A STORY OF HIGHWAY DEVELOPMENT IN NEBRASKA

By
George E. Koster

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BACKGROUND

"A Story of Highway Development in Nebraska" (Revised 1997) is an updated and expanded version of "A Story of Highway Development in Nebraska" (1986), the latter being published by the Department of Roads in December of that year. The text is a compilation of information taken from a myriad of sources and leans heavily on the author's judgement and experience. And, since the entire undertaking was accomplished on a part-time basis, footnotes were omitted for simplicity of publication. In instances where the author may have used brief passages written by another, without using quotation marks or giving that person proper credit, forgiveness is requested. The purpose of the text is not for personal acievement, literary merit, or financial gain. Rather, it is for purposes of history, education, and public information about the development of highways in Nebraska.

THE AUTHOR

George E. Koster, a fourth-generation Nebraskan and former Secretary to the State Highway Commission (1972-1975), is assigned to the Project Development Division at the Department of Roads headquarters in Lincoln. He is the author of the "Research Study on Corridor Preservation" (1973), "History of the Nebraska State Highway Commission" (1974, 1986, and 1992), "A Story of Highway Development in Nebraska" (1986), "A History of the Principal Executives of the State Highway Department" (1995), and "A Story of Highway Development in Nebraska" (Revised 1997).

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PREFACE

My father was a Registered Professional Engineer and building highways was his life. He worked hard, put in long hours, and for almost half his career, had no fringe benefits. Hired by the Department of Roads and Irrigation in 1933 at age 24, he was first covered by Social Security at age 42, received a 40-hour workweek at age 49, began participating in a state retirement plan at age 55, and died on duty at age 63. My father was proud of his profession, dedicated to his work, and loyal to the institution of which he was a part. His has been a tough act to follow.

Hopefully, the text will inform the reader about the evolution of Nebraska's highways and a bit of associated history. It is a story of change, of progress, but mainly of people. While I make no pretense to literary merit, I'm proud to have been given the assignment, on a part-time basis, to describe the development of Nebraska's highways from their modest beginning to the magnificent transportation network of the 1990's. Above all, I wish to thank Judy K. Kelly and her staff in the Word Processing Center of the Communication Division for their most excellent support. Thanks must also go to the many present and former employees who contributed so generously of their time and recollections. And finally, I wish to thank Miss Fay Gordon, formerly of Norfolk High School, and my mother for their instruction and insistence on a reasonable use of the English language.

But as my mind wanders back through the dim mists of time to the days that were, I encounter the shadowy images of countless beings. These are the highway workers of yesteryear, who through loyalty, dedication, and hard work, gave us a solid foundation for the highway system now enjoyed by today's mobile society. Therefore, it is with respect that I dedicate this book to those highway workers who have gone before, to that "undiscovered country from whose bourn no traveller returns."

George E. Koster
Lincoln, Nebraska
August 1997

THE STATE HIGHWAY DEPARTMENT

The 1895 Legislature created the State Board of Irrigation which first met on April 24 of that year. In 1911, the Legislature changed the board's name to the State Board of Irrigation, Highways, and Drainage. The 1919 Legislature changed the board's name to the Department of Public Works. In the same year, the registration of motor vehicles, which was begun by the Secretary of State in 1913, was transferred from that office to the Department of Public Works. The department was then composed of two bureaus and one headquarters division: the Bureau of Roads and Bridges; the Bureau of Irrigation, Water Power, and Drainage; and the Motor Vehicle Records Division.

While the department's field divisions varied from five to ten from 1919-25, they stabilized at eight in 1925 and were located as follows: Divisions 1 and 2 (Lincoln), Division 3 (Norfolk), Division 4 (Grand Island), Division 5 (Scottsbluff), Division 6 (McCook), Division 7 (North Platte), and Division 8 (Ainsworth). Although field Division 2 was responsible for 10 counties in the east-central (Omaha) area, its office was in Lincoln.

In 1933, the Legislature changed the department's name to the Department of Roads and Irrigation. The department was still composed of two bureaus: the Bureau of Roads and Bridges and the Bureau of Irrigation, Water Power, and Drainage. The Bureau of Roads and Bridges was subdivided into four headquarters divisions: Road Construction and Maintenance, Maps and Plans, Clerical and Records, and Motor Vehicle Registration. Also in 1933, the field Division 5 office was transferred from Scottsbluff to Bridgeport.

The 1937 Legislature created within the department, the Division of Highway Safety and Patrol, to be known as the Nebraska Safety Patrol. In 1942, the department was composed of the Bureau of Highways; Bureau of Irrigation, Water Power, and Drainage; Motor Vehicle Division; and the Safety Patrol. In 1954, the responsibility for operation of the Scale Section and 12 weighing stations was transferred from the Safety Patrol to the Bureau of Highways.

The 1957 Legislature divided the Department of Roads and Irrigation into three separate state agencies: the Department of Roads, Department of Motor Vehicles, and Department of Water Resources. The Department of Roads was composed of the Bureau of Highways (four headquarters divisions, eight headquarters sections, eight field divisions) and the Safety Patrol. In 1967, the Legislature changed the name of the Nebraska Safety Patrol to the Nebraska State Patrol.

In 1968, the field Division 2 office was transferred from Lincoln to Omaha. Since 1969, field divisions have been called districts. Also in that year, District 6 (McCook) and District 8 (Ainsworth) became sub-districts of District 7 (North Platte) and District 3 (Norfolk), respectively. At the same time, District 7 (North Platte) was renumbered and became District 6. The former McCook district was reinstated in 1971 and became District 7. In 1977, the former Ainsworth district was reinstated and once again became District 8.

The 1981 Legislature made the Nebraska State Patrol a separate state agency and the 1985 Legislature reassigned the Carrier Enforcement Division from the Department of Roads to the patrol. In 1997, the Department of Roads has 17 headquarters divisions and eight field districts, with assistance from the State Highway Commission and Office of Legal Counsel (Attorney General). The eight field districts are: District 1 (Lincoln), District 2 (Omaha), District 3 (Norfolk), District 4 (Grand Island), District 5 (Bridgeport), District 6 (North Platte), District 7 (McCook), and District 8 (Ainsworth).

STATE ENGINEERS

		From		To	Years & Months Served
1.	Robert B. Howell	5/1895	-	4/1896	01-00
2.	William R. Akers	4/1896	-	4/1897	01-00
3.	J. Morris Wilson	4/1897	-	4/1900	03-00
4.	Charles B. Channel	4/1900	-	4/1901	01-00
5.	Adna Dobson	4/1901	-	4/1909	08-00
6.	Edward C. Simmons	4/1909	-	4/1911	02-00
7.	Donald D. Price	4/1911	-	3/1915	04-00
8.	George E. Johnson	3/1915	-	3/1923	08-00
9.	Robert L. Cochran	3/1923	-	7/1934	11-04
10.	Arthur T. Lobdell	7/1934	-	1/1935	00-06
11.	Albert C. Tilley	1/1935	-	1/1941	06-00
12.	Wardner G. Scott	1/1941	-	1/1948	07-00
13.	Fred H. Klietsch	2/1948	-	8/1951	03-06
14.	Harold L. Aitken	8/1951	-	4/1953	01-08
15.	Lorenz N. Ress	4/1953	-	1/1959	05-10
16.	Robert L. Cochran	1/1959	-	12/1959	01-00
17.	John W. Hossack	1/1960	-	11/1968	08-10
18.	Marvin L. Nuernberger	11/1968	-	1/1971	02-02
19.	Thomas D. Doyle	1/1971	-	6/1977	06-05
20.	David O. Coolidge	6/1977	-	1/1983	05-07
21.	Louis E. Lamberty	2/1983	-	2/1986	03-00
22.	Raymond H. Hogrefe	3/1986	-	10/1987	01-08
23.	Gerold C. Strobel	10/1987	-	7/1991	03-09
24.	W. Wayne Teten	7/1991	-	1/1992	00-06
25.	Allan L. Abbott	1/1992	-		

Note: From 1895-1919, the dates were confirmed from the minutes of the meetings of the State Board of Irrigation (1895-1911) and the State Board of Irrigation, Highways, and Drainage (1911-1919). Said minutes are located at the Department of Water Resources. From 1920-1997, the dates were confirmed from personnel records at the Department of Roads. Messrs. Lobdell (1934-35) and Teten (1991-92) served as the acting State Engineer.

CHAPTER 1

THE EARLY DAYS

The invention of the wheel ranks as one of the most important events in the history of the world. There was nothing like it in nature to copy and it had to be created whole, in a giant leap of the imagination. When this was finally achieved by some unknown genius over 5,000 years ago, it decisively and permanently altered the course of human progress. With carts, ancient farmers could transport their surplus crops to the growing cities so that other men were free to turn to nonagricultural pursuits. The war chariots of Assyria and Egypt helped make their armies and kingdoms into the mightiest of their time. Likewise, the prairie schooner, stagecoach, and railroad led America's dynamic westward movement in the 1800's. Without the wheel, today's civilization would be quite impossible.

