

THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE  
HIGHWAYS: ITS SERVICE TO MAJOR UNITED  
STATES ARMY INSTALLATIONS

by

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A MASTER'S REPORT

submitted in partial fulfillment of the  
requirements for the degree

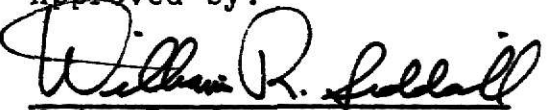
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## CHAPTER I

### INTRODUCTION

Automobiles and associated motor vehicles, because of their increasing popularity in all segments of society, have brought about drastic changes in the domestic transportation system of the United States. Included in these changes is the development and continued refinement of highway networks. During the 1930's this nation saw tremendous expansion in highway mileage. With the beginning of the decade of the 1940's, better quality highways were being developed.

The importance of highway networks as an effective means of mass freight and passenger transportation was vividly recognized by the United States defense establishment during the early years of World War II. In 1942, motor carriers in the United States transported an amount roughly 10% greater than in 1941, which was a record year. As of 1943, the trend was continuing.<sup>1</sup> An 11% increase was reported that year.<sup>2</sup> Trucks were the links in the vast assembly lines, joining plant with plant, farm with factory, mine with mill.

As early as 1938 plans were being made to develop a

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<sup>1</sup>Joseph L. White, G. Lloyd Wilson, and James M. Curtin, "American Transportation Facilities at the Outbreak of the War," Annals of the American Academy of Political and Social Science, (November, 1943, Vol. 230), p. 8.

<sup>2</sup>U. S. Interstate Commerce Commission, 59th Annual Report, (Washington: Gov't Printing Office), p. 6.

system of "super highways" which would provide connectivity between all regions of the United States; and, at the same time, would meet the requirements of national defense.<sup>3</sup> This system was to become part of the vast Federal-aid system of roadways.

President Franklin D. Roosevelt can be credited with supplying the impetus for providing Army installations with access to the federal highway system. In a 1940 letter to James M. Carmody, Administrator, Federal Works Agency, Roosevelt directed that a report be given as to the adequacy of the highway system in meeting the needs of national defense. One of the recommendations made in this report was that improvements be made in the strategic network of roads as routes of importance from the standpoint of national defense. The greater portion of that network included what is now the "National System of Interstate and Defense Highways."<sup>4</sup>

#### A. Background to the Interstate Highway System

Within the public highway system, a relatively small but strategically important set of roadways was marked for special attention relative to national defense. Congress in

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<sup>3</sup>U. S., President, 1932-1945 (F. D. Roosevelt), Toll Roads and Free Roads, 76<sup>th</sup> Cong., 1st Sess., House, Document No. 272 (Washington: Gov't. Printing Office, 1939), p. IX.

<sup>4</sup>U. S. President, 1949 (Truman), Highway Needs of the National Defense, (81st Cong., 1st Sess., House, Document 249, Wash.: GPO, 1949), pp. 56-58.

1944 directed the selection and improvement to higher-than-normal standards of a "National System of Interstate Highways." This system was to be "so located as to connect by routes, as direct as practicable, the principal metropolitan areas, cities, and industrial centers, to serve the national defense, and to connect at suitable border points with routes of continental importance in the Dominion of Canada and the Republic of Mexico."<sup>5</sup> Congress introduced this legislation in the form of Senate bill 2105, which became Public Law 78-521 December 20, 1944.<sup>6</sup> Specifically, Section 7 of this bill provided for the designation, "System of Interregional Highways."

Two years before S. 2105 was introduced, the National Resources Planning Board conducted a study entitled Transportation and National Policy. Mention was made of a national master highway plan with the plan designed to meet, along with other provisions, the requirements of national defense.<sup>7</sup> Many other studies were made prior to the introduction of S. 2105. The results of these studies provided Congress the necessary input of information relative to interregional highway planning. To gain insight into what motivated Congress to initiate action on an interregional highway system, it is appropriate

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<sup>5</sup>U. S. Laws and Statutes, United States Statutes at Large, Vol. 58, Part 1, Public Laws (Washington: Gov't Printing Office, 1945), p. 842.

<sup>6</sup>U. S. Congressional Record, (78th Cong., 2nd Sess., 1944, Vol. 90, Part 5), p. 7167.

<sup>7</sup>U. S., National Resources Planning Board, Transportation and National Policy (Washington: GPO, 1942), p. 387.

now to examine various studies which dealt with this subject.

In 1938, Congress directed the Bureau of Public Roads to make a study of the feasibility of either a system of toll roads or free roads for the United States. Special consideration was to be given to requirements of national defense. The study envisioned, in the first portion of the report, a system of toll superhighways to serve the nation's roadway needs. The study rejected the toll road approach for a number of reasons too lengthy to discuss here; instead it recommended in the second section a system of free roads, supported by federal and state government, not direct-toll funding. The recommendations of the report were concurred with by President Franklin D. Roosevelt in his letter of transmittal carrying the report to the Congress.<sup>8</sup>

Definite patterns for a superhighway system were taking shape in the early 1940's. Toll Roads and Free Roads contained maps of possible routes; however, later publications made accurate (when viewed from the present time) graphic forecasts of what the system would be. In the June 1941 issue of Public Roads magazine is a map (Fig. 1) of the "exciting highways following the approximate alinement of the tentatively selected interregional highway system." The system was forecast to be 29,330 miles in length.<sup>9</sup> When comparing this

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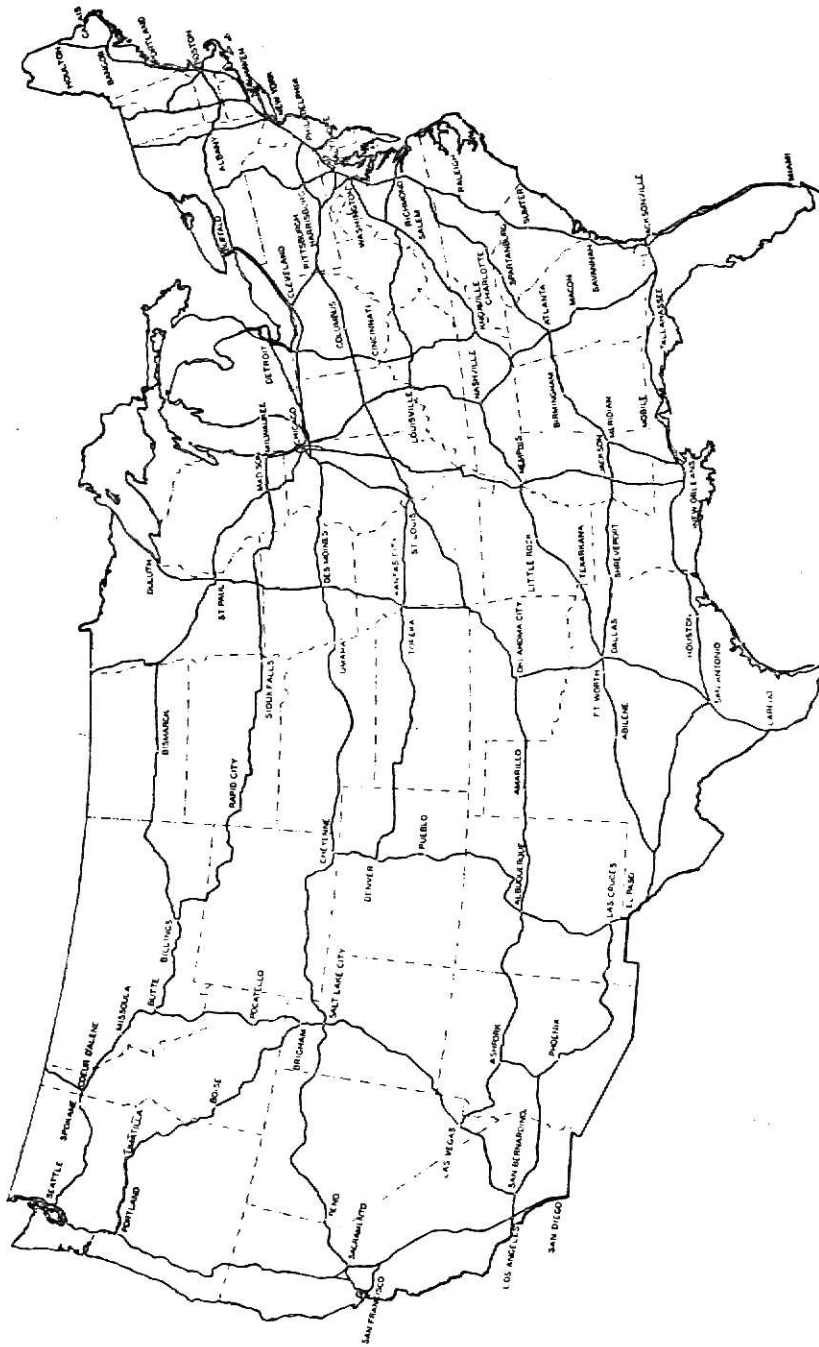
<sup>8</sup>U. S., President, 1932-1945 (F. D. Roosevelt), Toll Roads and Free Roads, 76th Cong., 1st Sess., House, Document No. 272 (Washington: Gov't Printing Office, 1939), pp. VII-IX.

