# Motor Carrier Vehicle Weights and Dimensions and Their Impact Upon the Competitive Balance Between the Rail and Road Modes in Western Canada

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## ABSTRACT

The overall objective of much of the research undertaken to date related to vehicle weights and dimensions has been directed to increasing and/or maximizing the efficiency and productivity of the motor carrier industry. In this regard, significant increases in productivity have been realized by allowing larger and heavier trucks to operate on public roads. These productivity increases may however have come at some cost to the public because of increased costs of providing roadway infrastructure.

The increases in truck size and weight, while increasing the productivity of trucks has also had a direct and in some cases, a dramatic effect on the inter-modal competitive balance between the road and rail modes. While considerable research resources have been directed toward issues related to vehicle weights and dimensions, little or no attention has been directed toward the impact of changes in vehicle weights and dimensions upon the inter-modal competitive balance between the rail and road modes, and/or the determination of the appropriate role for the truck and rail modes.

This paper presents a historic overview of the competitive balance between road and rail in western Canada, and by way of a case example, illustrates the impact that recent changes in vehicle weights and dimensions have had on the productivity of the motor carrier industry and the competitive balance between the rail and road modes.

The example raises the question of the appropriate roles for the rail and road modes and the necessity or lack thereof for the existing extensive rail network in western Canada. It also raises the issue of the appropriateness to subsidize one mode while not the other when the two compete head to head for the traffic.

## INTRODUCTION

In western Canada, freight transportation demands are served in part by an extensive rail network as well as an extensive road network. The existing rail network in Saskatchewan is illustrated in Figure 1. The provincial highway network and the municipal road network are illustrated in Figures 2 and 3 respectively.

The railway network as we know it today was constructed primarily between 1900 and 1930. During the early part of this century, the railways were clearly the life line of western Canada in providing essentially all required freight and


**Existing Saskatchewan rail network**

**FIGURE 1**

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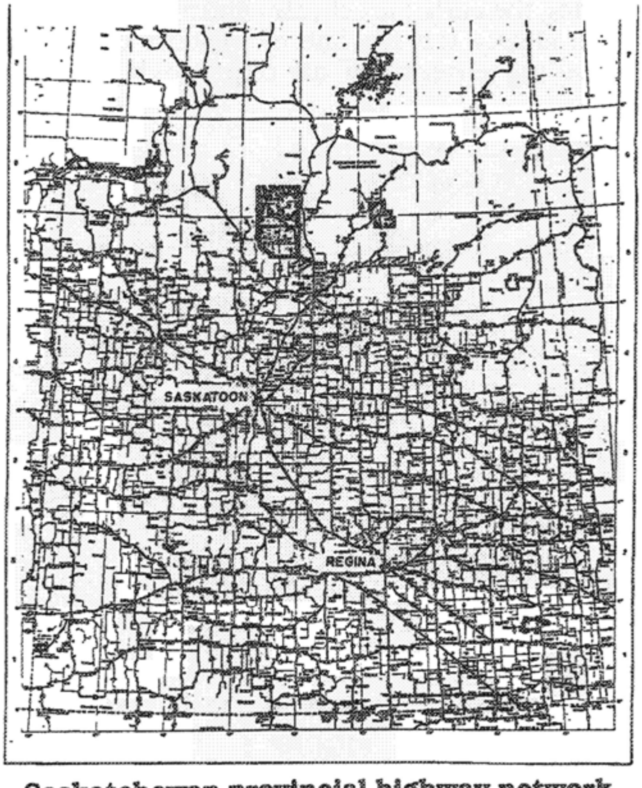
passenger transportation services beyond those provided by horse and wagon.

With the settlement of the west came the development of wagon trails on established rights of way. Beginning in the 1920's, but more particularly following World War II, these wagon trails were upgraded first to graded dirt roadways, then in the 1940's and 1950's to all weather gravel roads and finally in the 1960's and 1970's many were reconstructed and paved.

This evolutionary development of first the rail network and then the road network has resulted in what some consider to be extensive duplication of transportation infrastructure. Clearly it is in Canada's best interest to ensure that transportation requirements are well served, however it is equally in the best interest of the country to ensure that these requirements are served in the most efficient and economical way possible. This in most cases would not suggest extensive duplication of infrastructure.

Given today's railway and motor carrier technology and the demands for transportation services, there are some demands which are best served by rail, there are some best served by truck, and there are some that could be served efficiently by either mode. There are yet other situations where the best system is a combination of the two modes.