In the early 1900's, Henry Bourne Joy, president of the Packard Motor Car Company and first president of the Lincoln Highway Association, made a motor trip west across America to promote better roads. Arriving in Omaha, he sought directions from the local Packard dealer and was told that there was no road going directly west. Mr. Joy insisted that there must be a way. The dealer led him to the western edge of the city, took down a wire fence, pointed him westward, and informed him that he would encounter several more fences on his journey. Mr. Joy proceeded as instructed, taking down fence after fence until, as he recalled:

> "A little farther and there were no fences, no fields, nothing but two ruts across the prairie."

It is indeed difficult for a modern traveller to reflect back a hundred years to a society which was devoid of automobiles, trucks, buses, and even roads as we know them today. The following story, popular in its day, dramatizes the way things were and was told by Louis W. Hurst, Lincoln Supply Base Superintendent, on the occasion of his 40th Anniversary with the department in 1968:

> "Years ago, a man, woman, and three little children came to Lincoln in an old wooden wagon pulled by two plow horses. The man drove the rig to a local church, stopped, and they all went in. They were greeted by the Rector who asked, 'How may I help you?' The man replied, 'We'd like to get married.' The Rector stared over his spectacles at the three little children and asked, 'Aren't you a little late my son?' The man said, 'Yes Father, we are a little late, but the roads have been pretty bad.'"

Such was the status of Nebraska's roads before World War I. Throughout America, the situation was much the same. Prior to 1914, the nation's interstate and to a great extent, intercity transportation needs, were served primarily by railroads and steamboats. At the local level, mobility for individuals was mostly by horse and buggy.

The development and maintenance of roads was a local matter, certainly not a state or national concern until the turn of the 20th Century. In some areas, the concern was greater than others. For many years, farmers had experienced hardships in getting their crops to market and transportation problems increased the risk of farming. During rainy seasons, dirt roads and trails became quagmires, making passage impossible. Crops rotted or were stored at high cost. Once the roads were passable, there was often a glut on the market as everyone rushed their crops to the railhead, driving prices down. Better roads, however, had to be financed and many farmers feared that additional taxes would prove an undue burden, further increasing the risk of farm failures. A national commitment to the systematic development and maintenance of a network of highways would have to await the emergence of the automobile as the focus of the mass-production, mass-consumption society of the 1920's.

But, of course, highway history began long before that. In England during the feudal times of the Middle Ages, the care of roads was based upon the "trinoda neccessitas," the threefold required service of the tenant: (1) repelling an enemy, (2) constructing fortifications, and (3) repairing roads and bridges. With the decline of feudalism, the foregoing requirement developed into the common law whereby the repair of highways became the responsibility of the local parishes. Compulsory labor upon the highways was legalized in the year 1555 when the "Statute for Mending of Highways" specified that:

> "Constables and Churchwardens of every parish shall yearly, upon the Tuesday or Wednesday in Easter Week, call together a number of parishioners, and then elect and choose two honest persons of the parish to be surveyors and orderers for one year of the works for amendment of the highways in their parish."

The statute labor system was introduced to America by the first settlers and became embedded in the laws of the British Colonies and later the United States, where they survived until the beginning of the Twentieth Century. Known as "working out the road tax," the statute labor system was supplemented by other ways and means for improving roads such as donations by public-spirited citizens, private subscriptions, assessments upon adjacent property, bridge tolls, fines for failure to perform statute labor, public lotteries, public land sales, military funds, taxes collected by the various levels of government, etc. The lack of legislation authorizing local taxes specifically for roads, combined with the inequities of the statute labor system, were largely responsible for the poor condition of the roads in the colonies and early republic.

The oldest road in what is now the United States was El Camino Real (The Royal Road). It ran from Santa Fe, New Mexico, via El Paso, Texas, to Chihuahua, Mexico along present-day Interstate 25 and Interstate 10. Spaniards first traveled this road in 1581.

The first highway legislation in the British Colonies of North America was passed by the Virginia Legislature in September 1632. It provided that:

> "HIGHWAYES shall be layd out in such convenient places as are requisite accordinge as the Governor and Counsell or the commissioners for the monthlie corts shall appoint or according as the parishioners of every parish shall agree."

In 1657, this basic highway law was supplemented by the Virginia Legislature and provided:

> "That surveyors of highways and maintenance for bridges be yearly kept and appointed in each countie court respectively, and that all gennerall wayes from county to county and all churchwaies to be laied out and cleered yearly as each county court shall think fitt, needful, and convenient, respect being had to the course used in England to that end."

In 1806, Congress provided for the planning and construction of an east-west route from Cumberland, Maryland to Wheeling, West Virginia (then Virginia). This important road, which was later extended westward, was destined to be known as the National Pike or Cumberland Road. From 1806 to 1838, Congress passed 34 appropriation acts for this purpose, totaling about $7 million. It was the first federal construction of an interstate or national road in American history and was located along the route presently known as US-40.

As the newly built railroads appeared on the scene as the solution for long-distance traffic, there was a general decline in the construction of main highways during the remainder of the century. During this period, road construction was confined mainly to local roads of a "horse and buggy" variety under the jurisdiction of local governments. The medieval system of "working out the road tax" was the principal means of local road support. Congress, however, enacted literally hundreds of laws appropriating road funds for military and other purposes, including roads providing access to new settlements. The aggregate amount appropriated by Congress up to 1893 for the construction of roads and bridges was reportedly in excess of $17 million.

Any discussion of historic roads or their design should include the Via Appia, or "Appian Way," which was the first and most famous of the 29 great military roads radiating from Rome. Begun in 312 B.C. by the censor Appius Claudius Caecus, it originally ran to Capua, 132 miles to the south-southeast. And, by about 244 B.C., it had been extended another 230 miles southeastward to the port of Brundisium in the "heel" of Italy on the Adriatic Sea. The Via Appia averaged 35 feet in width, 3-5 feet in thickness, and its surface was slightly convex to facilitate good drainage. It consisted of a 15.5-foot two-way roadway, flanked by curbs 2.0 feet wide by 18.0 inches high, and paralleled by 7.75-foot one-way side roads. The foundation was of heavy stone blocks cemented together with lime mortar. Over these were laid polygonal blocks of lava that were smoothly and expertly fitted together. The lava blocks formed a good traveling surface which had extraordinary durability over the centuries. The massive solidity of this thick Roman cross-section was standard practice for more than 2,000 years until superseded by McAdam's light wearing-surface in the 19th Century.

John Louden McAdam (1756-1836) was a Scotsman who invented the "macadam" road surface. He maintained that roads should be raised above the adjacent ground for good drainage and covered with a surface of small, broken stones. His design called for a drained and compacted subgrade to support the load. Eighteen feet in width, the center of the road was constructed three inches higher than the edges. On that, he required stone to serve as a wearing surface and roof to keep water out of the foundation. That surface was about 10 inches thick and consisted of clean, broken stone without clay, earth, or other organic material that might hold water or be affected by frost. Each of the stone fragments was to weigh not more than six ounces and had to pass through a two-inch ring. The layers of stone were laid on top of another, each compacted by the traffic rolling over it. As weak spots

appeared, they were repaired before the next layer was added. It was one of the best systems of rolling and compaction ever devised. Mr. McAdam reached the pinnacle of his fame in 1827 when he was appointed Surveyor-General of Metropolitan Roads in Great Britain.

In 1824, a process for making Portland cement was patented by bricklayer Joseph Aspdin in England. He chose the name because of a resemblance of the cement (when set) to Portland stone, a limestone quarried on the Isle of Portland, Dorset, England. By having conferred the name, Mr. Aspdin is commonly considered to be the inventor of what has become the modern Portland cement.

Asphalt is a material with a long history. The ancient Egyptians preserved bodies of the dead by wrapping them in cloth impregnated with asphalt. It was used in the Tower of Babel and as waterproofing for the basket in which the infant Moses was found in the 13th Century B.C. (Exodus 2:3). The Babylonians also used it with brick to pave a road 600 years before the birth of Jesus Christ. And in the 10th Century A.D., the streets of Cordova, Spain were treated with asphalt during the Moorish occupation.

A native of Vermont, Amzi Lorenzo Barber graduated from Ohio's Oberlin College in 1867 and moved to the nation's capitol in that year to teach at Howard University. Extensive street improvements planned for the District of Columbia caused him to study asphalt as a paving material. In 1877, Mr. Barber obtained a franchise to procure asphalt from the great pitch lake on the Island of Trinidad, a former British possession about the size of Delaware located off the coast of Venezuela. A year later, his paving company was converting the streets of Washington, D.C. into the nation's smoothest. In 1884, he had a nationwide monopoly of the Trinidad deposit and by 1888, his Trinidad Asphalt Company controlled all leases on the deposit. Thus, Mr. Barber became known as the "Asphalt King" because he controlled the world's chief source of asphalt for some 20 years.

Henry Ford (1863-1947), the industrialist who became within his lifetime the one person most universally identified as the creator of modern mass production, was born on a farm near Dearborn, Michigan during the Civil War. The principal manufacturing innovation credited directly to Mr. Ford is the assembly-line method of automobile production, which he first employed in 1913. His industrial philosophy was deceptively simple: reduce the price of

the product, increase the volume of sales, improve production efficiency, increase output to sell at still lower prices, and so repeat the cycle indefinitely.

