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**PROCEEDINGS OF A SYMPOSIUM  
ON  
GLOBAL GRAIN DISTRIBUTION  
SYSTEMS: IMPEDIMENTS TO  
INCREASED EXPORTS**



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POLICY ISSUES AND FISCAL DEBATE: AMERICAN AGRICULTURAL  
TRANSPORT RESEARCH NEEDS

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The initial response was euphoric: a Secretary of Transportation would formulate a comprehensive infrastructure policy for the United States. Agricultural needs would inevitably be a part of that analysis. How else could farm production achieve competitive opportunities without gaining time and place utilities.

It became apparent soon enough, however, that Secretary of Transportation Skinner's best intentions did not fit this Administration's broad policy objectives nor tightening budget concerns. The statement of national transportation policy that emerged has been characterized as pabulum - a mass of platitudes that assert the most obvious transport needs, and falls far short of proposing a farsighted plan for rebuilding, development, and financing options. The general recommendation that states must prepare to raise most, if not all, of the money smothers real debate of the structural policy options.

Most transportation observers recognize that:

- the rural roads and bridges have been seriously neglected;
- a 40-year-old interstate highway system, built in bits and pieces, will require more funds to refurbish and rebuild than its original cost;
- the inland waterway system will require enormous funding to keep open only the parts that are currently navigable;
- the lesser regulation embodied in the Staggers Rail Act of 1980 may have curtailed competitive rail opportunities, adversely affecting farm income;
- a persistent, unabating shortage of grain cars is a near-term certainty;
- rail plant rationalization forces more farm production to trucks and barges; and
- that these concerns describe merely the surface.

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This paper will delineate transportation constraints in the movement of bulk grain and grain products by truck, rail, and barge and will suggest areas of economic and engineering analyses that may contribute to improvement in transportation efficiency and capacity. Some of our questions will address national policy, often focusing heavily on the funding issue. We do not purport to provide answers, only our thoughts and experience that may prove helpful in designing responsible research projects. Our focus will be limited to the capabilities of surface modes to handle and move expanding volumes of bulk grains and oilseeds.

### General Data Background

We encounter our first research prospect in trying to estimate the grain tonnage that moves for both export and domestic consumption. As all export grain shipments are inspected by the Federal Grain Inspection Service, the volume of grain exports is known. For example, in crop year 1988-89, we exported 4.372 billion bushels of all grains from all U.S. ports. In the current but incomplete 1989-90 crop year, we expect total grain exports of 4.416 billion bushels; and it has been conservatively estimated that 4.35 billion bushels will be exported during 1990-91. Domestic movements, however, are beyond numeric certainty.

Car loadings on Class I railroads are known with reasonable accuracy, but those data do not distinguish between domestic and export shipments. Regional rail and shortline loadings are somewhat speculative unless they have been included in Class I data after receipt in interchange service. Some of this smaller rail grain traffic probably goes unreported.

Barge reports of domestic movements can be best characterized as being no more than informed guesses. Grain loadings are uniformly reported as 1,400 short tons per barge although each barge load ranges between 1,550 and 1,600 tons. From the data maintained by the Corps of Engineers, it is clear that an undetermined number of grain units are counted more than once. Further, towboat captains do not always know the commodity loaded in each barge in each tow; and those are included by the Corps in the "Others" category which are not made a part of each grain's total at year's end. Finally, the most current barge data seem to be for 1986.

To our knowledge, no record is maintained of truck shipments. Even after removing farm to first storage movements, there is a considerable volume that moves by truck from country elevators to river terminals and in longer haul services, and none of these movements are compiled for planning reports except to meet sporadic safety and enforcement objectives.

Domestic volumetric data were usually dismissed as far less significant than export shipments because of a general, but unproven, assumption that domestic ship-



ments do not vary by more than one percent from year to year. It has become apparent from increased poultry and cattle feeding operations widely dispersed throughout the country that domestic grain movements may have been increasing by 4 to 5 percent annually, at least since 1987; moreover, the lengths of haul may have increased.

The NC-137 grain flow surveys are the only available multi-modal data on grain flows. However, the long delays in publishing and lack of statistical error estimation make these reports less than optimal.

Without an adequate domestic grain data base or a means to estimate that volume with reasonable accuracy, the need for and timing of many infrastructure improvements, necessary to grain transportation, may be misjudged; and project priorities may not reflect future demand for each surface mode's services. Faulty data can produce at least two adverse effects: necessary repair and improvement could lag behind market development; or they could proceed unnecessarily before they would be justified by growing demand for grain transport services.

