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RESEARCH ABSTRACT COMPENDIUM AGRICULTURAL
AND RURAL CHAPTER OF THE TRANSPORTATION RESEARCH FORUM

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INTRODUCTION - MICHAEL W. BABCOCK

One of the problems of the Agricultural and Rural Chapter of the TRF is a lack of geographic concentration. As a result, the only practical opportunity for face-to-face interaction is the annual meeting. However since only 20 percent of the chapter membership attends the TRF annual meeting in any given year, it is easy to get out of touch with the work of colleagues.

When I was President of the chapter several years ago, I published professional biographies of chapter members in the chapter newsletter. This was well received by the membership. The Research Abstract Compendium is a variation on the theme of using the written word to unify people that are dispersed all over the country. It is hoped that the Research Abstract Compendium will enable the chapter members to become familiar with the recent work of their colleagues, will unify the chapter, and will help with recruiting (i.e. some of you haven't been paying your dues).

The work of the chapter members is organized in alphabetical order and the affiliation and phone number of each member is given to facilitate contact between members. In organizing the Research Abstract Compendium we were impressed by the amount of joint research of chapter members. To avoid duplication, jointly authored work is listed by first author although this rule is occasionally violated for various reasons.

ALBERT J. ALLEN, MISSISSIPPI STATE UNIVERSITY, 601-325-2883

Yousef A. Alseleem, Albert J. Allen, and Jeanne Reeves. "The Effects of Changes in Truck Regulations on Watermelon Markets." *Proceedings of the 54th Annual Professional Agricultural Workers Conference (PAWC)*, December 1996, Tuskegee, Alabama.

The objective of this study is to estimate how various changes in truck regulations and transportation costs would affect the distribution of watermelons among regions in the United States, Canada, Mexico and other international markets. To accomplish the objective of this study a spatial equilibrium quadratic programming model was developed. To measure the impact of alternative changes in truck regulations and transportation costs on the distribution of watermelons among regions and international markets in the base model, the empirical results were obtained in four different scenarios. Those scenarios were : (1) the impact of increasing total U.S. transportation cost, (2) the impact of increasing U.S. fuel taxes, (3) the impact of increasing U.S. truck license and permit cost, and (4) the impact of increasing U.S. truck insurance cost.

Results, when compared to the base model, indicated that a 4.45 percent increase in fuel taxes, a 2.42 percent increase in truck transportation costs, a 5.81 percent increase in truck insurance cost, and a 7.23 percent increase in the cost of truck licenses and permits will reduce social welfare by 0.11, 0.36, 0.06, and 0.05 percent respectively. Results also showed that the shipments from Miami-to-Detroit, Miami-to-Philadelphia, Miami-to-New York, Columbia-to-Detroit, Columbia-to-New York, and Columbia-to-Philadelphia were the most sensitive for the scenarios analyzed in this study.

Alina Quesada, Albert J. Allen, and Jeanne Reeves. "Financial Characteristics of Refrigerated Food Products Trucking Firms in the U.S." forthcoming in *Journal of Food Distribution Research*.

The objective of this study is to provide an overview of the financial characteristics of the U.S. Refrigerated Food Products trucking industry. To accomplish the objective of this study, data were obtained from the *TTS Blue Book of Trucking Companies, 1993-1994*, published by Transportation Technical Services, Inc. The analytical tools used for the segment's financial assessment were the following liquidity, profitability and solvency ratios: Working Capital, Current Ratio, Expense After-Tax Income-to-Equity Ratio, After-Tax Income-to-Total Capital Ratio, and Net Debt-to-Equity Ratio. For each of these analytical tools the following statistics were calculated: number of observations or number of firms reporting, minimums, maximums, means, and standard deviations.

Results reveal that approximately one-fifth of the firms in the refrigerated food products carrier industry were operating at a loss as evidenced by negative Income Before Taxes estimates. In addition, over nine percent of the firms had negative amounts of Stockholders Equity.

In terms of profitability, the Pre-Tax Income-to-Gross Revenue Ratio for the firms as a group averaged 0.01. This value means that one cent of every dollar earned in services ("sales") was available to pay taxes and distribute profits. The West region mean value for this ratio was 0.02 while the Midwest and Northeast had a mean value of 0.03. These values indicate that income before taxes relative to gross revenue was higher for those regions than that obtained for the overall segment. The South had a negative value of 0.01.

Alina Quesada and Albert J. Allen. "A Comparative Analysis of Agricultural Commodity Trucking Firms in the U.S." Working Paper.

The objective of this study is to provide an overview of the financial characteristics of U.S. Agricultural Commodity trucking firms as a group and by U.S. region. To accomplish the objective of this study, data were obtained from the *TTS Blue Book of Trucking Companies, 1993-1994*, published by Transportation Technical Services, Inc. Results from the study reveal that approximately one-fourth of the firms in the agricultural commodity carriers industry were operating at a loss as indicated by their negative Income Before Taxes estimates. Close to 4 percent of the industry's companies showed negative amounts of Stockholder's Equity.

Alina M. Quesada and Albert J. Allen. "Truck Regulations Affecting the Shipment of Agricultural Products in Mississippi." *Proceedings of the Midsouth Academy of Economics and Finance Meeting*, February 1996, Atlanta, Georgia.

The movement of agricultural commodities by truck has become an increasingly important aspect of agricultural marketing in Mississippi. This trend means that federal and state laws and regulations governing the shipment of agricultural commodities are increasingly affecting the profitability of agricultural trucking firms in the state. The purpose of this study is to determine the activities of the major agencies regulating motor carrier shipment of agricultural products in

Mississippi. Data sources to accomplish the objective of this study are personal interviews and published data of the various regulatory agencies. Results from this study reveal that Mississippi regulates the shipment of agricultural commodities in several ways. The state imposes restrictions on size and weight of vehicles, establishes rules regarding safe operation of vehicles and standards to be met by drivers, establishes insurance responsibilities, and imposes taxes on vehicles. Also, results reveal that regulations and fees are minor or major concerns of the following agencies: (1) The Mississippi State Tax Commission through the Bureau of Revenue and the Petroleum Division; (2) The Oversize/Overweight Permit Section of the Mississippi Department of Transportation; (3) The Mississippi Public Service Commission; (4) The Mississippi Department of Agriculture and Commerce; and (5) The U.S. Department of Transportation. One or another of the above agencies have major or minor responsibilities to impose two types of taxes including (a) registration fees and fees for operating authority and (b) fuel taxes.

BEN ALLEN, IOWA STATE UNIVERSITY, 515-294-2422

Benjamin J. Allen, Richard F. Poist, Jack H. Blanshan, Carol J. Thompson, and Deborah A. Johnson, "Contemporary Lumping Practices in the United States: A Status Report." *Journal of Transportation Law, Logistics and Policy*, Fall 1996, Vol. 64, No. 1, pp. 35-60.

The purpose of this study is to provide a more comprehensive and systematic examination of lumping issues. Lumping refers to the loading or unloading of motor carrier equipment by individuals other than employees of carriers, shippers or receivers. A total of six survey instruments were developed and disseminated. Questionnaires were administered during 1993, asking three general research questions.

All parties agreed that the responsibility to unload is either undefined or unclear for approximately seven percent of the loads. A total of 72 percent of motor carrier respondents indicated they had used lumpers in 1992. Most lumping is voluntary, almost all occurs at the unloading site and the average cost of lumpers/truckload is \$65 in 1992. Third party loading/unloading firms provide a significant portion of the lumping services.

Lumping services appear to constitute an important logistical function by providing a mechanism for meeting the needs of shippers, receivers, and carriers in performing a necessary function of logistics-loading and unloading of carrier equipment. Services provide an alternative for loading or unloading by drivers so they may meet time-sensitive schedules and reduce their exposure to injury and fatigue.

Benjamin J. Allen, C. Phillip Baumel, and David J. Forkenbrock, "Expanding the Set of Efficiency Gains of a Highway Investment: Conceptual, Methodological, and Practical Issues." *Transportation Journal*, Fall 1994, Vol. 34, No. 1, pp. 39-47.

The purpose of this paper is to explore ways in which logistical cost savings can be incorporated into benefit-cost analyses of highway improvements. This piece uses a conceptual methodology to estimate the annual logistical cost savings and also uses figures and tables to display the information found.

The logistical cost savings approach has the fundamental advantage of a more complete and accurate estimate of the benefits accruing to the users of freight transportation. The approach incorporates in the calculation of benefits *inter alia*, what most shippers consider to be the most important characteristic of trucking service: reliability of transit time.

More information is needed to increase the understanding of the likely impact of decreases in variability of lead time on a firm's logistical costs. Research is needed on appropriateness of including the effects of a highway improvement on a firm's logistical network. Research is also needed to determine how to best sample for and collect the data needed for this time-related logistical cost saving approach to evaluating proposed highway investment projects.

Charles D. Braunschweig, Michael R. Crum, and Benjamin J. Allen. "Evolution of Motor Carrier Contracting." *Transportation Quarterly*, Spring 1995, Vol. 49, No. 2, pp. 99-115.

The primary purpose of this article is to facilitate an understanding of contracting for trucking service and its future. To accomplish this purpose the article has two objectives (1) to examine the extent and nature of contracting during the 1980's; and, (2) to discuss the recent legislative and regulatory changes concerning motor carrier contracting. Two studies were done, one based on a representative survey of mostly large manufacturing shippers and the other is a carrier survey.

A total of 82 percent of motor carrier respondents reported providing some form of contract service in 1989. Nearly two-thirds of all respondents expected an increase in percentage of total revenue under contract by 1995. More than half of both Class I carriers and Class II carriers believed that carrier size was a factor in the willingness of shippers to contract with a given carrier. For the entire sample of carrier and shipper respondents, the three items most often included in contracts are: due dates for freight bill payments, procedures for settling freight claims, and dedication of equipment by the carrier to meet shippers' needs.

Survey results indicate contracting produced a number of benefits for both shippers and carriers. Results also indicate contracting for motor carrier service was pervasive after most regulations pertaining to contracting were eliminated. Contracting didn't appear to adversely affect the availability of common carriage service. The current legislative and regulatory requirements don't appear to negate the benefits or reasons for contracting nor to be so burdensome as to discourage contracting.

**KEVIN ANDRES, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-7767**

Kevin Andres completed his master of science degree in Civil Engineering with an emphasis on transportation. He has been involved with several projects including the development of the North Dakota Intermodal Management System, transportation cost and location analysis for the proposed ProGold Corn Plant, and development of a guidebook addressing transportation regulatory issues as they relate to agricultural operations. Andres' research interests include intermodal transportation, and intelligent transportation system technologies.

Kevin Andres. *Integration of Pavement and Intermodal Management Systems to Quantify Pavement Impacts Due to Short-Term Modal Shifts in Freight Traffic.*

This study presents a method for quantifying incremental pavement impacts due to short-term modal shifts in freight traffic from railroads to trucking operations. The developed method integrated and interfaced various components of Intermodal Pavement Management Systems. This method allowed computation of impacts based upon shipping levels and pavement conditions. To illustrate the process, this methodology was applied to a simulated abandonment of all Washington state branch line railroads. Results obtained from this study were directly used in the development of Washington's Local Rail Freight Assistance program.

WALTER J. ARMBRUSTER, FARM FOUNDATION, 708-571-9393.

Walter J. Armbruster is managing director of Farm Foundation, Oak Brook, Illinois. As chief executive officer of the non-profit Farm Foundation, he works as a catalyst, facilitator and stimulator of research, education and dialogue on private and public policy issues related to agriculture and rural communities. He had provided leadership in organizing policy and professional symposiums on marketing issues and has served as editor and contributing author to a number of marketing research and education publications. His research focus has been on marketing efficiency, marketing institutions, government programs and marketing policy issues.

Armbruster is president of the American Agricultural Law Association, president-elect of the American Agricultural Economics Association, secretary-treasurer of the International Association of Agricultural Economists, board member of the Council on Food, Agricultural and Resource Economics, chairman of the board of directors of the National Farm-City Council, and member of the Executive Committee of the National Policy Association's Food and Agricultural Committee. Armbruster has served on numerous regional research and extension committees of the land grant university system, professional association committees, national advisory boards and USDA committees.

MICHAEL W. BABCOCK, KANSAS STATE UNIVERSITY, 913-532-4571.

Michael W. Babcock, Eugene R. Russell, and Marvin Prater. *Employment Impacts of Highway Construction and Maintenance Activities in Kansas.* Kansas Department of Transportation. February 1996. 76 pages.