By the 1880's, the demands of various interest groups, however, would force the federal government to reexamine its role in road development and prove significant to the ultimate development of a national highway system. The first such organization, the Good Roads Movement, came from bicyclists. Using the motto, "Lifting Our People Out of the Mud," they organized the League of American Wheelmen in 1880 and lobbied state and federal officials for better roads. The bicyclists were supported in their efforts by the National Grange, the Populists, and the Farmer's Alliance. Even railroad interests supported this movement, recognizing the advantage to be gained if farmers could more easily move their crops to the rail centers.

In response to the Good Roads Movement and the appropriate congressional legislation, U.S. Secretary of Agriculture J. Sterling Morton (1832-1902) of Nebraska City, Nebraska instituted the Office of Road Inquiry within the Department of Agriculture on October 3, 1893. With an annual appropriation of $10,000, this office undertook an investigation of the condition of roads throughout the nation. It represented a departure from usual federal policy. In 1896, however, the annual appropriation dropped to $8,000 and remained at that level for four years.

The automobile, developed in the 1890's, created an even greater demand for better roads. While affordable only to the rich, fascination for this horseless, mechanical contraption was clearly widespread. In 1895, there were four experimental automobiles in the United States. In 1896, Henry Ford built his first automobile and, in 1903, established the Ford Motor Company at Detroit. Mr. Ford's ambition was to produce an automobile at a price within the reach of millions. By 1904, there were 54,590 cars and 700 trucks in actual use. In 1910, the number of automobiles was estimated at a half-million and, by 1920, there would be over nine million registered vehicles in the U.S.

Technical progress, however, was not limited to automobiles. On December 17, 1903 near Kitty Hawk, North Carolina, Orville Wright (1871-1948) made the first successful powered, sustained, and controlled flight in a fixed-wing aircraft. It was one of the great technical achievements of all time and one that would soon alter the course of human events.

By 1904, the increase in motorized transportation led the federal government to commission a census of the nation's roads. The census showed that there were slightly over two million miles of roads in the nation, most of which were plain dirt. But the census also revealed that the nation had begun to experiment with other surfaces such as gravel, shell, sand, sawdust, burned clay, plank, and macadam. In 1905, there was not a single mile of paved rural road in the entire United States. It would be another four years, however, before the first mile of rural concrete pavement was completed on Woodward Avenue in Wayne County, Michigan.

Between 1903 and 1916, the federal government wrestled with its role in highway construction. Numerous bills were introduced in Congress (over 60 in 1912 alone) calling for federal funds for road construction. Pressure came from various quarters and as more and more farmers purchased vehicles to transport goods to market, they continued to press for better farm-to-market roads. The Good Roads Movement expanded into 50 large associations and over 500 smaller ones. Automotive manufacturers recognized that better roads were essential to the industry. The poor condition of America's highways was made even more apparent as Rural Free Delivery (RFD) began on October 1, 1896. By 1900, RFD was nationwide and the Post Office began replacing the horse and buggy with motorized delivery vehicles. In 1912, Congress passed the Post Office Appropriation Act which allotted $500,000 for rural road construction to facilitate mail delivery. The Act was designed for local and state governments who were willing to provide two-thirds funding for road projects. Seventeen states took advantage of this measure which resulted in the construction or improvement of 425 miles of roads.

The Ford Motor Company introduced the Model T in 1908, claiming that it was "a car that every man earning a good salary can afford." The initial price was $850. With mass production, the price of a Model T was reduced to $600 in 1912, $450 in 1918, and its all-time low of $290 in 1924. Nicknamed the "Tin Lizzie," the Model T was high-slung, gauche, dependable, almost indestructible, and quite unforgettable. This car changed the face of the land, pulled America out of the mud, and transformed a people. By 1930, half-grown boys had more mechanical know-how than most skilled mechanics of 1910. In 1910, mechanical skill meant knowledge of how to "use" machines. By 1930, it meant knowledge of how to "make" them.

In 1912, real estate developer/promoter Carl Graham Fisher (1874-1939), who built the 2.5-mile, oval Indianapolis Speedway in 1909, became interested in a project to build a transcontinental highway. Mr. Fisher traveled throughout the nation promoting the idea and raising funds for the construction of a highway, which was named the Lincoln Memorial Highway in honor of President Abraham Lincoln, to run from Jersey City, New Jersey through Omaha, Nebraska to San Francisco, California. Mr. Fisher's motivation stemmed from his belief that too little was being done by state and local governments and too often there was a suspicion of mismanagement or corruption on the part of politicians and contractors. "The highways of America," Mr. Fisher said, "are built chiefly of politics, whereas the proper material is crushed rock or concrete." He was supported in his efforts by the automotive industry, states, and private citizens. Thus, the Lincoln Highway Association was formed in Detroit on July 1, 1913 and the Lincoln Memorial Highway was officially dedicated as such on October 31 of that year. Mr. Fisher continued to be a major force behind the project, publishing periodic reports on the condition of the nation's highways while encouraging people to stay at home less and travel more. His slogan, "See America First," underscored his promotion of American tourism which, in turn, would create a greater demand for continued highway development. In a 1914 publication of the Lincoln Highway Association, entitled "Following the Path of Progress," Mr. Fisher left a great deal unsaid in describing highway conditions west of Omaha:

> "The tourist must be prepared to put up with a few inconveniences. At no point is the distance between ranches or towns greater than 80 miles or so. No real hardships nor dangers which would make the trip disagreeable to women will be encountered."

The charter meeting of the American Association of State Highway Officials (AASHO) was held at the Raleigh Hotel in Washington, D.C. on December 12, 1914. Attending were 19 persons representing 16 states and the federal Office of Public Roads. The purpose of this first meeting was twofold: (1) to organize an American Association of State Highway Officials, and (2) to draft a federal-aid road bill. The latter was the associations first substantial contribution to the nation's highways. The bill was founded on the principle of cooperation between the 48 states and the federal government, as equal partners, in the development and improvement of the nation's highways in a comprehensive manner and pursuant to a well-conceived plan.

The 1916 Federal-Aid Road Act, signed by President Woodrow Wilson on July 11, was a landmark in the debate over federal-state responsibilities for highway construction and

maintenance. This legislation (H.R. 7617), 90 percent of which had reportedly been drafted by AASHO, was introduced in the House of Representatives on June 6, 1916. It provided federal financial support for highway development and, at the same time, established the separate responsibility of the states for sharing the cost of construction and assuming the responsibility for maintaining highways financed in this manner. The Act allowed the federal government to finance up to 50 percent of the cost of construction, not to exceed $10,000 per mile (exclusive of bridges of more than 20 feet clear span), with the state absorbing the remaining costs. It also required that each state establish a state highway department for the purposes of maintenance and administering the federal funds. The state would be the smallest unit of government with which the federal government would transact business. Under this act, Congress appropriated $75 million to be dispersed over a five-year period. The funds were managed by the Secretary of Agriculture and were to be apportioned to the states on the basis of population, land area, and miles of rural postal routes.

The early leaders of AASHO are credited, almost single-handedly, with preserving the partnership concept between the state highway departments and the federal government. After approval of the 1916 Federal-Aid Road Act, which defined the partnership principle, a movement developed for a limited mileage system of highly improved highways to be designated, constructed, maintained, operated, and owned by the federal government. Such legislation was introduced for congressional consideration. Some backers of the movement were also active in the infant AASHO organization and at the 1918 AASHO Annual Meeting in Chicago, the battle of partnership versus national ownership came to a showdown. The voting ended in a tie and a decision was delayed.

A year later, officials of the Kansas Highway Department took active leadership in an attempt to enlist support for the partnership concept. Representatives from Kansas and six neighboring state highway departments met in Kansas City and prepared a resolution seeking support from other departments. Later, at the 1919 AASHO Annual Meeting in Louisville, exactly one-half of the member states represented had signed the petition. Again, a stalemate appeared inevitable. By explaining, cajoling, and pleading, the supporters of the petition induced the representatives of 12 other states to join the movement by the fourth day of the convention. A resolution, adopted by this convention and confirmed decisively a year later, assured AASHO support for the partnership principle. AASHO then led the successful fight against a federally-owned national system of highways and these principles have prevailed since that time.

The 1916 Federal-Aid Road Act was the impetus for most states, including Nebraska, to assume greater leadership in the development of roads. To a large extent, many of the issues with which the federal government had grappled were also reflected in the states. In Nebraska, these issues predate its statehood. On February 17, 1855, Congress appropriated funds for the construction of a military road from Omaha west to Fort Kearny in the Nebraska Territory. The first Territorial Legislature in Nebraska also recognized the need for developing roads to connect settlements within the territory and passed several measures dealing with survey procedures and road specifications. However, it was generally assumed that the construction and cost of such projects should be the responsibility of the counties affected. This responsibility was spelled out in the first county road law passed on January 26, 1856, which placed the basic authority for constructing territorial roads with the county commissioners, who could levy taxes and appropriate labor to construct and maintain these roads:

> "The opening, making, and keeping in repair of all territorial roads, shall be under the jurisdiction of the board of county commissioners of the county in which the same may be situated. All public roads shall be surveyed, opened, made passable, and kept in repair, forty feet wide; and all bridges on any public road shall be at least sixteen feet wide, with a good and sufficient railing on each side, three feet high, the whole length of the bridge. To provide a fund for opening, making, and keeping roads in repair, there shall be laid upon each able-bodied male citizen within any organized county, between the ages of twenty-one and sixty years, a poll-tax of two days' labor to be expended upon the public roads."

