LATIN AMERICA TRADE AND TRANSPORTATION STUDY (LATTS) II

Introduction

The purpose of this briefing paper is to describe the analyses pertaining to the identification and condition examination of the LATTS II highway connectors. Intermodal highway connectors, which are intraregional transportation arteries and feeder networks used by trucks to travel from facilities to major highways, constitute an important part of the LATTS II Strategic Highway System. They are the portion of the highway system connecting the LATTS II mainline system with the LATTS II facilities (waterports and airports) – please see Exhibit 1 for the basic graphical illustration.

Since they are typically short, but account for a larger proportion of the vehicle miles traveled, they are often referred to as the so called "critical last miles" of the overall highway network. These highway intermodal connectors are sometimes overlooked, even though their deficiencies can significantly impact the efficient movement of vehicles, especially large trucks. Intermodal connectors fulfill an ever-increasing role in freight transportation. The requirements placed on these network elements are forcing competition at the national, state, and municipal levels. The need for the best freight system possible is clear. Therefore, it is important that any constraints identified by the analyses be viewed as Alliance-wide issues, since the economic effects of one facility's inability to serve travel needs will affect not only its local market/state economy, but that of the whole Alliance.

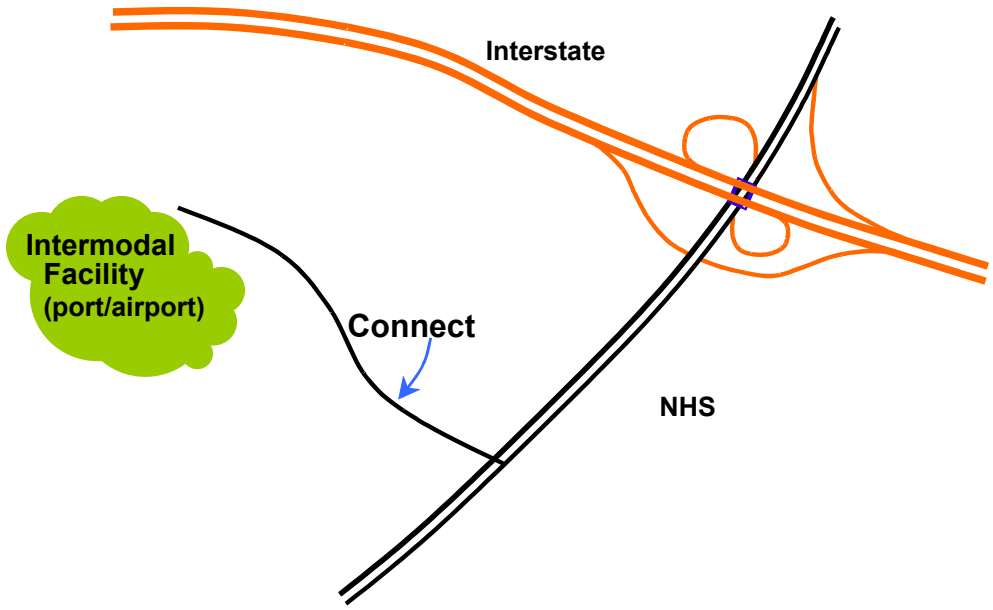
Approach Overview

The first step in the process was to identify the relevant data sources of connectors information. The most detailed source of connectors was found to be the database accompanying the (National Highway System) NHS Intermodal Freight Connectors Study[1]. As part of this study, the Federal Highway Administration (FHWA)'s Office of Intermodal and Statewide Programs collected the data (based on a comprehensive survey) as part of a requirement of the Congressionally-mandated study under Section 1106(d) of TEA-21. This legislation charged the Administrator of FHWA to characterize the nature of the condition of connectors on the NHS that serve seaports, airports, and other intermodal freight transportation facilities. This database, hereafter referred to as NHS Connectors Database, despite not covering all the LATTS II facilities, was found to be very useful for the purpose of both identification of LATTS II connectors and their characteristics. However, the need to use other sources of connector information arose. The FHWA maintains a listing a NHS Intermodal Connectors. This listing supplies only a short description (route and mileage) of a large number of highway connectors, and does not provide any connector characteristics or deficiencies. This source was helpful in supplementing the information not covered in the NHS Connectors Database. Additional sources of connector identification included information collected from the facilities, the DOTs and other sources such as directories, maps, and websites.

