory Panel to determine the amount of funds and human resources spent directly and indirectly by federal and provincial governments specifically on safety associated with each mode (including railway, pipeline, aviation, marine, and trucking) relative to the risk posed by each mode to the public and the environment – an area where I suggest there needs to be a significant adjustment.

Another relevant question in this area of concern is whether or not the required level of safety should really be based on competitive inter-modal economics, or rather on what constitutes the most reasonable and prudent public interest. I would suggest that the latter criteria is the one that should initiate

government intervention more than the former from a technical and political point of view. Therefore the Advisory Panel's assertion in this respect may merit reconsideration. I cannot perceive government openly using value of life estimates as part of determining a threshold for railway safety regulatory action.

I suggest that modal competition in respect of safety should be a matter of one mode being proud that it operates with lower risk posed to the public and the environment than the other modes. There is something wrong with the corporate culture that argues that their mode need do no more than meet the lowest common denominator, that there is no need to mitigate known safety defects for which the technology and appliances are readily available just because another mode statistically can be shown to have a lesser safety record. If, however, the Advisory Panel believes that it is within its jurisdiction to make judgements with respect to the trucking, marine, aviation, and pipeline modes of transport, then I suggest that comparisons should be made on the same quantitative measures of risk to the public and risk to the environment arising from the operation of each mode.

Furthermore, if it is comparative safety that becomes the standard it may be worthwhile to explore public safety standards applicable to other industrial activities – particularly with respect to preventing entrance to hazardous properties.

2.5 Transport Canada Railway Safety Enforcement Powers

With respect to Transport Canada enforcement powers, I suggest that:

1. Transport Canada should provide adequate resources and funds to permit comprehensive railway safety inspections of all major components of the railway systems under federal jurisdiction at least once each year;
2. Transport Canada railway safety inspectors should identify those defects found that impact negatively on safety whether or not they are covered by proclaimed regulations or technical standards and communicate their existence to the appropriate railway officials; and
3. Transport Canada should publish the railway safety inspector findings regularly.

2.6 Baseline Safety Requirements

Baseline safety requirements, I suggest, should be determined in the context of previously discussed acceptable railway operational risk.

2.7 “Interface with Non-Railway Users”

With respect, the whole railway safety issue, apart from employee safety, relates to train operation interface with the public and the environment. In this respect, the growing use of terminology such as “interface with non-railway users” should not be permitted to cloud the real issues. Nor should such terminology be permitted to incrementally move to a position where the issue of safety involving persons traversing railway crossings and present along rights of way are not considered to be two of the most important railway safety issues, at least in terms of risk posed to the public (which averaged almost an occurrence each day resulting in 92 fatalities/year and 72 serious injuries/year as well as untold cost, between 2001 and 2005). If such a kill rate happened as a result of one or two occurrences, the public cry for safety improvement would be deafening.

2.7.1 Effectiveness of the Crossing Subsidy Program

The current crossing warning/protection up-grade subsidy program is woefully inadequate and may in fact be a deterrent to safety improvement at crossings. I suggest that the program is one where usually there are adequate funds to permit the Minister of Transport to announce funding after a tragic loss of life or lives at particular crossings in order to demonstrate government concern and action, but not enough to mitigate the same or greater level of risk at many other similar crossings, where there has yet to be a fatality or serious injury which, if corrected, would demonstrate a true concern for public safety. There are certainly not sufficient funds assigned, at present, to ensure that individuals face a similar or acceptable risk at all railway crossings, under all expected circumstances.

It only makes common sense that the national policy on railway crossings should not be so political in nature. Indeed, I suggest that the Advisory Panel adopt and recommend inclusion in the *RSA* that each person across the country, who has to traverse railway tracks in cars, on foot, or on bicycles, should face a relatively equal, reasonable, and prudent risk under all normal environmental conditions and times of day. Such is not now the case.

It also makes sense that the responsibility for public safety at crossings should predominantly be the railway who owns the track and who operates the trains over the roads and sidewalks so that each member of the public has an expectation that they will be reasonably protected and warned of the risk posed by the industrial activity of train operation. And, the road authority should continue to bear a secondary responsibility for advance warning signs, road/sidewalk condition/design, and lighting.