A January 1860 amendment to the Nebraska Territory's county road law provided that four rods (66 feet) was the legal width of a county road.

In September 1860, the first telegraph line in the Nebraska Territory was completed between Omaha and Brownville. That same year also saw the beginning of the Overland Stage Service and the Pony Express.

Also in 1860, the Nebraska City business community and Otoe County Commissioners undertook a project to build a new road 190 miles westward from Nebraska City to Fort Kearny. It was later referred to as the Steam Wagon Road because of the 1862 attempt of Major Joseph R. Brown of New Ulm, Minnesota, an early fur trader and businessman, to use it for his steam-powered tractor which pulled a string of freight cars. The wagon itself was a version of the huge steam-powered tractors that later became fairly

common on the Great Plains. Built in New York by John Reed, the 20-ton, $9,000 steam engine arrived at Nebraska City aboard the steamboat "West Wind" on July 12, 1862. The huge red machine, with 12-foot drive wheels at the rear and 6-foot steering wheels in front, was the first self-propelled road vehicle to operate west of the Mississippi River. On its maiden voyage to Denver, this pioneer motor vehicle, manned by a crew of three, broke down about seven miles west of Nebraska City. Major Brown put the crew up in a local hotel and wired New York for replacement parts, only to learn that the foundry had been nationalized by the federal government for war production and that parts would be unavailable. Thus, the steam wagon experiment was abandoned for lack of replacement parts but the Steam Wagon Road remained a part of the Denver Trail and was one of the most traveled roads in the West. The project represented an early and successful effort of local government in road construction.

The first rail on the Union Pacific line in the Nebraska Territory was laid at Omaha in July 1865 and the first train service was offered early in 1866.

The Nebraska Legislature recognized the need for public roads again in 1879 when a law was passed providing that all section lines become roads. This law granted counties the authority to build and maintain these section line roads and authorized a tax levy of three mills to finance the projects. The state was taking the leadership in recognizing the need for roads, but not in their construction. This meant that road construction and maintenance would remain largely a local matter, and because of local taxation, interest in better roads would rarely extend beyond township lines. Generally, the men of the community would opt to do road construction work to pay off their tax levy, but showed little interest in additional taxation to extend the road or in volunteering for additional work of that nature.

In 1890, there were almost 63 million people in the U.S. and two-thirds lived in the rural areas. At that time, Nebraska's population was 1,062,656.

As more and more automobiles appeared in Nebraska, concern for the condition of roads would increase. By 1904, when the federal government commissioned its Census of Roads, Nebraska had 79,462 miles, most of which were section line roads. There was growing concern over the condition of these roads and also for the lack of or poor condition of the bridges within the state. In an effort to improve the quality of the bridges, the 1905 Legislature required the State Board of Irrigation to supply bridge plans, for bridges costing

over $200, to counties that requested them. This law was a major step toward greater state involvement in road development by centralizing one aspect of road construction under an existing state agency.

The 1895 Legislature created the State Board of Irrigation on March 26 of that year by passing House Roll No. 443 with the emergency clause. Governor Silas A. Holcomb signed the bill into law on April 4. The basic duties of the board were to oversee and regulate irrigation practices in an effort to manage and conserve the water resources of the state while maintaining the integrity of affected rivers and waterways. The complex, technical nature of these functions required the involvement of engineers and other specialists. Thus, the additional responsibilities for bridge plans and specifications was a logical extension of the work of this agency. Less than 19 years after Lieutenant Colonel George Armstrong Custer and his men rode to death and eternal fame at the Battle of the Little Big Horn in Montana, the board's first meeting was held on April 24, 1895. The board consisted of Governor Holcomb; Arthur S. Churchill, Attorney General; and Henry C. Russell, Commissioner of Public Lands and Buildings. At its May 10 meeting, the board elected a Secretary, Robert B. Howell, who the law required to be a "hydraulic engineer with theoretical knowledge, practical skill, and experience." At its meeting on May 16, the board resolved "that the official title of the Secretary ... shall be State Engineer and Secretary of the State Board of Irrigation."

Robert Beecher Howell was born at Adrian, Michigan on January 21, 1864. He entered the United States Naval Academy on September 21, 1881, graduated on June 5, 1885, and moved to Omaha in 1888. At age 31, Mr. Howell became Nebraska's first State Engineer on May 10, 1895 and served until April 2, 1896. He served as a Naval lieutenant during the Spanish-American War and was discharged on December 2, 1898. He was elected to the State Senate in 1902. Mr. Howell was appointed to the Board of Directors of the Metropolitan Utilities District (MUD) at Omaha and elected to that board in 1904, 1910, 1916, and 1922. He was appointed Omaha Water Commissioner in 1912 and served as the MUD General Manager from 1913-23. A Republican, Mr. Howell was elected to the U.S. Senate in 1922, re-elected in 1928, and died on March 11, 1933 at Walter Reed Hospital in Washington, D.C. He was married to the former Alice Chase Cullingham of Omaha.

In his "History of Irrigation in Dawson County," H. O. Smith of Lexington describes the 1894-95 construction of a large ditch by the Farmers and Merchants Irrigation Company. In

this November 1896 document, the value of good engineering was superbly recognized and well stated:

> "There is one mistake common to enterprises of this kind that this company was shrewd enough to avoid, the mistake of thinking that money could be saved in engineering. From the start, a thoroughly competent engineer was employed and kept on the work till it was completed, and to this fact is the success of the enterprise largely attributable. Mistakes in engineering are always costly and frequently irreparable. A good engineer knows what he is worth and will not work cheap. A cheap man guesses at his value, and guesses at his work, too, and the best guessers cannot guess right all the time. A company that puts a costly enterprise in the hands of a guesser doesn't have to guess at the result; it is an assured failure."

The State Board of Irrigation thus became the agency through which the state would address, for the time being, the issues of roads and motor vehicle transportation. To this extent, it was the state's first "Department of Roads." In addition to its involvement with bridge planning, the board sought legislation for a motor vehicle registration fee, which was passed by the Legislature in 1905. Each automobile was to be registered with the Secretary of State at a cost of $1.00. Other legislation passed during the 1905 session involved: (1) speed limits and safety considerations, (2) motor vehicle operation near horses or other draft animals, (3) brakes, signals, lights, and (4) penalties for violation of the foregoing. According to one story:

> "A gentlemen traveling across Nebraska in 1903 with his bulldog named Bud, so startled a farmer that the poor fellow leaped from his haywagon and hid underneath. The sight of both driver and dog wearing goggles in an open-top vehicle speeding across the plains must have been a frightening apparition."

However, the automobile was not destined to remain a rare sight. From 1902, when the first automobile reportedly rolled down the streets of Lincoln, until 1906, the number of automobiles in Nebraska would increase by over one thousand. In 1906 alone, 1,087 automobiles were registered with the Secretary of State. Two years later, the number would be quadrupled. This dramatic increase in the number of motor vehicles represented statewide enthusiasm for automotive travel as farmers and city-dwellers alike recognized the advantages of "horseless buggies." In 1914, the production of motor vehicles in the United States exceeded the output of wagons and carriages for the first time. As the number of automobiles and trucks continued to increase, so did the demand for better roads.

By 1910, motor vehicle registrations in Nebraska had risen to 11,339 and the Legislature was compelled to respond because the automobile was obviously here to stay.

Recognition of this was reflected in 1911 legislation which changed the name of the State Board of Irrigation to the State Board of Irrigation, Highways, and Drainage. This legislation provided that the board "shall elect a Secretary who shall be a civil engineer of general theoretical knowledge, practical skill, and experience, who shall be known as the State Engineer." Registration fees were raised to $2.00 a year, the income derived from this source to be allotted to the county road funds. In addition, the State-Aid Bridge Act was established, which required that the state and county act jointly in the letting of bridge contracts with the state paying half of the construction costs. Anticipating larger and heavier vehicles, the law required all new state-aid bridges to be constructed to support loads of not less than 20 tons and over streams at least 175 feet in width. To finance this legislation, a levy of one-fifth mill per annum on each dollar was assessed. By 1912, $175,808 had been raised for the State-Aid Bridge Fund. By becoming a more active participant in bridge building, the Board of Irrigation, Highways, and Drainage hoped to promote higher quality and thus, safer bridges.

A summary of Nebraska's automobile laws, as published in the 1913 Official Road Book of the Nebraska State Automobile Association, showed the following:

> "Register with the Secretary of State in Lincoln; fee, $2.00 per year. No provision is made for individual operating licenses. Owner must provide his own tags. Non-residents are exempt if they have their own state tags. Speed limits: 10 miles an hour in business section, 15 miles in residence district, 20 miles elsewhere. Lights: one or more white lights in front and a red light in the rear."

