

**BACKGROUND PAPER ON PRESERVING
THE IDENTITY OF GRAIN SHIPMENTS**

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INTRODUCTION

Linking North Dakota grain producers to final consumers is vitally important to the state's economy. Without transportation as a mechanism to link buyers and sellers farmers would have no incentive to produce more than could be consumed in their respective local area. Thus, value is added (place utility) as the grain is transported from surplus producing areas to deficit producing areas. These production areas are typically separated from consumption areas by great distances, thus, necessitating an effective transportation and marketing system.

Consumption areas or market outlets for much of North Dakota's grain production is overseas. Over half of the total disappearance of hard red spring wheat (HRS) and durum during the past six years has been due to exports (Table 1). Thus, wheat producers and the state's overall economy are largely dependent on foreign buyers.

PROBLEM STATEMENT

The current export market is becoming more and more competitive. Whereas U.S. wheat exports increased virtually every year during the 1970s and early 1980s, they have decreased in each of the last four crop years (1982-83 to 1985-86). Wheat exports of 950 million bushels in 1985-86 mark only the second time in the last ten years that exports have not topped 1 billion bushels. While U.S. wheat exports have been declining, Argentina and Australia have been increasing exports. In 1980-81 Argentina and Australia exported 141 million bushels and 391 million

TABLE 1. SUPPLY AND DISAPPEARANCE OF HARD RED SPRING AND DURUM,
1980-81 TO 1985-86.

Crop Year	Supply			Disappearance		
	Beginning Stocks	Production	Total ^a	Domestic Use	Exports	Total
------(Million Bushels)-----						
1980-81						
HRS	285	312	598	153	188	341
Durum	61	108	171	52	59	111
1981-82						
HRS	257	464	722	171	205	376
Durum	60	183	245	57	82	139
1982-83						
HRS	346	492	842	195	239	434
Durum	106	146	256	61	59	120
1983-84						
HRS	408	323	732	197	221	418
Durum	136	73	212	51	62	113
1984-85						
HRS	314	409	725	171	183	354
Durum	99	103	207	46	61	107
1985-86 ^b						
HRS	371	460	836	181	160	341
Durum	100	113	218	53	45	98

^aIncludes imports.

^bProjected.

Source: USDA, ERS, Wheat Outlook and Situation Yearbook, WS-274,
Washington, D.C., February, 1986.

bushels of wheat, respectively. By 1984-85 Argentina increased wheat exports 117 percent to 306 million bushels while Australia increased exports 42 percent to 556 million bushels.

In order to at least maintain current market share or to increase wheat exports, the U.S. must become more competitive in the world market. One method of helping achieve this goal is to promote the high quality of wheat and other crops grown in North Dakota. Related to this is delivering a high quality product that will provide maximum customer satisfaction and repeat business. Preserving the identity of wheat shipments, when possible, in order to maintain the high quality of grain produced in North Dakota, may help boost sagging exports. Also identity preserved shipments also may help ease complaints from foreign buyers as to grain quality.

OBJECTIVES

The objectives of this paper are primarily twofold. First, the logistical process of identity preserved grain shipments will be described. And second, certain cost comparisons will be made with traditional wheat shipments from North Dakota.

COMINGLING OF GRAIN

Typical grain flows from North Dakota are detailed in Figure 1. Grain marketed in this manner is typically elevated and comingled with grain of a like class at several stages during the process. Country elevators, subterminals and terminal

elevators often blend grain in order to achieve a certain quality. For example, lower protein wheat is often blended with higher protein wheat when protein premiums make it economical to do so. In any case, comingling and/or blending grain results in the loss of the grain's original identity (quality, grade, class, etc.) and is common practice in the grain industry.