The direct employment resulting from highway construction and maintenance activities in the state of Kansas is examined as well as the indirect and induced employment (by state industrial sector) resulting from those activities. Six types of highway improvements were selected for analysis: (1)Resurfacing; (2)Restoration, Rehabilitation, Reconstruction and Minor Widening; (3)New Bridges and Bridge Replacement; (4)Major and Minor Bridge Rehabilitation; (5)New Construction, Relocation, and Major Widening; and (6)Safety/Traffic Operations/Traffic Services Projects. The objective of the study are accomplished through the use of a 68-sector, survey-based, input-output model that was developed for the state of Kansas by the Economics

Department at Kansas State University. The model is adapted to include six additional sectors corresponding to the six highway improvement types listed above. The input-output data for these six sectors is obtained from highway contractors who were awarded KDOT contracts during the period July 1, 1991 to May 19, 1994.

The major findings of the study are that: (1) The major supplying industries that are common to most of the six highway improvement types are Nonmetallic Mining, Petroleum, and Coal Products, Cement and Concrete, Motor Freight, and Fabricated Metals; (2) The significance of imports (purchases from out-of-state suppliers) in the input structure varies by highway improvement type, ranging from 2.6 to 16 percent; (3) Output multipliers ranged from 2.32 to 2.72, and income multipliers varied between 1.71 and 3.03; (4) The economic impact of the contracts included in the study as measured by output is \$2.2 billion. The impact as measured by income is \$428.8 million. (Both the multipliers and the impact are underestimated since the investigators were unable to obtain input purchase data for highway work that was subcontracted.); (5) The direct, indirect and induced employment per million dollars of output for the six highway improvement types ranged from 35.18 to 51.91 full time equivalent jobs.

Michael W. Babcock, Marvin Prater, and Eugene Russell. *The Economic Impact of General Aviation Airport Deterioration on Kansas Communities*. Kansas Department of Transportation. September 1996. 150 pages.

Given indications of the decline in the quality of Kansas general aviation airports and the potential negative effects of airport deterioration on Kansas communities, the objectives of the research are to document the deterioration of Kansas general aviation airports by obtaining information regarding the needed capital improvements at these airports; to measure the economic impacts of substandard airports on general aviation service users; and to identify the types of business firms whose location decisions are significantly affected by high quality air service. The objectives of the research are accomplished through the use of questionnaires distributed to managers of Kansas general aviation airports, to Kansas businesses that use airports, and to members of the Kansas Pilots Associations (KPA).

Airport managers provided a long list of needed capital improvements with special emphasis on lengthening and resurfacing the runway. Managers revealed that they believe that the most important problem of general aviation airports is obtaining financing for airport maintenance and capital improvements. The principal effect of airport deterioration on the users of airports is a decrease in safety. The KPA and business firm respondents indicated that condition and length of the runway are two of the most important factors in the decision to base their aircraft at a particular airport. The implication of this finding is that deteriorating general aviation airports will lose based aircraft, possibly leading to closure of the airport. The KPA and business firm survey respondents described the impacts on airport users if the airports they use frequently were closed. A total of 53 Kansas companies said they would collectively lose \$35.3 million per year if the airports they frequently used are closed. The report concludes that a state program of airport investment could be justified, if it were to mitigate this loss and preserve the estimated \$16 million direct economic impact of the Kansas general aviation airport system.

Michael W. Babcock, M. Jarvin Emerson, and Marvin Prater. "Estimating Economic Impacts of Highway Improvements: A Kansas Case Study." *Proceedings of the 1996 Transportation Research Forum*. Vol. I. pp. 136-155.

This study presents a model-procedure to estimate the economic impacts of specific types of highway improvement within a regional context and to also examine the reasons for differential impacts. Although the empirical estimation of the model is for the state of Kansas, it can be applied to any sub-national region. The specific objectives of this study are:

1. Measure the *direct* income, output, and employment resulting from specific highway improvement types in the state of Kansas.
2. Measure the *indirect* and *induced* income, output, and employment resulting from specific highway improvement types in the state of Kansas.

The objectives of the study are achieved through the use of a 68 sector survey based input-output model for the state of Kansas developed by the Economics Department at Kansas State University. The model is adapted to include six additional sectors corresponding to the following six highway improvement types.

<u>Category</u>	<u>Highway Improvement Type</u>
1	Resurfacing
2	Restoration and Rehabilitation; Reconstruction and Minor Widening
3	New Bridges and Bridge Rehabilitation
4	Major and Minor Bridge Rehabilitation
5	New Construction; Relocation; Major Widening
6	Safety/Traffic Operations/Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services

The input-output data for these six sectors is obtained by surveying highway contractors who received Kansas Department of Transportation (KDOT) contracts during the period July 1, 1991 to May 19, 1994. The total value of these contracts is \$827.8 million. Some of the major findings of the study are:

1. The major supplying industries that are common to most of the highway improvement types are nonmetallic mining, petroleum and coal products, cement and concrete, motor freight, and fabricated metals.
2. The significance of imports (purchases from out-of-state suppliers) in the input structure varies by highway improvement type ranging from 3 to 16 percent of total contract value.
3. The cost/input structure varies by highway improvement type.
4. Output multipliers of the six highway improvement types ranged from 2.32 to 2.72 while the income multipliers varied between 1.71 and 3.03.

5. The economic impact of the highway contracts included in the study as measured by output is \$2.2 billion while the corresponding figure for the income impact is \$428.8 million.
6. The direct, indirect, and induced employment per million dollars of output for the six highway improvement types ranged from 35.2 to 50.9 full time equivalent jobs.
7. The economic impact of the highway contracts included in the study as measured by employment is 33,123 full time equivalent jobs.

C. PHILLIP BAUMEL, IOWA STATE UNIVERSITY, 515-294-6263

Gregory R. Pautsch, Bruce Babcock, and C. Phillip Baumel. "Estimating the Value of Guaranteed Rail Service," *Journal of the Transportation Research Forum*. Vol. 36. No. 1 (1996) pp. 59-73.

The purpose of this research is to develop a framework to estimate the value of guaranteed rail service to grain shippers. The analysis consists of estimating density functions for the days waiting for conventional tariff service. A shipper loss function for waiting for rail service was also estimated. Three qualitative results were established. First, the value of guaranteed service increases as the quality of guaranteed service rises. Second, the value of guaranteed rail service increases as conventional tariff service becomes less reliable. Finally, when grain is stored on the ground, the value of guaranteed rail service increases.

The quantitative estimates are based on the only data available on car want and delivery dates. Grain shippers need to collect more data on the delay of receiving rail cars in guaranteed service and conventional tariff service as well as their losses while waiting for rail service. Better data would enable the quantitative estimates for guaranteed service to reflect the true shipper value. Shippers could use the estimated values to negotiate guaranteed car supply contracts and to improve their bidding for COTs and PERs. Furthermore, the increased value of improved guaranteed service will be of future importance to shippers if railroads begin offering a menu of different service offerings.

Railroads may also find it advantageous to collect the data. Railroads contemplating offering scheduled service may use the estimated shipper value of a zero-day delivery window to examine if the projected costs of the service are retrievable. Also, the estimated shipper value of guaranteed service may help railroads in pricing guaranteed service and in setting minimum acceptable bids for guaranteed service auctions.

Marty McVey and C. Phillip Baumel. "Optimal Logistics System for Differentiated Quality Corn and Soybeans." forthcoming.

This article, based on a Ph.D. dissertation, develops a model to describe the potential benefits of producing genetically modified corn and soybeans as well as describing the optimal use of the current distribution system. The model is used to determine the benefits for two farms in central and western Iowa that produce four types of genetically modified corns and soybeans.

The model also tracks the market and modal shifts in the distribution system that accompany the production of those genetically modified grains.

C. Phillip Baumel et. al. "Managing Change-Managing Risk: A Primer for Agriculture." Iowa State University Extension, PM-1695, January 1, 1997.

This publication, coordinated by Baumel, contains 12 articles describing the risks facing grain and livestock producers and alternative strategies that farmers can pursue to reduce these risks. These materials were used in a telecommunications program delivered to 12 sites in Iowa. The material and format will be used to develop risk management strategies, including transportation, for grain elevators.

MARTHA BEARER, U.S. DEPARTMENT OF AGRICULTURE, 202-720-8037

Martha Bearer is an agricultural marketing specialist with the Transportation and Marketing Division of the Agricultural Marketing Service, USDA. Her job activities include the following:

- Conducting research to improve transportation efficiency in the movement of agricultural commodities, inputs, and food products.
- Identifying issues and monitoring transportation trends which affect agricultural producers.
- Maintaining liaison with other agencies and organizations concerned with agricultural and/or transportation matters.
- Providing technical assistance and information to the public through seminars, workshops, and publications. Assisted in writing and/or reviewing the following recent publications: Rural Roads and Bridges: Condition and Status of Roads; Rural Roads and Bridges: Condition and Financing of Local Bridges; Rural Roads and Bridges: Management Issues Facing Local Highway Officials; Rural Roads and Bridges: Financing Local Roads and Bridges in Rural Areas; and Maintaining Local Rail Freight Service.
- Monitoring the effects of the Intermodal Surface Transportation Efficiency Act (ISTEA) on agriculture and rural transportation infrastructure, and monitoring provisions of ISTEA during its reauthorization.

**DOUGLAS BENSON, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-7767**

Mr. Benson has eight years of experience in transportation research specializing in the analysis of railroad operations and in the development of computer systems used for transportation analysis. He has over ten years experience in computer science including operational evaluations of United States military computer systems. His current research interests include the development of a short line and regional railroad database system and the incorporation of a rural and small urban aviation research program into the U.G.P.T.I.'s research

activities. He has supported the development of several computer and mainframe software systems and railroad database systems.

Doug Benson and Riaz Aziz, *North Dakota Rural Aviation Study*.

This project surveys the aviation community in North Dakota. The study will provide the foundation for assessing the development of a rural aviation research program at the U.G.P.T.I. The program will add great value to the aviation community by providing an objective research and service facility to the community.

PAUL J. BERTELS, U.S. DEPARTMENT OF AGRICULTURE, 202-690-3616

Paul J. Bertels is an economist with the U.S. Department of Agriculture, Agricultural Marketing Service, Transportation and Marketing Division. His chief responsibilities include staff analysis of important issues and problems affecting agricultural transportation. The majority of his past work has focused on grain transportation issues particularly barge transportation. This work has also included analysis of a number of general river issues. His recent activities include representing the USDA and the U.S. Army Corps of Engineers, Upper Mississippi River-Illinois Waterway Economic Coordinating Committee. The following is a list of his recent publications.

Marcel P. Aillery, Paul J. Bertels, Joseph Cooper, Michael Moore, Steven Vogel and Marca Weinberg, *Salmon Recovery in the Pacific Northwest: Agricultural and Other Economic Effects*, Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, February 1996.

Paul J. Bertels. *Role of Navigation Among the Competing Uses of the Missouri River*, Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service, May 1995.

Paul J. Bertels. *1991 Annual Barge Summary: An Analysis of U.S. Grain Shipments on the Nation's Waterways*, Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service, September 1992.

**JOHN BITZAN, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-7767**

John Bitzan has over seven years of research experience in transportation economics. He has performed research in rail pricing, intercity freight movements, rail operations and efficiency, rural road financing, and rural transit. Bitzan has recently completed the required course work for a Ph.D. in Economics from the University of Wisconsin-Milwaukee.

John Bitzan and Denver Tolliver, *Western Coal Transportation Study*.

The purpose of this study is to evaluate the impacts of the Clean Air Act Amendments on the potential for western coal traffic and to examine the transportation competitiveness of western coal.

John Bitzan and Jill Hough, *An Evaluation Guidebook for Rural and Small Urban Transportation Systems in the Mountain Plains Region*.

The guidebook is designed to provide transit operators with a tool for evaluating their performance against other similar systems in the MPC region. As transit operators evaluate their system and strive to achieve the performance level of the top transit systems within their peer group, a greater degree of efficiency and effectiveness will be attained within the transit industry.

JIM CARON, U.S. DEPARTMENT OF AGRICULTURE, 202-690-1304

James A. Caron is an economist with the Agricultural Marketing Service, Transportation, and Marketing Division, USDA. He is the Director of the Shipper and Export Assistance (SEA) program which provides new and experienced agricultural exporters with the information they need to get their products to foreign markets on time, in good condition, and at the lowest cost.

KEN CASAVANT, WASHINGTON STATE UNIVERSITY, 509-335-1608

Ken Casavant and Eric Jessup. "EWITS Report Offers Profiles in Tonnage." Washington State University. 1996.

As a result of an extensive two-year assessment of freight truck movements on major Washington highways, EWITS Research Report #9 offers a colorful portrait of profiles in tonnage. Profiles that characterize freight truck movements throughout the state and the tonnage of cargo transported via trucks and highways. The information from this rich data base regarding statewide truck freight and goods movement was obtained from the first state-wide freight truck origin and destination study in the nation. Employing over 300 people at 28 strategically located sites across the state, over 30,000 truck drivers were interviewed and probed for information about where they started, what they were hauling, where they were headed, and what roads they were going to use to reach their destination. Ninety-six percent of the truck drivers interviewed participated in the study which was conducted over four seasons to incorporate seasonality of freight movements. The primary data collection sites consisted of permanent truck weigh stations and ports of entry around the state.