I suggest that the Advisory Panel find that the cost of warning and protecting the public of the risk posed by train operations at railway crossings (other than the responsibility of the road authority) should rightfully be a good-corporate-citizen-cost of doing business, and the cost of the road authority responsibility should rightfully be the responsibility of the tax payers in the road authority's constituency.

Subsidies to assist the railways and road authorities to provide reasonable and prudent warning to and protection of the public who have to cross the tracks can be considered a subsidy of the railways' profits and a subsidy of the local municipality tax burden. The subsidy amount is however finite and on an annual basis is far from adequate to cover the costs of the many safety deficiencies that exist at railway crossings. This surely should not prevent the railways from mitigating those well-known safety deficiencies and paying the price to reduce the risk their trains pose when they cross public streets.

Government policy, I suggest, should not advocate directly or indirectly that safety improvement should only happen up to the level of an arbitrarily determined subsidy budget limit.

Interestingly, it may be that the existence of a government subsidy program to offset costs of crossing warning/protection up-grades may, in fact, result in a safety culture where crossing safety up-grades only or usually exist when the government is willing to pay for the majority of the cost. And yet, at the same time, one of the objectives of the *RSA* is to "...recognize the responsibility of railway companies in ensuring the safety of their operations..."

I therefore recommend that the Advisory Board consider the adequacy and effectiveness of the existing railway grade crossing fund concept and budget limit and perhaps contemplate an alternative program that would have the necessary incentives to reduce the risk faced by individuals having to traverse railway crossings to an acceptable level.

Here, as well, there is a problem with measuring risk and using risk as a measure to initiate safety improvement action at railway crossings. One traditional technical criteria for a safety up-grade is the traffic cross product (# trains per day x # of vehicles per day) at a particular crossing. This is a highly simplistic measure of the theoretical rate of opportunities for there to be a collision between a vehicle and a train at a particular crossing. It is in no way a measure of the risk faced by a vehicle driver, a

pedestrian, or a cyclist, under normal environmental conditions, at any time of day, when those individuals must traverse the tracks. This type of risk surely should be the criteria for the up-grade of crossing warning/ protection systems or otherwise action to improve public safety at the crossing. Furthermore, I am not aware of any empirical proof that even vaguely supports the concept that traffic cross product is a strong determinant of railway crossing occurrence frequency or consequence.

There are many variables which dictate the risk faced by the public approaching railway tracks (some of which include adequacy of sight lines; number of tracks; maximum permissible train speed; flashing light alignment; flood lighting of railway equipment at night; side reflective tape on railway equipment; ability of the train crew to stop before unexpected obstructions on the track; presence and visibility of approach signs; presence of automatic protection devices; road speed; presence of blowing snow, fog or glaring sunlight; adequacy of manual protection procedures; presence of pedestrian gates and maze barriers; the alertness and skill of the parties involved; and so on). Crossings that present the higher level of risk to individuals who have to traverse them are not necessarily identified for safety improvements under the current regime.

Consider for a moment two situations:

1. a passive crossing with low traffic cross product, on a rural road at night, with all quadrants obscured by trees and corn fields, no equipment flood lighting, an advanced warning sign, a reflectorized railway cross buck sign, with black unmarked railway cars passing over and blocking the road and a vehicle approaching at the posted speed of 80 km/h on a curve; and
2. a passive crossing with high traffic cross product, on an urban road at night, with good lighting, advanced warning signs, cross buck, slow moving trains, posted road speed of 30 km/h and good sight lines in all quadrants.

Clearly, the need for safety improvement is much more in the first scenario and that decision is not dominated by the magnitude of the relative traffic cross product.

I would therefore suggest that the Advisory Panel consider identifying the need to set crossing warning/protection up-grade criteria based on an acceptable level of risk faced by any individual who has to traverse railway tracks under all environmental conditions, times of day, and whether the individuals approach by vehicle, on foot, or by bicycle.

2.7.2 Need for a Right of Way Access Deterrent Program

It is well known that railway rights of way are often frequented by persons, irrespective of the obvious danger of doing so. It is also well known that a relatively large proportion of these persons are children and youths. They are seen everyday by railway operating crews, and the frequency and location of such events could easily be determined by a survey of such crew members in combination with Transport Canada right of way inspections for approach paths, graffiti, other indications of pedestrians, and fence breaches.

