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INCENTIVE PROGRAMS

FOR ENHANCING

TRUCK SAFETY AND PRODUCTIVITY

A Canadian Perspective

Prepared for
Transportation Development Centre
Safety and Security
Transport Canada

by

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on behalf of

Canada Safety Council

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This report reflects the views of the authors and not necessarily those of the Transportation Development Centre.

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16. Abstract

Incentive programs strengthen the motivation to be safe and, combined with proper tools and knowledge, will result in improved safety. An estimated $30 to $50 million is spent annually by Canada's trucking industry on this type of program.

A review of theoretical considerations respecting safety incentive programs is provided. Forty trucking companies across Canada are interviewed regarding their use of incentive programs, and findings of the interviews summarized. Guidelines for developing and evaluating safety incentive programs are provided along with a series of factors for enhancing the effectiveness of these programs.

A two-year pilot program is recommended to develop and validate a procedures manual for companies to follow when designing, implementing and administering a safety incentive program. This would include detailed benefit-cost analyses of these programs within a minimum of four trucking companies. A nationwide recognition-based incentive program is recommended. The framework and organizational structure for this program would be developed as part of the pilot program.

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16. Résumé

Les programmes de mesures incitatives renforcent la motivation à adopter un comportement sûr et, conjugués aux outils et aux connaissances appropriés, ils débouchent sur des gains de sécurité. On estime entre 30 miliions et 50 millions de dollars les sommes affectées annuellement par l'industrie canadienne du camionnage à ce type de programmes.

Le rapport offre un survol des fondements théoriques des programmes d'incitation à la sécurité. Il rend compte d'entrevues menées avec quarante entreprises de camionnage canadiennes concernant leur recours à des programmes d'incitation à la sécurité. Il énonce enfin des lignes directrices pour l'élaboration et l'évaluation de tels programmes, ainsi qu'une série de facteurs favorisant l'efficacité de tels programmes.

Il est recommandé de lancer un programme pilote d'une durée de deux ans afin d'élaborer et de valider un manuel de procédures destiné à aider les entreprises dans la conception, la mise en oeuvre et l'administration d'un programme d'incitation à la sécurité. Ce programme pilote devrait comporter des analyses coûts-avantages approfondies portant sur les programmes d'incitation d'au moins quatre entreprises de camionnage. Il est aussi recommandé d'instaurer un programme de reconnaissance national, dont le cadre et la structure organisationnelle seraient définis au cours du programme pilote.

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EXPRESSION OF APPRECIATION

The study team would like to express its heartfelt appreciation to all members of the steering committee, who contributed freely to this project throughout its duration. From this guidance and input the study team was able to develop much more fully many of the items included in this report than would have otherwise been possible.

EXECUTIVE SUMMARY

To meet the challenge of improving safety and productivity in a competitive marketplace, transport companies are increasingly turning to safety incentive programs. A preliminary study by Dr. Gerald Wilde for Transport Canada (TP 12305E) concluded that:

- of currently available accident countermeasures, those that affect people's motivation seem to be the most promising;
- those that reward people for accident free performance hold the most promise;
- some promise to be more effective than others because they contain elements that appear to enhance motivation towards safety.

The present study was initiated by the Canada Safety Council, with funding from the Transportation Development Centre, Transport Canada. The aim was to identify what programs are in place in the industry, their strengths and weaknesses, and the obstacles to successful implementation of safety incentive programs; and to make recommendations on further actions that would enhance the use of safety incentive programs by industry.

Improved Motivation Towards Safety

Incentive programs entail the use of a pre-announced reward, usually cash, to potential recipients provided they do not have an accident of their own fault within a specified period of time. Incentive programs differ from safety engineering and safety education programs. Engineering and education offer the tools and knowledge to be safer; however, if not properly applied, safety is not improved. **Incentive programs strengthen the motivation to be safe and, combined with proper tools and knowledge, will result in improved safety** (Wilde).

The effectiveness of incentive programs in reducing accidents is often remarkably high. Reductions of 80% or more have been reported. **Benefit-cost ratios are usually greater than 2 to 1, meaning that companies can make money on these accident reduction efforts**. Two companies interviewed as part of this project reported benefit-cost ratios of 3 to 1 for their programs. In both cases insurance rebates due to reduced claims as a result of the program covered the employee bonuses paid under the programs.

Industry Use of Incentive Programs

In this project 40 companies were interviewed regarding their use of safety incentive programs. The interviews focused on long haul trucking firms. The companies, located across Canada, covered a range of sizes (from fewer than 20 power units to over 500) and carrier types.

Interview results show that safety incentive programs are extensively used in the industry, with 70% of carriers interviewed having a program in place. **The use of safety incentive programs is growing. Many of the companies have implemented theirs within the last two years, and many others are considering or developing them**.

However, companies do not have a reference point from which to develop their programs. Typically they rely on their own judgement and word-of-mouth from industry contacts. This lack of reference material means that the programs developed often have problems that lead to their demise. Most carriers interviewed felt that a document outlining various incentive packages and the factors that make them successful would be very useful for the industry.

The safety programs in place vary widely in their detail, level and type of remuneration. Remuneration varies from $300 to $6,000 per annum, with 1 cent per kilometre driven being a common rate. The programs typically apply to owner-operators as well as to company drivers. The study team estimates that overall the industry spends $30 to $50 million a year on safety incentive programs alone. Additional amounts are spent on their safety-related areas, such as training and equipment.

Payment frequency varies from monthly to annually, with the most common being quarterly. The monthly and quarterly are used to allow drivers to see the results of their efforts quickly. The more extended periods are used to reduce administrative costs.

Good communication within the company and between drivers and management is absolutely critical. This was repeatedly stressed by companies with successful programs. Moreover, it takes time for the programs to take effect after they have been introduced. Companies reported a time lag of one year or more from introduction of the program to attainment of benefits. They also noted the need to constantly refine and update the programs.

Companies offering a wide range of safety initiatives reported more success with their incentive programs. Safety incentive programs are more effective if accompanied by a comprehensive safety program that includes, but is not necessarily limited to, the following:

- Company management with demonstrated commitment to safety. For example, equipment is kept in good condition and speed limits enforced.
- Driver recognition through award programs using pins, certificates or plaques.
- Driver of month/year award.
- Good communication within company.
- Safety meetings, although many companies cannot get drivers together as they are on the road and these meetings take away from their little time at home. Some companies pay extra per mile for training, providing incentive for drivers to attend these meetings.
- New drivers receive proper training when joining company. New drivers are trained properly before they develop bad habits or attitudes.

- Drivers are advised of inadequate performance and corrective measures, such as Professional Driver Improvement Course (PDIC) or another form of training, are suggested if necessary.

In short, the firm must have an overall safety culture for an incentive program to achieve its maximum potential.

Enhancing the Effectiveness of Incentive Programs

Experience with incentive programs shows that some have had much greater effect than others. Therefore, identifying the distinctive features of the more successful programs is important. Exhibit 1 gives a practical checklist of the features of successful incentive programs.

Exhibit 1Requirements for Effective Incentive Programming

1. Strong managerial vigour and commitment
2. Program planned in consultation with the target population
3. Incentives extended to different levels in the organization
4. Simple rules
5. Fair adjudication of responsibility for accidents
6. Rewards focused on not having an accident
7. Attractive rewards
8. Progressive accumulation of safety credits
9. Rewards perceived as equitable
10. Rewards perceived as attainable
11. Supplementing incentives with safety training considered
12. Under-reporting of lesser accidents discouraged
13. Peer pressure toward safe conduct enhanced
14. Short incubation periods
15. Proper program evaluation

Need for Further Development of Incentive/Recognition Programs

The need for companies to have a reference manual for designing, implementing, managing and evaluating safety incentive/recognition programs is compelling. In addition, the effectiveness of these programs within the Canadian trucking industry has not been adequately demonstrated through specific, detailed case studies. These two factors are major impediments in the effective, more widespread use of these programs for improving safety.

To date safety incentive programs function totally within individual transport companies. **While such programs, usually based on cash rewards, are having a very positive influence on safety, an additional set of benefits could be derived from an industry-wide recognition-based safety program**. Such a program would recognize the achievements of both companies and drivers that successfully met various safety criteria. For example, drivers would receive plaques, certificates, pins or some other form of recognition for different levels of accident-free driving (e.g., 5 years, million miles).

This program would further enhance safety within the trucking industry by:

- providing companies with expertise in the development and administration of safety incentive and recognition programs;
- providing companies with an option for contracting out administration of these programs (which might be appealing to smaller companies);
- providing a ready reference point for determining the safety record of drivers throughout their career;
- providing a forum for drivers to become recognized as role models for new drivers.

Such a recognition program must reach out to governments as well as industry to ensure the widest possible acceptance on the part of the industry. For such a program to function properly and attract as many transport companies as possible, it must be presented as a national program. However, in keeping with the nature of the trucking industry, it must also recognize that the bulk of the industry operates locally.

Recommendations

In light of the above, a two-year pilot program is recommended that would:

- ***Develop a procedures manual***. This manual would be in an easy-to-read, easy-to-use format, probably in a 3-ring binder. It would provide companies with step-by-step instructions on the development, implementation and administration of safety recognition programs.

- ***Validate manual procedures***. The manual and suggested procedures would be field tested with four or more companies to fine tune and adjust its contents and ensure its suitability for use by trucking companies of all sizes and from all industry segments.

- ***Provide detailed case study benefit-cost analyses***. Four or more case studies of safety incentive programs would be completed with detailed benefit-cost analyses. This would provide Canadian companies with examples relevant to their own operations.

- ***Develop a framework and organizational structure for a national recognition program***. Details of the administration of the program would be developed, including the role of national and provincial administrators. The procedures manual noted above would be a key component of this program as carriers would need to have such a program, or its equivalent in place to participate.

TABLE OF CONTENTS

LIST OF EXHIBITS

SAFETY INCENTIVE PROGRAMS FOR ENHANCING TRUCK SAFETY AND PROFITABILITY

1.0 INTRODUCTION

Safety and productivity of Canadian trucking companies are issues of importance to both governments and private transport companies. Trucking is increasingly important to Canada's economic well being as shippers turn to manufacturing and logistics that place increased emphasis on transportation, and in particular, trucking. Safe, efficient and cost effective trucking is necessary for Canada's industries to remain competitive in what is increasingly a global economy. Trucking safety is a major public issue.

To meet the challenge of improving safety and productivity in a competitive marketplace, transport companies are increasingly turning to safety incentive programs. A preliminary study by Dr. Gerald Wilde for Transport Canada (Wilde, 1995) concluded the following:

Of all accident countermeasures that are currently available, those that affect people s motivation seem to be the most promising.

Of all countermeasures that affect people s motivation towards safety, those that reward people for accident-free performance seem to be the most promising. Some promise to be more effective than others because they contain the elements that appear to enhance motivation towards safety.

Given the promise of safety incentive programs to improve safety, a basic question existed as to why these programs are not used much more frequently by industry. This project was initiated by the Canada Safety Council, with funding from the Transportation Development Centre, Transport Canada, to answer this question.

2.0 OBJECTIVE AND SCOPE

The objectives of this report are to:

- Identify what programs are in place in the industry;
- Identify the strengths and weaknesses of these programs;
- Identify obstacles to successful implementation of safety incentive programs;
- Identify programs the industry could adopt for today s business environment;
- Recommend further actions that would enhance the use of safety incentive programs by industry.

The study addresses the points raised by industry in reviewing Dr. Wilde s report:

- What types of incentives work best (e.g., monetary vs. non-monetary)?
- Who must be responsible for the implementation of the program for it to be the most effective (transport company, insurance company)?
- Should the bonus focus on the individual or the team?
- Who must be the target populations of the incentives program (managers, drivers, dispatchers)?

The scope of work for the project included:

- Establish the Steering Committee for the study and work in close consultation with the committee;
- Establish the detailed work program in conjunction with the Steering Committee;
- Interview a sufficient number of companies across the country to establish what incentive programs are in place, and to identify their strengths and weaknesses;
- Develop interview procedures and conduct several trial interviews to test the procedures;
- Interview companies and drivers to obtain their views on safety incentive programs, what is liked and disliked, what works and what doesn t work;
- Identify what makes a program successful; and what are the obstacles to having a successful program;

- Identify what further work is required to ensure that safety incentive programs are used to their full potential;

- Provide a concise, easy to read document summarizing findings that can be used by industry to improve understanding of these programs, how they work, what has been the industry experience, and factors that should be considered in developing and implementing a successful incentive program.