The next step was to collect the data for the identified connectors. As previously mentioned, the NHS Connectors Database served as the primary source of detailed information of connectors' characteristics. However, since it does not cover all the LATTS II facility connectors, other sources needed to be used. One of these sources is the Highway Performance Monitoring

[1] NHS Intermodal Freight Connectors Study. U.S. Department of Transportation, Federal Highway Administration. 2000.

Exhibit 1
Basic Connector Structure



System (HPMS)[2]. This road data source, which actually constitutes a component of the NHS Connectors Database, contains no railroad crossing data, and limited data on geometric, and operations deficiencies of connectors. This database did not capture all the connectors, either, therefore other data sources such as the facilities' data, and the DOTs needed to be utilized to collect information on connector deficiencies. Additionally, efforts were made to supplement the information on general connector characteristics with freight or truck and capacity data. For this purpose the Freight Analysis Framework (FAF)[3] was used. This source provides year 1998 and forecasted 2020 Average Annual Daily Truck Traffic (AADTTs) and capacity (i.e., volume-to-capacity ratio) data.

The connector identification and data collection results were then analyzed and summarized.

[2] Highway Performance Monitoring System. U.S. Department of Transportation, Federal Highway Administration.
[3] Freight Analysis Framework. U.S. Department of Transportation, Federal Highway Administration. 2002.

Results Summary

There are 106 existing LATTS II airports (51) and waterports (55) in the Strategic Transportation System. These 106 facilities were found to have 127 terminal areas. Nineteen of these terminals were found not to need an NHS connector (because they were already served by an existing NHS route). Altogether 115 highway connectors linked to 40 airports and 47 waterports were identified (some terminals have more than one connector). For 80 of these connectors comprehensive data was available in the NHS Connectors Database, while for 23 of the connectors the HMPS was used, and for the remaining 12 other sources were utilized (see Exhibit 2 for the summary of the key data sources). The total mileage of all the LATTS II connectors was found to be about 36 miles (see Exhibit 3 for the map showing the number of connectors and their mileage for each of the Alliance states/commonwealths).

