Saskatchewan Government Insurance
2013 Rate Program
Documentation for Information Request #3
Comparison of Motorcycle Rates

Premiums based on a four month riding season

Cruiser

Year	Make	Model	Declared Value	Engine Capacity (CC)	SGI Current	SGI Indicated	SGI Proposed	Average MPI	Average ICBC
2009	YAMAHA	XVS950 V-STAR	$ 7,300	942	$490	$620	$559	$1,018	$597
2009	HARLEY DAVIDSON	FLHXI STREET GLIDE EFI	$ 16,675	1,584	$513	$730	$586	$1,166	$801
2005	YAMAHA	XVS11S V-STAR 1100 CUSTOM	$ 4,350	1,063	$464	$620	$529	$1,062	$533
2007	HARLEY DAVIDSON	FLSTCI HERITAGE SOFTAIL CLASSIC EFI	$ 12,650	1,584	$516	$729	$586	$1,121	$719
2008	HARLEY DAVIDSON	FLHTCUI ULTRA CLASSIC ELECTRA GLIDE EFI	$ 15,450	1,584	$513	$730	$586	$1,166	$775

Sport

Year	Make	Model	Declared Value	Engine Capacity (CC)	SGI Current	SGI Indicated	SGI Proposed	Average MPI	Average ICBC
2008	HONDA	CBR125R	$ 2,250	125	$190	$475	$219	$942	$262
2007	HONDA	CBR600RR	$ 7,175	599	$540	$1,034	$617	$1,466	$534
2008	SUZUKI	GSX-R750	$ 8,350	749	$566	$1,036	$647	$1,575	$560
2007	SUZUKI	GSX-R600	$ 6,050	599	$540	$1,034	$617	$1,466	$510
2009	KAWASAKI	EX250R NINJA	$ 3,025	249	$190	$475	$219	$942	$299

Dual

Year	Make	Model	Declared Value	Engine Capacity (CC)	SGI Current	SGI Indicated	SGI Proposed	Average MPI	Average ICBC
2009	HONDA	CHF50 JAZZ	$ 1,900	49	$139	$159	$161	$330	$125
2007	SUZUKI	DR-Z400S	$ 4,275	398	$166	$284	$194	$682	$331
2009	YAMAHA	VINO 125	$ 2,850	125	$170	$285	$199	$348	$282
2009	KAWASAKI	KLX250S	$ 3,775	249	$170	$285	$199	$652	$317
2008	KAWASAKI	KLR650	$ 4,275	651	$391	$507	$444	$1,018	$468

Based on the driving record: an SDR discount of 20% has been applied to SGI rates, a 30% DSR discount has been applied to MPI rates and a conviction free driving record has been assumed for ICBC rates.

MPI motorcycle premiums are fully earned over the 5 month period from May 1 to October 1.

Collision and comprehensive deductibles of $500, TLP limit $1,000,000.

Response to IR #11

Class	Coverage	Frequency or Severity	Selected Trend Past	Selected Trend Future	Class Claim Count Range	Class Claim Counts	Credibility[1]	Complement of Credibility Class Group	Compliment of Credibiilty Class Group Selected Trends Past	Compliment of Credibiilty Class Group Selected Trends Future	Credibility-Weighted Trends Past	Credibility-Weighted Trends Future
Motorcycles	Medical Expenses Without Funding	Frequency	-7.00%	-5.00%	2007 - 2011	665	0.7915	All Vehicles Excluding Trailers and Motorcycles	-2.00%	-2.00%	-5.96%	-4.37%
Motorcycles	Medical Expenses Without Funding	Severity	8.00%	8.00%	2007 - 2011	665	0.7915	All Vehicles Excluding Trailers and Motorcycles	6.00%	5.00%	7.58%	7.37%
Motorcycles	Income Replacement Benefits	Frequency	-3.00%	-3.50%	2007 - 2011	314	0.5438	All Vehicles Excluding Trailers and Motorcycles	-3.00%	-3.50%	-3.00%	-3.50%
Motorcycles	Income Replacement Benefits	Severity	20.00%	20.00%	2007 - 2011	314	0.5438	All Vehicles Excluding Trailers and Motorcycles	8.00%	8.00%	14.53%	14.53%
Motorcycles	Permanent Impairment	Frequency	-4.00%	-4.00%	2007 - 2011	401	0.6143	All Vehicles Excluding Trailers and Motorcycles	0.50%	0.50%	-2.26%	-2.26%
Motorcycles	Permanent Impairment	Severity	0.00%	0.00%	2007 - 2011	401	0.6143	All Vehicles Excluding Trailers and Motorcycles	0.00%	0.00%	0.00%	0.00%
Motorcycles	Care Benefits	Severity	10.00%	10.00%	2007 - 2011	260	0.4951	All Vehicles Excluding Trailers and Motorcycles	-3.00%	-3.00%	3.44%	3.44%
Heavy Vehicles[2]	Comprehensive Coverage	Frequency	4.50%	4.50%	2007 - 2011	441	0.6441	Light Vehicles	0.00%	0.00%	2.90%	2.90%
Heavy Vehicles	Comprehensive Coverage	Severity	2.50%	2.50%	2007 - 2011	441	0.6441	All Vehicles Including Trailers	4.00%	4.00%	3.03%	3.03%
Heavy Vehicles	Glass Coverage	Frequency	45.00%	45.00%	2007 - 2011	42	0.1993	All Vehicles Including Trailers	40.00%	40.00%	41.00%	41.00%
Heavy Vehicles	Glass Coverage	Severity	-10.00%	-10.00%	2007 - 2011	42	0.1993	All Vehicles Including Trailers	-8.00%	-5.00%	-8.40%	-6.00%
Heavy Vehicles	Fire, Lightning, Explosion Coverage	Frequency	3.00%	3.00%	2007 - 2011	532	0.7075	All Vehicles Including Trailers	-5.00%	-5.00%	0.66%	0.66%
Heavy Vehicles	Fire, Lightning, Explosion Coverage	Severity	2.00%	2.00%	2007 - 2011	532	0.7075	All Vehicles Including Trailers	6.00%	8.00%	3.17%	3.76%
Heavy Vehicles	Theft	Frequency	9.00%	9.00%	2007 - 2011	71	0.2582	All Vehicles Including Trailers	-5.00%	-5.00%	-1.39%	-1.39%
Heavy Vehicles	Theft	Severity	4.00%	4.00%	2007 - 2011	71	0.2582	All Vehicles Including Trailers	7.00%	7.00%	6.23%	6.23%
Trailers	Glass Coverage	Frequency	0.00%	0.00%	2007 - 2011	13	0.1108	All Vehicles Including Trailers	40.00%	40.00%	35.57%	35.57%
Trailers	Glass Coverage	Severity	0.00%	0.00%	2007 - 2011	13	0.1108	All Vehicles Including Trailers	-8.00%	-5.00%	-7.11%	-4.45%
Trailers	Fire, Lightning, Explosion Coverage	Frequency	0.00%	0.00%	2007 - 2011	269	0.5037	All Vehicles Including Trailers	-5.00%	-5.00%	-2.48%	-2.48%
Trailers	Fire, Lightning, Explosion Coverage	Severity	6.00%	6.00%	2007 - 2011	269	0.5037	All Vehicles Including Trailers	6.00%	8.00%	6.00%	6.99%
Trailers	Theft	Frequency	-4.00%	-4.00%	2007 - 2011	649	0.7819	All Vehicles Including Trailers	-5.00%	-5.00%	-4.22%	-4.22%
Trailers	Theft	Severity	5.00%	5.00%	2007 - 2011	649	0.7819	All Vehicles Including Trailers	7.00%	7.00%	5.44%	5.44%

(1) Credibility equation = √(Class Claim Counts/Credibility Factor) = √(Class Claim Counts/1062)

(2) Classes: A - Heavy Trucks IRP, A - Heavy Trucks Non-IRP, A - Power Units IRP, A - Power Units Non-IRP, C&D - Heavy Trucks, C&D - Power Units, Farm Vehicles - Heavy Trucks, Farm Vehicles - Power Units, PV - Heavy Trucks and Vans, PV - Power Units

Round #2 - Question 23

a) Driver Education	Actual 2011	Actual 2012	Budget 2013
Saskatchewan High School Program	$ 2,495,022	$ 6,368,769	$ 6,793,574
First Nations Program	-	-	1,457,500
	2,495,022	**6,368,769**	**8,251,074**

- 2012 was the first full year for SGI funding Saskatchewan driver education, having assumed responsibility for it from the Province in fall 2011.

- Growth in 2013 is primarily a result of the establishment of funding a First Nations specific program. We are also anticipating a 10% increase in Driver Education costs for high school driver education due to increasing contract costs and higher expected student enrollments.

- The High School Driver Education program has a small section in the curriculum regarding sharing the road with motorcycles, but the program does not specifically deal with how to drive a motorcycle.

b) External Services	Actual 2012	Budget 2013
Comprised of:		
Traffic Safety Promotion*	$ 1,762,880	$ 4,148,861
Other	1,831,924	2,470,836
Total External Services	**$ 3,594,804**	**$ 6,619,697**

* Refer to Round #2 - Question 28 for summary of Traffic Safety Promotion initiatives

- A majority of external service costs for the Auto Fund are attributable to Traffic Safety programming. The other category as noted above is reflective of external service costs allocated by the cost allocation model. Costs in this category reflect items that include information technology, financial, actuarial, audit, and legal consulting expenditures

- 2013 growth is largely attributable to Traffic Safety program spending returning to a historical level, as in 2012 spending was reduced to accomodate a lower rate increase.

c) Advertising	Actual 2012	Budget 2013
Promotion of My SGI website	$ 229,125	$ 350,000
e-Claim campaigns	168,980	210,000
Extended Claims service hours awareness	-	250,000
Other	9,387	22,138
	178,367	482,138

Saskatchewan Auto Fund
Reconcile Traffic Safety to Appendix B
Round #2 - Question # 24a

($000s)	Forecast 2012	2013
Wages & Salaries	$ 9,650	$ 10,110
Drinking and Driving Awareness	2,659	2,718
Driver Education	6,369	8,251
External Services *	1,636	4,149
Safety Awareness	861	1,393
Travel (including vehicle costs)	586	610
	21,761	27,231
Indirect costs **	1,396	1,491
Total Traffic Safety as per Appendix B	**23,157**	**28,722**

* 2012 Traffic Safety spending was reduced to accomodate a lower general rate increase. The 2013 external services amount reflects a return to historical average spending for Traffic Safety programs.

** Indirect costs include costs allocated from various departments that provide support to Traffic Safety activities. They are allocated monthly as part of the regular cost allocation process.

Appendix 1

A Framework for Decision Making for SGI's Traffic Safety Strategy

1.0 – Introduction

In January 2011, SGI's Board of Directors approved, in principle, a new Traffic Safety Strategy (TSS). The overarching goal of this strategy is to reduce the number and severity of traffic crashes thereby, reducing the claim costs incurred by SGI.

This document proposes a decision-making framework for the assessment of safety measures that are developed as part of the TSS. The steps outlined in this framework will be used to:

- prioritize initiatives and decide which will produce the best results for SGI's investment dollars;
- identify the timing of initiatives; identify opportunities for partnering with other agencies for mutual benefit;
- discover efficiencies for delivering existing programs; and,
- terminate programs that do not work.

The framework proposed is based on well-established research in the field of traffic safety program evaluation (Ref 1 – 13). The approach presented belongs to a group of tools collectively described as Efficiency Assessment Tools. These tools are based on the welfare economic principles of rationale-choice and getting the most out of limited and scarce resources (5). These tools are applicable to the variety of road safety measures we anticipate from SGI's safety strategy.

The primary tool to be employed for assessing the safety measures will be Cost Benefit Analyses (CBA). CBA is used to find the most economical way to reach policy objectives by weighing costs against monetized benefits. The CBA helps uncover the measure or combination of measures that provides the most benefits in excess of costs.

This document provides more detail on CBA as an efficiency assessment tool, and its application within the context of the TSS.

Section 2 provides a description of some foundation elements of this efficiency assessment tool. Section 3 describes the steps involved in using CBA for traffic safety assessment. In Section 4, some considerations for adapting the CBA tool for the assessment of innovative safety measures are discussed. The importance of performance monitoring and program evaluation is discussed in Section 5, and this is followed with an overall summary in Section 6.

2.0 – General Framework for Efficiency Assessment

The primary reason for investing in traffic safety measures is to help create a new environment in which the number and severity of traffic collisions is lower than what would have occurred in the absence of the new measures. Understanding the size of the impact of a safety measure is therefore, an important point of departure. However, for the efficiency assessment proposed in this framework, a broader viewpoint has been adopted. The effects of a traffic safety measure will be construed as any change in social welfare (positive, negative, intended or unintended) that results from the measure.

To estimate the overall impact of a measure in the CBA, it is necessary to determine the duration of the effectiveness of the measure, and any variations in the magnitude of its effectiveness over this period. Additionally, it is important the geographical scope of the impact of the measure be clearly established as well as an enumeration of various actors (people, organizations etc.) that the measure affects.

The specific steps involved in the CBA process will be presented in the following sections.

2.1 – Comparing Alternative Measures

To ensure a good estimation of the economic efficiencies gained from an investment in a specific traffic safety measure, the safety, and other associated impacts are compared to what would have happened in a scenario without the measure in place (i.e. the "do nothing" alternative). This approach assumes all independent developments such as population growth, demographic, economic, and transportation changes in the environment for which the efficiency analysis is being performed apply equally to the alternative with the measure, as it would have to the "do nothing" alternative. To account for these changes, specialized forecasting techniques for traffic safety program evaluation will be used to estimate the crash impacts of various road safety measures.

2.2 – Accounting for Time

Where there are a number of alternative measures with different durations under consideration, the analysis period that will be used in the CBA is that of the measure with the longest duration. This allows comparisons of costs and benefits associated with the different alternatives to be done on equal footing. If the duration of a measure is shorter than the analysis period, the investment in the measure will be refreshed as many times as necessary to ensure its time horizon matches the analysis period. For example, suppose two solutions are under consideration for managing a wildlife-vehicle solution in a 5km road corridor:

i) large warning signs that have a design life of five years and a total cost of $60,000 and,
ii) a fence with a design life of 10 years and an initial cost of $200,000.

The analysis period in a CBA for this example will be 10 years. The warning sign solution, because of its shorter design life, is repeated after the first five years for a second five-year period for comparison purposes.

Since costs and benefits associated with a safety measure occur over a period of time, the time value of money will be accounted for through the use of a discount rate. This means that effects and costs that occur at a later time are weighted less heavily than those closer to the implementation date of the measure. Through discounting, the stream of benefits and costs associated with the safety measure will be converted into present value (i.e. implementation or base year) dollars or annualized values to facilitate the economic comparison of alternatives.

2.3 – Geographical Scope of the Efficiency Analysis

The measures contemplated in the TSS have differing degrees of geographical range of impact. For instance, while the scale of impact of an intersection improvement would be limited to a specific location and its immediate surrounding, an enforcement initiative could affect a broader region of the province. Additionally, positive impacts in one region could produce negative effects in another, or for another subset of the population. To account for this potential for redistribution of impacts, the

efficiency analysis will be approached from a "whole" Saskatchewan perspective and narrowed down as required to a specific geographic area. For example, suppose a safety measure under consideration is the introduction of legislation to ban riding in the back of pickup trucks in Saskatchewan to manage injuries resulting from occupant ejection. Such a law has an impact on all Saskatchewan residents. Thus, CBA will be approached from this perspective of a "whole" Saskatchewan viewpoint. Although there will be expected safety benefits across all regions of Saskatchewan, there will be more severe mobility/transportation impacts in northern Saskatchewan, where the practice of riding in the back of pickup trucks is a common mode of transportation.

2.4 – Societal Viewpoint

CBA will use a societal approach to assessing the costs and benefits of any measures that are contemplated or implemented. All relevant societal effects of a safety measure, no matter whom it applies to, will be examined. Therefore, in instances where the cost to one party is the equivalent benefit of another party, these effects will cancel each other in the cost-benefit analysis. For example, traffic fines collected as a result of a newly implemented program are costs to the (offending) road user, which are transferred to government as benefits. These types of transfers will not be part of CBA.