<sup>9</sup>H. E. Hilts, "Planning the Interregional Highway System," Public Roads, Vol. 22, No. 4 (June, 1941), pp. 69-70.

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EXISTING HIGHWAYS FOLLOWING THE APPROXIMATE ALIGNMENT OF THE TENTATIVELY SELECTED INTERREGIONAL HIGHWAY SYSTEM.

Source: Public Roads, June, 1941, p. 70.

Figure 1

with the present system (Fig. 2), striking similarities are evident.

Evidence of continued planning of the interregional highway system preparatory to its introduction in Congress is Interregional Highways, the Report and Recommendations of the National Interregional Highway Committee, dated January 1, 1944. The revised system totaled 34,000 miles. The principal determinants in route selection were: interconnection of larger cities of all regions; accommodation of short-run traffic in and about lesser cities; creation of a system of optimum extent and maximum utilization.<sup>10</sup> Significant safety features are added in this report. In studies prior to this report, most of the least traveled sections of the system would be two-lane roadways. Beginning with Interregional Highways, all roadways were to be at least four-lane. Other features such as curvature, sight distances, and bridging requirements are discussed in detail.

The groundwork laid by these studies and reports made it possible for Congress to begin considering the possibility of the construction of an interregional highway system in the United States. The Senate Committee on Post Offices and Post Roads, (Senator Kenneth McKellar, Chairman), commenced hearings on S. 2105 on August 18, 1944. Provisions of the bill other

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<sup>10</sup>U. S., President, 1932-1945 (F. D. Roosevelt), Interregional Highways, 78th Cong., 2nd Sess., House, Document No. 379 (Washington: Gov't Printing Office, 1944), p. 40.

# **THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS** **STATUS OF IMPROVEMENT AS OF DECEMBER 31, 1971**

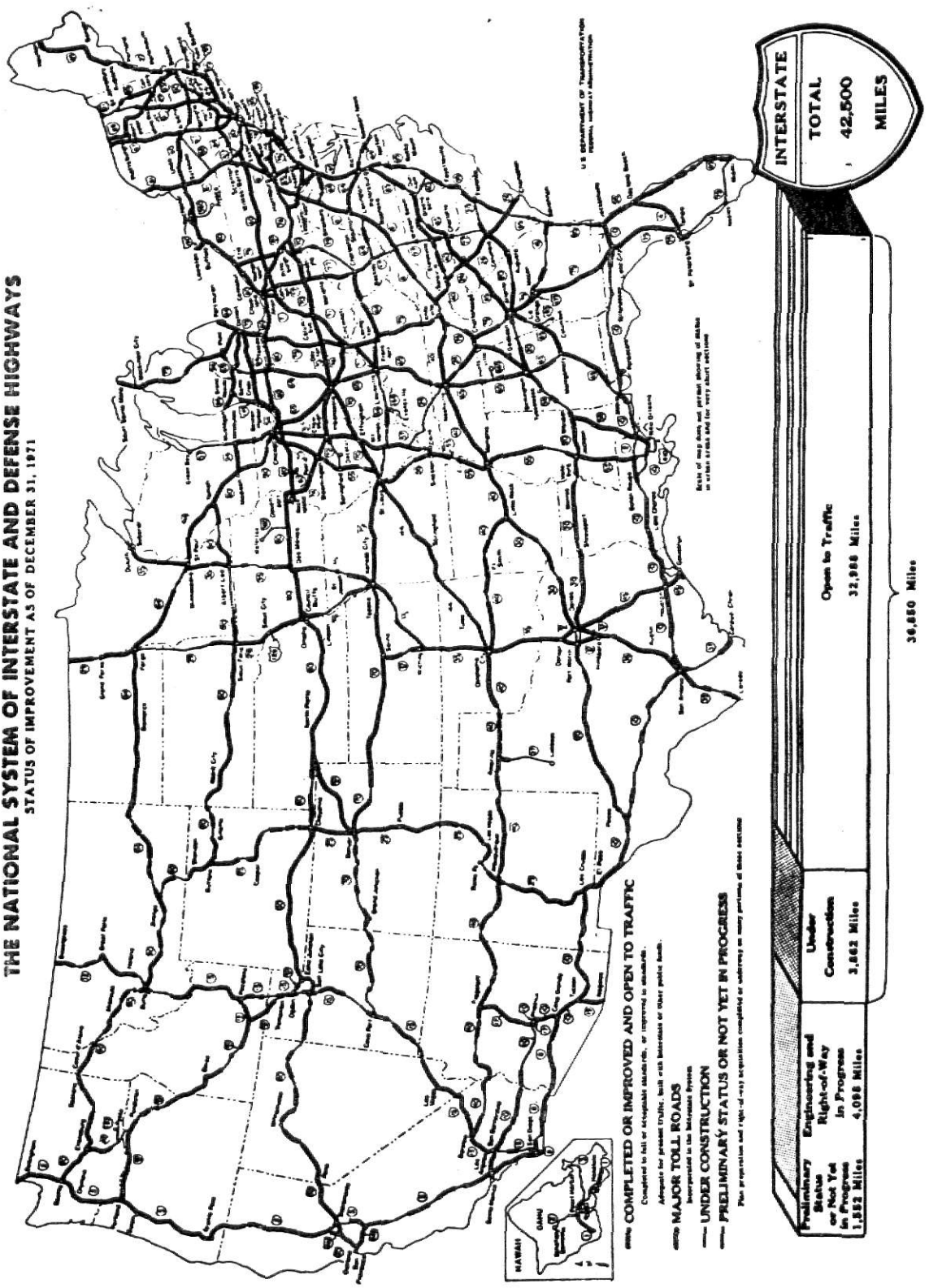


Figure 2



than Section 7, which dealt with the Interregional System, received most of the attention of the committee. No mention was made of Section 7 during the hearings.<sup>11</sup> During study by the Senate after the bill's introduction, the name of the system in the proposal became "National System of Interstate Highways." The Senate, as the House, did not regard Section 7 of the bill worthy of much discussion other than the name change.<sup>12</sup>

One of the keys in the present report is determining the intent of Congress with regard to the Interstate System serving the needs of the national defense. It is appropriate initially to mention specific points made by Congressmen and Senators in discussions of S. 2105 during 1944. The bill's sponsor, Senator Carl Hayden of Arizona, said during early debate, "the bill is based upon the assumption that the American people cannot enjoy prosperity without an adequate highway-transport system. The question naturally arises as to what it will cost to have an adequate system."<sup>13</sup> This statement set the mood of the Congressmen. World War II was drawing to a close, and Congress was beginning to realize what an expensive proposition post-war recovery was going to be. Among the items with a high priority was highway renewal and

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<sup>11</sup>U. S. Congress, Senate, Committee on Post Offices and Post Roads, To Amend and Supplement the Federal-Aid Road Act, 1916 (Hearing, 78th Cong., 2nd Sess., August 18, 1944, Wash: GPO, 1944), pp. 85-104.

