

THE INTERSTATE RAIL SYSTEM: A PROPOSAL

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PREFACE

This is the seventh in a series of research memos describing activities and findings as a part of the work done under the research project entitled "Transportation to Fulfill Human Needs in the Rural/Urban Environment." The project is divided into five topics, and this research memo is the second under the topic "Transportation Development in the Southwest with Emphasis on Intermodal Freight and the Dallas-Fort Worth Regional Airport."

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ABSTRACT

Development of a nationwide network of modernized rail lines somewhat similar to the Interstate Highway System would provide improved transportation service to the nation. This paper suggests the development of such a system, and presents an introduction to the concept, physical requirements, implementation process, and potential benefits of the system. Specific potential routes in the West South Central states are discussed for purposes of illustration.

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Purpose and Scope

The purpose of this paper is to suggest the development of a new transportation system in the United States through the redevelopment of an old system. The proposed system would produce benefits including reduced transportation costs, improved service, conservation of energy resources, reduced congestion, and reduction of adverse environmental effects.

This paper is envisioned as one of a series of steps leading to the eventual development of a nationwide modernized rail system somewhat along the lines of the Interstate Highway System. At this stage of the process, a detailed treatment of the entire national system is not practical. Therefore the West South Central states of Arkansas, Louisiana, Oklahoma, and Texas have been used for purposes of illustration. These states make up the overall study area for the research topic entitled "Improvement of Intermodal Freight Transportation in the Southwest."

Background

The concept of a nationwide system of modernized rail lines has been suggested several times in the past. One of the best overall treatments of the subject is Super-Railroads for a Dynamic American Economy, by John W. Barriger. Barriger's book was published in 1956, but many of his ideas are still up-to-date in the 1970's. The overall transportation environment has changed considerably since 1956, with the result that Barriger's overall plan is even more appropriate today than at the time it was first proposed.

One major change occurred the same year that Barriger's book was published. Passage of the Federal Aid Highway Act of 1956 authorized construction of the Interstate Highway System, formally called the National

System of Interstate and Defense Highways. The Interstate Highway System consists of 42,500 miles of freeways reaching all states except Alaska. (See Figure 1.) The system has made possible significant improvements in highway transportation service. Other modes of transportation have made corresponding advances in recent years. The result has been a continuing decline in the railroad industry. According to the Transportation Association of America, the rail share of domestic intercity ton miles has declined from 48.4 percent in 1956 to an estimated 38.9 percent in 1972. The decline in the rail share of the nation's freight bill has also been significant--from 19.8 percent in 1958 (the earliest year for which such data are available) to 12.4 percent in 1971.