According to the comprehensive study, approximately 8 million truck trips transporting 90.1 billions tons of cargo occur on Washington highways each year. The economic value of this cargo is estimated at over \$146 billion each year with over 500 different communities serving as either origins or destinations for truck trips on Washington highways. However, the study also highlighted the state's importance in the national and international transportation system with 25 percent of all truck traffic originating outside the state borders. Many trucks originating in Washington are also destined for places outside the state borders. Many trucks originating in

Western Washington and 35 percent of trucks originating in Eastern Washington are destined for locations outside the state. Trucks with the heaviest loads are typically from counties with a dominant agricultural and logging economic base and also generally have the lowest value per shipment.

Ken Casavant and Richard Mack. "The "Grain Train" in Washington State: An Evaluation of Internal and External Benefits." Washington State University, 1996.

This paper details findings of an economic analysis of the Washington State Department of Transportation Grain Train Project. The project entailed the purchase and oversight of 29 rail grain cars by the state of Washington for use by short line railroads in the eastern half of the state. Funding stemmed from monies received by the state from the U.S. Department of Energy as a settlement from oil companies that had overcharged customers. The analysis examines the utilization, performance, and regional impacts of the project. Underlying the analysis is the structure of internal efficiency and externalities.

As for physical utilization, the project achieved its initial target, resulting in 423 carloads in 1995. Financial evaluation of the project shows that operating revenues will not only cover operating expenses and replace the 29-car fleet when fully depreciated, but will be sufficient to increase the fleet to 140 cars by the end of the 23rd year. Even if the project had been financed at market rates, revenues would cover operating costs, replace the original cars, and increase fleet size to 91 cars.

Project management was found to be effective. Quantifiable impacts for 1995 of displacing trucking by rail cars totaled \$303,439. This was comprised of \$8,263 of safety savings, \$14,129 of fuel savings, \$92,320 of transportation charges saved by agricultural producers, and \$188,727 of avoided damages to state and county roads.

The project met most of its goals. Benefits derived from the project are such as to call for a consideration of how to increase the scope of the project in order to spread the internal and external benefits to more shippers and communities.

FRANK DOOLEY, NORTH DAKOTA STATE UNIVERSITY, 701-231-7452

Frank Dooley and Klay Walinga. "The Effect of Corn Processing Plants on Local Feed Markets." Report available from the Upper Great Plains Transportation Institute (U.G.P.T.I.)

Adding value to commodities has emerged as a dominant theme in agriculture. Corn milling is one area with much activity. This study models the effects of corn processing plants on local feed prices. The results are important to many of the entities involved, which include corn processors, corn producers and livestock feeders. A linear programming model is used to analyze the local price movements for corn and wet by-product under four different scenarios. Results are (1) selling wet by-product locally can reduce drying and corn costs while increasing by-product revenues and overall plant profitability, (2) prices are very sensitive to corn availability in the region, and (3) wet by-products from wet mills are more of a direct substitute for corn than those of a dry mill, yet dry mills of similar size have greater impacts on local corn price.

Frank Dooley and Suzanne Lahlum. "The Effect of Hazardous Materials Regulations on the Optimal Number and Size of Fertilizer Plants. Report available from U.G.P.T.I

This study attempts to determine how compliance with hazardous materials regulations affects logistic, operating, and investment costs of fertilizer plants and evaluate the effect on plant size and industry market structure. A cost-minimizing, mixed-integer linear programming model was employed in four different scenarios to analyze the effects of possible fertilizer regulation. Results show compliance with the regulatory guidelines will (1) start elimination of excess capacity, (2) generate cost savings of 8 percent for the industry, and (3) discourage storage capacity expansion.

Frank Dooley and Cynthia Miller. "The Effect of Procurement Relationships Logistical Policies and Costs." Report available from U.G.P.T.I.

A major logistical area where costs can be reduced is in inventory. The objective of this study is to explain the effects of close versus adversarial industrial buyer-supplier relationships on logistical and procurement policies and costs. A two-firm economic order quantity model was developed that minimizes costs of inspection, inventory, and quality (in terms of conformance), based on joint buyer and supplier costs. Results indicated that logistical costs can fall by 4.2 percent with a close buyer-supplier relationship because of reduced uncertainty and inspection costs.

JAMES W. DUNN, PENNSYLVANIA STATE UNIVERSITY, 814-863-8625

James W. Dunn and Gregory L. Harnish. "A Short-Run Analysis of Inland U.S. Barge Pricing for Grain." *Transport Gateways and Trade Corridors*. Canadian Transportation Research Forum, Barry E. Prentice, ed., 1996, Vol. 2, pp. 566-582 and Gregory L. Harnish and James W. Dunn. "A Short-Run Analysis of Grain Barge Rates on the Mississippi River System. *Proceeding of the 38th Annual Meeting of the Transportation Research Forum*. Vol. 2, 1996, pp. 557-572.

These studies, based on Harnish's M.S. thesis, address the economics of barge transportation for grain on the Mississippi River system. It first describes the system and the various forces acting in and on the system. Then an econometric model is estimated trying to explain rates for hauling grain. This study finds that the level of exports and coal rates are particularly important determinants of rates. Export levels are moderately important until they reach a level of about 1.35 mil. tons per week, at which time they become especially important. Labor rates, rail rates, and fuel prices are not very important. The effect of distance increases above St. Louis or on the Ohio River because of the delays caused by the locks and dams.

Richard Beilock, James Dunn, Barry Prentice, and Roger Clemmons. "Transportation-Related Problems and Opportunities for U.S./Mexican Produce Trade." *Proceedings of the International Conference on Harvest and Postharvest Technologies for Fresh Fruits and Vegetables*. 1995, pp. 638-644.

This study, done with Rich Beilock and Barry Prentice, had as its goal to achieve better understanding of the Mexican perishables distribution system. We talked to importers, exporters, transportation firms, transportation customers, and examined physical facilities in the major perishable distribution areas of Mexico. We found a system almost entirely dependent of trucks. Furthermore the system is based on the premise of negligible inventories. Cold storage facilities are almost nonexistent. Many (most) fresh fruits and vegetables in Mexico do not move by refrigerated truck. Most homes shop for fruit and vegetables daily and have very little home refrigeration capacity. As a result, in Mexico perishables are even more perishable than they need be because they are not handled in a manner to extend their useable life. The regular highways are congested, with unlimited access, and go through all of the towns. New limited access toll roads have been built but the tolls are prohibitively high and commercial vehicles are not using them. The prospect for a meaningful role for the national railroad in perishables' distribution is remote. Any outsider doing business in Mexico with perishable product will need to make dramatic adjustments in usual handling practices in order to maintain product quality.

Greg S. Condas and James W. Dunn. "The Economics of Hedging Dry Bulk Ocean Freight Using the Baltic Exchange." *Journal of the Transportation Research Forum*. 33(1993).

Greg Condas in his 1990 thesis studied ocean freight rate futures markets in detail and discussed the opportunities for hedging ocean freight changes using this market. Because the futures contract is based on an index of routes there is a lot of basis risk, even when hedging a movement included in the index. For movements that are not part of the index and especially for movements that are not part of heavily traveled dry bulk carrier movements, the basis risk is large enough to make hedging less valuable. In other parts of his thesis, Condas examined many other aspects of the performance of this futures market, including the price discovery process, price stability, forward pricing, intermarket price dynamics, and the statistical behavior of freight futures prices.

Richard Beilock, James Dunn, Barry Prentice, and Herman Guzman. "Logistics and Trade Expansion with Mexico." *Proceedings of the 36th Annual Meeting of the Transportation Research Forum*. Vol. 1, 1994, pp. 287-305.

With the passage of NAFTA, many of the legal barriers to expanded trade with Mexico have been removed and others will be phased out over time. There can be little doubt that increased trade will result. However, the extent and pace of these increases will depend, in large measure, upon the capacity of the logistical system. In this paper the Mexican logistical system and the interface with its U.S. counterpart are discussed.

This paper is based upon interviews, conducted by the authors, with policy makers, carriers, and shippers in Mexico, the United States, and Canada; secondary data; and previous studies. The paper is divided into four sections. In the first section, the overriding importance of motor carriage and its prospects in the future are addressed. In the second section, Mexican ports and railroads are discussed. In the next section, storage is discussed. In the final section, the findings are briefly summarized.

Frederico O'Campo, James Dunn, and Stephen Smith. "Infrastructure and Philippines Rice Productivity. *Proceedings of the 36th Annual Meeting of the Transportation Research Forum*, Vol. 2, 1994, pp. 777-784.

Efforts to increase third-world food supplies have concentrated on improving agricultural production with better varieties, diffusion of technology, and subsidies to fertilizer and other yield enhancing inputs, but have ignored the benefits of developing transportation infrastructure. This study examines the yield responsiveness of Philippine rice farmers to changes in national and local roads from 1972 through 1990. Using time series data from 12 regions, the study finds that various roads have a significant positive relationship with rice yield, with elasticity estimates ranging from 0.14 to 0.39.

KEN A. ERIKSEN, U.S. DEPARTMENT OF AGRICULTURE, 202-690-1328

Ken A. Eriksen is a transportation economist with the Transportation and Marketing Division of the Agricultural Marketing Service, USDA, and is also the current President of the agricultural chapter of the TRF. His research activities include the following:

- Assessing and observing court action and shipper response to the alleged unconstitutionality of the Harbor Maintenance Tax.
- Acquiring and assimilating an agricultural exports database by port district and country of destination.
- Performing an economic analysis and evaluation of agricultural exports through U.S. west coast ports by port district and country of destination.
- Assessing and evaluating potential increases in Canadian grain movements into the U.S.
- Assisting and evaluating the potential impacts to agriculture of a rail merger between Conrail and CSX or Conrail and Norfolk Southern.
- Updating and evaluating the 1989 "Transportation of U.S. Grains: A Modal Share Analysis." (see Jerry Norton for abstract).
- Assessing and evaluating long shore labor impacts on agricultural shipments.
- Evaluating Cargo Preference impacts on agricultural shipping.

EDWARD FITZSIMMONS, CREIGHTON UNIVERSITY, 402-280-2170

Edward Fitzsimmons. "Industry Performance During a Period of Regulatory Uncertainty." Working Paper.

Regulation of the oil pipeline industry was transferred from the Interstate Commerce Commission (ICC) to the Federal Energy Regulatory Commission (FERC) in 1977. Litigation and pressures for deregulation, however, prevented FERC from enunciating its own standards for rate regulation until the resolution of the Williams Pipeline case in 1985. Changes in FERC policy and industry pressure for regulatory reform continued until 1992 when Congress passed the Energy Policy Act mandating guidelines for rate regulation in the future. This paper presents a

counterfactual analysis comparing the actual performance of the oil pipeline industry during 1985-92 with performance predicted on the assumption that ICC practices had continued.

Edward Fitzsimmons and James Knudsen. "Market Share Instability Among Class I Railroads and the Impact of Deregulation." *Quarterly Review of Economics and Business*. Vol. 31, No. 2, Summer 1991.

Congress deregulated the railroad industry so that railroads would become more competitive. This policy change poses two questions. Did deregulation increase competition? And if it did, were post-deregulation levels of competition sustained or did railroads learn to avoid competition as they gained experience with the newly deregulated transportation industry. Using market-share instability as a measure of the level of competition, several measures of structural determinants of competition, and pooled time-series regression, evidence was found that competition did increase after deregulation but that market-share instability also began to decrease, suggesting that railroads were learning to avoid competition in the new regulatory environment.

Edward Fitzsimmons. "Factors Associated with Intramodal Competition Reported by Small Railroads." *Logistics and Transportation Review*, Vol. 27, No. 1, March 1991, pp. 73-90.

This paper analyzes the impact of structural characteristics of rail transportation markets on the incidence of intramodal competition reported by small railroads. Two hypotheses are tested. The first hypothesis states the probability that a railroad will experience intramodal competition depends upon the diversity of its service mix. The second states that probability that a railroad will experience intramodal competition depends upon characteristics facilitating customer choice. Some support for both hypothesis is found.

Edward Fitzsimmons, Wade German, and Michael W. Babcock. "Intermediate-Term Rail Market Analysis," *Transportation Quarterly*. October 1991, pp. 555-570.

In the area of intermediate-term railroad planning, special attention must be given to cyclical fluctuations in the economy and to the relationship between these macro-cyclical events and cyclical fluctuations in the railroad industry. This article identifies a set of techniques that can be used to identify and measure cyclical behavior in railroad output and prices. The cyclical analysis has four steps: (1) identifying related sectors in the economy for use as bench marks; (2) isolating the trend and cyclical components in rail traffic and benchmark economic data; (3) comparing the cyclical component in the rail traffic volume data series with the cyclical component in the benchmark data series; and (4) integrating trend and cyclical components to predict their effects on railroad traffic volume. The four step analysis is applied to the rail market for transportation of construction materials.

