Intercity Rail Passenger Systems Update

CURRENT RESEARCH AND DEVELOPMENT IN INTERCITY RAIL PASSENGER SYSTEMS

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The Transportation Research Board's Committee on Intercity Passenger Rail (AR010) is concerned with research that will lead to better planning and implementation of intercity rail passenger systems, with particular emphasis on the full range of high-speed systems including new technology. This research will include demand analysis, financial considerations, economic impacts (including consideration of user and social benefits), and institutional arrangements including public-private partnerships. The research should also address impacts on other rail operations, coordination with other modes, rail-highway interfaces, corridor versus system concerns, technology assessment, environmental impacts, and implementation strategies.

Intercity Rail Passenger Systems Update is published intermittently by the Transportation Research Board to disseminate information about current research and development in intercity rail passenger systems. Matthew J. Melzer, editor; Anthony D. Perl, Chair, TRB Committee on Intercity Passenger Rail; Elaine King, TRB staff officer. Any findings and conclusions are those of the authors and not of TRB. Submit news items to Elaine King, Transportation Research Board, 500 Fifth Street, NW, Washington, DC 20001, telephone 202-334-3208, or email eking@nas.edu. **www.TRB.org**

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Intercity Rail Passenger Systems Update

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CHAIRMAN'S LETTER

Dear Readers:

At the end of 2008, both the economy and the electorate signaled that major changes will unfold in 2009. A year from now, the economy around which America's transportation system has been planned and built will look quite different, and many of the new public officials in Washington and elsewhere in the United States will be considering ways to manage the transition.

Intercity passenger rail will be on their agenda for change, on account of its growing economic and environmental contributions in 2008, and because of the green light given by Californians—with the passage of Proposition 1A—to North America's most ambitious high-speed rail initiative in a generation. In this issue, these interesting developments are examined and they will be further discussed at our committee's TRB Annual Meeting sessions. I expect that readers of this newsletter will contribute to these exciting developments, and I hope that TRB's Committee on Intercity Passenger Rail will provide useful input in those efforts.

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EDITOR'S INTRODUCTION

A subtitle for this issue might read, A Brighter Future for Intercity Passenger Rail. In the past year, dramatic increases in fuel prices have led to increased Amtrak ridership and to greater public awareness of the benefits of incremental increases in speed. Ronald Sheck's article provides evidence that new policies, technology, and investments have dramatically changed—and improved—rail passenger services in Europe. Joseph Schwieterman's piece identifies developments that could create support for high-speed rail investments in the United States.

Tim Gillespie comments on the fuel efficiency advantage of passenger rail (and on lower greenhouse gas emissions), and he contributes to arguments that favor investments in passenger rail. Finally, the future for Amtrak is considerably brighter with the enactment of the Passenger Rail Investment and Improvement Act of 2008, as summarized by Ross Capon.

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GROWTH OF EUROPEAN PASSENGER RAIL SYSTEMS

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Ron Sheck retired after six years at the Washington State Department of Transportation—the last four of which he served as Urban Rail Program Manager, Public Transportation Division. He has also served as Assistant Director, Guideway Research, Center for Urban Transportation Research, University of South Florida, and as Director, Transportation Programs Division, New Mexico State Highway and Transportation Department, where he managed preliminary studies that led to the RailRunner commuter system.

A September 2008 announcement by Air France, describing plans to inaugurate high-speed passenger trains with service from Paris to London and from Paris to Amsterdam, is evidence of the growing role of passenger rail in Europe.

High-speed trains are the glitz and glamour of Europe's rail systems, but high-speed rail is only part of the story. New policies, technology, and investments have dramatically changed rail passenger services in Europe. Faster trains are increasing in number, and not just on new, dedicated high-speed corridors, but on main lines and secondary routes throughout the European continent. Passenger trains have become major components in the transportation network and are better connected than ever to other modes, including air, intercity and regional bus, local transit, international ferries, and lake and river boats.

Policy changes have occurred at both the national and international levels, and the creation of the European Union (EU) has resulted in a common approach. Integrated planning and investment recognizes the important contributions of passenger rail to meeting mobility, economic development, and environmental goals. EU development funds have enabled upgrades, the expansion of national systems, and enhanced Europe-wide system integration.

Major shifts in rail ownership and finance have taken place in many European countries; thirty years ago, almost all rail systems were government owned and operated. Today, that situation has changed. In the United Kingdom, infrastructure

Thalys PBKA, Amsterdam Centraal station.