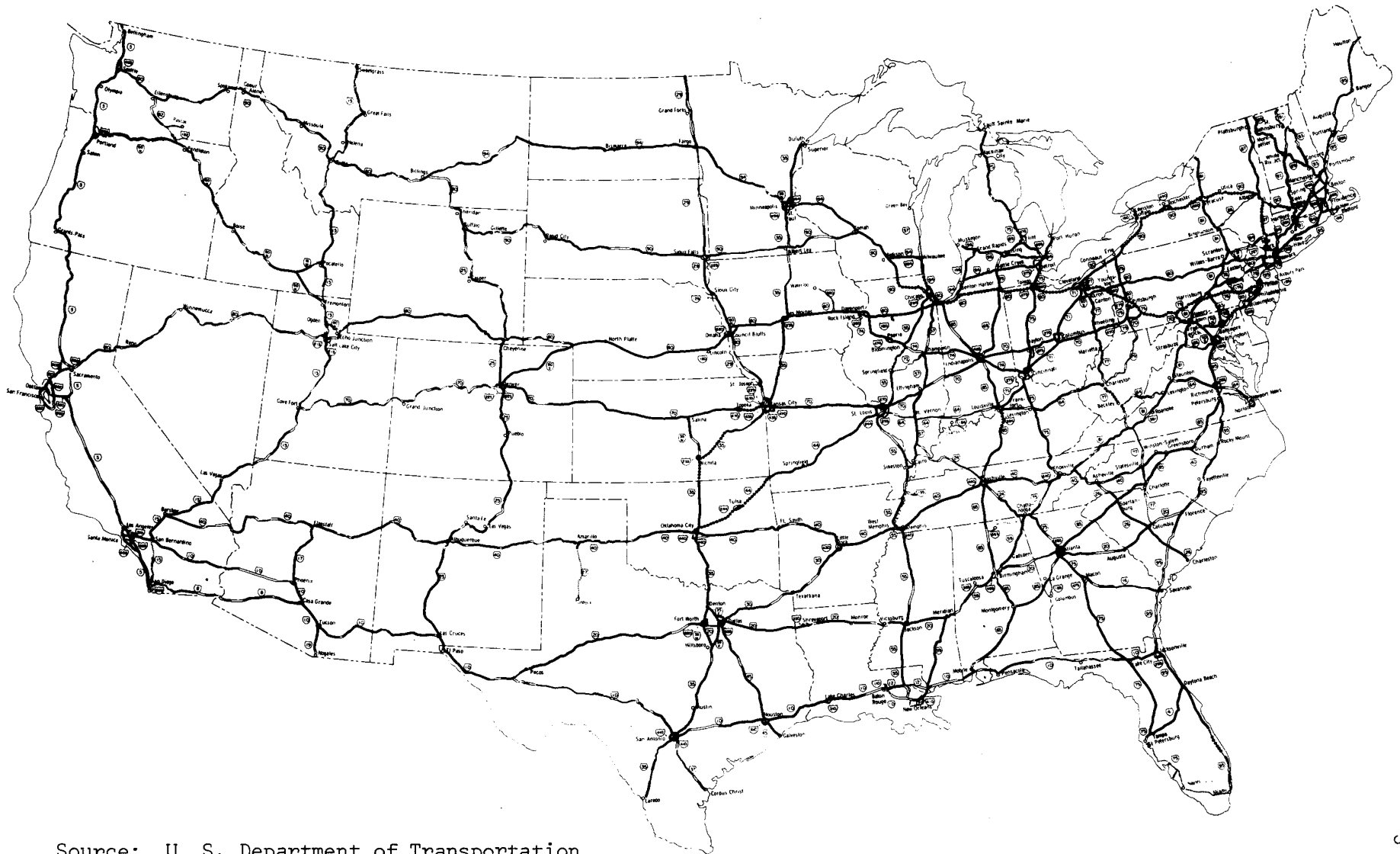
In 1973, the railroad industry does not present a very favorable appearance. Most of the railroads in the Northeast are in bankruptcy, and several other lines in other parts of the nation are close to bankruptcy. Despite mergers, technological advancements, and capital investments, the industry seems no closer to attainment of Barriger's goal of super railroads today than in 1956.

On balance it is unfortunate that the railroad system has deteriorated to this extent. The rail system is a valuable resource, the potential value of which far exceeds its present value. The inherent advantages of rail transportation in energy conservation and environmental impact combined with the potential efficiency of the mode make it desirable to use the rail system to its best advantage.

The factors contributing to the current situation in the rail industry are varied and complex. A complete discussion of them is beyond the scope of this paper. The problems confronting the rail industry today include a fragmented organizational structure, inadequate earnings, a deteriorating physical plant, and frequently unreliable service. Even the proposed solutions

Figure 1

THE INTERSTATE HIGHWAY SYSTEM



Source: U. S. Department of Transportation

to many of the various railroad problems in the recent past have a rather negative sound. Among such "solutions" have been abandonment of trackage, elimination of passenger service, and reduction of employment. The apparent economic necessity of such negative measures is not disputed, given the regulatory and managerial constraints facing the industry. The cause for wonder and concern is the failure of persons within or outside the rail industry to develop positive plans for the future of the rail system.

Concept

The plan proposed in this paper provides for the development of a nationwide network of modernized rail lines comparable to the Interstate Highway System. The proposed system has been referred to here as the Interstate Rail System. The role of the Interstate Rail System in the overall rail system would be similar to that of the Interstate Highway System in the overall highway system.