JERRY FRUIN, UNIVERSITY OF MINNESOTA, 612-625-8720

Jerry Fruin and Dan Halbach. "The Relationship of Fuel Consumption and Road Surface Quality." *1996 Semisesquicentennial Transportation Conference Proceedings*, May 1996, pp. 40-41.

The purpose of this article is to determine the difference in fuel consumption of a vehicle due to road surface type and quality. Rural road sections in two Minnesota counties (Dakota and Chicago) were studied. The road surfaces included new bituminous, gravel surfaces of varying condition and aggregate composition, and one dirt surface. Photos and video of the test sections help to identify and record road conditions.

A DYANAFAC on-board dynamometer and computer developed by Banks Technologies was installed in a 1994, ½ ton, 4X4 extended cab pickup. Baseline chassis dynamometer laboratory runs were done to determine rear wheel horsepower to check and calibrate the on-board dynamometer. The DYANAFAC system computes horsepower based on a vehicle's velocity (mph), acceleration, mass (vehicle weight) and vehicle drag characteristics. Given these parameters, a microprocessor can mathematically calculate horsepower. An analysis of horsepower and fuel requirements is presented by vehicle speed and tire pressure for each surface type.

Accurate knowledge of increased cost due to the quality of road surface is very important if we are to determine the most cost/effective methods and procedures for deciding when, where and to what extent rural roads should be maintained or upgraded. The existing information often used by various studies (see "Vehicle Cost on Paved, Granular, and Earth Surfaced County Roads" by Hanson, Hamlett, Pautsch, and Baumel, TRF Proceedings 1985) is based on data from Roble Winfrey's work at the Iowa Engineering Experiment Station in the 1920s and 1930s (see "Automobile Operating Cost and Mileage Studies" by Winfrey, Iowa State College of Agriculture and Mechanic Arts, Vol. 30, No. 8, July 22, 1931). Current vehicles (and rural roads) are not comparable to those that existed when the Winfrey studies were done. The resulting cost estimates and methodology using these new technologies will be useful to researchers and officials evaluating alternative investment, disinvestment, and maintenance strategies for funding rural roads.

Doug Tiffany, Janelle Brown, and Jerry Fruin. "Using Arc View for Multiple Application Modeling of Biomass to Energy Systems." Working Paper.

This research is part of the Minnesota Agri-Power Project coordinated by the University of Minnesota Center for Alternative Plant and Animal Products (CAPAP) of the Minnesota Valley Alfalfa Producers. The objective of the overall project is to construct and operate a 75 megawatt power plant at Granite Falls, Minnesota. The plant would be fueled by gasified biomass (alfalfa stems). An important part of the economic feasibility of the project depends on the market for the alfalfa leaves which would be separated prior to gasification as well as crop yields and quality factors. When the power plant comes online, there will be a requirement for 700,000 tons of

alfalfa bales harvested on 140,000 acres from more than 1,000 farms within a 100 mile radius of Granite Falls.

This study demonstrates the use of commercial mapping software for leaf meal plant location decisions as the number of processing plants increase from the pilot stage to after the plant comes online. The study also uses a number of other optimization techniques such as plant assignment, intermediate storage decisions, and least-cost routing. The model demonstrates extensions from the traditional uses of transportation studies developing yield estimates, quality estimates and risk factors obtained by analyzing factors such as soil type, plant variety, cropping histories, and weather history by township and/or field.

Sabit Khazimzhanov and Jerry Fruin. "An Analysis of Agricultural Barge Movement Trends on the Inland Waterway System" Working Paper.

This study is an analysis of the "intertemporal" spatial economy of transporting agricultural commodities on the system of inland waterways for the period of 1980-92. The main purpose is to isolate the effects of different macroeconomic events on the shipment pattern of grains, feed products and fertilizers.

The paper includes an empirical analysis of barge movements of several categories of agricultural commodities. Information on waterborne receipts and shipments comes from annual reports entitled *Waterborne Commerce of the United States* by the U.S. Army Corps of Engineers. This very detailed and comprehensive source of data is a compilation of all barge movements on U.S. waterways.

We developed a dataset which contains all shipments of grains, feed products, and fertilizers on the Inland Waterway System for 1980-92 between 33 origin and destination river ports. A standard general equilibrium model complemented with spatial economics analysis sometimes fails to model and explain the dynamics of bulky agricultural commodity movements in shallow draft waterways. Our approach was to blend descriptive and analytical methods to investigate several nontrivial observations about the waterway movements of agricultural commodities without being bound to incorporate them into the formal model. Beginning with a simple network flow model of transportation for barge industry planning, we isolated the basic set of industry constraints shaping the barge rate structure. Then we employed this simple model for defining the equilibrium of agriculture and the multimodal transportation system subject to the exogenous world demand.

One of the main trends in recent years is that grains are partially redirected to grain processing sites for ethanol production near the Lower Ohio, Tennessee and Illinois ranges. By-products were then shipped in the form of animal feeds from these locations to both export and domestic destinations.

Arthur Friesen and Jerry Fruin. "A Survey of Farm-to-Market Grain Movements." 1996 *Proceedings of the Canadian Transportation Research Forum*. Winnipeg, Manitoba, May 1996, pp 339-350.

This study is a descriptive analysis of farm-to-market grain movement in Minnesota. Farmers in three areas in Minnesota (Crop Reporting Districts 1, 7, and 9) were randomly sampled. Survey responses from 651 farmers were obtained. Farmers identified the number and type of grain hauling equipment owned, the type of market to which their 1994 grain was delivered and the distance by road surface to market. Transportation furnished by commercial haulers or grain buyers was identified.

Farmers in Districts 1 (the Northwest) and 7 (the Southwest) identified the local elevator as the first point of sale for the majority of their grain, 93 and 80 percent, respectively. Terminal and local elevators received nearly equal proportions of the marketed grain in District 9 (the Southeast). Average delivery distance to a local elevator in District 1 is 10.8 miles, 4 miles longer than in Districts 7 and 9. Approximately 80 percent of farmers delivering to a local elevator, deliver to the elevator closest to their farm.

Commercial haulers and grain buyers hauled 21 percent of all the grain delivered to market in the three districts combined. The grain hauling activities of commercial haulers were most intensive in District 9 where they delivered 43 percent of the grain marketed. District 9, which is contiguous to river terminals along the Mississippi and Minnesota Rivers, had the largest proportion of grain delivered to terminal elevators, by tractor trailers, and by commercial haulers. The average delivery was longest for tractor trailers and shortest for gravity wagons.

A large percentage of grain was hauled on gravel surfaced roads but generally for only a small part of total distance to market. Approximately half the distance of an average trip to market was made on good black top roads with the remaining portion on gravel, multi-lane hard surface, and poor black top in decreasing order. Although a substantial proportion of the bushel-miles were hauled on black top roads, these roads make up a relatively small proportion of the available mileage in each district.

An analysis of ownership of tractor trailers, tandem axle trucks, straight trucks, grain carts, and gravity wagons is presented, including data on the size, age, and annual mileage of trucks and the occurrence of lights, brakes, and type of tire on grain carts and gravity wagons. Ownership and use of equipment has regional differences. Farmers in each district favor a particular type of equipment. Farmers in District 1 own the most tandems and use them to haul nearly 70 percent of the grain marketed. Gravity wagons are the most abundant type of grain hauling equipment in Districts 7 and 9. Farmers in District 7 use gravity wagons to deliver the largest proportion, nearly 35 percent, of their grain to market. Farmers in District 9 use their tractor trailers to deliver the largest proportion of their grain to market.

STEVE FULLER, TEXAS A&M UNIVERSITY, 409-845-1941

Steve Fuller and L. Fellin. "Effect of Proposed Waterway User Tax on U.S. Grain Flow Patterns and Producers." *Journal of the Transportation Research Forum*. Vol. 37. No. 1 1997 (forthcoming).

The Clinton administration recently proposed the barge fuel tax be increased from \$0.20/gallon to \$1.20/gallon. Because the increased tax could have important implication for U.S. agriculture, quadratic programming models of the soybean/corn sectors are used to evaluate

the impact on flow patterns, producer prices/revenues and export levels. Results show the tax increase would divert 10.6 million metric tons from the inland waterways; 70 percent of the diversions are from the upper Mississippi/Illinois systems. The lower Mississippi River port area is projected to lose 9 million tons, while Gulf, Great Lakes, North Atlantic and Pacific Northwest ports increase by 3.35, 1.49, 1.74 and 1.4 million tons, respectively. Soybean/corn producers in Minnesota, Illinois and Iowa incur annual revenue losses of \$151 million and about 75 percent of the expected decline in all producer revenues. Exports of U.S. soybeans are nearly unchanged with the proposed tax increase while corn exports decline 2.16 percent. If the proposed tax were implemented, barge-transported soybeans/corn would increase federal revenues \$89 million per year. The proposed tax increase had unfavorable implications for U.S. producers, grain handling/exporting industries and barge transportation firms, however, the impact is not judged to be calamitous.

Steve Fuller, Melanie Gillis, and Houshmand A. Ziari. "Effect of Liberalized U.S.-Mexico Dry Onion Trade: A Spatial and Intertemporal Equilibrium Analysis." *Journal of Agricultural and Applied Economics*. 28, 1 (July 1996): 135-147.

A spatial intertemporal equilibrium model of the North American dry onion economy is constructed to analyze the impact of liberalized U.S.-Mexico trade. In a free-trade environment, exports of Mexican onions to the U.S. are projected to increase about 50 percent, while Mexico's share of the U.S. market increases from 8.7 to 12.8 percent. Farm-level prices in the U.S. are projected to decline 8.9 percent, while production declines 2.4 percent. The effect of free trade on the U.S. producers is disproportional across regions. Northwest storage onion producers experience the greatest decline in production; however, analysis suggests that improved storage methods may offset a portion of the unfavorable impacts of liberalized trade on these producers. In spite of the unfavorable impact of free trade on U.S. dry onion producers, the industry would not be economically devastated.

John Schmitz and Steve Fuller. "Effect of Contract Disclosure on Railroad Grain Rates: An Analysis of Corn Belt Corridors." *The Logistics and Transportation Review*. Vol. 31, No. 2, June 1995, 99. 97-124.

This study evaluates the impact of railroad contract disclosure regulation (PL99-509) on rail rates for corn on four important shipment corridors. After the passage of this regulation, rail rates increased on corridors with no direct barge competition while rates decreased on corridors with substantial direct competition from barge traffic. The paper concludes that such rate change patterns may be a result of increased information combined with the highly concentrated structure of the rail industry.

Laurence M. Crane, Pat Pinnoi, and Steve Fuller. "Estimating Demand for Public Rural Roads in Texas." *The Review of Regional Studies*. Vol 24, No 1, Fall 1994, pp. 195-209.

Following Bergstrom and Goodman, private demand functions for publicity provided rural roads in Texas are estimated at the county level. Results show the effect of income and tax rate (price) to have the expected effect and the demand for rural roads to have changed over time. In particular, demand has become more inelastic, and the influence of income on demand has moderated.

**GENE C. GRIFFIN, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-8343**

Gene Griffin is currently Director of the Upper Great Plains Transportation Institute at North Dakota State University. Griffin is also Director of the Mountain-Plains Consortium, a four university, six state federally funded regional consortium to conduct transportation research and education. He is also the Executive Director of TELB, a telecommunications system dedicated to transportation in Region VIII. He has more than 20 years of experience in transportation as a researcher and as a research administrator. Griffin has conducted research in the areas of rail, motor carrier, public policy, and rural and agricultural transportation. He has published 18 technical reports, 30 staff papers, 27 verified statements, testified in several transportation regulatory proceedings, and conducted transportation consulting on a national and international basis. His current research interests include logistics as a tool for economic development, motor carrier safety issues, truck driver retention, motor carrier management, low volume roads, and agricultural transportation and logistics.

Gene Griffin, Kimberly Vachal, Kevin Andres, and Matt Titus. *ProGold Corn Plant Analysis I and II*.

The Transportation Institute participated with the North Dakota Department of Transportation and the Public Service Commission in a joint development and presentation of an analysis prepared for the Governor's Task Force created to attract the plant to North Dakota. The analysis covered corn acquisition costs, North Dakota's rail and highway system, and the Local Freight Assistance Program.

A second follow-up analysis was conducted at the request of the Governor's Task Force which addressed implications for North Dakota producers of alternative plant sites. The analysis covered corn acquisition costs, a center of gravity model of ProGold subscribers and shares, and corn gathering costs. The resulting analysis indicated that North Dakota has an acquisition cost advantage over South Dakota and that locating the plant in South Dakota would cost the majority of the shareholders a substantial amount of money.

**HERMAN GUZMAN, CORPORATE TRANSPORTATION MANAGER, DEL MONTE
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Mr. Guzman was born and raised in Mexico City, Mexico. He studied business administration and economics at the Instituto Tecnológico y de Estudios Superiores de

Moneterrey (B.S. 1987), and Economics and International Trade at the University of Manitoba (M.A. 1991).