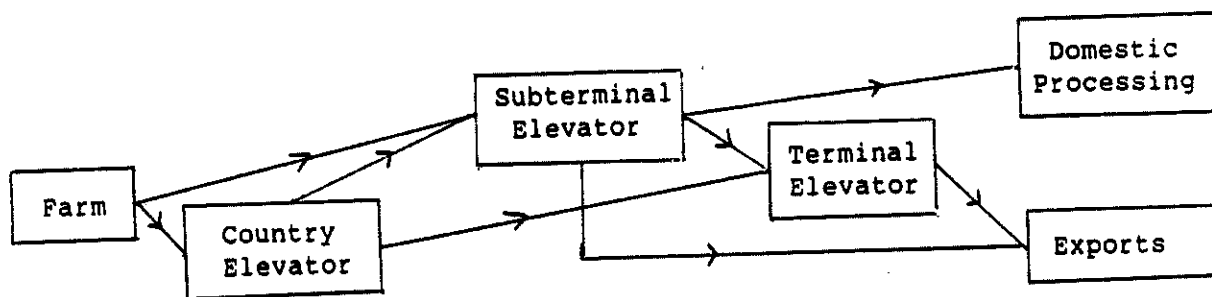


Figure 1. Typical Grain Marketing Flows From North Dakota.

Most of the comingling that takes place occurs when the grain is elevated at the various elevators. Country elevators, subterminals and terminal elevators typically elevate and distribute grain to a bin containing grain of a like quality because of lack of storage. At the country elevator and subterminal elevator level, grain coming from different farmers is comingled. Terminal elevators comingle grain that comes from different regions. Thus, grain at the terminal level is mixed with grain from a much wider geographical area than grain comingled at the country elevator or subterminal level.

CONCEPT OF IDENTITY PRESERVED GRAIN SHIPMENTS

The concept of identity preserved (IP) grain shipments is definitionally fairly simple. IP grain involves assuring that the grain that is loaded at origin is delivered at the final destination. For example, a farmer that loads grain on a truck and hauls it to the local elevator is positive that the grain that was loaded is also being delivered. However, the elevator operator does not know the true origin of the grain because the grain was not physically observed being loaded. This is normally not a concern to the elevator operator since payment to the farmer is based on the quality of the grain (grade factors) and not the origin. However, sometimes the final buyer (usually a foreign buyer) is concerned that the grain that was purchased was from a certain origin or other such factor. In such an instance an IP grain shipment would assure the buyer that the exact grain that is purchased will be delivered.

While there is no clear-cut definition of IP grain there are varying degrees. For example, a buyer may be concerned only with receiving HRS wheat produced in North Dakota or Montana. However, another buyer may prefer a specific quality of HRS that was produced in a specific area in North Dakota.

LOGISTICS AND COST OF IP GRAIN SHIPMENTS

There are two basic constraints involved in preserving the identity of grain shipments, logistics and cost. Logistics involves coordinating the physical movement of the grain from

origin to final destination while cost includes all transportation, storage and handling charges incurred during the process. Generally, logistical considerations are greater for IP grain shipments than for traditional shipments because the ultimate goal of preserving the identity of a particular grain shipment is to avoid comingling of grain. Thus, transfer of the grain (i.e. from truck or rail to barge, or from truck or rail or barge to vessel) should be accomplished at a facility that can guarantee that the grain will not be comingled during elevation, or at a facility that provides direct pass-through service.

Methods of IP Grain Shipments

A number of methods may be used to facilitate the process of IP grain shipments. Three methods of IP grain shipments will be discussed in this section: (1) direct pass-through, (2) containerization, and (3) bagging.

Direct Pass-Through

Direct pass-through is generally defined as direct transfer of grain from inbound mode to outbound mode with no elevation involved. While direct pass-through involves a considerable amount of coordination it reduces the risk of comingling grain relative to traditional types of grain shipments. An example of such a move is depicted in Figure 2. Such a move would typically involve a rail (or truck) movement from North Dakota to a river point at Minneapolis/St. Paul (MSP) for direct transfer to

barges. From MSP the grain would move by barge to the Gulf where it would be transferred directly into an ocean-going vessel. A mid-stream transfer facility would typically be used to facilitate the barge to vessel transfer.

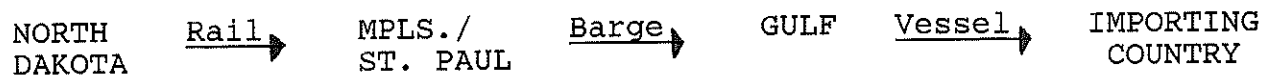


Figure 2. Example of an Identity Preserved Grain Shipment Involving Direct Pass-Through Facilities.