Exhibit 2
LATTS II Connectors – By Main Data Source

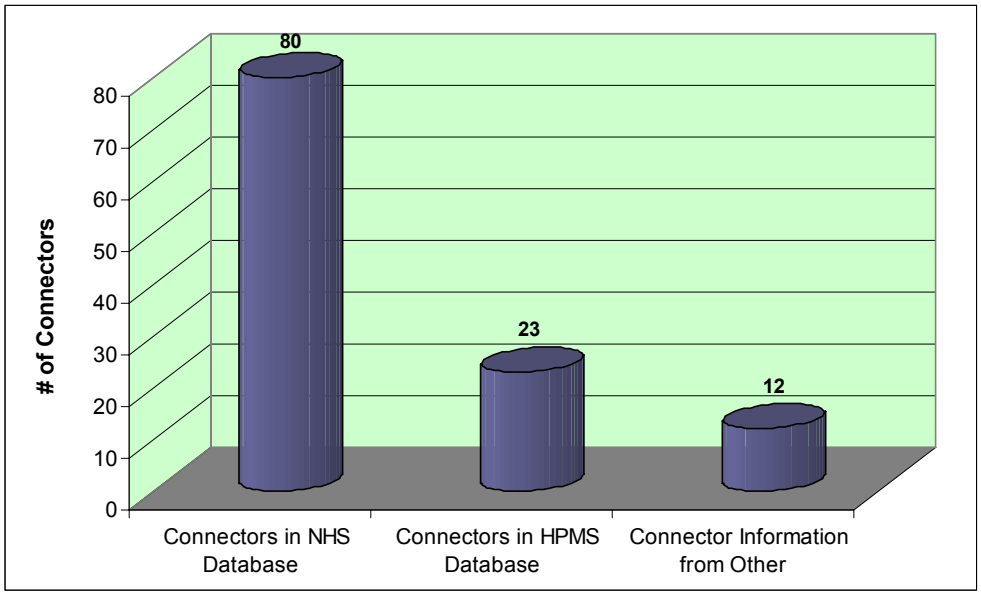
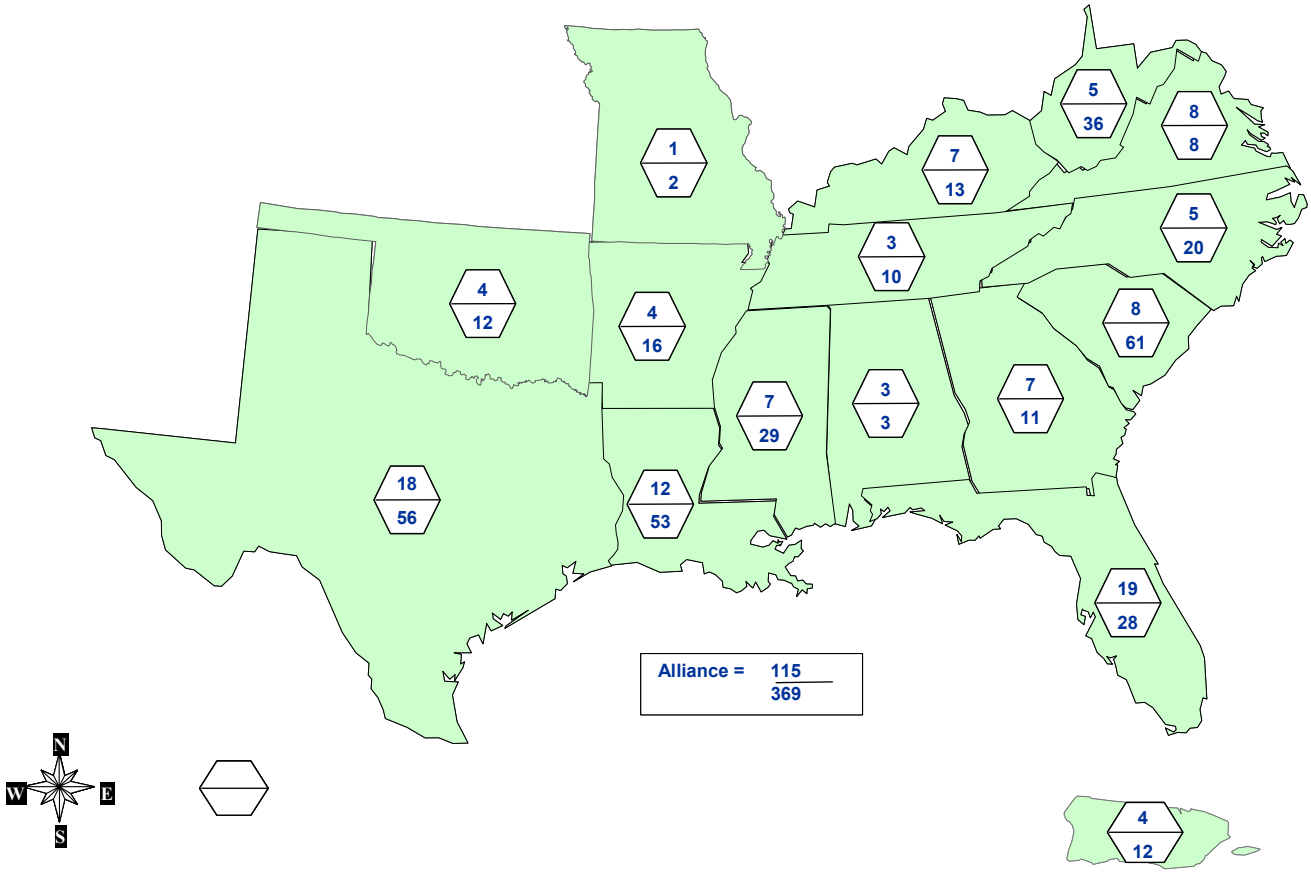