We would suggest, therefore, consideration of the following research needs:

- (1) Can it be demonstrated that the gap in data (largely domestic grain movements by truck and barge) is significant, or insignificant, to policy development that may depend on forecasting future modal demands in which grain volumes are important?
- (2) Can models be developed, that relying on Class I domestic rail data, could provide reasonable estimates of total multi-modal domestic grain volume?
- (3) Can a real time data collection system be developed that, although incomplete, would provide a better basis for estimating domestic grain volume than the NC-137 grain flow surveys or other estimation processes?

#### Grain Trucking Problems

Deterioration of rural roads and bridges, relevant to the trucking of grain and oil-seeds, has been staggering. While the number of farm families has declined, farm sizes have increased and heavier equipment is being used to haul grain production to its first stop in the marketing chain. Every bushel moves at least once by truck and it is not unusual, especially in the absence of rail service, for large volumes of grain to move again by truck from country elevator to a terminal elevator or processing plant. State and interstate road repair and replacement budgets have remained under stress for more than a decade and local rural roads and structures have been deteriorating for



decades. Now that reliance on federal funding appears to be largely displaced, local funding is highly unlikely as a realistic policy to restore all or most of the local roads given the advanced state of disrepair.

Road and bridge conditions obviously vary in each state, and each state will value each motorway segment differently if we were to focus only on a segment's value to local crop production. Thus, we suggest that cost-benefit analyses of policy options become more vital where public, nonagricultural use is light or rare. The local motorways problems and correctional options will have an impact on our national economy as local grain production may be precluded from seeking distant domestic and export markets.

We suggest consideration of the following rural road and bridge research:

- (1) What effect would roadway disinvestment likely have on rail and barge line-haul traffic, where these modes depend on truck bushels for significant grain volume?
- (2) Would creation of private roadways likely convey sufficient benefits to serve as an option to reducing state and county maintenance costs? Or, would some combination of state, local, and private support maintain greater road mileage, displacing fewer bushels from more attractive non-local markets?
- (3) Is it a tenable option for a state to restrict a roadway's use to farm traffic only, without privatization but with minimum maintenance to be funded by the state with farm-owner participation? Would it be practical to allow local, nonfarm use by residents who are willing to pay a user's fee?
- (4) What is the optimum combination of rural road reconstruction, downgrading, privatization, and abandonment so that the combined net social benefits -- including grain traffic -- is maximized.

#### Grain Barge Problems

Barge experts seem to agree that there are no reliable data to confirm the number of covered dry bulk barges that are and could be used in grain service. There are no studies that grapple with the number of barges that will be necessary to meet reasonable assumptions of future demand if exports were to increase to 5.0 billion bushels or more annually.

Many of the locks, dams, and other navigation structures on the middle and upper segments of the Mississippi waterway are more than 50 years old. When they



were built the Corps of Engineers forecast 50 years for the concrete and other components of those navigation structures as their service utility. Failure of any of those aging structures could bring navigation to and from grain loading terminals farther upstream to a halt. In some cases, alternate rail service may be available at higher cost; and in others, only trucks would be a possible substitute for river shipment. As the low-cost mode for grain movement, stoppage and lengthy delays could and would have serious impacts on grain prices and our ability to move very substantial volumes to export elevators on the Mississippi River in the New Orleans port range. Of critical importance, the elevators in the New Orleans area (generally referred to in the grain industry as the center Gulf) represent the premier means of grain exports from this country, leading other grain port ranges by considerable volumes. No railroad (and there are only three serving the New Orleans area) could possibly assume the grain tonnage that would be diverted if massive delays or blockages were experienced above an aging navigation structure at mid-river or beyond.

We suggest consideration of the following barge research:

- (1) Can a study accurately estimate the number of grain barges, and barges that could be quickly converted for grain loading, in current operation? In considering diversion of barges from other dry bulk services to grain, what adverse effects would that action have on the movements of coal, coke, and fertilizers?
- (2) Can economic models assist in forecasting grain barge fleet size necessary to meet future demand as exports increase to and beyond 5.0 billion bushels annually?
- (3) In addition to a historical review of Corps of Engineers improvements and its forecasts of structural utility, can economic and engineering studies estimate with some certainty the remaining serviceability of the reinforced concrete and other components used in those navigational elements? Can we develop engineering and economic standards to establish the priority of replacement for each aging structure?
- (4) Can we accurately estimate the need for increased rail and truck capacity that would be needed if we assume the structural failure of those components likeliest to require replacement or substantial repair within the next 10 years?