3.0 INCENTIVE PROGRAMS: THEORETICAL CONSIDERATIONS

3.1 Improved motivation towards safety

Among the various possible approaches to accident prevention, the use of incentive programs for accident-free performance has become more prominent in recent years (Vaaje, 1991; Guastello, 1993; Wilde, 1998). Incentive programs entail the extension of a pre-announced bonus to potential recipients – such as workers or drivers - provided they do not have an accident of their own fault within a specified time frame.

Incentive programs differ from safety engineering and safety education programs which offer the tools and knowledge to be safer. However, if these tools are not applied properly, safety is not improved. ***Incentive programs strengthen the motivation to be safe and, combined with proper tools and knowledge, will result in improved safety.*** This is illustrated by Exhibit 3.1.

Safety can be increased by the use of incentives because they reduce the level of accident risk the operator is willing to accept in return for the benefits expected. This is referred to as the target level of risk. Four factors determine the target level of risk:

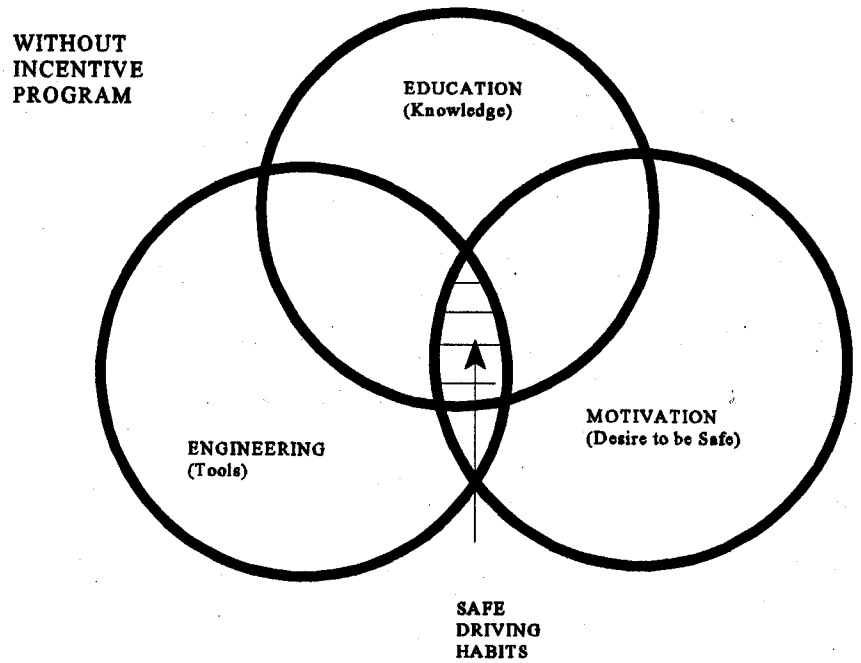
(1) the expected advantages of comparatively risky behaviour are higher;
(2) the expected costs of comparatively risky behaviour alternatives are lower;
(3) the expected benefits of comparatively safe behaviour alternatives are lower;
(4) the expected costs of comparatively safe behaviour alternatives are higher.

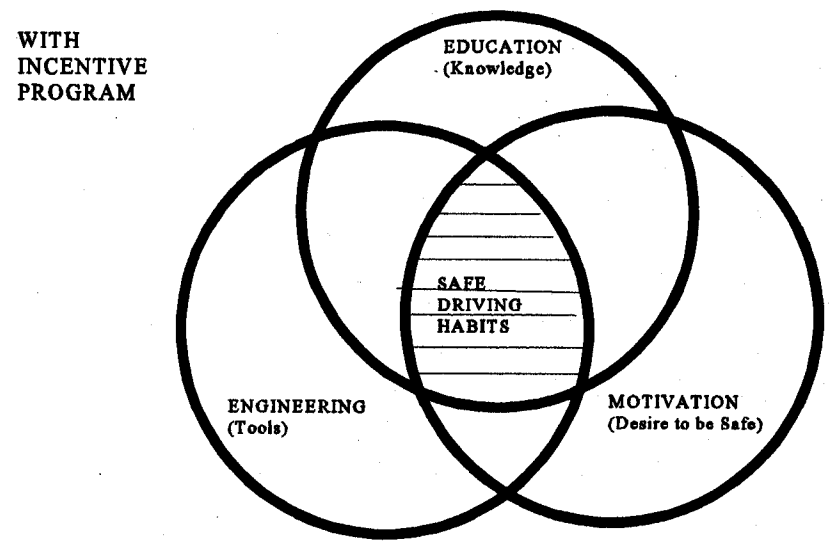
Attempts to motivate individuals to lower their target risk may, in principle, be carried out in a number of different ways. One way is to punish operators for accidents in which they are deemed to be at fault. Another way is to reward operators for not having an accident. The practice of punishing operators for specific unsafe actions has been found unsatisfactory for two reasons: it commonly fails to bring about a reduction in the accident rate, while provoking undesirable side-effects including resentment and antagonism. The incentive approach, however, has shown to be effective in every case documented in the academic and professional journals. Their only identified undesirable side-effect in some cases is under-reporting of minor accidents. A frequently beneficial side-effect is improved morale and productivity.

The effectiveness of incentive programs in reducing accidents is often remarkably high. Accident reductions of 80 per cent or more have been reported. The implementation costs of these programs - that is, the costs of the bonuses and program administration - are considerably smaller than the savings associated with accident reduction.

Benefit-cost ratios are usually greater than two to one, meaning that companies can make money on these accident reduction efforts. This is largely due to the improvement in safetyl eading to reduced fees to workers compensation and other forms of insurance. ***The favourable benefit-cost ratios imply that safety incentive programs can make a significant contribution to a company's financial well-being.***

Exhibit 3.1: Illustration of How a Safety Incentive Program Works





Three factors contribute to safety habits: Knowledge, Engineering and Motivation. An increase in safety motivation is achieved by an incentive program, leading to better safety habits. After Stephen R. Covey, "The 7 Habits of Highly Effective People." Published by Simon and Schuster, New York. 1989.

3.2 Finding the right amount of risk

No behaviour provides total certainty of the desired outcome. Essentially all behaviour may be viewed as risk-taking behaviour. "Zero risk" is not a meaningful goal, as it can only exist if one does nothing. Instead of aiming at the elimination of risk, an individual or company should attempt to optimize the exposure to risk in an activity. In this case, "optimal" means the degree of risk at which the aggregate needs of that individual or the company are likely to become best fulfilled.

Why people should opt for a level of accident risk that is greater than zero can readily be explained**.** Increasing your driving speed and/or the amount of driving enhances your exposure to accident risk. With increased exposure, both expected gains and expected losses increase. Greater speed means shorter travel time towards your destination, as well as more thrill and excitement. A greater distance driven means more mobility. Greater speed, however, also means more wear and tear on your vehicle, higher fuel consumption, a chance of a traffic ticket and more severe consequences if an accident occurs. For each combination of speed and amount of driving, the expected net benefit equals the expected gain minus the expected loss. At zero exposure to risk, there is no mobility and the net benefit of mobility is likewise nil. When speed is extremely high, the expected loss is greater than the expected gain and the expected net benefit falls below zero. The reasonable amount of risk to be taken lies somewhere in between.

While it is obvious that people should not maximize the danger of accident, neither should they opt for the other extreme. Instead they should attempt to maximize the expected net benefit from road travel and choose a speed and other actions accordingly. They should, therefore, try to select a level of exposure to accident risk that is greater than zero and that promises maximal net benefit from the behaviours chosen. That level of risk is the ***target level of risk*****.** Since zero risk is obviously not a meaningful goal, people target their risk level above zero. They do this not only when driving, but also at work and in sports and leisure-time activities; and with respect to lifestyles that may have consequences for health, such as tobacco and alcohol use, dental hygiene, diet and exercise.

3.3 Motivating people to alter their target level of risk

In the last several years there has been a major increase in interest in the use of incentives for accident-free operation as an approach to accident prevention. This appears to be an international phenomenon; with reports on the topic from Europe as well as the Americas, in Dutch, English, German, Norwegian, Russian, Spanish and Swedish. Publications on the topic have become more frequent not only in the scientific journals, but also in the trade press (e.g., Markus, 1991; Legler, 1992; Mazzurco, 1992; Synnett, 1992; Redmann, 1993; McIlwaine, 1994; Gerson, 1994; Weinstock, 1994; Colledge, 1995, Geller, 1996).

What explains this increased interest? It may be due to the large amount of empirical evidence compiled in occupational, clinical and health psychology that shows the benefit of applying the "behaviour modification approach" to the treatment of dysfunctional behaviour and the shaping of desirable behaviours; that is by means of reward and/or punishment. On the other hand, there are indications of growing disappointment with the traditional approaches to accident prevention.

3.4 Traditional approaches

The behaviour modification approach, with its focus upon motivation, is indeed quite different from the traditional philosophy towards road and occupational safety: Engineering, Education and Enforcement (often referred to as Triple E). Engineering can provide an improved opportunity to be safe, education can enhance the performance skills, and enforcement of rules against specific unsafe acts may be able to discourage people from engaging in these particular acts. ***However, none of these interventions is likely to increase the desire to be safe.*** Therefore, if safety is actually determined more by the desire to be safe than by the physical opportunity that is offered or by the level of skill, the introduction of accident countermeasures of the engineering, education and enforcement varieties would not necessarily improve overall safety.

What may occur instead is behavioural adaptation, that is, a change in behaviour that offsets the potential safety benefits, as has been discussed by a group of international road safety experts in an OECD report (1990). The greater opportunity for safety and the increased level of skill may not be utilized for greater safety, but instead, for more advanced performance. Examples of this may be found in Appendix C.

It has been recognized for some time from various studies on the effect of formal driver education upon safety of young novice drivers in the general population that this formal training fails to contribute to safety. This is generally explained as follows: Formal driver training does indeed, as one would expect, improve driving skill in terms of vehicle-handling ability, but it also adds to driver (over)confidence. As the training appears to add more to confidence than it adds to skill, overconfidence grows disproportionately and the accident rate of the graduates does not drop, but increases instead (Brown et al., 1988). It is, therefore, of particular relevance to this report is a recent Norwegian study that found a counterproductive effect on safety due to "safety" training imposed on truck drivers. A law was passed that made skid control training mandatory for truck drivers in one area of the country, but not in another. By comparing the accident rate of truck drivers between the two areas it was found to be higher in the area with the new law. Once again, this was attributed to training enhancing overconfidence (Christensen and Glad, 1996). However, there is reason to believe that driver training programs, in combination with measures that are aimed at enhancing safety motivation, will have a desirable effect upon a driver s safety record.

In short, the greater engineering opportunity for safety and the increased level of skill may not be utilized for greater safety, but instead, for more advanced performance. What may occur instead is behavioural adaptation, that is, a change in behaviour that offsets the potential safety benefits.

3.5 Incentives versus disincentives: reward versus punishment

The notion that unwanted behaviour may be repressed by authorities acting upon people's motivation has, of course, a long history, as is clear from the universal presence of punitive law. Although punishment for violations of the traffic code (in the absence of an accident) is also one of society's traditional attempts at motivating people towards safety, the evidence for its effectiveness

still remains to be presented (OECD - Road Research, 1974; Carr, Schnelle and Kirchner, 1980; Bonnie, 1985). Even in cases in which selective enforcement does reduce the rate of a particular type of accident (e.g., drinking-and-driving accidents), this does not necessarily lead to a reduction in the overall accident rate. This is because the rate of accidents with other immediate causes may increase (Wilde, 1988a and 1990). Sobriety is no guarantee for safety, nor are seatbelt use, obeying the speed limit or wearing safety boots.

To believe that the overall accident rate will decrease with a reduction in one particular cause of accidents is to ignore the human capacity to adapt to changing circumstances (Wilde, 1994). One cannot improve safety by piecemeal measures that fail to affect the root cause of accidents- i.e., accident risk acceptance. Many people will adjust their behaviour pattern to continue to act with the same level of accident risk as before. On the other hand, there is evidence for the general deterrent effect of punishing road users for being involved in an accident in which they are at fault (e.g., Barmack and Payne, 1961).

