APPENDICES

APPENDIX A: GOODS™ MODEL CALIBRATION

The *GOODS*™ Model System is a flexible multimodal demand-forecasting tool that provides comparative evaluations of alternative socioeconomic and network scenarios. It also allows input variables to be modified to test the sensitivity of demand to various parameters such as elasticities, values of time, and values of frequency. This section describes in detail the model methodology and process used in the GLSLS New Vessels study.

DESCRIPTION OF THE GOODS™ MODEL SYSTEM

The *GOODS*™ Model is structured on three principal models: Total Demand Model, and the Hierarchical Modal Split Model. For this study, these two models were calibrated separately for four types of commodity, i.e., *Food, Raw Material, Semi Finished,* and *Finished*. For each market segment, the models were calibrated on origin-destination container freight data, network characteristics and base year socioeconomic data.

The models are calibrated on the base year data. In applying the models for forecasting, an incremental approach known as the "pivot point" method is used. By applying model growth rates to the base data observations, the "pivot point" method is able to preserve the unique container freight flows present in the base data that are not captured by the model variables. Details on how this method is implemented are described below.

TOTAL DEMAND MODEL

The Total Demand Model, shown in Equation 1, provides a mechanism for assessing overall growth in the container freight market. This form of model has been shown to be very successful in reflecting the way in which container traffic relates to both the difficulty or cost of travel and the landuse patterns of a region - See Equation 1.

Equation 1:

$$C_{ijp} = e^{\beta 0p} e^{\beta 1p\ Uijp} (SE_{ip})^{\beta 2p} (SE_{jp})^{\beta 3p}$$

Where,

C_{ijp}	=	Number of containers of commodity type p from zone i to j,
SE_{ip}	=	Socioeconomic variable for zone i for commodity type p,
SE_{jp}	=	Socioeconomic variable for zone j for commodity type p,
U_{ijp}	=	Total utility of the transportation system for zones i to j for type p,
β_{0p}, β_{1p}, β_{2p}, β_{3p}	=	Coefficients for commodity type p.

As shown in Equation 1, the total number of containers moving between any two zones for all modes of shipping, segmented by commodity type, is a function of the socioeconomic characteristics of the zones and the total utility of the transportation system that exists between the two zones. For this study, commodity type includes *Food, Raw Material, Semi Finished,* and *Finished*, and socioeconomic characteristics consist of population, manufacturing employment, and forestry, fisheries and mining employment. The utility function provides a logical and intuitively sound method of assigning a value to the shipping opportunities provided by the overall transportation system.

In the Total Demand Model, the utility function provides a measure of the quality of the transportation system to shippers in terms of the times, costs, reliability and level of service provided by all modes for a given freight type. The Total Demand Model equation may be interpreted as meaning that shipping between zones will increase as socioeconomic factors such as population and employment rise or as the utility (or quality) of the transportation system is improved by providing new facilities and services that reduce shipping times and costs. The Total Demand Model can therefore be used to evaluate the effect of changes in both socioeconomic and shipping characteristics on the total demand for shipping.

Socioeconomic Variables

The socioeconomic variables in the Total Demand Model show the impact of economic growth on container freight. The *GOODS*™ Model System uses three variables (population, manufacturing employment, and forestry fisheries, and mining employment) to represent the socioeconomic characteristics of a zone. The socio economic variables were chosen to best represent the shippers who generate the freight flow and recipients who "consume" the commodity. Exhibit 1 shows the variables that were used.

Exhibit 1: Socioeconomic variables

Container Freight Type	Generator	Attractor
Food	Manufacturing Employment	Population
Raw Material	Forestry, Fisheries, and Mining Employment	Manufacturing Employment
Semi-Finished	Manufacturing Employment	Manufacturing Employment
Finished	Manufacturing Employment	Manufacturing Employment

Shipping Utility

The value of shippers put on a wide range of transportation factors is considered in defining the utility of shipping.