Herman Guzman is the Corporate Transportation Manager of Del Monte Fresh Produce. Del Monte Fresh Produce is one of the largest shipper-growers of fresh fruit and vegetables in the world. Mr. Guzman has been with Del Monte since 1995. His major tasks have been the development and implementation of a "Core Carrier" transportation program for Del Monte Fresh Produce, N.A. Inc., as well as freight rate negotiations, carrier selection, and developing a distribution program for domestic production.

Before Del Monte, Mr. Guzman was the Regional Manager of International Banking for Bancomer, S.A., the second largest bank in Mexico. In this position, he developed successful export programs and acted as a consultant in logistics and international trade for different clients.

Mr. Guzman has co-authored two publications with Dr. Barry Prentice while working as a Research Associate at the Transport Institute, University of Manitoba. His research included analysis of the transportation and distribution options of Canadian grain exports to Mexico. He chaired the session: *Trucking in the NAFTA Environment*, at the Canadian Transportation Research Forum, 31st Annual Conference, 1996, Winnipeg, Canada.

Mr. Guzman is a member of several transportation related organizations: American Production and Inventory Control Society (North Texas Chapter), Transportation Research Forum (Agricultural and Rural Transportation), and Council of Logistics Management.

KARL HACKER, U.S. DEPARTMENT OF AGRICULTURE, 202-690-0152

Karl Hacker is an agricultural economist with the Transportation and Marketing Division of the Agricultural Marketing Service, U.S.D.A. His main activity is editing the *Grain Transportation Newsletter*, which covers developments affecting the transportation of grain, both in the domestic and international marketplace. The publication provides statistical information on rail, barge, and vessel loadings and deliveries, along with other information impacting the movement of grain from the farm to the marketplace. Some of the data is collected directly, while other information is obtained from secondary sources such as other agencies in the USDA or outside organizations. The data also allows for a brief analysis of the current state of the transportation sector and its effect on the grain industry and vice versa. Also, the report is currently being revised to increase the efficiency and accuracy of data as well as to expand its availability by making it electronically accessible. Karl's other duties include responding to questions and inquiries from those interested in information in the newsletter and issues concerning the grain industry.

JILL HOUGH, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE, 701-231-7767

Jill Hough has six years of experience in transportation. She has B.S. and M.S. degrees in Agricultural Economics from North Dakota State University. Since joining the U.G.P.T.I., Hough has performed research in the areas of rural economic development, logistics, rural transit, and low-volume roads. Hough has helped orchestrate a low-volume road research and service

program. The program goals are to research and inform state and county road officials about timely low-volume road topics in Region VIII. She is a member of the Transportation Research Forum and was one of the co-authors for the outstanding paper award in 1992, presented by the agricultural chapter of TRF.

Jill Hough, Ayman Smadi, and Gene Griffin. *An Assessment of Rural Road Needs.*

The objective of this project is to analyze the differences in perceptions of rural road needs between rural road providers and rural road users in order to determine if the users needs are being met. After the rural road users' perceptions have been identified, more accurate attempts can be made to use innovative and efficient methods to meet their needs in the future.

Jill Hough and Denver Tolliver. *Optimum Size of an Effective Transit Agency in Rural or Non-Metropolitan Areas.*

The objective of this project is to determine the optimum size of rural transit systems located in rural or non-metropolitan areas in order to maximize efficiency and effectiveness. Determining the optimum sizes of transit systems will help allocate scarce resources within the transit industry.

Jill Hough and John Bitzan. *Performance Evaluation Workbook for Rural and Small Urban Transportation Systems.*

The workbook is being developed as a supplement to the performance evaluation guidebook to provide transit operators with an easy to use method to conduct system performance evaluations on an annual basis. The workbook will enable operators to organize their evaluations, calculate the performance indicators, identify system areas in need of improvement, and select from suggested remedies for improvement.

Jill Hough. *Logistics of the U.S. Wheat Industry.*

The objective of this project is to describe the basic workings of the complex wheat logistics system with a special emphasis on transportation. Condensed educational materials are being produced from this report to inform producers about complex issues, such as transportation costing, within the logistical system.

Jill Hough and Angela Dauner. *Red River Trade Corridor Logistics Services.*

The objective of this report is to consider the availability of logistical services for non-bulk commodities or manufactured goods in and through the Red River Trade Corridor. The report contains a description of the logistical services necessary for trade between the United States, Canada, and Europe. In addition, the report contains a directory of select logistical services in Fargo and Grand Forks, North Dakota, and Winnipeg, Manitoba.

BARTON E. JENNINGS, UNIVERSITY OF TENNESSEE, 423-974-8945

Edwin P. Patton and Barton E. Jennings. "Grade Crossing Investment Decisions and the Continued Coring of the U.S. Railroad Industry" *Proceedings of the Fourth International Symposium on Railroad-Highway Grade Crossing Research and Safety*, The University of Tennessee Transportation Center, October 8-10, 1996, Knoxville, Tennessee (awaiting publication).

This article and presentation examine the trends of rail line consolidation found in the United States railroad industry and how this consolidation affects investment decisions by both the railroad and public agencies. More specifically, the research divides rail lines into different categories based upon such characteristics as signalization, rail weight, and siding spacing. Historical trends are then used to predict future train volumes, ownership, and even existence based upon the rail line category. It is argued that public investment in such items as grade crossing safety devices should recognize these trends and should use them to determine future benefits of the improvements and investments.

Barton E. Jennings and Mary Collins Holcomb. "Beyond Containerization: The Broader Concept of Intermodalism" *Transportation Journal*, Vol. 35, No. 3, Spring 1996, pp. 5-13.

This article examines the movement of bulk materials (i.e.: plastic pellets, grains, chemicals, sands and gravels, coal, salts, coiled steel, etc.) that involve a multimodal transportation option. More specifically, the research examines the benefits and disadvantages of this "transload" of materials between modes of transportation and how they apply to shippers, carriers and third party providers of such facilities. Based upon case studies of more than forty firms as well as historical information, the paper argues that the volumes and values of material moving in such a manner are enormous and that the coordination of intermodal activities under the Intermodal Surface Transportation Efficiency Act must also include these movements to provide true benefit to the shipping community.

Frederick J. Wegmann, Arun Catterjee, Martin Lipinski, Barton E. Jennings, and R. Eugene McGinnis. *Characteristics of Urban Freight Systems (CUFS)*, The University of Tennessee Transportation Center, December 1995.

The volume provides an overview of research in the area of urban freight movement. It includes information on volume prediction, carrier operations, accident and incident rates, loading zone characteristics, trip rates, and other information of use to an urban planner. Also included are recommended industrial standards for design or use of various facilities and equipment as well as original research into the impact upon freight movement of various decisions made by urban designers.

ERIC JESSUP, WASHINGTON STATE UNIVERSITY, 509-335-5558

Eric Jessup and Ken Casavant. "An Economic Evaluation of Benefits of State Purchase of Proposed Rail Line in Washington State." Washington State University, 1996.

This paper reports on a study of state purchase of a proposed rail line abandonment in Washington. The central question was whether the state should intercede and purchase the lines, circumventing a potential sale to a short line. This bold step would be predicated on the assumption that any short line, to maintain profitability, would abandon part of the acquired line. To avoid this, the state would purchase the line and lease it back to the short line with the stipulation that all trackage remain in place and service be available to shippers.

The analysis examines the characteristics of the line as to traffic volume, modal competition, road damage avoidance, etc. An examination of internal and external benefits of the action forms the analytical framework of the study.

Results indicate that transportation cost to shippers is decreased significantly with the purchase and maintenance of the line. Infrastructure damage is decreased dramatically compared to the loss of the line, over \$625,000 annually. An internal rate of return to the state was very favorable and the probability of maintaining the lines increases.

The paper concludes with a sensitivity examination of the assumptions of the analysis and the resultant policy implications.

Eric Jessup and Ken Casavant. "GIS Grain Flow Model Application: Estimating Value of Rail Car Access." Washington State University, 1996.

Harvest time in Eastern Washington is usually accompanied with much discussion among grain producers and elevator operators about rail car shortages. Obtaining access to the much demanded grain rail cars is often difficult and alternative (higher cost) transportation methods are often required for transporting grain to market. The increased shipping cost, as a result of rail car shortages, impacts producer profits negatively and generates more truck traffic on roads and highways. Individually, producers are well informed about the per bushel differential between shipping grain via rail and the next best alternative, but information on the value of having access to rail cars (or alternatively, the cost of not having access to rail cars) has been unclear prior to the development of the GIS grain flow model.

The rail car shortage problem for grain shipments is one of the multitude of applications of the GIS grain flow model developed from EWITS. This grain flow model accounts for all shipments of grain (both wheat and barley) from production locations to final markets at Portland, Oregon or cattle feedlots in the Columbia River basin region. The model provides a very realistic view of how grain from eastern Washington is actually transported to market including all intermediary destinations such as elevators and river ports and use of truck, rail and barge modes. Transportation routes are determined using a cost minimizing linear program with constraints on the volume of grain allowed to be shipped via rail. Rail capacity constraints are initially set to historic levels to determine the value of rail car access. Sensitivity analysis is then performed,

increasing and decreasing the rail capacity constraints, to identify changes under more (less) severe rail car shortage scenarios.

According to the recent study, titled "Estimating the Value of Rail Car Accessibility for Grain Shipments: A GIS Approach," the value of having access to rail cars varies from \$109.8 per rail car in the most optimistic car availability scenario to \$128.9 per rail car in the most restrictive car availability situation. The value of rail car access also depends on location and varies with distance to the Columbia River. For counties near river port facilities, the value of rail car access is estimated at \$35 per rail car whereas counties further from the river reach as high as \$396 per rail car.

The study uses an unconventional approach to investigating the annual occurrence of rail car shortages in Eastern Washington. By combining the two technologies for commodity flow modeling, considerable gains are realized in modeling flexibility and robustness. A full description of the methodology and results is provided in EWITS Working Report #5, "Estimating the Value of Rail Car Accessibility for Grain Shipments: A GIS Approach."

KEITH A. KLINDWORTH, U.S. DEPARTMENT OF AGRICULTURE, 202-690-1312

Keith A. Klindworth is the Director of the Marketing and Transportation Analysis Group (MTA) in the Agricultural Marketing Service (AMS) of U.S.D.A. The group consists of a staff of 11 economists, one traffic manager, and one agricultural engineer. Other program activities of MTA are:

- Conducting analyses of marketing and transportation problems and issues associated with domestic and international distribution of agricultural commodities. These studies support policy determinations, regulatory decisions, and legislative proposals.
- Estimating the economic impact upon agriculture of proposed changes in transportation rates and services, and representing agricultural interests before state and federal regulatory agencies.
- Maintaining liaison with federal and state agencies and research organizations involved with international agricultural trade, marketing, and transportation matters.
- Evaluating the impact of changing distribution channels and economic conditions on the nature and scope of domestic market operations and marketing trends.
- Evaluating transportation or marketing conditions or requirements that may restrict access to markets for U.S. agricultural products or which may present new opportunities for U.S. agricultural products.

Keith's most recent publication is "Shipping U.S. Grain to Mexico," an analysis of the logistics of shipping U.S. grain to Mexico. Keith has been Treasurer of the agricultural chapter of TRF for many years.

WON W. KOO, NORTH DAKOTA STATE UNIVERSITY, 701-231-7448

Won W. Koo, Denver D. Tolliver and John D. Bitzan. "Railroad Pricing in Captive Markets: An Empirical Study of North Dakota Grain Rates." *Logistics and Transportation Review*, 1993, Vol. 29, No. 2, 123-137.

Railroad pricing behavior in shipping agricultural commodities from North Dakota to domestic and export destinations is examined by using an econometric technique with cross-sectional data from 1984 to 1989. North Dakota is a typical captive market where intermodal and intramodal competition is highly limited. However, intermodal and intramodal competition are significant factors that influence rail rates. The findings of this study suggested that the degree of captivity varies within the state. In addition, rail rates are very sensitive to distance, volume, and weight per car. This study also indicates that rail rates for wheat are higher than those for corn and soybeans, which are produced heavily in water competitive regions.

James R. Jones, Lu Qu, Kenneth L. Casavant, Won W. Koo. "A Spatial Equilibrium Port Cargo Projection Model." *Maritime Policy and Management*, 1995, Vol. 22, No. 1, 63-80.

A mathematical spatial programming model developed to analyze changes in international and hinterland commodity flows through a regional port system is applied to wheat shipments through the U.S. Pacific Northwest port system. Two scenarios, one focusing on a Chinese quarantine on wheat shipments from the Pacific Northwest and the other on possible closure of barge transportation on the Columbia-Snake River, illustrate the capacity of the model to evaluate the impacts of international and hinterland shocks on the regional port system.

