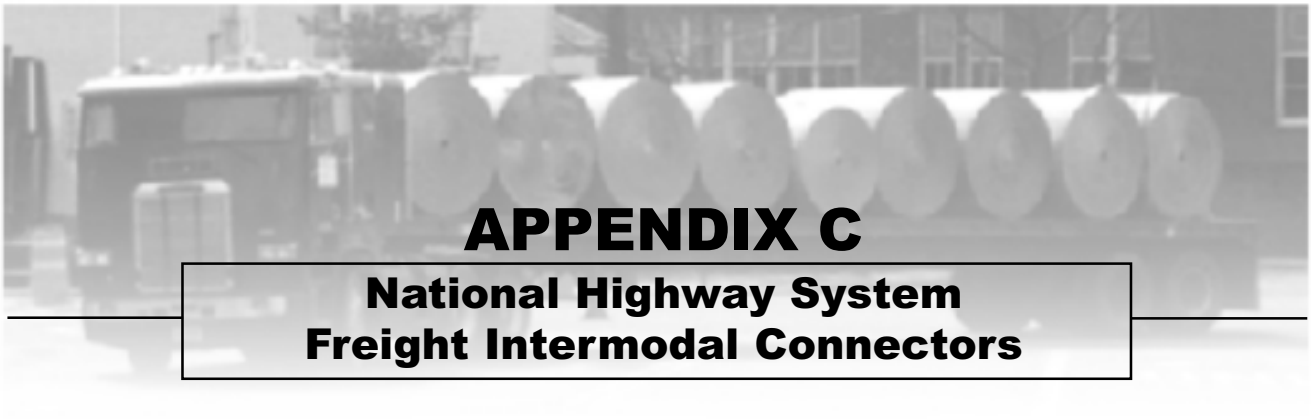


APPENDIX C

National Highway System Freight Intermodal Connectors

Background

Section 1106(d) of TEA-21 enacted June 9, 1998, requires the Secretary to conduct a "review of the condition of and improvements made, since the designation of the National Highway System, to connectors on the National Highway System that serve seaports, airports, and other intermodal freight transportation facilities..." National Highway System (NHS) connections to major passenger and freight intermodal terminals were designated in November 1995 by the Federal Highway Administration in cooperation with the States and approved by Congress in TEA-21. Connections to 1407 major freight and passenger terminals were identified totaling 2032 miles. There were 519 freight terminals (port, rail, and pipeline facilities) approved by TEA-21. In addition, 100 major freight airports were identified in cooperation with FAA. An analysis of the condition of and the investments on the connectors is presented here. Additional analyses on the investment process and impediments to making investments is underway and will be reported to Congress in June 2000.

Data Collection

To obtain the information necessary to meet the requirements of Congress, it was decided that a field inventory of the freight connectors by FHWA Division Offices in each State was necessary. Inventory data was obtained for the following categories: connector condition, investment information, and the investment process. Much of the information was obtained from existing data sources maintained within the State DOTs, MPOs and possibly local jurisdictions when available. However, in most cases, on-site visits were needed to supplement available sources. The field inventory information was designed to be collected on a field visit and relies primarily on the observations and judgement of the field data collector.

Information on investments was critical to the study, however, there were difficulties associated with getting complete data, especially where local and private sector funding is involved. The Transportation Improvement Programs (TIPs) and Statewide Transportation Improvement Programs (STIPs) were the primary source of information. Since not all improvements are listed as separate projects on the TIPs and STIPs, they had to be supplemented with input from local agencies or private sources, or discussions with terminal operators where possible. The inventory also requested information on any perceived impediments to investments on connectors.

Connector Condition

Pavement Condition

This is a key element in the serviceability of a connector which can affect the speed of travel, and in the case of poor pavement condition, can cause damage to the vehicle and its contents. The rating of pavement was broken into five categories, primarily based on the speed that the truck could comfortably travel (See Exhibit C-1).

