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Intermodal Management System Planning and the Search for MPO-Level Freight Data

*Russell B. Capelle, Jr.**

ABSTRACT

ISTEA required the development of six management systems and one monitoring system, including the intermodal management system (IMS). Because freight planning has not been a high priority in MPO planning agencies and because intermodal freight flow/facility data are often proprietary within the private sector, IMS planning teams must be particularly imaginative, creative, ingenious, proactive, and data-recycling conscious in order to develop their management system. This paper identifies freight data sources used and usable for IMS Work Plan development purposes, mentioning specific directories, associations, consulting firms, and databases. It is hoped that working MPO and State planners will use these "leads" to develop better and more comprehensive freight intermodal data.

INTRODUCTION

Intermodalism, like beauty, is in the eye of the beholder. The word "intermodal" means very different things to different people and to propose a universal definition may not be useful.

Strictly defined using the Latin roots of the word (*inter* = between; *modus* = way), intermodal suggests movement *between* different *ways* of transporting a good or a person. If a person or commodity moves by more than one mode, it has moved intermodally.

Like a point in mathematics, however, some things need to remain undefined or loosely defined so other things can be better defined using them as a basis.

Although the Intermodal Surface Transportation Efficiency Act (ISTEA) was passed in 1991, the National Commission on Intermodal Transportation (NCIT) is only now in May and June of 1994 holding hearings to "gather the public's views of what intermodalism is and should be" (Journal of Commerce, April 6, 1994). (The staff director of NCIT is Ms. Anne Aylward, former Maritime Director of Massport, a Massachusetts agency with responsibilities in air, water and highway [bridge/tunnel] transportation.)

Since ISTEA was passed, intermodalism has been in the forefront of transportation issues. Secretary of Transportation Federico Pena, when he dedicated the new National Transportation System (NTS)--the intermodal successor to the component part, the National Highway System (NHS)--did it not at a major highway interchange but at Union Station in Washington, DC, a major hub on the rail network.

ISTEA MANDATES INTERMODAL MANAGEMENT SYSTEMS

ISTEA mandated that States and metropolitan planning organizations (MPO) develop six management systems and one monitoring system by specific deadlines. One of those systems, the intermodal management system (IMS) is unique and particularly challenging in several respects. Not the least of the challenges is that freight flow data at the MPO level for most modes is either nonexistent or the property of private sector transportation companies.

The IMS is particularly unique among the management and monitoring systems because of distinctions that can be made among them. Certain of the MSs are asset, equipment or facility management systems. These include the Pavement Management System (PMS), the Bridge Management System (BMS), and the Public Transit Facilities Management System (PTMS). The other three management systems and the Traffic Monitoring System for Highways (TMS/H) are *performance management systems*. These include the IMS, the Safety Management System (SMS) and the Congestion Management System (CMS).

An additional important distinction can be made among the latter three--*the IMS is the one performance management system with a dearth of freight intermodal databases in the public domain*. Because much of freight intermodal transportation is in the private sector, the important databases are there. The IMS doesn't have the "leg up" that the other MSs have--online data in the public domain. For example, the CMS has a wealth of data available--Census Transportation Planning Package (CTPP) data and household survey and trip data used during demand modeling and the four-step planning process as the MPO creates its regional transportation plan.

Because freight data are scarece in the public domain, it is particularly important for the IMS to develop a strong outreach and private sector involvement component. Typically this takes the form of a Freight Advisory Council or group that includes representatives from the private sector (transportation companies; associations and organizations representing all modes) meeting on issues of mutual concern and sharing data that can be used for the common purpose--better planning of transportation facilities and the interfaces among them.

NATIONAL DATABASES WON'T PROVIDE INTRASTATE/INTRAMPO DATA

The Commodity Flow Survey of 1993, the returns from which are now being summarized and analyzed at the U. S. Bureau of Census, will provide excellent macroregional freight flow data when the database is publically released in 1995. However, because of disclosure problems, no MPO-level data will be released.

Another major national database, the 1992 Truck Inventory and Use Survey (TIUS), offers no vehicle miles traveled or other data below the state level. The publically released version of the Interstate Commerce Commission (ICC) Rail Waybill Statistics shows Bureau of Economic Analysis (BEA) region-to-BEA-region flows. For smaller states that provides little help.

FOCUS ON SOLUTIONS NOT PROBLEMS

But let us not highlight the data problems--that has been done enough already. The TRB's Data for Decisions (1992) is one of the most recent efforts to review data challenges.

