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| Author(s) Alan Clayton, P. Eng, University of Manitoba Robyn McGregor, P. Eng., EBA Engineering | | | No. of Pages 6 |
| Performing Organization Name and Address EBA Engineering Consultants Ltd. 14535 - 118 Avenue EDMONTON, AB T5L 2M7 University of Manitoba Winnipeg, Manitoba | | Sponsoring Agency Name and Address Manitoba Highways and Transportation Saskatchewan Highways and Transportation Alberta Transportation Public Works and Government Services Canada | |
| Supplementary Notes | | | |
| Abstract This is an Executive Summary of all the final reports for the project. In total, there are four separate final reports, each detailing the results and conclusion of the Study's four pre-defined tasks. The main purpose for the study is to, first, document the current policies and practices of the three prairie provinces (Alberta, Saskatchewan and Manitoba) in setting seasonal truck road weight restrictions. Then, the researchers are to identify opportunities to support a science-based framework for rationalizing and harmonizing the three provinces' regulations and enforcement rules. | | | |
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| | | Project Co-ordinator Imants Krumins, P. Eng. | |

ALBERTA TRANSPORTATION

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EXECUTIVE SUMMARY

“HARMONIZATION OF SPRING WEIGHT RESTRICTIONS AND WINTER WEIGHT PREMIUMS FOR ROADS IN THE PRAIRIE REGION”

SCOPE

Spring weight restrictions are applied by road authorities throughout the prairie region on all but a limited number of primary highways to reduce the magnitude of loads on trucks by as much as 50 percent during the critical six to eight week spring thaw. It is during this critical period when the pavement/subgrade is in its weakest condition and particularly severe damage would occur on these roads without these restrictions.

Winter weight premiums are permitted on essentially all highways throughout the region whereby loads as much as 26 percent higher than specified under basic weight regulations are allowed in the winter months on the premise that the pavement/subgrade is frozen. These higher loads effect greater efficiency in the shipping/trucking industry which translates into economic benefits to the region.

Policies and practices pertaining to spring weight restrictions and winter weight premiums have evolved over the years on a jurisdiction to jurisdiction basis to suit the particular interest of each jurisdiction. However, freight movements across these jurisdictions continue to increase so an examination with respect to rationalizing and harmonizing these policies and practices is warranted.

This Study has been directed at identifying opportunities for rationalizing and harmonizing regulations and enforcement practices, and modernizing data collection, information and communication systems, relating to spring weight restriction and winter weight premium aspects of truck size and weight (TS&W) limits in the prairie region. The geographic area of interest for the Study has been the provinces of Manitoba, Saskatchewan and Alberta and the Alaska Highway, as well as the northern tier states of Minnesota, North Dakota and Montana.

BACKGROUND

The work for this Study has its origins in a work plan prepared in spring 1999 as an unsolicited proposal by EBA Engineering Consultants Ltd. (EBA) and the University of Manitoba Transportation Information Group (UMTIG). The proposal envisioned six primary areas of activity:

- evaluating the rationale of existing regulations and enforcement policies and practices concerning spring weight restrictions and winter weight premiums in the Prairie Region;

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- understanding their impacts on regional trucking movements and shipper costs;
 - understanding their implications on truck safety;
 - synthesizing and assessing new knowledge about pavement performance implications of existing policies and practices concerning weight restrictions and premiums;
 - researching possibilities for the utilization of advanced technologies and intelligent transportation systems for real-time monitoring of truck traffic, pavement, and weather conditions in the Prairie Region, routing trucks, communicating information amongst agencies and with truckers and shippers, and enforcement relating to spring weight restrictions and winter premiums; and
 - identifying areas for research to refine the rationalization, harmonization and modernization of regulations and enforcement concerning spring weight restrictions and winter premiums.

Manitoba Highways and Government Services, Saskatchewan Highways and Transportation, Alberta Infrastructure, and Public Works and Government Services Canada agreed to co-sponsor an initial phase of the Study. Representatives from the sponsoring agencies formed a Steering Committee to oversee the work. The four specific tasks for the Study were to:

Task 1 - examine existing laws, regulations and policies governing seasonal limits.

Task 2 - investigate technical rationale for these policies and practices.

Task 3 - examine potential uses of advanced technologies in harmonization and enforcement.

Task 4 - identify immediate opportunities for rationalization and harmonization.

KEY FINDINGS

Key findings from the Study which were presented in detail in the four separate Task Reports are:

- There is a myriad of complex and sometimes conflicting regulations pertaining to spring weight restrictions and winter weight premiums in the prairie region. These regulations vary with respect to methods of determination, methods of application, intensity, introductory/termination dates, duration, and implications for different truck types and different inter-jurisdictional highway classifications.
- There is no evidence that any one of the myriad of regulatory systems or approaches prevalent in the region offers any relative benefits or dis-benefits over any other. However, there is a general consensus that conditioned-based approaches to seasonal weight limit regulations are inherently more rational than calendar-based approaches from an engineering perspective. However, condition-based approaches require advanced communication and forecasting capabilities to advise the shipping/trucking industry on a real-time basis to changes in allowable loads.