One of the conditions then commonplace, which now seems preposterous, was the total lack of road markings such as mileage markers, direction signs, and identification numbers. Carl G. Fisher dramatized that lack with a story from his own experience in 1913:

> "Three of us drove out nine miles from Indianapolis and were overtaken by darkness before we could return. It began to rain and we came to a road which forked three ways. We couldn't remember which way we had come and could see no lights from the city. We also couldn't read the sign posted at the fork. One of us would have to climb the pole to read the sign. We matched to see who would climb and I lost. I was halfway up the pole when I remembered that my matches were inside my coat and I couldn't reach them. So down I had to come, dig out the matches, put them into my hat, and climb again. I got to the sign, scratched a match, and before the wind and rain put it out was able to read: CHEW BATTLE AXE CUT PLUG."

In 1914, State Engineer Donald D. Price reported that Nebraska had three major highways: (1) the Meridian Highway, which paralleled the Sixth Principal Meridian from

Winnipeg, Canada to the Gulf of Mexico, following the present-day path of US-81, (2) the Lincoln Highway, which followed the path of present-day US-30 from Omaha to Fremont, Columbus, Grand island, Kearney, North Platte, Ogallala, and Sidney, and (3) the Omaha-Lincoln-Denver Highway, referred to as the O.L.D., which passed through Omaha, Lincoln, Hastings, and McCook, to Denver on the path of present-day US-6 and 34. These highways were described as being in fairly good shape although in many places, particularly in the West, they deteriorated into deeply-rutted trails. Overall improvement in road conditions throughout Nebraska was noted as county boards extended their road systems, often coordinating their work with Good Roads Associations and Commercial Clubs. While recommending a more vigorous role for the state in road development and the creation of state highways, Mr. Price noted the increased interest and initiative on the part of counties and individuals in building and maintaining roads. He recognized that a coordinated state highway system would inevitably require greater centralized authority and funding.

The 1915 Legislature passed a law which provided that the Secretary to the State Board of Irrigation, Highways, and Drainage "shall be a civil engineer and practical road builder, and shall ... be known as the State Highway Engineer." This legislation also provided that the "State Highway Engineer shall make, in cooperation with the engineering department of the Nebraska State University, tests of materials for road construction and ... shall issue bulletins showing compressions and tensile strength of such materials."

The state found itself moving gradually toward a more central role and ventured further into the area of highway construction when the 1915 Legislature appropriated $35,000 as the state's 50 percent share of a project to pave the roads on the south and east side of the State Agricultural School in Lincoln. This is the first record of state-supervised road construction in Nebraska. At his discretion, Governor John H. Morehead decided to use convict labor on the project and Assistant State Engineer W. D. J. Steckelberg was assigned to supervise the construction. Six inmates from the State Penitentiary began work on August 27, 1915 and the entire project, from grading to brick work, was built by hand and completed at 9:00 a.m. on Thanksgiving Day, November 25, 1915. State Engineer George E. Johnson had the following to say about the last two days of construction:

> "On the afternoon of November 24th, the last bricks were laid and the pitch gang, with two heating kettles, figured that they could finish the remainder by working a couple of hours overtime in the evening. Several newspaper reporters who came out to see the finish were told by the superintendent that the street would be opened to traffic the next morning. As luck would have it, the last reporter had hardly disappeared

> when one of the tar kettles sprung a leak and was rendered useless. This meant that the road could not be opened for another day at least. After debating among themselves, the men of the pitch gang, convicts if you will, volunteered to work all night in order to keep the word of the superintendent. This they did, cheerfully, faithfully, and for twenty-six hours continuously without sleep or rest. Consequently, the 25th of November was, after all, a day of thanksgiving. The following morning...the men packed up their belongings and returned, once again, to complete paying their debt to society. The superintendent is more than pleased with the results and has nothing but praise for the way in which the men responded to the demands of the work."

In 1914, when workers' wages in U.S. manufacturing industries were averaging about $11 a week, Henry Ford announced unheard-of benefits for his employees: a minimum daily wage of $5.00, an eight-hour workday, and profit sharing. In 1922, he raised his minimum daily wage to $6.00 and introduced a 40-hour workweek in 1926. State workers in Nebraska would not have a 40-hour workweek until 1958.

The Good Roads Movement also was at work at Nebraska as numerous groups pressured the Legislature for more active involvement in road development. In his message to the Legislature in 1915, Governor Morehead reported that:

> "For ten years, the Legislature had been besieged by different good roads projects, but no tangible results had arisen. The state was in a transition period between the old-fashioned, farmer road government and the newly promoted projects... and the major proposals for a centralized road system were killed by a lack of votes."

However, when the first Federal-Aid Road Act became law on July 11, 1916, Nebraska was quick to respond. The 1917 Legislature appropriated $640,000 to match the first three-year appropriation from the Federal Road Fund and authorized the State Board of Irrigation, Highways, and Drainage to proceed with road construction. In cooperation with county officials, the board devised a plan to connect all county seats with approximately 5,000 miles of highways, to be designated as the state highway system. In addition, the State-Aid Road Fund was created. This fund was financed by general taxation and apportioned on the same basic formula established by the 1916 Act: population, land area, and miles of existing roads. In order to allocate highway funds equitably, the board divided the state into 19 project districts (A thru S), each consisting of four or five counties.

By accepting the provisions of the 1916 Act, Nebraska was launched full-scale into the construction and maintenance of state highways. In spite of a slow-down caused by construction deferments in 1917-18 while the United States was engaged in World War I,

significant progress was made in highway development by the end of the decade. By 1918, sixteen projects comprising 512 miles had been approved by the federal Office of Public Roads and Rural Engineering, and contracts for 200 miles had been let. An additional 1,600 miles had been surveyed and the plans for some 952 miles had been prepared.

The first federal-aid road project in Nebraska, FAP No. 1, was started in July 1918 on the road between Lincoln and Emerald (West "O" Street). The project was completed in 1919 at an estimated cost of $217,295, of which $54,400 was federal-aid and $162,895 was county funds. The work consisted of 5.44 miles of three-inch vertical fiber brick paving, culverts, etc.

In a paper read before a technical institute in 1917, Lincoln Highway promoter Henry B. Joy said that:

> "The national interest in good roads will continue to increase until we have in this country a road system second to none, which will bind this country closer together, eliminate sectionalism, eliminate provincialism, make Americans cosmopolitans, and work wonders in the unification of American sentiment and in the forming of a cohesive empire of democracy, permanently linked together through just such a system of highways as was the foundation of Rome's greatness."

In 1918, U.S. Secretary of Agriculture D.F. Houston selected Thomas H. MacDonald (1881-1957), the chief highway engineer for the Iowa Highway Commission and co-founder of the Mississippi Valley Conference, as the director of the federal Office of Public Roads and Rural Engineering. While the Secretary probably could have cared less about Mr. MacDonald's political background, it was a well known fact that he had come from a "rock-ribbed Republican family of the Iowa variety." President Woodrow Wilson and Secretary Houston, both Democrats, needed the best man that they could find regardless of his political affiliation. They also needed a man: (1) who fully believed in federal-state cooperation, (2) with extraordinary capabilities, vision, and who was completely familiar with the 1916 Act and the day-to-day administrative problems encountered in working under it, and (3) who was extremely dedicated to making federal-aid a success so as to reflect great progress in producing the roads that everyone was demanding. They found such a man in Thomas Harris MacDonald. Finally taking office on May 3, 1919, Mr. MacDonald set the stage for his tenure as head of the federal agency with his first public pronouncement:

> "This is an All-American job. It will require support and understanding from all because all will be affected. So long as I am in this office, the door will always be open and we will try to set our policies on a basis of fact, research, and good will. We must recognize the important part that the states have in this work."

On July 1, 1919, Mr. MacDonald's title was changed to chief of the Bureau of Public Roads and he was affectionately referred to by highway officials as "The Chief" from that time until his death many years later. Under his direction, the bureau undertook numerous research projects dealing with vehicle movement and highway safety. He advanced the theory that it would be better to design highways to fit the kind of drivers actually operating vehicles than to attempt to remake drivers to fit some engineering ideal of highway design. This concept, which has now been generally accepted, was for many people a new viewpoint when he advanced it.

His March 31, 1953 retirement from the bureau marked the end of an era of highway progress entirely undreamt of at the time he assumed office. Unquestionably, America's leadership in the highway field and highway progress in the years to come, to a considerable degree, will be a reflection of the vision and integrity of "The Chief." On the occasion of his retirement, Mr. MacDonald commented on the future role of his office:

> "I think that the role of the federal government is not to dictate to the states, cities, or counties; but through their legislatures and highway departments, to help the cities and counties in the administration of this work."

From 1953 until his death four years later, Mr. MacDonald held the title of Distinguished Research Engineer at Texas A. & M. University, College Station, Texas. He was buried at Washington, D.C. in the Cedar Hill Cemetery, which has a commanding view of the nation's capitol. Dr. K. W. McCracken, minister of the New York Avenue Presbyterian Church, called for a rededication to the enduring principles which Mr. MacDonald did so much to bring into being:

> "This is not the time or place to laud the man. Rather, it is the place to call on those who follow him to carry on the great work which he has done for the people of his country and the world."