The Interstate Rail System would consist of a designated nationwide network of lines designed to meet the present and future transportation needs of the nation. Most of the proposed system would utilize existing railroad rights-of-way.

The routes of the Interstate Rail System would be selected to serve major transportation corridors just as the Interstate Highway System routes were selected. Many of the Interstate Rail System routes would probably parallel those of the Interstate Highway System. The same combination of transportation requirements, national defense considerations, and the political process would influence selection of the exact routes. Those routes over which rail passenger service is currently operated (shown in Figure 2) would probably be prime candidates for consideration in many sections of the nation.

RAIL PASSENGER SERVICE ROUTES



Source: Adapted from The Official Guide of the Railways

The location of Interstate Highway System routes in major transportation corridors and the superiority of those routes over other highways have enabled the Interstate Highway System to carry a disproportionate share of the nation's total highway traffic. The Federal Highway Administration has stated that the Interstate System constitutes a little more than 1 percent of the nation's road and street mileage, but that it will carry more than 20 percent of all traffic. This comparison is not applicable to the rail situation because of the large volume of purely local traffic carried by the road and street network, but a similar comparison does provide an indication of the potential role of the Interstate Rail System.

The total mileage of railroad line in the United States is roughly comparable with the total rural mileage of the Federal Aid Primary Highway System, which includes the Interstate Highway System and other primary highway routes. The rural mileage of the Interstate Highway System comprises 34,420 of the 223,528 total rural miles of the Federal Aid Primary System, or 15.40 percent. The total mileage of railroad line in the United States is 205,202.

While the rural Interstate System mileage is only 15.40 percent of the total Federal Aid Primary System mileage, the Interstate portion of the mileage carried 35.47 percent of the traffic in 1971. The comparison of rural traffic volumes provides an indication of the concentration of intercity traffic on the Interstate routes. Inclusion of urban highway mileage would result in an even greater portion of total traffic moving on the Interstate Highway System, but would not provide an indication of intercity movement.

The comparison for the West South Central states is similar to the national comparison. The Interstate portions of both the total mileage and the total traffic are slightly less than the corresponding national portions. Details of the comparison are presented in Table 1.

Table 1

**COMPARISON OF MILEAGE AND TRAFFIC DENSITY—RAILROADS, INTERSTATE HIGHWAY SYSTEM,
AND TOTAL FEDERAL AID PRIMARY HIGHWAY SYSTEM**

	Rail mileage	IH rural mileage	FAP rural mileage	IH % of FAP rural mileage	IH rural traffic (millions)	FAP rural traffic (millions)	IH % of FAP rural traffic
Arkansas	3,582	441	3,533	12.48	1,379	4,442	31.04
Louisiana	3,753	571	2,650	21.55	1,982	4,830	41.04
Oklahoma	5,332	621	6,898	9.00	1,671	6,814	24.52
Texas	13,563	2,386	14,561	16.39	6,347	18,469	34.37
Total West South Central	26,230	4,019	27,642	14.54	11,379	34,555	32.93
Total United States	205,202	34,420	223,528	15.40	112,857	318,187	35.47

Source: Association of American Railroads, *Yearbook of Railroad Facts, 1973*. Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics, 1971*.

In the absence of current data for the rail system, these comparisons provide an indication of the extent to which intercity traffic is concentrated in the major transportation corridors. The concentration of rail traffic is probably even more pronounced if corridors rather than specific rail lines are considered, since parallel rail lines exist in many corridors and the rail system provides less complete total coverage of the nation than does the Federal Aid Primary Highway System. In 1956, Barriger estimated that 10 percent of the railroad mileage in the United States carried 50 percent of the total net ton miles. According to a report in Modern Railroads, speakers at a recent Railway Systems and Management Association meeting on railroad electrification in Chicago indicated that 20,000 miles of line (about 10 percent of the total miles of line) carry 60 percent of all rail freight traffic.

Physical Requirements

The Interstate Rail System should be designed to bring to rail transportation the same sort of improvements that the Interstate Highway System brought to highway transportation. The basic requirement in the engineering of the Interstate Rail System should be to provide for movement of large volumes of traffic at the maximum feasible speed with minimal interference from other activities (both rail and nonrail) and consistent with the highest attainable standards of safety.