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is publicly owned—as it is in all European counties—but train operations have been franchised out for almost 12 years. The 18 current operators have acquired new rolling stock and have developed service that is unprecedented in both quantity and quality.

In 2006, a new record was established in the United Kingdom when over one billion passengers were carried by train—the highest number since 1950. Some regional services in Germany, the Netherlands, and Poland are now handled in a similar manner. To operate international passenger services, new companies and brand names have appeared all over Europe. Some are connected with high-speed rail, including Eurostar (London–Paris and London–Brussels); Thalys (France, Belgium, and the Netherlands); and Cisalpino (Switzerland and Italy).

Sleeping car services in Western Europe have been greatly reduced as faster daytime trains have reduced travel time and as low-cost airlines have eaten into the long-distance market. International sleeping car trains have been almost entirely taken over by private operators, often with partial ownership by national railroads and redesignated as hotel trains offering meals, snacks, showers, and other amenities included in the ticket price. City Night Line, a German–Swiss company, operates 29 overnight services connecting France, the Netherlands, Denmark, Germany, Austria, Switzerland, and Italy, as well as all internal sleeping car trains in Germany. Other companies operate similar services between Spain and Portugal; France, Switzerland and Italy; and France and Italy.

EU rules have encouraged open access to independent operators of both freight and passenger services on the state-owned railway lines. In summer 2008, announcements were made by Air France and by Nuovo Transporto Viaggiatori—a new company that will compete with Trenitalia on the Italian high-speed network linking Milan, Florence, Venice, Rome, and Naples in 2011.

Recognizing the importance of local travel and commuting that is increasingly unfettered by international borders, local and regional governments have established new joint operating ventures to provide local services—Switzerland–Italy, Switzerland–France, Belgium–Netherlands, Switzerland–Austria—branded with new names, logos, and paint schemes.

New technology has played a major role in the growth of passenger rail in Europe; high-speed train sets that have evolved out of the original Spanish Talgo, French Train à Grande Vitesse (TGV), Swedish X2000, and German ICE have brought new levels of speed and comfort that have extended beyond major corridors. Locomotive or power-car hauled trains have given way to new distributed-power modular sets that allow the entire train to generate passenger revenue. The newest high-speed train successor to the TGV—the AGV—is an example that already has customers outside of France.

In the early 1990s, Spain decided to build its high-speed network as standard gauge, instead of the existing Iberian broad gauge. Gauge-changing technology has allowed trains operating on the new dedicated high-speed lines (Madrid–Sevilla and Madrid–Barcelona) to continue to other destinations (Valencia, Granada, Malaga) using existing broad-gauge track.

Continental Europe uses four different electrical systems requiring a switch in current between countries, and sometimes within countries. Historically, this required

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a change in motive power, but multi-current locomotives and electric multiple units now exist in large numbers, obviating border stops to change power. Train control systems also differed from country to country. New locomotives and train sets with cab signaling are now able to switch easily from one system to another.

EU transportation policy and financial support has led to development of a new high-speed train command and control system: the European Railway Traffic Management System (ERTMS). The system will provide greater capacity and safety, and it will eventually be installed on all high-speed routes. Information technology developments have greatly improved communications for travelers on the trains and at stations, as well as for trip planning, making reservations, and purchasing tickets.

European nations, individually and collectively, are investing heavily in passenger rail. EU transportation development funds have been especially helpful to smaller countries, including Ireland, Portugal, Greece, and new member states from Eastern Europe. Massive national investments in infrastructure also have been critical. In Spain, 4 percent of the GDP has gone to improving infrastructure for almost a decade. Ireland is investing over 6 billion Euros to improve its national rail network from 2006–2015.

High-speed lines and train sets to operate on them are the most talked-about elements of multiyear national and European investment strategies. A half dozen manufacturers produce rolling stock and locomotives, and Asian companies have also made progress in selling to Europe. France buys TGV sets by the hundreds; Spain has produced its own trains and buys from suppliers elsewhere in Europe; and Ireland is replacing its rail passenger fleet with new rolling stock from Spain and Korea.

As media attention is focused on new, dedicated high-speed lines extending from Paris and Madrid; connecting London with Paris and Belgium; linking key cities in Germany; and joining Rome, Naples, and the northern Italian cities, other infrastructure improvements go unnoticed. Double, triple, and quadruple tracking; easing curvature; expanding electrification; upgrading signal and communication systems; and elimination of grade crossings are investments that have increased capacity and allowed for shorter travel times and more frequent services. Major station investments have occurred, too, including the new Central Station in Berlin, the massive rebuilding of London's St. Pancras station, the continuing growth of Zurich's Bahnhof, and the new station in Sevilla.