I understand that it has been for some time possible for local police to charge persons who access the right of way – that charge carrying a substantial fine. I also understand that such policing activity is not common for some unknown reason.

I suggest that the Advisory Panel consider recommending possible safety improvement by the policing community undertaking to regularly and diligently perform surveillance of well-known areas where persons access the right of way and warn and charge same with a maximum fine. In that railways have long since reduced their police forces to a level where they cannot do such things, it may be reasonable for the railways to subsidize local police to perform this duty.

It is also well known that the fences that usually are found along railway rights of way are in no way a human deterrent to accessing the right of way. Indeed, the fences often are in extremely poor shape and without appropriate signs warning of the attendant risks of accessing the railway right of way. Quite often there are similarly no such warning signs at railway crossings where right of way access is easiest.

Recognizing that it is not always easy to maintain human deterrent fencing, I recommend that the Advisory Panel consider what might be an additional deterrent to children and youth who may enter the railway right of way, simply because there is no fencing, no warning sign, or the fence is very old and broken down. Indeed, the lack of sound deterrent fencing and frequent warning signs could indicate to persons that there is not sufficient danger to warrant the railway to install warning and protection, and therefore it is not that hazardous to walk onto the right of way. Such thinking is understandable in a society where fencing and warning signs are commonplace for most other industrial properties and is even imposed on home owners who have a backyard pool.⁸

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One thought is that the planting of hardy brambles in areas of unwanted access may offer a reasonable and self-sustainable deterrent.

2.8 Railway Safety Data Issues

2.8.1 Data Collection

Data pertaining to railway occurrences are reported to the Transportation Safety Board under regulation by railways under federal jurisdiction. The Railway Association of Canada also appears to collect such information from its members. To that extent, there may be duplication, but there is a need for an independent data collection source to ensure data credibility and acceptance by the public. At the same time, for the data collection exercise to be truly independent, there needs to be a process of verification of the accuracy of the data reported and a process whereby the reporting of all required occurrences is properly made and not omitted. This is not always done which may make the accuracy of the data questionable.

Currently, the Transportation Safety Board and the railway industry collect and collate data on the frequency, nature, and type of certain railway accidents with some occurrence data including causative factors and number of fatalities/serious injuries. Much of this data is not made public in a form whereby specific company performance can be seen. The data rarely include specifics as to the direct and indirect consequences, other than fatalities, serious injuries, and whether or not dangerous goods were involved. In order to properly assess railway safety, one needs specific information on the nature and magnitude of the consequences of reported occurrences.

The Advisory Panel may wish to recommend that the required information reported to the Transportation Safety Board by railway companies should include such things as:

1. cost of physical damages to railway property (equipment, infrastructure, etc.);
2. cost of physical damage to non-railway property;
3. degree of environmental damage;
4. direct and indirect cost of environmental clean-up (including legal claims);
5. direct and indirect cost of fatalities and serious injuries (including legal claims and social costs);
6. direct and indirect cost of train/shipment delays and productivity disruption; and
7. other measurable consequences.

Such information, if collected by Transportation Safety Board, would permit it to realistically determine a better measure of the state of railway safety by analyzing and publicly reporting on train operational risk to the public and the environment on a regular basis, rather than reporting such aggregate industry-wide measures of the frequency of occurrences per million train-miles which is an inadequate and misleading measure of railway safety.

The collection and collation of comprehensive consequence data by Transportation Safety Board would, if used with currently available data, better measure railway risk to the public and the environment and would offer significantly improved opportunities to identify trends and anomalies that would signify areas where change or safety action would further improve railway safety.

The Advisory Panel may wish to recommend that the Transportation Safety Board, from time to time, validate that all reportable occurrences are in fact reported to it and that all reported data are accurate.

2.8.2 Need for Better Railway Occurrence Data Transparency

The data currently collected and collated by Transportation Safety Board are not made public in their entirety and particularly are not made public in a way to permit comparison between railway companies. If this were done, I suggest that it may result in a healthy competition between railways in terms of relative railway safety performance.

The Advisory Panel may wish to recommend that the federal government body responsible for occurrence data should make that data available to the public in its entirety and present data collations and analyses separately for each railway company on an annual basis.