In general, the Interstate Rail System routes should be double-tracked in medium- and high-density traffic areas with single track provided only in low traffic density areas. In all areas, the lines should be equipped with full centralized traffic control and modern communications facilities. The highest practical standards of track structure and roadbed should be used in the system. Except for isolated locations with low vehicle volume, all highway

grade crossings should be eliminated. Wherever possible, standards of grade and curvature should be improved. In most cases, existing rights-of-way could be used. The degree of improvement required on specific existing lines would depend on the construction and maintenance standards of the particular lines.

The current petroleum resource situation makes electrification of all or part of the Interstate Rail System worthy of consideration. Electrification would enable the use of coal, nuclear, or other energy sources instead of the diesel fuel now used for most rail operations.

Implementation

Bringing the Interstate Rail System from the preliminary proposal stage to reality will require a level of planning, coordination, and financing that is probably beyond the capability of the railroad industry as it is currently organized. It is doubtful that the 68 major railroads in the United States could agree on the details, or perhaps even the desirability of the proposed system. Nevertheless, there is strong evidence that such a system would be in the national interest. Implementation of the proposed system will probably require significant levels of public-sector participation. The overall planning of the system should be undertaken at the national level with inputs from state, local, and industry interests.

Probably the most feasible method of developing the Interstate Rail System would be for the federal government to acquire the right-of-way, track, and other fixed improvements for the Interstate Rail System routes and to provide funds for the construction and upgrading of the system. Operating rights on the rail routes would be awarded either on a "grandfather" basis to the carriers currently operating over the route selected and over any essentially parallel routes, or to any party capable of providing satisfactory

transportation service.

Such a plan would use public money to improve what had become public property, but would preserve private operation of the transportation services. The plan would create a situation in rail transportation similar to that which now exists in air, highway, and inland waterway transportation. In each of these modes, the rights-of-way are publicly owned but the transportation services are provided by private enterprise. Maintenance, dispatching, and various other services would be provided by the Federal Railroad Administration or a similar agency created for the purpose. While some may charge that public acquisition of the rail rights-of-way would be a step toward nationalization of the railroad industry, a more probable result would be a strengthening of the private railroad industry by placing it on an equal basis with other competing forms of transportation.

Another possible method of developing the Interstate Rail System would be for the government to provide capital to various individual railroad companies for improvements in the rail system subject to the adoption of equitable trackage rights agreements with competing railroads over the improved lines. Ownership and control of the lines would remain with the current owners. The plan would probably encounter stiff political opposition, since it would provide public money for improvement of private property.

Other ideas under discussion currently or in the recent past included a proposal for public acquisition of all railroad rights-of-way with continued operation by the railroad companies. The idea was suggested by the president of a railroad company, but was not generally well received in railroad industry circles. Another proposal contained in a recently introduced bill would provide for the creation of a single corporation to operate the nationwide railroad system. Adoption of such plans would change the implementation process for

the Interstate Rail System proposed here, but would not alter the basic concept of the proposed system.

The Interstate Rail System in the Southwest

The West South Central states of Arkansas, Louisiana, Oklahoma, and Texas contain 5,182 miles of Interstate highway, of which 4,797 miles are part of direct intercity through-routes. Existing rail lines parallel most of these routes, and in some cases alternate rail routes approximate the Interstate routes.

Figure 3 illustrates a possible network of Interstate rail routes in the West South Central states based on existing railroad routes which approximately parallel the Interstate Highway System routes. In actual practice, the Interstate Rail System routes would not necessarily have to parallel Interstate highways. In many cases, other routes might be preferable, from either a transportation or a public policy viewpoint.