In the next section, specific details of CBA are discussed as well as the information and data requirements for this analysis.

3.0 – Cost-Benefit Analysis

CBA will be used to estimate the economic welfare effects of our safety measures (i.e. an assessment of whether the benefits that accrue from the investment exceed the costs). Two metrics commonly used in the CBA are the net present value of a safety measure and the cost-benefit ratio.

The net present value is defined as:

Net present value = Present value of all benefits – Present value of all costs

Benefits refer to all monetized effects resulting from the implementation of the safety measure. Negative benefits are subtracted. Costs include all aspects of the resources and time and effort required to implement and run the safety measure.

The cost-benefit ratio is defined as:

Cost-benefit ratio = (Present value of all benefits)/(Present value of implementation costs)

When project benefits exceed costs, the net present value is positive and the cost-benefit ratio is greater than one. The net present value however, communicates in dollar terms – the magnitude of the positive impacts of the safety measure.

The steps employed in CBA are as follows:

1. Estimate effectiveness of relevant safety measure in terms of number of target crashes/casualties it can be expected to prevent per unit of implementation of the measure.
2. Estimate other indirect effects of the measures (ie. an intersection safety improvement that leads to increased delays at a location).
3. Estimate the cost of implementing the measure.

4. Estimate the benefits of the relevant direct effects of the measure, including the monetary value of a reduction in the number of crashes and their severity, and all other identifiable indirect effects.
5. Convert all costs of implementation and benefits to present or annual values using the appropriate project life and discount rate.

Two examples of the application of CBA to road safety measures are provided in Appendix B.

3.2 – Estimating Effectiveness of Safety Measures

A basic input for CBA is an estimate of the effectiveness of the safety measure in terms of the number of crashes and casualties it can be expected to prevent. Two pieces of input are required for this estimation – the safety effect of the measure and the number of target crashes affected by the measure. The most common way of quantifying the safety effect of a measure is through a crash reduction factor (i.e. the percentage of crash reduction following the implementation of the measure.)

An initial source to estimate the effects of various traffic safety measures is current research and literature on traffic safety. The applicability to Saskatchewan depends on:

i) availability of relevant values (ie. are results based on analysis from places comparable to sites of interest in Saskatchewan?);
ii) validity of the data used to develop the estimate (ie. was sufficient data used to develop the estimates?);
iii) variability of the reported effects (ie. is there a large variability in estimates reported from available studies?);
iv) whether the reported values are local or general (i.e. are the available estimates from a small localized safety initiative?); and,
v) the temporal characteristics of the effects reported (i.e. do the estimated effects change over time?)

The information obtained from other research will be rigorously vetted prior to using them in CBA since the quality of these inputs directly affect the quality of the assessment.

Generally, the safety measures that will be employed for the assessment of programs/measures fall into one of the following areas:

1. Road user-related measures (impact of training and education, sanctions, legislation, enforcement and incentives. etc.)
2. Vehicle-related measures (active safety e.g., Day time running lights, passive safety e.g., use of seat belts etc.)
3. Infrastructure-related measures (road design, maintenance etc.)

3.3 – Valuation of Road Safety Effects of Measures in CBA

In CBA, the reduction in costs associated with the effect of a safety measure on the number of crashes and casualties is used as the primary means of estimating benefits that accrue from that measure. This requires an assignment of costs (i.e. monetize) to crashes and fatalities or injuries that could result from them. Generally, there are five major items that make up crash costs:

- Medical costs

- Costs of lost productive capacity
- Valuation of lost quality of life (loss of welfare due to involvement in a traffic crash)
- Costs of property damage
- Administrative costs, police costs, fire department costs, court costs, etc.

There is a substantial body of published research on techniques and values recommended for monetizing crash costs (Ref 14 – 16). Published values for casualty collisions are usually based on techniques that seek to find how much people are willing to pay to avoid a traffic fatality or an injury. These values are broadly classified as societal costs and tend to be substantially higher than costs obtained from SGI's Claims cost data. This is mainly because of large differences in estimates of lost productive capacity and valuation of lost quality of life.

For example, estimates of the societal cost of a fatality, based on the willingness to pay approach, could be as high as $7.5 million, while SGI's average claim cost for a fatality is about $120,000. Low-end estimates for the societal cost of an injury resulting in partial disability are about $240,000 and about $480,000 for total disability. SGI's average injury claim cost for a major loss (i.e. injuries that require long-term treatment or rehabilitation) is about $170,000.

These disparities between SGI's Claims crash costs and published data on societal costs have implications for the estimated benefits associated with a safety measure. Due to the relatively high social cost of fatalities and injuries, a cost-benefit analysis of safety measure, based on societal costs, would typically report a high cost-benefit ratio. Therefore, for the purposes of our efficiency assessments, we calculate two cost-benefit ratios or net benefits – one using SGI Claims costs and the other based on societal costs of crashes. The former will serve as a screening tool to find out if the measure would provide a return on investment that covers associated Claims costs. Both of these cost-benefit ratios will be used as inputs in the decision-making process.

3.4 – Side-Effects

Road safety measures generally produce three kinds of effects – safety, mobility and environmental. Mobility effects are manifested in changes in travel time and vehicle maintenance expenses associated with implementation of the measure. The impact of the safety measure on speed distribution or traffic volumes can also have environmental implications due to changes in fuel consumption, pollution and green house gas emissions. While it may be difficult to fully quantify these effects, an attempt will be made to account for them at a qualitative level as much as possible.

3.5 – Costs of a Safety Measure

An important element of CBA is the cost associated with implementing the safety measure. The costs to be considered (17) can be categorized as:

(i) direct costs
(ii) political capital
(iii) resource allocation

<u>Direct costs</u>

This is the most quantifiable of the costs mentioned above and also the most common cost included in typical efficiency assessments of road safety measures. The costs of a safety measure primarily refer to

the societal costs of all means of production (labor and capital) employed in implementing the measure i.e. the implementation costs (5). Transfers (flows of money from one group to another that are not paid in exchange for goods or services) would not be taken into account because they have no social welfare effect.

For the TSS, costs incurred in designing a program such as construction costs for intersection improvements, impaired driving advertising, promotion and awareness costs for seatbelt use, costs of police personnel for roadside enforcement associated with the measure, police equipment costs, extra costs incurred by other parts of the Justice system etc., are examples of direct costs. These costs will be estimated over the design life of the measure so both the initial investment costs and the annual costs of operation and maintenance are captured. The appropriate discount rate will be used to determine the present value of the costs or its annualized values.

Political capital

An assessment of political capital (willingness) will involve gauging the appetite for existing government to accept the risk of introducing a contemplated safety measure. Political capital also includes an assessment of what and how many of the measures in the annual timetable for the TSS can realistically be accomplished. In the event a measure gains political acceptance and goes forward, an assessment of costs associated with passing and implementing relevant legislation will be done.

Some of the safety measures in the TSS could introduce restrictions on people's choices on how, when and where they can drive. For instance, a photo radar initiative could persuade drivers to choose speeds lower than they would normally select and may be seen as a cash grab by government; aging drivers may have to satisfy more conditions before they hold a drivers' licence; red light cameras may deter some drivers who would have taken the risk to run a red light; extending the learner's period for qualifying for a new licence may be seen as restrictive, discriminatory and unfair by new drivers; the hospitality industry may see a tough law on drinking and driving as a hindrance to business etc.

These issues could generate political discomfort and lead to customer dissatisfaction with SGI. Although these issues are not easily quantifiable, they will be identified, assessed (e.g. through polling), discussed and considered as part of our decision-making framework.

Resource allocation issues

Many of the resources available for the successful development, implementation and operation of some of the TSS measures are fixed. That is, once they are deployed and used for one measure, they are not simultaneously available for use in another effort. For example, resources available to undertake intersection improvements during any particular period are limited and dependent on the availability of such resources from partner agencies, such as the City of Regina. Thus, the readiness of SGI to partner in such safety initiatives is not necessarily the determining factor as to whether they will be implemented. Similarly, there are limited enforcement resources available to generate the relevant deterrence effect for all safety measures under consideration. The cost of deploying resources in pursuit of one goal is thus the opportunity cost of foregoing another goal. Although these costs are also difficult to quantify, these will be explicitly addressed in the assessment.

4.0 – Decision Making for Innovative Countermeasures

For measures that are innovative in nature, or for which no previous evaluation studies are available, the estimate of the expected safety effect of the measure is unknown. Thus, an important component of the efficiency assessment described above is not available. In these cases, the analyses will use estimates of the safety effect of the measure based on expert judgment and crash statistics. Sensitivity analyses of the implications of various practical assumptions of the magnitude of the safety effect on the cost-benefit ratio of the measure will also be conducted. Additionally, attributes of the proposed measure will be assessed to see if it possesses the appropriate "winning features" for successfully impacting the safety problem. This will be done by comparing the features of the proposed measures to those of some proven safety measures (Ref 17, 18).

5.0 – Monitoring and Program Evaluation

The assessment of new or existing programs will rely heavily on data, research and the use of cost-benefit analyses as outlined above. This information will be used to: prioritize initiatives and decide which would produce the best results for SGI's investment dollars; identify the timing of initiatives; identify opportunities for partnering with other agencies for mutual benefit; discover efficiencies for delivering existing programs; and, terminate programs that do not work.

While individual crashes cannot be predicted, traffic safety research similar to the analysis that SGI undertook in developing the TSS, has identified various factors that make a crash (and its consequences) more or less likely to occur. It is on this basis that predictions are made about how the existing pattern of crashes could change if a measure were introduced. It is, nonetheless, important that the new pattern of crashes after the introduction of the measure be monitored to assess if its expected impact is being realized or not. Each initiative selected for implementation will include an evaluation framework and timetable to monitor, evaluate, and provide opportunities for program improvements or termination.

6.0 – Summary

This document proposes a framework for efficiency assessment of measures that emanate from the TSS and SGI's current road safety programs. The tool suggested for this is cost-benefit analysis.

This framework is based on existing research in the field of traffic safety program evaluation and economic analysis. In summary, the decision-making process will consider:

i) the nature of particular road safety problems as identified in the TSS
ii) the range of potential measures that can be applied to the problem
iii) the resources available
iv) potential physical, corporate, partner, or political constraints

Each of the measures under consideration will be assessed by examining:

i) its predicted effects including intended and unintended effects
ii) temporal variation of the effects
iii) the scale of its impacts ie. an intersection, city, region of the province, etc.
iv) the costs of implementation (both direct and indirect)

The framework outline above provides a structured decision-making process that is transparent, comprehensive, incorporates the best knowledge about the effects of the measures under consideration, injects a societal perspective into the decision-making process, and ultimately assists SGI in making the best use of its road safety investment dollars.

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MAJOR SAFETY INITIATIVES

Year	2007	2008	2009	2010	2011	2012	2013 (Budget)
TRAFFIC SAFETY PROMOTION (education, public awareness, community involvement, partnership building, enforcement programs, infrastructure							
In School Road Safety Resources	$ 1,785.00	$ 1,004.00					
Rollover Simulator	$ 2,042.00						
1. Child Passenger Safety Training Program	$ 3,292.00	$ 1,304.00	$ 1,217.00	$ 1,126.00	$ 632.00	$ -	$ 6,000.00
Ride's On Us	$ 55,000.00	$ 77,430.00	$ 95,703.00	$ 55,000.00	$ 81,881.00	$ 76,879.00	$ 62,000.00
SADD	$ 88,100.00	$ 102,064.00	$ 102,069.00	$ 102,069.00	$ 102,069.00	$ 102,069.00	$ 102,069.00
Saskatchewan Safety Council	$ 199,913.00	$ 201,810.00	$ 155,989.00	$ 142,718.00	$ 142,718.00	$ 133,000.00	$ 55,000.00
Saskatchewan Wildlife Federation	$ 20,000.00	$ 21,700.00	$ 20,000.00	$ 20,000.00	$ 39,900.00	$ 20,000.00	$ 20,000.00
Server Intervention	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
Community Grants	$ 164,053.00	$ 86,932.00	$ 50,000.00	$ 57,406.00	$ 61,944.00	$ 40,256.00	$ 25,000.00
First Nation School Contest	$ 7,464.00						$ 165,000.00
Enforcement Overdrive	$ 199,250.00	$ 288,086.00	$ 417,071.00	$ 419,100.00	$ 450,400.00	$ 483,500.00	$ 469,000.00
No Regrets Program	$ 74,650.00	$ 16,500.00	$ 16,500.00	$ 16,500.00	$ 20,000.00	$ 20,000.00	$ 16,500.00
Police Partnership – Training	$ 4,071.00			$ 474.00	$ 7,391.00	$ 1,499.00	$ 10,000.00
Police Partnership – Vehicles	$ 18,669.00	$ 16,800.00	$ 19,200.00	$ 18,000.00	$ 19,800.00	$ 20,400.00	$ 19,200.00
Safe Saskatchewan	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 45,000.00		
Road Safety Youth Conference	$ 2,652.00						
Report Impaired Drivers					$ 100,000.00	$ 125,000.00	$ 125,000.00
Winter Road Maintenance	$ 48,330.00	$ 217,384.00			$ -	$ -	$ 25,000.00
55 Alive		$ 30,000.00	$ 60,000.00	$ 60,000.00	$ 30,000.00	$ 52,500.00	$ 70,000.00
First Nation Role Model Tour		$ 30,223.00	$ 31,923.00				$ 45,000.00
2. Infrastructure Improvements	$ 459,127.00	$ 222,000.00	$ 139,850.00	$ 354,000.00	$ 150,000.00	$ 18,400.00	$ 238,500.00
Traffic Safety Scholarship		$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 25,000.00		
Seat Belt Challenge		$ 66,306.00	$ 61,752.00	$ 170,272.00	$ 64,160.00	$ 146,977.00	
Pedestrian Safety Project			$ 5,000.00	$ 7,500.00	$ -	$ -	$ 10,000.00
Impaired Driving Projects (MADD, Operation Red Nose, Designated Driver)				$ 35,000.00	$ 24,202.00	$ 56,339.00	$ 87,996.00
Red light cameras							$ 125,000.00
First Nations Traffic Safety Positions				$ 43,500.00	$ 83,635.00	$ 167,000.00	$ 184,000.00
Child Traffic Safety Position			$ 72,000.00	$ 72,720.00	$ 76,811.00	$ 78,040.00	$ 76,811.00
Atoskata Youth Camp		$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00		
Red Feather Spirit Lodge		$ 9,480.00	$ 9,480.00	$ 9,480.00	$ 9,480.00		
PA Intersection Enforcement					$ 50,000.00		$ 50,000.00
Enhanced enforcement - intersections							$ 250,000.00
Multi-Agency Seat Belt Team/Monthly blitzes					$ 30,000.00	$ 30,000.00	
Automatic Licence Plate Recognition					$ 129,491.00	$ 100,000.00	$ 207,000.00