Let us highlight potential solutions, because, after all, the MPOs are the new decisionmakers on the block and are mandated to create management systems by specific deadlines or lose certification. That makes it imperative that we not boo-hoo in our sleeves about what we don't have. We must creatively, imaginatively, and proactively develop some base level of intermodal flow and facility data in order to meet the IMS Work Plan deadline of October 1, 1994 and fully implement the IMS by October 1, 1996.

DATA SLEUTHING

Data for intermodal purposes are basically of three types:

You have it:

Available data online or in hard copy within agencies
Recyclable data--data collected for other purposes which can be used for the IMS.

You don't, but you can get it:

Existing data acquired from outside (consultants or data suppliers)

You don't have it yet (and may never):

Newly collected data--data from trucking company surveys, automatic traffic recorder (ATR) placement plans or consultants brought in to develop new flow or facility characteristics data collection plans
"Druthers data"--data you'd like to have if you had your "druthers," but data that might be realistically unavailable (too much money, personpower or time)

HOW WILL EMPHASIS ON "ISSUE-BASED DATA" NARROW MY DATA SEARCH?

The world is too complex to understand without some simplification. When transportation professionals use models and theories to try to understand transportation interrelationships, they make assumptions to simplify complex reality *for a time*. In everyday life we prioritize some tasks and "deprioritize" some others in order to get things done in the time allowed.

Especially because freight intermodal and potential freight intermodal data are primarily in the private sector, some narrowing of our data needs is necessary. We would never have the

time, personpower, or budget available to acquire or collect all the data a perfect IMS would need. We need some device to prioritize what can be obtained.

Each state or MPO has its own important transportation issues--"hot button" projects, bottlenecks that need fixing, consultant reports underway. Although we need to plan to be *flexible*, the concept of collecting *issue-based data* for the IMS is a useful one not only to narrow down the search but also as a frame of reference for how the data will ultimately be used to provide a foundation for strategic decisions.

The Technical Team developing the State's/MPO's IMS should discuss the intermodal issues that are most important. They need to identify the intermodal issues before they itemize their data needs. An inland state without water transportation won't need to collect waterborne commerce data. A state with expansion at certain airports may concentrate only on air freight data for certain airports. A region with a military base that will be reused for a transportation purpose will need intermodal data for that development. And a state where doublestack rail clearance issues are "hot" may prioritize its data search within certain corridors and particularly for truck and rail flow data within those corridors.

Incident management on the highways is an important issue which involves many management systems and causes the need for particular types of data. Potentially all six management systems and the traffic monitoring system for highways could be affected by car-truck/truck-car incident management planning. The SMS and CMS are most directly affected, and the TMS/H monitors highway traffic of which the incident is a part. Indirectly there is an effect which is important to consider in the PMS and perhaps the BMS, depending on the location of the incident. There may be overflow onto public transit facilities from certain incidents, so the PTMS is affected. Even the IMS is involved or could potentially be involved. If truck/rail intermodal flows were increased, that might take some truck traffic off the highways, reducing the exposure to possible future incidents. Knowing that incident management planning is an **important issue** suggests a **data need**--for incident-level truck flow data by commodity, vehicle type, and other categories.

The December 1, 1993 Federal Register Interim Final Rule strongly urges issue-based data decisions. "States and local agencies are strongly encouraged to identify their intermodal transportation issues and determine the type and level of data that are necessary to address these issues as part of their IMS" (p. 63467).

In other words, the device of highlighting issue-based data is not new or revolutionary, but it is useful. An IMS Team that says it wants to collect anything and everything without thinking how the data will ultimately be used--or indeed if the data will ever be needed and used--is an inundated, lost IMS Team. The Team must decide on what are regionally important issues and highest priority data needs. Only by prioritizing the data search within certain issue areas can an efficient data search process be maintained.

Avoiding the issue-based data approach could be counterproductive. Important issues would be defined by the choice of data rather than *vice versa*. Some issues would have been eliminated summarily because of data choices and not because of their regional importance.