Exhibit C-1

Pavement Rating Categories

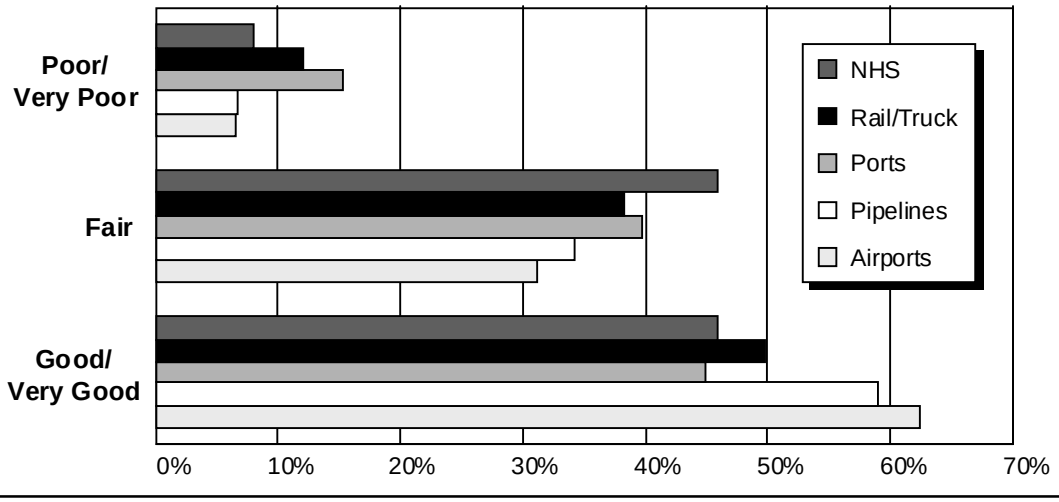
Very good	Newly built or resurfaced and distress free
Good	Smooth surface with little to no cracking or rutting
Fair	Serviceable with shallow rutting and moderate cracks beginning to occur, but does not affect travel speed on the connector
Poor	Same problems as fair but worse, causing some reduction in speed
Very poor	Major problems with potholes etc., causing substantial reductions in speed

For all the connectors inventoried, about half were considered good or very good, 37 percent were rated as fair, and 12 percent were rated as poor or very poor. The average for all of the NHS with poor/very poor rating is 8 percent. Fair pavements would be considered due for resurfacing and poor and very poor are past due for resurfacing and possibly reconstruction. Pavement condition by terminal type was also calculated.

While airports and pipelines were about average with 7 percent in the poor and very poor categories, rail/truck and ports showed 12 percent and 15 percent respectively. The poor and very poor rating are important because they cause reductions in the speed and efficiency of a facility and may also damage the vehicle and its contents (See Exhibit C-2).