Information Request #28a

Year	2007	2008	2009	2010	2011	2012	2013 (Budget)
Selective Traffic Enforcement Program					$ 33,785.00	$ 33,000.00	$ 63,785.00
Safety Awareness - Corporate Relations				$ 65,149.00	$ 58,778.00	$ 53,021.00	$ 66,000.00
Highway Safety signs				$ 50,645.00	$ -	$ -	$ 120,000.00
3. Wildlife Solutions					$ -	$ -	$ 1,450,000.00
TOTAL	**$ 1,403,398.00**	**$ 1,479,023.00**	**$ 1,347,754.00**	**$ 1,790,659.00**	**$ 1,852,077.00**	**$ 1,762,880.00**	**$ 4,148,861.00**
TRAFFIC SAFETY PROGRAM EVALUATION (program evaluation, program development, research)							
Motorcycle Safety			$ 225,000.00	$ 23,893.00	$ 45,423.00	$ 20,000.00	$ 40,000.00
GIS Development					$ 18,336.00	$ 1,512.00	$ 30,000.00
TOTAL			**$ 225,000.00**	**$ 23,893.00**	**$ 63,759.00**	**$ 21,512.00**	**$ 70,000.00**
DRIVER PROGRAMS (impaired driving, driver improvement)							
Medical Payments	$ 176,631.00	$ 284,380.00	$ 347,823.00	$ 350,000.00	$ 402,776.00	$ 404,427.00	$ 436,103.00
District Health Funding	$ 1,442,478.00	$ 1,185,599.00	$ 1,291,889.00	$ 1,366,136.00	$ 1,309,660.00	$ 1,287,042.00	$ 1,337,024.00
Rehabilitation Assessment	$ 600,000.00	$ 600,000.00	$ 600,000.00	$ 600,000.00	$ 600,000.00	$ 600,000.00	$ 600,000.00
TOTAL		**$ 2,069,979.00**	**$ 2,239,712.00**	**$ 2,316,136.00**	**$ 2,312,436.00**	**$ 2,291,469.00**	**$ 2,373,127.00**
DRIVER DEVELOPMENT (driver education)							
Aboriginal Driver Education	$ 104,644.00	$ 112,638.00	$ 93,115.00	$ 125,000.00	$ 50,000.00		
Immigrant Driver Education			$ 122,100.00	$ 100,000.00	$ 100,000.00		
Translation services for driver testing							$ 120,000.00
High School Driver Education					$ 1,700,000.00	$ 7,375,000.00	$ 8,251,074.00
Annual Driver Educator Seminar					$ 40,000.00	$ 40,000.00	$ 45,000.00
TOTAL		**$ 112,638.00**	**$ 215,215.00**	**$ 225,000.00**	**$ 1,890,000.00**	**$ 7,415,000.00**	**$ 8,416,074.00**
CARRIER SAFETY SERVICES (carrier safety audits, services)							
Safety Seminars		$ 7,000.00	$ 9,407.00	$ 21,000.00			$ 18,000.00
TOTAL		**$ 7,000.00**	**$ 9,407.00**	**$ 21,000.00**			$ 18,000.00
TRAFFIC SAFETY ADVERTISING							
Bike Helmet	$ 167,000.00						
Booster Seats	$ 167,000.00	$ 167,000.00	$ 167,000.00	$ 167,000.00	$ 167,000.00		
Child Restraint	$ 86,380.00	$ 86,380.00	$ 86,380.00	$ 86,380.00	$ 86,380.00	$ 165,000.00	$ 165,000.00
Designated Driver							
Drinking & Driving	$ 715,000.00	$ 715,000.00	$ 790,000.00	$ 790,000.00	$ 790,000.00	$ 250,000.00	$ 250,000.00
Driver Distraction	$ 276,537.00	$ 276,537.00	$ 276,537.00	$ 276,537.00	$ 276,537.00	$ 10,000.00	$ 10,000.00
Road Safety – Y.L.	$ 544,000.00	$ 544,000.00	$ 544,000.00	$ 544,000.00	$ 544,000.00		
Rural Seatbelts	$ 163,000.00	$ 163,000.00	$ 263,000.00	$ 263,000.00	$ 263,000.00		
Aboriginal Media		$ 100,000.00	$ 100,000.00	$ 100,000.00	$ 100,000.00		

Information Request #28a

Year	2007	2008	2009	2010	2011	2012	2013 (Budget)
Aging Driver		$ 60,000.00	$ 60,000.00				
Drive Right		$ 250,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00		
Cell phones				$ 800,000.00	$ 450,000.00		
Speed Issues			$ 50,000.00	$ 50,000.00	$ 50,000.00		
Miscellaneous		$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 59,430.00		
Slow to 60							
SADD Advertising	$ 275,000.00	$ 125,000.00					
Wildlife						$ 100,000.00	$ 100,000.00
Motorcycle						$ 75,000.00	$ 75,000.00
RID Advertising							$ 400,000.00
Safety Awareness - Brochures					$ 301,705.00		
TOTAL	**$ 2,393,917.00**	**$ 2,536,917.00**	**$ 2,636,917.00**	**$ 3,376,917.00**	**$ 3,338,052.00**	**$ 600,000.00**	**$ 600,000.00**

Cost Benefit

Most of the specific major initiatives have been implemented to support our traffic safety partners such as the Saskatchewan Safety Council, Saskatchewan Wildlife Federation, Law enforcement and are not easily amenable to the conduct of cost benefit analysis. For tangible projects such as infrastructure improvements, Child Passenger Safety Program and wildlife fencing solutions, cost benefit analysis were conducted prior to investments.

1. In 2010 BC Injury Research and Prevention Unit did an evaluation on the Saskatchewan child passerger safety. It was found that Return on investment for the Saskatchewan Child Passenger Safety Program ranges from 9.02:1 when excluding the estimated emergency room and ambulance costs, to 12.18:1 when including these costs (based upon the TAIS mortality data). program, which included a cost benefit component. For every dollar spent on prevention, 9 to 12 dollars are saved on direct health care costs (based upon the TAIS mortality data).

2. Cost benefit analysis have been conducted on infrastructure improvements in Regina, Saskatoon, and PA. The results indicated that infrastructure improvements in Regina, Saskatoon and Prince Albert could return 2.8 - 7.3, 6.3 - 10.2, and 11.8 - 13.3 respectively for each dollar invested in the project.

3. An evaluation 23 months after installation showed a 40.7% reduction in wildlife collisions in the fenced section, compared with reductions of 39.1% and 20.4% for the east and west unfenced sections, respectively.

Question #29 - Round #2
HTB Annual Budget

	2013 Budget	2012 Actual	2011	2010	2009	2008	2007	2006
Salaries & Benefits	430,119	443,029	433,796	426,844	440,831	423,133	411,270	368,870
Provincial HTB matters:								
Hearing Officer Honorariums	84,000	54,592	55,067	58,174	63,063	56,719	63,121	49,708
Hearing Officer Expenses	84,000	54,215	62,941	66,135	57,700	60,466	61,206	45,319
SGI Appeals:								
Hearing Officer Honorariums	325,000	326,250	296,659	244,680	214,457	169,574	137,539	141,296
Hearing Officer Expenses	60,000	55,428	61,990	52,109	52,398	52,149	46,062	59,685
Other Expenses *	61,455	46,831	33,966	35,053	36,511	36,310	43,700	41,780
	614,455	537,316	510,623	456,151	424,129	375,218	351,628	337,788
Revenue **	(2,580)	(4,810)	(3,775)	(3,595)	(4,465)	(2,716)	(69,405)	(111,928)
Grand Total	**1,041,994**	**975,535**	**940,644**	**879,400**	**860,495**	**795,635**	**693,493**	**594,730**

* Key categories in other expenses include:

	2013 Budget	2012 Actual	2011
Legal costs related to provincial HTB matters	25,000	13,261	11,584
Travel, meals and related expenditures	11,150	13,333	4,265
Telephone/communications	17,180	19,173	16,887
Other	8,125	1,064	1,230
	61,455	46,831	33,966

** Revenue realtes to business application fees received to transport passengers for compensation.

Saskatchewan Auto Fund
Salvage Operations
Round #2 - Question 34
($000's)

		2008	2009	2010	2011	2012	Budget 2013
Sales							
Whole Vehicles		$ 13,285	$ 15,782	$ 18,117	$ 22,695	$ 24,744	$ 23,742
Parts		10,261	10,747	12,020	12,450	12,848	14,061
Other		2,399	2,434	2,809	3,292	3,353	2,625
	Total	**25,945**	**28,963**	**32,946**	**38,437**	**40,945**	**40,428**
Cost of Goods Sold							
Whole Vehicles		6,339	6,624	8,286	10,267	11,316	10,923
Parts		2,489	2,308	1,893	2,166	2,272	2,795
Other		788	1,186	872	1,087	1,002	464
Indirect *		6,889	7,258	7,409	8,325	8,241	8,746
	Total	**16,505**	**17,376**	**18,460**	**21,845**	**22,831**	**22,928**
Gross Profit		9,440	11,587	14,486	16,592	18,114	17,500
Adminstrative Expenses **		4,095	4,133	4,662	4,337	4,502	4,702
Net Income * **		**$ 5,345**	**$ 7,454**	**$ 9,824**	**$ 12,255**	**$ 13,612**	**$ 12,798**

* Indirect cost of goods sold include certain costs not allocated to the above noted sales categories. These costs include certain salaries and benefits, tow truck expenditures, freight, storage and supplies.

** Administrative expenses are overhead related expenses including certain salaries and wages, building maintenance and depreciation, security services and information technology costs.

*** Net Income for Salvage operations is included in Other Income in Appendix B. A summary of other income was prepared and provided in the response to Round #1 Question 118.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (a) - Forecasts with a 10% Decrease in Claims Incurred Costs
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

	Forecast					
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	862,767	943,103	1,005,390	1,066,657	1,128,697
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**858,261**	**938,507**	**1,000,702**	**1,061,875**	**1,123,820**
Net premiums earned	**773,871**	**828,423**	**904,865**	**971,881**	**1,034,795**	**1,093,801**
Claims incurred	650,702	624,336	701,791	716,901	798,916	878,881
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	60,335	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,283	92,627	99,097	105,311	111,367
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**854,110**	**951,176**	**978,923**	**1,075,209**	**1,169,616**
Underwriting loss	**(127,069)**	**(25,687)**	**(46,311)**	**(7,042)**	**(40,414)**	**(75,815)**
Investment earnings	72,393	44,132	26,843	16,242	62,004	101,486
Other income	35,059	38,157	40,316	42,763	45,215	47,724
Increase (decrease) to RSR	(19,617)	56,602	20,848	51,963	66,805	73,395
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	179,050	201,418	253,381	320,186
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**179,050**	**201,418**	**253,381**	**320,186**	**393,581**
Current year loss ratio (excl LAE)	84.1%	75.4%	77.6%	73.8%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	82.6%	85.4%	81.6%	85.0%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.9%	5.7%	5.6%
Traffic safety ratio	3.0%	3.5%	3.2%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**103.1%**	**105.0%**	**100.8%**	**103.9%**	**107.0%**
MCT	**47%**	**64%**	**69%**	**83%**	**97%**	**110%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (b) - Forecasts with a 0.5% Increase in Vehicle Drift
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

		Forecast				
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	866,987	947,662	1,010,251	1,071,814	1,134,154
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**862,481**	**943,066**	**1,005,563**	**1,067,032**	**1,129,277**
Net premiums earned	**773,871**	**830,823**	**909,277**	**976,602**	**1,039,820**	**1,099,112**
Claims incurred	650,702	691,052	701,022	716,880	799,276	879,447
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	67,039	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,614	93,075	99,576	105,820	111,906
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**927,861**	**950,855**	**979,381**	**1,076,078**	**1,170,721**
Underwriting loss	**(127,069)**	**(97,038)**	**(41,578)**	**(2,779)**	**(36,258)**	**(71,609)**
Investment earnings	72,393	44,132	25,718	15,637	59,962	98,534
Other income	35,059	38,280	40,446	42,902	45,362	47,879
Increase (decrease) to RSR	(19,617)	(14,626)	24,586	55,760	69,066	74,804
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	107,822	133,928	189,688	258,754
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**107,822**	**133,928**	**189,688**	**258,754**	**333,558**

Current year loss ratio (excl LAE)	84.1%	83.2%	77.1%	73.4%	76.9%	80.0%
Loss ratio (incl LAE)	96.4%	91.2%	84.9%	81.2%	84.7%	87.9%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.8%	5.7%	5.6%
Traffic safety ratio	3.0%	3.5%	3.2%	3.1%	2.9%	2.8%
Combined ratio	**116.4%**	**111.7%**	**104.5%**	**100.3%**	**103.5%**	**106.5%**
MCT	**47%**	**39%**	**46%**	**63%**	**80%**	**94%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (c) - Forecasts with a 0.5% Increase in Vehicle Volume
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

	Forecast					
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	867,001	947,677	1,010,266	1,071,832	1,134,173
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**862,495**	**943,081**	**1,005,578**	**1,067,050**	**1,129,296**
Net premiums earned	**773,871**	**830,832**	**909,292**	**976,618**	**1,039,838**	**1,099,131**
Claims incurred	650,702	693,044	704,544	720,655	803,429	884,043
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	67,270	71,771	76,490	81,577	87,085
Issuer fees and premium taxes	79,138	85,614	93,078	99,578	105,822	111,907
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**930,084**	**954,819**	**983,645**	**1,080,705**	**1,175,763**
Underwriting loss	**(127,069)**	**(99,252)**	**(45,527)**	**(7,027)**	**(40,867)**	**(76,632)**
Investment earnings	72,393	44,132	25,684	15,580	59,622	97,783
Other income	35,059	38,281	40,446	42,902	45,362	47,880
Increase (decrease) to RSR	(19,617)	(16,839)	20,603	51,455	64,117	69,031
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	105,609	127,732	179,187	243,304
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**105,609**	**127,732**	**179,187**	**243,304**	**312,335**

Current year loss ratio (excl LAE)	84.1%	83.4%	77.5%	73.9%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	91.5%	85.5%	81.7%	85.2%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.9%	5.6%	5.5%
Traffic safety ratio	3.0%	3.5%	3.1%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**112.0%**	**105.0%**	**100.9%**	**104.0%**	**106.9%**
MCT	**47%**	**39%**	**45%**	**60%**	**76%**	**90%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (d) - Forecasts with a 10% Increase in Investment Income in 2013
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

	Forecast					
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	862,767	943,103	1,005,390	1,066,657	1,128,697
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**858,261**	**938,507**	**1,000,702**	**1,061,875**	**1,123,820**
Net premiums earned	**773,871**	**828,423**	**904,865**	**971,881**	**1,034,795**	**1,093,801**
Claims incurred	650,702	691,052	701,022	716,880	799,276	879,447
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	67,039	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,283	92,627	99,097	105,311	111,367
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**927,530**	**950,407**	**978,902**	**1,075,569**	**1,170,182**
Underwriting loss	**(127,069)**	**(99,107)**	**(45,542)**	**(7,021)**	**(40,774)**	**(76,381)**
Investment earnings	72,393	49,233	25,751	15,622	59,752	97,975
Other income	35,059	38,157	40,316	42,763	45,215	47,724
Increase (decrease) to RSR	(19,617)	(11,717)	20,525	51,364	64,193	69,318
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	110,731	132,776	184,140	248,333
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**110,731**	**132,776**	**184,140**	**248,333**	**317,651**

Current year loss ratio (excl LAE)	84.1%	83.4%	77.5%	73.8%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	91.5%	85.4%	81.6%	85.1%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.9%	5.7%	5.6%
Traffic safety ratio	3.0%	3.5%	3.2%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**112.0%**	**105.0%**	**100.8%**	**104.0%**	**107.0%**
MCT	**47%**	**40%**	**46%**	**61%**	**77%**	**90%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (e) - Forecasts with 10% Lower LAE in 2013
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

	Forecast					
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	862,767	943,103	1,005,390	1,066,657	1,128,697
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**858,261**	**938,507**	**1,000,702**	**1,061,875**	**1,123,820**
Net premiums earned	**773,871**	**828,423**	**904,865**	**971,881**	**1,034,795**	**1,093,801**
Claims incurred	650,702	691,052	701,022	716,880	799,276	879,447
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	60,335	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,283	92,627	99,097	105,311	111,367
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**920,826**	**950,407**	**978,902**	**1,075,569**	**1,170,182**
Underwriting loss	**(127,069)**	**(92,403)**	**(45,542)**	**(7,021)**	**(40,774)**	**(76,381)**
Investment earnings	72,393	44,132	25,776	15,637	59,804	98,059
Other income	35,059	38,157	40,316	42,763	45,215	47,724
Increase (decrease) to RSR	(19,617)	(10,114)	20,550	51,379	64,245	69,402
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	112,334	134,404	185,783	250,028
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**112,334**	**134,404**	**185,783**	**250,028**	**319,430**

Current year loss ratio (excl LAE)	84.1%	83.4%	77.5%	73.8%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	90.7%	85.4%	81.6%	85.1%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.9%	5.7%	5.6%
Traffic safety ratio	3.0%	3.5%	3.2%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**111.2%**	**105.0%**	**100.8%**	**104.0%**	**107.0%**
MCT	**47%**	**41%**	**47%**	**61%**	**77%**	**91%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (f) - Forecasts with 10% Lower Administration Expenses in 2013
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