However, knowing what data are needed doesn't mean data are available in State or MPO agencies or even obtainable by them. The Interim Final Rule states that "the FHWA and the FTA believe that much of the data is (sic) currently available although it (sic) may need to be

Figure 1
Issue-Based Data Needs

Planning and Designing
the Freight Component of an
Intermodal Management System
Means Defining Issues, Anticipating Challenges and Potential Strategic Decisions
Because We Don't Need Every Snippet of Data--Just ISSUE-BASED DATA

ISSUES / POTENTIAL STRATEGIC DECISIONS

DATA / DATABASE NEEDS

DATA **MODEL**ING NEEDS

REGIONAL / STATEWIDE
PLANNING MODELING

MAKE STRATEGIC **DECISIONS**
FOR
FINAL PLAN/T.I.P.

compiled in a format more useful to the management systems" (FR, p. 63446). True for the PMS and BMS, perhaps, but "currently available" doesn't apply to the IMS.

The Interim Final Rule also points out (FR, p. 63446) that "data collected will differ between regions and states. The FHWA and the FTA believe that the Congress intended that the management systems be used by State and local officials to aid in decisionmaking and not for establishing a nationwide data base for use by the [U. S.] DOT for either peer comparisons or to meet its internal data needs. The FHWA and FTA do not believe that mandating standardized data sets is either necessary or warranted. This function can be better served by other mechanisms, such as the FHWA's Highway Performance Monitoring System (HPMS), FTA Section 15 data, and the newly established Bureau of Transportation Statistics."

In other words, States and MPOs are pretty much on their own to search and find appropriate freight intermodal data.

WHERE DO I GET DATA FOR MY MODELS?

What organizations, groups, directory publishers & other sources can I use?

The easiest avenue of IMS development is the road through already plowed data. Some of the data you already have within your MPO or State agency structure may have eluded you because you didn't think it was usable for freight intermodal purposes. Here are a few of the *readily available* data sources that Massachusetts has used to good advantage for intermodal management system work plan development:

Some useful sources included in most transportation libraries (contact author for complete information):

Census, U. S. Bureau of:

The U. S. Bureau of Census' County and City Data Book (latest edition) and County Business Patterns (CBP) database provide multiplier and surrogate variable information that may be valuable for estimates in larger states. Some consultants develop databases using CBP data multiplied by average amounts (cost, tons, etc.) to get some idea of freight flows on a county-to-county basis. For small states that has very limited value.

The U. S. Bureau of Census' 1993 Commodity Flow Survey will provide origin/destination matrix data but only at the National Transportation Analysis Region (NTAR)-to-NTAR level. All of Massachusetts fits into two of the 89 NTARs (Numbers 4 and 6) in the country, and the Boston MPO region is within NTAR Number 4. NTARs are aggregations of Bureau of Economic Analysis (BEA) regions.

Companies:

Direct contact with major transportation companies in your region is highly recommended, since most intermodal data resides in the private sector. Some States establish formal Freight Advisory Councils, but individual contacts should also be pursued. Major rail, trucking, shipping, intermodal service and other companies are listed in many of the directories mentioned above.

Consulting firms:

Several consulting firms, research institutes, and foundations may be able to develop flow data from already existing databases they have or through surveys of trucking companies:

ATA Foundation
DRI/McGraw-Hill's *Freightscan* database
Reebie Associates' *Transearch* database

Corps of Engineers, U. S. Army:

For waterborne flow information, check the regional office of the U. S. Army Corps of Engineers, which is responsible for compiling and publishing the authoritative source, Waterborne Commerce of the United States each year.

Directories:

Directories of associations, organizations and businesses are an extremely valuable source not only of contact information for use in organizing your Freight Advisory Council but also as potential providers of data. In Massachusetts, these are a few of the directory-like sources we use:

American Business Publishers:

State directories are published by American Business Publishers (ABP) of Omaha, Nebraska. Using Standard-Industrial-Classification (SIC)-code data, they put out very detailed directories for each state and even for particular categories of business. ABP's Massachusetts Business Directory provided a fine-grained listing of for-hire trucking companies which could be plotted by town to highlight "high trucking activity towns" in the state. ABP takes special orders for any cross-classification of data and the listings include address and phone number.

Associated Industries of Massachusetts:

Check for a local directory of manufacturers--for use in identifying *private* trucking fleets and other businesses who generate large for-hire trucking movements. In Massachusetts we use the Directory of Manufacturers published by the Associated Industries of Massachusetts in Boston.

Gale's Encyclopedia:

Gale's Encyclopedia of Organizations and Associations. Latest annual edition. Detroit, MI: Gale Publishing Company. Includes contact information on all types of associations and organizations; helpful index by various categories.

ICC Rail Waybill:

ICC Rail Waybill Statistics that canm be released to the public provide BEA-to-BEA data. They do not provide intermodal-facility-level detail that will be necessary in establishing at-facility performance measures.