<sup>12</sup>U. S., Congressional Record, (78th Cong., 2nd Sess., 1944, Vol. 90, Part 7), pp. 7676-7684, 9255-9259, 9272-9277.

<sup>13</sup>Ibid., p. 7676.

construction. The War had taken a great toll in terms of highway deterioration and damage (due to Army training). Among the provisions always included in the bill was Section 7. No attempts were made to remove or add to that section, save the change in name from Interregional Highway System to Interstate Highway System. It can be assumed that Congress considered Section 7 an integral part of the bill, yet was silent on the intent of the section as it relates to the nation's defense requirements.

The bill became Public Law 78-521 on December 20, 1944. It was not until 1956 that Congress became concerned about making the Interstate System a reality. Between 1944 and 1948 some improvements were made in the system; however only 6% of its total mileage was up to requisite standards. Approximately \$11 billion was needed as of 1948 to modernize the system. The Korean War interrupted plans for system funding, and it wasn't until the passage of the Federal-Aid Highway Act of 1956 that Congress authorized the needed funds. This same act redesignated the system's name "National System of Interstate and Defense Highways." To expedite construction, Congress authorized appropriations approximating \$25 billion during 1959-1969. Additionally, 1,000 more miles were added to the original 40,000 for the entire system.<sup>14</sup>

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<sup>14</sup>Harry B. Yoshpe and Fred R. Brown, Transportation: the Nation's Lifelines, (Washington: Industrial College of the Armed Forces, 1961), pp. 17-19.

In the search for specific statements of intent by Congress relative to the system fulfilling the requirements of national defense, an examination of various reports and studies during the period 1944-1956 is necessary. Perhaps a short summary statement made in a non-government report provides the best insight toward understanding the intent of Congress and/or Public Laws. In National Transportation Policy Dearing and Owen wrote:

Generally speaking, a land transportation system adequate for the peace-time economy would ordinarily meet the basic physical requirements for war.<sup>15</sup>

This succinct description, although it pertains to the United States land transportation system in general, is probably the closest one can get in defining intent up to 1949.

Further investigation into this question is needed. During debate in the House of Representatives prior to passage of the 1956 Act, several Congressmen mentioned specific benefits the Interstate System would provide to the national defense. Their remarks were general in nature; however, they portrayed the intent of Congress, for no objections verbally, or changes in the Act were made.

Congressman John Dempsey of New Mexico was first to voice support of the national defense aspects of the 1956 Act, and in a statement made on the floor of Congress, he said:

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<sup>15</sup>Charles L. Dearing and Wilfred Owen, National Transportation Policy (Washington: The Brookings Institution, 1949), p. 161.

There is one highly essential feature in this legislation which I feel has been overlooked in some degree, due to the tendency to consider the legislation purely from the standpoint of dollars and of miles of roads to be built. That has to do with the Nation's defense. . . . I trust the day will never come when we will find it necessary to take the precautionary measures which this program is intended to implement, but I am sure this Congress is taking a great forward step when it has the foresight to provide better and more adequate means for evacuation of our population from congested centers. . . . Failure to pass this legislation would put upon the Congress the responsibility for such (difficulty as World War II transport problems) as might engulf this nation. I, for one, want no part of such a failure to be ascribed to me. I am sure that every member of this House feels the same way about it.<sup>16</sup>

Similar statements of support were made on the floor of the House by Congressmen Springer of Illinois, Cramer of Florida, and Baldwin of California. Besides the terms which denote support of national defense, all of these Congressmen expressed the need for capabilities of providing mass evacuation, a function of the military in times of national emergencies. Senators who supported this legislation were in general agreement with the language of members of the House.

It is difficult to summarize the intent of Congress in its direction that the Interstate Highway System be constructed to meet the needs of national defense. This is due mainly to lack of substantive evidence that explains why Congress directed the system to be located as it is. Exhaustive debate was conducted on the floors of the Senate and House. Yet interestingly enough, among the hundreds of pages of debate recorded in the Congressional Record, only the few statements

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<sup>16</sup>U. S., Congressional Record, 84th Cong., 2nd Sess. (1956), Vol. 102, Part 5, 7125.

mentioned earlier pertained to national defense. As can be expected, most of the debate centered on dollars, amount of mileage in this state or that, and the decision as to whether union labor should be demanded in construction of the system. These problems are important aspects of the debates on the system. The national defense requirements were either important aspects of the system and it was taken for granted that the system would satisfy the needs; or it was not an important consideration, only useless language.

One last development in the discussion of background to the Interstate Highway System is the addition of 1,500 more miles to the system, authorized by the Federal-Aid Highway Act of 1968. In addition to this, Congress made a more definitive statement on when the Interstate System was to be completed. The following is excerpted from amendments to Public Laws enacted by the 89th and 90th Congress:

It is hereby declared to be in the national interest to accelerate the construction of the Federal-Aid highway systems, including the National System of Interstate and Defense Highways. . . . It is hereby declared that the prompt and early completion of the National System of Interstate and Defense Highways, so named because of its primary importance to the national defense, and hereafter referred to as the "Interstate System", is essential to the national interest and is one of the most important objectives of this Act. It is the intent of Congress that the Interstate System be completed . . . through the fiscal year ending June 30, 1974 . . . and that the entire system in all States be brought to simultaneous completion.<sup>17</sup>

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<sup>17</sup>U. S. Laws and Statutes, United States Code, 1964 Edition, Supplement IV (Washington: Gov't Printing Office, 1969), pp. 1591-1592.

With the addition of the 1,500 miles in 1968, the total system is 42,500 miles. As of June 30, 1970, 71% of the system was open to traffic, 12% was under construction, 14% was in design stages, and 3% had not advanced beyond preliminary status. The revised total cost to complete the system by the mid-1970's is \$69.87 billion, including \$62.50 billion in Federal funds.<sup>18</sup>

Research into the history of the Interstate Highway System indicates that little active consideration of military usefulness of the system was made by law-makers. They made many assumptions about how the system would serve the needs of national defense. Congress issued very broad instructions concerning this, and much decision-making power was delegated to the Secretary of Transportation (prior to 1967, the Secretary of Commerce) and the several state highway departments. Such matters as approval of geometric and construction design, right-of-way acquisition, and route selection were the responsibility of the Secretary of Transportation (Commerce).<sup>19</sup> Space limits a detailed inquiry into all transactions which occurred between the Secretary and the state highway departments relative to the question being examined in this report. Only the language used by Congress and Public Law are considered.

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<sup>18</sup>U. S. Department of Transportation, Fourth Annual Report, FY1970 (Washington: Gov't Printing Office, 1971), p. 74.

<sup>19</sup>U. S. Laws and Statutes, United States Statutes at Large, Vol. 70, Part 1 (Washington: Gov't Printing Office, 1957), pp. 380-385.

## B. Major Army Installations

In this report the accessibility of the 20 largest Army installations to the Interstate Highway System is examined. These 20 installations are listed in order of size in Table I. The size of the installations is determined on the basis of troop population. Troop population is the number of active Army soldiers (officers and enlisted men) assigned to a specific installation. It does not include dependents and civilians who live and/or work at the installation. Reluctance of Department of the Army officials to discuss populations and the fluid personnel situation in the military make it impracticable to specify an exact population figure for each installation. The following nevertheless are the twenty most populous installations as of June 30, 1972, according to official records in Washington.