One of the most important factors to be considered in such a move is demurrage. If the coordination of both inbound and outbound modes at each transfer location is not precise, considerable demurrage penalties may be assessed. Demurrage refers to the payment that is due for detaining a shipment beyond its specified time. In the case of rail grain shipments demurrage usually commences after 24 hours for loading and unloading.

Demurrage for barge transportation usually varies and depends on terms specified in the bid/offer process. Shippers commonly have five days free time, excluding Sundays and holidays, for each barge furnished for loading at origin and for unloading at destination.¹

¹Waterways Journal and Merchants Exchange St. Louis, Basics of Barges Freight Trading, Seminar, June 29 and 30, 1982.

Typical demurrage charges for the various modes are contained in Table 2. Demurrage for rail transportation typically varies between \$.006/bu./day and \$.018/bu./day while barge demurrage is usually less than a third of that for rail. While demurrage for ocean-going vessels varies significantly depending on size of vessel, origin, destination and other factors, a figure of about \$.01/bu./day is common for a 15,000 m.t. vessel after allowing 3-4 days for loading and/or discharge.

TABLE 2. ESTIMATED DEMURRAGE CHARGES FOR VARIOUS MODES, GRAIN TRAFFIC.

Mode	Capacity (bu.)	Free Time	Demurrage	
			Per Unit ----- (\$/day) -----	Per Bushel
Rail, JCHC	3,300	24 hrs.	20 ^a	.006
			30 ^b	.009
			60 ^c	.018
Barge	50,000	5 days	100 ^d	.002
			150 ^e	.003
			250 ^f	.005
Vessel	550,000	3-4 days	5,000	.009

^aDays 2-5.

^bDays 6-7.

^cAfter 7 days.

^dDays 6-15.

^eDays 16-25.

^fAfter 25 days.

Given typical rates, substantial demurrage penalties could result if proper coordination is not implemented for an IP grain shipment. That is, if one party were coordinating an entire move from an inland location, such as North Dakota, to an importing

country in order to preserve the identity of grain, a considerable coordination and planning effort would be involved.

Coordinating a Direct Pass-Through Shipment

This section contains a hypothetical example of what might be involved in the coordination and planning of moving IP grain from North Dakota to an importing country. In addition, cost estimates are included. The example involves an entire 15,000 m.t. HRS shipment from Grand Forks to Puerto Rico.

Roughly three unit trains and 11 barges would be needed to move the grain from Grand Forks to the Gulf. One unit train hauls about 172,000 bushels of HRS so three trains would be needed to fill a 15,000 m.t. (550,000 bushel) vessel.² The actual train shipment size would be about 56 cars (185,000 bushels), but would probably move under the 52-car rate unless a rail contract was negotiated with the railroad involved in the movement. One barge holds about 50,000 bushels so 11 would be needed to facilitate the move.

Country Coordination. The initial coordination step involves assembling 550,000 bushels of similar quality HRS (according to the buyer's specification) at a single facility. The most significant factor to consider is getting farmers to deliver this much grain in a relatively short period of time.

²A jumbo covered hopper car (JHC) holds about 3,300 bushels of wheat.

Assuming the elevator could handle about ten trucks per hour during a ten hour day, it would take about 14 days to assemble the 550,000 bushels (assuming 400 bushel capacity trucks). Thus, assuming smooth receiving operations, it would take about three weeks to assemble the grain at the country.

Rail transit time from the country to a barge facility in MSP would take about three to four days.³ Thus, if one train is loaded every day for three consecutive days and transit time is four days, one week would be needed to move the grain to MSP. If the assembly stage goes smoothly the entire farm-to-MSP part of the move could be feasibly facilitated in about 20 days (14 days for assembling the grain and six days for transit until the final unit train is unloaded.)

Rail/Barge Transfer. A typical river facility could transfer grain from one unit train to barges in one day. Thus, loading of the 11 barges could be facilitated in three days. The transfer could start before all the grain has been loaded on trains at the country so the train/barge transfer could be coordinated so that only one or two additional days would be required to facilitate the entire move. Thus, the entire process of assembly to barge load-out could be accomplished in about 20 days. If the stages are not overlapped time would be about 23 days. Transit time from MSP to the Gulf is about 11 days so

³Personal communication with railroad official.

movement from North Dakota (including assembly) to New Orleans would take about 34 days.