Investments have taken intercity rail services to new stations at airports in Zurich, Geneva, Amsterdam, Paris, and elsewhere. Improving connectivity by investments in major intermodal facilities is a result of policy shifts that emphasize the multimodal nature of travel. Investments are also overcoming geographic barriers to rail travel throughout Europe. The Channel Tunnel project had skeptics and detractors, but few people would argue today that it was not a good investment, especially when considering the profits generated from 2007–2008.

The great companion water piece is the tunnel–bridge combination that links Denmark and Sweden. Rail trips from Continental Europe and the United Kingdom or the Scandinavian Peninsula were not possible before these projects. The Alps have always been a barrier between Northern and Southern Europe, and the first rail transit through Switzerland occurred as a result of major tunnels built in the early 1900s. A century later, new lower-level base tunnels are reducing travel times.

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The 21-mile Lötschberg base tunnel opened in late 2007, and travel times between Basel and Milan have been cut from five hours to four. The 30-mile Gotthard base tunnel will open in 2016. A Brenner base tunnel is now under construction between Austria and Italy, and France and Italy recently signed an agreement to build a 29-mile tunnel linking the two countries. New tunnels are being planned under the Pyrenees. As waters are crossed and mountains bored out more effectively, the countries of Europe are being drawn together more closely by rail.

Policies, technologies, and investments have come together to give rail travel a stronger role in the European transportation network. Trains are capturing an ever-larger share of the combined rail–air market in many city pairs separated by up to 400 miles. Europeans and visitors to the continent benefit from the increase in train frequencies and in the reduction of travel times.

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A POSITIVE TURN FOR HIGH-SPEED RAIL

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The high-speed rail (HSR) movement in the United States has encountered surprising twists and turns in recent months. Fortunately, most of the developments have been positive. If we define HSR as rail service with a top speed of 110 mph or more—a standard much lower than that used in other parts of the world—our country last saw new HSR mileage in late 2006, when 110-mph service began on the Keystone Corridor between Harrisburg and Philadelphia.

State governments envision greater mileage coming online. Last year, with Justin Scheidt of Michigan State University, our academic institute assembled an inventory of government-backed HSR efforts throughout in the United States. The inventory includes 31 systems at various stages of planning that involve 64 corridors, tracks of 21 freight railroads, and 15,552 unique route miles.

More than 87 percent of the railroad mileage identified for high-speed service is operated by freight-oriented railroads, and slightly more than 70 percent is single track. The preferred technology tends to differ sharply between interstate and intrastate routes. Intrastate proposals are more likely to involve advanced technologies—such as magnetic levitation (maglev) or Train à Grande Vitesse (TGV)-type systems that require dedicated rights-of-way—than interstate routes.

Since completion of the study, two new HSR proposals have gathered momentum. The DesertXpress—slated to use newly built track along Interstate 15 between Victorville, California, near Los Angeles, and near Las Vegas, Nevada—is envisioned as relying extensively on private financing. Meanwhile, this autumn, the state of Minnesota will have $1.1 million available for an environmental impact study on a more conventional HSR service (110 mph) between Duluth and Minneapolis–St. Paul.

None of these efforts has generated as much publicity as California's intrastate HSR program, which has suffered a series of fits and starts; a bond measure for funding the program, Proposition 1A, passed by a narrow margin in the November election. Startup costs, right-of-way conflicts, and political resolve may prevent many—perhaps most—of the proposed systems from becoming a reality. Nevertheless, news from short- to medium-distance passenger corridors suggest that HSR is presently in a better position than it was in the past.

Ridership in corridors outside the Northeast has been particularly strong. Dramatic increases in fuel prices helped boost Amtrak ridership on these corridors by 13.3 percent in FY 2008 (which began in October 2007) from the previous fiscal year—the increase is in addition to the impressive growth in the prior period. This has helped bring the benefits of incremental increases in speed back into public focus.

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Amtrak has been successful in spite of a veritable explosion of intercity bus service on key routes, especially in the Midwest and in the Northeast. In November, our institute found that intercity bus sector service grew by 9.8 percent between the 4th quarters of 2007 and 2008, and helped to offset some of the decline that has occurred in the last 45 years. BoltBus (a Greyhound affiliate serving the Northeast) and Megabus (with hubs in Chicago and New York) operate—controversially—from curbsides near railroad terminals. (For summaries of both studies, see http://www.depaul.edu/~chaddick.)