Exhibit C-2

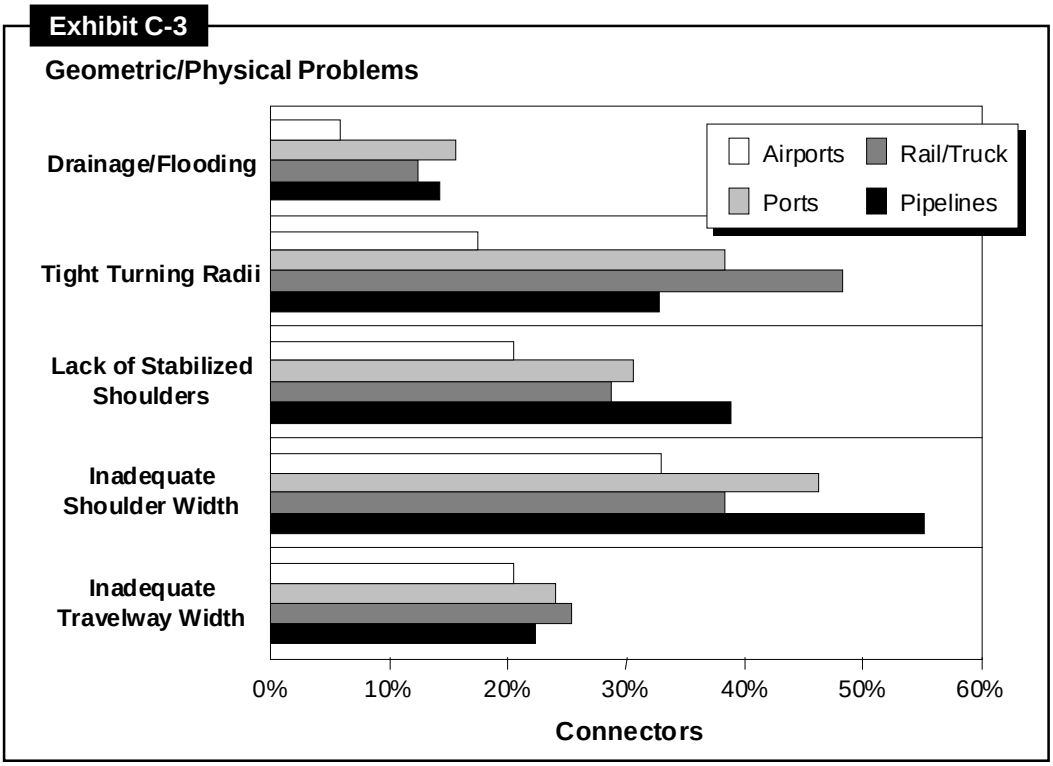
Pavement Conditions



Geometric and Physical

A list of physical features were listed on the inventory form. These items were checked when they were considered deficient. The top 5 problems are shown below.

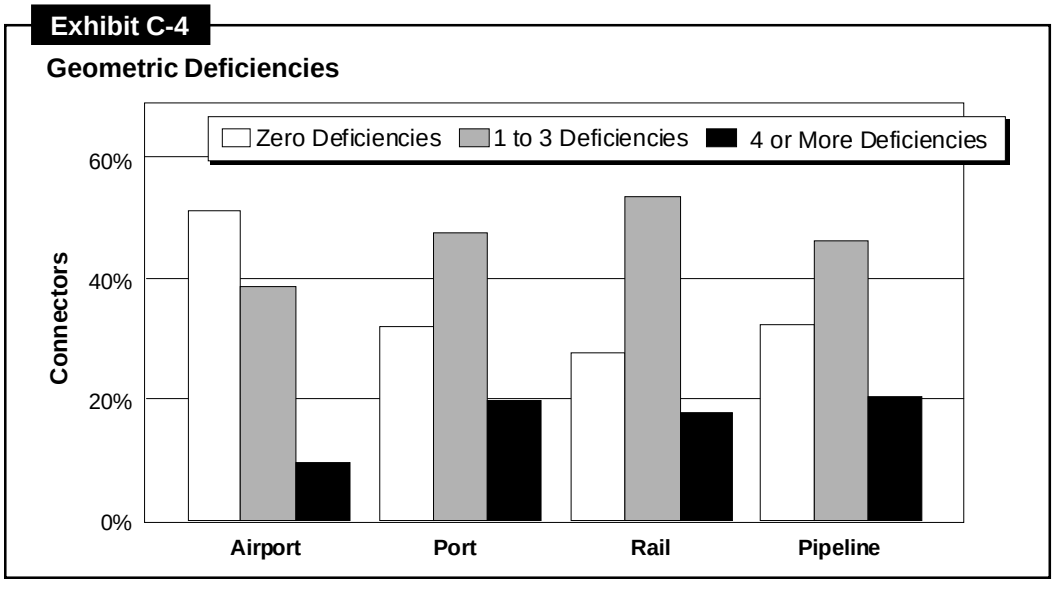
Exhibit C-3



Inadequate shoulder width (insufficient width to accommodate a parked truck without hindering traffic flow), turning radii (right turning trucks are required to make wide turns into adjacent lanes), and lack of stabilized shoulders (shoulder not paved or not able to support heavy trucks) were the most prevalent problems. Inadequate travelway width (roadway width is not adequate for two-way truck traffic) and flooding were also significant problems. Any one of these are a problem where heavy truck traffic is present.

A number of connectors also showed multiple deficiencies. Exhibit C-4 shows that almost half the terminals have at least 2 deficiencies and 10 to 20 percent have 3 or more deficiencies.