Estimates of shipping utility for a transportation network are generated as a function of generalized cost (GC), as shown in Equation 2:

Equation 2:

$$U_{ijp} = f(GC_{ijp})$$

Where: GC_{ijp} =Generalized Cost of shipping between zones *i* and *j* for commodity type *p*

Because the generalized cost variable is used to estimate the impact of improvements in the transportation system on the overall level of trip making, it needs to incorporate all the key modal attributes that affect an individual's decision to make shipments. The generalized cost of shipping includes all aspects of shipping time (access, egress, in-vehicle times), shipping cost (fares, tolls, parking charges), schedule convenience (frequency of service, convenience of arrival/departure times) and reliability.

The generalized cost of shipping is typically defined in shipping time (*i.*e., minutes) rather than dollars. Costs are converted to time by applying appropriate conversion factors, as shown in Equation 3. The generalized cost (GC) of shipping between zones i and j for mode m and trip purpose p is calculated as follows:

Equation 3:

$$GC_{ijmp} = ST_{ijm} + \frac{SC_{ijmp}}{VOT_{mp}} + \frac{VOF_{mp}\,OH}{VOT_{mp}\,F_{ijm}} + \frac{VOR_{mp}\,\exp(-OTP_{ijm})}{VOT_{mp}}$$

Where:

ST_{ijm}	=	Shipping Time between zones *i* and *j* for mode *m*
SC_{ijmp}	=	Shipping Cost between zones *i* and *j* for mode *m* and commodity type *p*
VOT_{mp}	=	Value of Time for mode *m* and commodity type *p*
VOF_{mp}	=	Value of Frequency for mode *m* and commodity type *p*
VOR_{mp}	=	Value of Reliability for mode *m* and commodity type *p*
F_{ijm}	=	Frequency in departures per week between zones *i* and *j* for mode *m*
OTP_{ijm}	=	On-time performance for shipping between zones *i* and *j* for mode *m*
OH	=	Operating hours per week

The first term in generalized cost function is the shipping time. The second term converts the cost of shipping into time units. The third term in the generalized cost function converts the frequency attribute into time units. Operating hours divided by frequency is a measure of the headway or time between departures. Tradeoffs are made in the stated preference surveys resulting in the value of frequencies on this measure. Although there may appear to some double counting because the station wait time in the first term of the generalized cost function is included in this headway measure, it is not the headway time itself that is being added to the generalized cost. The third term represents the impact of perceived frequency valuations on generalized cost.

The fourth term of the generalized cost function is a measure of the value placed on reliability of the mode. The negative exponential form of the reliability term implies that improvements from low levels of reliability have slightly higher impacts than similar improvements from higher levels of reliability.

CALIBRATION OF THE TOTAL DEMAND MODEL

In order to ensure that the total demand model uses appropriate local or regional constraints needs to be calibrated using base year data. To calibrate the Total Demand Model, the coefficients are estimated using linear regression techniques. Equation 1, the equation for the Total Demand Model, is transformed by taking the natural logarithm of both sides, as shown in Equation 4:

Equation 4:

$$\log(C_{ijp}) = \beta_{0p} + \beta_{1p}(U_{ijp}) + \beta_{2p}\log(SE_{ip}) + \beta_{3p}\log(SE_{jp})$$

Equation 4 provides the linear specification of the model necessary for regression analysis.

The segmentation of the database by commodity type resulted in four sets of models. The results of the calibration for the Total Demand Models are displayed in Exhibit 2-2.

In evaluating the validity of a statistical calibration, there are two key statistical measures: *t*-statistics and R^2. The *t*-statistics are a measure of the significance of the model's coefficients; values of 1.95 and above are considered "good" and imply that the variable has significant explanatory power in estimating the level of trips. The R^2 is a statistical measure of the "goodness of fit" of the model to the data; any data point that deviates from the model will reduce this measure. It has a range from 0 to a perfect 1, with 0.4 and above considered "good" for large data sets.

Based on these two measures, the total demand calibrations are good. The *t*-statistics are very high, aided by the large size of the data set. The R^2 values imply very good fits of the equations to the data.