Exhibit 3
Number & Mileage of LATTS II Connectors



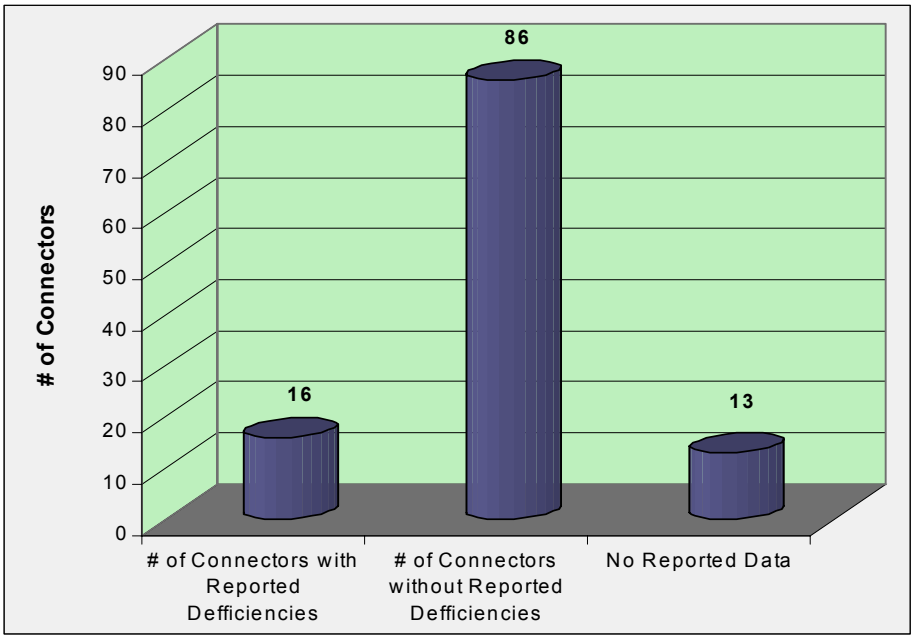
Summary of Connector Deficiencies

This section summarizes various connector problems or deficiencies that were reported in the aforementioned sources and may stand in the way of the connectors serving the strategic roles they play. The connector deficiencies are grouped into four main categories: pavement, physical/geometric, railroad crossings, and traffic operations and safety.

Pavement Condition Deficiencies

There were 16 (14%) connectors found with reported pavement condition problems, while 86 (75%) connectors did not have any reported problems, and for 13 (11%) there was not data found. Exhibit 4 shows the summary of the connector pavement condition findings.

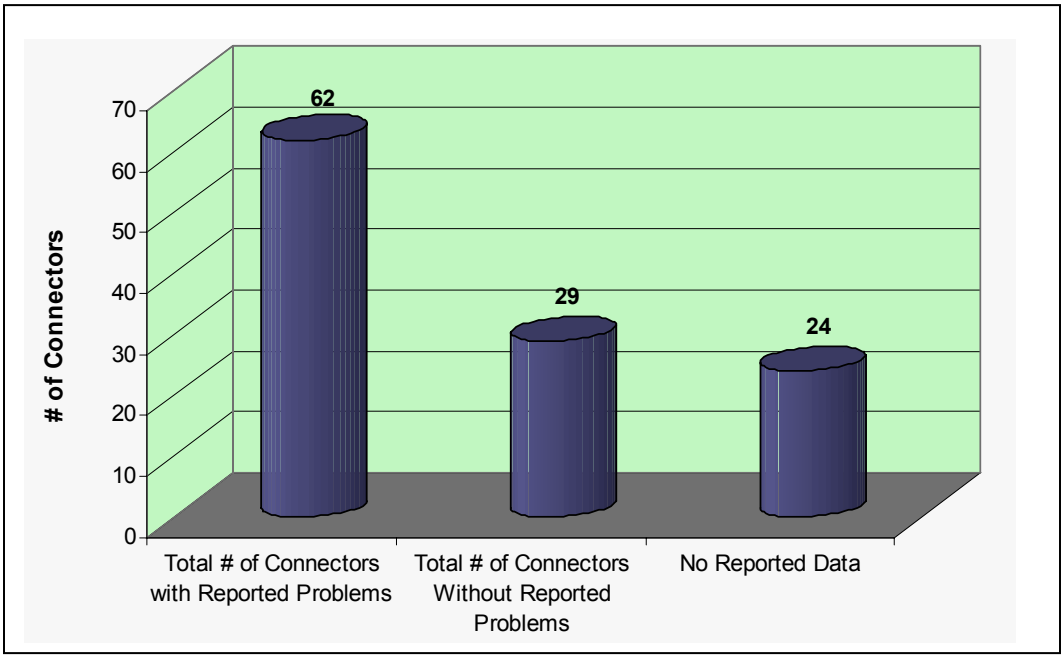
Exhibit 4
LATTS II Connectors and Reported Pavement Condition Deficiencies