Exhibit C-4

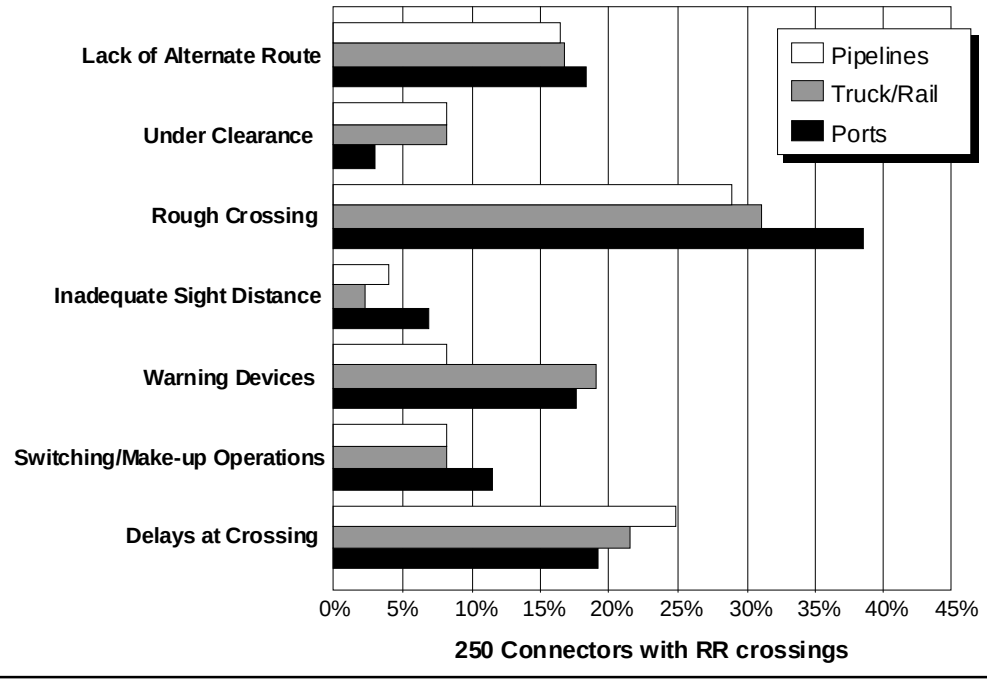


Railroad Crossings

Because of the presence of active railroad crossings near or adjacent to most freight terminals, they were evaluated as a separate category. There were 250 connectors with active crossings and 25 percent of the connectors had railroad crossing inadequacies (See Exhibit C-5).

Exhibit C-5

Railroad Crossing Problems



The most common problems were "rough crossing" (roughness or profile causes a significant reduction in speed to crossing vehicles), delays (delaying traffic for excessive periods), substandard crossing warning devices, and lack of alternative route if blocked by a train (extended delays that essentially block access to the facility). Lack of alternate routes, delays at crossings and switching/ make-up operations could seriously affect the operation of a terminal. The remaining items indicate a significant number of unsafe or substandard crossings.

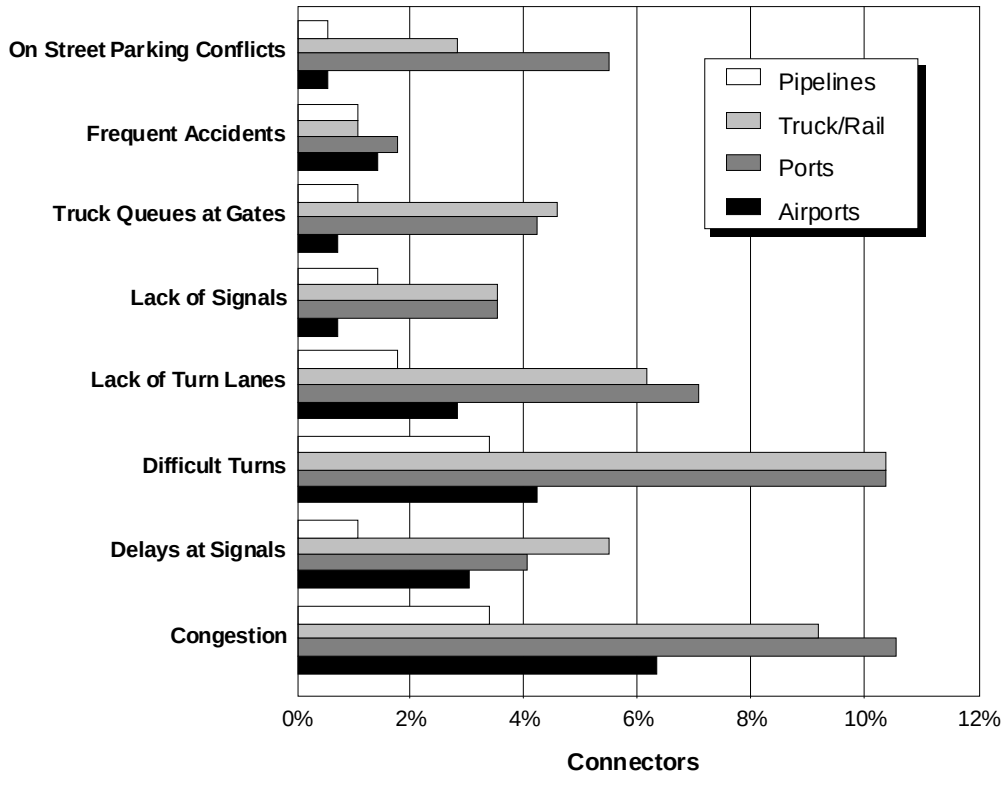
Traffic Operations and Safety

Over half of the freight connectors exhibited safety and/or operational problems. (See Exhibit C-6)

Heavy traffic, difficulty making left and right turns and lack of turning lanes were the most prevalent problems causing congestion on the connectors. Delays at traffic signals, on-street parking conflicts, and truck queues at facility gates are also shown.