Weining Mao, Won W. Koo, and Mark A. Krause. "World Feed Barley Trade Under Alternative Trade Policy Scenarios." Agricultural Economics Report No. 350, 1996, Department of Agricultural Economics, North Dakota State University.

A spatial equilibrium model based on a quadratic programming algorithm was developed to analyze world feed barley trade and international competition among major exporters (Australia, Canada, the European Union, and the United States) under the current and alternative trade policy scenarios. The U.S. Export Enhancement Program plays an important role to maintain U.S. market share in importing countries. Eliminating Canadian rail subsidy decreases Canadian offshore exports, but greatly increases its exports to the United States. This is mainly because transportation costs in shipping agricultural commodities from Canada to offshore markets are much higher than those from Canada to the United States after elimination of the rail subsidies. The North American Free Trade Agreement increases feed barley trade within North America but has little impact on world flows of feed barley.

Won Koo and Jerry Fruin. "Methodology and Data Systems for Study of Transportation," in *Transportation Research Needs and Issues of Chinese Agriculture*, ed. by Donald W. Larson, Ohio State University, July 1994, pp. 21-32.

The objective of this study is to examine the basic modeling techniques applied to transportation systems for agricultural products to analyze how a transportation system can improve the efficiency of agricultural production through production specialization in the Chinese agricultural sector. The paper is principally concerned with the discussion of deterministic optimization models, such as quadratic programming. The authors point out that these models

can be used to optimize the Chinese agricultural transportation system. Production activities are also incorporated in the models. The authors discuss the data requirements to implement the models.

**BRENDA LANTZ, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-7767**

Brenda Lantz completed a masters degree in statistics with an emphasis in transportation research at North Dakota State University. Her research focused primarily on the motor carrier industry and she has worked at the Institute as a research assistant since 1990. Her future plans include continuing her work at the Institute and eventually pursuing a doctoral degree in transportation. Lantz has authored and co-authored numerous publications concerning various aspects of the motor carrier industry and has assisted with many others. She has also spent a summer with the U.S. Department of Transportation, Federal Highway Administration, Office of Motor Carriers in Washington, D.C. Lantz has been designated a Fellow of the Eno Center of Transportation Leadership Development. She also received the TRF graduate student paper award.

Brenda Lantz. Evaluation of Differences Between Spontaneous and Anticipated Inspections of Medium and Heavy Trucks in a Highway Environment.

This study evaluates what, if any, differences exist between "anticipated" inspections (i.e. those conducted at weigh stations) and "spontaneous" ones. This should result in improvement of the roadside inspection process and a more efficient use of resources.

Brenda Lantz, Gene Griffin, and Matt Titus. Improving Motor Carrier Safety by Developing a Partnership Among the Federal Government, the States, and the Trucking Industry Through the Motor Carrier Safety Assistance Program.

This study identifies the perceptions of the Motor Carrier Safety Assistance Program (MCSAP) by those who administer the program and those whom the program applies to. Also, suggests methods of gaining support for the program by client groups in order to increase its effectiveness and improve motor carrier safety.

Brenda Lantz and Matt Titus. 1995 North Dakota Motor Carrier Directory.

This directory is a list of motor carriers operating in North Dakota. Includes amount and type of equipment, type and scope of operation, as well as the primary cargo carried. A separate listing of grain haulers is also provided.

Brenda Lantz. Development of an Inspection Selection System (ISS) to Aid Inspectors.

This study examines the development of a system which would be available to inspectors at the roadside to assist them in deciding whether or not to inspect a particular commercial vehicle. Characteristics determining the probability a vehicle is recommended for inspection include the number of previous inspections the carrier has had relative to their size, their out-of-service rates, and results from any safety or compliance reviews which have been completed on the carrier.

Brenda Lantz and Gene Griffin. *Truck Driver Family Issues Assessment Study*.

This study examines the dissatisfaction of drivers associated with issues relating to the family. This dissatisfaction is seen as one major reason for high turnover rates in the trucking industry. The study determines the nature of the trucking family environment and finds ways to apply this information to programs of intervention and support useful to trucking companies.

Brenda Lantz. *Development of a Predictive Model to Ascertain Probable Safety Ratings for Motor Carrier Firms: A Nationwide Perspective*.

This study examines the feasibility of developing a model from data collected by the Federal Highway Administration to ascertain the probable likelihood of a certain safety rating for motor carrier firms. This would enable efforts to be concentrated on those firms with the least chance of achieving a satisfactory rating. Models are developed both for North Dakota and the nation as a whole.

DONALD W. LARSON, OHIO STATE UNIVERSITY, 614-292-6229

Donald Larson and Chris Alexander. "Soybean Movements by Rail in the United States." Working Paper. Ohio State University, May 1995.

This study traces the major railroad movements of soybeans between states, regions, and Business Economic Areas (BEAs) using the 1992 Public Use Waybill data published by the former Interstate Commerce Commission (ICC). The production of soybeans is highly concentrated in the Corn Belt (Iowa, Missouri, Illinois, Indiana, and Ohio) and this region accounts for two-thirds of the railroad originating shipments. Substantial railroad soybean shipments originate as well in the Northern Plains (Kansas, Nebraska, South Dakota, and North Dakota). Soybean destinations are more widely dispersed across the U.S. but seem to be located near major water transportation routes. The major problem of the study is the large number of railroad shipments that did not disclose the origin and/or destination of the shipment due to data reporting rules.

Roland R. Robinson and Don W. Larson. "Possible Joint Chinese and U.S. Grain Transportation and Distribution Research Opportunities." in *Transportation Research Needs and Issues for Chinese Agriculture*, ed. by Donald W. Larson, Ohio State University, July 1994, pp. 45-58.

The purpose of this paper is to examine possible opportunities for international collaborative research in general and suggest some issues for joint research in grain transportation and distribution. These interests and opportunities are examined in four sections of the paper. The first section describes the organization and administration of publicly supported agricultural research in the U.S., particularly the U.S. Department of Agriculture, the Land Grant Universities and the State Agricultural Experiment Stations (SAES). The second section discusses the concept of regional research programs and the growing interest in international research. The third section discusses the benefits from cooperative research and opportunities for possible joint Chinese and U.S. grain transportation and distribution research. The paper addresses some possible strategies for moving ahead in transportation research using an international collaborative approach in the last section

TOM MAZE, IOWA STATE UNIVERSITY, 515-294-8103

Tom Maze. "Midwest Multi-State One-Stop Electronics Purchase of Motor Carrier Credentials." Center for Transportation Research and Education (CTRE), Iowa State University, 1996.

This project is Federal Highway Administration Sponsored Operational test. CTRE was the project developer and is the project manager. The original project partners included the state Departments of Transportation of Minnesota (the lead state and managed through MinnDOT's Guide Star Office), South Dakota, Nebraska, Kansas, Missouri, Illinois, Wisconsin, and Iowa, the American Association of Motor Vehicle Administrators, the ATA Foundation Western Highway Institute Lockheed-Martin IMS, and Rockwell International.

The two main objectives of this project are to (1) design and test a simple, easily deployable low cost, and upwardly compatible one-stop electronic system for the purchase of motor carrier credentials that will make it possible for a motor carrier to apply for, and receive all the necessary credentials or permits electronically from either the base state or the necessary individual states, and (2) evaluate the improvements in both state and motor carrier productivity offered by streamlining the process for motor carriers to purchase credentials by utilizing a simple, easily deployable, low cost, and upwardly compatible one-state electronic system.

Tom Maze. "Statewide, Non-NHS Federal Aid Eligible System, Pavement Management Program." Center for Transportation Research and Education (CTRE), Iowa State University, 1996.

The purpose of this project is to develop a pavement information system for the state of Iowa that will include the non-National Highway System and Federal Aid Eligible highways. Originally, this project started as the Iowa statewide pavement management system as mandated by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. When the National Highway System Act was passed by Congress in 1995 relaxing the previous mandate, participation in the project by Iowa cities, counties, and regional governments became voluntary. However, the majority of Iowa governments are still planning to participate.

CTRE is responsible for building the database in a dynamically segmented GIS environment, populating the database with pavement historical information, supervising the collection of pavement condition data, disseminating the data back to governmental organizations, and assisting all governmental agencies in performing their pavement management functions. This project is being sponsored by the Iowa Department of Transportation through the Office of Program Management. The project is being supervised by a project advisory committee and subcommittee consisting of Iowa Department of Transportation staff, city representatives, representatives of regional governments, and county engineers.

Tom Maze. "Oregon Green-Light Evaluation: An ITS-CVO Electronic Verification Project." Center for Transportation Research and Education (CTRE), Iowa State University, 1996.

The objective of the Oregon Green Light Operational Test is to provide mainline preclearance for commercial vehicles, utilizing and integrating several technologies: WIM, AVI, VMS, transponders, etc. Information will be exchanged between the commercial vehicle operator and the Oregon Department of Transportation at the port-of-entry, where it will be checked for proper registration, tax status, and safety information. If the data are in compliance, the vehicle will be instructed to proceed through the inspection station.

The objectives of the evaluation are to:

- Assess Safety (compliance with size and weight, out-of-service, accident issues, etc.).
- Assess Productivity (more efficient tax processing and collection, improved auditing effectiveness, and lower tax evasion).
- Assess User Acceptance - both agency and motor carrier.
- Assess Institutional Issues - assess the impact on users, document any changes.
- Assess Non-Technical Interoperability Issues - note any changes and resolve any issues.

J. REILLY MCCARREN. WISCONSIN CENTRAL RAILROAD 618-624-4701

Reilly recently moved to Chicago to assume his new duties as Executive Vice President and Chief Operating Officer of Wisconsin Central Railroad. Reilly was formerly an executive for Gateway Western Railroad, one of the larger regional railroads.

B. STARR MCMULLEN. OREGON STATE UNIVERSITY. 541-737-1480

B. Starr McMullen and Joe Kerkvliet. "The Impact of Unionization on Motor Carrier Costs." *Economics Inquiry*. Forthcoming April 1997.

This research finds that union trucking firms have significantly different cost structures than non-union firms even after controlling for higher unionized labor costs. The translog cost function approach used here incorporates a unique dummy variable technique to test not only for overall differences in union/non-union costs, but also to identify which individual cost function parameters differ between the two types of firms. Results suggest that unionized trucking firms are at a competitive disadvantage in the less regulated, post-1980 trucking industry.

William Nebesky, B. Starr McMullen, and Man-Keung Lee. "Testing for Market Power in the U.S. Motor Carrier Industry." *Review of Industrial Organization*. Vol. 10, 1995, pp. 559-576.

During the 1980's, researchers noted a trend towards increased concentration in the general freight, less-than-truckload (LTL) portion of the U.S. motor carrier industry. The purpose of this study is to employ new empirical industrial organization techniques to determine whether the more concentrated, post-1980, LTL industry exerted monopoly pricing behavior and to compare the nature of pricing behavior before and after regulation reform.

The results suggest that the trend toward increased industry concentration does not imply anticompetitive performance. Also, the results indicate the presence of regulation-induced market power several years prior to regulation reform in 1980.

B. Starr McMullen and Kumiko Okuyama. "Productivity Changes in the U.S. Motor Carrier Industry 1976-1990: A Malmquist Index Approach." *TRF Annual Forum Proceedings*, 1996, Vol. 2, pp. 516-532.

The purpose of this paper is to examine the sources of changes in U.S. motor carrier productivity between 1976 and 1990, using a Malmquist Index. This non-parametric approach allows productivity changes to be decomposed into mutually exclusive categories: changes in technical efficiency (firms moving to the efficient production frontier) and changes in technology. A panel of 46 Instruction 27 general freight commodity carriers is used as the sample for this study. Results show the expected increases in technical efficiency following the MCA but these improvements were partially offset in many years by technological regression. It appears that the major efficiency improvements were achieved in the first few years following deregulation.

Anita Bambe and B. Starr McMullen. "Measuring the Non-Pecuniary Costs of Triple Trailer Operation in Oregon: A Contingent Valuation Approach." *TRF Annual Forum Proceedings*, 1996, Vol. 2, pp. 623-651.

This study uses a contingent valuation research technique to quantify the value of triple trailer safety to the general public. Estimates obtained indicate that people would be willing to pay an average of \$35.26 annually to remove triple trailers from the road. Given the failed 1992 Oregon referendum to ban triple trailers, this translates into annual benefits from triple trailer operation of at least \$130 million per year for the state of Oregon.

Actual social benefits from triple trailer operation could be considerably in excess of this amount since the estimate in this study just places a lower bound on the value of perceived benefits. Also if states bordering Oregon were to permit triple trailer operation, benefits to Oregonians would rise due to the overall increase in efficiency of the interstate highway transportation system serving the Pacific Northwest. These results support those who argue for increased use of triple trailers on efficiency grounds.

Starr is also editor of *Research in Transportation Economics*. The latest issue is Vol. 4, 1996, which contains several articles by former and current TRF members. If you are looking for a publication outlet, send your manuscripts to Starr.