Physical/Geometric Deficiencies

Overall, of the connectors reporting deficiencies, the majority (62 connectors or 53%) were reported to have problems with regards to physical/geometric conditions. Twenty nine connectors (26%) were reported not to have deficiencies, and for 24 connectors (21%) no data was available. The main problems in this category related to road shoulders, inadequate travelway width, tight turning radii, and drainage/flooding. The summary of the physical problems category is provided in Exhibit 5.

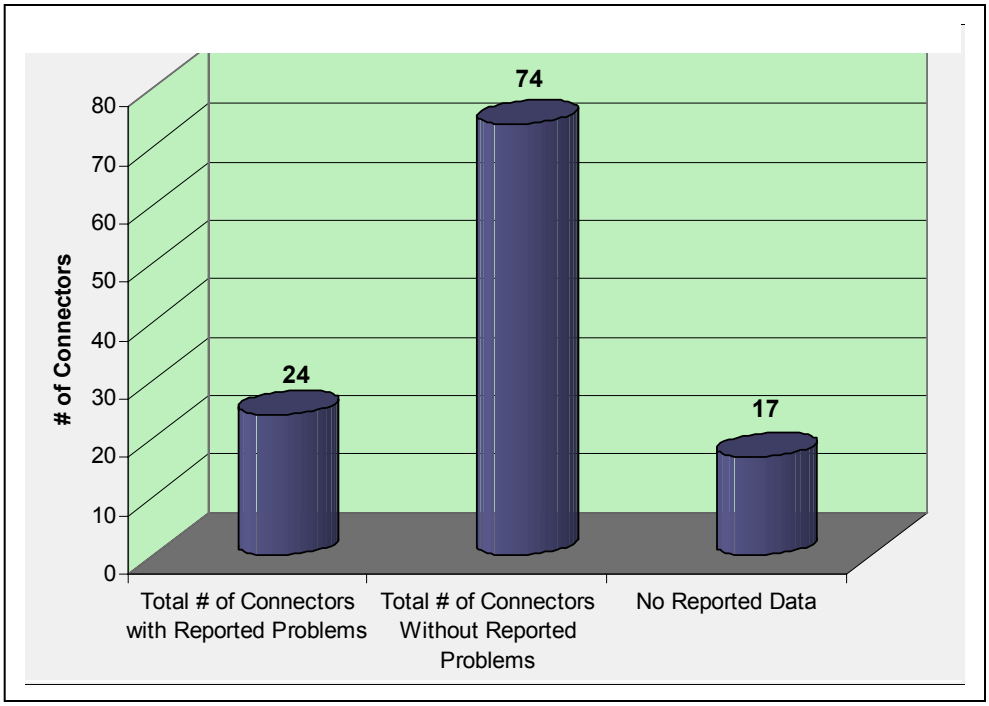
Exhibit 5
LATTS II Connectors and Reported Geometric/Physical Deficiencies



At-Grade Railroad Crossing Deficiencies

Twenty four connectors (21%) were found to have deficiencies related to at-grade railroad crossings. However, most of the connectors (74 connectors or 63%) did not report problems in this category, and for 17 connectors (15%) no relevant data was found. The most frequent problems in this category pertained to rough crossing surface, and warning devices. Exhibit 6 shows the summary of the railroad crossing deficiencies on the LATTS II connectors.