**Saskatchewan provincial highway network**

**FIGURE 2**

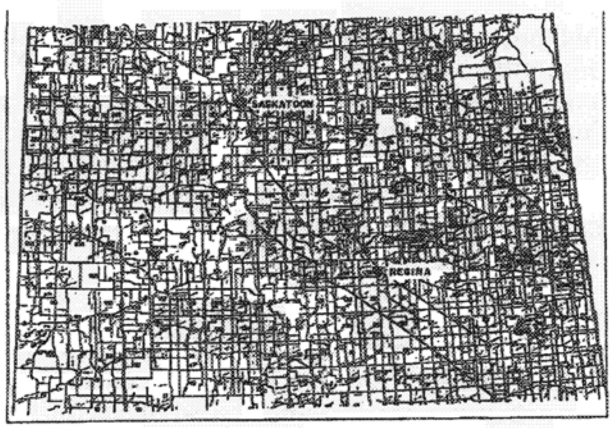
Generally speaking the rail mode dominates in long hauls of large tonnages between few origins and few destinations. For example, the railways dominate the hauls of coal, potash, and sulphur. On the other hand, the motor carrier industry dominates in areas demanding a high level of service between many diverse origins and destinations (i.e. general freight). There are however an ever increasing number of situations wherein the railways and the motor carrier industry compete head to head for the freight.

The magnitude and vigour of this head to head competition is enhanced by recent technological developments. One area of technological development which plays an instrumental role in the competitive balance between the rail and road modes is that related to motor carrier vehicle weights and dimensions.

To illustrate this inter-modal competitive balance and the role of vehicle weight and dimension regulations, it is useful to first review recent technological advances in terms of vehicle weights and dimensions, and then to analyze a specific case example of inter-modal competition.

## DEVELOPMENTS IN VEHICLE WEIGHTS AND DIMENSIONS

In the past 10-15 years, there has been a significant effort directed toward increasing and/or maximizing the efficiency and productivity of the motor carrier industry. In this regard, significant increases in productivity have been




**Saskatchewan municipal road network**

**FIGURE 3**

realized by allowing larger and heavier trucks to operate on public roads.

To illustrate, Table 1 summarizes the changes in allowable axle and gross vehicle weights for Saskatchewan since 1975 when the Highway Strengthening Program was first implemented in western Canada.

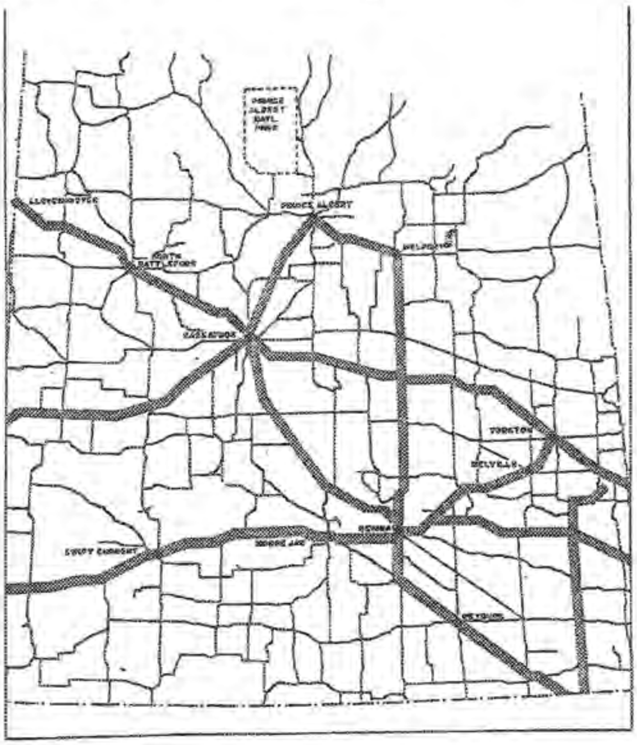
As noted from Table 1, the evolution of the current allowable axle and gross vehicle weights involved essentially 3 steps or stages over a decade. The first was associated with the implementation of the highway strengthening program in 1975 and involved increasing the allowable axle and gross vehicle weights on 3180 Kms of designated highways within Saskatchewan from:

1) 8200 Kg to 9100 Kg on a single axle,

2) 14,500 Kg to 16,000 Kg on a tandem axle group, and

3) 33,600 Kg to 50,000 Kg in terms of allowable gross vehicle weight.

These increased axle and gross vehicle weights were associated primarily with inter-regional highways as illustrated in Figure 4.



**1975 primary highway system (3180 km)**

FIGURE 4

These increases in allowable weights resulted in at least two responses from the trucking industry. The first was to load the existing fleet, which for the most part consisted of standard 5 axle tractor semi-trailer units to heavier weights, and the second was to purchase 2 axle pup trailers to pull behind the standard 5 axle semi so as to exploit the advantages of increased payloads associated with the increased allowable gross vehicle weights. (1)

The increase in load on the standard 5 axle semi associated with the increased axle weights (potentially) resulted in a 10-12% increase in productivity (typical payloads on 5 axles 33,600 Kg were 20 tonne and 23 tonne at the higher axle weights). These increases in productivity came at essentially no cost because the major cost components including labour and capital remained unchanged and fuel consumption increased by only 1-2%.

While the 10-12% increase in productivity noted above was important, the big increases in productivity were associated with the move to combination units (i.e. a 5 axle semi pulling a 2 axle pup trailer known as an A-Train, or the use of two semi-trailers known as a B-Train).