	Forecast					
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	862,767	943,103	1,005,390	1,066,657	1,128,697
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**858,261**	**938,507**	**1,000,702**	**1,061,875**	**1,123,820**
Net premiums earned	**773,871**	**828,423**	**904,865**	**971,881**	**1,034,795**	**1,093,801**
Claims incurred	650,702	691,052	701,022	716,880	799,276	879,447
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	67,039	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,283	92,627	99,097	105,311	111,367
Administrative expenses	52,671	49,890	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**921,986**	**950,407**	**978,902**	**1,075,569**	**1,170,182**
Underwriting loss	**(127,069)**	**(93,563)**	**(45,542)**	**(7,021)**	**(40,774)**	**(76,381)**
Investment earnings	72,393	44,132	25,732	15,624	59,766	97,997
Other income	35,059	38,157	40,316	42,763	45,215	47,724
Increase (decrease) to RSR	(19,617)	(11,274)	20,506	51,366	64,207	69,340
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	111,174	133,200	184,566	248,773
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**111,174**	**133,200**	**184,566**	**248,773**	**318,113**
Current year loss ratio (excl LAE)	84.1%	83.4%	77.5%	73.8%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	91.5%	85.4%	81.6%	85.1%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.0%	6.2%	5.9%	5.7%	5.6%
Traffic safety ratio	3.0%	3.5%	3.2%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**111.3%**	**105.0%**	**100.8%**	**104.0%**	**107.0%**
MCT	**47%**	**40%**	**46%**	**61%**	**77%**	**90%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (g) - Forecasts with 10% Decrease to Traffic Safety Expenses in 2013
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

	Forecast					
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	862,767	943,103	1,005,390	1,066,657	1,128,697
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**858,261**	**938,507**	**1,000,702**	**1,061,875**	**1,123,820**
Net premiums earned	**773,871**	**828,423**	**904,865**	**971,881**	**1,034,795**	**1,093,801**
Claims incurred	650,702	691,052	701,022	716,880	799,276	879,447
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	67,039	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,283	92,627	99,097	105,311	111,367
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	25,850	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**924,658**	**950,407**	**978,902**	**1,075,569**	**1,170,182**
Underwriting loss	**(127,069)**	**(96,235)**	**(45,542)**	**(7,021)**	**(40,774)**	**(76,381)**
Investment earnings	72,393	44,132	25,703	15,600	59,678	97,860
Other income	35,059	38,157	40,316	42,763	45,215	47,724
Increase (decrease) to RSR	(19,617)	(13,946)	20,477	51,342	64,119	69,203
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	108,502	130,499	181,841	245,960
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**108,502**	**130,499**	**181,841**	**245,960**	**315,163**

Current year loss ratio (excl LAE)	84.1%	83.4%	77.5%	73.8%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	91.5%	85.4%	81.6%	85.1%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.9%	5.7%	5.6%
Traffic safety ratio	3.0%	3.1%	3.2%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**111.6%**	**105.0%**	**100.8%**	**104.0%**	**107.0%**
MCT	**47%**	**39%**	**45%**	**60%**	**76%**	**90%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Saskatchewan Auto Fund
Statement of Operations
IR Round 2 #35 (h) - Forecasts with 10% Higher Other Income in 2013
Including 1.03% Rate Increase and 1.23% RSR Surcharge in 2013*

		Forecast				
year ended December 31	2012	2013	2014	2015	2016	2017
($000's)	$	$	$	$	$	$
Direct premium	804,308	862,767	943,103	1,005,390	1,066,657	1,128,697
Ceded premium	(4,742)	(4,506)	(4,596)	(4,688)	(4,782)	(4,877)
Net premiums written	**799,566**	**858,261**	**938,507**	**1,000,702**	**1,061,875**	**1,123,820**
Net premiums earned	**773,871**	**828,423**	**904,865**	**971,881**	**1,034,795**	**1,093,801**
Claims incurred	650,702	691,052	701,022	716,880	799,276	879,447
Prior year claims (Net of Disc/PFAD)	33,211	-	-	-	-	-
Loss adjusting expense (LAE)	62,061	67,039	71,332	76,003	81,105	86,640
Issuer fees and premium taxes	79,138	85,283	92,627	99,097	105,311	111,367
Administrative expenses	52,671	55,434	56,101	56,981	59,307	61,516
Traffic safety	23,157	28,722	29,325	29,941	30,570	31,212
Total claims and expenses	**900,940**	**927,530**	**950,407**	**978,902**	**1,075,569**	**1,170,182**
Underwriting loss	**(127,069)**	**(99,107)**	**(45,542)**	**(7,021)**	**(40,774)**	**(76,381)**
Investment earnings	72,393	44,132	25,732	15,609	59,710	97,910
Other income	35,059	41,972	40,316	42,763	45,215	47,724
Increase (decrease) to RSR	(19,617)	(13,003)	20,506	51,351	64,151	69,253
Rebate to policyholders *	-	-	-	-	-	-
RSR:						
Balance Beginning of Year	134,261	119,001	109,445	131,471	182,822	246,973
Appropriation from Redevelopment Reserve	4,357	3,447	1,520	-	-	-
Balance, End of Year	**119,001**	**109,445**	**131,471**	**182,822**	**246,973**	**316,226**

Current year loss ratio (excl LAE)	84.1%	83.4%	77.5%	73.8%	77.2%	80.4%
Loss ratio (incl LAE)	96.4%	91.5%	85.4%	81.6%	85.1%	88.3%
Issuer fee and premium tax ratio	10.2%	10.3%	10.2%	10.2%	10.2%	10.2%
Administrative expense ratio	6.8%	6.7%	6.2%	5.9%	5.7%	5.6%
Traffic safety ratio	3.0%	3.5%	3.2%	3.1%	3.0%	2.9%
Combined ratio	**116.4%**	**112.0%**	**105.0%**	**100.8%**	**104.0%**	**107.0%**
MCT	**47%**	**40%**	**46%**	**61%**	**76%**	**90%**

*Note: The RSR surcharge is assumed to be in effect until August 2016.

Documentation for Information Request #36

Saskatchewan Government Insurance
2013 Rate Program
Documentation for Information Request #122

	(a)	(b)	(c)		(d)	(e)	
Vehicle Class	Projected Rating Year Premium at Current Rate Level	Projected Rating Year Premium with Proposed Rate Change and RSR - Original Proposal	2011 Written Exposures That Will Be within +/- 5% of Adequate - Original Proposal	% of Class That Will Be within +/- 5% of Adequate - Original Proposal	Projected Rating Year Premium with Proposed Rate Change and RSR - Revised Proposal	2011 Written Exposures That Will Be within +/- 5% of Adequate - Revised Proposal	% of Class That Will Be within +/- 5% of Adequate - Revised Proposal
CLEAR Rated Vehicles	$781,809,409	$784,932,347	750,603	97.4%	$794,229,752	748,110	97.1%
A - Commercial Light Trucks			0	0.0%		0	0.0%
F - Farm Light Truck - 1994 & Newer			49,097	97.1%		48,825	96.6%
LV - Private Passenger Vehicles (PPV)			673,874	97.5%		671,680	97.2%
LV - PPV - Farm Cars, SUVs and Vans			22,563	97.9%		22,537	97.8%
LV - Police Cars			0	0.0%		0	0.0%
LV - Police Trucks, Vans & SUVs			0	0.0%		0	0.0%
LV - U Drives			4,899	99.8%		4,897	99.7%
PT - Taxis (Rural)			171	100.0%		171	100.0%
Conventionally Rated Vehicles							
Ambulances	$264,604	$273,266	300	100.0%	$273,266	300	100.0%
A - Commercial Vehicles:							
Heavy Trucks and Vans IRP Reg. Ded.	$388,527	$364,149	449	96.5%	$364,149	449	96.5%
Heavy Trucks and Vans IRP $15K Ded.	$17,625	$14,671	16	45.9%	$14,671	16	45.9%
Heavy Trucks and Vans Non-IRP	$1,005,357	$1,037,632	956	99.5%	$1,037,632	956	99.5%
Power Units IRP Reg. Ded.	$7,950,004	$7,894,548	3,386	96.5%	$7,894,548	3,386	96.5%
Power Units IRP $15K Ded.	$1,769,011	$1,551,677	567	46.6%	$1,551,677	567	46.6%
Power Units Non-IRP	$2,522,122	$2,187,416	266	22.5%	$2,187,416	266	22.5%
C & D - Commercial Vehicles:							
Heavy Trucks and Vans	$6,994,269	$8,060,837	8,340	67.5%	$8,060,837	8,340	67.5%
Power Units	$10,887,164	$11,477,536	4,722	72.5%	$11,477,536	4,722	72.5%
F - Farm Vehicles:							
Heavy Trucks and Vans	$4,328,514	$4,001,603	21,832	84.3%	$4,001,603	21,832	84.3%
Light Trucks - 1993 & Older	$2,320,047	$1,989,419	14,684	100.0%	$1,989,419	14,684	100.0%
Power Units	$6,531,012	$5,998,633	7,913	84.6%	$5,998,633	7,913	84.6%
Hearses	$44,998	$52,435	0	0.0%	$52,435	0	0.0%
L - Automobile & Motorcycle Dealer Plates	$2,633,786	$2,759,639	3,905	100.0%	$2,759,639	3,905	100.0%
L - Snowmobile Dealers	$2,077	$2,112	0	0.0%	$2,112	0	0.0%
LV - Antiques	$797,455	$978,695	11,538	100.0%	$978,695	11,538	100.0%
LV - Buses	$155,769	$195,588	0	0.0%	$195,588	0	0.0%
LV - Buses (Restricted)	$8,207	$10,053	33	100.0%	$10,053	33	100.0%
LV - Motorcycles:	$16,562,437	$28,587,613	11,192	100.0%	$19,348,462	252	2.3%
Cruiser/Touring			8,242	100.0%		5	0.1%
Dual Purpose/Other			1,285	100.0%		243	18.9%
Sport			1,665	100.0%		4	0.2%
LV - Motorhomes	$1,846,220	$2,136,973	4,140	81.4%	$2,136,973	4,140	81.4%
MT - Snowmobiles	$450,511	$450,494	4,908	100.0%	$450,494	4,908	100.0%
PB - Passenger Inter-city Buses	$999,407	$1,141,670	246	52.9%	$1,141,670	246	52.9%
PC - Passenger City Buses	$750,212	$874,582	0	0.0%	$874,582	0	0.0%
PS - Passenger School Buses	$1,191,697	$1,509,913	1,213	38.1%	$1,509,913	1,213	38.1%
PT - Taxis	$1,908,896	$2,264,812	0	0.0%	$2,221,921	0	0.0%

Documentation for Information Request #36

	(a)	(b)	(c)		(d)	(e)	
Vehicle Class	Projected Rating Year Premium at Current Rate Level	Projected Rating Year Premium with Proposed Rate Change and RSR - Original Proposal	2011 Written Exposures That Will Be within +/- 5% of Adequate - Original Proposal	% of Class That Will Be within +/- 5% of Adequate - Original Proposal	Projected Rating Year Premium with Proposed Rate Change and RSR - Revised Proposal	2011 Written Exposures That Will Be within +/- 5% of Adequate - Revised Proposal	% of Class That Will Be within +/- 5% of Adequate - Revised Proposal
Trailers							
F - Trailers	$1,963,623	$2,314,324	29,464	100.0%	$2,314,324	29,464	100.0%
LT - Trailer Dealers/Movers	$265,009	$271,821	478	100.0%	$271,821	478	100.0%
T - Personal Trailers	$10,996,417	$12,100,314	33,240	83.1%	$12,100,314	33,240	83.1%
T - Utility	$1,721,460	$2,926,503	76,201	100.0%	$2,926,503	76,201	100.0%
TS - Commercial Trailers	$4,931,599	$5,579,813	45,531	100.0%	$5,579,813	45,531	100.0%
Miscellaneous Classes							
A - Excess Value	$117,048	$117,048	0	0.0%	$117,048	0	0.0%
C&D - Non-Resident	$11,456	$11,609	0	0.0%	$11,609	0	0.0%
C&D - Excess Value	$1,270,544	$1,270,544	0	0.0%	$1,270,544	0	0.0%
Industrial Tracked Vehicles	$81	$82	0	0.0%	$82	0	0.0%
LV - Motorized Bicycle	$252	$258	0	0.0%	$258	0	0.0%
PV - Converted Vehicles	$3,978	$4,191	0	0.0%	$4,191	0	0.0%
PV - Heavy Trucks and Vans	$296,337	$298,253	374	90.1%	$298,253	374	90.1%
PV - Power Units	$60,101	$59,403	42	78.1%	$59,403	42	78.1%
TS - Excess Value	$831,678	$831,678	0	0.0%	$831,678	0	0.0%
	$876,608,918	$896,534,156	1,036,537		$896,549,519	1,023,105	

MOTORCYCLE CAUSATION STUDY

- Each year 5 motorcycle riders are killed and 210 sustain various degrees of injuries in traffic collisions.
- Fifty-six percent of casualties to motorcycle riders result from single vehicle collisions in which the rider is most likely to be at fault.
- Motorcycle riders are twice as likely to be killed in multi-vehicle collisions as in single vehicle collisions.
- Between 61 – 67% of collisions involving motorcycles result in casualties to the rider, who is most likely 16-25 years of age.
- Seventy-three percent of motorcycle collisions occur on urban roads but twice as many deaths to riders occur on highways.
- Police reported data indicate that about 115 motorcycles are involved in collisions where there are no injuries to the rider but with damage costs exceeding $5,000.
- The top major factors that contribute to collisions involving motorcycle riders are:
    - Inattention
    - Road Condition
    - Driver Inexperience/Confusion
    - Taking Evasive Action
    - Excessive Loose Gravel
    - Animal Action (Wild)
    - Careless Driving/Stunting
- **The most commonly injured body region for motorcycle riders involved in collisions is the extremity (hands and wrists, legs, feet and ankles)--between 44 – 52% of injuries sustained by motorcycle riders are in the extremities region.**
- **For all motorcycle types, the rider is 4-12 times as likely to sustain injuries to the extremities as injuries to the head, neck, back and abdomen/pelvis regions.**
- **The rider's face appears to be the most protected in the event of a collision compared with other body regions.**
- **Other than injury to the extremity, riders are also more likely to sustain injuries on the backs and abdomen/pelvis regions than injuries to the head, neck, face and chest.**
- Sports bike riders are more likely to sustain injuries to their extremities than riders on other motor bikes.

KET STATISTICAL FACT: Studies indicate that quality motorcycle protective clothing is associated with reduced risk and severity of crash-related injury.