K-III Publishing:

Valuable information is included in directories published by such companies as New York City's K-III Publishing. They put out these volumes:

K-III's Official Intermodal Guide, Fall/Winter 1993
K-III's Official Intermodal Equipment Register
Intermodal Reporter
Warehousing/Distribution Directory
Railway Line Clearances
American Motor Carrier Directory

K-III's The Official Intermodal Directory's Massachusetts section lists a few of the major rail/truck-truck/rail intermodal facilities and some of the major truck terminals but doesn't include such facilities as tank farms (pipeline/rail/truck intermodal), air freight terminals, and other intermodal facilities. No passenger intermodal facilities are included.

Northeast Directory of Transportation Services:

Northeast Directory of Transportation Services. South Boston, MA: Northeast Journal of Transportation, 1993/1994. (617) 695-1660.

Phone directories:

They provide valuable and very current listings of associations and businesses. Do not overlook this source because it is not designed and organized exactly for your intermodal management system purpose! This is a particularly good source for locations of drayage companies, the population of which might change frequently.

Shipping associations:

Your local shipping association's handbook will have valuable information. For example, the Port of Boston Handbook is put out by the Boston Shipping Association. Check the business pages of your phone book or a local/regional directory for address and phone number.

Thomas directory:

The Thomas Directory Company/Thomas Publishing of New York City has a series for the nation ("green books")and for many regions ("orange books" for Eastern New England) that provide company (all types) listings, including contact information. Thomas also publishes Inbound Traffic Guide Directory: Complete Handbook of Intermodal Facilities and Services, an annual publication.

TruckSource:

TruckSource (latest edition) is put out by the ATA Information Center (703/838-1880) of the American Trucking Associations. It lists valuable contact information about the trucking industry and its many subcategories and includes a bibliography of major reports and studies on a wide variety of trucking issues.

Highway Department, State:

Your state highway department's Traffic Volumes publications provide some helpful data. Also, truck counts previously done for special studies offer potential. Special counts with vehicle classifications and regular Highway Performance Monitoring System counts with vehicle classification offer some raw average daily traffic flow data. Deployment of automatic traffic recorders for special counts in and around intermodal facilities is always an option, although an expensive one.

Institute of Transportation Engineers:

Institute of Transportation Engineers' latest Trip Generation manual can provide multipliers (Land Use Type 030, for example, is for a "truck terminal" and includes intermodal facilities). MPOs and States are advised to use studies from your own region if possible; the rates in the ITE manual for Land Use Type 030 are based on two early 1970s studies in California. Also a good source is the Institute of Transportation Engineers' Transportation Planning Handbook (1992), which is an anthology of articles on particular transportation subjects. Chapter 2.7 covers "Goods Movement" on p. 64 and Chapter 7 (pp. 201-293), "Transportation Interface Areas," provides excellent coverage of intermodal topics and has useful intermodal facility diagrams.

Studies Completed Previously or Specially Designed Studies:

Previously completed special studies whose freight flow and other freight data can be used for intermodal planning purposes or studies designed especially for IMS purposes are two options. Some States and MPOs have hired consulting firms (e.g., Reebie Associates with their *Transearch* database or DRI/McGraw-Hill with *Freightscan*) to generate freight flow data and some MPOs have arranged for special surveys by arms of trade associations (e.g., the American Trucking Associations Foundation's (ATAF) regional office in Rumford, RI performed a truck company survey for the Worcester [MA] MPO).

Trade Journals:

Several trade journals and newspapers have useful facility and corridor information:

American Shipper magazine
Journal of Commerce
Northeast Journal of Transportation
Railway Age
Transport Topics
World Wide Shipping Guide data/descriptions

Trucking Industry Sources:

Trucking industry information on companies in your region:

- American Business Publishers' (Omaha, NE) special state and SIC category directories
- American Trucking Associations' Motor Carrier Annual Report & Motor Carrier Quarterly Report
- K-III Publishing's American Motor Carrier Directory

Transportation Technical Services' Blue Book
Transportation Technical Services' National Motor Carrier Directory for trucking/drayage company contact information

Universities and Research Institutes:

Local/regional university libraries and research institutes (e.g., a Center for Transportation at a nearby university) have specialized sources, specialized library collections, access to the Transportation Research Information Service and National Technical Information Service, and students pursuing their masters or doctorate. These and dissertations may provide corridor/facility base inventory information for the IMS Work Plan. Graduate and undergraduate students may serve as regular or summer interns to perform data collection and survey administration for IMS purposes.