For forecasting purposes, the total demand equation needs one modification. Because of increases in the standard of living, the amount of consumption of freight will rise and consequently the volume of commodity flow will also rise. The static model in Exhibit 2 do not account for this effect. Thus the following time series model was calibrated:

$$\log(C_t) = \underset{(11)}{13.258} + \underset{(5)}{0.682}\log(GDP_t) \qquad R^2=0.60$$

where:

C_t= Total container traffic in year t
GDP_t = Gross domestic product (in billions) in year t

(t statistics in parenthesis)

This equation implies that a 1% increase in GDP will result in a 0.682% increase in the total freight traffic. The total demand model was refined with this equation for forecasting.

Exhibit 2: Total Demand Model Coefficients [(1)]

Food
$$\log(C_{ij}) = \underset{(-9)}{-5.867} + \underset{(14)}{0.741}\, U_{ij} + \underset{(16)}{0.623} \log(M_O) + \underset{(12)}{0.461} \log(P_D) \qquad R^2=0.74$$

where $U_{ij} = \log[\exp(-3.969 + 0.248\, U_{Batch}) + \exp(0.00057\, GC_{Truck})]$

Raw-Material
$$\log(C_{ij}) = \underset{(-4)}{-3.862} + \underset{(11)}{0.462}\, U_{ij} + \underset{(7)}{0.462} \log(FM_O) + \underset{(10)}{0.560} \log(M_D) \qquad R^2=0.60$$

where $U_{ij} = \log[\exp(-2.406 + 1.741\, U_{Batch}) + \exp(0.000922\, GC_{Truck})]$

Semi-Finished
$$\log(C_{ij}) = \underset{(6)}{4.138} + \underset{(21)}{1.215}\, U_{ij} + \underset{(4)}{0.239} \log(M_O) + \underset{(4)}{0.201} \log(M_D) \qquad R^2=0.55$$

where $U_{ij} = \log[\exp(-3.5217 + 0.844\, U_{Batch}) + \exp(0.00078\, GC_{Truck})]$

Finished
$$\log(C_{ij}) = \underset{(-20)}{-10.413} + \underset{(9)}{0.291}\, U_{ij} + \underset{(25)}{0.671} \log(M_O) + \underset{(26)}{0.696} \log(P_D) \qquad R^2=0.83$$

where $U_{ij} = \log[\exp(-3.910 + 0.940\, U_{Batch}) + \exp(0.001312\, GC_{Truck})]$

where:

M= Manufacturing Employment,
P= Population,
FM= Forestry, Fisheries and Mining Employment,
U_{ij} = Combined utility of all modes,
C_{ij} =Number of Containers moving from zone i to zone j,
U_{ij} =Combined utility of all modes from zone i to zone j,
O =Origin Zone,
D = Destination Zone.

[(1)] *t-statistics are given in parentheses.*

INCREMENTAL FORM OF THE TOTAL DEMAND MODEL

The calibrated Total Demand Models could be used to estimate the total container freight market for any zone pair using the population, Manufacturing Employment , forestry , fishery, and mining employment and the total utility of all the modes. However, there would be significant differences between estimated and observed levels of trip making for many zone pairs despite the good fit of the models to the data. To preserve the unique container freight shipping patterns contained in the base data, the incremental approach or "pivot point" method is used for forecasting. In the incremental approach, the base container freight data is used as a pivot point, and forecasts are made by applying trends to the base data. The total demand equation as described in Equation 1 can be rewritten into the following incremental form that can be used for forecasting (Equation 5):

Equation 5:

$$\frac{C_{ijp}^{\ f}}{C_{ijp}^{\ b}} = \exp(\beta_{1p}\ (U_{ijp}^{\ f} - U_{ijp}^{\ b}))\ \left(\frac{SE_{ip}^{\ f}}{SE_{ip}^{\ b}}\right)^{\beta_{2p}} \left(\frac{SE_{jp}^{\ f}}{SE_{jp}^{\ b}}\right)^{\beta_{3p}}$$

Where:

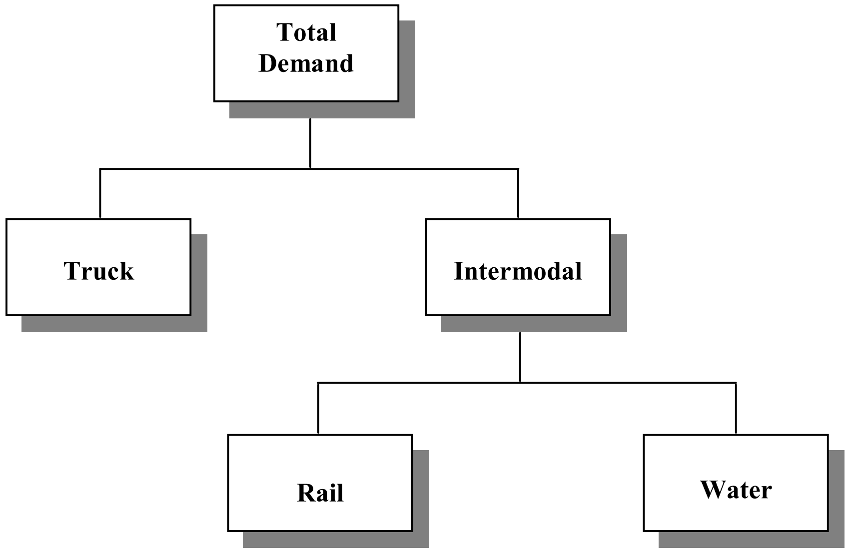
C^{f}_{ijp}	=	Number of Containers of commodity type *p* shipped from zone *i* to *j* in forecast year *f*
C^{f}_{ijp}	=	Number of Containers of commodity type *p* shipped from zone *i* to *j* in base year *b*
SE^{f}_{ip}	=	Socioeconomic variables for zone *i* for commodity type *p* in forecast year *f*
SE^{b}_{ip}	=	Socioeconomic variables for zone *i* for commodity type *p* in base year *b*
SE^{f}_{jp}	=	Socioeconomic variables for zone *j* for commodity type *p* in forecast year *f*
SE^{b}_{jp}	=	Socioeconomic variables for zone *j* for commodity type *p* in base year *b*
U^{f}_{ijp}	=	Total utility of the transportation system for zones *i* to *j* for commodity type *p* in forecast year *f*
U^{b}_{ijp}	=	Total utility of the transportation system for zones *i* to *j* for commodity type *p* in base year *b*

In the incremental form, the constant term disappears and only the elasticities are important.

HIERARCHICAL MODAL SPLIT MODEL

The role of the Hierarchical Modal Split Model is to estimate relative modal shares, given the Total Demand Model estimate of the total market. The relative modal shares are derived by comparing the relative levels of service offered by each of the shipping modes, and making a choice based on the behavioral values derived from the shipper stated preference survey. The *GOODS*™ Hierarchical Modal Split Model uses a nested logit structure. As shown in Exhibit 3, two levels of binary choice are calibrated.

Exhibit 3: Hierarchical Structure of the Modal Split Model



The main feature of the Hierarchical Modal Split Model structure is the increasing commonality of shipping characteristics as the structure descends. The first level of the hierarchy separates truck shipping – with its spontaneous frequency and highly personalized characteristics – from the intermodal modes. The second level of the hierarchy separates rail from the water mode.

INCREMENTAL FORM OF THE HIERARCHICAL MODAL SPLIT MODEL

To assess modal split behavior, the logsum utility function, which is derived from travel utility theory, has been adopted. As the modal split hierarchy ascends, the log sum utility values are derived by combining the generalized costs of shipping. Advantages of the logsum utility approach are 1) the introduction of a new mode will increase the overall utility of shipping, and 2) a new mode can readily be incorporated into the Hierarchical Modal Split Model, even if it were not included in the base-year calibration.