The total combined troop population of the twenty installations represents approximately one-half of the total for the entire active Army. Other locations of troops include those installations smaller than the major ones within the continental United States. There are over two hundred posts, camps, and stations fitting this category. The remainder of Army strength is located outside the continental United States.

## C. Statement of Problem and Method of Approach

Although much has been written about the Interstate System providing service to national defense, the true worth



of the system has not been measured in precise terms. This study will examine this question and aspects of the system which relate to the Army installations listed in Table I. The Army in past years has used the Interstate System primarily for training and for transport of troops and freight. Other common uses have included Army-supported natural disaster relief operations and Army Reserve and National Guard unit training. Conceivably, the system would be used should armed hostile conflicts occur on or away from United States soil.

The Interstate System is of particular importance over and above other highways in that the roadways of the system provide a rapid, unhindered means of long distance movement for Army transportation elements. Once entry is gained to the system, non-stop convoy movement becomes a reality. The closer an installation is to access to the system, the more flexible and responsive that installation can become in accomplishing the missions given to it.

Of the twenty Army installations included in this study, nine are located within five highway miles of an Interstate Highway entrance ramp. Therefore, all major Army installations do not have "immediate" access to the Interstate System. The problem is to determine whether this is in consonance with the intent of the interstate highway concept as it is outlined by public law.

The primary method of approaching the basic problem will be measuring and analyzing time and distance factors relating



Table I

Installation <sup>20</sup>	Year Became Permanent Installation <sup>21</sup>
1. Fort Hood, Texas	1950
2. Fort Bragg, North Carolina	1922
3. Fort Knox, Kentucky	1932
4. Fort Dix, New Jersey	1939
5. Fort Ord, California	1940
6. Fort Benning, Georgia	1918
7. Fort Carson, Colorado	1954
8. Fort Riley, Kansas	1855
9. Fort Sam Houston, Texas	1890
10. Fort Jackson, South Carolina	1917
11. Fort Leonard Wood, Missouri	1956
12. Fort Sill, Oklahoma	1909
13. Fort Polk, Louisiana	1961
14. Fort Lewis, Washington	1927
15. Fort Gordon, Georgia	1942
16. Fort Bliss, Texas	1890
17. Aberdeen Proving Grounds, Maryland	1918
18. Fort Monmouth, New Jersey	1917
19. Fort Meade, Maryland	1917
20. Redstone Arsenal, Alabama	1949

<sup>20</sup>Based on personal interviews with Mrs. Ann Wentworth, Customer Service Director, Office of the Deputy Chief of Staff for Personnel, Headquarters, Department of the Army.

<sup>21</sup>Tom Scanlan (ed.), Army Times Guide to Army Posts (Harrisburg: The Stackpole Co., 1963), pp. 1-269.

to travel from Army installations to access to the Interstate System. The average distance from system entry ramps to on-installation convoy terminals at all twenty installations is 21.2 highway miles. Many variables will affect the time required for a convoy of an installation to gain access to the Interstate System. Availability of two- or four-lane routes to access, convoy speeds, traffic interference, and modes of military transportation are some of the factors which must be investigated and weighed in analyzing time and distance relationships.

A critical factor upon which much of this study will be based is that point at which the "Army installation convoy terminal to entrance ramp distance" is determined to be too far to provide optimum service to these installations. The author will attempt to set a real value for this distance in order to facilitate meaningful assessment of the problem at hand. Among the methods for establishing this value are: study of Army doctrine with reference to time and distance factors in road movement; comparing time and distance factors to amount of traffic interference; interviews with Army transportation officers.

## CHAPTER II

LOCATIONAL RELATIONSHIP BETWEEN THE INTERSTATE  
HIGHWAY SYSTEM AND MAJOR ARMY INSTALLATIONS

No definitive set of rules exists in describing location selection for Army installations. Locations for these installations are as diverse and varied as the missions and functions performed by men and equipment located on the several installations. Concerning the installations themselves, some were made out of mud, and their manner of creation remains apparent today. Others are beautiful places which would pop the eyes of envious real estate people. If you have seen one Army post, or even more, you have not seen them all.<sup>1</sup>

To a degree, a similar lack of rules seems to apply to the location of the Interstate Highway System with regard to serving the needs of national defense, or more specifically, for purposes of this report, the needs of major Army installations. This will be discussed more fully in Chapter III of this report.

One example exists which indicates the system planners went out of their way to provide better access to Army installations. The entrance ramp used by Fort Carson, Colorado, was built especially for that installation. More information about this is contained in the discussion of Fort Carson later in

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<sup>1</sup>Tom Scanlan (ed.), Army Times Guide to Army Posts (Harrisburg: The Stackpole Co., 1963), p. V.

this chapter. No further evidence could be found which would indicate the degree of consideration given to Army installations in planning or adjusting routes of the system.

Although no "checklist" exists for selection of an Army installation location, some factors are relatively common in the process. Availability of land and certain resources are essential. The amount of land and types of resources required will vary with the purpose of the installation. One of the resources necessary for all Army installations is an adequate transportation system. Connections with a roadnet are absolutely necessary, a railhead is necessary in most cases, and an airfield is desirable in all cases. The roadnet requirement is basic to the mission of the Army as the ground force of the national defense establishment. Some of the domestic roadnet needs are furnished by the Interstate Highway System.

In this chapter, each installation named earlier as a subject for study in this report will be examined individually. As a result of interviews with Transportation Officers at each installation, the author has established the following general frame of reference:

1. General description as to location and function.
2. Problems encountered in gaining access to the Interstate Highway System.
3. Connectivity with Interstate Systems in terms of time and distance factors, using the following assumptions:

- a. Two-lane access roads are classed as "poor roads" and a convoy will cover 10 miles in an hour over them.<sup>2</sup>
- b. Four-lane and wider access roads are classed as "good roads" and a convoy will cover 20 miles in an hour over them.<sup>3</sup>
- c. The travel time of the lead vehicle of a convoy will be the only time factor computed. No specific convoy sizes will be discussed.
- d. The following are the formulae which will be used to delineate the accessibility of the Interstate System to a given installation:

distance from convoy  
terminal to entry ramp (a)

speed as determined  
by 3a or 3b (b)

= time required  
assuming clear roads (c)

number of intersections x category of interference  
(x) (y)

interference  
= factor  
(z)

#### A. Fort Hood, Texas

Two Army divisions are housed at Fort Hood--no other installation has more than one. Various supporting units are located here as well. Fort Hood is adjacent to Killeen, Texas

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<sup>2</sup>U. S. Department of the Army, FM55-35, Motor Transport Operations and Motor Transport Units (Washington: Gov't Printing Office, 1965), p. 45.

<sup>3</sup>Ibid.

in the central part of the state. Interstate 35 is 16 miles east of Fort Hood; and U. S. Highway 190, a 4-lane route heavily congested with both civilian and military urban traffic connects the two. Numerous intersections exist along this route which could impede convoy movement. Even though the traffic interference is heavy, officials at Fort Hood give the Interstate Highway System service to them a "good, but could be better" rating. Specifically what is needed to help ease congestion over access roads to the system is a new 4-lane highway bypassing the urban area of Killeen. This is in planning stages now.<sup>4</sup>

Using the formulae established earlier, the following relationships exist now at Fort Hood:

$$\frac{16a}{20b} = 48c \text{ (minutes)}, \quad 30x \times 3y = 90z \text{ (interference factor)}$$

#### B. Fort Bragg, North Carolina

Fort Bragg is the home of the Army's only airborne division. In addition to this, many other "combat-ready" type units and many training schools are permanent residents. Besides being one of the most populous installations, it is one of the largest in spatial extent, measuring 30 by 12 miles.