EXAMPLE: DATA SOURCES USED FOR BOSTON MPO APPLICATIONS

Truck flows are a minor component in Boston's regional planning model at present. Several special urban goods movement studies have been carried out recently by consulting firms and by the staff of CTPS, however, and offer some useful data.

CTPS's Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area (1993) proposes a set of light truck and combined medium and heavy truck trip generation rates based on square footage of occupied building floor space for use in base and future Central Artery/Tunnel (CA/T) study area traffic assignments. The rates were derived from the published literature, truck delivery surveys, and shipping terminal truck counts and validated from a set of vehicle classification counts.

Another Boston Region MPO study that touches on data sources for application in eastern Massachusetts is Bechtel/Parsons Brinckerhoff's Central Artery (I-93)/Tunnel (I-90) Project: South Boston Truck Access and Circulation Study (January 1994). The purpose of this study was to consider truck access and circulation between the interstate highway system and the Designated Port Area of South Boston which would be affected by the CA/T project, during the construction period and under the full-build condition.

Several other data sources are available, including:

- Traffic/vehicle counts from permanent count stations and from coverage count stations (where 48-hour counts are taken about 800 times a year) in the system which collects Massachusetts' portion of the Highway Performance Monitoring System data. This effort is managed by the Bureau of Transportation Planning and Development (BTP&D) of the Mass. Highway Department (MHD) and Executive Office of Transportation and Construction (EOTC), which also has data in its Road Inventory File.

- Vehicle counts from MHD's weigh-in-motion (WIM) scales.

- Accident records used as a sample of data at particular locations/links/highway segments. Using the vehicle identification number (VIN), some vehicle detail is available.
- Detailed Massachusetts Turnpike Authority data with vehicles in ten categories.
- Traffic counts done by other Massachusetts regional planning associations (RPAs)
- Massport's ten permanent stations at Logan Airport and on Route 1A, providing total portal counts, and their soon-to-be-implemented automatic vehicle identification (AVI) system.
- CTPS's regional model data on employment by industry, land use, and zoning.

CREATIVE DATA SLEUTHING

Getting acceptable freight flow data within smaller states and within MPO regions is definitely a challenge. Freight planning has not been a focus at many MPO planning agencies, with the exception of such forerunners as the Chicago Area Transportation Study (CATS) which pioneered much of the commercial vehicle data planning research other planning agencies have borrowed and used.

Truck flow data are particularly hard to obtain because of the complexity of the for-hire and private trucking industries and the changing nature of their composition. Several creative ways of obtaining truck flow data from publically available (non-direct-consulting-firm) sources are suggested below:

Agency-designed truck company survey; mailing lists from business directories

Freight Advisory Council member cooperation and data sharing

Other regional planning associations'/MPOs' databases assembled by consulting firm(s) for previous studies done for other purposes but now clearly usable for IMS purposes (truck count data, truck/rail/waterborne flow data, and so on)

Land use data (from air photo surveys) used to generate truck data (using ITE or other multipliers)

Business directory and trucking industry directory information to isolate companies, comnpany characteristics, and fleet size; use TIUS averages for the state to assign estimated trip lengths

Apply commercial vehicle category percentages to total ADT to get commercial vehicle ADT from HPMS permanent count data; apply similar techniques to special count data

Organize a targeted ATR placement for intermodal purposes (around intermodal facilities) to obtain new freight flow data specific to important points (transfer facilities) in the intermodal corridors

These and other methods can move States and MPOs closer to the stage where knitted eyebrows are replaced by confident gazes. ISTEA's architects had a vision of intermodalism that is overarching and extremely important as a rubric to guide our future thinking and planning. Unfortunately, as with all visionary legislation, the goal is clearer than the means to achieve it. Planning for increased intermodal efficiency first requires measuring that past, present and potential future efficiency. And measuring can't be done without data--without something to measure and a measuring stick.

CONCLUSIONS

Like Sherlock Holmes, MPO and State freight planners need to search imaginatively and creatively for intermodal facility and flow data, much of which resides in the private sector and may or may not become available through cooperative efforts within a Freight Advisory Council atmosphere.

One of the first things to do is to look back at what has been collected for other purposes before. It may now be used for intermodal purposes. In this age of recycling practically everything, it is not extraordinary to expect we'll need to **recycle data**!

ENDNOTE

* The author is Interagency Technical Team Leader for the Massachusetts Intermodal Management System.