In this spirit, AASHO immediately established a Thomas H. MacDonald Memorial Award to be given annually to an employee, or prior employee of a member department, who has rendered continuous, outstanding service over a period of time in highways, or who has made some single or exceptional contribution to the art and science of highway engineering.

CHAPTER 2

THE ROARING TWENTIES

By 1919, motor vehicle registrations in Nebraska had reached 211,750 and the increased automobile use throughout the state supported the demand for continued highway expenditures. Further, the proliferation of automobiles themselves created new problems of safety that the State Board of Irrigation, Highways, and Drainage would have to address. Initially, motor vehicle registration fees were increased to a minimum of $10 to provide additional funds for highway maintenance.

It was apparent to State Engineer George E. Johnson and others that the problems of automobiles and highways were consuming more and more resources and manpower. Administratively, the obvious answer seemed to be either the reorganization of the State Board of Irrigation, Highways, and Drainage or the creation of a new department to deal exclusively with highways. An 1875 Nebraska law, which forbade the creation of any new executive office, precluded the latter course of action. Governor Samuel R. McKelvie addressed this problem in his 1919 inaugural message when he described the current law as one which fostered "a system of government that reeks with divided responsibility, loose ends, and overlapping function."

The 1919 Legislature took up the issue and after a long struggle, passed the Civil Administrative Code Bill, an extensive reorganization of Nebraska state government. This bill provided a cabinet form of government for the state and eliminated seven boards/commissions and ten related subdivisions. At the same time, the bill created six new departments, one of which was the Department of Public Works. This department assumed the responsibilities formerly carried out by the State Board of Irrigation, Highways, and Drainage. The Secretary of the Department of Public Works was given the additional title of State Engineer and was charged with supervising the construction of highways and bridges, as well as irrigation, drainage, and water rights. The department had two bureaus: the Bureau of Roads and Bridges and the Bureau of Irrigation, Water Power, and Drainage. The Bureau of Roads and Bridges was composed of the Divisions of Maps and Plans, Road Construction, and Road Equipment. In addition, the Division of Motor Vehicle Registration was moved from the Secretary of State's office to the Department of Public Works. The bill also provided that each county should maintain all mileage of the state highway system within

the county, the cost of such maintenance to be paid out of the state highway fund. In 1920, the Bureau of Roads and Bridges had five field divisions and the state highway system totaled 4,770 miles.

The first major Portland cement concrete paving project on the state highway system was FAP (Federal-Aid Project) 81, Fremont to Ames, a part of the Lincoln Memorial Highway. Construction began in August 1919 and consisted of 5.943 miles of grading, culverts, 7.33"x18' of concrete pavement, and one bridge. The project was completed in 1920 at a cost of $199,440.34 ($60,221.17 federal, $60,221.17 state, and $78,998.00 county), or about $33,559 per mile. The 1919-20 Biennial Report tells the following story:

> "This concrete surfaced road lies between Fremont and Ames on the Lincoln Highway. The soil, being composed of humus and sand, made travel difficult unless weather conditions were ideal. Thus, the Dodge County Board formed a paving district and the completed road is said to be the best concrete paving in the state. The entire work was handled by men, machinery, and a few teams, the latter being employed for grading only. The coarse aggregate for the concrete was pumped from the pits south of the project, screened, loaded into Fords equipped with Lee dump bodies, and hauled with the proper portion of tested cement to the mixer. Tamping and finishing were done entirely by machinery and, as a result, a concrete was obtained which passed a higher crushing strength than the Potomac gravel concrete, the government's standard. The work was carried on in a scientific and economical manner. Traffic has increased more than 100 percent due to the hard surface."

As highway construction increased, the testing of road materials became more important and in about 1920, the department established a cooperative agreement with the University of Nebraska for the accomplishment of tests and analyses. During the 1919-20 biennium, 1,208 individual tests were accomplished. In addition to maintaining quality and standards for materials, the department hoped to develop a new surfacing material made of oils or asphalts that would withstand the increased traffic, yet have a lower initial cost than concrete pavement.

The 1921 Legislature reduced the minimum length for state-aid bridges from 175 to 100 feet so that more counties could avail themselves of this aid.

In 1922, each of Nebraska's 93 counties was assigned a prefix number (1 thru 93) for purposes of licensing motor vehicles. The numbers were determined by the total motor vehicle registrations in each county. Douglas County received the prefix "1" because it had

the most registrations, while Hooker County received "93" because it had the fewest. These same county prefix numbers are still in use today.

In 1923, the Ford Model T reached a peak annual production of 2,011,125, a record not to be exceeded by a single company until 1955.

With the Department of Public Works, Nebraska now had an administrative structure through which it could more directly and efficiently address the specifics of highway construction and maintenance. In December 1924, the department moved into the new State Capitol, which was still under construction. According to Stephen R. Gilbert, a 1924 graduate of the University of Nebraska College of Engineering who was hired by the department as an engineer in 1925, this arrangement was not without its challenges:

> "We were officed in the south part of the new capitol and... only the north and south parts were completed. The old capitol was still located in the middle. To go to the governor's office, we had to go through a canvas and jump across the tracks (for hauling materials) to get to the other side." (Stephen R. Gilbert, 1985 Interview)

For the nation as a whole, the decade of the twenties was one of great productivity and prosperity. Capital invested in manufactured goods was at record highs through most of the period. Automobiles became consumer goods in much the same way as electric refrigerators and radios. By 1929, there were over 23 million registered passenger vehicles in the United States. Automobile production had increased from 2.2 million in 1920 to 5.5 million in 1929. Nebraska reflected this national trend with motor vehicle registrations nearly doubling from 223,000 in 1920 to 419,198 in 1929.

In 1927, after 15,456,868 Model T's had been built, Ford discontinued the Model T in favor of the Model A.

The prosperity of the nation and the increase in automobiles were also reflected in highway construction. Over $10 billion were invested in highway construction nationally during the twenties, resulting in 275,000 miles of asphalt and concrete highways built by 1929. For most states, this was accomplished through a considerable increase in public taxation and investment. Between 1913 and 1930, expenditures on rural highways accounted for 17.5 percent of the increase in all taxes and 25 percent of the increase in state and local taxes. For most states, the balance of highway financing came from bond issues

and other forms of public indebtedness. It was estimated that by 1929, almost half of all state indebtedness in the nation represented outlays for highways.

While recognizing these national trends and needs, Nebraska was neither willing to go into debt nor significantly increase taxation to finance highway construction. In fact, Nebraska and Florida were the only two states during this decade that incurred no public indebtedness for highway construction. This conservative fiscal policy challenged the Bureau of Roads and Bridges to meet the highway demands of Nebraska as economically as possible or fall behind the rest of the nation. A great deal of effort was expended in constructing highways to provide a smooth, dirt surfacing. In fact, Nebraska became a national leader in the design and development of dirt highways, prompting numerous officials from other states to visit and examine this method of construction. The impression was invariably positive as evidenced by a 1921 article in a Kansas newspaper. The author had attended the 1921 AASHO Annual Meeting in Omaha and was impressed with the construction and maintenance of Nebraska's dirt highways:

> "Oh, the Nebraska roads! These roads are not graded up to a sharp point that makes your car run sideways instead of straight ahead. They are level. Then a sharp ditch is cut on each side for the water to drain off. They are perfect as any pavement in the world, except, of course, when it rains you stay at home. Over such roads as these, it is a simple matter for a Ford car to travel 115 miles in four hours and twenty minutes (26.5 miles per hour)."

Progress in this era was not limited only to land transportation. On May 20-21, 1927, Charles A. Lindbergh (1902-1974), the "Lone Eagle," made the first solo nonstop flight across the Atlantic Ocean. Flying a specially built aircraft named the "Spirit of St. Louis," he departed Roosevelt Field near New York City on May 20 and landed at Le Bourget Field near Paris on May 21 after 33.5 hours of flying. For this, he received worldwide fame.
Mr. Lindbergh learned to fly in the early 1920's at a flying school near 20th and Lake Streets in Lincoln, Nebraska.