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- Seasonal weight limit policies can have significant pavement cost implications, but little is known about them in quantitative terms. Recent work by the Minnesota Department of Transportation indicates that being one week late in posting spring weight restrictions could shorten the life of a pavement by anywhere from 4 to 8 percent (equivalent to 2 to 4 weeks of additional pavement damage every year, for 20 years). Being one week late in removing 10 percent winter weight premiums could shorten the life of a pavement by anywhere from 5 to 12 percent (equivalent to 2.5 to 6 weeks of additional pavement damage every year, for 20 years). No similar information is available from other agencies in the region.
 - Little technical rationale is available to support the wide variety of approaches and details in the spring weight restriction and winter weight premium policies and practices of most agencies in the region. Except for Minnesota's recent research on spring weight restrictions, which led to a condition-based approach to implementing these restrictions, most of the significant research concerning the subject was carried out in the 1960's and 1970's. There is a critical need to supplement this early research to develop sound technical rationale to respond to the significant changes that have occurred since that time and to predict the impact of any proposed truck loading scenarios.
 - Over the last several decades, there has been a significant increase in allowable axle loads, changes in truck configurations, growth of commodity exempt vehicles and a huge increase in truck volumes on roads with very light pavement structures. These events reinforce the need for updated technical rationale using state-of-the-art techniques to properly balance the benefits of winter weight premiums, and perhaps more limited spring weight restrictions, with damage to the highway infrastructure.
 - There are many exciting opportunities to utilize advanced technologies within the context of intelligent transportation systems to assist in:
 - harmonizing and rationalizing spring weight restrictions and winter weight premiums throughout the region;
 - weight enforcement;
 - development and sharing truck traffic information;
 - real-time monitoring and forecasting of subgrade, pavement and weather conditions;
 - improving truck and shipper routine advisory services; and
 - information management.

OPPORTUNITIES

Specific immediate opportunities for rationalization and harmonization of spring weight restrictions and winter weight premiums that can be initiated immediately are:

- ***Technology Transfer***

Develop a technology transfer mechanism amongst provincial jurisdictions to support the documentation of technical activities with respect to basic weight regulations, spring weight restrictions and winter weight premiums (such as Saskatchewan's Central Tire Inflation (CTI) programs, Alberta's Falling Weight Deflectometer (FWD) strength recovery testing methodologies, and Manitoba's studies of seasonal variation of Long-term Pavement Performance (LTPP) sites).

- ***Simplified Basic Weight Regulations, Spring Weight Restrictions and Winter Weight Premiums***

Simplify basic weight regulations, spring weight restrictions and winter weight premiums regulations to the extent practical. Examine the regulations in each jurisdiction and identify the differences. Eliminate minor variances where there is no sound technical basis to maintain the variance. Where there is a sound technical basis for the variance, compare the different technical approaches to the issue and explore the use of common technical approaches.

- ***Enhanced Communications***

Extend the use of state-of-the-art communication tools (WEB/Internet) to communicate relevant information on a real-time basis regarding spring weight restrictions and winter weight premiums throughout the prairie region. Use a GIS-T map format and advanced technologies within an intelligent transportation system concept starting with the provincial transportation agencies and extending it to the trucking/shipping industry subsequently.

- ***Condition-Based Criteria***

Adopt a condition-based approach for spring weight restrictions and winter weight premiums. A condition-based system is a system whereby the physical state (condition) of the road is measured (e.g., frost depths, thaw depths, strength testing) and these measurements as well as predicted conditions (from air temperatures and weather forecasts) are used through engineering analysis to set, adjust, suspend or terminate spring weight restrictions and winter weight premiums.

- ***Regional Truck Routes***

Examine spring weight restrictions and winter weight premiums on a regional network basis and, apart from harmonization, identify individual sections of highways that could be upgraded to create significant new contiguous regional truck routes with higher allowable loads (basic weight regulations, spring weight restrictions and winter weight premiums).

- ***Enforcement***

Enhance communications between enforcement agencies to bring efficiencies to the enforcement process and to allocate resources in optimal fashion to minimize pavement damage during spring weight restrictions, for example. Use Geographic Information Systems for Transport (GIS-T) mapping as the basis for the communications process and exchange supplementary data as well, such as from Automatic Vehicle Classifiers (AVC) and Weigh-in Motion (WIM) sites.

RECOMMENDATIONS

The Study concludes by recommending that a task force be established consisting initially of representatives from the three Canadian prairie provinces and the federal government. This task force would work on a collaborative basis with a mandate to:

1. Implement immediate harmonization opportunities.
2. Collaborate on means to share relevant information that is already collected by the agencies.
3. Explore standardization in presenting data on spring weight restrictions and winter weight premiums to the shipping/trucking industry on a regional basis.
4. Consider the need for an investigation of regional economic impacts of the spring weight restriction and winter weight premium issue - perhaps in the broader context of continuously changing truck size and weight issues of the region. The economic impacts would quantify the potential benefits in advancing a more rationale harmonized approach on a broad regional basis.
5. Define a rational state-of-the-art engineering approach using modern analytical techniques and advanced technologies to assess the impact of truck transport on the highway infrastructure during spring weight restrictions and winter weight premiums. Secure pooled funding to develop this approach by collaborating with adjoining US states and sourcing climate change as well as traditional research funding sources. Implement findings on a progressive and proactive basis.
6. Define the parameters for a GIS-T network for the prairie region and jointly secure funding to implement the network. Implement harmonization initiatives using the enhanced communications systems built around the GIS-T system.

The importance of the trucking industry as an integral part of the prairie economy is apparent. Agencies must have access to the knowledge and analytical tools to respond in a sound technical manner, and timely fashion, to issues surrounding spring weight restrictions and winter weight premiums and to respond to pressures to increase allowable weights for basic weight regulations

and winter weight premiums or to reduce the duration of the spring weight restriction period. This is critical to successfully optimize the balance between enhancing the competitiveness of the trucking industry and associated benefits to the economy on the one hand, with the corresponding damage to the roadway infrastructure on the other hand. Hence, commitment to development of state-of-the-art technical rationale, particularly in view of the availability of advanced technologies and intelligent transportation system capabilities, is indeed important to the overall management of the highway infrastructure.