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The Impact of the Louisiana Rail Infrastructure: A System Analysis and Plan

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13. Abstract
The University of New Orleans Transportation Institute assisted the Louisiana Department of Transportation and Development (DOTD) to develop the State Rail Plan for the purpose of guiding the state's freight and passenger rail transportation planning activities and project development plans over the next 20 years. This plan describes the state's existing rail network and rail-related economic and socio-economic impacts. It also describes the State Rail Plan process, Louisiana's rail vision and supporting service objectives, proposed publicly sponsored short- and long-range capital improvements, studies, and recommended next steps to address the issues identified. This plan is intended to meet the requirements established by the federal Passenger Rail Investment and Improvement Act of 2008 to ensure Louisiana qualifies for future federal funding for rail projects.

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The completion of this system analysis and the development of the rail plan would not have been possible without the participation of many rail stakeholders and others, and the University of New Orleans and the Louisiana Department of Transportation and Development expresses its appreciation to those individuals and parties who participated as stakeholders in this effort.

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Implementation Statement

This 2020 State Rail Plan is an update the 2015 plan that was developed under the authority and guidance of the Rail Section of the DOTD's Office of Multimodal Commerce. Overall, and through both the 2015 public involvement and this update, stakeholders and the general public expressed understanding and appreciation of the value and potential of the state's passenger and freight rail operations. DOTD, the designated rail authority in Louisiana, is responsible for rail planning in the state and assisting freight railroads in applying for federal funds for improvement projects. The University of New Orleans Transportation Institute and the Office of Multimodal Commerce coordinated closely with other DOTD divisions responsible for various rail related functions, including highway-rail at-grade crossing improvements and grade separations, in the development of the plan.

Table of Contents

Introduction

Louisiana's rail system plays an essential role in linking Louisiana shippers with markets throughout North America. Chief among high-volume rail shippers in the state is the petrochemical industry. Historically, New Orleans has been a major gateway for the interchange of rail traffic between eastern and western railroads. In recent times, railroads have brought increasing volumes of oil tapped in the upper Midwest to Mississippi River ports for export. Amtrak's intercity passenger services in the state are limited, but Amtrak provides essential transportation services for Louisianans. A brief description of Louisiana's rail network is provided in the Literature Review.

Literature Review

In 2014, Llorens and Richardson examined the economic contribution of short line railroads to Louisiana, the capacity of the short lines to handle new 286,000-pound railcars, and other issues related to short line rail capital improvements for funding. For every short line railroad in Louisiana, they examined how many people it employed, the costs associated with the railroad, its profits and tax returns, how much it benefited the environment due to reducing the truck burden, and how much it benefited Louisiana industry overall. They did a survey of the relevant parties at the federal, state, and rail industry level. They also conducted interviews with persons familiar with short line rail operations and made one site visit to each short line. Their overall solution for upgrading the capacity of the short lines was state funding in the form of grants and loans as well as combining these two into mixed funding streams [1].

Additionally, in 2014 an update of the Louisiana State Hazard Mitigation Plan details the nature of the threats faced by the state from various natural hazards, particularly storms and flooding along the coast. It does not, however, address the possibility of passenger rail service as an option for evacuation in the event of such occurrences (State Hazard Mitigation Planning Committee (SHMPC), 2014). The Southern Rail Commission website directly confronts this issue when discussing the possibility of establishing passenger rail service between New Orleans and Baton Rouge: “Passenger rail can also be part of an evacuation strategy to safely and conveniently move large numbers of people out of the Greater New Orleans Region when threats arise including ambulatory medical patients that can be moved to Baton Rouge area hospitals” [2].