2.8.3 Need for More Analytical Study of Occurrence Data

The Transportation Safety Board currently is charged with the mandate to conduct studies when it believes such studies would advance railway safety. Only two such studies on railway matters have been published since the Transportation Safety Board was first formed, and yet the data that are available could, if comprehensively analyzed, present findings that may provide leads to needed safety action to improve safety. The lack of study/analysis of such data may ultimately reflect badly on the need for the Transportation Safety Board to collect such information. If resources are not available at Transportation Safety Board to do such studies/analyses, then the raw occurrence data should be made available to those in government or the private sector who are willing and able to analyze such data with a view to identifying ways to improve railway safety.

The Advisory Panel may wish to identify a structure within which the reported occurrence data should be published in both raw and analyzed forms.

2.9 Need for Expeditious Implementation of Necessary Regulations and Standards

Transport Canada's performance in developing and finalizing critical safety regulations pertaining to railway crossings and unauthorized access of railway rights of way, under the provisions of the *RSA*, has been far from expeditious – those regulations and standards still being in draft form for, I believe, over or close to a decade.

This situation is, I suggest, not only inexcusable but also counter-productive in terms of railway safety advancement. It places the railways in a situation where they do not know what will eventually be required and hence, there is a reason to defer safety advancement expenditures that might otherwise be made if the regulations were finalized. As such, I suggest that there is a need for making Transport Canada more accountable by setting a time limit or other incentive to ensure expeditious development and promulgation of the regulations and standards required by the *RSA*.

I suggest that the Advisory Panel examine the reasons why railway crossing and right of way access regulations and standards have not been finalized and promulgated before now and report on same in detail with recommended remedial measures for the expedition of Transport Canada responsibilities under the provisions of the *RSA* in the future. This is so important as the majority of railway-related fatalities and serious injuries are incurred at railway crossings and involve persons walking along railway rights of way.

In this respect, I do not know the reasons for the delay in the development of regulations and standards, but I would suggest that it may very well be a result of an overwhelming desire, under the current regime, to ensure that every stakeholder is equally happy with the result, rather than proceeding on an independent course of action based on technical prowess and in consideration of the input, but not necessarily full agreement, of all stakeholders. I suggest that such regulations and standards should at no time be developed under a negotiative atmosphere in the future or held up because of potential regulatory reform in another country.

2.10 Need for Systematic Transport Canada Railway Safety Inspections

Recent audits⁹ performed by Transport Canada on the Canadian National Railway indicate that there were a rather surprising number of safety defects found.

These audits suggest that the subject railway had not been acting in a proactive fashion to ensure that it mitigated well-known and repetitive safety defects that can cause accidents. Indeed, subsequent action by the subject railway apparently significantly reduced the occurrence frequency on the subject railway, thereby indicating the company's capacity to reduce occurrence frequency in reaction to a negative regulatory audit – a capacity that no doubt existed prior to the audit but not proactively initiated by the company.

Indeed, it is my opinion that the major railway safety improvements over the last three decades have been the result of reaction to catastrophic and national newsworthy accidents such as at Hinton, MacGregor, Fording River, and Mississauga, where public hearings were held to fully disclose the facts and railway reaction, and on a more local scale as a result of fatalities and serious injuries at railway crossings and along railway rights of way – not as a result of the strong proactive railway concern for public safety. The audit results also suggest that there may be a need for Transport Canada to be more proactive, rigorous, and systematic in respect of its railway safety inspection programs for, had it been so, so many safety defects would likely not have been allowed to develop.

It is therefore recommended that the Advisory Panel review the recent Transport Canada audits and inspection reports in detail and determine what the frequency of Transport Canada safety inspections are, the adequacy of same, and the effectiveness of same in respect of action taken when safety defects are found. The Advisory Panel may also wish to explore the need for increased Transport Canada staffing and budget to permit a reasonable and prudent annual inspection program.

Quite apart from the generality of the foregoing, I would suggest that the following inspection activities are particularly critical and that the Advisory Panel may wish to recommend that Transport Canada assign appropriate staff and budget to facilitate, over a period of less than one year:

- a system-wide inspection of all railway crossings at grade, identifying safety defects in respect of non-compliance with the existing draft railway crossings regulations and technical standards as if they were in force, with an immediate safety action requirement for the railways involved to rectify said safety deficiencies; and

⁹ “Targeted Inspection of CN Operations...” 5 January 2006 by Transport Canada

- a system-wide inspection of all railway rights of way to assess the adequacy of physical deterrent fencing and warning signs to deter children and youths from accessing the right of way in areas where train operating crews know the track is frequented by children and youth, with an immediate safety action requirement for the railways involved to rectify said safety deficiencies.