Fort Bragg is located 10 miles north of Fayetteville, North Carolina. It is 12 miles from the nearest entry to the

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<sup>4</sup>Statement by Mr. Edward Rose, Deputy Transportation Officer, Fort Hood, personal interview, January 3, 1973.

Interstate System. The 12 miles (from the convoy terminal on Fort Bragg to entry to Interstate 95) consists of a 4-lane congested urban roadway passing through the city of Fayetteville. Ten major intersections which impede convoy movement exist along this road. According to the Fort Bragg Transportation Officer, the traffic interference which a convoy would expect to encounter would be medium. The type traffic interference would be urban-civilian, owing to the location of the access road. The Transportation Officer, when asked to comment on the overall adequacy of Interstate System service to his installation, replied, "I'd better not commit myself on this because it is an area which impacts on the local political situation."<sup>5</sup>

One can only infer from this statement that the Interstate System could be better located to satisfy the needs of this installation. The following show time, distance, and traffic interference factors for Fort Bragg:

$$\frac{12a}{20b} = 36c \text{ (minutes) , } 10x \times 2y = 20z \text{ (interference factor).}$$

#### C. Fort Knox, Kentucky

Fort Knox is the Army's armor training center. Most functions there which relate to Army missions are centered around tank and cavalry tactics and equipment.

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<sup>5</sup>Statement by Col. Casper Berger, Transportation Officer, Fort Bragg, personal interview, December 20, 1972.

Interstate 65, passing through Elizabethtown, Kentucky, 15 miles south, is the nearest system highway serving this installation. U. S. highway 31W, a 4-lane roadway with only four traffic intersections to hinder movement of an Army convoy, connects Fort Knox to the system. Overall interference is medium. A "good" rating was given the Interstate System in serving the needs at this installation.<sup>6</sup>

Applying the formulae, the following is found:

$$\frac{15a}{20b} = 45c \text{ (minutes)}, \quad 4x \times 2y = 8z \text{ (interference factor)}.$$

#### D. Fort Dix, New Jersey

Fort Dix is in the business of training new soldiers for the Army. One of many basic training installations located in the continental United States, Fort Dix is the largest.

This installation is 17 miles south of Trenton, New Jersey; and Interstate 295, passing through Trenton and continuing northeast, is 15 miles from it. Of the 15 miles along access roads, 13 are 4-lane and 2 are 2-lane. Four major traffic intersections exist along this route. Medium interference is expected over it. The interference consists of both military and civilian traffic. The transportation

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<sup>6</sup>Statement by Mr. W. R. Morgan, Traffic Manager, Fort Knox, personal interview, December 20, 1972.



official contacted at Fort Dix gave the service provided by the Interstate System a "good" rating.<sup>7</sup>

The following time and distance relationships and the interference factor are computed from information given by the installation official:

$$\frac{13a}{20b} = 39c + \left( \frac{2a}{10b} = 12c \right) = 51c \text{ (minutes)}$$

$$4x \times 2y = 8z \text{ (interference factor).}$$

#### E. Fort Ord, California

Fort Ord is another installation where training for new soldiers is conducted. It is 9 miles east of Monterey, California. Interstate 5 is 75 miles east, and the access road to this highway from Ord is about one-half 2-lane and one-half 4-lane. Five intersections which hinder convoy movements are located along the access road. Medium traffic is the average over this road. Transportation officials at Fort Ord consider the Interstate System to be adequate with regard to its service to that installation.<sup>8</sup>

The following are the appropriate calculations for measuring time and distance factors:

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<sup>7</sup>Statement by Mr. Bernard Pfeiffer, Traffic Manager, Fort Dix, personal interview, January 3, 1973.

<sup>8</sup>Statement by Captain Maril Montero, Deputy Transportation Officer, Fort Ord, personal interview, January 3, 1973.

$$\left(\frac{39a}{20b} = 1:55c\right) + \left(\frac{36a}{10b} = 3:40c\right) = 5:35c \text{ (hours and minutes)}$$

$$5x \times 2y = 10z \text{ (interference factor).}$$

#### F. Fort Benning, Georgia

The primary function at Fort Benning is training Infantry officers. It is the home of the Army's Infantry School. Units which support the school are housed here also.

Fort Benning is on the southern edge of Columbus, Georgia. Access to Interstate 85 is through the western edge of Columbus. The Auburn, Alabama interchange is the nearest entry ramp on "85". It is 26 miles distant from the on-Fort-Benning convoy terminal. The access road has medium traffic interference, 12 interfering intersections, and is 2-lane all the way. The Fort Benning official interviewed gave the Interstate System an "adequate, but could come closer to us" rating. He mentioned that area politicians have tried in vain to have a special spur of the system connect Columbus with the Interstate 85.<sup>9</sup>

Using the data of the preceding paragraph, the following factors emerge:

$$\frac{26a}{10b} = 2:40c \text{ (hours \& minutes); } 12x \times 2y = 24z \text{ (interference factor).}$$

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<sup>9</sup>Statement by Mr. W. T. Patterson, Traffic Manager, Fort Benning, personal interview, December 20, 1972.

### G. Fort Carson, Colorado

Fort Carson is one of many installations on which the major function is housing an Army division. The Fourth Infantry Division along with other miscellaneous supporting units are located here.

Fort Carson enjoys a choice location in relation to the Interstate System. It is five miles south of Colorado Springs, Colorado, astride Interstate 25. The nearest entry ramp is 3 miles from the convoy terminal. This ramp was constructed in 1972 especially for Fort Carson's use. Previous to this, the nearest entrance was 6 miles distant and located near the center of Colorado Springs. With this addition, service is substantially improved. Even though the roadway providing access to the interstate system is 2-lane, there are but three traffic intersections which may impede convoy movement--and these along with the entry ramp are located on the installation. Only light traffic interference is encountered at any time. These factors provide an ideal situation for this installation with regard to Interstate System service. This is substantiated by the Transportation Officer at Fort Carson. He especially considers the fact that the entry ramp is on the installation important in ease of access to the system. Overall, he gives the adequacy of service an "outstanding" rating.<sup>10</sup>

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<sup>10</sup>Statement by Major Gilbert Saenz, Transportation Officer, Fort Carson, personal interview, December 21, 1972.

The time, distance, and traffic interference relationships:

$$\frac{3a}{10b} = 18c \text{ (minutes) , } 3x \times 1y = 3z \text{ (interference factor).}$$

#### H. Fort Riley, Kansas

The First Infantry Division is the largest unit in residence at Fort Riley. Miscellaneous units which provide support to the Division also are located there.

Fort Riley is located midway between Manhattan and Junction City, Kansas. Interstate 70 skirts this installation, and there are but 2 miles between the convoy terminal and a system entry ramp. Even though the access road is 2-lane, there are only two intersections which hinder movement (both on-installation) and there is only light military traffic interference. Because of these favorable aspects, Fort Riley officials give the Interstate System an outstanding rating.<sup>11</sup>

The time, distance, and interference factors are as follows:

$$\frac{2a}{10b} = 12c \text{ (minutes), } 2x \times 1y = 2z \text{ (interference factor).}$$

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<sup>11</sup>Statement by Mr. George Ridenour, Transportation Officer, Fort Riley, personal interview, December 19, 1972.

## I. Fort Sam Houston, Texas

Medical training and specialized medical facilities, along with a regional Army headquarters, are the primary reasons for Fort Sam Houston being a major Army installation. It is one of the more desirable places of assignment for persons in the Army.