VICTOR MOSIER. FLATLAND PROFESSIONAL SERVICES. 316-286-5326

Vic Mosier is President of Flatland Professional Services, Inc., which provides railroad engineering, planning, and traffic management services. Recent work includes design and construction inspection of a track raise to meet a highway crossing with signal installation. Other present work includes negotiation of car interchange rates for a shortline railroad. Previous work includes studies of short line feasibility and regional/statewide freight traffic patterns. Vic is located in Abbyville, Kansas.

JERRY D. NORTON. U.S. DEPARTMENT OF AGRICULTURE. 202-720-4211

Jerry D. Norton is an economist with the U.S. Department of Agriculture, Agricultural Marketing Service, Transportation and Marketing Division. His chief responsibilities include staff analysis of important issues and problems affecting agricultural transportation. He is also responsible for longer term research on broader marketing and transportation issues that impact the movement of agricultural products. His past work has focused primarily on grain transportation issues particularly those related to rail transportation. Much of his published work has dealt with the availability of adequate rail transportation capacity and the impact of railcar shortages on grain shippers and markets. The following are some of his publications.

Jerry D. Norton. *Assessing the Impact of Railcar Availability on Grain Prices*. Washington DC: U.S. Department of Agriculture, Agricultural Marketing Service, September 1995.

This study uses empirical data to evaluate the effect of railcar availability on grain price spreads between country and export markets. Three distinct rail markets for export grain were identified and included in the analysis: (1) wheat moving from Kansas, Oklahoma, Texas, Colorado, and Nebraska to the Texas Gulf, (2) wheat moving from Idaho, Montana, North Dakota, Oregon, and Washington to the Pacific Northwest, and (3) corn moving from Minnesota, Nebraska, and South Dakota to the Pacific Northwest. The relationship between grain price spreads and railcar availability proved to be statistically significant and negative, indicating that as the availability of railcars decreases, the spread or difference between the export market price and the country price increases. The study concludes that increases in price spreads caused by reductions in railcar availability and railcar shortages lower farm prices and reduce the competitiveness of U.S. grain exports.

Jerry D. Norton, Paul J. Bertels, and Freeman K. Buxton. *Transportation of U.S. Grains: A Modal Share Analysis*. Washington, DC: U.S. Department of Agriculture, Agricultural Marketing Service, July 1992.

The analysis of movements of grain by mode of transport provides important information about changes in the competitiveness and relative efficiencies between the modes. The goal of this analysis was to estimate the tonnages of grain shipped by rail, barge, and truck using

secondary data sources. The types of grains analyzed were corn, wheat, soybeans, sorghum, barley and rye, and oats. The types of movements investigated were those to domestic markets and those to ports for export.

Keith A. Klindworth and Jerry D. Norton. *Railcar Shortages for Grain Shippers: A Current Overview*. Washington, DC: U.S. Department of Agriculture, Office of Transportation, April 1988.

Incorporating historical trends in grain movement, rail grain movement, and grain car utilization, this study attempted to estimate the likely need for and availability of railcars for grain through the year 2001, in the absence of additions to the existing grain car fleet. Given the assumed levels of grain movement, railcar retirements, and cars out of service for mechanical reasons, railcar shortages for grain shippers are inevitable in the coming decade. Although improvements in car utilization will serve to offset increased demand to some extent, the natural level of fleet attrition could result in car deficits throughout the 1990's.

BARRY E. PRENTICE, UNIVERSITY OF MANITOBA, 204-474-9766

Barry E. Prentice and Chris Loly. "Cattle and Beef Transport in Western Canada: A History of Intermodal Competition and Plant Location." *Proceedings of the Transportation Research Forum 1995*, Vol. 1, pp. 195-208.

The case of the Canadian cattle industry is somewhat different than the U.S. experience. In Canada, low levels of competition in transportation made for a slow transition of the location of processing from the center of demand to the source of supply. Eventually, Winnipeg did develop as a major meat packing center based on its location as a railway trans-shipment point. Like Chicago, however, the slaughter of cattle relocated from Winnipeg to be closer to the origin of supply.

There is a very strong relationship between increases in competition in the transportation industry and the migration of the locus of cattle processing towards the source of surplus supply. Other developments, such as the emergence of new markets, and changes in storage and processing technology also affected the location of processing.

Barry E. Prentice and Jake Kosior. "Agricultural Trucking in the Post Rail Freight Subsidy Era: Implications for Manitoba." *Proceedings of the Transportation Research Forum 1996*, Vol. 2, pp. 590-607.

Policy changes and economic forces are reorganizing the haulage of agricultural production in Manitoba. Under the regulated/subsidized rail freight rates for export grains, unremunerative rail branch lines were kept in operation despite the economic losses. Moreover, value added food processing on the prairies was discouraged because local prices were inflated artificially by the subsidized freight to export points. Under full rail freight costs, local processing is beginning to substitute export markets and many rail branch lines have been slated to close. As

a result, the average length of truck haul is increasing and the structure of the trucking sector is changing.

The trucking industry is placing greater demands on the province's highway and other supporting transportation infrastructure, as the railways withdraw from the market. The changes in the trucking industry have implications for the maintenance of highways and infrastructure provision policies. The purpose of this study is to establish the emerging pattern of agricultural trucking in Manitoba.

The specific objectives of the study are:

1. to examine agricultural trends that influence farm trucking practices, and
2. to analyze trends in rural trucking practices of farmers and commercial service suppliers.

Dave W. Benell and Barry E. Prentice. "A Regression Model for Predicting the Economic Impacts of Canadian Airports." *The Logistics and Transportation Review*, Vol. 29, No. 2 (June 1993), pp. 139-158.

This paper extends the work of Prentice and Yeow in a comparative analysis of the economic impact studies that have been completed at 44 airports across Canada. An econometric analysis was undertaken in an attempt to estimate the relationship between sets of readily available indicators of airport activity and the economic impacts of Canadian airports. The result is an econometric model that can be used to update economic impacts, and that provides elasticities of airport employment and revenue. These elasticities can be used to predict the effects on an airport's direct economic impacts of changes in such variables as passenger numbers and local economic conditions.

Barry E. Prentice and Edward R. Bruning. "The Stability/Efficiency Regulatory Tradeoff: The Case of For Hire Trucking." *Proceedings of the Transportation Research Forum 1994*, Vol. I, pp. 43-58.

Highway protests and border blockades have been staged by Canadian truckers in 1990 and 1991 to highlight their complaints about low earnings and "unfair" U.S. competition. A Task Force that was created by the Federal Minister of Transport found no evidence of unfair competition or loss of market share to U.S. carriers, but the lack of profits in the Canadian trucking industry were confirmed. The events that created economic problems for the trucking industry were identified to be the severe economic recession which began in 1989, the rapid rise in the exchange rate value of the dollar after 1987, and the adjustment of the industry to changes in the regulatory environment.

The current economic recovery and the dollar devaluation has returned profitability to the Canadian trucking industry, but the prospects of adequate incomes may be short-lived for the carriers. The regulatory change, which was introduced by the Motor Vehicle Transport Act (MVTA) of 1987, removed the supply restraints that were critical to the industry's stability. Under the new regulatory environment, the competitive structure of the Canadian trucking industry makes it more responsive to the business cycle. As a result, the instability associated

with the expansion and contraction phases of the economy is now passed through, and may be amplified in the truckload (TL) sector of for-hire trucking.

Regulatory reform was initiated to improve the efficiency of the motor carrier industry, but it has been introduced without establishing any programs or institutions to deal with the structural instability that the previous system effectively controlled. The purpose of this paper is to set out the conceptual framework for the examination of the change in the structural stability that can be observed in the truckload (TL) sector of the motor carrier industry. The paper begins with a conceptual model of the stability/efficiency regulatory trade-off frontier. Subsequently, stylized supply and demand models are used to outline the inherent stability/efficiency trade-off that confronts the regulation of the trucking industry. The policy implications of this trade-off are discussed and avenues for dampening the instability of the TL sector are considered. One of these alternatives, the development of an efficient information market, is described in the final section of the paper.

Barry E. Prentice and Herman Guzman. "Rail Transport of Canadian Grain to Mexico: Some Implications of NAFTA." *Proceedings of the Transportation Research Forum 1994*, Vol. I, pp. 263-276.

The liberalization of trade with Mexico, under the auspices of NAFTA, is creating interest in the transportation connections to this market. Given the distances involved, the railways seem well-positioned to expand their traffic between Canada and Mexico. At the present time, the railways compete with ocean transport for bulk movements to Mexico, while the trucking industry carries the majority of the value-added products. There are several political, economic and technological trends that are moving in favor of increased Canada-Mexico rail movements. This is particularly evident in the potential for rail movements of grain from Western Canada to Mexico.

Before the reform movement, the Mexican government intervened in virtually all of the country's agricultural marketing activities. Through the state-owned *Compania Nacional de Subsistencial Populares* (CONASUPO), the government was involved in all aspects of grain imports and distribution. The demise of CONASUPO has been a benefit for Canadian grain exports. Under the old system, end-users of grain in Mexico had little influence on the choice of suppliers. CONASUPO negotiated the quality and price of imports that were offered on a take it, or leave it, basis to the end-users. Now that the millers in Mexico have a choice, they are seeking the higher quality and consistency that Canadian grain exporters can offer. The Mexican millers are also more interested in the better quality assurance and reliability of delivery that can be obtained by direct rail movements.

Mexican policies of trade liberalization, deregulation and privatization are creating new investment opportunities and encouraging innovations that will improve the cost/service of rail transportation. Since joining GATT in 1986, most Mexican import tariffs have fallen by 50 percent. Under NAFTA the U.S. and Canada will have duty free access for all goods within 15 years, and nontariff barriers are being converted to tariff rate quotas. As a result of these trade opportunities, strategic alliances are being forged between Canadian, U.S. and Mexican carriers,

like the PBI rail-barge system, and the CSX/Sea-Land rail ferry proposal, that will make the railways more competitive with alternative shipping modes.

Despite the progress, some problems that have hampered rail transport to Mexico remain unresolved. The inefficiency of the Mexican railway diminishes its dependability as a strategic alliance partner, but given its monopoly position, the interlining U.S. and Canadian rail carriers have no other choice. Another chronic problem is the congestion at the border crossings, and within the Mexican rail system. Congestion extends car cycle times and reduces the profitability of moving grain by rail from Canada. Finally, obstacles to the development of north/south grain movements also remain in Canada.

**JULENE RODRIGUEZ, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-7767**

Julie Rodriguez works in the area of motor carrier economics and management. She has co-authored a national study of truck driver job satisfaction which has been widely accepted by the motor carrier industry. Other areas of interest in the motor carrier arena include costing and customer service studies. Rodriguez is also involved in logistics. She has been working on starting a Council of Logistics Management roundtable in the Upper Great Plains region and has worked on logistical analysis of various proposed projects.

EUGENE R. RUSSELL, KANSAS STATE UNIVERSITY, 913-532-1588

Eugene R. Russell, Michael W. Babcock, and Curtis Mauler. "A Methodology for Determining Road Damage Due to Railroad Branchline Abandonment." *1996 Semisesquicentennial Transportation Conference Proceedings*. June 1996, pp. 165-169.

As of late, there has been a trend towards low-density rail abandonment. This trend is cause for great concern for the policy makers and planners of Kansas and other Midwestern states. Abandonment of light density rail lines constitutes a major change in the method of transportation by which grain is transported in rural areas, not only at the local elevator level but also at the production level. Farmers, who generally sell their production to elevators offering the highest bid price, would probably be inclined to ship their grain to elevators served directly by rail because of the tendency of these elevators to provide higher bid prices due to the cheaper shipping costs. In addition, with discontinued rail service, elevators are forced to truck their grain to other elevators with rail service or to terminal elevators. The impacts of these changes cause increased truck mileage which means additional use and damage to public roads and streets.

Since highway pavements are structures with finite lives, they are designed to withstand a specific number of equivalent, 18,000 pound single axle loads (ESALs). The truck traffic consumption of ESAL design life, and increased highway infrastructure costs associated with it, can increase rapidly where significant volumes of rail traffic diversions to trucks are involved. This phenomena not only occurs on those highway segments that were designed for high levels of truck traffic, but also occurs with greater consequence to rural highways which are often not designed to handle large truck volumes.

In this study, a transportation estimating model developed by M. H. Chow was used to generate wheat flow data relevant to determining the impacts of railroad abandonment. Grain flow data in bushels of wheat was developed by Chow's program for two scenarios: 1) pre-abandonment scenario and 2) post-abandonment scenario. This data was then transformed into truck loads originating at the different farms and elevators. The proposed abandonment of ATSF branchlines in south central Kansas were found to produce an estimated additional eight percent of wheat that will be transported by truck out of local elevators to terminal elevator transit points. Road damage costs were calculated for both the before and after abandonment scenarios. This analysis determined that the abandonment of the considered ATSF rail lines would result in an estimated additional annual damage to Kansas highways of \$1,004,590. The additional damage constituted a 48 percent increase in incremental truck damage over the before abandonment scenario caused by the rail abandonments.