The approach that attempts to deter people from specific unsafe acts (in the absence of an accident) suffers from several other problems as well, some of which have been identified in the context of organizational psychology (Arnold, 1989): (a) The "self-fulfilling prophecy of attribution." Labeling people with undesirable characteristics may stimulate individuals to behave as if they had these characteristics. Thus, the very imposition of a speed limit may provoke some people to drive faster than they otherwise would. (b) The emphasis is on process controls (i.e., on specific behaviours, such as using a piece of safety equipment or obeying the speed limit, instead of on the outcome: safety).

Process controls are cumbersome to design and implement. Moreover, they can never be totally exhaustive, that is, cover all undesirable specific behaviours of all people at all times. (c) Punishment brings negative side-effects. Punishment creates a dysfunctional organizational climate: resentment, uncooperativeness, antagonism, sabotage. Moreover, some people vehemently resist any action taken by authorities that they view as an infringement of their personal independence and freedom of choice. As a result, the very behaviour that was to be prevented may in fact be stimulated.

3.6 Cost-effectiveness of incentive programs

With few exceptions, the available literature deals with industries other than trucking. We have attempted to cull the information presented to extrapolate what may be useful and applicable to the trucking industry. Reductions in the accident rate per employee-year of 50 per cent or more are not uncommon in manufacturing, construction and other industries. The trucking and delivery division of a German food processing plant saw a reduction in direct accident costs by more than two-thirds in the first year of implementing an incentive program, and the reduction remained at that level for over three decades (Gros, 1989). In other cases, the results are better still, e.g., in two American mining companies the number of lost days per employee dropped by 89 and 98 per cent respectively (Fox, Hopkins and Anger, 1987).

Sometimes the results are more modest. A cable manufacturing plant in the USA reduced the accident costs per employee by 35 per cent; a manufacturer of tobacco products by 31 per cent (Stratton, 1988); a grain processing and transportation company by 30 per cent; a Pacific resort complex by 39 per cent; and a manufacturer of food products by a more modest 10 per cent (Bruening, 1989).

In some cases, major reductions in accident costs are achieved in return for low implementation costs of the incentive program. On other occasions, the implementation costs may be comparatively high. Similarly, a minor reduction in accidents may sometimes be accomplished with an incentive program that costs very little relative to the savings it produces. Therefore, it is of interest to consider not only the degree of accident reduction that may be achieved with incentive programs, but also the expense relative to the savings.

The ratio between benefits (savings on accidents prevented) and program costs is usually greater than 2 to 1. This means that companies can make money on such accident prevention efforts (largely due to the reduction in fees to workers' compensation boards and other insurance that follows an improvement in a company's safety record). ***Two companies interviewed in the present study reported three to one benefit-cost ratios for their incentive programs. In both cases, insurance rebates more than covered the bonuses paid to drivers.***

Such favourable results raise a novel issue of equity: how are the profits to be divided between the owners of the company (whose managers implement the incentive program) and its employees (who deliver the increase in safety)? The favourable effects continue over time. Incentive plans in two American mines were studied over periods of 11 and 12 years. In one mine the number of days lost due to accidents was reduced by about 89 per cent of baseline, and in the other by as much as about 98 per cent. Benefit-cost ratios varied from year to year between 18 and 28 at one mine and between 13 and 21 at the other. There was no sign that the effectiveness of the incentive plans diminished over time at either mine (Fox, Hopkins and Anger, 1987). An incentive program for German drivers of trucks and delivery vans has remained consistently effective over the 30 years it has been in existence (Gros, 1989). A high benefit-cost ratio - about 23 to one - has also been observed for incentives for safety in the resort hotel business (Bruening, 1989).

An incentive program implemented in a manufacturing plant of conveyor systems in Tennessee showed a benefit-cost ratio of 20 to one while bringing about a 77 per cent reduction in accidents (Hatcher, 1991). Another program was implemented in a construction company at a cost of about US$30,000 a year and produced savings in workers' compensation insurance premiums of about US$400,000 a year, which amounts to a benefit-cost ratio of 13 to one (Synnett, 1992).

3.7 Objections to incentive programs

In addition to the practical problem of accident under-reporting, some moral objections to incentive programs have occasionally been mentioned. These do not claim that incentives are not effective in changing human behaviour, but argue that people ought not to be rewarded for the kind of desirable behaviour (no accidents) they should display on their own accord.

Another argument is that drivers are already being paid for a job in which they are supposed to act safely. Companies that adhere to this philosophy have the accident records that come with this philosophy. Despite the occasional occurrence of such arguments, society has a prevailing inclination to reward students for studying hard, to reward prisoners for good behaviour, to extend prizes for positive achievements in many domains of life. Similarly, society has a strong inclination to punish people for behaviour they should have avoided. It is difficult to imagine a society that does not use the external motivators of reward and punishment. To withhold rewards for desirable behaviour is clearly in conflict with current culture.

Sometimes too, it has been argued that "safety is a reward in its own right." But safety is not the only reward. Although safety is a desirable state of affairs, it is commonly traded for other commodities: financial gain, mobility, adventure, thrill and social admiration or approval for acts of daring or self-sacrifice. Road and aviation accidents can easily be reduced to zero by any individual who decides never to make use of the roads or fly again, but most of us are willing to sacrifice a degree of safety in return for the benefits that come from road and air travel.

Occasionally safety incentive programs are not adopted or are even cancelled by management because of practical objections against "the complexity of the rules and/or the administration" of such a program. Complexity is, however, not an inherent aspect of incentive programming and it can easily be avoided or remedied.

In summary, it can be inferred from the available information that:

- ***the trucking industry can use incentive programs to its advantage, both in terms of increased safety and enhanced profitability;***

- ***by proper monitoring and refinement of an already existing incentive program, incremental improvements in safety and profitability can be achieved;***

- ***there is every reason to support further field testing of the incentive approach, as it holds good promise for the trucking industry. There is little literature specifically on the use of incentive programs within the trucking industry; further field testing would address this void.***

- ***potential benefits are not limited to accident reduction, but are likely to include better company morale, greater productivity and a reduction in personnel turnover.***

4.0 MOTOR CARRIER AND DRIVER INTERVIEWS

In total 40 companies were interviewed with respect to their use of safety incentive programs, and their safety programs. The interviews focused on long haul firms. Appendix A lists the companies interviewed. The companies were interviewed face-to-face with the exception of two that were interviewed by telephone to control travel costs.

The companies interviewed were located across Canada, covered a range of sizes (as measured by number of power units) and carrier types (less than truckload, truckload, lowbed, etc.). Companies with and without incentive based safety programs were interviewed. Special efforts were taken to interview carriers with fewer than 50 power units to determine whether these carriers are less likely to have an incentive based safety program, and less likely to have specialized resources to implement such a program. A summary of the interview results is provided in Exhibit 4.1.

EXHIBIT 4.1: USE OF INCENTIVE PROGRAMS - SUMMARY

Company Size	200 Plus Power Units	50 to 200 Power Units	Fewer than 50 Power Units	Total of All Companies
Number of Companies Interviewed	**9**	**16**	**15**	**40**
Number of Safety Incentive Program	**7**	**12**	**9**	**28**
Number with Some Form of Performance Program	**3**	**7**	**6**	**16**
Number with Safety Recognition Program	**7**	**8**	**8**	**23**

Incentive plans can take many possible forms. A sample incentive program is outlined in Exhibit 4.2. This incentive program was selected for illustration as it is straightforward, covers both company drivers and owner-operators and has a successful four-year track record. It is presented as an example only and should not be taken as a model program endorsed by the study team.

EXHIBIT 4.2: EXAMPLE OF A SAFETY INCENTIVE PROGRAM

Safety Bonus Program for Company Drivers

1 year	**$500.00**	**Plus Certificate**
2 year	**$500.00**	**Plus Certificate**
3 years	**$1,000.00**	**Plus Plaque and Gift**
4 years	**$1,000.00**	**Plus Plaque**
5 years	**$2,000.00**	**Plus Plaque and Gift**

To qualify:

Must be employed a minimum of eleven months and remain employed past the end of the year

Maximum of one speeding or hours of service infraction tolerated

Plan is predicated on being claim free, accidents and cargo

Definition of claim is no cost to the company in excess of $200 (Canadian)

If involved in a claim during the first three years, the employee goes back to 0 years

If involved in a claim after the completion of three claim-free years in succession, the employee loses the balance of that year plus one full year

Program is in effect (day/month/year)

Program is (day/month) to (day/month) each year. All monies will be paid out in (day/month)

EXHIBIT 4.2 EXAMPLE OF A SAFETY INCENTIVE PROGRAM (Cont d)

Safety Bonus Plan for Owner-Operators

1 year	**$500.00**	**Plus Certificate**
2 years	**$600.00**	**Plus Certificate**
3 years	**$700.00**	**Plus Plaque and Gift**
4 years	**$800.00**	**Plus Plaque**
5 years	**$900.00**	**Plus Plaque**

To Qualify:

An owner must be provided with services pursuant to an agreement with the carrier for a minimum of eleven months and continue to provide services past the end of the contract year

The plan is predicated on being claim free, accidents and cargo

Maximum of one speeding or hours of service infraction permitted

If involved in a claim in the first three years, the owner goes back to 0 years

If involved in a claim after the completion of three claim free years in succession, he owner loses the balance of that year and one full year

Program is in effect (day/month/year) subject to amendment by the carrier from time to time

Program will be administered on a fiscal year (day/month) through to (day/month). All monies will be paid out in (month)

Prior to this project, little was known about the extent of safety incentive programs in the trucking industry. Interview results show that safety incentive programs are extensively used in the industry, with 70% of the carriers interviewed having a program in place. While smaller companies (fewer than 50 power units) tended to make less use of safety incentive programs than larger companies, 60% of companies this size that were interviewed had safety incentive programs in place.

The use of safety incentive programs is growing; many of the companies interviewed have implemented their program within the last two years, while others are considering or developing them. Little information is available to guide companies in the development and application of these programs.

Nearly 60% of the companies interviewed had a safety recognition program in place. These typically involve a certificate, pin or some other form of recognition for one or more years of accident-free driving. Many companies have both a safety incentive program and a safety recognition program in place. Forty per cent (40%) of the carriers interviewed also had performance/productivity programs in place. Exhibit 4.3 provides more detail on the interview results in a manner that protects the carriers' identity.

Driver interviews were conducted with two trucking firms and at one major truck stop. One fleet was a for-hire fleet while the other was a private fleet. The for-hire fleet has over 200 power units and operates interprovincially and internationally. The majority of the drivers are employees of the company.

The drivers interviewed at the truck stop were unanimous that the incentive programs were, if managed properly, effective and motivate drivers to be extra careful. The drivers were unanimous that cash is the best form of bonus recognition. There was little interest in some form of recognition that drivers could wear due to the practical problems associated with transferring such a symbol from jacket to jacket. The drivers were also unanimous that the programs are only as good as the company that introduces them. It was clear the drivers felt that the leadership for these programs rests with company management.

The for-hire fleet interviewed does not have a cash bonus safety incentive plan. The fleet participates in the Quebec Safety League safety recognition program and has previously won safety awards from the league. Again drivers were unanimous in rejecting a symbol they would display on their clothes for the reasons noted above. They felt that safety awards presented to a company often fail to provide the drivers themselves with some form of tangible recognition. As an example, drivers noted that a letter of recognition personally recognizing their achievements, would appeal to them, and would help them better their career.

The private fleet interviewed operates mainly on short hauls. The company participates in the Quebec Safety League program to access the information available on safety tips and programs. Drivers interviewed felt that it important to preserve a good company image in the public eye.

The long haul drivers interviewed felt money was the best reward. Short haul drivers work in teams of three, each taking turns with the actual driving. The team concept was therefore very important to both the company and the drivers. Both drivers and company management felt that, for this reason, cash rewards would not be successful in this company.