## Rail Grain Problems

The last decade has been one of enormous changes in the railroad system. These changes are, to a large extent, the result of the enactment and implementation of the Staggers Rail Act of 1980 and the grain industry's adjustments to those changes. Although rail rates were not deregulated, the oversight and regulatory functions of the Interstate Commerce Commission were dramatically altered. Further, the merger process seems to foster consolidations; and the abandonment process has been subjected to a rigorous schedule and generally favors such plant reductions. We would summarize Staggers' underlying policy and objectives as intending to give greater weight to managerial discretion as exercised by each rail carrier without frequent speculative review by less knowledgeable regulators.

No issue has received more attention in the last several years in the grain trade than the declining number of covered hopper cars, replenishment of that fleet of cars, reasonable compensation for railroads' use of private grain cars, and the impact of dwindling rail car capacity on line-haul rates and other rail practices. We have estimated that if grain exports are 4.4 billion bushels (this crop year's estimate) and the national car fleet achieves only 12 loaded trips in that year in both domestic and export services, shippers will demand 131,000 empty cars monthly for loading. If 15 loaded trips prove to be a more realistic national average, 98,000 cars would probably be sufficient. Domestic grain traffic is not known with certainty although the rail data in this respect are the best maintained of the three surface modes; and the greatest delays in unloading are believed to occur generally in domestic grain service. Looking ahead, exports of 5.0 billion bushels in the 1992-93 crop year is not beyond reality especially if trading relations with the U.S.S.R. are normalized and other important political alliances also improve. In the latter context, we would estimate that the range of car demand would be between 118,000 and 158,000, the principal variant being cycle time. If the current grain car fleet, both rail-owned and private, is about 100,000 units, it is readily predictable that we will lapse into persistent, unabating grain car shortage that will quickly emulate the magnitude common for many years prior to 1983. In describing the outlines of this problem, we are ever mindful that policy development should attempt to avoid the federal tax and other economic gimmicks that encouraged over building the car fleet in the 1976-80 period, producing a surplus that hurt both rail and private owners for 8 or more years after 1982.

Active interest and preliminary marketing efforts have recently begun to sell improved versions of the current 4750-cubic-foot grain covered hopper and newly developed articulated hopper car units. Articulated units move on common trucks between cars instead of employing coupling devices. Unit sizes usually mentioned are a double-container unit, a 5-container unit, and a 10-container unit. It is critical to note that such units cannot be uncoupled to accommodate lengths of track in a so-called ladder configuration, which were originally built on the notion that all units would be approximately 62 feet in length. Thus, in handling articulated units at virtually every export facility,



some existing trackage would be surplus and other track segments would be totally unusable to hold longer articulated units for unloading. The expense of track realignment and/or replacement is considerable; and at many export locations, there is simply no land available at or in the vicinity of the elevators to expand trackage, or change its configuration to accommodate articulated units. In fact, it has been rumored that the grain trade may specifically exclude application or shipment in articulated units, obviously reducing their utility and value.

Line abandonments have been liberally approved by the Interstate Commerce Commission. Regional and shortline railroads have been created throughout the country, and such restructuring of the national rail system often seems to occur where the former Class I owner hauled mostly bulk grain. In other cases, abandoned rail service was replaced by trucking. These rationalizations of the rail system have undoubtedly increased individual and systemic efficiencies, but there appears to have been little attention to the impacts on nonrail investment in grain marketing infrastructure.

Lastly, railroads have not been immune as targets for outsider efforts to change their management, achieve greater common stock values through corporate, equity, and debt restructuring, and leveraged buy-outs. Except in the case of the proposed Santa Fe and Southern Pacific merger, the ICC has approved, to our knowledge, every other proposed merger since enactment of Staggers. Presently pending in Congress is legislation that would require the ICC to review all non-merger changes in rail corporate, equity, and debt structures. The principal focus of this legislation seemingly is those situations where the results include assumption of larger debt loads by the rail entity than it may have had previously. The public fear appears to suggest that financially stronger railroads, at least since Staggers, may have been, and could be, rendered technically bankrupt after assuming much larger debt (often at "non-market" rates of interest) or less able to produce sufficient cash flow to cover depreciation and essential maintenance.

We suggest the following railroad research needs:

- ( 1 ) Can more sophisticated economic models be developed that would provide improved forecasting basis for grain car supply and future demand? Can it be established with reasonable certainty how many hopper cars are used in, and are available for, bulk grain service?
- ( 2 ) Is it realistic to presume that railroads will have the capital resources to build grain cars as needed instead of allowing free access to the national rail system for private units to encourage investments by private sources and grain shippers?