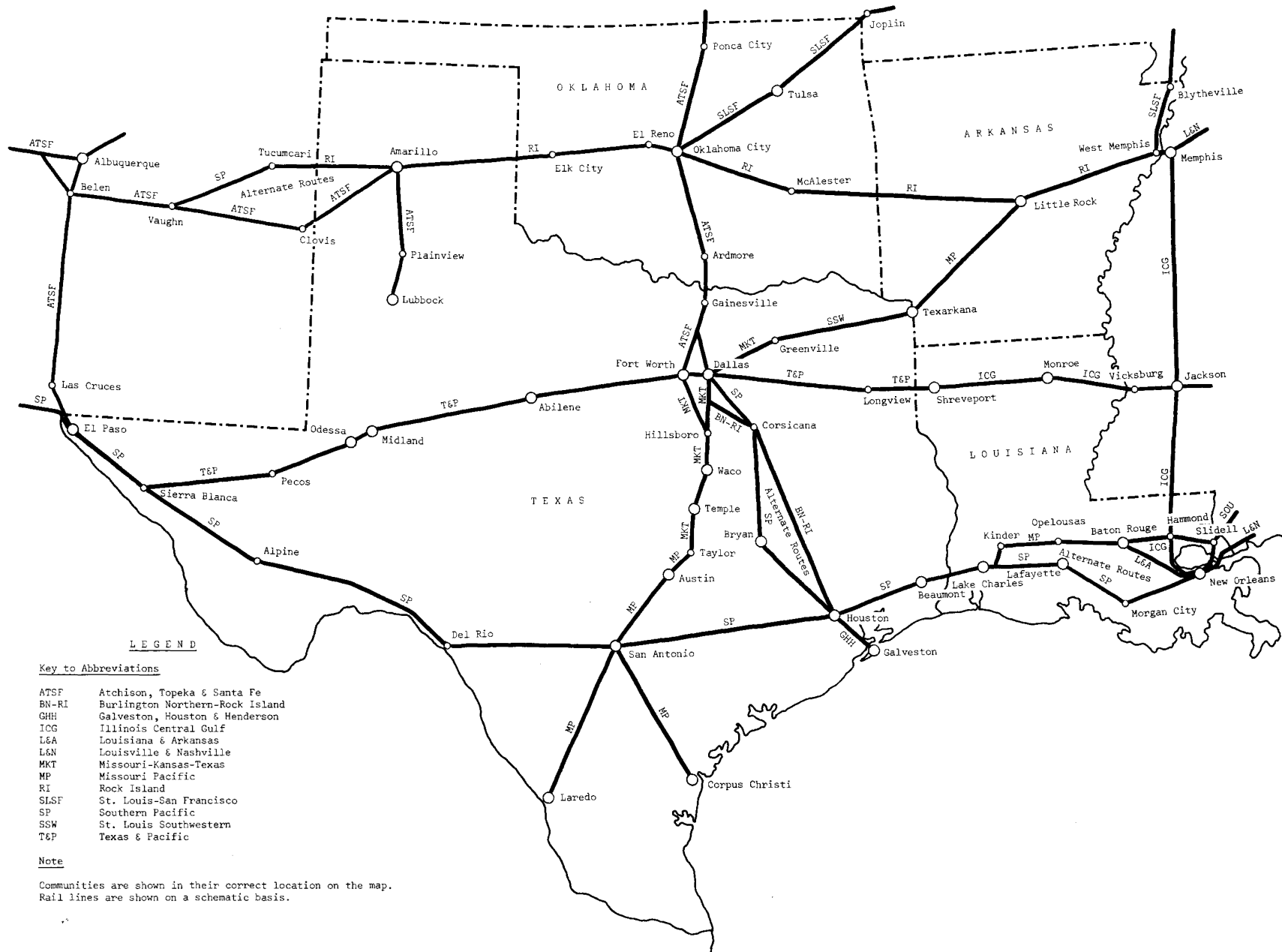
Actual route selection would be accomplished only after detailed study. The potential Interstate Rail System routes described here provide an example of what such a system might look like in the Southwest if Interstate rail routes were selected to parallel Interstate highway routes. The discussion also illustrates some of the problems involved in the development of such a network. Rail freight service is currently provided over all of the lines mentioned. Mention has been made of those routes over which rail passenger service is currently operated. The routes are discussed in numerical order of the paralleling Interstate highways.