In 2015, the DOTD completed the 20-year State Rail Plan. At that time, the major aspect of the rail system was its freight component in service of the petrochemical industry [3]. Freight rail in Louisiana consists of six Class I railroads. These and 14 ancillary railroads, serving 2,730 miles of track [3]. Louisiana also has three Amtrak service lines that go to Chicago, New York, and Los Angeles. The plan reported that the state’s rail system generated 494,900 jobs with an income of $25.2 billion, “… and total economic output of $134.6 billion” [3]. The draft plan was made available on the Internet for the public; every state railroad was contacted for input into the plan; and three public meetings were held. These yielded awareness of interest in rail service between Baton Rouge and New Orleans, restoring passenger rail to the Gulf Coast, and “… Shreveport/Bossier City–Dallas/Fort Worth intercity service …” [3]. They also highlighted safety concerns,

attention to the community impacts of rail projects, and concern over funding sources for both freight and passenger rail. This led to the development of short and long-range rail improvement objectives totaling $1,980 million.

The plan recommended the development of a Rail Program to get federal funding for rail improvements, especially as these relate to the need for increasing the weight capacity of the short lines; a state-level funding program; safety improvements at rail crossings; regional rail policy cooperation; improvements to passenger rail service; and "… the development of new intercity rail initiatives that enhance mobility options for Louisianans" [3]. It also recommended supporting and expanding the New Orleans Rail Gateway Program, increasing the rail capacity of the six Class I railroads linking the Port of New Orleans to the rest of the nation, and the Gulf Coast Rail Relocation Project restoring passenger service to Gulf Coast communities. In 2016, the DOTD updated the Statewide Transportation Program (STP). It is a blueprint for transportation in Louisiana through 2044. It pointed out that a significant share of the operation and maintenance of the state transportation system took place at the local level [4]. The multimodal component of this plan "… [covered] all modes including highways and bridges, freight and passenger rail, ports and waterways, aviation, trucking, public transportation, and non-motorized transportation" [4]. Its emphases were on maintenance of existing systems, safety, economic development, community development, and the environment [4]. It focused on the needs of short line rail roads in the rail mode as well as improving highways as intermodal connectors.

The plan identified a total of $56 billion (2010 dollars) in necessary maintenance and improvements to the statewide transportation system by the year 2044. Of this amount, $1.16 billion was linked to freight rail and $0.56 billion to passenger rail. The majority of the amount was for roads and bridges at $35.99 billion [4]. The plan determined that the most feasible funding scheme for the statewide improvements depended on an increase in the Transportation Trust Fund for fiscal year 2020 with no allowance for any increase in federal funding [4]. While the plan was heavily inclined towards highway projects, it did include recommendations for freight rail. These were: analyzing economic impact; promoting freight rail funding to state lawmakers and Louisiana Congress people; "[maintaining] a minimum balance of $25 million in Priority 2 of the State Capital Outlay Program for navigation and port related freight rail capital projects…"; obtaining funding a program to separate highway and rail grades; researching best practices to promote the closing of unnecessary grade crossings, some of which are privately owned; maintaining funding for safety plans at rail crossings; and supporting the development of justified

intercity passenger rail service [4]. There was also support for funding the New Orleans Rail Gateway [“Mega”] Project [4].

Also in 2015, Kelle and Jin began work on a computer simulation model to examine possible improvements to Louisiana's freight transportation infrastructure [5]. They noted that previous computer models tended to focus on one mode only rather than performance at intermodal connections. This is due to the difficulty of modeling transportation flows. They held that simulation models should include railway, marine, and truck working together at intermodal nodes as these intermodal nodes are often chokepoints for freight that have negative societal impacts. They also stated that such a “… model should also incorporate other transportation performance measures such as reliability, safety and security, environmental impact, economic development, etc.” [5]. At the date of publication, their model was primarily focused on freight mobility, but they stated plans to expand it to “… include other metrics of reliability, safety, and environmental stewardship” [5].

In 2016, Dr. Codjoe undertook a literature review of rail safety signage, cataloging problem locations at Louisiana rail crossings via DOTD. This study addressed the issue of vehicles stopping too close to rail crossings. Dr. Codjoe did traffic data collection before and after the installation of new safety signage to determine the effectiveness of its installation [6]. Expanding on this study in 2017, Dr. Codjoe undertook a survey of all state transportation departments, railroads, “… and owners of private road/driveway [rail] crossings” [7]. At that time, Louisiana was number seven in the nation for rail crossing deaths. The proposed solution to this problem was to incentivize the closure of unnecessary crossings.