State Engineer Robert L. "Roy" Cochran had long been an advocate of gravel for highway surfacing. A 1910 graduate of the University of Nebraska College of Engineering, Mr. Cochran served as the State Engineer from 1923 to 1934, Governor from 1935 to 1941, and State Engineer again in 1959. While pavement might be necessary in many states, he contended, Nebraska was blessed with significantly less rainfall and a light, sandy loam which dried out quickly. Gravel was an excellent and economical medium to use under these

conditions. And, as Stephen R. Gilbert notes, Mr. Cochran was determined to get as many highways graveled as possible:

> "All of the highways, except for a very few, were either dirt or gravel. Mr. Cochran's idea was to get them all graveled as soon as possible. Of course, they had to be graded and the culverts built before the gravel was applied." (Stephen R. Gilbert, 1985 Interview)

By 1929, Nebraska ranked fourteenth in the nation in state highway mileage, graveled or better. According to Oliver W. Johnson, who was hired by the department as a chainman in 1927 and appointed as the Construction Division Engineer in 1967 and Deputy State Engineer in 1968, the only paving was around the larger population areas:

> "Most of the paving was in Omaha and a little bit in Grand Island and Lincoln. All the rest of the state highways were either gravel or dirt. Even Highway 30, the Lincoln Highway, wasn't graveled. Most of the highways in those days were new projects. There hadn't been anything done on them before. The work consisted of grading, culverts, and gravel surfacing. That was the standard improvement in 1927." (Oliver W. Johnson, 1985 Interview)

The end of World War I brought unexpected benefits for the states after Congress passed legislation in 1918 allowing for the transfer of surplus equipment, material, and supplies from the War Department to the state highway departments. Nebraska received many hundreds of pieces of miscellaneous equipment, tons and tons of material and supplies, 407 trucks, and 74 touring cars. The first shipment arrived in June 1919. The state, in turn, sold 251 of the trucks and numerous materials/supplies to county road departments for use in road construction and maintenance. Arthur B. Chaplin, who worked with county road construction and maintenance in the early 1920's, was hired by the department in 1925 and became a principal assistant in the Division of Road Construction and Maintenance in 1927. He recalls moving some of this surplus equipment from Webster County north to a highway project near Scotia:

> "I had an elevator grader and 14 little red dump wagons strung out and pulled them with that old tractor. It took me two days to get started." (Arthur B. Chaplin, 1985 Interview)

This additional equipment lessened some of the costs of highway work. To manage the equipment, the department created a Division of Equipment in 1919 and located it at 6th and South Streets in Lincoln. While technology would bring vast improvements in motorized equipment over the next decade, this surplus equipment remained in service until parts were

no longer available. Mr. Chaplin talks about the problems of initially modifying the equipment and maintaining it:

> "It was all armor plated. I took a lot of that armor plate off and got it dressed down so it wasn't such an obstacle to use. We were still using that surplus equipment in the early thirties and it got so you couldn't get parts. We used what we could off of it while it was being junked and saved everything we might need to keep another piece like it in service." (Arthur B. Chaplin, 1985 Interview)

In addition, the end of World War I led to a favorable labor market for employers. A high unemployment rate caused by the return of soldiers and the demobilization of wartime industries meant that labor costs declined immediately following the war. Highway construction, however, was one area in which there was a growing demand for labor and many states found themselves in the fortunate position of being able to expand their highway departments with more highly trained employees at reasonable costs. In Nebraska, this resulted in an increase from 54 department employees in 1917 to 273 in 1920.

In the 1880's, a strong man with a shovel could load 12.5 cubic yards of dirt per day. In 1885 at Fresno, California, a blacksmith invented the "Fresno Scraper," a device that when drawn by mules, could move up to 100 cubic yards of dirt per day (at a cost, in 1927, of about 50 cents per cubic yard). In the 1920's, Fresnos were commonly pulled by tractors, which substantially increased their efficiency.

Throughout the decade of the twenties, highway construction continued to demand more and more manpower because most of the actual work was accomplished by hand:

> "The grading was done by hand-labor and horses. The grading contractor had 20 to 25 men and each drove a four-horse team. They pulled small scrapers called Fresnos. They would scoop up a load of soil and then the horses would pull the load up on the grade where it would be dumped and spread out. That's how they graded the road. The culvert work was also all handwork." (Oliver W. Johnson, 1985 Interview)

And as in any era, the department had its share of "characters," according to Oliver W. Johnson, who always enjoyed telling the following true story:

> "The first day that I worked for the department in 1927, my boss was a guy named Walt. He never said much. I'd come to work in the morning and he might not say anything for an hour or two. Anyway, we were working out of Sidney and it was my first day. We loaded the equipment into his Model T...not a word was spoken...and headed for a grading project located between Gurley and Dalton, about 12 miles

> away. When we arrived...he still hadn't spoken...we drove down through the project where the men were operating scrapers pulled by horses. As we passed each rig, the teamster would wave and say: 'Hi, Walt'. Walt waved back but remained silent. We passed quite a number of these individual teamsters and each waved and said: 'Hi, Walt'. He still hadn't said anything to me. As we passed the last rig, it was the same thing...a wave and 'Hi, Walt'...and Walt waved back. He then turned to me and said: 'I always wave at the sonsabitches, it makes-em feel good'." (Oliver W. Johnson, 1985 Interview)

Highway construction and maintenance became more centralized at the state and federal levels during the twenties. In 1921, Congress passed another Federal-Aid Highway Act. The difficulties of moving troops and war supplies across the country during World War I demonstrated the inadequacies of America's transportation network. The railroads, previously under the control of the U.S. government from December 1917 to March 1920, were running at capacity. Attempts to transport goods via the nation's highways to supplement rail transportation proved nearly impossible because of the inconsistent and often poor condition of these highways. Congress was convinced that the nation needed an adequate interstate system of highways, if only for national security.

The 1921 Act required that each state select its most important existing highways, not to exceed seven percent of the total road mileage in the state as certified under the 1916 Act. These were the only roads on which federal money could be expended and were known as the Seven Percent System. Eventually these roads, which comprised over 200,000 miles nationwide, would become official federal-aid highways with the state responsible for their maintenance in perpetuity. If the federal government determined that any highway in this system was inadequately maintained, it would take over the maintenance and charge the state accordingly.

Under the 1921 Act, 5,619 miles of highways in Nebraska were eligible for federal funds, the latter to be matched by state funds on a 50-50 basis. Distribution to the states was based upon the ratio that the state bore to the total of all states in population, land area, and miles of postal routes. In this manner, the eastern states which contributed heavily in federal taxes did not receive a proportionately heavy return for highways while the western states profited accordingly. Nebraska received $4.15 for each dollar of federal taxes which it paid for highways. Even with this favorable return, however, it was a constant struggle throughout the twenties to raise the amount of state matching funds necessary to receive Nebraska's full share of federal money. Nebraska's State-Aid Road Fund was financed by direct property taxes and, politically, property tax relief often had a higher priority than roads. The 1922

Legislature, acting in special session, passed a resolution against the continuance of federal-aid because the property tax was too high. Also, four Nebraska congressmen, up for re-election that year, voted against a bill to continue the federal-state cost sharing of road projects. According to historian Dr. Addison E. Sheldon:

> "They were following the expressed desires of the State Legislature. Nebraska wished to be the judge of its own needs and its own methods of road building."

Nebraska did not pull out completely from this federal-state cooperation but appropriated only $1.5 million in 1923, $2 million short of the federal allocation available for Nebraska. The 1925 Legislature addressed the property tax problem by providing Nebraska's first gasoline tax, two cents per gallon, for the construction and maintenance of state highways. This new tax became effective on March 31, 1925 and it was estimated that it would raise $3 million annually, of which $2 million could be used to meet the federal-aid matching requirement, and the remaining $1 million could be used for highway maintenance. In 1929, the gasoline tax was increased to four cents per gallon. The latter became effective on March 29, 1929.

While accepting the responsibility for maintaining its federal-aid system as specified by the Federal-Aid Highway Act, Nebraska continued to assign state highway maintenance to the counties until 1926. The state reimbursed the counties for such work. This proved ineffective and State Engineer Robert L. Cochran pointed repeatedly to inconsistencies and neglect on the part of various counties. As a result, the 1925 Legislature passed a statute requiring the Department of Public Works to maintain the state highway system, effective on January 1, 1926, except for those portions located within the corporate limits of municipalities having a population over 1,400. On that date, the state system totaled 5,330 miles, of which 726 miles were graveled, 127 miles were paved, and 4,477 miles had dirt surfacing. The trend toward centralization of functions was also evidenced by legislation which specified that contracts for highway construction and maintenance could henceforth be awarded only by the Department of Public Works, thereby eliminating the role of counties in contract lettings. In addition, legislation in 1927 empowered the Department of Public Works to acquire rights-of-way directly.

While many aspects of highway construction changed with the times, there were few advances made to lessen the hardships of survey work. George J. Welty, who was hired by the department as a chainman in 1929, describes an early surveying experience:

> "Three of us drove to Ord in a Ford roadster. The surveyor's equipment was on the running board and someone had to carry the instrument on his lap. We made drainage area surveys in the prairie grass hills west of Ord. We drove up and over the steep hills and around grazing cattle. Some of the hills were eroded in steps which we drove over going down with hope that we could find a way out. It would have been impossible to return the same way we came." (George J. Welty, 1985 Interview)

As the sale of motor vehicles increased through the 1920's, new problems emerged and the functions of the Bureau of Roads and Bridges expanded to address them, leading the Department of Public Works to move into the new State Capitol in 1924. By 1926, the number of department employees had increased to about 600.

Because it was determined that many traffic accidents were caused by the glare of headlights, the 1921 Legislature passed a lens law which required the Department of Public Works to approve the specifications of every headlamp lens sold within the state. The increase in traffic accidents also led the State Engineer to recommend the issuance of driver's licenses as early as 1922. This remained a concern of the department until the appropriate legislation was finally passed in 1929 providing for the issuance of driver's licenses at a fee of 75 cents each. Further concern for safety led to a $30,000 appropriation in 1929 for the enforcement of motor vehicle laws. To accomplish this, three patrol officers were hired, each equipped with a car and a set of scales for weighing trucks. While these officers were expected to cite motorists for all traffic violations, it was obvious that a small force of three men was insufficient to cope with the problem statewide. For that reason, particular attention was given to violations of the license and truck weight laws. A fourth officer was added in 1934.