As only two choices exist at each level of the modal split hierarchical structure, a Binary Logit Model is used, as shown in Equation 6:

Equation 6:
$$P_{ijmp} = \frac{\exp(U_{ijmp}/\rho)}{\exp(U_{ijmp}/\rho) + \exp(U_{ijnp}/\rho)}$$

Where:

P_{ijmp} = Percentage of containers of type *p* from zone *i* to zone *j* by mode *m*

U_{ijmp}, U_{ijnp} = Utility functions of modes *m* and *n* between zones *i* and *j* for container purpose *p*

ρ is called the nesting coefficient

In Equation 6, the utility of shipping between zones *i* and *j* by mode *m* for trip purpose *p* is a function of the generalized cost of shipping. Where mode *m* is a composite mode (e.g., the surface modes in the third level of the Modal Split Model hierarchy, which consist of the rail and bus modes), the utility of shipping, as described below, is derived from the utility of the two or more modes it represents.

Utility of Composite Modes

Where modes are combined, as in the upper levels of the modal split hierarchy, it is essential to be able to measure the "inclusive value" of the composite mode, e.g., how the combined utility for rail and water compares with the utility for truck alone. The combined utility is more than the utility of either of the modes alone, but it is not simply equal to the sum of the utilities of the two modes. A realistic approach to solving this problem, which is consistent with utility theory and the logit model, is to use the logsum function. As the name logsum suggests, the utility of a composite mode is defined as the natural logarithm of the sum of the utilities of the component modes. In combining the utility of separate modes, the logsum function provides a reasonable proportional increase in utility that is less than the combined utilities of the two modes, but reflects the value of having two or more modes available to the traveler. For example, suppose:

Utility of Rail or $U_{rail} = \alpha + \beta_0 GC_{rail}$
Utility of Water or $U_{water} = \beta_1 GC_{water}$

Then:
Inclusive Utility of Surface Modes, or $U_{intermodal} = \log(e^{Urail} + e^{Uwater})$

Improvements to either rail or water would result in improvements to the inclusive utility of the combined intermodal modes.

Calibration of the Hierarchical Modal Split Model

Working from the bottom of the hierarchy up to the top, the first analysis is that of the rail mode versus the water mode. As shown in Exhibit 4, the model was effectively calibrated for the four trip purposes with reasonable parameters and R^2 and *t* values. All the coefficients have the correct signs such that demand increases or decreases in the correct direction as shipping times or costs are increased or decreased, and all the coefficients appear to be reasonable in terms of the size of their impact.

Exhibit 4: Rail versus Water Modal Split Model Coefficients [(1)]

Food	$\log(P_{Rail}/P_{Water}) = -0.0000711\,(GC_{Rail} - GC_{Water})$ (-30)	R^2=0.52
Raw-Material	$\log(P_{Rail}/P_{Water}) = -0.0000982\,(GC_{Rail} - GC_{Water})$ (-29)	R^2=0.59
Semi-Finished	$\log(P_{Rail}/P_{Water}) = -0.000104\,(GC_{Rail} - GC_{Water})$ (-47)	R^2=0.70
Finished	$\log(P_{Rail}/P_{Water}) = -0.000143\,(GC_{Rail} - GC_{Water})$ (-47)	R^2=0.80

[(1)] *t-statistics are given in parentheses.*

For the second level of the hierarchy, the analysis is of the Intermodal modes (i.e., rail and water) versus truck. Accordingly, the utility of the Intermodal modes is obtained by deriving the logsum of the utilities of rail and water. As shown in Exhibit 5, the model calibrations for both trip purposes are all statistically significant, with good R^2 and *t* values and reasonable parameters.

The analysis for the top level of the hierarchy is of truck versus the intermodal modes. The utility of the intermodal modes is obtained by deriving the logsum of the utilities of the rail, and water modes. As shown in Exhibit 5, model calibrations for all commodity types are all statistically significant, with good R^2 and *t* values and reasonable parameters in most cases. The constant terms show that there is a bias towards the truck mode.

Incremental Form of the Modal Split Model

Using the same reasoning as previously described, the modal split models are applied incrementally to the base data rather than imposing model estimated modal shares. Different regions of the GLSLS may have certain biases toward one form of shipping over another and these differences cannot be captured if a simple regression approach is used. In GOODS™ a "pivot point" method is used that allows different sub-regional biases to be retained. To apply the modal split models incrementally, the following reformulation of the hierarchical modal split models is used (Equation 7):

Equation 7:

$$\frac{\left(\dfrac{P_A^f}{P_B^f}\right)}{\left(\dfrac{P_A^b}{P_B^b}\right)} = e^{\beta\,(GC_A^f - GC_B^b) + \gamma\,(GC_B^f - GC_B^b)}$$

For hierarchical modal split models that involve composite utilities instead of generalized costs, composite utilities would be used in the above formula in place of generalized costs. Once again, the constant term is not used and drivers for modal shifts are changed in generalized cost from base conditions.