Ridership for the Acela high-speed service increased by 6 percent in 2008.

The gains in the Northeast have also been impressive. The Acela service is seeing growing demand—ridership was up more than 6 percent and revenue was up 16 percent last fiscal year. Conventional traffic in the corridor increased by 10.2 percent. Demand in the Northeast has softened with current economic conditions, but it continues to increase and push the limits of Amtrak's capacity on most routes.

Recognizing the significance of recent developments, the U.S. Government Accountability Office launched a study on the issues and assumptions regarding HSR. All of these developments make 2009 a fascinating time for proponents of advanced ground transportation.

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ENERGY-EFFICIENT TRAINS FOR THE REDUCTION OF GREENHOUSE GAS EMISSIONS

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The massive U.S. transportation system is a major source of global greenhouse gas (GHG) emissions, and is almost entirely responsible for the nation's dependence on oil as a major source of energy. Transportation consumes 7 of every 10 barrels of oil consumed in the United States.[1] Approximately 28 percent of greenhouse gas emissions in the United States are attributed to the transportation sector and that is expected to rise to 36 percent by 2020, according to the U.S. Environmental Protection Agency.[2] In order to reduce U.S. GHG emissions, reductions in transportation sector emissions must be achieved.

Highway transportation is responsible for large amounts of energy consumption, as well as GHG emissions, and accounts for 72 percent of transportation energy use and carbon emissions. Air transport comes in a distant second, accounting for 10 percent of transport emissions. According to the *New York Times*, however, "…aviation emissions are the fastest-growing sources of greenhouse gases. In the United States alone, aircraft traffic is expected to rise 60 percent by 2025."[3] Rail (freight and passenger), ship, and other transport modes together are responsible for less than 10 percent of transport emissions.

Experts say that fuel efficiency offers the most immediate and largest potential for reducing carbon dioxide emissions from the transportation sector in the next three decades.[4] This is true—in part—because very little research has been done in the development of radically advanced low-carbon energy technologies that can replace our current oil-based transportation energy. The one policy that will have the most immediate impact is the one that will demand more from the modes of transportation that are currently the most fuel and carbon efficient.

According to the Department of Energy's Oak Ridge National Laboratory, intercity passenger rail is 17 percent more efficient than air travel and 21 percent more efficient than auto travel.[5] A 2006 report, prepared jointly by the Center for Clean Air Policy and the Center for Neighborhood Technology, provided a technical analysis demonstrating that the implementation of high-speed rail technologies on

[1] Pew Center on Global Climate Change, *Reducing Greenhouse Gas Emissions from U.S. Transportation*, May 2003, David L. Greene and Andreas Schafer.
[2] *Greenhouse Gas Emissions from the U.S. Transportation Sector 1990-2003*, Chapter 11, page 41, March 2006, EPA 420 R 06 003.
[3] *New York Times Magazine*, April 20, 2008, page 49. Dashka Slater.
[4] Earth Policy Institute, *Cutting Carbon Emissions Fast*, Chapter Ten, Stabilizing Climate, Lester Brown 2006.
[5] *Transportation Energy Data Book*, U.S. Department of Energy, Oak Ridge National Laboratory, 26th Edition, Stacy Davis.

federally-designated HSR corridors would result in a net savings of 6 billion pounds of carbon dioxide emissions.[6]

Policy makers need more data that will allow them to determine which investments will deliver the highest fuel efficiency–carbon emission return on investment. There is a limited amount of research available to aid the design of a more balanced transportation system. However, in January 2006, the Center for Clean Air Policy and the Center for Neighborhood Technology released a report on High-Speed Rail and Greenhouse Gas Emissions in the United States (http://www.cnt.org/repository/HighSpeedRailEmissions.pdf). The report used the 11 federally designated high-speed rail corridors in the United States to estimate the annual GHG benefits, if these high-speed rail systems were developed as planned. The report concluded that high-speed rail development in these corridors "will generate substantial GHG savings in all regions." Emission savings are greater when passengers are diverted from cars and air travel which, according to the report, "generate more emissions per passenger mile than high-speed rail technologies."

The research also suggests that while the incremental approach to high-speed rail may produce quick results, high-speed rail technology, with higher speeds and higher upfront costs, could generate more significant value in certain areas of the country. The report also provides an analysis and includes benefits of the various types of high-speed technology.