Fort Sam Houston is within the city limits of San Antonio, Texas. The on-post convoy terminal is but 2 miles from the nearest Interstate 35 Highway entrance ramp (also located in post). The 2 miles of 2-lane access road is intersected by 4 major crossroads. A medium load of civilian and military traffic can be expected. The Deputy Transportation Officer at Fort Sam Houston said that the Interstate System service to his installation was "outstanding".<sup>12</sup>

The time, distance, and interference factors are computed as follows:

$$\frac{2a}{10b} = 12c \text{ (minutes)} , \quad 4x \times 2y = 8z \text{ (interference factor)}.$$

## J. Fort Jackson, South Carolina

Basic training is the most prevalent activity at Fort Jackson. Other infantry-related training units and support activities are also located on this installation.

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<sup>12</sup>Statement by Captain Frank Murtaugh, Deputy Transportation Officer, Fort Sam Houston, personal interview, January 3, 1973.

Fort Jackson is another southern installation within or adjacent to a major urban center. Columbia, South Carolina is adjacent to this installation. The Interstate 20 entrance ramp is located on post, only 2 miles from the convoy terminal. The 2-mile, 2-lane access road is lightly traveled and is intersected by only one major roadway. The Transportation Official contacted rated the Interstate service to Fort Jackson as "outstanding".<sup>13</sup>

From the data gathered, the following computations can be made:

$$\frac{2a}{10b} = 12c \text{ (minutes)}, \quad 1x \times 1y = 1z \text{ (interference factor)}.$$

#### K. Fort Leonard Wood, Missouri

Basic training, with emphasis on military engineering functions, is the major activity at Fort Leonard Wood. Most new soldiers who become members of Army Engineer units receive their instruction here.

This installation is in a rural central Missouri setting. The nearest urban area is the small town of Waynesville, Missouri, 5 miles north. The closest Interstate highway entrance ramp is 4 miles distant. A convoy traversing these 4 miles would encounter 2 miles each of 2-lane and 4-lane roadways and 2 major crossroads. Traffic interference is

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<sup>13</sup>Statement by Mrs. Nancy Nelson, Administrative Officer, Transportation Office, Fort Jackson, personal interview, January 3, 1973.

categorized as medium. Interstate highway service to Fort Leonard Wood was rated "very good" by the Transportation Officer there.<sup>14</sup>

The time, distance, and interference factors are calculated as follows:

$$\left(\frac{2a}{20b} = 6c\right) + \left(\frac{2a}{10b} = 12c\right) = 18c \text{ (minutes)}$$

$$2x \times 2y = 4z \text{ (interference factor).}$$

#### L. Fort Sill, Oklahoma

This is another installation on which a specialized training activity is located. At Fort Sill, all officers and many enlisted men in the Field Artillery branch of the Army receive their training.

Fort Sill adjoins Lawton, Oklahoma, a small city to the south. The nearest Interstate highway entrance ramp is 100 miles from the on-post convoy terminal. Of the 100 miles of roadway connecting with the entrance ramp, 90 miles is 2-lane and 10 miles is 4-lane. Six major traffic intersections are encountered along this road, which is lightly traveled. As might be expected from this data, Interstate highway service to Fort Sill is only "fair", according to the official contacted at that installation.<sup>15</sup>

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<sup>14</sup>Statement by Lieutenant Colonel G. W. Ansted, Transportation Officer, Fort Leonard Wood, personal interview, January 3, 1973.

<sup>15</sup>Statement by Mr. Don Herrin, Freight Manager, Fort Sill, personal interview, January 3, 1973.

Applying the formulae to the figures gathered, the following are found:

$$\left(\frac{90a}{10b} = 540c\right) + \left(\frac{10a}{20b} = 30c\right) = 570c \text{ (minutes, or } 9 \frac{1}{2} \text{ hours)}$$

$$6x \times 1y = 6z \text{ (interference factor).}$$

#### M. Fort Polk, Louisiana

Basic training is the only function assigned to Fort Polk. It is the most recently designated permanent installation in the Army. This follows a series, over a twenty-year period, of openings and closings.

It is the Army's "Camp Swampy", for it is located in the moist central Louisiana Kisachie National Forest. DeRidder, Louisiana, a small rural town, is 20 miles south of Fort Polk. Seventy miles of 2-lane roadway connects Fort Polk with the nearest Interstate highway entrance ramp. A medium amount of traffic interference is generally encountered along this roadway, which is intersected by 2 major crossroads. Fort Polk's Transportation Officer rated Interstate highway service to his installation as "satisfactory".<sup>16</sup>

Using the formulae previously set forth, the following relationships exist for Fort Polk:

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<sup>16</sup>Statement by Colonel Beauregard Brown, III, Transportation Officer, Fort Polk, personal interview, January 3, 1973.



$$\frac{70a}{10b} = 420c \text{ (minutes, or 7 hours)}$$

$$2x \times 2y = 4z \text{ (interference factor).}$$

#### N. Fort Lewis, Washington

Fort Lewis is home to the Ninth Infantry Division. This unit, along with its support elements, are the only tenants of the installation. It is in an urban area midway between Olympia and Tacoma, Washington. An Interstate 5 entrance ramp is located on post only 1 mile from the on-post convoy terminal. Along this 1 mile of 2-lane roadway leading to the ramp, there are no major intersections, and the traffic load is light. "Outstanding" service is afforded Fort Lewis by the Interstate highway system according to the Traffic official contacted there.<sup>17</sup>

The following calculations are made with regard to time, distance, and interference factors:

$$\frac{1a}{10b} = 6c \text{ (minutes) , } 0x \times 1y = 0z.$$

#### O. Fort Gordon, Georgia

All of the Army's military policemen and many of its signalmen receive training at Fort Gordon. Some support units are housed here also. The nearest Interstate 20 entrance ramp

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<sup>17</sup> Statement by Mrs. Quest Comstock, Assistant to the Transportation Officer, Fort Lewis, personal interview, January 3, 1973.

is located off post, 5 miles from the on-post convoy terminal. The 5 miles of roadway consist entirely of 2-lane county road, intersected by 4 major crossroads. Traffic along the county road is light. The Transportation Officer commented that the Interstate highway service to Fort Gordon was "good".<sup>18</sup>

Applying the established calculations to the data gathered, the following relationships exist:

$$\frac{5a}{10b} = 30c \text{ (minutes)}$$

$$4x \times 1y = 4z \text{ (interference factor).}$$

#### P. Fort Bliss, Texas

Fort Bliss, with a long tradition of Cavalry activity, is now the home of the Army's Air Defense Artillery School. The vast open areas of West Texas afford ample space for range firing by students of this school.

This installation is located along the northern edge of El Paso, Texas. Because of its urban setting, access to the Interstate System can be expected to be easy. This is true, for Interstate 10 is only 2 miles from Fort Bliss. A 2-lane road with 5 major intersections provides access to highway 10. Medium traffic interference is expected when moving over this road. The Transportation Officer at Fort Bliss indicated

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<sup>18</sup>Statement by Major Paul O'Conner, Transportation Officer, Fort Gordon, personal interview, January 3, 1973.

that service provided by the system is "outstanding".<sup>19</sup>

The following are the appropriate time, distance, and interference factors for this installation:

$$\frac{2a}{10b} = 12c \text{ (minutes)} , \quad 5x \times 2y = 10z \text{ (interference factor)}.$$

Q. Aberdeen Proving Grounds, Maryland

Aberdeen has as its primary function housing the Ordnance School for the Army. As this installation's name implies, it is a proving ground--in this instance, a testing and proving ground for large Army vehicles.

Baltimore, Maryland is 25 miles southwest of Aberdeen. A major north-south system roadway, Interstate 95, is 3 miles north of Aberdeen. The access road is 2-lane with three interfering intersections. Overall traffic is classified "medium". The official contacted at Aberdeen considered the system "outstanding" in meeting their requirements.<sup>20</sup>

The calculations for the factors discussed earlier are as follows:

$$\frac{3a}{10b} = 18c \text{ (minutes)}, \quad 3x \times 2y = 6z \text{ (interference factor)}.$$

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<sup>19</sup>Statement by Lieutenant Colonel J. L. Stallings, Transportation Officer, Fort Bliss, personal interview, January 3, 1973.