Exhibit 5: Intermodal versus Truck Modal Split Model Coefficients (1)

Food $\log(P_{Intermodal}/P_{Truck}) = \underset{(-50)}{-3.968} + \underset{(3)}{0.2480}\, U_{Intermodal} + \underset{(27)}{0.00057}\, GC_{Truck}$ $R^2=0.70$

Where $U_{Intermodal} = \log[\exp(-0.0000711\, GC_{Rail}) + \exp(-0.0000711\, GC_{Water})]$

Raw-Material $\log(P_{Intermodal}/P_{Truck}) = \underset{(-15)}{-2.406} + \underset{(14)}{1.7417}\, U_{Intermodal} + \underset{(26)}{0.00092}\, GC_{Truck}$ $R^2=0.63$

Where $U_{Intermodal} = \log[\exp(-0.0000982\, GC_{Rail}) + \exp(-0.0000982\, GC_{Water})]$

Semi-Finished $\log(P_{Intermodal}/P_{Truck}) = \underset{(-27)}{-3.5217} + \underset{(8)}{0.8439}\, U_{Intermodal} + \underset{(31)}{0.00078}\, GC_{Truck}$ $R^2=0.65$

Where $U_{Intermodal} = \log[\exp(-0.000104\, GC_{Rail}) + \exp(-0.000104\, GC_{Water})]$

Finished $\log(P_{Intermodal}/P_{Truck}) = \underset{(-17)}{-3.9104} + \underset{(5)}{0.9408}\, U_{Intermodal} + \underset{(17)}{0.00131} GC_{Truck}$ $R^2=0.56$

Where $U_{Intermodal} = \log[\exp(-0.000143\, GC_{Rail}) + \exp(-0.000143\, GC_{Water})]$

(1) *t-statistics are given in parentheses.*

APPENDIX B: STATED PREFERENCE SURVEY SAMPLE

U.S. Department of Transportation | Midwest – Northeast Shipper Survey | Transport Canada Transports Canada

Midwest - Northeast Shipper Survey

OMB Control Number[1]: 2133-0536 (expiration date: 4/30/06)

COMPANY NAME: ______________________________

RESPONDANT TITLE: ______________________________

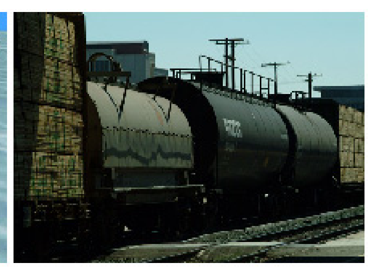
STATE: ______________________________ COUNTRY: ______________

Dear Freight Shipper:

The *US Department of Transportation* and *Transport Canada* are conducting this ***Midwest-Northeast Shipper Survey***. The purpose of this study is to obtain information on freight shipper preferences in order to improve freight transportation links in the Upper Midwest and Northeast regions of the US and Canada. Specifically, the study explores the potential role that various transportation alternatives can play in ensuring the most effective and economical means of transporting freight through your region to other areas of the US and Canada, and to the rest of the world. The information collected from this study will only be used for statistical purposes and is authorized by the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA). Your participation in this study is strictly voluntary. Under current confidentiality protection laws[2], your personal information will be kept confidential and will not be disclosed to anyone other than the employees and contractors who work on this study. By law[2] employees and contractors working on this survey are subject to either penalties and/or fines if they disclose any information that could identify you [3].

This survey will take around 15 to 20 minutes to complete[4]. If you have any questions about this survey, please contact Transportation Economics & Management Systems, Inc. at 3*01-846-0700* or by email at mail@temsinc.com. By completing the following questionnaire, your input will help ensure that any new additional transportation alternatives are geared to meet your long-term transportation needs in this era of ever increasing freight demands.