Payloads for these types of vehicles operating at a gross vehicle weight of 50,000 Kg were in the order of 30 tonne relative to the 20 tonne at gross vehicle weights of 33,600 Kg. This increase in payload of approximately 10 tonne or 50% resulted in increases in operating costs of about 15%, with fuel consumption being increased about 10%. In shifting from a 5 axle semi operating at 33,600 Kg to a combination unit operating at 50,000 Kg, the traffic which took three loads with the semi could be transported in 2 loads with the combination vehicle. The end result was that transport costs were reduced by about 23% and fuel consumed by about 27%. (2)

Needless to say, these substantial increases in productivity were welcomed by shippers, consignees, and truckers. The difficulty was that the benefits were only available to movements that:

1) grossed-out as opposed to cubed-out, and

2) the origin and destination of the movements were both on the primary highway system.

These constraints to the accrual of the benefits resulted in a situation wherein many, if not most

**Table 1 — History of maximum allowable and gross vehicle weights on primary, secondary and municipal roads in Saskatchewan[1]**

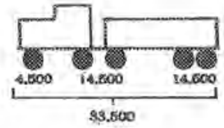
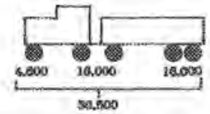
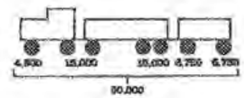
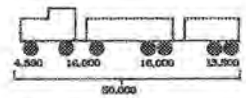
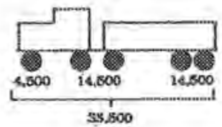
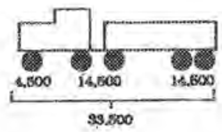
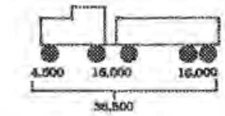
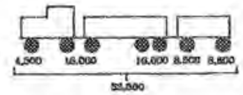
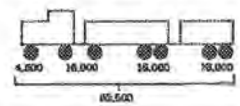
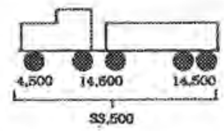
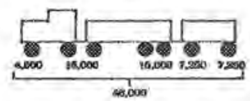
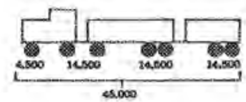
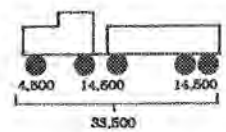
| Step | Dates | Road classification | Steering axle | Single axle | Tandem axle | GVW | Length (kms) | Typical vehicles & loading | Sum of allowable axle loads (kg) | Typical payloads[1] (tonne) | Payload as % of 5 axle semi per 1975[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Allowable weights (kg)[2] | | | | | | | | |
| | Pre June 1975 | | 5,500 | 8,200 | 14,500 | 33,600 | 200,000[3] |  | 34,500 | 20 | 100% |
| Step 1 Highway strengthening program | June 1975 to Nov 1980 | Primary | 5,500 | 9,100 | 16,000 | 50,000 | 3,100 |  | 37,500 | 23 | 115% |
| | | | | | | | |  | 55,700 | 30 | 150% |
| | | | | | | | |  | 53,500 | 30 | 150% |
| | | Secondary | 5,500 | 8,200 | 14,500 | 33,600 | 17,720 |  | 34,500 | 20 | 100% |
| | | Municipal | 5,500 | 8,200 | 14,500 | 33,600 | 180,000 |  | 34,500 | 20 | 100% |

**Table 1 — History of maximum allowable and gross vehicle weights on primary, secondary and municipal roads in Saskatchewan[1]**

| Step | Dates | Road classification | Allowable weights (kg)3 Steering axle | Single axle | Tandem axle | GVW | Length (kms) | Typical vehicles & loading | Sum of allowable axle loads (kg) | Typical payloads[1] (tonne) | Payload as % of 5 axle semi per 1975[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Step 2 Primary from 50,000 kgs to 53,500 kgs & permit combination units on secondary highways | Dec 1980 to May 1985 | Primary | 5,500 | 9,100 | 16,000 | 53,500 | 3,180 |  | 37,500 | 23 | 115% |
| | | | | | | | |  | 55,700 | 33.5 | 168% |
| | | | | | | | |  | 53,500 | 33.5 | 168% |
| | | Secondary | 5,500 | 8,200 | 14,500 | 49,000 | 20,020 |  | 34,500 | 21 | 105% |
| | | | | | | | |  | 50,900 | 27 | 135% |
| | | | | | | | |  | 49,000 | 27 | 135% |
| | | Municipal | 5,500 | 8,200 | 14,500 | 34,500 | 180,000 |  | 34,500 | 23 | 115% |
| Step 3 Extend primary highway system | June 1985 Onwards | Primary | 5,500 | 9,100 | 16,000 | 53,500 | 6,930 | Same as Dec 1980 to May 1985 | | | |
| | | Secondary | 5,500 | 8,200 | 14,500 | 49,000 | 16,270 | Same as Dec 1980 to May 1985 | | | |
| | | Municipal | 5,500 | 8,200 | 14,500 | 34,500 | 180,000 | Same as Dec 1980 to May 1985 | | | |

1 Payloads vary between vehicle type (ie. flatdeck, van, hopper, etc) and type and model of equipment , these are typical averages and only illustrate the order of magnitude. increase in payload does not necessarily reflect increased productivity because costs typically increase with increasing payload.