In 2016, the Panama Canal expansion was addressed by Sarder et. al. Their concern was how the expansion would lead to freight volume increases in eastern and gulf coast ports, with an eastward freight shift. This could prove to be problematic, as these intermodal transportation systems were already congested [8]. They developed a transportation infrastructure database utilizing the Highway Performance Monitoring System, the National Highway Planning Network, the Freight Analysis Framework Version 3, freight distribution scenario analyses, transportation network impact modeling, GIS model development and visualization, and economic impact analyses of the projected freight increases. Their research also looked to the possibility of moving congested intermodal hubs and expanding these hubs’ capacities [8]. This ultimately led to the development of a web platform for “… assessing and selecting the best routes for freight movement and best location for freight facilities” [8].

In assessing rail passenger service along the Gulf Coast, Uddin et al. examined the Mississippi DOT's strategic planning report to identify the service gaps for "...underserved and/or vacationers to casinos and beaches"; traffic congestion on gulf coast highways; the safety hazards of highway travel in automobiles due to competition with freight trucking; travel restriction to automobiles not being economically competitive; emissions and air pollution; the anticipated growth in highway freight; and the lack of political will to integrate passenger rail with highway traffic [9]. Their recommendation was for transportation agencies in the Gulf Coast region to focus commuter rail studies specifically on reducing highway congestion and pollution [9].

In 2017, the Gulf Coast Working Group of the Federal Railroad Administration had a narrower emphasis on the restoration of passenger rail connecting New Orleans with Orlando, Florida. Specifically, the group was looking at issues of "tourism and business travel; congestion on I-10 and the utilization of this commuter rail artery to facilitate access to jobs, education, and healthcare as support for disaster and emergency response in a region susceptible to coastal storm events" [10]. The final recommendation of the group was for one daily round-trip each between New Orleans and Orlando and between New Orleans and Mobile, Alabama. At the Midsouth Megaregions Freight Planning Meeting and Workshop in Memphis (2016), local, state, federal, and Metropolitan Planning Organization representatives networked together to study transportation policy at the scale of the Midsouth megaregion: Alabama, Arkansas, Louisiana, Mississippi, and Tennessee. Their focus was upon infrastructure and congestion, freight, and environment, especially as related to air quality, economic vitality, and transportation-related safety. The participants concluded that these issues can only be fully addressed at the megaregional level, which requires coordination across state lines of existing local, regional, state, and federal policy [11].

In 2018, Kommalapati et. al. noted the effort by the cities of Dallas and Houston for the construction of a High-Speed Rail (HSR) system between them. Their proposed study would address the lack of awareness of how deployment of this system will impact environmental quality. Their solution was to evaluate the environmental impact of such a system in all of its developmental, utilization, aging, and decommissioning time components, including the phase of "… raw material extraction" [12]. For the operating phase of the system, they proposed "… [developing] estimates for [air pollution] and energy consumption per vehicle/passenger-kilometer traveled under scenarios of varying passenger ridership/migration level" [12]. This could be a valid approach for assessing

the environmental impact of the proposed HSR corridor between New Orleans and Baton Rouge.

Objective

Rail in Louisiana is in a state of transition from both a passenger and freight standpoint. In order to best plan for future investment, an impact analysis was required to understand how to best incorporate rail infrastructure into the state's multimodal transportation vision. This research addressed this issue by answering: What is the current state of rail in Louisiana? What is the potential for development of Louisiana's rail system? What key corridors should be targeted for investment based on benefit/cost analysis, safety, congestion mitigation, etc.? Which rail lines in the state are eligible for federal assistance, which are liable to be abandoned, and which are in negotiations regarding abandonment or discontinuance? How could funding be obtained for key corridors, economic development, rural development, and/or short line railroads?