Thank you for your participation!

Note: This collection of information will collect stated preference data from carriers and shippers as the first step in assessing the economic significance of the Great Lakes/St. Lawrence Seaway region. Public reporting burden is estimated to average 15 to 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Please note that an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. ***The OMB control number for this collection is 2133-0536 and will expire April 30, 2006.***

Midwest - Northeast Shipper Survey

(Shipper Information - Section 1)

To begin, we would like to ask you some questions about your firm in order to understand your transportation needs.

1. **How large is the facility at your location?**
   a. Number of employees ◯ Less than 500 ◯ More than 500
   b. Tons shipped per year (approx.) ___________________________

2. **Does your facility ship freight using trucks, trailers, rail cars, or containers through the Northeast or Midwest regions of the US or Canada?**

   ◯ Yes ◯ No

3. **Which regions and/or countries does your facility ship to?**

a.	Inside the US	◯ Yes	◯ No
b.	Inside Canada	◯ Yes	◯ No
c.	Internationally to other Countries	◯ Yes	◯ No

*Please look at the map area depicted below when answering **Questions 4 - 7**. If you are a shipping agent, please consider the shipping arrangements or decisions that you make for one of your top clients when answering these questions. For "door to door" steamship line operations, please consider the arrangements that you make for the inland and/or inter-modal leg of the commodity movement.*

Midwest - Northeast Shipper Survey *(continued)*

4. What is your facility's top commodity movement (from origin to destination)?

Based on the map shown on the previous page, please list your facility's top commodity movement that uses trailers or containers to transport goods for a distance of 300 miles or more. Distance, for the purposes of this survey, means from origin to destination including all transfers. For international shipments, please indicate the North American terminal or port the commodity travels through.

Origin City (City, State/Prov.)	Destination City (City, State/Prov.)	Commodity	Port (U.S./Can.) If applicable	*AVG Per Month*		Carrier Mode
				# Trailers/ Containers	Total # Tons	
					_______ Metric Tons _______ Short Tons	O for hire trucks O private trucks O rail

** 2000 lbs = short ton*

5. Do you experience any seasonal variations or fluctuations in volume of shipments made during certain months of the year?

Please estimate the percentage of annual shipments that you make for each season.

Spring (March-May)	**Summer** (June-August)	**Fall** (Sept –Nov.)	**Winter** (Dec.-Feb.)
________%	________%	________%	________%

6. How often do you change carriers during a year?

Almost Never	1 – 2 times a year	3 – 5 times a year	6 times or more a year
O	O	O	O

7. For the commodity movement listed in Question 1, which factors are important in choosing a carrier service?

	Not Important	Slightly Important	Important	Very Important
Price of service	O	O	O	O
Time of arrival/ departure	O	O	O	O
Frequency of service	O	O	O	O
Reliability of service	O	O	O	O
Other: _______________	O	O	O	O

Midwest - Northeast Shipper Survey

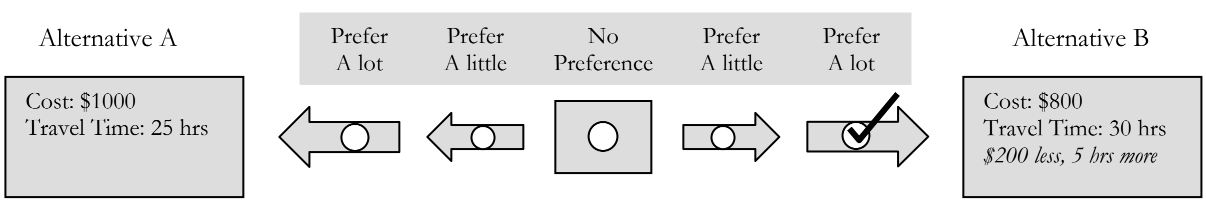
(Shipper Information - Section 2)

Instructions:

In the next section, we will ask you some questions about your shipping preferences for your top commodity movement listed in Question 4. Here, you will be presented with two shipping alternatives. Please select the alternative you prefer – Alternative A or Alternative B – and indicate the degree to which you prefer your choice by selecting the option that matches your preference (a*s shown in the example*).