<sup>20</sup>Statement by Mr. Norman Smith, Deputy Transportation Officer, Aberdeen Proving Grounds, personal interview, January 3, 1973.

## R. Fort Monmouth, New Jersey

Communications and electronics training is the major function at Fort Monmouth. Specialized activities such as the Communications Systems Agency and the Satellite Communications Agency are housed at this installation as well.

Fort Monmouth is between Red Bank and Eatontown, New Jersey. Interstate 95 is 38 miles west of this installation. Over the route (15 miles of 2-lane and 23 miles of 4-lane) connecting the two are ten intersections which hinder movement. Traffic is classified as medium by Fort Monmouth traffic planners. The overall rating they give to service provided by the system is "excellent".<sup>21</sup>

Using data furnished by the Fort Monmouth official contacted, the following is found to exist:

$$\left(\frac{15a}{10b} = 90c\right) + \left(\frac{23a}{20b} = 70c\right) = 160c \text{ (minutes, or 2 hrs., 40 min.)}$$

$$10x \times 2y = 20z \text{ (interference factor).}$$

## S. Fort Meade, Maryland

Fort Meade is the headquarters for First Army, one of four major regional U. S. commands. In addition to this, miscellaneous support units are located here. The National Security Agency is also housed here.

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<sup>21</sup>Statement by Mr. Ernest Burt, Operations Chief, Motor Vehicle Branch, Transportation Office, Fort Monmouth, personal interview, January 5, 1973.

This installation is in the center of the Washington-Baltimore urban area, about 20 miles from each city. Interstate 95 serves Fort Meade, and the two are connected by a heavily traveled 2-lane roadway 9 miles in length. There are 3 major intersections along this road which further hinder movement over it. In spite of the heavy interference in gaining access to the system, its service is rated as excellent by Fort Meade transportation officials.<sup>22</sup>

The formulae applied to information from Fort Meade is as follows:

$$\frac{9a}{10b} = 54c \text{ (minutes) , } 3x \times 3y = 9z \text{ (interference factor).}$$

#### T. Redstone Arsenal, Alabama

The Army's Missile Command is located at Redstone Arsenal. Many of this nation's achievements in rocketry were initiated here by Dr. Werner von Braun and his associates.

Redstone is in northern Alabama, just west of Huntsville. Interstate 65 is 25 miles further west. A 4-lane road connects Redstone to the system. Only 2 major interfering crossroads appear along this road, and traffic is of medium intensity. When queried about the rating she would give

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<sup>22</sup>Statement by Mr. Marlin Ramsey, Administrative Officer, Transportation Office, Fort Meade, personal interview, January 4, 1973.

Interstate System service to this installation, the Deputy Transportation Officer replied it was "good".<sup>23</sup>

From data collected from Redstone, the following factors appear:

$$\frac{25a}{20b} = 75c \text{ (minutes) , } 2x \times 2y = 4z \text{ (interference factor).}$$

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<sup>23</sup>Statement by Mrs. Sue Carter, Deputy Transportation Officer, Redstone Arsenal, personal interview, January 3, 1973.

## CHAPTER III

## DISCUSSION OF RESULTS OF INVESTIGATION

Generally, as a result of information from the several transportation officials, it can be said that the Interstate Highway System serves major Army installations well. There are a few exceptions to this, but none which would indicate service is completely unsatisfactory. Before analyzing the data gathered, a more detailed examination of the method of setting up and using the formulae outlined early in Chapter II is necessary.

The first formula deals with pure time and distance factors. For purposes of this formula, clear roads are assumed to exist with no interference or hindrance from other traffic. The only two variables are distance (a) from the on-installation convoy terminal to the nearest Interstate System entrance (information furnished by the respective installation interviewees), and speed (b) of one vehicle in a convoy. As Army doctrine indicates, the speed of a convoy using "good roads" will be 20 miles per hour; over "poor roads", 10 miles per hour.<sup>1</sup>

By dividing distance by speed, the time in hours and/or minutes (c) (assuming clear roads) is determined (i.e.,  $a/b = c$ ). For the 20 installations combined, the average

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<sup>1</sup>U. S. Department of the Army, FM55-35, Motor Transportation Operations and Motor Transport Units (Washington: Gov't Printing Office, 1965), p. 45.

travel time was found to be 1 hour and 45 minutes.

Pure distance, rate, and time measurements are not sufficient for providing a concise picture of the usefulness of the Interstate System. Other variables must be weighed. The second formula measures the interference which logically can be expected to impede movement of an Army convoy over the extent of the access road. Two separate questions put to the installation traffic officials which enabled calculation of the interference factor were:

1. Number of traffic intersections or crossroads which impede movement of a convoy (x)?
2. Category of overall traffic interference along the access road: light, medium, heavy (without regard to time of day, month, year--meant to reflect the average in the opinion of the official)? "Light" was assigned a value of 1; "medium", 2; and "heavy", 3 (y).

These two numbers were multiplied to arrive at the "interference factor" ( $x \times y = z$ ). The average for installations examined in this report was 12.05.

When ( $a/b = c$ ) and ( $x \times y = z$ ) are viewed separately, a meaningful analysis of the problem at hand cannot be made. It is necessary to look at them in concert. Thus each z unit was assigned a value equal to one minute to approximate its real value in time. The following formula was then used:  
 $c + z = T$  (total time to interstate).

Although the average travel time (T) is 1 hour and 57



minutes, it is misleading, for by eliminating the three most distant installations (Forts Ord, Sill, and Polk), the average is reduced to 58 minutes. Description of service by transportation officials at these three installations was: Ord--"adequate", Sill--"fair", and Polk--"satisfactory". Perhaps these opinions reflect an unwillingness to condemn the system; instead, the ratings are a polite way of saying that service could be better if the system were nearer to the respective installations. When comparing the ratings of these to those of the remaining seventeen, the three in question are the only ones which even approach derogatory comment. The only exception within the other seventeen is the remark of the Transportation Officer at Fort Bragg. This individual declined to rate service because of political implications. However, when looking at Bragg's travel time and interference, it can be concluded that it does not belong in the same category with the three now being discussed.

Even though Forts Ord, Sill, and Polk have the longest travel times, their interference factors are lower than the average (Ord = 10, Sill = 6, Polk = 4). Their rather remote locations account for the lack of interference.

Fort Hood is the most atypical of all installations with regard to interference. Thirty major intersections, with habitually heavy traffic cause this. An inspection of location of the access road at Fort Hood reveals why there is a high interference factor. The access road cuts through the busiest, most congested section of Killeen, Texas, a city of

about 45,000 population. The recent expansion of Fort Hood's mission and population by Department of the Army helps account for some of the heavy interference.

By eliminating Fort Hood's interference (90), the average for the other nineteen installations is 7.95. There are three others--Fort Bragg (20), Fort Benning (24), and Fort Monmouth (20), which exceed by a large amount the average interference factor.

At the opposite end of the continuum of ratings of the installations are seven which are given "outstanding" ratings by interviewees, and Fort Leonard Wood, which was rated "very good" by the Fort's Transportation Officer. All are within 20 minutes travel time of the system, and have interference factors which are below the overall average.

#### A. Conclusions

Three separate categories may be designated to describe the adequacy of service provided to major Army installations by the Interstate Highway System. These are:

1. Easily accessible
2. Moderately accessible
3. Marginally accessible.

The three categories and the installations within each are portrayed in Table II. The factors of c, z, T, and the installation official's ratings were used to delineate the categories. Where there was clearly a combination of factors which showed superior service, a rating of "easily accessible"

was given. The category at the opposite end of the continuum was designated as "marginally accessible". A definite break in degree of overall service between Forts Benning and Ord appears to provide the proper division between this and the next higher category, "moderately accessible".