EXHIBIT 4.3: SUMMARY OF CARRIER INTERVIEWS - Category: Fewer Than 50 Power Units

Company And Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
1. TL Canada	No							Uses owner-operators exclusively. Feels deductible on insurance is sufficient incentive to avoid accidents
2 TL Canada	None					Yes		Pay on a per haul basis with company trucks. Has proven to be a tremendous incentive to reduce maintenance, improve safety record, productivity
3. LTL and TL US	None	n/a	n/a	n/a	n/a	No	No	Prefers to explain to employees what the expectations are at hiring time; top management involvement in monitoring performance
4. TL Western Canada	None	n/a	n/a	No	n/a	Provincial safe driving program		Company does not feel need for incentive program. Most drivers get home each night allowing them to attract best drivers
5. TL Canada and US	Cancelled	1 year	1 cent per mile	No	n/a	No	No	Felt safety incentive was not effective
6. LTL and TL US	No program, considering one	n/a	n/a	No	n/a			Program will need to be recognized by governments and shippers Problem to implement for small firm
7. TL Central and Western Canada	Under Consideration	n/a	n/a	No	No	No	No	
8. TL Canada and US	In place (combined with performance bonus)	1 year	$100 to $500 per year	Yes	Combined with safety bonus		Plaque for years of service with company	

TL - Truckload LTL - Less Than Truckload

EXHIBIT 4.3 SUMMARY OF CARRIER INTERVIEWS - Category: Fewer Than 50 Power Units (cont'd)

Company And Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
9. TL (Bulk)	In place	1 year	3% of net salary paid annually	No	n/a	Yes. Through Safety Association	Yes Professional Driver Improvement Course (PDIC) and dangerous goods	Program administered by management alone; punitive system was abandoned after 1 year. Drivers of dangerous goods in bulk perform many logistics duties where incidents are as relevant as accidents
10. LTL and TL	In place	1 year	% of salaries based on 4 criteria. Accident is one	Fuel efficiency, Claims other than accidents. Performance		Yes. Through Safety Association	Dangerous goods, PDIC	Has a punitive system; need for recognition of fleet performance through provincial/national programs such as Partners in Compliance (PIC)
11. TL (Bulk) Canada and US	In place	2 years	2 cents per mile paid semi-annually	Yes	Deduction from safety bonus if certain criteria not met. (i.e. Paper work complete)	No	Driver of the year awards.	Insurance costs are down. Good safety record. Recently increased incentive from .01 per mile to .02
12. TL Canada and US	Yes	4 years	1 cent per mile. Paid every 6 months. Minor infraction results in loss of 6 month bonus; major infraction 12 months	Performance and loyalty bonuses	1 cent per mile for each	Awards for long term accident free driving	Good service awards	Incentive program has improved safety. Future pay increases will be through bonus system tied to safety and performance
13. TL Canada and US	In place	5 years	1 cent per mile each 6 months; plus 1 cent per mile for each 12 months accident free	No	n/a	Next year	Driver of the year award	Found paying semi-annually better than quarterly. Sometimes took more than 3 months for accidents to be noted. Consider program to be very effective
14. TL (Bulk) US	Yes	6 years	n/a	On time delivery	Monetary	Yes	Safety recognition in community	Demerit points system
15. TL Canada and US	In place	8 years	1 cent per mile paid quarterly	Yes	Series of gifts increasing in value with years of performance (awards include TVs, etc)	Yes	Yes	Incentive programs are very effective

TL – Truckload LTL - Less Than Truckload

EXHIBIT 4.3: SUMMARY OF CARRIER INTERVIEWS – Category: 50 to 200 Power Units

Company and Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
1. LTL Western Canada	No	n/a	n/a	n/a	n/a			Company has a combination of local delivery and long haul operation. Difficult to implement a fair and equitable incentive program in this mix
2. Specialized carrier in Western Canada.	Dropped previous safety incentive program	n/a	Was 0.5 cents per kilometre	No	n/a	Awards for 5, 10, 15, 25 years of accident free driving	No	Enforcement of hours of service and vehicle speeds. Drivers home each night
3. LTL and TL division no US	Does not have a program in place but is looking at implementing one	n/a	n/a	No	n/a	no	Yes PDIC and dangerous goods	Monetary program was not seen as workable for them; see any program as administrative nightmare; need administrative tool to assist them if program is to work and if they are to control it; safety performance in rural areas different from that in major centres
4. TL US	Does not have a program but is looking at implementing one	n/a	n/a	n/a	n/a		Dangerous goods Continuous improvement	Provides drivers with driver manual; prefers to focus on motivation rather than monetary incentives
5. TL Canada and US	In place	1 year	$50/Month	Yes	Combined safety and bonus performance	Recognition for 5, 10 & 15 yrs accident free driving	No	
6. TL US	In place	1 yr	3 cents per mile to owner-operators; 2 % of salary to employees; paid twice a year	Yes	Based on productivity	no	Yes	Employees and owner-operators react differently to bonuses; strong involvement of top management

TL – Truckload LTL – Less Than Truckload

EXHIBIT 4.3 SUMMARY OF CARRIER INTERVIEWS - Category: 50 to 200 Power Units

Company and Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
7. TL Eastern Canada	In place (combined with performance bonus)	1 year (others in place previously)	Drivers rated on 5 items: - safety and compliance - mileage – communication & claim free production - on time performance and customer service - public complaints on driving. $75 to $170 per month depending on mileage	Yes	$45 to $100 for each 4 remaining criteria after safety & compliance	Driver of the year award	Driver appreciation day	
8. TL Ontario and Western Canada	Yes.	2 years	2 cents per mile to company drivers. Not applicable to owner-operators. Paid every 3 months	Yes	Awards for meeting various criteria	No	Yes	Incentive program is one of several factors producing a good safety record; others include driver selection; orientation and training vehicle safety inspections, enforcement of hours of work regulations
9. TL Canada	In place	3 years	4.5% of paid earnings annually	Yes	Included in the 4.5% noted under safety bonus	Under consideration	No	
10. LTL and TL, Canada and US	In place	5 years	Point system with merit / demerit points. Each point worth $100. Paid annually	Part of merit / demerit point system	$100 for each point	Awards program to start next year	Prizes for no accidents / no claims during winter months	Monetary awards alone are not sufficient to foster safe driving. Need an open line of communication within company
11. Mixed fleet Western Canada	Yes	5 years	1.3 cents per mile to company drivers and 1.75 cents per mile to owner-operators. Paid every 6 months	No	n / a	Long service awards and safety awards		
12. LTL in Western Canada	Yes	5 years	2 cents per kilometre for those paid on mileage. $1 per hour for hourly workers. Paid semi-annually	No	n / a	Developing a recognition program with awards, presentations and prizes	No	Company feels its incentive program is working well

EXHIBIT 4.3 SUMMARY OF CARRIER INTERVIEWS - Category: 50 to 200 Power Units (cont'd)

Company and Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
13. Flat deck carrier, Ontario westward and US	Yes	7 years	2 cents per mile paid semi-annually to company drivers. Owner-operators incentive is in insurance premiums paid	Yes. Combined with safety program. Profit sharing plan as well	Not available	Employee of the Month	No	
14. TL Eastern Canada	In place	15 years	10% of wages	No	n/a	Safety awards	No	Company very committed to bonus program. Value of bonus has increased over years in view of salary increases

TL - Truckload LTL – Less Than Truckload

EXHIBIT 4.3: SUMMARY OF CARRIER INTERVIEWS – Category: 200 plus power units

Company and Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
1. TL and LTL Canada and US	None	n/a	n/a	No	n/a	Awards for 5, 10, 15, 20 years of accident free driving. Million mile club	Company has a quality improvement program which encourages everyone to identify problems	Company has a points program to decide when driver requires additional training or dismissal
2. TL and Bulk; Canada and US	Has other driver oriented program instead	1 year	1.5 cents per mile	No	n/a	Yes. Awards for each year of accident free driving	yes	Program is reward for good performance and good safety record
3. TL and Bulk; Canada and US	Merit point system with accident free one of several categories	1 year	1.5 cents per mile paid every two weeks	Based on mileage driven, on time performance, years of experience	Up to 7 cents per mile; paid every 4 weeks	Driver of year. 5, 10, 15 20 year service awards	Audio tape for entertainment with safety messages inserted.	
4. LTL and TL division U.S.	Had a program for 1 year and cancelled it in 1997	1 year	1 cent per mile paid quarterly	No	n/a	No	yes	Program was cancelled because it created problem with under-reporting of accidents; difficult to administer no employee involvement on committee; monetary bonus created a problem among drivers; application of no-fault system in some jurisdictions caused a problem
5. TL - U.S.	In place	1 Year	2 cents per mile for accident free paid annually	Yes	1 cent a mile	No		Has a punitive system; has a management/employee committee program should be recognized widely so as to improve trucking's image

TL – Truckload LTL – Less Than Truckload

EXHIBIT 4.3 SUMMARY OF CARRIER INTERVIEWS - Category: 200 Plus Power Units

Company and Category	Status Of Safety Bonus	Time In Place	Basis Of Payment	Performance Bonus	Basis Of Payment	Safety Recognition Program	Other Driver Oriented Program	Notes
6. TL Canada and US	In place	4 years	1 cent per mile if target accident rate met; paid quarterly	No	n/a	Awards (certificate)	no	Savings 3 times the cost. Replaced earlier program of $50 per month
7. TL Canada and US	In place	5 to 10 years	2 cents per mile paid quarterly	Fuel economy program	3 cents per mile	Yearly safe driving award	Company long service award	Recently increased deductible from $1,000 to $3,000. Accidents decreased. Get excellent ratings from insurance company
8. TL Canada and US	In place	10 years	1 cent per mile paid quarterly	Discontinued a 1 cent per mile bonus; replacing with awards program	Commercially available awards program	Being implemented	Special recognition program	Performance bonus was not achieving results expected.
9. TL Canada and US	In place	10 years	½ cent per mile	No	n/a	Pins for each year of accident free driving. Plaques and gifts for 5, 10, 15 years.	No	Good safety record Pleased with program

TL – Truckload LTL - Less Than Truckload

5.0 INTERVIEW FINDINGS

The following points highlight the findings from the interview process.

5.1 Use of safety incentive programs

Safety incentive programs are in widespread use in the industry, with 70% of companies interviewed having a program. Virtually all companies with over 100 power units offer a safety incentive program and the majority of the smaller firms interviewed have a program in place. The programs typically apply to both owner-operators and company drivers. The study team estimates the industry spends in the order of $30 to $50 million annually on safety incentive programs.

5.2 Size of bonus

Safety incentive programs vary widely in their detail, level and type of remuneration. Remuneration varies from $300 per year to $6,000 per year, with 1 cent per mile being a common rate. Costs of minor claims are usually deducted from the bonus. For many firms this was a good way to handle such claims.

5.3 Use of other incentive programs

Larger companies often have an employee productivity/performance package, of which the safety bonus for accident free driving is one distinct part.

5.4 Payment frequency

Payment frequency varies from monthly to annually. The most common payment period is quarterly or semi-annually. The rationales expressed by companies for their payment frequency were as follows:

- Monthly payments mean drivers see results of their efforts frequently. If they have an accident, they are back in program quickly;

- Paying every 3 or 4 months reduces administrative burden and drivers see bigger cheques. This payment frequency also gives time for all accident claims to be processed in each period, to avoid a claim arriving after the bonus has been paid. This is by far the most frequent payment schedule;

- Semi-annual or annual payments reduce administrative burden and increase size of cheque. Programs that pay annually often pay the bonus just before Christmas.

5.5 Other benefits

Driver retention is an important by-product of incentive programs. Drivers who leave part way through a payment period do not get a bonus.

5.6 Corporate culture

What is successful in one firm will not be in another. Each company has to tailor its program to suit its own corporate culture.

5.7 Lack of relevant literature

Companies do not have a reference point for developing their programs and typically rely on their own judgement and discussions with other firms. Most carriers interviewed felt a document that outlined various packages and what makes them successful would be very useful to the industry.

5.8 Quantification of benefits

It has proven difficult for firms to quantify benefits. Some companies cancelled or changed their programs as they felt they were not beneficial. The study team believes many of these programs were designed with flaws which led to their demise. Other companies were 100% committed to their program even though they could not quantify benefits. As one manager stated "if the program saves us one rollover a year, it s worth it." Two companies reported a savings-to-cost ratio of 3 to 1 when the program was implemented. For one of these companies, their insurance rebate as a result of the lower accident totals was greater than the total bonus money paid to drivers. As the company stated, "this means we re getting the program for free."