2 This is a gross simplification of the regulations. For details see applicable regulations

3 Reference (3)

of the major commodity movements by truck in Saskatchewan, could not reap the benefits of the increased allowable weights. The primary constraint to many major movements including fuel, grain, fertilizer, asphalt, road oils and lumber was the fact that one end of the trip originated or was destined to a location off of the primary highway system.

The second major change in the evolution of current vehicle weight and dimension regulations in Saskatchewan came about in December 1980 when maximum allowable gross vehicle weights were increased from 50,000 Kg to 53,500 Kg on the primary highway system, and from 33,600 Kg to 49,000 Kg on the secondary highway system.

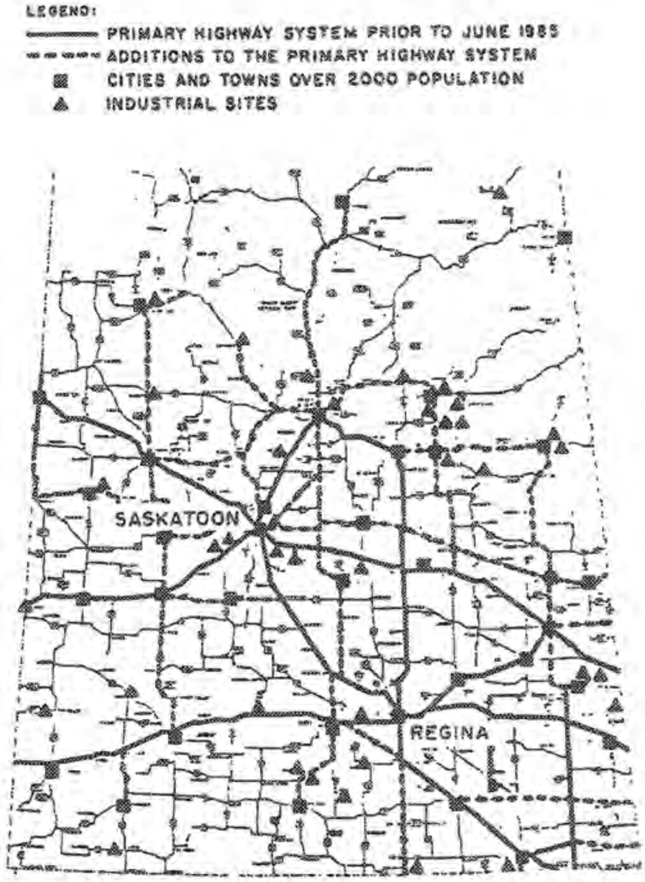
The increase in gross vehicle weight on the primary system brought the "gross weight" constraint more in line with the "sum of the axle weight" constraint for the vehicles typically being used. That is, for a 7 axle A-Train operating on the primary highway system, the sum of the maximum allowable axle weights totalled 55,700 Kg, whereas the maximum allowable gross was only 50,000 Kg. (It is not clear to the author as to the logic for selecting 50,000 Kg as the maximum allowable gross vehicle weight when the highway strengthening program was implemented. It clearly had nothing to do with the vehicles that eventually emerged in response to the change.) Similarly, the sum of the maximum allowable axle weights for a 7 axle B-Train was 53,500 Kg and the maximum allowable gross was 50,000 Kg.

In short, the maximum allowable gross vehicle weights (i.e. 50,000 Kg) were unnecessarily restrictive relative to the allowable axle weights and the types of vehicles being used. The allowable gross was therefore increased to remove this unnecessary constraint. It is interesting to note that the allowable gross was increased only to 53,500 Kg consistent with the 7 axle B-Train, as opposed to 55,700 for the 7 axle A-Train. This was done presumably to avoid granting an advantage to 7 axle A-Train configurations relative to the more stable 7 axle B-Train. This increase in allowable gross vehicle weight on the primary highway system resulted in a 3.5 tonne or about 10% further increase in productivity for combination units operating on the primary highway system.

Increasing the allowable maximum gross vehicle weight on the secondary highway system from 33,600 Kg to 49,000 Kg while maintaining the previously permitted axle weights (i.e. 8,200 Kg on a single axle and 14,500 Kg on a tandem) in essence permitted combination units to operate on the secondary highway system, albeit at somewhat lower axle and total gross vehicle weights and payloads (i.e. the payloads 49,500 Kg are in the order of 27 tonne as opposed to 33.5 tonne at 53,500 Kg).

Permitting combination vehicles to operate on the secondary highways (at reduced weights) extended significant benefits under the highway strengthening program. In addition, these benefits were expanded by extending the secondary highway system from 17,720 to 20,020 Kms.

The most recent modification to vehicle weight and dimension regulations in Saskatchewan came in June of 1985 when the length of the primary highway system was more than doubled from 3180 Km to 6930 Km. The current primary highway network in Saskatchewan is illustrated in Figure 5.