APPENDIX

The Count of Motorcycles for 2012

Body Style	Count
MC Cruise/ Touring	10,481
MC Sport	2,296
MC Dual Purpose/ Other	1,551
Motorized Bicycle	8
Total	**14,336**

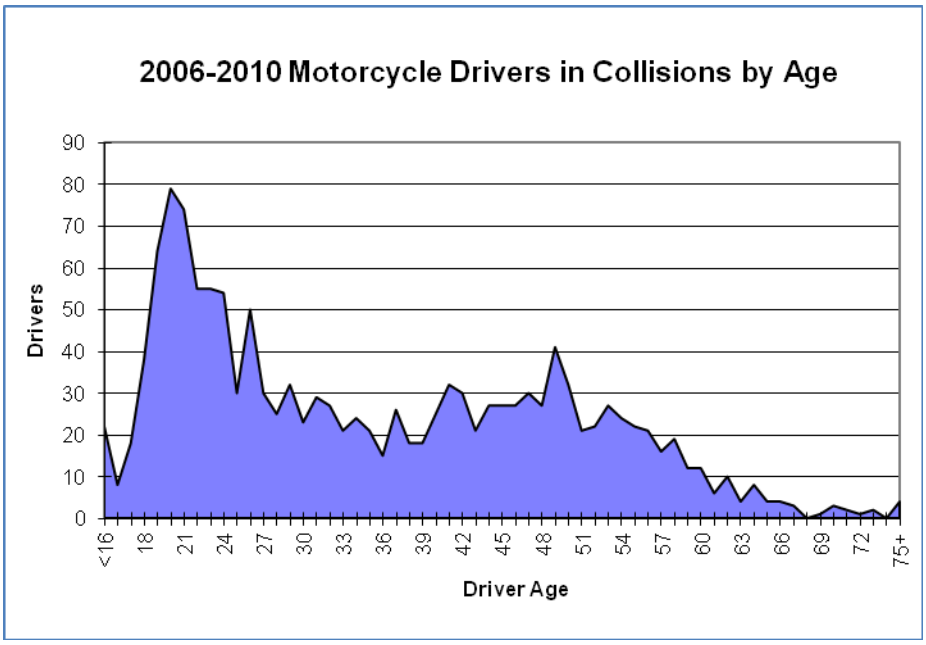
All Injuries by Injury Region (2008-2010)

	Injury Region								
Body Style	**Head**	**Neck**	**Face**	**Chest**	**Extremities**	**Back**	**Abdomen/ Pelvis**	**Entire Body**	**Total**
Cruise/Touring	49	46	32	33	229	52	32	37	510
Sport	21	19	5	12	149	31	30	21	288
Dual Purpose/Other	6	5	1	4	24	8	6	1	55
Motorcycle	21	20	7	17	113	30	21	16	245
Total	97	90	45	66	515	121	89	75	1098

Percent (%) of Injuries by Injury Region by Body Style (2008-2010)

	Injury Region								
Body Style	**Head**	**Neck**	**Face**	**Chest**	**Extremities**	**Back**	**Abdomen/ Pelvis**	**Entire Body**	**Total**
Cruise/Touring	9.6%	9.0%	6.3%	6.5%	44.9%	10.2%	6.3%	7.3%	100.0%
Sport	7.3%	6.6%	1.7%	4.2%	51.7%	10.8%	10.4%	7.3%	100.0%
Dual Purpose/Other	10.9%	9.1%	1.8%	7.3%	43.6%	14.5%	10.9%	1.8%	100.0%
Motorcycle	8.6%	8.2%	2.9%	6.9%	46.1%	12.2%	8.6%	6.5%	100.0%
Total	8.8%	8.2%	4.1%	6.0%	46.9%	11.0%	8.1%	6.8%	100.0%

Information Request #41



Top 10 Major Contributing Factors: Collisions Involving Motorcycle Riders by Age Category

Age 16- 24	Age 25-33	Age >33
Driver Inexperience/Confusion	Inattentive	Taking Evasive Action
Inattentive	Driver Inexperience/Confusion	Road Condition
Road Condition	Road Condition	Inattentive
Excessive Loose Gravel	Taking Evasive Action	Animal Action (Wild)
Careless Driving/Stunting	Excessive Loose Gravel	Driver Inexperience/Confusion
Taking Evasive Action	Animal Action (Wild)	Uninvolved Vehicle
Exceeding Speed Limit	Uninvolved Vehicle	Excessive Loose Gravel
Animal Action (Wild)	Careless Driving/Stunting	Weather Conditions
Uninvolved Vehicle	Exceeding Speed Limit	Other Human Action
Driving To Fast For Conditions	Other Human Action	Distracted

Determinants of Motorcycle Crash Liability in Saskatchewan

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Abstract

When motorcycles are involved in traffic accidents, the insurance company is tasked with the responsibility of assessing the many contributing factors that determine legal responsibility. Legal responsibility must be established in order to adjudicate claims that result from occupant casualties and physical damage to vehicles involved in the accident. Fault must also be established for driver improvement purposes, since a driver's propensity to be at fault may increase over time. Against this background, this study provided insight into the combination of rider, vehicular and environmental determinants of motorcycle crash liability.

Using crashes (N=2136) involving motorcycles from the Saskatchewan Traffic Accident Information System (TAIS) between 2000 to 2007, and logistic regression techniques, the association between crash liability and rider, vehicle and environmental factors was determined. The model developed enabled the computation of the probability of a motorcycle rider being at-fault in a crash.

Assessing the major categories separately revealed that the age of the rider, alcohol use, at-fault crash history and non-criminal code conviction history were the most significant predictors of crash liability within the rider category. When only vehicle factors were considered in the model, engine size, body type and model years were retained as the predictors of crash liability. With respect to environmental factors, road surface was the only significant predictor of whether or not a rider was assessed to be at-fault in a crash. When all three major categories were considered collectively, crash liability appeared to be predicted by alcohol use, at-fault crash history, engine size, body type, model year and road surface.

There are indications that, at the macro level, motorcycle crash liability could be reliably predicted using a combination of rider, vehicle, and environmental factors seventy-five percent of the time. Specifically, road surface conditions, especially when gravel is present, and prior involvement in at-fault collisions, significantly affect crash liability. The precision of estimating probability of fault is greatly enhanced when these factors are combined with alcohol use and choice of motorcycle body type, engine size, and model year. The results have positive implications for safety education of motorcycle riders, in which the significant predictors of crash liability could be emphasized to reduce at-fault crash risk. Most importantly, the results from this study provide

a starting point for motorcycle driver improvement, law enforcement and strategic assessment of fault as a business solution for insurance companies.

INTRODUCTION

Whether as a form of transportation or leisure activity, the dangerous nature of motorcycling has long been recognized. When a motorcycle related collision occurs, many factors can be taken into consideration as possible precursors to the cause of the event. For example, there are driver dependent factors (i.e. age, gender and rider behaviors), vehicle dependent factors (i.e. model year and colour) and environmental factors (i.e. location and road conditions). Over the years, the traffic safety community has investigated many of these potential risk factors to motorcycle crashes and motorcycle crash severity.

Lardelli-Claret et al. (2005) assessed the effect of driver dependent factors on the risk of causing a collision for two wheeled motor vehicles. They found that inappropriate speed had the greatest influence on the risk of causing a collision, followed by driving under the influence of alcohol and excessive speed. Langley et al. (2000) examined the association between motorcycle engine size and injury crash risk. Their results indicated that injury crash risk increased by 50% for all motorcycle cubic capacity (cc) categories compared with motorcycles with a less than 250 cc. However, there was no consistent pattern of increasing risk as cc increased. In a study conducted by Meuleners et al. (2007), crash location (rural vs urban) was found to have a significant effect to the occurrence of hospitalizations for both bicyclists and motorcyclists. Even though rural crashes comprised only 14% of all events studied, the risk of hospitalization was fives times that of the urban locations.

While research on various risk factors to motorcycle crashes are abundant, attempts to a collective examination are few and far in between. That is, the simultaneous assessment of risk factors attributed to the driver, the vehicle and the surrounding environment. This will help to provide a more elaborate account on the combination of factors that are most influential to crash occurrence. Results may encourage the design of a more meaningful program or a composite of initiatives/education to enhance safety. Further to this, the need to consider the joint effect of these factors is also imperative from an insurance perspective. When a collision occurs, legal responsibility must be established in order to adjudicate claims that result from occupant casualties and physical damage to vehicles involved in the accident. Fault must also be determined for driver improvement purposes, since a driver's propensity to be at fault may increase over time. However, fault can be influenced by a number of driver behaviors and compromised by various vehicle design and road conditions. Against this background, this study investigated the combination of rider, vehicular and environmental determinants of motorcycle crash liability.

DATA

The data used in this study came from Saskatchewan Government Insurance (SGI). 2136 crash records involving motorcycles were identified from the Traffic Accident Information System (TAIS) between the years of 2000 and 2007. There were a total of 1963 unique riders among these crashes. Additional information such as license status, claims experience and traffic violations pertaining to these riders were also extracted from a number of internal databases. Such data was selected based upon consideration from previous literature review and availability. The obtained data was categorized into the three major risk elements and represented by nineteen variables. In addition, two crash-related variables were also included to account for the temporal effect.

Age, gender, experience, alcohol involved, speeding involved, criminal conviction history, non-criminal conviction history, suspension history, at-fault crash history, license validity and license class were variables among rider dependent factors. It should be noted that the historical account (i.e. convictions, traffic violations, etc.) on riders considered only three years prior to the date of the study crashes. Vehicle dependent factors

included model year, body type, engine size and colour. Roadway alignment, road condition, location of crash and road surface was considered under the environmental factor category. Lastly, the two crash-related variables described the time of day and month of the crash.

METHOD

Logistic regression techniques were used to model the dichotomous response of whether or not motorcyclists involved in a crash were assigned fault (crash liability). Their ability in predicting the risk, severity even the likelihood of a crash has been effectively demonstrated in a number of safety literature (Meuleners et al., 2007, Magazzu et al., 2006, Zambon & Hasselberg, 2006, Lardelli-Claret et al., 2005). In this study, crash liability was estimated as a function of various rider, vehicle and environmental factors using the following form:

$$Log_e\{\Pr(F)/[1-\Pr(F)]\} = \beta_0 + \beta_i R_i + \beta_i V_i + \beta_i E_i \qquad [1]$$
$$i = 1,2,3...$$

where the probability of being assigned fault (Pr(F)) divided by the probability of not being assigned fault (1-Pr(F)), represents the 'odds' of being at-fault. β_0 is the intercept of the model, β_i is the parameter estimate for the corresponding rider factor *(R)*, vehicle factor *(V)* and environment factor *(E)*.

Based on the developed model, the probability of a motorcycle rider being assigned fault in a crash was computed by:

Pr (F) = (odds of being at-fault) / 1 + (odds of being at-fault) [2]

Overall model fit was assessed using the Akaike's Information Criterion (AIC) by comparing the value generated for an intercept only model to the intercept and covariates model. The fitness of the binary response logistic model was determined by means of the Likelihood Ratio test, which tested the statistical significance of the covariates within the model.

ANALYSIS

In the first part of the study, three separate models were developed in which we investigated the exclusive predictive power of the rider, vehicle and environmental factor. Due to the sheer number of variables at hand, stepwise selection was used to determine the most significant predictors in each scenario. In the second part of the study, the response variable was regressed over all the predictors retained from the first part of the analysis. Stepwise regression was once again employed to determine the most prevalent effect among the various factor variables. All analyses were carried out using the statistical software, SAS® Enterprise Guide® 4.1

RESULTS – PART I

Model fit

For each factor category, the intercept & covariates model produced a smaller AIC value compared with the intercept only model (Table 1). This indicates that the former model is superior to the latter. Subsequently, our working models showed a good fit.

Table 1: Model Fit Statistics

	AIC Criterion	
Model	**Intercept only**	**Intercept & Covariates**
Rider Factors	890.779	783.510
Vehicle Factors	2041.479	1960.944
Environmental Factors	1890.954	1729.848

Rider Factors

Assessing only the rider factors revealed that the age of the rider, non-criminal conviction history, alcohol use and at-fault crash history were the most significant predictors of crash liability within the rider category (Table 2). Specifically, the effect of at-fault crash history was most prevalent within the model (p-value = <0.0001). The presence of alcohol also played a significant role in the determination of crash liability (p-value = 0.0028).

Table 2: Type III Analysis of Effects retained in the Stepwise Regression Model for Each Factor Category

Effects	**Rider Factors**		**Vehicle Factors**		**Environmental Factors**	
	Wald Statistic	**P-value**	**Wald Statistic**	**P-value**	**Wald Statistic**	**P-value**
Age	10.4446	0.0151	-	-	-	-
Non-criminal conviction history	4.2837	0.0385	-	-	-	-
Alcohol involved	8.9526	0.0028	-	-	-	-
At-fault crash history	66.6548	<0.0001	-	-	-	-
Model year	-	-	27.0709	<0.0001	-	-
Body style	-	-	16.2327	0.0010	-	-
Engine size	-	-	18.9918	0.0019	-	-
Road surface	-	-	-	-	112.6980	<0.0001

- Effect not applicable to factor category

Interpretation on the effect of these factors can be drawn from the model results shown in Table 3. A positive value in the parameter estimate for at-fault crash history indicates that for every unit increase in the number of previous at-fault crashes, the likelihood of being assigned fault in a crash also increased. One may also interpret the model by examining the odds ratio of being assigned fault in a crash. The odds of being assigned fault when no alcohol was involved is 0.044 times that when alcohol was present. A ratio of less than 1 indicates a lower likelihood of being at-fault compared with the reference level. Alternatively, a ratio of greater than 1 indicates a higher likelihood. In this instance, the odds of being liable is higher with alcohol consumption. Taking a similar approach, riders who were 20 to 34 years of age were more likely to be

assigned fault in a crash compared with the riders over 55 years of age (O.R. = 2.270, C.I. 1.213-4.248). The odds of which was higher than all other age categories.

Table 3: Model Results – Crash Liability as a function of Driver Dependent factors

Variable	Estimate	s.e.	Chi-Square	p-value	Odds Ratio	C.I. Low	C.I. High
Intercept	0.6198	0.5355	1.3397	0.2471	-	-	-
Alcohol Involved: No	-1.5597	0.5213	8.9526	0.0028	0.044	0.006	0.341
*Alcohol Involved: Yes	-	-	-	-	1.000	-	-
Age: 15-19	-0.1297	0.2707	0.2295	0.6319	1.245	0.515	3.011
Age: 20-34	0.4709	0.1517	9.6325	0.0019	2.270	1.213	4.248
Age: 35-54	0.0077	0.1585	0.0023	0.9614	1.428	0.764	2.671
*Age: 55 & over	-	-	-	-	1.000	-	-
Non-criminal conviction history: No	0.1950	0.0942	4.2837	0.0385	1.477	1.021	2.137
*Non-criminal conviction history: Yes	-	-	-	-	1.000	-	-
**At-fault crash history (0,1,2…)	0.9766	0.1196	66.6548	<0.0001	2.655	2.100	3.357

*Reference level

**Continuous variable representing the number of previous at-fault crashes

Vehicle Factors

Engine size, body type and model years were retained as the predictors of crash liability among the vehicle factors (Table 2). By observing the Wald statistics and p-value generated, it was evident that the contributory effect of body type and engine size was almost parallel. Paramount to their effects was model year with a p-value of <0.0001.

Considering model year, the likelihood of being liable for a crash is the highest if the motorcycle involved had a model make that was beyond 2000 (Table 4). With respect to engine size, riders who operated a motorcycle with a cubic capacity (cc) between 601 to 800 had the greatest odds of being assigned fault. Motorcycles with a sporty body style were associated with the highest odds of being liable in a crash, almost two times that of the general body style.

Table 4: Model Results – Crash Liability as a function of Vehicle Dependent factors

Variable	Estimate	s.e.	Chi-Square	p-value	Odds Ratio	C.I. Low	C.I. High
Intercept	0.2063	0.1768	1.3618	0.2432	-	-	-
Model year: <1970s	-0.7579	0.4374	3.0025	0.0831	0.256	0.088	0.746
Model year: 70s	-0.0398	0.2410	0.0272	0.8690	0.524	0.301	0.911

Model year: 80s	-0.1097	0.1580	0.4824	0.4873	0.489	0.360	0.663
Model year: 90s	0.3012	0.1505	4.0034	0.0454	0.737	0.564	0.963
*Model year: >2000	-	-	-	-	1.000	-	-
Engine size: <200cc	0.1611	0.5568	0.0837	0.7723	1.660	0.441	6.251
Engine size:200-400cc	-0.3864	0.2924	1.7460	0.1864	0.960	0.485	1.901
Engine size: 401-600cc	0.1499	0.1673	0.8028	0.3703	1.642	1.195	2.256
Engine size: 601-800cc	0.2138	0.1663	1.6532	0.1985	1.750	1.279	2.393
Engine size: 801-1000cc	02073	0.1791	1.3399	0.2471	1.738	1.230	2.458
*Engine size: >1000cc	-	-	-	-	1.000	-	-
Body type: Cruise/touring	-0.0709	0.1472	0.2322	0.6299	1.039	0.792	1.365
Body type: Sport	0.4813	0.1525	9.9611	0.0016	1.806	1.335	2.442
Body type: Dual purpose	-0.3008	0.3434	0.7672	0.3811	0.826	0.334	2.043
*Body type: Motorcycles (general)	-	-	-	-	1.000	-	-

*Reference level

Environmental Factors

With respect to environmental factors, road surface was the only significant predictor of whether or not a rider was assessed to be at-fault in a crash (p-value = <0.0001) (Table 2).