5.9 Other initiatives complement safety incentive program

Companies with a wide range of safety initiatives reported more success with their incentive programs. Safety incentive programs alone don't appear to be sufficient. A full safety program includes the following:

- Company management with demonstrated commitment to safety. For example, drivers are pulled off road in bad weather or when tired. Equipment is kept in good condition and speed limits enforced;

- Driver recognition through award programs using pins, certificates, plaques;

- Driver of month/year award;

- Good communication within company;

- Safety meetings, although many companies cannot get drivers together, as they are on the road and these meetings take away from their little time at home. Some companies pay extra per mile for training, providing incentive for a driver to get training;

- Monetary recognition is important, but so are other forms of recognition through pins, certificates, plaques which drivers are able to retain over a long period of time;

- New drivers receive proper training when joining company. New drivers are trained properly before they develop bad habits or attitudes;

- Drivers are advised of inadequate performance; needed corrections are noted; driver is sent on PDIC (Professional Driver Improvement Course)or other form of training if necessary;

- In short, a firm must have a safety culture for the incentive program to achieve its maximum potential.

5.10 Give property damage accidents a lot of attention

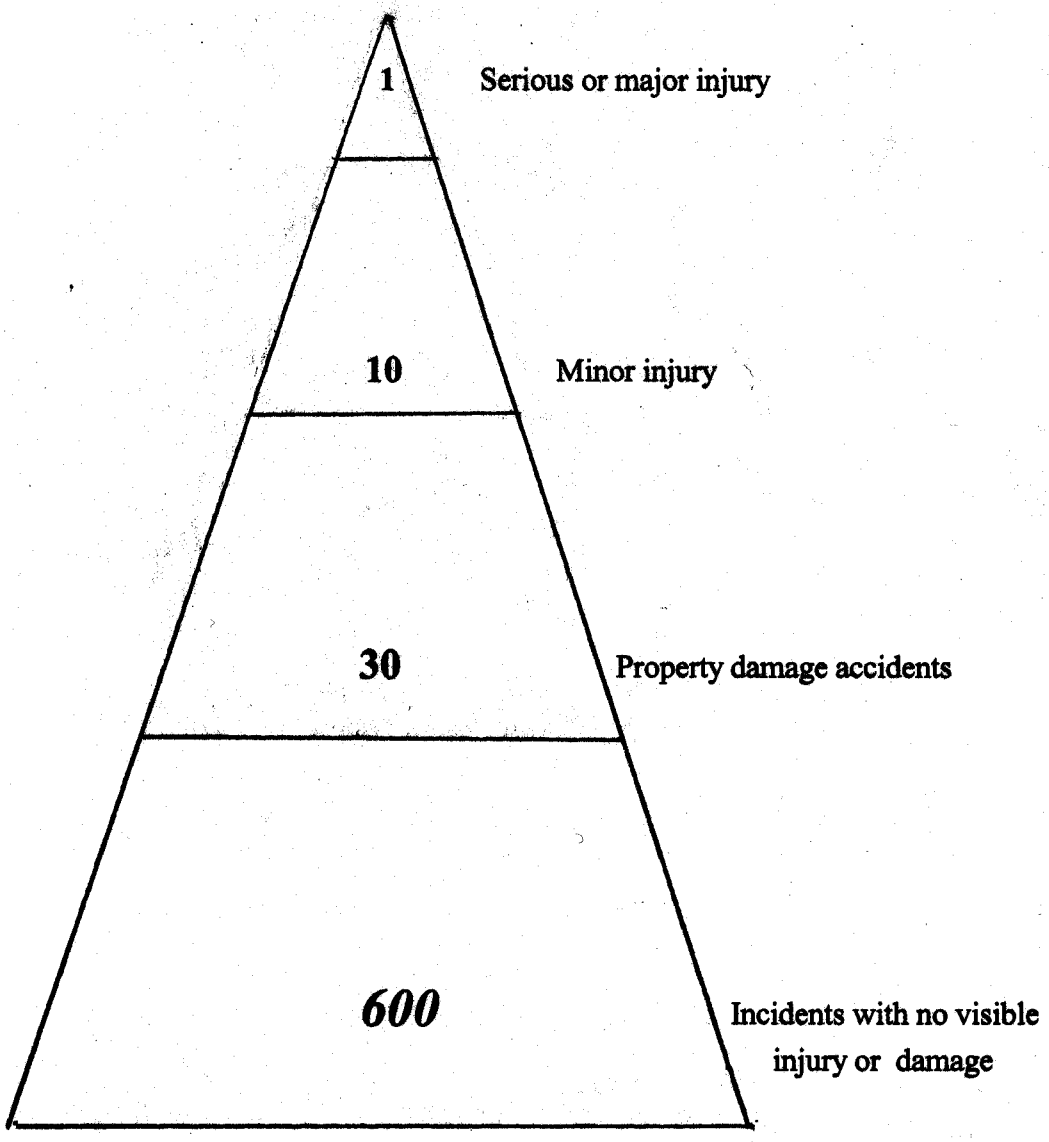
Virtually all companies interviewed focused on all forms of accidents, including all forms of property damage accidents. It was felt that focusing on these types of accidents, and reducing their frequency and severity, would result in fewer accidents involving minor injuries and serious/major injury accidents. This was supported by a major study of industrial accidents that revealed the ratios in the accidents reported, as illustrated by Exhibit 5.1. This 1969 study involved nearly 1.8 million accidents reported by 297 cooperating companies. Part of the study also involved 4,000 hours of interviews by trained supervisors on the occurrence of incidents that under slightly different circumstances could have resulted in injury or property damage.

The ratios noted may not hold for all organizations. The significant point is that major injuries are rare events and that many opportunities are afforded by the more frequent, less serious events to take actions to prevent the major losses from occurring. Safety leaders also emphasized that these actions are most effective when directed at incidents and minor accidents with a high loss potential.

5.11 Proper communication is critical

Communications within the company, and between drivers and management is critical. This message was stressed repeatedly by companies with successful programs. These companies indicated they often did not have enough communication when they first started their programs, which led to difficulties that had to be addressed. The study team believes that many programs are cancelled or less effective than they could be due to lack of communication.

EXHIBIT 5.1: RELATIONSHIP BETWEEN INCIDENTS AND ACCIDENTS



(Refer to Section 5.10)

Source: Frank E. Bird, Jr. and George L. Germaine. *Loss Control Leadership.* Published by Institute Publishing (A Division of International Loss Control Institute) Highway 78, PO Box 345. Loganville, Georgia 30249. 1987. ISBN- 0-88061-054-9

5.12 Preventable versus non-preventable accidents

Determining preventable versus non-preventable accidents can become a point of contention. Most companies use a committee to decide. The committee is usually odd numbered in case a vote is required, but this is not always the case, as the committees typically achieve a consensus. Driver representatives usually form part of the committee, often the majority. Drivers were reported to be more severe than other committee members. Appendix B provides information on determining whether or not an accident was preventable.

5.13 Arguments presented for not having a safety incentive program

Some of the arguments presented against safety incentive programs are listed below. The study team response to these points is presented in Chapter 6.

- Can t demonstrate safety will improve or did improve;
- Incentives only work for the better drivers; the bad ones just don t care;
- Bonus becomes part of pay package and expected, thereby negating incentive to be extra careful;
- Why pay someone extra to do what they are already paid to do;
- Too complex to administer.

5.14 Need to keep safety message fresh

Companies need to find different ways of keeping safety in the minds of its personnel through special events, special initiatives, etc.

5.15 Drive check program

Manitoba Insurance Corporation is promoting a Drive Check Program that seems to be popular with companies. Each trailer carries a decal showing trailer number and 1-800- 2 ADVISE for public to call with compliments or complaints.

5.16 Other driver incentive programs

Some companies had recently started elite driver programs that gave special recognition to better drivers, including jackets, prizes and mileage incentives. As these are relatively new, it was not possible for companies to gauge their success as yet.

5.17 Programs take time to take effect

Companies reported a time lag of up to one year or more from introduction of the program to actual attainment of benefits. Apparently, real benefits were typically seen after two or three payments of bonuses were received and drivers saw tangible benefits and modified their behaviour accordingly. Similarly, benefits would continue some time after a program was cancelled. Some carriers reported cancelling their program a few months after its introduction as they were not getting expected results. This lead/lag issue suggests these companies may not have waited long enough for the benefits to kick in.

5.18 Keep at it

Companies with programs that they consider successful reported a need to constantly refine and update their programs.

5.19 Not all drivers may respond

It was reported that not all drivers respond to incentive programs and that ways to reach these drivers had to be developed. This included better training of the driver when joining the company and sending drivers on driver improvement courses.

5.20 Identification of problem drivers

Companies reported that the audit trail required by an incentive program allowed them to better identify problem drivers, necessary training and justification for termination where required.

6.0 EVALUATION OF ARGUMENTS AGAINST SAFETY INCENTIVE PROGRAMS

During the course of the interviews, study team members encountered a number of arguments against safety incentive programs. Each of these arguments is presented below with our response. It was felt that these points needed to be addressed as they are not necessarily valid reasons for not having a safety incentive program.

6.1 "Can t demonstrate safety did improve or will improve"

Our review of the literature failed to find a single documented case of an unsuccessful incentive program. We believe one of the major obstacles is having access to a proper evaluation methodology. Chapter 7 of this report therefore presents a methodology for evaluating a safety incentive program.

We believe another problem leading to this statement has been the introduction of safety incentive programs that have been critically flawed and therefore did not produce safety benefits. Chapter 8 presents a number of points to consider when developing and implementing a safety incentive program to increase its chances of success.

6.2 "Incentives only work for the better drivers; the rest don t care"

It is accepted that not all people will respond positively to incentive programs. However, most people do and a company is in a better position than they would be without a safety program, even if all drivers do not respond.

Incentive programs should be designed to bring peer pressure on all drivers, so drivers who do not respond initially will do so over time. Most of the incentive programs that are in place in the companies we interviewed feature individual awards. Programs that feature team bonuses, such as for achieving an overall fleet fuel efficiency would increase the peer pressure for all drivers to participate.

Drivers may not respond because they do not have the proper training or feedback on their driving habits. Drivers who do not respond therefore may need additional training. The incentive program is a way of identifying which drivers need corrective training or even some form of disciplinary action. Every driver does not need to be an active participant for the program to be a success.

6.3 "Bonus becomes part of the pay package"

Some people expressed a concern that the bonus becomes part of the pay package and expected, thereby negating the incentive to be extra careful. Clearly, this is a situation to be avoided. To address this risk some companies issue separate safety bonus cheques, have different payment schedules for these payments, and make special personal presentations to reinforce that these bonuses are not part of the basic pay package.

Company management must remain vigilant to ensure that the bonus does not become seen as part of the basic pay package. There is a need to keep the safety message fresh and remind personnel that it is a bonus program and not part of basic pay package.

6.4 "Why pay someone extra for what they are already paid to do"

Incentive programs increase a person's desire to be safe, as described earlier in this report. As a result an individual is more likely to properly apply the tools and knowledge for safe driving. In many aspects of North American culture individuals receive rewards for displaying a sought-after behaviour. The fact is that people respond to incentives, thereby improving safety.

6.5 "Too complex to administer"

The most successful incentive programs are simple in design and easy to administer. During the company interviews we saw a number of incentive programs that seemed unnecessarily complex and difficult to administer. This does not need to be the case.

7.0 EVALUATION OF A SAFETY INCENTIVE PROGRAM

Proper evaluation of a safety incentive program is a difficult task and needs to be considered when the program is being planned. Evaluation is required to determine the effect the program is having and what adjustments, if any, are required to make the program as effective as possible.

The simplest form of determining the effect of an incentive program is a before-after comparison of relevant costs and savings. Data are collected for the period prior to the introduction of the incentive plan and compared to the situation following introduction of the plan. Care must be taken to factor in items (such as weather, changes in economy, technology, and legislation) that may have changed during the period the comparison is made. For example, one cannot compare a summer period with a winter period, as the difference in weather produces different accident rates during these periods. Some companies may be able to implement a program in only part of their operations, so that comparisons may be made with other areas of the company in order to take such differences into account.

Exhibit 7.1 presents a list of items to include in this before-after comparison. Exhibit 7.1 shows that accidents incur many indirect costs as well as the more obvious direct costs. Both direct and indirect costs should be included in the evaluation.