Barge/Vessel Transfer. Direct transfer from barges to an ocean-going vessel could be accomplished in one or two days.⁴ Thus, the process from assembly to ship load-out would take approximately 36 days (Table 3). If some of the stages are initiated before others are completed a few days time could be saved. For example, rail load-out at the country elevator could commence before assembly of the grain has been completed. Likewise, transferring the grain from rail to barges at MSP could begin before all three trains have arrived. The first time-saving measure would be somewhat risky because of the danger of incurring demurrage on the rail cars if all the grain is not assembled in a timely fashion. The second measure (loading the barges before all the trains have arrived) should be incorporated since it would save time and if demurrage were incurred it would be cheaper to pay barge demurrage than rail demurrage. Overlapping any of the other stages would not be possible since commencement of one depends on completion of the other.

⁴Personal communication with Mel Mai, owner of Delta Bulk Terminal, Inc., which operates Delta Conveyor at Convent, Louisiana. Delta Conveyor is a facility that specializes in transfer commodities directly from barges to ships.

TABLE 3. ESTIMATED TIME AND COST OF VARIOUS STAGES OF COORDINATING AN IDENTITY PRESERVED (IP) HRS WHEAT SHIPMENT FROM GRAND FORKS, NORTH DAKOTA TO PUERTO RICO.

Stage	Origin/ Destination	Time Involved (days)	Cost (\$/bu.)
Assembly Rail	Farm/Grand Forks	14	0.10
Transportation Rail/Barge	Grand Forks/MSP	6	0.33
Transfer Barge	MSP/MSP	3	0.05
Transportation Barge/Ship	MSP/Gulf	11	0.16
Transfer Ocean	Gulf/Gulf	2	0.08
Transportation All Stages	Gulf/Puerto Rico Farm/Puerto Rico	7 43	0.59 1.31

Containerization

Shipping in containers is one of the surest methods of preserving the identity of grain shipments. Since the commodity is loaded in the container at origin and is not removed until it is delivered to the final destination, the chances of comingling with other grain or other such altering of the grain's quality are virtually eliminated. However, one of the drawbacks of shipping in containers is the cost. For example, cost of moving HRS wheat from Grand Forks to Puerto Rico by traditional methods was about \$1.31 per bushel. The estimated cost of moving HRS in containers would be at least \$3.45 per bushel.⁵

⁵Personal communication with Vern Wills, Traffic Manager at the North Dakota Mill and Elevator. The North Dakota Mill is currently shipping flour in containers to Puerto Rico for about \$5.75/cwt. It is doubtful that such a low rate could be negotiated for bulk HRS wheat.

Coordination involved in a containerized move would be greatly reduced relative to a direct pass-through move. The North Dakota Mill and Elevator deals solely with a single company that arranges for all transportation and transfers such as local drayage, piggy-back rail transportation and ocean transportation. Thus, the coordination effort is greatly reduced, but the cost is fairly high.

Bagging

The Port of Duluth/Superior has a bagging facility that is used mainly for PL-480 shipments. Such a process could also be used to facilitate IP grain shipments. As with shipping in containers, the cost would be relatively high compared to traditional shipments, but it would reduce the risk of comingling and/or loss of quality. Bagging would add about \$0.35 per bushel to the cost of moving grain through Duluth/Superior.⁶

SUMMARY

A brief description of IP grain shipments and some specific examples were described in this paper. Moving grain through direct pass-through facilities allows a shipper certain assurances that the identity of the grain originated will be delivered at destination. Cost is relatively low in such a shipment, but considerable coordination and planning are

⁶Personal communication with Sam Browman, Duluth Port Authority.

involved. Containerization and bagging are well suited for IP grain shipments as the coordination and planning effort is greatly reduced. However, costs are relatively high.

RECOMMENDATIONS

While there has been much discussion concerning IP grain shipments, little has been documented. Since many questions arise concerning preserving the identity of grain shipments certain information should be assembled and documented. While some IP shipment examples were described in this paper a more comprehensive approach should be initiated. Transfer facilities in particular should be identified that could assist in an IP grain shipment. Additionally, more specific cost data would be beneficial in assessing the economics of such a move. Information concerning importing countries' receiving facilities would assist in determining what methods of shipment could best be utilized.