Source: Ref. 3.

**1986 primary highway system**

**FIGURE 5**

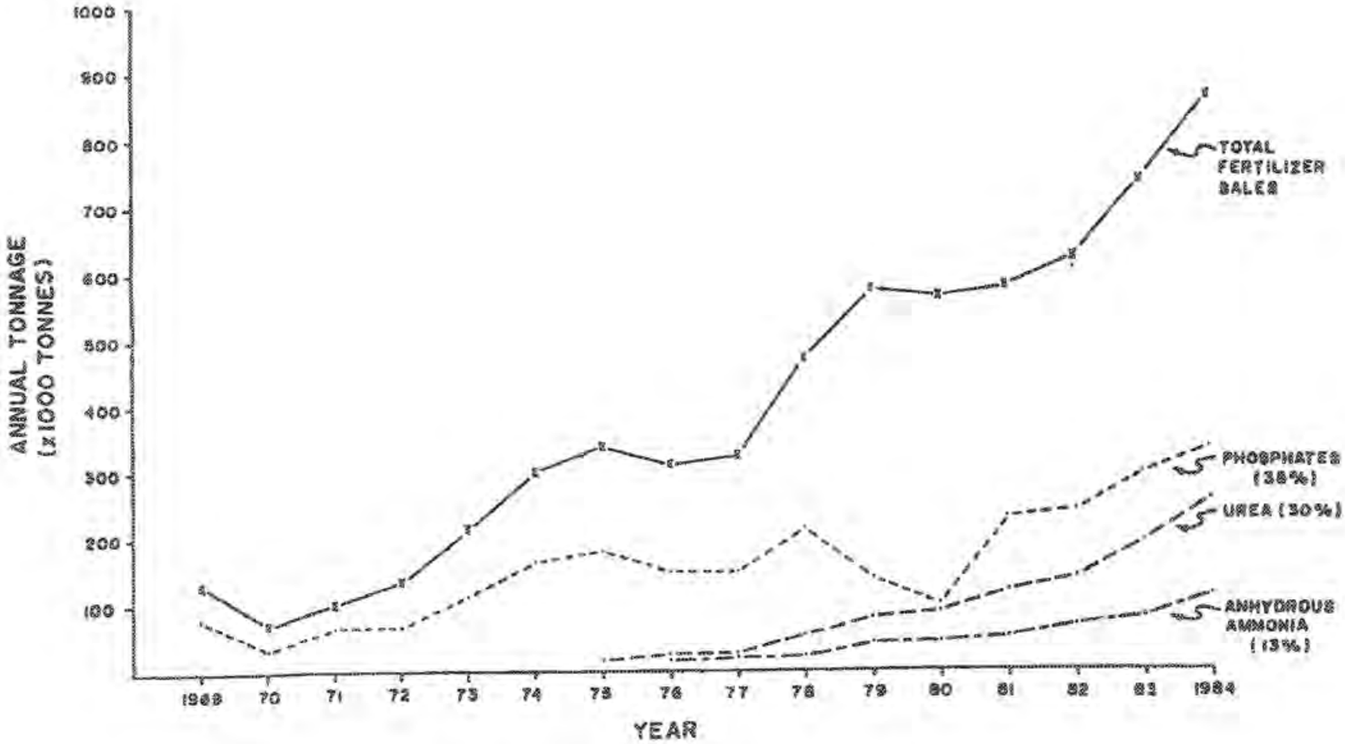
There is an important point worth noting in terms of the allowable maximum gross vehicle weights on municipal roads. Currently the Highways Act specifies that the maximum allowable gross vehicle weight on municipal roads is 34,500 Kg. The Act also allows Municipal Councils to modify this up or down as they deem appropriate. Municipal Councils do impose road bans during spring thaw and wet periods, etc., however, few if any have increased the allowable maximum above that specified in the Highways Act (i.e. 34,500 Kg). Therefore, strictly speaking, combination units (i.e. A and B-Trains) are not legally permitted on municipal roads without special permits. Some major hauls including grain and fertilizer regularly originate or are destined to locations on municipal roads. In actual fact, these hauls are regularly performed with combination units operating on municipal roads without special permits. There appears to be a "mutual" understanding between Municipal Councils and truckers whereby Councils do not enforce the regulations as long as truckers use discretion respecting operating on the roads when they are wet and/or soft.

In summary, over the past decade, the potential payloads hauled by trucks operating in Saskatchewan have been increased from about 20 tonne to in the order of 33 tonne. This increase in payload has been accomplished by permitting larger trucks (i.e. combination units) to operate with heavier axle loads. These increases in productivity resulting from the use of larger and heavier trucks have resulted in substantial reductions (i.e. 15-20%) in the unit costs of providing freight transportation services by truck. (4)

These reduced costs have extended the range of trucks relative to the railways and have clearly expanded the arena in which the two modes currently compete.

## THE CASE OF FERTILIZER

To illustrate the nature of the current competitive balance between the rail and road modes in western Canada, it is informative to review the history of the transportation of fertilizer.




