A Literature Study On National Network Of Highways

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Abstract: Engineers began to apply lessons learned from the analysis of prior contraflow operations, including limiting exits, removing troopers (to keep traffic flowing instead of having drivers stop for directions), and improving the dissemination of public information. As a result, the 2005 evacuation of New Orleans, Louisiana, prior to Hurricane Katrina ran much more smoothly. A widespread urban legend states that one out of every five miles of the Interstate Highway System must be built straight and flat so as to be usable by aircraft during times of war. Contrary to popular lore, Interstate Highways are not designed to serve as airstrips. This paper presents a literature survey on National Network of Highways.

Keywords: Interstate Highways; Evacuation; National Highway; Widespread Urban;

I. INTRODUCTION

A rural stretch of I-5; two lanes in each direction are separated by a large grassy median and cross-traffic is limited to overpasses and underpasses. The United States government's efforts to construct a national network of highways began on an ad hoc basis with the passage of the Federal Aid Road Act of 1916, which provided for $75 million over a five-year period for matching funds to the states for the construction and improvement of highways. The nation's revenue needs associated with World War I prevented any significant implementation of this policy, which expired in 1921. In December 1918, E.J. Mehren, a civil engineer and the editor of Engineering News-Record, presented his "A Suggested National Highway Policy and Plan" during a gathering of the State Highway Officials and Highway Industries Association at the Congress Hotel in Chicago. In the plan, Mehren proposed a 50,000-mile (80,000 km) system, consisting of five east-west routes and 10 north-south routes. The system would include two percent of all roads and would pass through every state at a cost of $25,000 per mile ($16,000/km), providing commercial as well as military transport benefits.

Planning

As the landmark 1916 law expired, new legislation was passed—the Federal Aid Highway Act of 1921 (Phipps Act). This new road construction initiative once again provided for federal matching funds for road construction and improvement, $75 million allocated annually. Moreover, this new legislation for the first time sought to target these funds to the construction of a national road grid of interconnected "primary highways," setting up cooperation among the various state highway planning boards. The Bureau of Public Roads asked the Army to provide a list of roads that it considered necessary for national defense. In 1922, General John J. Pershing, former head of the American Expeditionary Force in Europe during the war, complied by submitting a detailed network of 20,000 miles (32,000 km) of interconnected primary highways—the so-called Pershing Map. A boom in road construction followed throughout the decade of the 1920s, with such projects as the New York parkway system constructed as part of a new national highway system. As automobile traffic increased, planners saw a need for such an interconnected national system to supplement the existing, largely non-freeway, United States Numbered Highways system. By the late 1930s, planning had expanded to a system of new superhighways. In 1938, President Franklin D. Roosevelt gave Thomas MacDonald, chief at the Bureau of Public Roads, a hand-drawn map of the United States marked with eight superhighway corridors for study. In 1939, Bureau of Public Roads Division of Information chief Herbert S. Fairbank wrote a report called Toll Roads and Free Roads, "the first formal description of what became the interstate highway system" and, in 1944, the similarly themed Interregional Highways. The Interstate Highway System gained a champion in President Dwight D. Eisenhower, who was influenced by his experiences as a young Army officer crossing the country in the 1919 Army Convoy on the Lincoln Highway, the first road across America. Eisenhower gained an appreciation of the Reichsautobahn system, the first "national" implementation of modern Germany's Autobahn network, as a necessary component of a national defense system while he was serving as Supreme Commander of the Allied forces in Europe during World War II. He recognized that the proposed system would also provide key ground transport routes for military supplies and troop deployments in case of an emergency or foreign invasion.
1955 map: The planned status of U.S Highways in 1965, as a result of the developing Interstate Highway System I-55 under construction in Mississippi, photo from May 1972

The publication in 1955 of the General Location of National System of Interstate Highways, informally known as the Yellow Book, mapped out what became the Interstate System. Assisting in the planning was Charles Erwin Wilson, who was still head of General Motors when President Eisenhower selected him as Secretary of Defense in January 1953.

Construction

The Interstate Highway System was authorized on June 29, 1956 by the Federal Aid Highway Act of 1956, popularly known as the National Interstate and Defense Highways Act of 1956. Three states have claimed the title of first Interstate Highway. Missouri claims that the first three contracts under the new program were signed in Missouri on August 2, 1956. The first contract signed was for upgrading a section of US Route 66 to what is now designated Interstate 44. On August 13, 1956, Missouri awarded the first contract based on new Interstate Highway funding; this work began on US 40 (now I-70) in St. Charles County. Kansas claims that it was the first to start paving after the act was signed. Preliminary construction had taken place before the act was signed, and paving started September 26, 1956. The state marked its portion of I-70 as the first project in the United States completed under the provisions of the new Federal Aid Highway Act of 1956. The Pennsylvania Turnpike could also be considered one of the first Interstate Highways. On October 1, 1940, 162 miles (261 km) of the highway now designated I-70 and I-76 opened between Irwin and Carlisle. The Commonwealth of Pennsylvania refers to the turnpike as the Granddaddy of the Pikes.