Using wet road surface as a reference, gravel / sandy surfaces posed the highest odds when it comes to riders being liable to the causation of a crash – nearly three times the odds of wet road surface (Table 5). In the instant where the road surface was dry, riders were least likely to be assigned fault (O.R. = 0.336, C.I. 0.199 – 0.568).

Table 5: Model Results – Crash Liability as a function of Environmental Dependent factors

Variable	Estimate	s.e.	Chi-Square	p-value	Odds Ratio	C.I. Low	C.I. High
Intercept	1.3285	0.2133	38.7881	<0.0001	-	-	-
Road surface: Dry	-1.1576	0.2177	28.2668	<0.0001	0.336	0.199	0.568
Road surface: Gravel/Sand	1.0503	0.2613	16.1588	<0.0001	3.060	1.583	5.916
Road surface: Muddy	0.1756	0.5925	0.0878	<0.7670	1.276	0.254	6.414
Road surface: Wet	-	-	-	-	1.000	-	-

*Reference level

RESULTS - PARTII

When all three factor categories were considered simultaneously, crash liability appeared to be predicted by alcohol involvement, at-fault crash history, model year, engine size, body style and road surface (Table 6). The predominant effect among these factors came from road surface, generating the largest Wald statistics of 118.7485 (p-value = <0.0001). This was followed by the rider's previous at-fault crash history (Wald statistics, 89.6426, p-value = <0.0001). The remaining four factor variables shared a similar magnitude in effect to predicting crash liability. However, statistical significance was more pronounced in alcohol use (p-value = <0.0001), indicative of a slightly more reliable predictor.

Table 6: Type III Analysis of Effects retained in the Stepwise Regression Model when all Factor Categories were combined

Effects	Wald Statistic	P-value
Alcohol involved	15.1843	<0.0001
At-fault crash history	89.6426	<0.0001
Model year	17.8404	0.0013
Engine size	15.3150	0.0091
Body style	16.0515	0.0011
Road surface	118.7485	<0.0001

Parameter estimates and odds ratios for these factors can be found in Table 7. Riders involved in a crash occurring on gravel/sandy surfaces had the greatest odds of being assigned fault (O.R. 3.516, C.I. 1.755 – 7.043) among other road surface conditions. This likelihood increased as riders accumulated a higher number of prior crashes in which they were declared liable. Alcohol consumption continued to have a negative impact on riders' crash liability. With respect to vehicle factors in this model, sporty motorcycles with an engine size between 601 to 800 cc, manufactured after the year 2000 could potential increase a rider's likelihood of being assigned fault in a crash.

Table 7: Model Results – Crash Liability as a function of various Rider, Vehicle and Environmental Dependent Factors

Variable	Estimate	s.e.	Chi-Square	p-value	Odds Ratio	C.I. Low	C.I. High
Intercept	1.8484	0.4799	14.8365	0.0001	-	-	-
Alcohol Involved: No	-1.4580	0.3742	15.1843	<0.0001	0.054	0.012	0.235
*Alcohol Involved: Yes	-	-	-	-	1.000	-	-
**At-fault crash history (0,1,2…)	0.7993	0.0844	89.6426	<0.0001	2.224	1.885	2.624
Model year: <1970s	-1.5544	0.6001	6.7093	0.0096	0.102	0.024	0.445
Model year: 70s	0.2023	0.2842	0.5068	0.4765	0.593	0.319	1.104
Model year: 80s	0.2096	0.1992	1.1062	0.2929	0.598	0.422	0.846
Model year: 90s	0.4183	0.1909	4.7996	0.0285	0.736	0.541	1.002
*Model year: >2000	-	-	-	-	-	-	-
Engine size: <200cc	0.1083	0.5951	0.0331	0.8556	1.683	0.407	6.956
Engine size:200-400cc	-0.1535	0.3195	0.2308	0.6309	1.295	0.612	2.743
Engine size: 401-600cc	0.1626	0.1836	0.7852	0.3756	1.888	1.228	2.570
Engine size: 601-800cc	0.2291	0.1818	1.5875	0.2077	1.899	1.324	2.723
Engine size: 801-1000cc	0.0656	0.1953	0.1129	0.7369	1.613	1.087	2.392
*Engine size: >1000cc	-	-	-	-	-	-	-
Body style: Cruise/touring	0.1351	0.1630	0.6866	0.4073	1.423	1.035	1.955
Body style: Sport	0.4358	0.1662	6.8773	0.0087	1.921	1.369	2.696
Body style: Dual purpose	-0.3535	0.3702	0.9117	0.3397	0.873	0.328	2.324
*Body style: Motorcycles (general)	-	-	-	-	-	-	-
Road surface: Dry	-1.4148	0.2246	39.6794	<0.0001	0.330	0.189	0.576
Road surface: Gravel/Sand	0.9515	0.2680	12.6041	0.0004	3.516	1.755	7.043
Road surface: Muddy	0.7691	0.6032	1.6259	0.2023	2.930	0.562	15.263
Road surface: Wet	-	-	-	-	-	-	-

*Reference level

**Continuous variable representing the number of previous at-fault crashes

RESULTS – APPLICATION OF FINAL MODEL

The last stage of this analysis involved an application trial of the final model to predicting crash liability. N=326 motorcycle related crashes were extracted from TAIS between 2007 and 2008. Although, there were more actual crashes occurred during this time period, only crashes with records pertaining to the various factor variables were kept.

Based on the intercept value and parameter produced from the final model (Table 7), the odds of being assigned fault were determined according to the unique conditions surrounding each crash. The probability of being liable for a crash was subsequently calculated. Since SGI assign fault when driver/rider is assessed to be at least fifty percent responsible for the causation of a crash, a calculated probability of over 0.50 would be interpreted as rider being liable. Prediction from the model was later compared to the actual liability assessment.

We will use an actual crash record to illustrate this process. A cruise/touring motorcycle built in the 1980s, with an engine size greater than 1,000 cc was involved in a crash. At the time of the crash, no alcohol was involved and the road surface was classified as gravel/sandy. Rider did not have any previous crashes where he/she was assigned fault. For this particular instance, rider was assessed to be liable by SGI. We begin by determining the odds of this rider being responsible for the crash:

Odds of being at-fault = exp (1.8484 – 1.4580 + 0.0000 + 0.2096 – 0.4121 +0.1351 + 0.9515) = 3.577.

That is, the odds of being at-fault is almost 4 times that of not being at-fault. Subsequently, the probability of being assigned fault [2] is: 3.577 / (1+3.577) = 0.78.

Since 0.78 is greater than 0.50, our model predicted that the rider would be liable for the crash, which coincides with the actual assessment.

We performed this process on the remaining crashes and found a seventy-five percent success rate in this application. That is, out of 326 crashes, our model correctly predicted the crash liability for 246 crashes by incorporating the six significant factors pertaining to the rider, vehicle and environmental element of a crash.

DISCUSSION

Previous research

While some studies had tried to link the issue of crash liability to certain causation factors, attempts to incorporate various road elements in determining fault were few and far between. This is especially true with regards to motorcycle related crashes. In 1993, Soderstrom et al. examined alcohol use and driving records in relation to crash culpability among injured motorcycle riders. While culpability assessment revealed an apparent causative role in alcohol use, the statistical significance of this relationship was not investigated. Kim & Li (1996) developed a logistic regression model to explain the likelihood of motorists being liable in crashes involving bicyclists. They found that motorist age (squared), bicyclist age (squared), bicyclist helmet use, and motorist turning actions could increase the likelihood of motorists being assigned fault. A more recent study conducted by Kim & Boski (2001) explored the association between fault and various environmental, temporal, spatial and human factors in crashes involving vehicles and motorcycles. Frequency distribution of fault assigned according to driver/rider characteristics, crash time/day, location and other external factors were tabulated for the purpose of identifying patterns. However, the explicit relationship in determining fault was only investigated using human factors, specifically, risky behaviours. They found that behaviours such as inattentiveness, misjudgment, speeding and following too closely could increase the odds of a motorcyclist being liable in a crash.

Reasons attributing to such an infrequent topic in research may be due to a lack of reliable, descriptive and comprehensive source of data. SGI, a provincial insurance provider for compulsory auto insurance in Saskatchewan, maintain both claims data for business purposes as well as crash data relating to traffic safety issues. It should be noted that present study was made possible as a result of such resourceful data.

The subject of age

The age factor in motorcycle safety literature has been greatly explored. This is not only due to the fact that age data is relatively easy to obtain but also, groupings of ages can often be generalized into different social classes. For example, younger riders are often classified as having less operating experience. More recently, age matured riders are being associated with the term ‘born again’ riders. From past research, it is evident that age plays an informative role to crash involvement (Lardelli-Claret et al., 2005, Mullin et al., 2000). With respect to crash liability, Kim & Boski found that the likelihood is highest at the younger (15 year-old) and older (80 year-old) ends of the age spectrum among motorcycle riders in Hawaii. Results from this present study offered a different trend. We found that riders between the ages of 20 to 34 posed the highest odds in being liable in a crash. However, it is important to consider that separation in riding purposes as a result of climatic and geographic differences between the two study regions. Different riding purposes can potentially dictate a different age demographic. For example, since the riding season is short in Saskatchewan, riding is most often treated as a leisure activity. This is especially true for well-established adults who are able to afford a motorcycle as a seasonal vehicle. In Hawaii, a much longer riding season along with the short travel distances associated with island living has shaped motorcycling into a popular mode of transportation, regardless of age.

Overall, age appeared to be a significant predictor for crash liability when only rider factors were being analyzed. However, such an effect dissipated when vehicle and environmental elements were being considered as well. While the age factor has been generally accepted as a descriptive and reliable predictor in the safety research community, it is interesting to note that this is not always the case. In determining fault by considering all major elements (rider, vehicle, environmental) in a road system, maturity did not influence its likelihood.

Determining factors

When all factor categories were being considered, the most prevalent effect in the assessment of fault was found in road surface. That is, whether or not a motorcyclist is liable in a crash largely depended on the road surface at the time of crash. Specifically, gravel/sandy surfaces posed the greatest odds in motorcyclists being at-fault. Examining similar factors, Kim & Boski (2001) found that there were more single motorcycle crashes involving wet, oily, or debris-strewn surfaces than motorcycle-vehicle crashes. Condition of the riding surface is evidently compelling to a rider’s safety as well as his/her liability in a crash. As a result, motorcycle training courses and safe riding promotion should emphasize the potential danger from riding in such a condition. Further to this is to educate riders with maneuvers to recover control or the very least, to reduce the impact of the crash when faced with such a situation.

The next major contributing factor in the assessment of fault was riders' prior involvement in at-fault crashes. At-fault crash history has not been a popular factor in predicting motorcycle crashes. This is possibly due to data availability. Often times, studies focused on a specific time period when motorcycle crashes occurred, it can be challenging to obtain addition crash records to formulate this particular variable.

In the present study, at-fault crash history was created as a partial interpreter to the rider's recklessness and/or skillfulness in terms of operating a motor vehicle. The effectiveness of this variable demonstrated that not only factors at the time of the crash can influence the outcome of fault but rider's driving history can also be an important determinant. The significance of this relationship re-enforces the importance of some current SGI programs such as the Driver Improvement Program and the Safe Driver Recognition program. While both programs monitor a driver's traffic convictions and at-fault crashes, the Driver Improvement Program determines the sanction level based on demerit points accumulated. The Safe Driver Recognition program provides the safety rating and offers the corresponding insurance discount. Though, taking a different approach, both programs operate to enhance safety as well as to reduce the number of insurance claims.

While the predicting power was similar in magnitude among the remaining factor variables (alcohol involved, engine size, model year and body type), alcohol involved had a higher statistical significance (lower p-value, <0.0001). It has been well documented that the presence of alcohol increases crash risk (Lardelli-Claret et al., 2005, Lin et al., 2003). However, literature on alcohol involvement as a predictive variable for crash liability is limited. Current findings suggest that riders under alcohol influence were more likely to be assigned fault in a crash compared with those who were not under the influence. This information further magnifies the serious consequences of alcohol consumption. Relating to the past and present findings, without a doubt, continuous enforcement is crucial. In addition, education on the consequences of alcohol consumption while operating a motorcycle (and motor vehicle) is also a favorable preventive measure.

Model Application

The final model in this study proved to be suitable, returning a seventy-five percent success rate in predicting the crash liability of historical crashes. The result of this demonstration has two implications. First, the factor variables selected for the final model were appropriate in determining fault. Rider, vehicle and environmental elements all played a role in the assessment of crash liability. The effect of which, however, was most prevalent for the variable describing road surface. Second, the assessment of liability based on a logistic regression model is feasible using the internal data available at SGI. This illustration represents as a potential means of forecasting at-fault frequency. Of course, further research may be necessary to refine the estimation process. Nevertheless, such information can serve as an additional source of reference in the process of ratemaking and/or other initiatives within SGI.

LIMITATION

In order to compute the odds ratios to obtaining meaningful comparisons, most variables were set up categorically. As a result, analysis on the correlation between variables was difficult to perform since the SAS correlation procedure (Proc Corr) requires the variables to be of numeric nature. If correlation could be detected prior to the modeling process, then variables exhibiting high correlation may be removed, leading to a more refined regression model.

Another issue to be considered is the obstacle with missing data. TAIS is a diversified crash database documenting from driver's status such as age, license type, to operating element such as driver's intended movement and, to external factors like road conditions. Whether it was reported by police enforcement or by SGI's claims center, often times, not all the character fields pertaining to a crash were accounted for. As a result, some missing data is inevitable. Based on the nature of the variable, some tended to have more missing observations than others. Effect of the variables might not have been fully captured as a result.

CONCLUSION

In this study, crash liability was determined based on various rider, vehicle and environmental factors. A logistic regression model was used to predict the odds of a rider being assigned fault in a crash. Assessing the three major elements separately revealed that the age of the rider, alcohol use, at-fault crash history and non-criminal code conviction history were the most significant predictors of crash liability within the rider category. When only vehicle factors were considered, engine size, body type and model years were retained as the predictors of crash liability. With respect to environmental factors, road surface was the only significant predictor of whether or not a rider was assessed to be at-fault in a crash.

Rider, vehicle and environmental elements all played a role in the assessment of crash liability when they were being considered simultaneously. The effect of which, however, was most prevalent for the variable describing road surface. This was followed by at-fault crash history and alcohol involved. Gravel/sandy road surface, previous at-fault crash involvement and alcohol consumption all tended to increase the odds of a motorcyclist being liable in a crash. Subsequently, motorcycle training and improvement programs should emphasize these issues in the effort to reduce at-fault crash-risk and enhance safety.

Study results also indicated that, at the macro level, motorcycle crash liability could be reliably predicted using a combination of driver, vehicle, and environmental factors seventy-five percent of the time. The success of this demonstration has two implications. First, the factor variables selected for the final model were appropriate in determining fault. Second, the assessment of liability based on a logistic regression model is feasible using the internal data available at SGI. This illustration represents as a potential means of forecasting at-fault frequency. Further research may be necessary to refine the estimation process. Nevertheless, such information can serve as an additional source of reference in the process of ratemaking and/or other initiatives within SGI.

The results of this study have shown positive implications for safety education of motorcycle riders, in which the significant predictors of crash liability could be emphasized to reduce at-fault crash risk. Most importantly, the results from this study provide a starting point for motorcycle driver improvement, law enforcement and strategic assessment of fault as a business solution for insurance companies.

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Motorcycle Collisions Involving Another Vehicle(s) - 2007 to 2012

Pre-Collision Action of Other Vehicle	Number of Occurrences	% of Occurrences
Not Specified	57	6.1%
Going Straight Ahead	273	29.3%
Turning Left	261	28.0%
Turning Right	35	3.8%
Making U-Turn	21	2.3%
Changing Lanes	53	5.7%
Merging	12	1.3%
Reversing	39	4.2%
Overtaking/Passing on Left or Right	7	0.8%
Slowing or Stopping on the Roadway (Decelerating)	52	5.6%
Stopped in Traffic (inc. Mechanical Breakdown)	35	3.8%
Starting in Traffic (Accelerating)	26	2.8%
Starting from Parked Position, Leaving Roadside	11	1.2%
Parked Legally	42	4.5%
Parked Illegally	3	0.3%
Other Action	6	0.6%
TOTAL	**933**	

Following is a table that shows the major contributing factors in motorsysle collisions. For motorcycles, distraction and inattention are much less likely to be contributing factors but driver inexperience is notably more contributory (9.3% of total factors for motorcycles compared to 2.8% for all collisions). The other ones that jumped out are loose gravel, careless driving/stunting and evasive action.