2.11 Need For Better Information Access

The organizational components of the current railway safety regime claim to operate in a state of openness with transparency to all, and yet there are situations where the public, in its many forms, has difficulty in obtaining the facts associated with work performed by federal government railway safety professionals. It is suggested that the Advisory Panel consider recommending a relaxation of current information release restrictions and an improvement in responsiveness to public requests for facts held by railway safety organizations in respect of:

1. on-going Transportation Safety Board occurrence investigations;
2. railway and Transport Canada commentary on draft Transportation Safety Board investigation reports;
3. Transport Canada safety inspections, audits and studies;
4. Transport Canada deliberations on railway safety regulation and technical standard development; and
5. railway commentary on draft Transport Canada studies and audit reports.

If the information to be released is only collected facts, it should not prejudice an ongoing investigation, audit, or study. There should be no rationale for such information to remain confidential to government or for it to be hidden from the public except in very special circumstances, such as national security. There should be no reason to maintain official and working files. Such information should be willingly released by public servants without undue delay and complex and costly retrieval procedures. The release of such facts could directly and indirectly advance safety.

2.12 Need for Independence

The current and recent past modus operandi of the railway safety-related government organizations, operating under the *RSA*, appear to be those where independent investigations, studies, audits, etc. are performed by those paid by Treasury Board to be expert in the related fields but then, prior to making the results public, those with the most vested interest are given the right to first make confidential comments to those in government who decide what is to be made public.

Some would argue that this procedure is good, in that the company or the Ministry involved has the right to comment on that which may be damaging if made public and, if the company can be influenced in this way to make the necessary safety changes, then the public results can have a much more positive tone.

On the other hand, it may be that this process presents a situation where the independence of those who are supposed to be working on behalf of the people and the environment to ensure a reasonable and adequate level of safety, is questionable.

Therefore, the Advisory Panel may wish to examine this type of procedure and determine if it is of net value in ensuring the safety of the public and the environment and/or if it results in questions about the independence and credibility of the various government organizations involved to the detriment of the good work of government expert staff.

2.13 The Receptiveness of Transport Canada to Transportation Safety Board Recommendations

The way in which Transport Canada responds to recommendations made by Transportation Safety Board is critical to the efficiency and effectiveness of the current railway safety regime under the *RSA*.

The recommendations made by the Transportation Safety Board are carefully crafted in consideration of the findings of Transportation Safety Board investigations by expert staff, the views of the Board members, and the input of the railway involved and Transport Canada in respect of the draft investigation report contents (without the recommendations).

Since the Transportation Safety Board was first formed, these recommendations have been logged by Transportation Safety Board along with the response of Transport Canada and the actual safety actions taken. Transport Canada staff can explain exactly what was done and why with respect to each of Transportation Safety Board's past recommendations. Transportation Safety Board staff can explain what Transportation Safety Board has done to follow-up on systemic safety deficiencies that have not been mitigated in a reasonable amount of time.

Some Transportation Safety Board recommendations, for instance those with respect to the need for warning and protection at railway crossings where there is the chance of second train collisions with pedestrians, have been long studied but with no apparent systemic safety action at all.

It is suggested with respect that, if the Transportation Safety Board recommendations are not acted upon by Transport Canada and or the railways on a regular basis, then there may be something wrong with the way in which the recommendations are made, or there may be an unwillingness by those who can decide to expend money, to take necessary safety action, or an unwillingness on the part of the safety regulators to require railways to take necessary safety action when they are reluctant to do so.

The Advisory Panel may therefore find it instructive to review the efficiency and effectiveness of the reaction to Transportation Safety Board recommendations as such may lead to recognition of ways to advance railway safety improvement for proven systemic safety deficiencies – a subject which may be warranted to be included in the *RSA*.

3.0 Final Comment

I trust that the foregoing might be a small help to the Advisory Panel in the conduct of its important mandate, and I wish you success in tackling this difficult but extremely important task.

Respectfully submitted by

original signed

Gary M. McLaughlin

16 April 2007

END OF SUBMISSION