EXAMPLE

In the given example, the freight shipper was presented with two shipping alternatives: A) shipping a quantity of freight by truck or B) shipping a quantity of freight by rail. The shipper was then asked to select the shipping option he/she prefers the most and the degree to which he/she prefers that option. As shown below, the shipper strongly prefers Alternative B that costs $240 less even though it takes 4 hours longer to be delivered.



Please base your answers on the **top commodity** you listed in response to **Question 4** from the previous page of this survey.

If the shipping distance (# of miles between origin and destination including all transfers) of the **top commodity** you listed in response to **Question 4** is:

Less than 900 miles

GO TO SECTION A

More than or equal to 900 miles

GO TO SECTION B

SECTION A
Scenario 1

Please answer the following questions based on your freight shipping preferences.

A1. How important is transit time in choosing a carrier?

Assume that you are making a decision to ship a truckload or container load of the commodity you listed in response to **Question 4**. The commodity is being shipped approximately **700 miles** and you are given two alternatives that differ in cost and transit time. Please select which alternative you prefer - Alternative A or Alternative B - and indicate the degree to which you prefer your choice.

Alternative A	Prefer A lot	Prefer A little	No Preference	Prefer A little	Prefer A lot	Alternative B
Cost: $1400 Transit Time: 48 hrs	○	○	○	○	○	Cost: $1160 Transit Time: 52 hrs *$240 less, 4 hrs more*
Cost: $1400 Transit Time: 48 hrs	○	○	○	○	○	Cost: $1000 Transit Time: 58 hrs *$400 less, 10hrs more*
Cost: $1400 Transit Time: 48 hrs	○	○	○	○	○	Cost: $800 Transit Time: 73 hrs *$600 less, 25 hrs more*
Cost: $1400 Transit Time: 48 hrs	○	○	○	○	○	Cost: $700 Transit Time: 93 hrs *$700 less, 45 hrs more*
Cost: $1400 Transit Time: 48 hrs	○	○	○	○	○	Cost: $650 Transit Time: 198 hrs *$750 less, 150 hrs more*

SECTION B
Scenario 1

Please answer the following questions based on your freight shipping preferences

B1. How important is transit time in choosing a carrier?

Assume that you are making a decision to ship a truckload or container load of the commodity you listed in response to **Question 4**. The commodity is being shipped approximately **1200 miles** and you are given two alternatives that differ in cost and transit time. Please select which alternative you prefer - Alternative A or Alternative B - and indicate the degree to which you prefer your choice.

Alternative A	Prefer A lot	Prefer A little	No Preference	Prefer A Little	Prefer A lot	Alternative B
Cost: $2200 Transit Time: 72 hrs	○	○	○	○	○	Cost: $1900 Transit Time: 77 hrs *$300 less, 5 hrs more*

Alternative A	Prefer A lot	Prefer A little	No Preference	Prefer A little	Prefer A lot	Alternative B
Cost: $2200 Transit Time: 72 hrs	○	○	○	○	○	Cost: $1600 Transit Time: 87 hrs *$600 less, 15hrs more*

Alternative A	Prefer A lot	Prefer A little	No Preference	Prefer A little	Prefer A lot	Alternative B
Cost: $2200 Transit Time: 72 hrs	○	○	○	○	○	Cost: $1450 Transit Time: 102 hrs *$750 less, 30 hrs more*

Alternative A	Prefer A lot	Prefer A little	No Preference	Prefer A little	Prefer A lot	Alternative B
Cost: $2200 Transit Time: 72 hrs	○	○	○	○	○	Cost: $1375 Transit Time: 127 hrs *$825 less, 55 hrs more*

Alternative A	Prefer A lot	Prefer A little	No Preference	Prefer A little	Prefer A lot	Alternative B
Cost: $2200 Transit Time: 72 hrs	○	○	○	○	○	Cost: $1300 Transit Time: 252 hrs *$900 less, 180 hrs more*