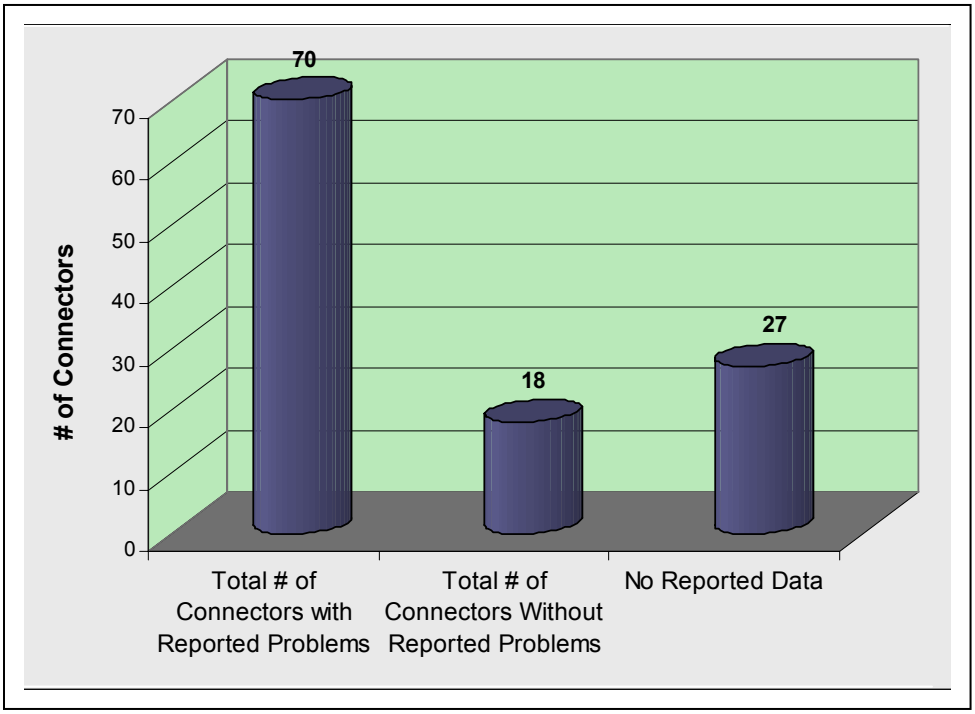
Exhibit 6
LATTS II Connectors and Reported Railroad Crossing Deficiencies



Traffic Operations. Safetv. and Delav Problems

Most (61%) connectors (70) were identified to have deficiencies related to operations, safety or delays. Eighteen connectors (16%) did not report problems in this category, and for 27 connectors (23%) there is no reported data. The main problems in this category lie in inadequate terminal signage, limited turning, and congestion. The summary of the operation problems on the connectors is shown in Exhibit 7.

Exhibit 7
LATTS II Connectors and Reported Operations, Safety and Delay Deficiencies



Truck Volumes and Volume/Capacity Issues

Following the review of the general connector deficiencies, additional, more freight-specific analyses were conducted. For this purpose, the data contained in the FHWA's Freight Analysis Framework was utilized. Based on the data available from this source, it was found that, on average for the Alliance region, the daily truck traffic on the connectors is expected to almost double from a recent level of about 2,600 daily trucks to over 5,000 daily trucks by year 2020 (see Exhibit 8). When these volumes are tied to capacity, in terms of volume-to-capacity (VC) ratios, it was found that, on average, the VC ratios for connectors in the Alliance as a whole are projected to deteriorate from the recent levels of around 0.5 to over 0.8 by year 2020 (see Exhibit 9).