**Saskatchewan fertilizer sales**

**1971 - 1984**

**FIGURE 6**

The widespread use of granular fertilizers in agriculture in western Canada began in the 1950's and expanded slowly into the 1960's. As illustrated in Table 2 and Figure 6, the use of fertilizers by Saskatchewan farmers has expanded dramatically since the early 1970's. Fertilizer sales in Saskatchewan totalled 873,000 tonnes in 1984 with monoammonia phosphates accounting for 38%, urea accounting for 30% and anhydrous ammonia accounting for 13%. The bulk of all fertilizers with the exception of anhydrous ammonia are granular products and are transported in hopper type rail or truck equipment. Anhydrous ammonia is handled as a liquid under pressure and/or low temperature and can be transported by truck or rail in special tankers.

There are five major manufacturers of fertilizer supplying the Saskatchewan market.

These are:

1) Western Co-operative Fertilizer Ltd. with plants in Calgary and Medicine Hat, Alberta

2) Esso Chemicals with a plant in Red Water, Alberta

3) Cominco with plants in Kimberly, B.C. and Carseland and Calgary, Alberta

4) Sherrit Gordon Mines with a plant in Fort Saskatchewan, Alberta, and

5) Simplot Chemicals with plants in the U.S.A.

When granular fertilizers first began to be used in agriculture in western Canada, essentially all product was bagged and was typically transported by either rail or truck to a distribution point (i.e. grain elevators, farm service centers, etc.), stored, and later picked-up by individual farmers. Most of the long hauls (i.e. from the Alberta plants to Saskatchewan) were by rail while some of the short haul distribution in Alberta was by truck.

As the total tonnages of fertilizer utilized increased, bagged product gave way to bulk and at the same time, trucks began to handle a larger portion of the total tonnage, with much of it moving in truckload lots directly from the plant in Alberta to the farms in Saskatchewan.

The various fertilizer manufacturers/distributors all had different methods of handling the freight charges. For example, a number of the companies "equalized" fertilizer prices regionally or in some cases provincially. When the product was handled by rail, the manufacturer typically made arrangements for transportation and paid the rail company. When truckers initially got involved, it was more often the agent in the field that arranged for the transportation, often with a local trucker. The fertilizer manufacturer typically gave the agent a "freight allowance" equal to the rail rate in such cases. The agent then made a deal with the trucker. If the trucking rate was less than the "freight allowance" (i.e. the rail rate), the agent pocketed the difference; if it was more, he paid the difference or used rail.

Since the road distance and therefore the truck rates had little in common with the rail distances/rates, there were situations where agents were doing rather well under the "freight allowance" system and utilizing trucks. In these situations trucks quickly captured the traffic. In other situations, the rail rate was very competitive with truck and therefore it wasn't until the convenience of direct plant to farm deliveries outweighed the additional cost of the truck that the trucks were able to capture the traffic. (It is important to note that while fertilizer sales were growing dramatically (i.e. 1974 onward) vehicle weight and dimension regulations were being modified so as to allow larger and heavier trucks.)

By the mid to late 1970's, the combined effect of moving from bagged to bulk product, more direct plant to farm deliveries, and increasingly competitive truck rates associated with larger more productive vehicles resulted in trucks capturing essentially all of the fertilizer movement from plants in Alberta to purchasers in Alberta, Saskatchewan and Manitoba. This domination of the fertilizer haul by the truck mode came about without a "whimper" from the railways. It must however be remembered that this all occurred during the "heady" days of the 1970's when the railways were worried about enough capacity for coal, sulphur, potash, etc.

The "heady" days of the 1970's and early 1980's are now history, and fertilizer manufacturers and distributors are seeking more cost effective methods of distributing their product. Until relatively recently, all fertilizer manufacturers provided storage for their product only at the plant site. This combined with the peaked nature of the demand for fertilizer resulted in some problems in terms of delivery during peak periods. Manufacturers and distributors have used "incentive" pricing to try to reduce the peaks,