Exhibit 7.2 presents a sample accident summary sheet. This sheet is useful in summarizing accident costs. It also allows one to quickly determine patterns that are occurring in accidents within a company (such as backing-up accidents). Measures can be developed to address such trends once the trends are identified.

EXHIBIT 7.1

ITEMS TO BE INCLUDED IN DETERMINING THE COST OF AN ACCIDENT

DIRECT COSTS

- **physical damage to cargo**
- **medical costs**
- **lost time at work**
- **injuries**
- **property damage**

INDIRECT (HIDDEN) COSTS

- **lost clients**
- **lost sales**
- **meetings missed**
- **salaries paid to employees in accident**
- **loss of employee performance**
- **cost to hire and train replacement employees**
- **supervisors' time**
- **loss of personal property**
- **replacement vehicle rental**
- **damaged equipment downtime**
- **accelerated depreciation of equipment**
- **accident reporting**
- **medical costs paid by company**
- **poor public relations and publicity**
- **increased public relations costs**
- **government agency costs**

EXHIBIT 7.2

ACCIDENT REGISTRAR

ACCIDENT INFORMATION COST INFORMATION

File Number	Date of Accident	Location of Accident	Name of Driver	Driver's Terminal	Route or City	Vehicle Number	Accident Details	Preventable or Non-Preventable	Collison	Injuries	Property Damage	Damage to Cargo	Recovery	Company Costs	Costs to Insurance Company	Total Costs	Number Killed/ Injured

8.0 FACTORS ENHANCING THE EFFECTIVENESS OF SAFETY INCENTIVE PROGRAMS

Experience with incentive programs shows that some programs have had much greater effect than others. It is, therefore, important to identify the distinctive features of the more successful incentive schemes.

An effort has been made to cull the ingredients of the most effective incentive plans from the separate published reports. The bibliographic references to these may be found in Wilde (1985), McAfee and Winn (1989) and Peters (1991). Identification of the program components that enhance the effectiveness of incentives has by necessity been an effort largely based on inference, because, to date, there have been no well-controlled experiments in which one particular incentive characteristic is being varied and all other factors are kept constant. For obvious reasons, such experiments are not likely to be forthcoming; industry is not in the business of running such experiments. The important ingredients of effective incentive programming are laid down in Exhibit 8.1, which may serve as a practical "checklist."

Exhibit 8.1
Requirements for Effective Incentive Programming

- Strong managerial vigour and commitment
- Program planned in consultation with the target population
- Incentives extended to different levels in the organization
- Simple rules
- Fair adjudication of responsibility for accidents
- Rewards focus on not having an accident
- Attractive rewards
- Progressive accumulation of credits
- Rewards perceived as equitable
- Rewards perceived as attainable
- Supplementing incentives with safety training considered
- Under-reporting of lesser accidents discouraged
- Peer pressure toward safe conduct enhanced
- Short incubation periods
- Proper program evaluation

8.1 Strong managerial vigour and commitment

The introduction and long-term maintenance of incentive programs should be conducted with managerial vigour, commitment and coherence. Workers or drivers should not only be informed of the program in existence, but they should also frequently be reminded of it in attention-catching ways, for instance by special events. To motivate and to inform the relevant audience, those in charge of incentive programs should provide clear and frequent knowledge of results to the target audience, i.e., feedback (Komaki, Barwick and Scott, 1978). Incentive programs should be continually improved, refined and adjusted to changing conditions and attitudes.

8.2 Program planned in consultation with the target population

The incentive scheme should be developed in cooperation and consultation with those people to whom it will be applied. People are more likely to actually strive for goals they themselves have helped define (Latham and Baldes, 1975; Komaki, Barwick and Scott, 1978). It should not be overlooked that an incentive is an incentive only if it is viewed as such by the recipients.

Members of the target audience(s) are themselves likely to be the most informative as to which particular incentives are the most motivating towards increasing their safety performance under what conditions of perceived equity, accessibility, incubation and other features of any incentive program under consideration. If the wishes and perceptions of the target audience are not considered in program design, incentive plans may perform well below their potential (Gregersen, Brehmer and Moren, 1996).

8.3 Incentives extended to multiple levels of the organization

Not only are shop-floor workers to be rewarded for safe performance, but so are their supervisors and middle managers. This creates a more cohesive and pervasive safety orientation within a company (Zohar, 1980; Fox, Hopkins and Anger, 1987; Bacher, 1989; Bruening, 1989; Synnett, 1992). For a true "safety culture" to emerge in a company, it is necessary that top management and other links in the line of command be made eligible for an award. This includes the dock worker to foreman, to supervisor and into middle management at least.

In the case of trucking safety this requirement takes on special significance because there are reasons for believing that the risk-taking inclinations of American and Canadian truck drivers are very much influenced by other officers in their companies and by *dispatchers* in particular (Rothe, 1991). It would seem desirable to include them as potential bonus recipients in any incentive scheme aimed at improving driver safety (for instance, by giving them a bonus, which as a percentage of their salary is the same as the drivers receive).

8.4 Simple rules

The operational rules of the program should be kept simple so that they are easily understood by all persons to whom the program applies. Also, in the area of incentives for the purpose of increasing productivity, it is known that too complex a set of rules may reduce program effectiveness (Doherty, Nord and McAdams, 1989).

8.5 Fair adjudication

In cases where the preventability of an accident and the responsibility for its occurrence may be questioned, it is of paramount importance that the judgement be viewed as fair and reasonable. For this reason, it is desirable to have the necessary procedures in place for an appeal process that is viewed as equitable by all parties concerned.

8.6 Rewards are focused on not having an accident

Incentive programs should reward the outcome variable, i.e., the bottom line - being free from accidents - not some process variable like wearing the seatbelt, driving when sober or obeying the speed limit. This is because rewarding specific behaviours does not necessarily strengthen the motivation towards safety, and a potential safety benefit due to an increased frequency of one specific form of "safe" behaviour may simply be offset by road users less frequently displaying other forms of "safe" acting. "The risk is here that while the rewarded behaviour may improve, other related safe behaviours may deteriorate." (McAfee and Winn, 1989, p.14). This is why the evidence from incentive programs for the purpose of increasing the frequency of particular safety behaviours - and there have been many such programs - have not been incorporated in the present report. It can be found elsewhere (e.g., Geller, 1996).

8.7 Attractiveness of the reward

Incentive programs can be expected to be more successful to the extent that they widen the utility difference between the perceived benefit of not having an accident and the perceived disadvantage of having an accident. Rewards for accident-free operation in industry have taken many different forms, ranging from cash to public commendation. While cash is often a reward, merchandise, especially customized merchandise, may constitute a lasting reminder of the value of safety.

It should be noted, however, that the attitude-shaping effect of modest awards can only take place after the operators have changed their behaviour for whatever minor external inducement. So, the award should be big enough to achieve some behaviour change to begin with (Loreno and Wilde, 1992).

8.8 Progressive accumulation of safety credits

The amount of the incentive should continue to grow progressively as the individual operator accumulates a larger number of uninterrupted accident-free periods; e.g., the bonus for 10 uninterrupted years of accident-free driving should be greater than 10 times the bonus for one year of accident-free driving (Wilde and Murdoch, 1982).

8.9 Rewards are perceived as equitable

The incentive program should be perceived as equitable by those participating in it. The bonus should be such that it is viewed as a just reward for not causing an accident in a given time period. Similarly, incentive systems should be designed such that those workers who are not eligible for the (top) award do not resent this and that those who are rewarded will be seen by others as justly receiving the award (Markus, 1991).

8.10 Rewards are perceived as attainable

Programs should be designed such that the bonus is viewed as realistically attainable. This is of particular importance if the bonus is awarded in a lottery system. Lotteries make it possible to hand out greater awards, and this may enhance the attention-getting appeal of an incentive program, but fewer people will receive a bonus. This, in turn, may discourage some people from making an active attempt to accumulate the safety credit to begin with and thereby adversely affect the safety incentive program (Bartels, 1976).

8.11 Supplementing incentives with safety training is considered

Educating towards safety is different from motivating towards safety. A person's ability to be safe should be clearly distinguished from that person's willingness to be safe. Some authors feel that it may be helpful to safety if workers are better informed about what specific behaviours can help to avoid accidents (Tschernitschek, 1978; Doherty, Nord and McAdams, 1989; Peters, 1991).

8.12 Under-reporting of lesser accidents is discouraged

Thought should be given to the question of how to counteract employees' tendency not to report the accidents they do have. Stimulation of this tendency seems to be the only currently identified negative side-effect of incentive programs (while occasionally moral objections have been raised against rewarding people for obtaining a goal they should aspire to on their own, without being “bribed into safety”; Hale and Glendon, 1987, p. 291). Some incentive programs have clauses providing for deduction of safety credits when accidents are not reported (e.g., Fox, Hopkins and Anger, 1987). Fortunately, only minor accidents are unreported occasionally, but, the greater the safety bonus, the more frequent this phenomenon.

8.13 Enhanced peer pressure towards safe conduct

Incentive programs should be designed such that they strengthen the peer pressure towards the objective of having no accident. Thus, the plan should not only stimulate each individual worker or driver's concern for her or his own safety, but also motivate her or him to influence peers so that their motivation towards safety is increased.

In industrial settings this contribution to a pervasive "safety culture" can be achieved by extending a bonus for accident-free performance of the work team in addition to the individual bonuses. The team bonus has been found to increase the competitive motivation towards winning the team award. As truck drivers usually operate as more or less solitary workers, without continuous face-to-face contact with other truck drivers, peer pressure towards safety may be more difficult to stimulate than in other settings. One possible method might be to make the eligibility for the bonus of *anyone* in the company dependent on a particular *company-wide* safety criterion (e.g. a specified percentage reduction in accidents) being attained.

Social inducement towards safe conduct can, however, be enhanced by informing families of the safety award program, its goals and rewards (Morisey, 1988). Bonuses that can be displayed in the homes of workers to remind them and their families that they were earned in recognition of safe operating performance are also effective (Fox, Hopkins and Anger, 1987; Kirk, 1990).

8.14 Short incubation periods

The specified time period in which the individual has to remain accident-free in order to be eligible for the bonus should be kept relatively short. Delayed rewards and penalties tend to be discounted and are thus less effective in shaping behaviour than are more immediate consequences. Periods as short as one month have been used in industry.

8.15 Evaluation

In the planning of an incentive program, thought should be given to the question of what actually constitutes its primary goal: the greatest possible net savings due to accident reduction or a maximal benefit-cost ratio. Some programs may reduce the accident frequency only slightly, but achieve this at a very low cost. The benefit-cost ratio may thus be higher than it is for another program, but the capacity for overall net savings is much less.

9.0 GUIDELINES FOR DEVELOPING A SAFETY INCENTIVE PROGRAM

Throughout this project, transport companies were genuinely interested in developments leading to better knowledge of safety incentive programs. Many companies need assistance in the development and implementation of these programs.

With this in mind, the following guidelines for establishing, administering and updating safety incentive programs are presented. They include:

- Preventable versus non-preventable accidents
- Establishment of employee-management committee
- Access to the committee
- Transparency of the decision process
- Appeal process

In passing it may be noticed that - although the present report deals primarily with positive incentives - these points equally apply to any disciplinary action undertaken by trucking companies against delinquent or negligent drivers.

Whatever program is implemented, it must be perceived as being fair. Rewards must be given to drivers who truly merit them. The employee/management committee must be very mindful of some of the tactics of certain individuals within the company. Switching trip cards, problems between dispatchers and drivers and extra pressure imposed by shippers must all come to the fore. Otherwise, drivers will soon lose faith in the management's commitment to safety.

9.2 Preventable vs. non-preventable accidents

The first step of any safety incentive program is to agree on a definition of preventable and non-preventable accidents. During the company interviews, the study team witnessed many companies struggling through the implementation of their programs because they did not have an agreed- upon definition to start with.

Several definitions of what is a preventable and what is a non-preventable accident exist. The definition of a preventable accident provided by the Canada Safety Council reads as follows:

"A preventable accident is one in which you fail to do everything reasonable to prevent it"

While open to interpretation, this definition is nevertheless used extensively by the trucking industry and operators of commercial vehicles. This definition is the first building block for the establishment of any safety recognition program, be it cash or non-cash rewards. Without that definition any program will fail and will create bitterness among the parties.