Interstate 10: The main line of the Southern Pacific is essentially parallel to Interstate 10 between El Paso and San Antonio, but is somewhat south of the highway. No other direct rail route exists across this sparsely populated area. Between San Antonio and Lafayette the Southern Pacific and

Figure 3

PROPOSED INTERSTATE RAIL SYSTEM ROUTES

WEST SOUTH CENTRAL STATES



LEGEND

Key to Abbreviations

- ATSF Atchison, Topeka & Santa Fe
- BN-RI Burlington Northern-Rock Island
- GHH Galveston, Houston & Henderson
- ICG Illinois Central Gulf
- L&A Louisiana & Arkansas
- L&N Louisville & Nashville
- MKT Missouri-Kansas-Texas
- MP Missouri Pacific
- RI Rock Island
- SLSF St. Louis-San Francisco
- SP Southern Pacific
- SSW St. Louis Southwestern
- T&P Texas & Pacific

Note

Communities are shown in their correct location on the map.
 Rail lines are shown on a schematic basis.

Interstate 10 are closely parallel through Houston, Beaumont, and Lake Charles. No rail connection exists between Lafayette and Baton Rouge. Possible alternate routes would include the Southern Pacific, which serves Lafayette but not Baton Rouge, and a combination Missouri Pacific and Louisiana and Arkansas route via Kinder and Baton Rouge, missing Lafayette. Construction of a new rail route between Lafayette and Baton Rouge would be very costly in view of the swampy terrain in the area. The continuation of the Interstate 10 route west of El Paso would be via the Southern Pacific. The continuation east of New Orleans would be via the Louisville and Nashville. Rail passenger service is currently operated by Amtrak on the Southern Pacific between Los Angeles and New Orleans.

Interstate 12: Interstate 12 provides a shortcut route from Baton Rouge to Slidell, bypassing New Orleans and Lake Ponchartrain. An Illinois Central Gulf line exists parallel to this route; however, no connection exists between Slidell and the Louisville and Nashville line to the east. The route does connect with the Southern at Slidell. The decision whether or not to upgrade this route would depend in part on the selection of the Interstate 10 rail-equivalent route.

Interstate 20: The main line of the Texas and Pacific provides a rail-equivalent route for Interstate 20 from Sierra Blanca to Shreveport, serving the metropolitan areas of Odessa, Midland, Abilene, and Dallas-Fort Worth. East of Shreveport, an Illinois Central Gulf line parallels Interstate 20 from Shreveport to Vicksburg and across Mississippi.

Interstate 27: A Santa Fe line parallels Interstate 27 between Lubbock and Amarillo. This route was a late addition to the Interstate Highway System.

Interstate 30: Between Dallas and Texarkana, the route which most closely parallels Interstate 30 is a combination route via the Missouri-Kansas-Texas (Katy) between Dallas and Greenville and the St. Louis-Southwestern (Cotton Belt)

between Greenville and Texarkana. Between Texarkana and Little Rock the Missouri Pacific line is the direct route.

Interstate 35: The Missouri Pacific parallels Interstate 35 from Laredo to Austin. North of Austin, the best parallel route would be the Missouri Pacific between Austin and Taylor and the Katy between Taylor and Hillsboro. The Katy line divides at Hillsboro, as does Interstate 35, with one line going to Dallas and the other to Fort Worth. North of Fort Worth, the Santa Fe parallels Interstate 35 across Oklahoma through Oklahoma City and into Kansas. No direct parallel route for Interstate 35E exists between Dallas and the Santa Fe line to the north. The Santa Fe has a connection between Dallas and Dalton Junction near Denton (a rather recent addition to the rail system), but this route is rather indirect. A possible direct route might be provided using a combination of Katy and Santa Fe lines north of Dallas, but this route would require expensive rebuilding in Dallas. Amtrak passenger service is currently operated on the Santa Fe between Chicago and Houston, including the line from Fort Worth to the north, and between Fort Worth and Laredo, including the Missouri Pacific line between Taylor and Laredo. The Amtrak routes south of Fort Worth will probably be changed in the near future.