- (3) Are annual grain movements, especially export movements, as cyclical or periodic as claimed by railroads as their major deterrent to further investment in rail grain capacity?
- (4) What were the pre-1983 and what are likely to be the economic implications of a persistent, unabating shortage of grain cars?
- (5) Can lighter weight hopper cars be built from such materials as aluminum or fiberglass that (a) would withstand rail operational dynamics in line-haul service, and (b) be competitive with steel units that currently cost \$42,000 to \$44,000?
- (6) Can an engineering and economic case be made for general use of a newly designed hopper car that, with lading, would exceed the current national load limit of 263,000 short tons gross? And, would the added lading capacity justify any additional car construction costs and the expenses of strengthening line-haul components of the national rail system?
- (7) Can the current 4,750 cubic foot grain car be altered to provide greater efficiency and lower operating costs, paying particular attention to redesign the present loading system that requires the use of perishable trough hatches and the creation of pneumatically operated discharge gates?
- (8) Are there economic incentives and/or other means of fostering the elevator modifications that would be required to make efficient use of articulated units? And, can a model be devised that would reliably estimate the national costs for accommodative modifications?
- (9) What are the relative economics between ordinary hopper cars and articulated units, focusing, among other factors, on construction costs, lading to tare weights, and increased wear on track and bridges attributable to 125-ton connecting trucks instead of the 100-ton components currently in use?
- (10) Have newly created regional and shortline railroads actually provided an economic modal option for grain elevators that otherwise would have been left without any rail service? What is the measure of that benefit where it may exist? Conversely, how many of these new rail operations have fallen short of successfully attracting grain, and why? How many of these lines are profitable, only marginally so, or struggling to survive?
- (11) What effects can be anticipated, economically and socially, where abandoned branch lines have not attracted any alternate rail service?



- (12) Is it sound public policy for Congress to mandate review and approval for financial restructurings where apparently financially sound railroads propose to reorganize by assuming a substantial amount of debt where the intent seems to be avoidance of an unwelcomed takeover bid?

### Public Funding Policy

We would suggest that a truly national economy, and its substantial agricultural component, cannot operate efficiently without an integrated nationwide transportation system. Although many local problems may be best handled by local or state effort, all parts of a multi-modal surface system are vital to the efficient marketing of grain in both domestic and export commerce. This comment seems particularly cogent as most of our grains and oilseeds are produced long distances from their consumption, processing, and export markets. It may be that the most efficient transport system would consist of core routes only, but we would suggest that much more than "spine lines" are necessary to grain marketing in its many facets.

We strongly suspect that transport system needed for efficient grain marketing will not survive if the major emphasis for reconstructive funding is made a state-by-state function and taxing burden. We are not proposing that more innovative means of preserving the essential parts of the national transport system - if they can be objectively identified - should not be attempted or cannot succeed; but the alternative should not be assumed without some study. We have previously suggested privatization of some rural roadways and some measure of individual private financing as options that should be tested. Whether federal budget deficits are the bete noire of our financial system is not for discussion here; but it is essential to appreciate that there will continue to be substantial resistance to massive federal funding of many economic and social programs. That resistance manifests itself in two major ways: substantial or sole federal funding of highway and waterway projects is a past luxury; and trust funds, if unspent, are used creatively to mask the true size of the budget deficit.

We shall conclude by turning the financing question in what may be considered a curious direction. Most of the avenues of transportation (highway, waterway, and airway) are publicly owned whereas rail rights-of-way are privately owned. Since the late 1970s, more grain spokespersons have asked whether the time has come for the federal government to assume ownership of rail rights-of-way, stopping short however of nationalizing individual rail operations. This general theme subsumes that the surviving rail operating entities, and private shippers willing to commit the capital, would pay a user's fee to the federal government for using the newly public rail rights-of-way. Unstated in this notion is the possibility that public ownership of all avenues of modal transport could foster creation of a coordinated transport improvement policy that would address all surface modes important to grain marketing.



We suggest the following public transportation finance research needs:

- (1) Can the federal role in surface transport improvement be held at its currently depressed level without doing serious harm to the national economy and its grain marketing component? What federal presence seems to be required by national economic goals, which include the importance of export agricultural marketing? User fees aside, what other taxing or privatization mechanisms should be considered, either on the federal or state level, to create a source for infrastructure improvement?
- (2) Should the federal and state roles in planning infrastructure be reduced dramatically, or eliminated, in favor of totally private and/or state planning and financing?
- (3) Considering federal acquisition of rail rights-of-way alone, what positive and negative policy implications are raised in this alternative approach to create possibly a better basis for planning and funding infrastructure improvement.
- (4) Is federal acquisition of rail rights-of-way an idea whose time has finally come, in that it may dampen partisan modal legislative demands that inhibit development of a comprehensive and coordinated multi-modal improvement plan based on some rational assessment of priorities? Would this approach ultimately result in complete reliance on federally mandated user fees on all modes to fund all infrastructure improvement?

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