Exhibit C-6

Operational Problems



Investment Information

Information on improvements made since the connectors were designated in November 1995 to the present and those programed for the next three years was requested. Investment levels by terminal type and funding source were gathered from State and MPO programing documents and other available sources. Exhibit C-7 shows funding by source.

Exhibit C-8 shows funding by terminal type.

To make a comparison with investment levels on the NHS system, the annual investments were calculated on a per mile basis. Exhibit C-9 shows annual investments per mile by terminal type for three years beginning in 1995.

When looking at average annual investments per mile on the overall NHS System of $141,500, connectors compare favorably. However, this may not represent what is occurring on the vast majority of connectors. To demonstrate this, the annual investment level without the five most costly projects was calculated. For example, these are "mega" projects like the Alameda Corridor and the San Francisco Airport connections that are not representative of investment activity on a typical connector. Airports seem to do the best but this may be due to the associated passenger activity and the importance of air travel to a community. Truck/rail is next best with a significant amount of work associated with modernizing and relocating terminals. The level of investment for ports appears to be very low ($40,628), less than 30 percent of the average for the NHS ($141,500), especially since ports exhibit the most deficiencies overall.

Exhibit C-7

Funding by Source*

	Past 3 Years	Next 3 Years
Federal	$229,272,642	$441,020,563
State	$81,576,843	$262,572,241
Local	$132,598,043	$177,403,774
Private	$134,810,000	$40,147,000
Total	**$578,257,528**	**$921,143,578**

* The "Past 3 Years" funding represents improvements made between November 1995 and late 1998, when the field inventory of the connectors was collected. For most connectors, funding identified for the "Next 3 Years" represents planned improvements for 1999 through 2001.

Exhibit C-8

Funding by Terminal Type*

	Past 3 Years	Next 3 Years
Airport	$230,229,157	$246,737,459
Pipeline	$19,122,800	$15,009,000
Port	$206,338,572	$391,364,621
Truck/Rail	$122,566,999	$268,032,498
Total	**$578,257,528**	**$921,143,578**

* The "Past 3 Years" funding represents improvements made between November 1995 and late 1998, when the field inventory of the connectors was collected. For most connectors, funding identified for the "Next 3 Years" represents planned improvements for 1999 through 2001.

Exhibit C-9

Annual Investment Levels Per Mile

Terminal Type	3-Year	3-Year w/out Top 5
Airport	$355,291	$80,731
Pipeline	$59,572	$12,483
Port	$136,129	$40,628
Truck/Rail	$119,811	$66,732
All NHS	**$141,500/mile**	

* The "3-Year" funding represents improvements made between November 1995 and late 1998, when the field inventory of the connectors was collected.

These investment levels on the connectors seem to indicate that there is significant under investment on freight connectors. The exhibit below may give some indication as to why this is occurring.

Exhibit C-10 shows that most connectors are owned by local governments, which may account for the low investments levels on freight connectors. Typically, local jurisdictions see freight as a private business activity which benefits the region and Nation as a whole. Since local roads are typically not a responsibility of the States, and in many cases cannot match Federal funding on local roads, they do not see freight connectors as their responsibility. States and MPOs often see freight as a lower priority because of the pressing needs of passenger travel.

Exhibit C-10

Freight Connector Mileage by Jurisdiction

Jurisdiction	Mileage	Percent
State	338	29%
Local	580	49%
State and Local	255	22%
Total	**1173**	**100%**

The inventory form also asked what factors contributed to needed improvements going unprogrammed. Those indicated from the survey form as to why this is occurring (in order of importance) are: 1) Low priority in State/MPO plans; 2) Lack of local match or sponsorship; 3) Lack of private sector participation; 4) Neighborhood-Community opposition; 5) Environmental concerns; and 6) Physical or Other Constraints.