Evidence on fuel efficiency and carbon emissions signals a need to begin implementing these corridors now. Given the current and future prospects of the cost of fuel and of a carbon constrained economy, greater efforts to expand rail passenger capacity and to begin funding rail projects will be needed in order to reap the benefits that other countries have already experienced by employing newer rail technology and high-speed rail corridors. The high cost of fuel in Europe and Asia has promoted development of high-speed rail, and the results of this development demonstrate that when reliable and convenient rail passenger service is available, customers and operators will move away from high-carbon producing modes—particularly as the cost of auto and air travel increase.

If our national transportation objectives include a significant reduction of dependence on foreign oil, on carbon emissions, and on congestion on highways and at airports, then our transportation decision-making processes need to be restructured to achieve those outcomes. The transportation investments made now will impact future transportation, environmental, and social investments. As the United States and the global community strive to exist in a carbon-constrained economy, transportation policy decisions must, out of necessity, include an analysis of carbon emissions and of the energy efficiency of alternative transportation mode options.

[6] *High Speed Rail and Greenhouse Gas Emissions in the U.S.,* prepared jointly by the Center for Clean Air Policy and the Center for Neighborhood Technology, January 2006. http://www.cnt.org/repository/HighSpeedRailEmissions.pdf

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AMTRAK UPDATE

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It has been a remarkable year for Amtrak; an important milestone in federal passenger train policy was reached on September 30, when Transportation Secretary Mary Peters and Federal Railroad Administrator Joseph Boardman took the train to Richmond, Virginia, and announced $30 million worth of capital grants to 13 states (shortly before this article went to press, Boardman was named Amtrak President and CEO, following the resignation of Alex Kummant).

A U.S. Department of Transportation news release stated that "the Secretary released new data today indicating that Americans drove 3.6 percent less, or 9.6 billion miles fewer, in July 2008 than July 2007. Since last November, Americans have driven 62.6 billion miles less than they did over the same nine-month period last year. Meanwhile, she said, transit ridership is up 11 percent, and in July, Amtrak carried more passengers than in any single month in its history."

Although $30 million is a small step in terms of the estimated need, it is a big step in the effort to bring a genuine, federal, intercity passenger train grant program into existence. Prospects for future growth look good. Peters' Richmond trip was bracketed by impressive victories in the Senate on September 29 and on October 1 for the Rail Safety–Amtrak reauthorization bill, which President Bush signed into law on October 16.

For years, perhaps decades, Amtrak has suffered countless legislative disappointments for reasons unrelated to the merits of passenger train service. This time, however, the stars were in alignment because of two key factors:

- The tragic September 12 Metrolink–Union Pacific collision in Chatsworth, California, which led Sen. Dianne Feinstein (D) to introduce a rail safety bill, ultimately combined with the passenger train reauthorization, and
- The financial meltdown, which kept Congress in session longer than planned and had the effect of providing enough floor time to get the rail bill passed.

The bill in question, H.R. 2095, in its final form, is an authorization bill. Whether the bill proves to be truly transformational as Rep. James Oberstar (D) and Sen. Frank Lautenberg (D) have claimed, will depend on whether appropriators find some or all of the increased funding that is authorized. At an October 2 news conference, Lautenberg—who also serves on the Appropriations Committee—said, "I don't think it's going to be easy, but I think it is likely that we'll get the authorized level."

The favorable legislative treatment occurred against a backdrop of strong demand for passenger trains, reduced driving, and tough times for airlines that are raising the cost of flying, even as they reduce capacity by parking older planes. Fiscal year 2008

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was the sixth straight year in which Amtrak ridership grew, and the growth this year was greater than that of previous years.

Media coverage—for the most part—has been sympathetic; faithfully reporting usage trends, but also frequently reminding the public that many routes still have bad on-time performance. Prospects for new equipment are limited to California, where state budget officials approved a baseline order of 26 cars—a number that could increase if ridership growth continues at a torrid pace. So far, it does not appear that any other states are going to do tag-on orders.

Some legislators have focused on the desirability of putting more of Amtrak's stored cars into service, and if a severe economic downturn and changing politics make it possible to enact a second stimulus, funds for this could be included. The one nagging concern is that transportation issues are almost never a priority for Presidential candidates, so a severe recession could dash hopes for the expanded funding that the passenger train business needs, and it could even undermine ridership growth. Overall, the environment for Amtrak is more favorable than ever. If the company can continue to improve service quality, it has a bright future.

NEWSLETTER COMMENTS

We look forward to your feedback on the format and the content of this publication. Comments on this newsletter, and most especially, continued contributions by committee members, friends of the committee, and others can be sent to the editor:

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