Thereby, the objectives of this research included the following:

- Work with DOTD to obtain waybill data
- Provide an updated Geographic Information System mapping of rail infrastructure with associated freight flow data
- Provide the necessary updates to the 2015 State Rail Plan per the requirements of the Passenger Rail Investment and Improvement Act (PRIIA) of 2008
- Use waybill data, in conjunction with Implan, to determine the current economic impact of rail in Louisiana and a benefit/cost analysis of potential future investments
- Outline the funding sources for rail including federal and state funding (including but not limited to USDOT, USDA, and DRA) and capital grant programs. Identify areas with the potential to implement public private partnerships.
- Identify corridors for investment that will maximize economic development opportunities, intermodal connectivity, and improve the efficiency of Louisiana's freight transportation system

Scope

Louisiana has undertaken a comprehensive study of its passenger and freight rail network and has identified key issues and opportunities. The State Rail Plan serves to document this information and set a direction for rail planning and project development into the future while also meeting the federal requirements to qualify the state for any future federal rail funding. Intermodal facilities have the potential to positively impact the Triple Bottom Line (TBL) (Environment, Economic Prosperity, and Social Well-Being) of Louisiana and the Gulf Region. When applying the TBL to transportation infrastructure, the three distinct, but linked outcomes, of the investment are commonly measured by increased freight velocity (efficiency); reduced air pollutions, carbon emissions, and traffic congestion (environment); and improved economic development and safety (equity). The relationship of these trends to land use and service gaps, climate change, and safety and security, as well as the key issues revealed in these summaries are provided.

Methodology

This research included analytical methods that integrate a set of performance measures/indicators. The key performance assessment methods used are “best practice” and “benchmarking.” A frontier or best practice deals with the technical efficiency. A best practice frontier can be estimated by evaluating output levels to input levels. This method provides a general assessment or overall picture of performances through a selected inputs/outputs ratio. This assessment can be applied as the existing rail system is operated in the same institutional and geographical environment. The best practice frontier method can evaluate which lines in the state are likely to be the most efficient and eligible for federal assistance.

Benchmarking, on the other hand, can analyze whether the corridors are currently improving their performances with their newly implemented services. It is “a systematic management process” that helps to search best practices and to monitor them [13]. Camp writes that “benchmarking is systematic research into the performance and the underlying processes and methods of one or more leading reference organizations in a certain field, and the comparison of one’s own performance and operating methods with these ‘best practices’ with the goal of locating and improving one’s own performance” [14] (Camp, 1989). Benchmarking is a continuously improving set of processes or steps. It is a Deming cycle (plan-do-check-act cycle) [13]. Strategic benchmarking is useful for “validating the adequacy of short and long-term goals” and setting a strategy with a high likelihood of success [15]. The output of benchmarking process-performance related to best practices are new learning, building capability, improved operational practices, and innovation.

Discussion of Results

Current State of the Louisiana Rail System

Freight Rail System

The rail system in Louisiana comprises 2,746 route miles, which are owned by 19 freight railroads. Six of these railroads are categorized as Class I railroads (large railroads) and own a total 2,350 route miles or 86% of the total rail mileage in the state. Short line and terminal railroads own and operate the remaining route miles in the state. In 2017, these freight railroads carried over 144 million tons of freight which originated or terminated in Louisiana or passed through the state. Chemicals and Allied Products comprised 20% of the total carloads, followed closely by Hazardous Materials, Coal, and Food or Kindred Products.