Motorcycle Collision Major Contributing Factors, 2007 to 2012

					1960	excl. "Did not cause"
MCF Code	Major Contributing Factor	PDO	Injury	Fatal	Total	% of Total
01	INATTENTIVE	86	128	4	218	11.1%
02	DISTRACTED	12	31	2	45	2.3%
03	HAD BEEN DRINKING	9	25	2	36	1.8%
04	IMPAIRED	14	11	3	28	1.4%
05	EXTREME FATIGUE	0	2	0	2	0.1%
06	FELL ASLEEP	0	1	0	1	0.1%
07	DRIVER INEXPERIENCE CONFUSION	40	141	1	182	9.3%
08	LOST CONCIOUSNESS ILLNESS	0	2	0	2	0.1%
09	PHYSICAL MEDICAL DISABILITY	1	2	0	3	0.2%
10	DRUGS PRESCRIPTION OR ILLEGAL	0	0	1	1	0.1%
11	DEFECTIVE EYESIGHT HEARING	0	0	0	0	0.0%

12	OTHER HUMAN CONDITIONS	8	21	0	29	1.5%
21	FAIL TO YIELD	13	26	1	40	2.0%
22	TRAFFIC CONTROL DISREGARDED	5	12	0	17	0.9%
23	FOLLOWING TOO CLOSELY	28	28	0	56	2.9%
24	DRIVING TOO FAST FOR CONDITIONS	11	50	0	61	3.1%
25	EXCEEDING SPEED LIMIT	9	54	9	72	3.7%
26	TURNING IMPROPER	5	8	0	13	0.7%
27	PASSING OR LANE USAGE IMPROPER	9	34	2	45	2.3%
28	BACKING UNSAFELY	2	0	0	2	0.1%
29	FAIL TO SIGNAL	0	0	0	0	0.0%
30	DRIVING WRONG WAY	0	1	0	1	0.1%
31	TAKING EVASIVE ACTION	33	142	1	176	9.0%
32	CARELESS DRIVING STUNTING	20	59	4	83	4.2%
34	OTHER HUMAN ACTION	16	51	3	70	3.6%
40	DEFECTIVE BRAKES	2	8	0	10	0.5%
41	DEFECTIVE LIGHTS	0	1	0	1	0.1%
42	DEFECTIVE EXHAUST SYSTEM	0	0	0	0	0.0%
43	LOAD SHIFTED SPILLED	2	0	0	2	0.1%
44	VEHICLE OVER OR IMPROPERLY LOADED	1	0	0	1	0.1%
45	DEFECTIVE STEERING	0	3	0	3	0.2%
46	DEFECTIVE SUSPENSION WHEEL FAILURE	0	5	0	5	0.3%
47	DEFECTIVE TIRES OR BLOWOUT	2	14	0	16	0.8%
48	DEFECTIVE ENGINE OR POWER TRAIN	2	3	0	5	0.3%
49	JACKKNIFE TRAILER SWING	0	1	0	1	0.1%
50	VIEW OBSCURED FROM VEHICLE	0	0	0	0	0.0%
51	OTHER VEHICLE CONDITION	4	12	0	16	0.8%
52	LIGHTS NOT ON	0	1	0	1	0.1%
60	ANIMAL ACTION(WILD)	33	92	1	126	6.4%
61	ANIMAL ACTION(DOMESTIC)	3	11	0	14	0.7%
62	ROAD CONDITION SURFACE OR STRUCTURE	61	117	2	180	9.2%
63	EXCESSIVE LOOSE GRAVEL	44	103	3	150	7.7%
64	SNOW DRIFT	0	0	0	0	0.0%
66	OBSTRUCTION DEBRIS ON ROADWAY	5	15	0	20	1.0%
67	VIEW OBSTRUCTED LIMITED OUTSIDE VEH	1	3	0	4	0.2%
68	SUN GLARE	1	3	0	4	0.2%
69	CONSTRUCTION ZONE	0	16	0	16	0.8%
71	SOFT OR DEFECTIVE SHOULDERS	0	9	0	9	0.5%
72	LANE MARKING INADEQUATE	1	0	0	1	0.1%
73	TRAFFIC CONTROL NOT WORKING	0	1	0	1	0.1%
74	WEATHER CONDITION	10	39	0	49	2.5%
75	UNINVOLVED VEHICLE	16	99	0	115	5.9%
76	UNINVOLVED PEDESTRIAN	0	9	0	9	0.5%
77	OTHER ENVIRONMENT CONDITION	3	15	0	18	0.9%
99	DID NOT CAUSE	231	288	6	525	

Motorcycle Pre-Collision Actions for 2007-2012

Motorcycle's Action	PDO	Injury	Fatal	Total	% of Total	Number of Injuries (all vehicles)	Number of Fatalities (all vehicles)
Going Straight Ahead	366	861	25	1,252	69.2%	952	26
Turning Left	39	87	1	127	7.0%	94	1
Turning Right	34	55	-	89	4.9%	59	-
Making U-Turn	3	4	1	8	0.4%	4	1
Changing Lanes	8	26	1	35	1.9%	27	1
Merging	12	12	1	25	1.4%	13	1
Reversing	2	-	-	2	0.1%	-	-
Overtaking/Passing on Left or Right	4	33	-	37	2.0%	35	-
Slowing or Stopping on the Roadway (Decelerating)	33	40	-	73	4.0%	44	-
Stopped in Traffic (inc. Mechanical Breakdown)	13	20	1	34	1.9%	24	1
Starting in Traffic (Accelerating)	4	8	-	12	0.7%	8	-
Starting From Parked Position, Leaving Roadside	3	2	-	5	0.3%	2	-
Entering Parked Position, Stopping on Roadside	1	-	-	1	0.1%	-	-
Parked Legally	87	2	-	89	4.9%	6	-
Parked Illegally	6	-	-	6	0.3%	-	-
Other	6	9	-	15	0.8%	11	-
Total	621	1,159	30	1,810		1,279	31

Motorcycle Collisions by Age of Motorcycle Driver

	20 and under				Over 20				TOTAL							
Year	Number Injured	% of Total	Number Killed	% of Total	Number Injured	% of Total	Number Killed	% of Total	Number Injured	Alcohol as a MCF	% Alc.	Number Killed	Alcohol as a MCF	% Alc.	**Number of Collisions***	**Alcohol as a MCF**
1990	60	33%	6	100%	121	67%	0	0%	181	11	6%	6	0	0%	**167**	7%
1995	30	24%	0	0%	94	76%	5	100%	124	11	9%	5	3	60%	**111**	11%
2000	30	20%	0	0%	121	80%	2	100%	151	14	9%	2	0	0%	**135**	8%
2005	26	17%	1	25%	130	83%	3	75%	156	8	5%	4	0	0%	**148**	5%
2010	44	22%	0	0%	158	78%	5	100%	202	4	2%	5	2	40%	**190**	3%
2011	21	10%	0	0%	193	90%	4	100%	214	10	5%	4	0	0%	**199**	4%
2012	19	9%	1	17%	186	91%	5	83%	205	10	5%	6	1	17%	**193**	5%

*Where an injury or fatality occurred

Notes:

Four cases were removed where driver's age was not specified.

24 cases are included where the driver was under the age of 16.

Where more than one motorcycle was involved in the collision, classification is based on younger driver.

Injuries and fatalities include all vehicles involved in the collision.

2012 data is preliminary.

Motorcycle Collisions, Single vs. Multi-Vehicle

	Single Vehicle					Multi-Vehicle					TOTAL			
Year	PDO	Injury	Fatal	Total	% of Total	PDO	Injury	Fatal	Total	% of Total	PDO	Injury	Fatal	Total
2007	53	111	4	168	55%	53	81	4	138	45%	106	192	8	306
2008	72	121	1	194	57%	61	84	4	149	43%	133	205	5	343
2009	45	98	1	144	46%	74	93	1	168	54%	119	191	2	312
2010	59	101	3	163	53%	59	84	2	145	47%	118	185	5	308
2011	32	98	1	131	44%	68	97	3	168	56%	100	195	4	299
2012	13	105	2	120	48%	46	82	4	132	52%	59	187	6	252
TOTAL	274	634	12	920	51%	361	521	18	900	49%	635	1155	30	1820
5 year average (2007 to 2011)	52.2	105.8	2.0	160.0	51%	63.0	87.8	2.8	153.6	49%	115.2	193.6	4.8	313.6

Notes:

2012 data is preliminary (PDO numbers are understated).

Saskatchewan Government Insurance
2013 Rate Program
Documentation for Information Request #44

	(a)	(b)	(c)		(d)	(e)	
Vehicle Class	Projected Rating Year Premium at Current Rate Level	Projected Rating Year Premium with Proposed Rate Change and RSR - 2012 Capping Rules	2011 Written Exposures That Will Be within +/- 5% of Adequate - 2012 Capping Rules	Will Be within +/- 5% of Adequate - 2012 Capping Rules	Projected Rating Year Premium with Proposed Rate Change and RSR - MC 0%, Taxi 15%	2011 Written Exposures That Will Be within +/- 5% of Adequate - MC 0%, Taxi 15%	% of Class That Will Be within +/- 5% of Adequate - MC 0%, Taxi 15%
CLEAR Rated Vehicles	$781,809,409	$793,820,612	748,110	97.1%	$796,784,611	747,344	97.0%
A - Commercial Light Trucks			0	0.0%		0	0.0%
F - Farm Light Truck - 1994 & Newer			48,825	96.6%		48,699	96.4%
LV - Private Passenger Vehicles (PPV)			671,680	97.2%		671,044	97.1%
LV - PPV - Farm Cars, SUVs and Vans			22,537	97.8%		22,533	97.8%
LV - Police Cars			0	0.0%		0	0.0%
LV - Police Trucks, Vans & SUVs			0	0.0%		0	0.0%
LV - U Drives			4,897	99.7%		4,897	99.7%
PT - Taxis (Rural)			171	100.0%		171	100.0%
Conventionally Rated Vehicles							
Ambulances	$264,604	$273,266	300	100.0%	$273,266	300	100.0%
A - Commercial Vehicles:							
Heavy Trucks and Vans IRP Reg. Ded.	$388,527	$364,149	449	96.5%	$364,149	449	96.5%
Heavy Trucks and Vans IRP $15K Ded.	$17,625	$14,671	16	45.9%	$14,671	16	45.9%
Heavy Trucks and Vans Non-IRP	$1,005,357	$1,037,632	956	99.5%	$1,037,632	956	99.5%
Power Units IRP Reg. Ded.	$7,950,004	$7,894,548	3,386	96.5%	$7,894,548	3,386	96.5%
Power Units IRP $15K Ded.	$1,769,011	$1,551,677	567	46.6%	$1,551,677	567	46.6%
Power Units Non-IRP	$2,522,122	$2,187,416	266	22.5%	$2,187,416	266	22.5%
C & D - Commercial Vehicles:							
Heavy Trucks and Vans	$6,994,269	$8,060,837	8,340	67.5%	$8,060,837	8,340	67.5%
Power Units	$10,887,164	$11,477,536	4,722	72.5%	$11,477,536	4,722	72.5%
F - Farm Vehicles:							
Heavy Trucks and Vans	$4,328,514	$4,001,603	21,832	84.3%	$4,001,603	21,832	84.3%
Light Trucks - 1993 & Older	$2,320,047	$1,989,419	14,684	100.0%	$1,989,419	14,684	100.0%
Power Units	$6,531,012	$5,998,633	7,913	84.6%	$5,998,633	7,913	84.6%
Hearses	$44,998	$52,435	0	0.0%	$52,435	0	0.0%
L - Automobile & Motorcycle Dealer Plates	$2,633,786	$2,759,639	3,905	100.0%	$2,759,639	3,905	100.0%
L - Snowmobile Dealers	$2,077	$2,112	0	0.0%	$2,112	0	0.0%
LV - Antiques	$797,455	$978,695	11,538	100.0%	$978,695	11,538	100.0%
LV - Buses	$155,769	$195,588	0	0.0%	$195,588	0	0.0%
LV - Buses (Restricted)	$8,207	$10,053	33	100.0%	$10,053	33	100.0%
LV - Motorcycles:	$16,562,437	$19,747,424	252	2.3%	$16,767,714	0	0.0%
Cruiser/Touring			5	0.1%		0	0.0%
Dual Purpose/Other			243	18.9%		0	0.0%
Sport			4	0.2%		0	0.0%
LV - Motorhomes	$1,846,220	$2,136,973	4,140	81.4%	$2,136,973	4,140	81.4%
MT - Snowmobiles	$450,511	$450,494	4,908	100.0%	$450,494	4,908	100.0%
PB - Passenger Inter-city Buses	$999,407	$1,141,670	246	52.9%	$1,141,670	246	52.9%
PC - Passenger City Buses	$750,212	$874,582	0	0.0%	$874,582	0	0.0%
PS - Passenger School Buses	$1,191,697	$1,509,913	1,213	38.1%	$1,509,913	1,213	38.1%
PT - Taxis	$1,908,896	$2,221,921	0	0.0%	$2,221,921	0	0.0%

	(a)	(b)	(c)		(d)	(e)	
Vehicle Class	Projected Rating Year Premium at Current Rate Level	Projected Rating Year Premium with Proposed Rate Change and RSR - 2012 Capping Rules	2011 Written Exposures That Will Be within +/- 5% of Adequate - 2012 Capping Rules	Will Be within +/- 5% of Adequate - 2012 Capping Rules	Projected Rating Year Premium with Proposed Rate Change and RSR - MC 0%, Taxi 15%	2011 Written Exposures That Will Be within +/- 5% of Adequate - MC 0%, Taxi 15%	% of Class That Will Be within +/- 5% of Adequate - MC 0%, Taxi 15%
Trailers							
F - Trailers	$1,963,623	$2,314,324	29,464	100.0%	$2,314,324	29,464	100.0%
LT - Trailer Dealers/Movers	$265,009	$271,821	478	100.0%	$271,821	478	100.0%
T - Personal Trailers	$10,996,417	$12,100,314	33,240	83.1%	$12,100,314	33,240	83.1%
T - Utility	$1,721,460	$2,926,503	76,201	100.0%	$2,926,503	76,201	100.0%
TS - Commercial Trailers	$4,931,599	$5,579,813	45,531	100.0%	$5,579,813	45,531	100.0%
Miscellaneous Classes							
A - Excess Value	$117,048	$117,048	0	0.0%	$117,048	0	0.0%
C&D - Non-Resident	$11,456	$11,609	0	0.0%	$11,609	0	0.0%
C&D - Excess Value	$1,270,544	$1,270,544	0	0.0%	$1,270,544	0	0.0%
Industrial Tracked Vehicles	$81	$82	0	0.0%	$82	0	0.0%
LV - Motorized Bicycle	$252	$258	0	0.0%	$258	0	0.0%
PV - Converted Vehicles	$3,978	$4,191	0	0.0%	$4,191	0	0.0%
PV - Heavy Trucks and Vans	$296,337	$298,253	374	90.1%	$298,253	374	90.1%
PV - Power Units	$60,101	$59,403	42	78.1%	$59,403	42	78.1%
TS - Excess Value	$831,678	$831,678	0	0.0%	$831,678	0	0.0%
	$876,608,918	$896,539,341	1,023,105		$896,523,630	1,022,086	