Interstate 37: A Missouri Pacific line parallels Interstate 37 between Corpus Christi and San Antonio. An alternate route exists on the Southern Pacific line between the two cities.

Interstate 40: No direct rail route parallels Interstate 40 between Albuquerque and Amarillo. To the west of Albuquerque the Santa Fe parallels Interstate 40. The closest approximation of the Interstate 40 route between Albuquerque and Amarillo is via the Santa Fe from Belen (30 miles south of Albuquerque) to Vaughn, the Southern Pacific between Vaughn and Tucumcari, and the Rock Island between Tucumcari and Amarillo. An alternate route is available via Clovis on the Santa Fe. East of Amarillo, the Rock Island parallels

Interstate 40 to Oklahoma and extends to Little Rock and Memphis. Interstate 40 uses a more northerly route between Oklahoma City and Little Rock via Fort Smith. No direct rail connection exists for this route, and construction costs would be high through rugged terrain in Arkansas. East of Memphis, the Louisville and Nashville approximates the route of Interstate 40.

Interstate 44: The St. Louis-San Francisco (Frisco) line closely parallels Interstate 44 from Oklahoma City to Tulsa, Joplin, Springfield, and St. Louis.

Interstate 45: Between Galveston and Houston, the Galveston, Houston, and Henderson parallels Interstate 45. The closest approximation of the Interstate 45 route between Houston and Dallas is the Burlington-Rock Island Joint Texas Division between Houston and Corsicana and the Southern Pacific between Corsicana and Dallas. Both the Southern Pacific and the Burlington-Rock Island routes offer slightly longer alternate routes between Houston and Dallas.

Interstate 55: The Illinois Central Gulf line closely parallels Interstate 55 from New Orleans to Memphis. North of Memphis, the Frisco line generally follows Interstate 55 to St. Louis. The Illinois Central Gulf line is used by Amtrak trains between Chicago and New Orleans. It provides a direct connection to Chicago (the ultimate destination of Interstate 55) but does not run through St. Louis.

Interstate 59: The Southern Railway line closely parallels Interstate 59 between New Orleans and Birmingham. Passenger service is operated on this route by the Southern.

Advantages

The proposed Interstate Rail System offers numerous potential benefits to the nation. Development of such a system would be a significant step toward a balanced transportation system. In recent years, large expenditures of public funds have been made for air, highway, and inland waterway transportation facilities, but relatively little public money has been invested in improvements to the rail system. Modernization of the national rail system is long overdue, but the depressed financial state of the railroad industry in combination with its fragmented organizational structure makes an extensive nationwide capital improvement program unlikely without government support.

As the nation enters a period of energy scarcity, the attractiveness of rail transportation for freight (and passenger) movement is increased. Estimates of the relative energy utilization efficiency of rail transportation over highway transportation in intercity freight movement range from two-to-one to more than four-to-one. Operation of rail piggyback trains on a direct, point-to-point basis over Interstate Rail System routes could produce significant energy savings and maintain service comparable to that provided on the highways.

Development of the Interstate Rail System routes would permit consolidation of the traffic now moving over several parallel routes onto a single improved route in many areas of the nation. Traffic volumes on many of the Interstate Rail System routes would be high enough to justify electrification of these routes. Electrification would permit use of more plentiful energy resources such as coal for electric power generation and would help to conserve the petroleum now used for diesel-electric locomotive operation.

The Interstate Rail System would aid transportation for national defense. The construction and line improvement investments would provide employment and aid the economy. Reduced transportation costs made possible by a more efficient national transportation system would help to lower the costs of all products. Rail transportation makes efficient use of land and produces relatively few adverse environmental effects.

The Next Step

The purpose of this paper has been to suggest the development of an improved rail transportation system. The particular possible routes described in the West South Central states have been shown for purposes of illustration. Obviously further studies should be undertaken to determine the optimal routes. A number of problems concerning financing, engineering, allocation of operating rights, and other matters must be solved before the proposed system could become a reality. In view of the potential benefits, allocation of additional resources for further investigation of the feasibility of an Interstate Rail System would be a sound investment.

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