Eugene R. Russell, Michael W. Babcock, and Curtis Mauler. "Study of the Impact of Rail Abandonment on Local Roads and Streets." *Conference Proceedings for Sixth International Conference on Low Volume Roads*. (Transportation Research Board). Vol. I, June 1995, pp. 110-119.

In the 1970's, 404 miles of Kansas rail line were abandoned. That figures rose to 745 miles in the 1980's. Railroad abandonment has had adverse consequences for Kansas farmers, rail shippers, and rural communities, including lower grain prices received by Kansas farmers, higher transportation costs and reduced profits for rail shippers; loss of market options for Kansas shippers, foreclosed economic development options in rural Kansas communities, higher road maintenance and reconstruction costs, and negative social impacts on rural Kansas communities. Kansas State University contracted to do a study of the adverse consequences for the Kansas Department of Transportation. Of the many objectives of that study, this paper deals with the measure of the public costs of rail abandonment in south central Kansas (e.g., increased road maintenance expenditures caused by larger truck volumes). The study area is a 10-county region in south central Kansas served by three former Santa Fe branchlines that were placed in Category 1 abandonment status in June 1990.

The principal findings of the project that relate to the impact on roads and streets are as follows. For the three branchlines as a group, the Santa Fe's share of wheat shipments (from study area grain elevators) fell from 74 percent in 1985 to about 60 percent in 1990. Most of the decline in market share occurred in 1990 and continued to fall in early 1991. The major 1990-1991 wheat markets for the grain elevators on study area branchlines are terminal elevators in Wichita and Hutchinson, Kansas, as well as Enid, Oklahoma. Substantial wheat volumes are sold to flour mills in Kansas and Oklahoma. Although abandonment of the Santa Fe branchlines resulted in only an 8 percent increase in commercial trucking of wheat, this additional trucking caused a 50 percent increase in road damage costs. The truck-attributable road damage costs resulting from abandonment of the three former Santa Fe branchlines was slightly more than \$1 million. Of this total, 27 percent was due to farm-to-country elevator truck movements, and 73 percent was attributable to shipments from country elevators to terminal elevators.

**AYMAN SMADI, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
701-231-7767**

Ayman Smadi has over five years of transportation research experience. He holds a Ph.D. from Iowa State University and an M.S. degree from the University of Oklahoma, both in Civil Engineering. He has worked on transportation research in the areas of statewide transportation planning, freight transportation modeling, intelligent transportation systems, rural roads service and safety issues, intermodal and safety management systems, and impacts of transportation regulatory policy. In addition to his research appointment at the Institute, Dr. Smadi is an adjunct professor in Civil Engineering. He teaches graduate courses in transportation engineering and planning, and he participates in graduate transportation student committees. Smadi is a member of the Institute of Transportation Engineers and ITS America.

Ayman Smadi, Gene Griffin, Mike Saewert, Kevin Andres, and Brenda Lantz. *Highway Regulatory Guidelines for Farm Equipment Operations.*

The purpose of the project was to develop a highway regulatory handbook for farm equipment operators. The study identified federal and state safety/operational regulations relevant to farm equipment operations. Information in the guidebook includes: federal and state regulations regarding operator requirements, vehicle registration, vehicle size and weight, and hazardous material transportation.

Ayman Smadi, Gene Griffin, Julie Rodriguez, Matt Titus, and Brenda Lantz. *The Dakota's IVHS/CVO Institutional Issues Study.*

The purpose of the project is to investigate institutional issues and barriers to implementing IVHS/CVO (Commercial Vehicle Operations) in North Dakota and South Dakota. The study team facilitated dialogue among users (motor carriers) and public agencies which administer, regulate, or enforce motor carrier operations. Outputs include recommended changes to procedures, rules and regulations to enhance motor carrier operations. A review of state's regulations and administrative procedures is underway. A steering committee of representatives from state agencies and motor carriers in the two states provides insights on critical regulation and operational issues in the two states, and potential technological solutions.

**DENVER TOLLIVER, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE, 701-
231-7190**

Denver Tolliver has been at North Dakota State University for over fifteen years. Previously, he was a railroad planner for the NDDOT. His primary research specializations include freight and intermodal analysis, statewide transportation planning, and highway impact assessment. Dr. Tolliver teaches graduate transportation courses in the Agricultural Economics and Civil Engineering departments, and is the state coordinator for the university transportation

centers programs in federal Region VIII. In 1983 he received the TRF Best Paper Award for his work on railroad costing.

Denver Tolliver and Suzanne Miller. *Hazardous Materials Traffic Inventory*.

The purpose of this project is to compile detailed data regarding hazardous cargo shipments in federal Region VIII and in North Dakota. In Phase I a detailed inventory of chemical and other hazardous materials movements was compiled. In Phase II truck shipments of fertilizers and farm chemicals within North Dakota are specifically evaluated. The results of the project will be useful to agribusiness industries, the state DOT, and local emergency response agencies.

Denver Tolliver, Doug Benson, and Ravi Korlimarla. *Nationwide Shortline Railroad Database*.

This project is funded by the FRA with in-kind resources being contributed by the American Shortline Railroad Association. The objective is to create a standard database for shortline and regional railroads and define an ongoing reporting process that will generate an annual profile of local and regional railroads in America. This profile will provide much needed information for the railroad industry, FRA, and state DOT's. Over 225 railroads have voluntarily responded to the initial survey.

Denver Tolliver and Brian Lindamood. *Rail Line Benefit Cost Analysis*.

In 1994, the authors analyzed the benefits and costs of investing public funds in three North Dakota rail branch lines. These studies are required by federal law. Rehabilitation of branch lines frequently prevents abandonment and increases in grain shipping costs.

Denver Tolliver, John Bitzan, and Joel Honeyman. *Impacts of Rail Restructuring on Rural America*.

This is a cooperative research project with USDA. The purpose is to quantify the extent of rail line abandonment since 1980, by region and state, and analyze the impacts of abandonment on rural states and communities.

**PHIL TINSLEY, WHOLESALE FLORISTS AND FLORIST SUPPLIERS OF
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703-242-7000**

Philip Tinsley Jr. is the Director, Special Projects at the Wholesale Florists and Florist Suppliers of America (WF & FSA). WF & FSA is a trade association which serves approximately 1,200 member companies located primarily throughout North America. Those companies include growers and distributors of cut flowers, plants and greens; manufacturers and distributors of floral hardgoods and industry service support companies such as transportation, computer software,

media and automation. Phil's responsibilities include seeking out and disseminating information on matters which are crucial to the economic impact of member companies. Those matters include, but are not limited to automation, transportation, care in handling of fresh floral products and new or unassigned functions.

**KIMBERLY VACHAL, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE,
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Kim Vachal received a masters degree in Agricultural Economics with an emphasis in International Trade and Marketing. Vachal has been employed at the Upper Great Plains Transportation Institute since 1992. Her position with the Institute has allowed her to continue research in the agricultural sector. Growing up on a farm in western North Dakota and working for Cargill as a commodity merchandising intern has given Vachal working knowledge of the grain marketing industry from farm to processor. She has used this background as a base for developing projects that examine various aspects of the grain marketing chain. Her work has allowed her to work with many grain transportation databases and resources. While at the Institute, Vachal has co-authored study reports for a wide array of agricultural products and topics including the durum industry, the corn sweetener industry, trade policies, the U.S. and Canadian transportation systems, and trends in grain movements.

Kimberly Vachal, *Annual Evaluation of the Competitiveness of Rail Carriers Serving North Dakota Elevators.*

North Dakota elevators were surveyed to assess the service they receive from rail carriers. The elevator service characteristics are analyzed for the state, and then compared by crop reporting district, railroad, elevator storage capacity, elevator load-out capacity and volume handled. The discussion of this information will provide an ongoing and consistent comparison of the railroads and their competitiveness in serving North Dakota elevators, and may also serve as a source for identifying trends in the elevator and grain marketing industries.

Kimberly Vachal, *Elasticity of the Demand for Durum Transportation.*

A derived demand model is used to estimate the elasticities of demand for durum transportation. Implications of the elasticities for the competitiveness of North Dakota producers are discussed.

Kimberly Vachal, *Management and Utilization of the North Dakota Grain Movement Data Systems.*

Reports specific to the grain movement database include:

1. North Dakota Grain and Oilseed Statistics: Grain movement data are summarized to describe patterns and shipment characteristics including destination, mode (rail and truck), origin, time, and commodity, for shipments originating from North Dakota.
2. Annual North Dakota Elevator Grain and Oilseed Marketing Report: The objectives of this report are to provide a benchmark of elevator managers in assessing performance, encouraging geographic competition within the elevator industry, and supply a source for recognizing trends in the characteristics of the North Dakota marketing system.
3. Monthly Grain Movement Reports: Monthly updates of the grain movement data are generated and mailed to groups including the North Dakota Wheat Commission.

Kimberly Vachal, *Domestic and Export Flow of U.S. and Canadian Durum*.

A spatial equilibrium model is used to estimate the impact on durum production and distribution of the changes that may affect the world durum market including the method of payment for the WGTA subsidy, levels of EEP and EEC subsidies.

Kimberly Vachal, *Producer Logistics & Rationalization of the Country Elevator System*.

Through the cooperation of the North Dakota Wheat Commission in developing a survey and mailing list, North Dakota wheat producers were surveyed regarding marketing decisions, grain delivery patterns and truck ownership. Producer information regarding marketing decisions, truck ownership, grain delivery patterns and elevator selection criteria is summarized.

CLYDE (SKIP) WALTER, IOWA STATE UNIVERSITY, 515-294-8632

Susan M. Holmes, Mark L. Power and Clyde Kenneth Walter, "A Motor Carrier Wellness Program: Development and Testing." *Transportation Journal*, Vol. 35, No. 3 (Spring 1996), pp. 33-48.

One approach to the problem of increasing health care costs for many employers is the worksite wellness program. Early intervention with employees' potential health problems can improve workers' health and productivity while reducing future health-related costs. Truck drivers may be a special case for wellness, because their mobile lifestyles may include high risk health behaviors such as poor nutrition habits, lack of exercise, and smoking. They are also removed physically from most worksite wellness programs. This study follows the development of a nutrition-focused wellness program for a selected group of truck drivers. The sample was split into a test group and a control group, and before-and-after measurements of nine health risk factors were made. Statistical tests conducted on this data showed the effectiveness of the program in weight control and overall physical fitness, although blood pressure and HDL cholesterol measurements were not affected. In addition to these tangible benefits, the increased attention received by the drivers may have a positive influence on their loyalty to their employer, an important consideration in times of driver shortages.

Clyde Kenneth Walter, "Longer Combination Vehicles: Issues and User Attributes," *Journal of the Transportation Research Forum*, Vol. 34, No. 2, 1995, pp. 102-118. Preliminary version in *Proceedings of the 35th Annual Meeting*. New York: Transportation Research Forum, October 15, 1993, pp. 215-226. Winner of 1993 Motor Carrier Research Award, \$1,000. Reprinted in *Transportation Executive Update*, Vol. 7, November/December 1993, pp. 6-11, 22.

The Intermodal Surface Transportation Efficiency Act of 1991 temporarily halted the discussion over expanding the use of longer combination vehicles. In the meantime, trade agreement provisions for coordinating transportation among Canada, Mexico and the United States, plus the continuing quest for productivity gains, promise to reopen the LCV debate. This paper reviews the background and effects of longer combination vehicles and presents the results of a survey of LCV-operating carriers. Survey results include information on the size and types of carriers, the specific equipment used, the commodities carried, the direction of changes in rates and costs of LCV operations on potential freight diversion.

Current project:

Multi-modal Investment Analysis Methodology. Principal Investigators: C. Phillip Baumel, Riad G. Mabayni, and Clyde Kenneth Walter.

In response to the ISTEA legislation most states have undertaken a comprehensive review of their long-range transportation plans. However, in most cases these plans consist of a compilation of separate modal plans. The primary reason states have had to resort to this approach is that presently there does not exist any generally accepted method for analyzing transportation investment needs on a multi-modal basis.

This project will develop a multi-modal transportation investment analysis methodology which should meet these criteria:

1. be demand based and reflect the fact that the demand for transportation is a derived demand.
2. approach transportation investment needs from a systems perspective.
3. recognize that the identification and evaluation of transportation investment needs should take into consideration household and business location factors.
4. recognize that transportation investment may result in external impacts on other elements of a state's or region's economy.

Phase I (in process) will involve a review of traditional transportation planning methods and recent research in the area of multi-modal transportation planning, a survey of changes in state-wide transportation planning practices since enactment of the Intermodal Surface Transportation Efficiency Act in 1991, and the development of a conceptual multi-modal transportation planning and investment analysis model. Later stages will be proposed for a three or four year project.