Passenger Rail Service

The state is served by three long-distance Amtrak trains, with New Orleans serving as a hub. There currently is no commuter or intercity corridor service provided in the state, either by Amtrak or other operators. There is one small tourist railroad operated by the Southern Forest Heritage Museum. Amtrak operates entirely over the trackage of Class I freight railroads, except for a small portion over the New Orleans Public Belt Railroad and trackage at the New Orleans Union Passenger Terminal. While service was expanded to Mobile and Orlando in the 1980s and 1990s, Amtrak's frequency of train service through Louisiana is now what it was in 1971. While the limited availability of passenger cars has constrained traffic growth, revenue management, targeted marketing, and high gas prices have driven ridership and ticket revenue to record levels. The three long-distance trains are: The City of New Orleans, operating between Chicago and New Orleans; the Sunset Limited, operating between Los Angeles and New Orleans; and the Crescent, operating between New York and New Orleans. A total of 212,767 passengers boarded and alighted at the seven Louisiana Amtrak stations in 2018. Of these, 181,544 boardings and alightings were at the New Orleans Union Passenger Terminal. Boarding and alightings at Amtrak stations in Louisiana are projected to reach 323,090 by 2038, a 52.5% increase over the 20-year period. The growth equates to a 2.1% annual increase for the period. The forecast is based on projections of population growth in the parishes served by the Amtrak stations and Amtrak's plan of restoring the rail service between New Orleans, Louisiana and Mobile, Alabama.

Goals for the Future of the Louisiana Rail System

DOTD has developed the following vision statement for rail transportation in the state. *The future Louisiana rail system will provide safe, reliable, and reasonably priced mobility for people and goods. In addition, it will contribute to a more balanced transportation system, economic growth, a better environment and energy conservation. The state's rail infrastructure and levels of service will expand to provide increased transportation efficiency, cost effectiveness, accessibility, capacity, and intermodal connectivity to meet market demands through a freight and passenger rail investment plan which includes public-private partnerships.*

To further this vision, the state will take a leadership role in planning rail service improvements. Rail service objectives aligned with the rail vision were developed based on the rail-related benefits, issues, and obstacles.

Freight Rail Objectives

- Improve the interchange of Class I rail traffic in New Orleans. Implement New Orleans Gateway (a program of projects). Increase the number of miles of track capable of 286,000-pound car weights on the state's short line railroads
- Minimize accidents, injuries, and fatalities at highway-rail grade crossings in Louisiana through crossing closures, safety improvements, and grade separations
- Encourage economic development through investments in the rail system, e.g., improved access to marine and river ports, new intermodal facilities, and new industrial leads and spurs
- Assist in funding rail improvements through Louisiana ACT No. 22, which established a designated Rail Program within DOTD. However, there is no dedicated funding source associated with this authorization.
- Leverage public-private partnerships for funding rail improvements

Passenger Rail Objectives

- Enhance existing services – maintain and improve existing stations
- Engage the freight railroads in new passenger rail planning initiatives
- Continue outreach to stakeholders

- Develop funding strategies for passenger rail initiatives
- Encourage multimodal integration
- Continue with Amtrak station upgrades

Based on identified needs and available funding sources, short-and long-range proposed rail investment programs were developed. The short-range projects are limited to those for which funding is available or expected to be available during the four-year short-range period. Long-range projects (5-20 years) were proposed during the outreach process or from other sources and will be further evaluated as to their feasibility, their merit on the basis of public benefits versus costs, and available public funding. These study areas include:

- Intercity service between Shreveport and Meridian, which could extend to Dallas/Fort Worth – Shreveport/Bossier City intercity service to Atlanta and East Coast cities
- Intercity service on the Kansas City Southern (KCS)/Union Pacific (UP) line between Shreveport and Baton Rouge linked with a new Baton Rouge – New Orleans intercity rail service
- A new Gulf Coast service linking New Orleans with Mobile, AL with additional stops serving the Mississippi Gulf Coast (Bay St. Louis, Gulfport, Biloxi, Pascagoula). Also, transit connectivity with new intercity rail services should be explored as a means to enhance access to the services and reduce dependence on auto travel to and from stations. This could include new thruway bus service linking Shreveport with the Texas Eagle in Texarkana, TX.