Appendix B contains procedures that can be applied to determine whether an accident is preventable or not. Some companies prefer to have this determination referred to an outside party. This can be a particularly useful approach for small companies where in-house resources and expertise limit the ability of the company to handle the more difficult cases.

It should be noted that determination of whether or not an accident was preventable or non-preventable is meant to be an education process, with the objective of determining how such accidents can be prevented in the future, and not a means to determine fault.

9.3 Establishment of an employee-management committee

Determining whether or not an accident is preventable or non-preventable is, in some situations, extremely difficult. It is therefore recommended that any safety incentive program within a transport company be accompanied by the creation of an employee-management committee to deal with this determination and the administration of the program. Drivers must be represented on this committee.

This committee should also be involved in the design of the program. This will ensure that the employees buy into the program and its processes. Some companies may find it useful to have an odd number of people on the committee, in case a tie-breaker vote is required. However, this is not absolutely necessary, as many committees strive towards reaching a consensus. Members on the committee should be appointed for a set period of time, with regular rotation.

In some instances, these committees have been valuable in Aweeding out@ individuals who tend to have a negative influence on the group. Peer pressure often makes it impossible for fellow employees to report someone without fear of being isolated within a group. The employee-management committee can be more than a group simply reviewing drivers records and deciding on the “preventability” of the accidents. It can play an active role in assisting transport companies to review their safety procedures.

9.4 Access to the committee

The employee-management committee should operate under certain rules and procedures that allow scrutiny. One of these first principles is unrestricted access to the committee by both management and employee representatives. In other words, should a driver or dispatcher want to address the committee, it should be possible to do so, albeit following a clear procedure.

The committee must establish this procedure. How often should they meet? How can an employee present issues or suggestions to the committee? The committee must address these items.

9.5 Transparency of process

The committee must clearly and directly communicate to the employees and management of the company those decisions that are relevant to the administration of the recognition program.

Communication tools used for the program can also be used to test the mood of the employees regarding new procedures.

In essence, the transparency of the process is the end result. The tool is the communication process a company develops around these programs. Communications about the safety recognition program can go a long way in spreading the word about a company s performance with existing and potential clients, as well with the company s employees.

9.6 Appeal process

It is essential to establish an appeal process to be used when someone feels the decision of the committee is unfair. The group to hear appeals must not exceed three members. They must decide quickly on matters before them. Again, membership on the appeal committee should rotate frequently. In some cases, appeals are referred to outside safety organizations.

10.0 NEED FOR FURTHER DEVELOPMENT OF INCENTIVE PROGRAMS

Generally speaking, trucking companies that have implemented safety incentive programs and participated in provincial safety recognition programs believe in the positive effects these programs have on their company s safety performance.

However, at this stage the effectiveness of these programs within the Canadian trucking industry has not been effectively demonstrated through specific detailed case studies. Companies also need a reference manual for designing, implementing, managing and evaluating a safety incentive program within their company. The lack of such a document deters many companies from having such a program. In other cases it leads to companies developing programs that are flawed and hence much less effective than they should be. This may lead to termination of the program and an unwarranted conclusion that incentive programs don t work. Having an easy to use reference would result in more widespread use of incentive programs, and in the adoption of more effective programs. In light of this, the following steps are recommended.

10.1 Development of a procedures manual

As a first step, procedures leading to the implementation of a complete safety incentive program should be developed. All of these procedures need to be made possible through a turn-key system, helping smaller transport companies to implement these programs without any administrative burdens. The recognition programs can have two types of manuals:

- A short-form kit
- A more detailed manual

These would be easy-to-read, easy-to-use documents, probably in the form of three-ring binders. The short-form kit would be of special assistance to smaller companies and employee-management committees. The full manual would be a reference manual for all groups involved in these programs.

10.2 Procedures Validation

The proposed manual will need to be validated by use with four or more companies over a period of 18 months. Modifications will be introduced as necessary.

10.3 Program evaluation

The safety incentive programs developed and implemented in items 1 and 2 should be carefully evaluated on their costs and benefits. This should be done over a two-year period. Chapter 7 provides more information on benefit-cost analysis of a safety incentive program.

11.0 DEVELOPMENT OF A NATIONWIDE RECOGNITION PROGRAM

11.1 Need

As presented earlier, many companies have safety incentive programs that recognize with cash bonuses the good safety records of their drivers. Some companies believe in rewarding good safety performance with rewards other than cash bonuses (recognition based programs). Many companies have a blend of these two types of programs.

Companies that do not reward their drivers with cash bonuses have a variety of reasons, including the existence of collective agreements, difficulty of benchmarking performance due to geographic areas of operations, or the wish that drivers have some form of reward that is lasting.

During the carrier and driver interviews, it became clear that cash rewards are what first come to mind when rewarding good safety performance. In our view, these financial rewards have to remain within the domain of each individual motor carrier as they depend on a number of factors relating to the internal organization, management and financial capabilities of each firm. However, as a result of the research work completed as part of this study, it is the opinion of the study team and steering committee that a nationwide safety recognition program should be developed.

Such a program would provide a further incentive for companies to develop safety programs within their own organizations by recognizing those drivers who had successfully completed various terms of accident-free driving, as well as companies with good safety records. Having an internal safety program in place would be a prerequisite to participating in this nationwide program.

The reasons for having this nationwide recognition program are as follows:

- such a program would provide all drivers with a certificate (and/or some other form of recognition) of safe driving that would be widely recognized. This would provide younger drivers with readily recognizable role models;

- when companies hire drivers they would be able to quickly and objectively ascertain a driver's safe driving achievements. There would be a basis for companies to recognize safe driving experience from a driver s former employment in addition to their own;

- all trucking firms could participate regardless of their types of operations, operating characteristics and financial ability;

- companies would gain beneficial publicity from having the safety achievements of their drivers recognized;

- safety in the industry would be further promoted.

In keeping with the nature of the trucking industry, a recognition program acknowledging that the bulk of the industry operates locally, must be presented as a nationwide program. Some may not see a value in nationwide recognition. However, our interviews indicate these same people recognize that although they operate locally, their clients may have a totally different view and for that reason alone they would see the need for a nationwide program.

Transport companies indicated that if a recognition program is nationwide its credibility would be much greater. It would also appeal to large organizations that are national or international in scope to take part in a program with higher visibility.

At the same time, it is important that the administration of a nationwide recognition program be left to provincial/regional organizations with a mandate relating to highway safety. The nature of the trucking industry dictates the need for provincial administration of these programs. The trucking industry is still an industry with a local "face". Although international transport represents a major growth area, the vast majority of commercial vehicles still operate close to home.

During the interviews with drivers and companies, we asked them what would they like to see as part of a recognition program for drivers. A certificate was felt to be compulsory. Some came up with the idea of a symbol (a patch) in addition to the certificate. This patch should be displayed on their uniforms. Others preferred easily recognizable pins.

Companies were unanimous on the need to have their participation in such a program, and their receipt of awards, well publicized with potential clients, industrial organizations and governments. Several companies interviewed noted that existing provincial safety recognition awards tend to reach a limited audience outside of those companies involved in the program. (This was, however, the only negative comment received about these programs). Thus, for a program to function properly and attract as many transport companies as possible, it must reach out to industry and governments alike to gain wider acceptance on the part of the industry.

From a driver's point of view, any recognition program should have a strong driver s component. It should recognize the drivers that receive awards with a symbol like a pin, or a watch that is distinctive and of quality. Drivers should also receive an individual plaque and a certificate for their accomplishments.

The recognition program should include special recognition for work done by truck driving schools. They were identified as important components of the trucking industry and their efforts should be supported and recognized.

11.2 Role of stakeholders

Many stakeholders have a role to play in the implementation of a national recognition program. It is probably premature to attempt to identify the roles of each potential stakeholder at this time. Suffice it at this stage to list them all.

11.2.1 Transport companies

The success of a safety recognition program will always be judged on the number and the type of transport companies it attracts. To be effective, a program must be representative of the industry it purports to cover. Award categories covering all the types of operators in the trucking industry will be needed.

11.2.2 Insurance corporations

As was demonstrated throughout our research program, insurance companies can play a critical role in the nurturing and support of a national recognition program. This could include:

- Encouraging trucking companies to adopt the safety recognition program and providing these companies with a copy of the turn-key manual;

- Helping to organize regional meetings with their clients in order to present the program.

11.2.3 Industry associations

In some cases it may be easier to implement through industry associations. This may be the case for dump truck operators and aggregate transport companies. Any program should have the flexibility to recognize the needs of specific segments of the industry in order to encourage their participation.

11.2.4 Transport employees and their organizations

Drivers are key to the success of the program. Positive role models for young drivers are needed. More discussion with truck drivers and transport companies on what is the best type and form of recognition for drivers is necessary. Interviews conducted during this study indicated that the idea of a label permanently affixed to a jacket of a driver was not well received by the drivers themselves. The idea of a pin was well received by many drivers, but this was not unanimous. More importantly, some of the drivers prefer personal recognition in the form of a certificate they could use to increase their employment flexibility. They would prefer something useful rather than ornamental.

11.2.5 Professional truck driving schools

Schools play a role in providing qualified new drivers to the trucking industry. They also deliver training programs to existing drivers. They often represent the first contact with the trucking industry for a new driver.

11.2.6 Provincial safety organizations

There is a critical need for safety organizations cutting across the horizontal and vertical structure of the trucking industry to be involved in the administration of recognition programs. These organizations need to be closely identified with the trucking industry, such as the Safety Leagues in Quebec and Ontario. Both organizations have active programs recognizing the safety records of trucking companies.

Provincial/national trucking associations have also maintained various recognition awards for driver achievements and safety performances. Trucking associations should be encouraged to run these programs in conjunction with broader recognition programs in their respective provinces.

11.2.7 Transport company clients

The transport companies we interviewed identified a clear need to broadcast the outcome of recognition programs to their clients. In the case of the for-hire transport companies, this is probably a very significant item that would make the program attractive to them.

11.2.8 Governments

Governments have a role to play in ensuring that as many companies as possible participate in these programs. One opportunity is Partners In Compliance (PIC) Program. PIC is an initiative of the Alberta Trucking Association, supported by all government transport administrators through the Canadian Council of Motor Transport Administrators (CCMTA).

PIC is not a safety program. It is a procedure and a performance process transport companies agree to in order to obtain the right to more self-enforcement of safety rules. The PIC manual could, for instance, incorporate as an appendix the details of the recognition program.

11.2.9 Media

The media have a promotional role to play through articles on the program. They should also be connected to the distribution of communiqués. One of the roles of the organizations administering the program should be to seek as broad a coverage as possible on the activities of the program.

12.0 RECOMMENDATIONS

In light of this study, a two-year pilot program is recommended. This program would:

- ***Develop a procedures manual***. This manual would be in an easy-to-read, easy-to-use format, probably contained in a 3-ring binder. It would provide companies with step-by-step instructions on the development, implementation and administration of safety recognition programs. Having such a program, or equivalent, in place is seen as a prerequisite for companies to participate in the nationwide recognition program;

- ***Validate manual procedures.*** The manual and suggested procedures would be field tested with four or more companies to fine tune and adjust its contents and ensure its suitability for use by trucking companies of all sizes and from all industry segments;

- ***Provide a detailed case study benefit-cost analysis***. Four or more case studies of safety incentive programs would be completed with detailed benefit-cost analysis. This would provide Canadian companies with examples relevant to their own operations;

- ***Develop a framework and organizational structure for a nationwide recognition program***. Details of the administration of the program would be developed, including the role of each stakeholder and participating agency.