Exhibit 8
LATTS II Connectors and Average Daily Truck Flows

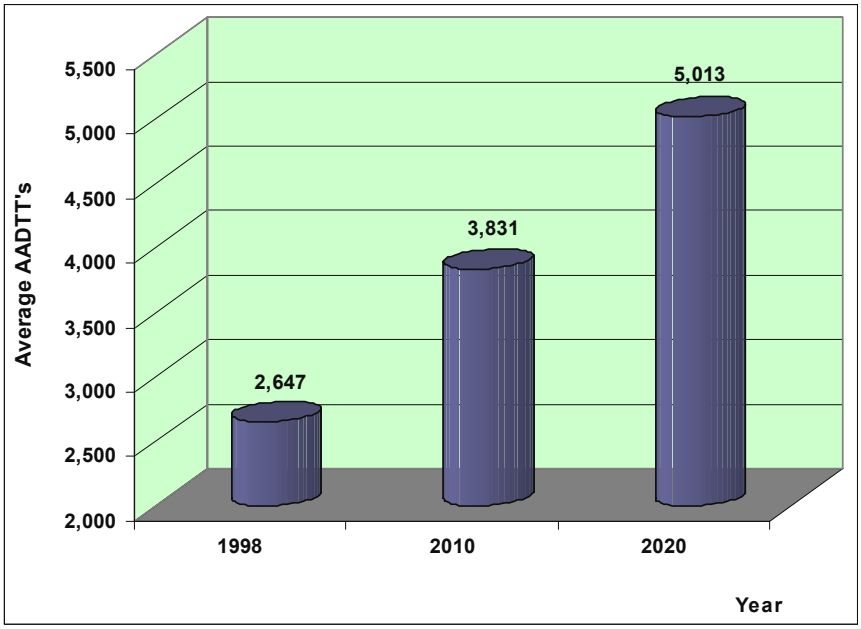
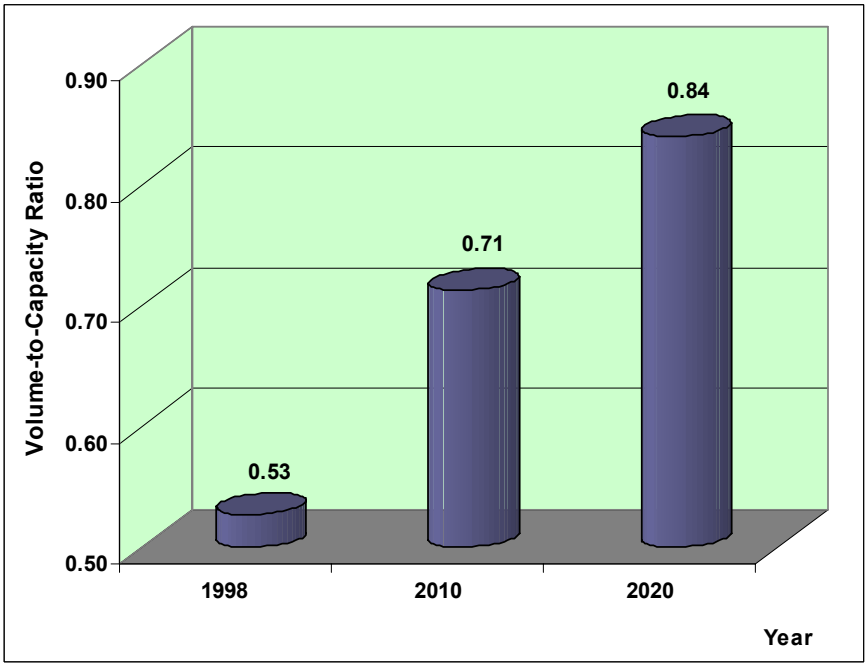


Exhibit 9
LATTS II Connectors and Average Volume-to-Capacity Ratios



Conclusion

There are multiple deficiencies on the identified 115 LATTS II connectors. The deficiencies are related to pavement condition, physical/geometric problems (particularly road shoulders, travelway, and turning radii), railroad crossings (rough surface, and warning devices), as well as operations/safety/delay deficiencies (inadequate terminal signage, limited turning, and congestion). The volume of trucks on the connectors is also expected to significantly increase, while the volume-to-capacity ratios are projected to worsen over time.

Overall, a very useful data source in these analyses was the NHS Connectors Database. The challenge with this source is that it does not capture all the connectors, and it is not freight-oriented enough. Consequently, a question worth considering it whether this database should be expanded and updated periodically.

In terms of the strategic opportunities, by keeping the connectors in good, working shape, delay reductions and better time reliability can be gained, which in turn can result in freight industry efficiency and productivity improvements, and ultimately lead to increased economic activity.