Table 1: Louisiana Rail Program of Projects

Short-range Needs in Years 1-4	Cost in Millions
New Orleans Rail Gateway	$53.4 (Environmental Assessment not completed/lack of agreement on projects); UP & NS upgraded back belt recently (approximately $20M); no federal or state funding
286K upgrade for short lines	$44.1
NOGC rail relocation	$43.5
Station improvements	$10.6
Crossing improvements	$21.1
Grade separations	$30.35
Shreveport - Dallas intercity rail	$32.3
Baton Rouge - New Orleans intercity rail	$80.6 (based upon service projections of 8 RT daily)
Total	**$315.95**
Long-range Needs in Years 5-20	**Cost**
New Orleans Rail Gateway	$480.6
286K upgrade for short lines	$176.3
NOGC rail relocation	$246.7
Grade separations	$86.5
Other short line needs	$55.4
Shreveport - Dallas intercity rail	$290.3
Baton Rouge - New Orleans intercity rail	$480.5 (Remainder of project costs after short-term needs are met)
New Orleans – Mobile intercity rail	$5.4 (See Southern Rail Commission)
Total	**$1,821.66**
Rail Program Total	**$2,137.61**

Conclusions

In recent years, DOTD has focused its freight rail-related efforts in three main areas. These are:

- Facilitating the implementation of the New Orleans Rail Gateway Program
- Assisting short line railroads to acquire funding for their improvements for infrastructure upgrades for heavier carloadings, crossing improvements, crossing closures, and rail line relocations
- Enhancing safety at crossings by implementing safety improvements and grade separations

The state's proposed short-range and long-range freight projects reflect a continued focus in these areas. Thereby, DOTD continues to support the establishment of a dedicated funding source for the Rail Program, with the primary mission of helping the state's railroads (particularly short lines) secure federal funding for improvements, such as ensuring 286,000-pound carload capacity on lines where shippers demand it. DOTD will also continue to make major investments in crossing safety. Additionally, DOTD supports the establishment of a state-funded Rail Infrastructure Improvement Program. This program could have a potential budget range of $10 million to $25 million per year, and, thus, be able to provide the state's required matching funds for federal funds.

For the New Orleans and Gulf Coast Railway Relocation Project to succeed, CRISI funds, Highway Safety Improvement funds, INFRA funds, and/or Rail Line Relocation and Improvement Capital grants will need to be obtained.

With the establishment of a designated funding source for the Rail Program, DOTD can expand its efforts to assist in funding rail improvements on private railroads that serve Louisiana shippers and perhaps one day might host new passenger rail services in the state.

Recommendations

DOTD is committed to the following initiatives:

- Carry out Louisiana ACT No. 22, which established a designated Rail Program within DOTD that is empowered to assist in funding rail improvements. However, there is no dedicated funding source associated with this authorization. DOTD will work to establish a funding source.
- Support the establishment of a state-funded Rail Infrastructure Improvement Program for helping to realize these improvements and maintaining lines in a state of good repair. This program could have a potential budget in a range of $10 million to $25 million per year.
- Continue to support the New Orleans Rail Gateway project and port-access improvements such as the Gulf Coast Rail Relocation project.
- Continue to promote and enhance rail safety at crossings.
- Continue to work with neighboring states on rail initiatives that benefit the region; continue to participate in the Southern Rail Commission on both passenger and freight initiatives.
- Support the improvement of existing Amtrak services and Amtrak stations.
- Support the development of new intercity rail initiatives that enhance mobility options for Louisianans.

Acronyms, Abbreviations, and Symbols

Term	Description
CRISI	Consolidated Rail Infrastructure and Safety Improvements
DOTD	Louisiana Department of Transportation and Development
DRA	Delta Regional Authority
FHWA	Federal Highway Administration
HSR	High-Speed Rail
INFRA	Infrastructure for Rebuilding America
LTRC	Louisiana Transportation Research Center
KCS	Kansas City Southern
NOGC	New Orleans Gulf Coast Railway
PRIIA	Passenger Rail Investment and Improvement Act
SHMPC	State Hazard Mitigation Planning Committee
STP	Statewide Transportation Program
TBL	Triple Bottom Line
UP	Union Pacific
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation

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