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APPENDIX A

LIST OF COMPANIES INTERVIEWED

A. G. D. Verchères Express Inc.
125, Calixa-Lavallée. C.P. 70
Verchères, Québec
J0L 2R0

Air Liquide Canada
1250 Boul René-Lévesque West
Montréal, Québec
H3B 5E6

Arnold Brothers
739 Lagimodiere Blvd.
Winnipeg, Manitoba
R2J 0T8

Big Freight Systems Inc.
Box 1210
Steinbach, Manitoba
R0A 2A0

Bison Transport
1051 Sherwin Road
Winnipeg, Manitoba
R3H 0T8

BOC GAZ
1980 Est, rue St-Patrice
Magog, Québec
J1X 3W5

Can-Am West Carriers Inc.
34408 Marshall Road
Abbotsford, B.C.
V2S 5A5

Canadian Freightway Ltd.
P.O. Box 1108, Station T
Calgary, Alberta
T2H 2J1

Christie Transport
P.O. Box 250
North Gower, Ontario
K0A 2T0

D&W Forwarders
81 Orenda Road
Brampton, Ontario
L6W 1V7

Day & Ross
P.O. Box 540
Hartland, N.B.
E0J 1N0

DMR Truck Inc.
1211 Gorham St., Unit 1
Newmarket, Ontario
L3Y 7V1

EDB Enterprises
2535 Inkster Blvd.
Winnipeg, Manitoba
R3C 2E6

Edge Transport
2917 Millar Ave.
Saskatoon, Saskatchewan
S7K 6P6

Exalta Transport Corp.
5545 52nd Ave. S.E.
Calgary, Alberta
T2C 4M1

Federated Co-op
P.O. Box 1050
Saskatoon, Saskatchewan
S7K 3M9

Gershman Transport Intl
1991 Brookside Blvd.
Box 54
Winnipeg, Manitoba
R3C 2E6

Great West Transport Ltd.
25-33rd St. East
Saskatoon, Saskatchewan
S7K 0R8

Groupe Papineau Group
C.P. 100
Saint-Jérôme, Québec
J7Z 5T7

Groupe VA Inc.
156, boul. Laurier
Laurier-Station, Québec
G0S 1N0

Kleysen Transport
2100 McGillivray Blvd.
Winnipeg, Manitoba
R3Y 1N3

Kriska Transportation
300 Churchill Road
Prescott, Ontario
K0E 1T0

Les Brasseries Molson
Région du Québec
1320, rue Notre-dame est,
Montréal, Québec
H2L 2R4

Liaison Can./U.S. Courier Inc.
67 Lindsay
Dorval, Québec
H9P 2S6

McConnell Transport Ltd.
P.O. Box 2024
Woodstock, N.B.
E0J 2B0

Milltown Transport
RR#3 Bay Road
St. Stephen, N.B. E3L 2Y1

Northern Resource Trucking
945 Millar Ave.
Saskatoon, Saskatchewan
S7K 6P6

Penner International Inc.
P.O. Box 2620
Steinbach, Manitoba
R0A 2A0

Prudhomme Trucks Ltd.
P.O. Box 86
Regina, Saskatchewan
S4P 2Z5

Redpath
95 Queen's Quay East
Toronto, Ontario
M5E 1A3

REM Transport
P.O. Box 481
St. Stephen, N.B.
E3L 3A6

Ridsdale Transport Ltd.
P.O. Box 7739
Saskatoon, Saskatchewan
S7K 4R5

Searcy Trucking
1470 Chevrier Blvd.
Winnipeg, Manitoba
R3T 1Y6

SGT 2000
354 rte 122,
St-Germain, Québec
J0C 1K0

Trans Mutual Truck Lines Ltd.
4505 78th Ave. S.E.
Calgary, Alberta
T2C 2Y9

Transport Pozer Inc.
9490, 30ème Avenue est,
Ville de Saint-Georges, Québec
G5Y 5C2

Transport Mirald
218, De Bretagne
Boucherville, Québec
J4B 5E4

Transport Besner
354, Route du pont
Saint-Nicolas, Québec
G0S 2Z0

Trivee Transport Ltd.
PO Box 71, Site 6 RR#5
Calgary, Alberta
T2P 2G6

Vedder Transport
34416 Marshall Road
Abbotsford, B.C.
V2S 5A5

APPENDIX B

PROCEDURES FOR DETERMINING A PREVENTABLE ACCIDENT

HOW TO DETERMINE WHETHER OR NOT AN ACCIDENT WAS AVOIDABLE

This document deals with almost all kinds of accidents. The driver has to answer a series of questions on the nature of the accident in which he/she was involved. If the answer to any one question is "NO," we can conclude that the driver's defensive driving was not up to standard.

It is often difficult to assess whether or not an accident was avoidable and make drivers understand that they committed an error. Drivers must be informed of the specific kinds of risks they will face and how to deal with them. If drivers do not have clear idea of what defensive driving entails, they may find themselves in a Catch-22 situation.

In addition to the definition of a defensive driver, this document contains questions to help determine whether or not an accident was avoidable and help drivers understand what is meant by defensive driving. After gathering all the details on an accident, the questions will determine to what extent an accident was avoidable or not.

> A defensive driver takes the ineptitude and ignorance of other drivers into account, acknowledges having no control over unexpected actions of other drivers and pedestrians or over weather and road conditions, and takes appropriate precautions. A defensive driver yields right of way and makes other concessions to avoid collisions, takes care not to commit driving errors and is always alert to avoid hazards created by the weather, road conditions, pedestrians and other drivers.
>
> Neither slippery surfaces, curves, hills, narrow roads, a lack of road signals, traffic lights that are out of order, nor lack of attention, carelessness or ignorance on the part of others relieve the driver of his/her responsibility to drive without accidents. These situations may arise at any time and the driver must drive accordingly.

ACCIDENTS AT AN INTERSECTION	YES	NO
1. Was the driver driving at a safe speed when approaching the intersection, considering the conditions?	____	____
2. Was he/she getting ready to stop before crossing the intersection?	____	____
3. If visibility was obstructed at the intersection, did the driver proceed slowly, ready to move his/her foot to the brake?	____	____
4. Was he/she sure that the other driver would stop?	____	____
5. Did the driver obey all road signals?	____	____
6. Did he/she display the intention of changing direction well in advance?	____	____
7. Was he/she in the proper lane to turn?	____	____
8. Was he/she paying attention to other turning vehicles?	____	____

9. Did he/she avoid overtaking another driver at the intersection? ____ ____

10. Did he/she refrain from putting the accelerator to the floor when the light turned green or entering the intersection when the light was already yellow? ____ ____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

READ-END COLLISION

1. Was the driver maintaining a buffer distance of at least one vehicle for each 10 mph, a distance that must be doubled at night and quadrupled in bad weather? ____ ____

2. Did he/she look at and pay attention to what was occurring ahead of the vehicle in front? ____ ____

3. Did he/she cautiously approach the green light, anticipating that the driver in front might stop abruptly when the traffic light changed? ____ ____

4. Did he/she stay out of the path of other vehicles? ____ ____

5. Did he/she refrain from losing control or skidding? ____ ____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

COLLISION WHILE BACKING UP

1. Did the driver have to back up? ____

   A. Was the driver parked so close to the vehicle in front that he/she had to back up before pulling away from the curb? ____ ____

   B. Did he/she have to enter the narrow road, dead end or private entrance from where he/she backed up? ____ ____

2. If visibility was obstructed when he/she backed up:

   A. Did the driver ask someone to guide him/her? ____ ____

   B. Did he/she walk around the vehicle before backing up? ____ ____

   C. Did he/she back up immediately after

walking around the vehicle? _____ _____

D. Did he/she use the horn while backing up? _____ _____

E. Did he/she look behind without using the rear-view mirror? _____ _____

F. If the distance was great, did he/she stop to get out and look around occasionally? _____ _____

3. Did he/she back up slowly? _____ _____

4. Did he/she adequately judge the clearance while backing up? _____ _____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

PEDESTRIANS

1. Did he/she drive on city roads and consider that pedestrians might walk in front of his/her vehicle? _____ _____

2. Was he/she ready to stop? _____ _____

3. Did the driver comply with safety standards by maintaining enough clear space between his/her vehicle and parked cars? _____ _____

4. Did he/she refrain from overtaking vehicles that were already stopped to let pedestrians cross? _____ _____

5. Did he/she refrain from putting the accelerator to the floor when the light turned green or entering the intersection when the light was already yellow? _____ _____

6. Did the driver know that there were groups of children and was he/she ready to stop if a child ran across the road? _____ _____

7. Did he/she yield the right of way to all pedestrians? _____ _____

8. Did he/she refrain from overtaking a stopped school bus? _____ _____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

PULLING AWAY FROM THE CURB

1. Immediately before pulling away from the curb, did the driver look behind and ahead, watching vehicles that were overtaking him/her or travelling in the opposite direction? ____ ____
2. Did he/she look behind instead of using the rear-view mirror? ____ ____
3. Did he/she signal before pulling away from the curb? ____ ____
4. Did the driver proceed only after ensuring that other vehicles did not have to change direction or speed to avoid him/her? ____ ____
5. Did he/she continue to occasionally glance behind after pulling away from the curb? ____ ____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

LOSS OF CONTROL

1. Was the driver driving at a safe speed, considering road and weather conditions? ____ ____
2. Was he/she maintaining at least twice the buffer distance required on dry pavement when following another vehicle, i.e. the length of one vehicle for every 10 mph? ____ ____
3. Did all his/her actions show forethought? ____ ____
4. Did he/she consider that the pavement might be icy on bridges, in gutters, ruts and near the curb? ____ ____
5. Did he/she consider that slush, shade, gravel, sand or ruts may conceal ice? ____ ____
6. Did he/she remain outside ruts and cross them at an angle long beforehand? ____ ____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

WHEN PARKED

1. Was the driver parked on the proper side of the road? ____ ____
2. Did he/she have to park so close to the intersection? ____ ____

3. Did he/she have to park in a driving lane, curve or on a hill? ____ ____

4. If required, did he/she indicate his/her position with a flag, safety flare or reflector? ____ ____

5. Was he/she parked parallel to the curb? ____ ____

6. Did he/she have to park so close to a lane or directly in front of a private entrance? ____ ____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

OTHER SITUATIONS

1. Did the driver do everything possible to avoid the accident? ____ ____

2. Was he/she driving at a reasonable speed, considering the conditions? ____ ____

3. Did he/she obey all traffic signals? ____ ____

4. Was his/her vehicle under control? ____ ____

5. Did he/she follow itinerary and delivery instructions? ____ ____

6. Did he/she ask for assistance when in doubt? ____ ____

7. Did he/she report the accident? ____ ____

IF THE ANSWER TO ANY ONE OF THESE QUESTIONS IS "NO," THE DRIVER WAS NOT DRIVING DEFENSIVELY AND IS AT FAULT.

APPENDIX C

BEHAVIOURAL ADAPTATION AND SAFETY

Appendix C

Behavioural adaptations of road users which may occur following the introduction of safety measures in the transport system are of particular concern to road authorities, regulatory bodies and motor vehicle manufacturers particularly in cases where such adaptations may decrease the expected safety benefit (OECD, 1990, p. 5). The OECD report cites numerous examples of this phenomenon. Taxicabs in Germany equipped with anti-lock brake systems were not involved in fewer accidents than taxis without these brakes. Increases in lane width of two-lane highways in New South Wales in Australia have been found to be associated with higher driving speeds; for every 30 cm of additional lane width speed increased by 3.2 km/h. This was found for passenger cars, while truck speed increased by about 2 km/h for every 30 cm in lane width.

An American study dealing with the effects of lane-width reduction found that drivers familiar with the road reduced their speed by 4.6 km/h and those unfamiliar by 6.7 km/h. In Ontario, it was found that speeds decreased by about 1.7 km/h for each 30 cm of reduction in lane width. Roads with paved shoulders as compared to unpaved shoulders in Texas were found to be associated with speeds at least 10 per cent higher. Drivers have generally been found to move at a higher speed when driving at night on roads with clearly painted edge markings.

Since the appearance of the OECD report, Finnish studies have reported on the effect of installing reflector posts along highways with an 80 km/h speed limit. Randomly selected road sections, which totalled 548 km, were equipped with these posts and compared with 586 km that were not. The fact that the installation of reflector posts increased speed in darkness will no longer come as a surprise, nor that there was not even the slightest indication that it reduced the accident rate per km driven on these roads; if anything, the opposite happened (Kallberg, 1992). Carefully matched samples of drivers with or without studded winter tires were compared on their moving speeds, prudence in negotiating curves and following distance. The second group drove significantly more slowly on slippery roads, in curves and maintained following distances that were longer by as much as 11 metres (Mäkien, Beilinson, Rathmayer and Wuolijoki, 1994).

More recently still, an American study reported that “air-bag equipped cars tend to be driven more aggressively and that aggressiveness appears to offset the effect of the air bag for the driver and increases the risk of death of others” (Peterson, Hoffer and Millner, 1995).