Milestones in the construction of the Interstate Highway System include:

- October 12, 1979: The final section of the Canada to Mexico freeway Interstate 5 is dedicated near Stockton, California. Representatives of the two neighboring nations attended the dedication to commemorate the first contiguous freeway connecting the North American countries.
- August 22, 1986: The final section of the coast-to-coast I-80 (San Francisco, California, to Teaneck, New Jersey) is dedicated on the western edge of Salt Lake City, Utah, making I-80 the world's first contiguous freeway to span from the Atlantic to Pacific Ocean and, at the time, the longest contiguous freeway in the world. The section spanned from Redwood Road to just west of the Salt Lake City International Airport. At the dedication it was noted that coincidentally this was only 50 miles (80 km) from Promontory Summit, where a similar feat was accomplished 120 years prior, the laying of the golden spike of the United States' First Transcontinental Railroad.
- August 10, 1990: The final section of coast-to-coast I-10 (Santa Monica, California, to Jacksonville, Florida) is dedicated, the Papago Freeway Tunnel under downtown Phoenix, Arizona. Completion of this section was delayed due to a freeway revolt that forced the cancellation of an originally planned elevated routing.
- September 12, 1991: I-90 becomes the final coast-to-coast Interstate Highway (Seattle, Washington to Boston, Massachusetts) to be completed with the dedication of an elevated viaduct bypassing Wallace, Idaho. This section was delayed after residents forced the cancellation of the originally planned at-grade alignment that would have demolished much of downtown Wallace. The residents accomplished this feat by arranging for most of the downtown area to be declared a historic district and listed on the National Register of Historic Places; this succeeded in blocking the path of the original alignment. After the dedication residents held a mock funeral celebrating the removal of the last stoplight on a transcontinental Interstate Highway.
- October 14, 1992: The original Interstate Highway system is proclaimed to be complete with the opening of I-70 through Glenwood Canyon in Colorado. This section is considered an engineering marvel with a 12-mile (19 km) span featuring 40 bridges and numerous tunnels and is one of the most expensive rural highways per mile built in the United States. Although this was claimed the final section of Interstate Highway to open, at the time this section was dedicated there were still missing interchanges.
elsewhere in the system, making some Interstate Highways not contiguous.

The initial cost estimate for the system was $25 billion over 12 years; it ended up costing $114 billion (adjusted for inflation, $425 billion in 2006 dollars) and took 35 years.

**Urban Interstates abandoned because of local opposition**

Political opposition from residents canceled many freeway projects around the United States, including:

- I-40 in Memphis, Tennessee was rerouted and part of the original I-40 is still in use under other designations.
- I-66 in the District of Columbia was abandoned in 1977.
- I-70 in Baltimore was supposed to terminate at I-95; the connection was cancelled due to its routing through Gwynns Falls Park. This includes the cancellation of I-170, partially built and in use as U.S. Route 40.
- I-78 in New York City was canceled along with portions with I-278, I-478, and I-878. I-878 was supposed to be part of I-78, and I-478 and I-278 were to be spur routes.
- I-83 in Baltimore was supposed to connect to I-95, but the connection was never built.
- I-95 through the District of Columbia into Maryland was abandoned in 1977. Instead it was rerouted to I-495 (Capital Beltway). The completed section is now I-395.
- I-95 was originally planned to run concurrently with I-93 along the Central Artery through downtown Boston, but was rerouted onto the Route 128 beltway due to widespread opposition. This revolt also included the cancellation of the Inner Belt and Southwest Expressway.

**Standards**

Main article: Interstate Highway standards

Interstate highway in New Jersey built to modern standards

The American Association of State Highway and Transportation Officials (AASHTO) has defined a set of standards that all new Interstates must meet unless a waiver from the Federal Highway Administration (FHWA) is obtained. One almost absolute standard is the controlled access nature of the roads. With few exceptions, traffic lights (and cross traffic in general) are limited to toll booths and ramp meters (metered flow control for lane merging during rush hour).

**Speed limits**

Further information: Speed limits in the United States and National Maximum Speed Law

Being freeways, Interstate Highways usually have the highest speed limits in a given area. Speed limits are determined by individual states. From 1974 to 1987, the maximum speed limit on any highway in the United States was 55 miles per hour (90 km/h), in accordance with federal law. Typically, lower limits are established in Northeastern states, while higher speed limits are established in Southern and Western states. For example, the maximum speed limit is 75 mph (120 km/h) in northern Maine, varies between 50 and 70 mph (80 and 115 km/h) from southern Maine to New Jersey, and is 50 mph (80 km/h) in New York City and the District of Columbia. Currently, rural speed limits elsewhere generally range from 65 to 80 miles per hour (105 to 130 km/h). Several portions of various highways such as I-10 and I-20 in rural western Texas and portions of I-15, I-80, and I-84 in Utah have a speed limit of 80 mph (130 km/h). Other highways in Idaho, Montana, South Dakota and Wyoming also have the same high speed limits. In some areas, speed limits on Interstates can be significantly lower in areas where they traverse significantly hazardous areas. The maximum speed limit on I-90 is 50 mph (80 km/h) in downtown Cleveland because of two sharp curves with a suggested limit of 35 mph (55 km/h) in a heavily congested area; I-70 through Wheeling, West Virginia, has a maximum speed limit of 45 mph (70 km/h) through the Wheeling Tunnel and most of downtown Wheeling; and I-68 has a maximum speed limit of 40 mph (65 km/h) through Cumberland, Maryland, because of multiple hazards including sharp curves and narrow lanes through the city. In some locations, low speed limits are the result of lawsuits and resident demands; after holding up the completion of I-35E in St. Paul, Minnesota, for nearly 30 years in the courts, residents along the stretch of the freeway from the southern city limit to downtown successfully lobbied for a 45 mph (70 km/h) speed limit in addition to a prohibition on any vehicle weighing more than 9,000 pounds (4,100 kg) gross vehicle weight. I-93 in Franconia Notch State Park in northern New Hampshire has a speed limit of 45 mph (70 km/h) because it is a parkway that consists of only one lane per side of the highway.

**II. CONCLUSION**

A widespread urban legend states that one out of every five miles of the Interstate Highway System must be built straight and flat so as to be usable by aircraft during times of war. Contrary to popular lore, Interstate Highways are not designed to serve as airstrips. This paper has presented a literature
survey on National Network of Highways to give awareness to some extent.

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IV. REFERENCES