**Table 2 — Saskatchewan fertilizer sales 1971 - 1984**

| Grade | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28-0-0 | 91 | 218 | 440 | 739 | 4 | – | 1,206 | 8,252 | 15,523 | 15,560 | 12,866 | 13,090 | 10,381 | ? |
| 82-0-0 | 131 | 427 | 1,483 | 1,429 | 1,949 | 4,215 | 11,313 | 24,587 | 44,344 | 45,626 | 53,942 | 67,219 | 82,325 | 117,508 |
| 45-0-0 | 1,271 | 2,543 | 3,868 | 5,938 | 7,074 | 12,641 | 25,579 | 53,360 | 83,944 | 96,102 | 110,766 | 142,579 | 195,321 | 258,339 |
| 34-0-0 | 4,534 | 6,672 | 11,079 | 24,240 | 26,962 | 42,572 | 48,386 | 55,881 | 68,076 | 72,329 | 62,976 | 55,273 | 61,829 | 51,763 |
| 21-0-0 | 4,746 | 5,310 | 11,265 | 11,624 | 9,301 | 7,838 | 8,726 | 7,495 | 8,920 | 9,990 | 11,448 | 9,267 | 15,321 | 23,543 |
| 11-55-0 | 10,768 | 11,324 | 21,124 | 42,000 | 14,400 | 26,867 | 35,754 | 67,073 | 55,859 | 37,059 | 44,801 | 246,913* | 299,154* | 335,792* |
| 11-48-0 | 52,066 | 55,816 | 95,739 | 120,551 | 165,019 | 126,016 | 115,810 | 149,055 | 81,300 | 64,373 | 69,414 | – | – | – |
| 11-51-0 | – | – | – | – | – | – | – | – | – | – | 121,147 | – | – | – |
| 18-46-0 | 59 | 51 | 93 | 358 | 22 | – | 1,604 | 111 | 720 | – | – | – | – | 174 |
| 16-20-0 | 4,816 | 5,170 | 7,110 | 10,872 | 12,900 | 8,692 | 7,353 | 9,208 | 15,276 | 17,485 | 17,486 | 15,826 | 19,194 | 23,738 |
| 27-14-0 | 810 | 945 | 2,503 | 3,002 | 2,216 | 2,604 | 1,123 | 6,442 | 5,090 | 4,633 | 5,054 | 4,132 | – | 13,778 |
| 23-23-0 | 18,558 | 31,479 | 40,837 | 69,885 | 80,195 | 63,846 | 52,090 | 63,756 | 54,977 | 41,524 | 39,207 | 39,149 | – | – |
| ANP* | 3,812 | 6,771 | 11,196 | 6,588 | 4,471 | 6,524 | 8,621 | 133 | 45 | – | – | – | – | – |
| AP* | 783 | 1,929 | 5,431 | 3,930 | 8,135 | 7,287 | 5,391 | 522 | 94,708 | 122,243 | 2,314 | – | – | – |
| 0-0-60 (KCL) | 154 | 8,006 | 238 | 962 | 822 | 909 | 343 | 1,809 | 5,688 | 7,261 | 6,070 | 9,126 | 9,126 | 12,931 |
| Others | 1,017 | 1,761 | 1,597 | 3,289 | 7,158 | 3,147 | 5,453 | 13,006 | 27,406 | 32,123 | 24,810 | 29,171 | 41,600 | 11,000 |
| Total | 103,616 | 138,422 | 214,003 | 305,407 | 340,628 | 313,158 | 328,572 | 476,739 | 581,876 | 566,378 | 582,301 | 630,650 | 742,680 | 873,014 |

← Short tons | Metric tonnes →

Source: Fertilizer Sales Statistics for Alberta and Western Canada, Alberta Agriculture, April 1984

* Includes all Minoammonium Phosphate 11-48-0; 11-51-0; 11-55-0

however these methods have been only marginally successful. Some agents have established fertilizer storage facilities in Saskatchewan to meet part of their own needs. More recently, some of the manufacturers have leased large warehouse type buildings at various locations in Saskatchewan to store fertilizer. Others have in the last year or two constructed large storage facilities in the market region. Much of this new construction was required someplace in the system because of increasing sales and because of the problems with transportation capacity, it made sense to establish it in the market area as opposed to at the plant site.

Initially, the truckers involved in the fertilizer movement into Saskatchewan handled it on a one-way loaded basis. However as the market expanded, aggressive truckers were able to put the eastbound fertilizer together with westbound movements. In fact, this available westbound capacity played a part in expanding the market for American soybean meal, corn, oyster shells, sand and numerous other products in Saskatchewan and Alberta. The movements developed as follows.

The Canadian railways (and some truckers) move significant tonnages of Saskatchewan potash into the U.S. corn belt. Traditionally these rail cars (and trucks) returned empty. However in recent times, some of these vehicles have been returning to Saskatchewan with products from the U.S. destined for Saskatchewan and Alberta. In the case of rail, these products typically move in returning potash cars (at backhaul rates) to Saskatoon where the product is transhipped to trucks for final delivery into western Saskatchewan or Alberta. Once unloaded, the trucks then pick-up fertilizer in Alberta eastbound for Saskatchewan or Manitoba.

The effect of this U.S. product moving in returning potash cars combined with available storage for fertilizer in Saskatchewan has resulted in the evolution of a new transportation distribution system. It is interesting to note that the railways in part created their own competition in Canada for the fertilizer movement. That is, it was only because the railways were willing to backhaul U.S. products to Saskatoon in returning potash cars that created the potential for the trucks to be exceedingly competitive on the eastbound fertilizer (that incidently the railways now have decided they would like to handle). Changes in vehicle weight and dimension regulations which permitted larger trucks to operate have also contributed to the overall efficiency of the system.

To demonstrate the impact that these combined effects are having on the cost of transporting and distributing fertilizer in western Canada, consider the following.

A typical 5 axle semi operating on a one-way loaded basis transporting fertilizer from Fort Saskatchewan, Alberta to Saskatoon would require approximately $35/tonne for a 21 tonne minimum load ($35/tonne x 21 tonnes/525 kms = $1.40/loaded km). The same haul using a combination unit with a minimum load of 31 tonnes would move for $28/tonne ($28/tonne x 31 tonnes/525 km = $1.65/loaded km).