Comparison of Basic Policies: 2012 Insurance Year			
	SGI	**MPI**	**ICBC**
Medical and Rehabilitation Expenses	Up to $6,382,084 per person; includes all costs of rehab and personal home care **Tort:** $24,954 or $187,158 if catastrophic injuries	Unlimited	Up to $150,000 per person
Personal Care	$805 weekly maximum plus $404 if cognitive care; $6,382,084 cap	$4,266 per month; no lifetime cap For catastrophic injuries: Increased by $835 per month (max)	Included in medical and rehabilitation expenses
Funeral Expenses (per person)	$9,573 lump sum to deceased's estate, regardless of actual cost **Tort:** $6,239	Reimburse estate for actual cost of expenses to a maximum of $7,753	Up to $2,500 reimbursement
Death Payment	**Spouse:** 50% of Income Replacement benefit (IRB) victim would have received had he/she lived, paid to spouse for life, minimum $65,840 or capitalized lump sum (payable to dependants, if no spouse) **Tort:** Based on maximum yearly income of $86,463, then paid at 45% of net income, minimum $56,147 payable bi-weekly or capitalized lump sum	**Spouse:** $56,888 minimum to $427,500 maximum lump sum payment; based on victims age and income (payable to dependants if no spouse)	**Spouse:** Initial payment to surviving spouse $5,000 where deceased is head of household; or $2,500 where deceased is spouse of head of household, plus $145 a week for 104 weeks
Death Payment continued	**Per Dependant:** (where both parents or sole parent is diseased) Youngest child will receive a spousal benefit of 50% of each deceased parent's Income Replacement Benefit (IRB). Each additional child will receive 5% of each deceased parent's IRB. Benefits are paid until age 21 and are held in trust to age 18	**Per Dependant:** $27,021 to $49,777 lump sum payment to each dependant based on dependant's age	**Per Dependant:** Initial payment for each child $1,000 Plus $35 per week for 104 weeks

Comparison of Basic Policies: 2012 Insurance Year			
	SGI	**MPI**	**ICBC**
Income Replacement Indemnity	90% of net income based on maximum $86,463 gross annual income. **Tort:** $376 per week (total) $188 per week (partial). Paid for 104 weeks and if unable to hold any employment, paid for life.	90% of net income based on maximum $85,500 gross annual income	75% of average gross weekly earnings minus the weekly total or wage loss payments from all other sources, or $300 per week (whichever is less).
Caregiver Weekly Indemnity	Caregivers with dependants receive up to $805 per week	Caregivers with dependants receive up to $540 per week depending on the number of children cared for	If homemaker is disabled and unable to perform his or her household tasks, eligible for benefits up to $145 a week to cover the cost of hiring someone to perform household tasks for a maximum of 104 weeks
Caregiver's Weekly Expense (child care)	**Reduced Caregiver Benefit:** Reimbursed up to $404 per week; for additional care-expenses incurred	**Dependent Care Expense:** Reimbursed up to $214 per week for additional care; expense incurred depending on number of persons cared for	N/A
Impairment Benefits	**Permanent Impairment:** $223,373 maximum (catastrophic injuries); $182,888 (all others) **Tort:** $162,204 maximum (catastrophic injuries); $12,477 maximum (all others)	**Permanent Impairment** $142,215 maximum; Catastrophic injury $224,561 maximum	N/A

Information Request #52

Saskatchewan Auto Fund
Summary of Losses, Premiums, and Loss Ratios by Business Type
As of May 31, 2012

Ultimate Loss

Year	Safe Driver Recognition	Business Recognition	Other	Total
2007	$405,923,018	$46,167,411	$83,382,112	$535,472,541
2008	$422,350,812	$48,500,948	$79,352,851	$550,204,611
2009	$458,039,311	$49,089,508	$80,151,050	$587,279,869
2010	$479,986,443	$57,375,325	$85,992,917	$623,354,686
2011	$528,964,884	$64,879,032	$99,187,838	$693,031,754
May 2012	$184,145,377	$21,183,440	$38,115,804	$243,444,620

Loss Adjusting Expenses

Year	Safe Driver Recognition	Business Recognition	Other	Total
2007	$43,198,795	$4,896,280	$7,296,640	$55,391,716
2008	$43,700,136	$4,973,496	$5,991,039	$54,664,671
2009	$43,598,111	$4,983,396	$4,900,976	$53,482,483
2010	$44,111,469	$5,327,395	$5,746,274	$55,185,138
2011	$44,794,731	$5,885,844	$5,755,077	$56,435,652
May 2012	$20,417,768	$2,383,213	$2,794,044	$25,595,024

Total Ultimate Loss and Loss Adjusting Expenses

Year	Safe Driver Recognition	Business Recognition	Other	Total
2007	$449,121,813	$51,063,691	$90,678,752	$590,864,256
2008	$466,050,948	$53,474,444	$85,343,890	$604,869,282
2009	$501,637,422	$54,072,903	$85,052,026	$640,762,352
2010	$524,097,912	$62,702,720	$91,739,191	$678,539,824
2011	$573,759,615	$70,764,876	$104,942,915	$749,467,406
May 2012	$204,563,144	$23,566,652	$40,909,848	$269,039,644

Earned Premiums

Year	Safe Driver Recognition	Business Recognition	Other	Total
2007	$453,579,018	$71,826,660	$23,859,111	$549,264,790
2008	$478,831,407	$73,977,875	$25,442,760	$578,252,043
2009	$512,541,314	$80,295,617	$27,558,312	$620,395,242
2010	$558,033,987	$90,286,324	$27,392,098	$675,712,409
2011	$588,945,939	$100,729,712	$27,089,539	$716,765,190
May 2012	$249,298,006	$43,968,432	$11,145,579	$304,412,017

Ultimate Loss Ratios Excluding Loss Adjusting Expenses

Year	Safe Driver Recognition	Business Recognition	Other	Total
2007	89.49%	64.28%	349.48%	97.49%
2008	88.20%	65.56%	311.89%	95.15%
2009	89.37%	61.14%	290.84%	94.66%
2010	86.01%	63.55%	313.93%	92.25%
2011	89.82%	64.41%	366.15%	96.69%
May 2012	73.87%	48.18%	341.98%	79.97%

Ultimate Loss Ratios Including Loss Adjusting Expenses

Year	Safe Driver Recognition	Business Recognition	Other	Total
2007	99.02%	71.09%	380.06%	107.57%
2008	97.33%	72.28%	335.43%	104.60%
2009	97.87%	67.34%	308.63%	103.28%
2010	93.92%	69.45%	334.91%	100.42%
2011	97.42%	70.25%	387.39%	104.56%
May 2012	82.06%	53.60%	367.05%	88.38%

2260 11th Avenue • Regina, SK S4P 2N7 • www.sgi.sk.ca

Licence Plate

Email: _____

Renewal Notice

The registration and insurance for the vehicle below expires on **07 Jun 2013**:

Year	Make and Model				
2010	DODGE RAM 3500 MEGA CAB 4WD DIESEL				
Vin		Class	RGVW (Kg)		
		LV	10000		

If any of the above information is incorrect please contact a motor licence issuer.

How to renew

To renew your registration and insurance:

- Stop by any motor licence issuer with this notice; or
- Renew online using MySGI (**www.sgi.sk.ca/mysgi**). Your updated certificate will be mailed to your current address on file (note, not all registrations are eligible for renewal through MySGI); or
- Mail a cheque or money order made payable to SGI in the amount owing along with the completed and signed Registration Eligibility Declaration (included below) to the address listed above.

Annual Fees:

Registration Fee	Insurance Premium	Insurance Discount	Total
$183.00	$1,064.00	$0.00	$1,247.00

We've made every effort to provide a correct and up-to-date estimate of fees, premiums and any outstanding money owed to SGI that apply. If there are any changes they will be adjusted when you renew.

Additional amounts owing to SGI as of 24 Apr 2013: $50.00CR

Registration Eligibility Declaration

If you are mailing this renewal, please answer the question(s), sign below and include your cheque or money order for any outstanding balance. Your answer to this/these question(s) may affect your eligibility for registration and insurance; therefore it's important you represent your situation accurately. A false declaration could result in loss of your insurance coverage.

If the answer is YES to any question you must contact a motor licence issuer.

[ ] Yes [ ] No During the registration term, will the vehicle leave Saskatchewan for any of the following reasons: for use while attending school; travelling to and from work; or for business use?

[ ] Yes [ ] No Will the vehicle be outside of Saskatchewan for more than 30 consecutive days for any reason other than school, work or business (i.e., snowbird, extended vacation, full-time traveller)?

X_____ _____

(Signature of registered owner(s) or authorized representative declaring information is true and correct) Date

Payment Options

- Register your vehicle for an annual term or a short-term of one to 11 months, and make a single payment for the annual term amount or the pro-rated short-term amount; or
- Use AutoPay monthly withdrawals. If you are choosing this option for the first time, please bring a void cheque into any motor licence issuer.

Option	Reg. & Ins. Discounted	Variable Term Fee	Admin. Fee	Total Cost	Expiry Date
1)Annual payment	$1,247.00	$0.00		$1,247.00	07Jun2014
2)Monthly payment	$103.75	$4.15		*$107.90	
3)Short-term:					
11 Months Term	$1,141.00	0.20%	$11.00	$1,154.00	07May2014
10 Months Term	$1,038.00	0.40%	$11.00	$1,053.00	07Apr2014
9 Months Term	$933.00	0.60%	$11.00	$950.00	07Mar2014
8 Months Term	$837.00	0.80%	$11.00	$855.00	07Feb2014
7 Months Term	$731.00	1.00%	$11.00	$749.00	07Jan2014
6 Months Term	$625.00	1.20%	$11.00	$644.00	07Dec2013
5 Months Term	$523.00	1.50%	$11.00	$542.00	07Nov2013
4 Months Term	$417.00	1.60%	$11.00	$435.00	07Oct2013
3 Months Term	$314.00	1.80%	$11.00	$331.00	07Sep2013
2 Months Term	$209.00	2.00%	$11.00	$224.00	07Aug2013
1 Months Term	$102.00	2.20%	$11.00	$115.00	07Jul2013

*The amount shown is an estimate only and subject to change based on the selected funds available day.

For more details on these payment options, please refer to SGI's rate calculator at **www.sgi.sk.ca**, visit any motor licence issuer or call 1-800-667-9868.

Recognition program

You have earned a safety rating of -18 as a result of your driving record. Due to your rating, you are not eligible for a discount on your vehicle insurance premium at this time.

Address changes

If you change your address, you must notify SGI within 15 days. To change your address, visit any motor licence issuer, access MySGI (**www.sgi.sk.ca/mysgi**), or go to **www.expressaddress.com**. You may be asked for your physical/civic address if it differs from your mailing address. This new information will help SGI meet national licensing standards.

For more information

For more information on additional coverage to reduce your deductible and/or increase your liability coverage, contact your independent insurance broker.

If you have questions about your vehicle registration and insurance, please contact any motor licence, call SGI at 1-800-667-9838 or 306-775-6900 in Regina, or visit **www.sgi.sk.ca.**

Rate Changes

SGI rate changes effective Aug. 4, 2012

SGI is implementing a 1.6% increase, with rate rebalancing, for its basic licence plate insurance rates.

Rebalancing means that not every vehicle receives a 1.6% increase. Rates are determined based on the claim costs for each vehicle make and model. As a result:

- 45% of Saskatchewan vehicle owners are receiving a rate increase, on average $7 per month.
- 37% are receiving a rate decrease, on average $6 per month.
- 18% won't have any change to their rates.

basic auto insurance

How does this affect you?

The new rates are effective as of Aug. 4, 2012. Rate increases are applied the next time a vehicle transaction takes place on or after that date (usually the next time you renew your plates). Rate decreases, on the other hand, were applied immediately on Aug. 4 and eligible vehicle owners automatically received a refund for the difference between their old rate and new rate for the remainder of their registration term.

The rates in the attached notice may differ from the rates you paid for your last renewal because of the rate rebalancing. If you want to see how vehicles you own are affected, please visit www.sgi.sk.ca/rates.

Why did SGI increase rates?

We're seeing rising claim costs for both injuries and vehicle damage, combined with declining investment income. An increase was needed to ensure SGI is financially positioned to cover all of its operating expenses and claim obligations.

Have questions?

Please visit the SGI website at www.sgi.sk.ca or call our Customer Service Centre toll free at 1-800-667-9868 or 775-6900 in Regina.

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SGI

www.sgi.sk.ca

Information Request #58c

SASKATCHEWAN AUTO FUND
2011 Actual vs. 2011 Projection and 2012 Actual vs. 2012 Projection
Statement of Operations
($000s)

year ended December 31	2011 Actual	2011 Projection	Variance		Note	2012 Actual	2012 Projection	Variance		Note
	$	$	$	%		$	$	$	%	
Premiums Written										
Net premiums written before discounts	849,257	847,163	2,094	0.2%		889,954	897,445	(7,491)	-0.8%	
Safe Driver discounts	(97,042)	(95,472)	(1,570)	1.6%		(100,728)	(102,981)	2,253	-2.2%	
Business Recognition discounts	(7,472)	(7,121)	(351)	4.7%		(8,059)	(8,098)	39	-0.5%	
Premiums Written - net	**744,743**	**744,570**	**173**	**0.0%**		**781,167**	**786,366**	**(5,199)**	**-0.7%**	
Premiums Earned	**726,282**	**726,059**	**223**	**0.0%**		**767,226**	**765,071**	**2,155**	**0.3%**	
Claims Incurred	806,924	797,118	9,806	1.2%		740,527	737,174	3,353	0.5%	
Premium Taxes	36,513	36,469	44	0.1%		38,555	38,923	(368)	-1.0%	
Issuer Fees	38,200	45,929	(7,729)	-20.2%	(1)	37,795	40,215	(2,420)	-6.4%	(3)
Administrative Expenses	52,778	54,003	(1,225)	-2.3%		51,546	52,671	(1,125)	-2.2%	
Traffic Safety Programs	20,547	21,013	(466)	-2.3%		22,627	23,157	(530)	-2.3%	
Total Expenses	**954,962**	**954,532**	**430**	**0.0%**		**891,050**	**892,140**	**(1,090)**	**-0.1%**	
Underwriting Loss	**(228,680)**	**(228,473)**	**(207)**	**0.1%**		**(123,824)**	**(127,069)**	**3,245**	**-2.6%**	
Investment Earnings	51,668	52,761	(1,093)	-2.1%		74,838	72,393	2,445	3.3%	
Other Income	34,088	30,345	3,743	11.0%	(2)	37,489	35,059	2,430	6.5%	(4)
Increase (Decrease) to RSR	**(142,924)**	**(145,367)**	**2,443**	**-1.7%**		**(11,497)**	**(19,617)**	**8,120**	**-70.6%**	
Rate Stabilization Reserve:										
Balance, Beginning of Year	271,856	271,856				134,261	134,261			
Appropriated (to) from Redevelopment Reserve	5,329	5,328	1	0.0%		4,357	4,357	-	0.0%	
RSR Balance, End of Year	**134,261**	**131,817**	**2,444**	**1.8%**		**127,121**	**119,001**	**8,120**	**6.4%**	
Redevelopment Reserve (RDR):										
Balance, Beginning of Year	14,653	14,653	-	0.0%		9,325	9,325	-	0.0%	
Appropriated (to) from Rate Stabilization Reserve	(5,329)	(5,328)	(1)	0.0%		(4,357)	(4,357)	-	0.0%	
RDR Balance, End of Year	**9,324**	**9,325**	**(1)**	**0.0%**		**4,968**	**4,968**	**-**	**0.0%**	
Loss Ratio	111.1%	109.8%		1.3%		96.5%	96.4%		0.1%	
Issuer Fee and Tax Ratio	10.3%	11.3%		(1.0%)		10.0%	10.3%		(0.3%)	
Administrative Expense Ratio	7.3%	7.4%		(0.1%)		6.7%	6.9%		(0.2%)	
Traffic Safety Program Expense Ratio	2.8%	2.9%		(0.1%)		2.9%	3.0%		(0.1%)	
Combined Ratio	131.5%	131.4%		0.1%		116.1%	116.6%		(0.5%)	
Minimum Capital Test as @ Dec. 31	60%	52%		8%		51%	47%		4%	

Notes:

(1) - The 2011 projection anticipated a premium deficiency, which did not materialize.

(2) - Income from salvage operations was higher than expected in 2011, a result of higher than anticipated sales in 2011. Additionally, customer usage of the short-term and auto pay registration programs was higher than planned.

(3) - The 2012 projection anticipated a $2.9 million premium deficiency expense, which did not materialize.

(4) - Income from salvage operations in 2012 was $2.2 million higher than forecasted primarily due to total loss vehicle sales.