Similar empirical observations led to the ordering of the installations within categories (Table II). The ordering follows the equation  $(c + z = T)$ , with the lowest number being one in order of effectiveness.

A factor considered critical to this study was cited in the section of this report entitled "Statement of Problem and Method of Approach". This factor was that point at which the "Army installation convoy terminal to entrance ramp distance" is determined to be too far to provide optimum service to major Army installations. It is concluded by the author that this distance should not exceed 26 miles if the installation is to be judged as having reasonable accessibility to the Interstate Highway System. Any installation located farther than this from an Interstate entrance does not, therefore, in the author's opinion, meet the spirit of the intent of the Federal legislation establishing the Interstate Highway System. This is in line with the rating system used as shown in Table II. All but three of the installations examined in this report meet this criterion. Forts Ord, Sill, and Polk, for which service is determined to be "marginally accessible", are the three outside the 26-mile limit.

Table II

Installation	C (hr:min)	Z	T (hr:min)	Interviewee Rating
EASILY ACCESSIBLE				
1. Lewis	:06	0	:06	Outstanding
2. Jackson	:12	1	:13	Outstanding
3. Riley	:12	2	:14	Outstanding
4. Sam Houston	:12	8	:20	Outstanding
5. Carson	:18	3	:21	Outstanding
6. Bliss	:12	10	:22	Outstanding
7. Wood	:18	4	:22	Very good
8. Aberdeen	:18	6	:24	Outstanding
MODERATELY ACCESSIBLE				
9. Gordon	:30	4	:34	Good
10. Knox	:45	8	:53	Good
11. Bragg	:36	20	:56	No comment
12. Dix	:51	8	:59	Good
13. Meade	:54	9	1:03	Excellent
14. Redstone	1:15	4	1:19	Good
15. Hood	:48	90	2:18	Good, but needs better access roads
16. Monmouth	2:40	20	3:00	Excellent
17. Benning	2:40	24	3:04	System access needs to be nearer
MARGINALLY ACCESSIBLE				
18. Ord	5:35	10	5:45	Adequate
19. Polk	7:00	4	7:04	Satisfactory
20. Sill	9:30	6	9:36	Fair

## B. Recommendations

Two general recommendations are considered appropriate by the author. The first has to do with future construction of roadways in the Interstate Highway System. The second concerns further study which should be initiated as a progression of this report.

As was noted earlier, the Interstate Highway System is due for completion by June 30, 1974.<sup>2</sup> Even though mileage was limited to 42,500 by Congress in 1968,<sup>3</sup> it cannot be said that additions will not be made. Many changes have occurred in the thirty-plus years the system has either been in planning, construction, or use. If consideration is given to expanding the system in the future, better service to Forts Ord, Sill, and Polk should be included. These three installations have, in the opinion of the author, only "marginally accessible" service. Improvements are recommended to draw these three into either of the two higher categories delineated by this report.

The scope of this study has limited to some degree the depth of investigation regarding the problem at hand. Only federal reports and records were examined. Time and space limitations prohibited study of individual state highway

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<sup>2</sup>U. S. Laws and Statutes, United States Code, 1964 Edition, Supplement IV (Washington: Gov't Printing Office, 1969), pp. 1591-1592.

<sup>3</sup>Ibid.

department documents. A study of the transactions among and between the states and the Federal government is thus recommended. This perhaps would give clearer indications of solutions to questions raised in this report.

## CHAPTER IV

## SUMMARY

Since the invention of the automobile, highway networks have taken on added importance in the transportation system of the United States. Paralleling highway needs of the civilian segment of this nation's society have been the highway needs of the nation's defense establishment. The Interstate Highway System serves part of the latter's requirements. The United States Army and its major installations in the contiguous states, as part of the national defense, has certain uses for a facility such as the Interstate Highway System.

Planning for the system started in 1938, when Congress directed the Bureau of Public Roads to conduct a feasibility study of a system of superhighways. Patterns for the system began to take shape during World War II.

This report attempts to determine the intent of Congress with regard to the system serving the needs of national defense. It was determined that little active consideration of military usefulness of the system was made by lawmakers. Much of the decision-making power concerning the system was delegated to the Secretary of Transportation (prior to 1967, the Secretary of Commerce).

The installations examined in this report are the twenty most populous (troop population) in the continental United States. Thus the study is narrowed. Instead of measuring the overall effectiveness of the system in serving

national defense, it concerns only these twenty installations. The problem, then, is how accessible the Interstate Highway System is to these installations. Ease of access is considered necessary by the Army because these roadways provide a rapid means of long distance road movement.

The primary means of approaching the problem was measuring and analyzing time and distance factors relating to travel between the system and Army installations. Input for this came from personal interviews with Army transportation officials at each of the installations. A critical factor upon which much of this study was to be based was that point at which "Army installation convoy terminal to entrance ramp distance" was determined to be too far to provide optimum service to these installations.

Separate time, distance, speed, and interference factors regarding travel between the system and the installations were quantified in order to utilize mathematical formulae which would provide a meaningful frame of reference concerning the question at hand. Each installation was studied individually to arrive at an ordering of adequacy of service.

Three separate categories were designated to describe service. These were:

1. Easily accessible
2. Moderately accessible
3. Marginally accessible.

Eight installations ranked in category 1, nine in 2, and three in 3.



It was concluded by the author that the ramp to installation distance should not exceed 26 miles if the installation is to be judged as having reasonable accessibility to the Interstate Highway System. Any installation located further than this from an entry ramp does not, therefore, in the author's opinion, meet the spirit of the intent of Federal legislation establishing the system.

Generally, as a result of this report, it can be said that the system serves major Army installations well. There are a few exceptions to this, as has been noted, but none which indicates service is unsatisfactory at any location. Since no precise instructions by Congress or Public Law exist relative to Interstate Highway System service provided to major Army installations, it was concluded that the federal agencies responsible for implementing Public Law did an adequate job of designating and constructing the system.

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THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE  
HIGHWAYS: ITS SERVICE TO MAJOR UNITED  
STATES ARMY INSTALLATIONS

by

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Since the invention of the automobile, highway networks have taken on added importance in the transportation system of the United States. Paralleling highway needs of the civilian segment of this nation's society have been the highway needs of the nation's defense establishment. The Interstate Highway System serves part of the latter's requirements. The United States Army and its major installations in the contiguous states, as part of the national defense, has certain uses for a facility such as the Interstate Highway System. However, no definitive set of rules exists to delineate adequacy of service which the system is to provide to the Army. Ideally, routes of the system should pass through each installation in order to provide optimum service. Because of other locational considerations, (i.e., civilian needs), this was not done. Therefore some installations are relatively distant from the system.

This report has analyzed the effectiveness of the system in providing accessibility to the twenty largest Army installations (determined by troop population). Data concerning locational relationships between the system and the installations were gathered from Army transportation officials. Time, distance, and traffic interference factors were measured and analyzed in order to determine the degree of service provided. As a result of this investigation, three categories of service were designated--"easily accessible", "moderately accessible", and "marginally accessible".

It was concluded that the distance referred to in the report as "Army installation convoy terminal to entrance ramp distance determined to be too far to provide optimum service" should not exceed 26 miles. This is the point at which the division between the ratings "moderately accessible" and "marginally accessible" was made. Service to three of the twenty installations was classed as "marginally accessible".

Since no precise instructions by Congress or Public Law exist relative to Interstate Highway service provided to major Army installations, it was concluded that the federal agencies responsible for implementing Public Law apparently did an adequate job of designating and constructing routes of the system.