Esso Chemicals built a large fertilizer storage and blending facility just east of Saskatoon at Clavet, Saskatchewan in 1982. The traffic manager for Esso was aware of the potential for the two-way truck haul and devised a way to capture the benefit of such for Esso Chemicals. He did this by making available to any interested trucker a contract to haul 500 tonnes (15-20 loads) of fertilizer from Fort Saskatchewan to Clavet at the truckers leisure. Once a trucker had completed the one contract for 500 tonnes, Esso Chemicals would give him another.

With this contract in hand, the truckers were obviously looking for some traffic westbound from Saskatoon into Alberta, preferably in the Edmonton area to balance the fertilizer. It so happened that much of the product coming into Saskatoon in returning potash cars was destined to the Edmonton area. Given that there were a number of truckers with contracts available from Esso Chemicals, plus the fact that there were a number of feed brokers etc. interested in having product moved westbound, it didn't take long to develop into a very competitive situation with Esso Chemicals holding the "key" to the operation. When the smoke cleared, the truckers were hauling soybean meal etc. from Saskatoon to Alberta, in particular into the Edmonton area for $16-18/tonne, and returning from Fort Saskatchewan to Clavet with fertilizer at $16-18/tonne.

The end result was that everyone involved was pretty happy. Esso Chemicals was getting fertilizer into Clavet for $16-18/tonne where they had been paying $28/tonne. The feed brokers were happy because due to the backhaul rail and truck rates, they had been able to penetrate the Alberta market with more competitive prices. The truckers were happy because they were getting the equivalent to $32-36/tonne (depending on deadhead distances involved in the two-way hauls) where they had been getting only $28/tonne on a one-way haul.

The magnitude of the success of this operation was constrained only by the amount of westbound product. That is, there was more fertilizer eastbound than other products westbound, therefore, the "benefits" were constrained by the volume of westbound product (or one would have thought such would be the case). Not so. As it turns out, Canadian National Railway has potash cars returning to Saskatoon from Vancouver. These cars could be routed via Fort Saskatchewan for the fertilizer eastbound to Clavet. The only question left was to determine the price that Esso Chemicals should pay for rail service from Fort Saskatchewan to Clavet. It appears as though "someone convinced someone else" that the marginal supplier was prepared to provide the service for $16-18/tonne. The rail rate was established at $19/tonne on a guaranteed annual tonnage of 30,000 tonnes.

While Esso Chemicals was one of the first fertilizer manufacturers/distributors to exploit the potential benefits of two-way truck hauls, others are now into the act or trying to get in. There will undoubtedly be some interesting changes in this area in the next few years. There is every reason to believe that increased tonnages will be moved in the future by rail.

The above case used fertilizer as the example. There are however numerous other situations wherein rail/road competition has resulted in significant changes in distribution methods and costs. For example, lime destined for the uranium mines in northern Saskatchewan used to move directly from quarries in Alberta and Manitoba to the mines in Saskatchewan by truck. Much of it now moves by rail to Saskatoon and is transhipped to trucks in Saskatoon for final delivery.

## CONCLUSION

Changes in vehicle weight and dimension regulations over the past decade in Canada have resulted in significant productivity gains within the motor carrier industry. In western Canada, these productivity gains have clearly established the motor carrier industry as a cost/effective competitor to the railways in transporting large tonnages over long distances.

In the case of distribution of fertilizer from plants in Alberta to destinations in Saskatchewan, the inter-modal competitive market environment appears to be working well. That is, truckers and rail companies are now seemingly happy to move freight at $16-19/tonne that only a few short years ago they required $35/tonne do the same job.

These significant efficiencies can be largely attributable to increased productivity associated with larger more productive trucks, the development of two-way hauls in both the road and rail modes, and the new reality in terms of the competitiveness of the rail and road modes.

There are at least two issues that arise from the above, but unfortunately are beyond the space available here. First is the question of duplication in infrastructure raised earlier. If the modern motor carrier industry is competitive with the rail mode on a haul involving nearly a million tonnes per year over one-way distances averaging at least 500 km, why do we need a railway network with access to everyone's front door or farm gate? Secondly is the question as to whether or not it is appropriate to provide the roadway infrastructure in Alberta and Saskatchewan at subsidized prices to the trucker in a situation where they compete head to head with another mode that must provide its' own infrastructure. (Given the new reality, I suspect that officials of railway companies might be (privately) more sympathetic to the truckers involved in moving western Canadian grain!)

This road cost issue is not insignificant in that the approximate 1.6 million tonnes of fertilizer that moves by truck each year in Alberta and Saskatchewan consumes the equivalent of 40-80 kms of highway rehabilitation annually. This represents an indirect subsidy of $6-12 million per year to the movement of fertilizer (i.e. 1.6 million tonnes, average haul 400 kms 30 tonnes/load, each truck equivalent to 4 ESAL per load and the average highway requiring a recap every 1 million equivalent axle repetitions at a cost of $150,000 per km).

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