Increased traffic produced other new problems in the mid-twenties. With two exceptions, the Lincoln Highway and the Omaha-Lincoln-Denver (O.L.D.) Highway, routes were generally not marked in Nebraska. Neither were hazards such as sharp curves or narrow bridges. What little that had been done was mostly accomplished by private groups:

> "In 1927, Highway 30 was known as the Lincoln Highway and had previously been marked with signs put up by the Automobile Association of California. They apparently had lots of money and as one of their projects, they marked the Lincoln Highway clear across the United States. They were red, white, and blue enameled steel signs." (Oliver W. Johnson, 1985 Interview)

Another example of these private efforts was the marking of the O.L.D. Highway (US-6/34) in Nebraska:

> "A group from Lincoln went out and put stencils on telephone poles at corners where the O.L.D. Highway would turn. The stencil said O.L.D. They put the stencil on the post and gobbed paint on it...between Lincoln and Hastings or maybe as far as McCook. There was no system of route-marking highways. Those things came later." (Oliver W. Johnson, 1985 Interview)

In 1924, AASHO began working on a uniform system for highway signing, which it adopted in 1925. In Nebraska, the Bureau of Roads and Bridges erected the first official state and U.S. highway markers (signs) in a ceremony on June 5, 1926. Among those attending were Adam McMullen, Governor; Frank C. Zehrung, Mayor of Lincoln; Robert L. Cochran, State Engineer; Charles H. Roper, President of the D.L.D. Highway Association; Burt A. George, Legislative Representative of the Nebraska Good Roads Association; and A. A. Jones, Manager of the Outdoor Advertising Company.

State Engineer Cochran personally designed the "covered wagon" state highway markers which Nebraska has used since 1926. He had hoped to use a buffalo (bison) in the logo, but found that Manitoba, Canada had chosen it first.

CHAPTER 3

THE GREAT DEPRESSION

Much has been written about the Depression of the 1930's and its devastation on the nation. The Gross National Product fell 46 percent from $103.1 billion in 1929 to $55.6 billion in 1933. Wages for all employees fell 42 percent from $51.1 billion to $29.5 billion during the same period. But, the agricultural sector was the hardest hit. Farmland values fell from $78.4 billion in 1920 to $57.7 billion in 1929 and to $36.2 billion in 1933. The total value of national farm output, particularly significant to Nebraska, declined from $13.8 billion in 1929 to $6.8 billion in 1933. However, the greatest toll of the Depression was in human terms. At its worst in 1933, unemployment reached nearly 25 percent nationally.

Perhaps nothing is more illustrative of America's condition in 1932 than a glance at its military establishment. At that time, the U.S. had the 16th largest Army in the world, putting it behind, among others, Czechoslovakia, Turkey, Spain, Romania, and Poland. There were 132,069 Americans in Army uniform. On paper, they could have put up a stiff fight against Yugoslavia (138,934). In reality, they would have been torn to pieces because most of them were committed to desk work, patrolling the Mexican border, and protecting U.S. possessions overseas. The Army Chief of Staff, General Douglas MacArthur, was left with about 30,000 available troops, a force smaller than that sent by George III of Great Britain to tame the rebellious American Colonies in 1776.

President Herbert C. Hoover was desperately trying to improve the economy, sometimes resorting to psychological warfare: "What this country needs is a great poem." To singer Rudy Vallee (1901-1986), he said in the spring of 1932: "If you can sing a song that will make people forget the Depression, I'll give you a medal." Mr. Vallee didn't get the medal. Instead, he sang:

"They used to tell me I was building a dream,
And so I followed the mob.
When there was earth to plow or guns to bear,
I was always there right on the job.
Once I built a railroad, made it run,
Made it race against time.
Once I built a railroad, now it's done,
Brother, can you spare a dime?"

In Nebraska, a predominantly agricultural state, the Depression was severe. Agricultural prices declined 56 percent between 1929 and 1933 with total farmland values decreasing from $2.5 billion to $1.6 billion. It was inevitable that this sharp drop would affect almost every other aspect of Nebraska's economy with a devastating impact on employment levels even in non-agricultural areas. The number of persons employed in manufacturing decreased 30 percent during this period while manufacturing wages declined by 50 percent. In the retail trades, employment dropped 21 percent and wages 43 percent. The number of employees in the wholesale trades declined only 13 percent but wages decreased by over 63 percent. The decline in agriculture affected practically everything else:

> "The condition of the farmers affected Nebraska merchants, lumber dealers, realtors, school teachers, laborers, and artisans. Housewives stocked their pantry shelves with the simplest necessities, construction lagged, and school administrators curtailed their programs as tax receipts went down. Day laborers, formerly sure of a place on Nebraska farms and in Nebraska industries, began the long trek of the unemployed."

Whatever the consequences of the Depression for Nebraskans, it proved ultimately beneficial to the continued development of the highway system. For Nebraska's highways, these years witnessed unprecedented progress. In 1930, the Bureau of Roads and Bridges had eight field divisions and the state highway system totaled 9,752 miles, of which only 6,882 miles were maintained. Of the latter, 4,760 miles were graveled, 1,725 miles had dirt surfacing, 368 miles were paved, and 29 miles were oiled.

Lower wages and depressed prices of construction materials, resulting from the economic conditions, contributed to this progress. Wages varied from 30 cents an hour for unskilled labor to 50 cents an hour for skilled labor during 1930-32. While this was less than the department paid for comparable work just a few years before, most who were able to get a job were glad to have it regardless of how much their skills might otherwise have been worth:

> "The Depression affected our ability to get jobs. I took electrical engineering at the University of Nebraska and graduated in 1934. None of my classmates were able to find jobs in electrical engineering and we considered ourselves very fortunate to get into any kind of engineering. When I got a testing job at the university in 1934 and was hired by the department as an engineer in 1935, I was one of the fortunate ones." (Orville L. Lund, 1985 Interview)

Mr. Lund, who became Materials and Tests Division Engineer in 1968, was indeed fortunate to find an engineering position soon after graduation. John W. Hossack, who served as the State Engineer from 1960-68, relates a similar experience:

> "I graduated in June 1933 from the University of Nebraska College of Engineering and there was no engineering work available. I was lucky to be hired by the department as a rodman in October at $90 a month. This was much better than the 75 cents a day I'd been getting for temporary work here and there on farms." (John W. Hossack, 1985 Interview)

There was also nothing fancy about the hiring practices in those days. After being offered a job with the department, Mr. Hossack sent a one-line telegram from Sutherland, dated October 15, 1933, to A. T. Lobdell, Chief of the Bureau of Roads and Bridges in Lincoln: "JOB ACCEPTED - WIRE ME COLLECT WHEN AND WHERE TO WORK." Mr. Lobdell replied by collect telegram on the same day: "REPORT TO ENGINEER OSBORN - RAGAN - HARLAN COUNTY - TOMORROW." And that's the way it happened. Mr. Hossack reported to Project Engineer Vernon F. Osborn at the Village of Ragan the next day.

According to Geoffrey R. King, who was hired by the department as a chainman in 1935, the situation was worse for those without a college degree:

> "Those who were not graduates or hadn't had engineering in college were hired at $4 a day, when they needed us. They had a paving job in my hometown, Arapahoe, and they needed a man to help them do final measurements, the rough work. The engineer in charge of that project had a similar job at Cambridge and I went there with him. He started a third project at Franklin but a local fellow got the job. I went back to dance-band-trumpet and anything else I could find to pick up a little money. It was pretty rough in the thirties and there just weren't any jobs. People were desperate!" (Geoffrey R. King, 1985 Interview)

Malcolm A. Gabel, who was hired by the department as a chainman in 1937, states that if you didn't know how fortunate you were to have a job, you soon found out if you asked for a pay raise:

> "I had made a sample drawing of some railroad crossings that the federal government wanted to improve. Anyway, we got a nice letter from the federal government saying that was a nice job. I took that down to the Personnel Director and was going to put a little pressure on him for a raise, I thought. Well, I went down there and sat and stewed a little bit first. Then, I went in and told him I deserved a raise and showed him this letter and the sketch that I made. He proceeded to tell me how lucky I was to have a job and said he had been laying-off all these married guys who had kids.

> Anyway, by the time I got out of there, I was damn glad I had a job. I didn't get a raise either." (Malcolm A. Gabel, 1985 Interview)

The salary picture was not always as bleak as it seemed, however. What appeared to be minimal pay often turned out to go much further because of the depressed economy:

> "I started at a monthly salary of $65 plus $35 subsistence. The minimum wage was 50 cents an hour for skilled labor, 30 cents for unskilled, at a maximum of 30 hours a week. That doesn't sound like much but we used to eat three meals in a restaurant for a dollar a day and rent a sleeping room for three dollars a week. So, out of $100, we still had a few dollars left at the end of the month." (Oliver W. Johnson, 1985 Interview)

And having some money often made those assigned to field work more than welcome in the small communities:

> "As we went to these small towns to work, we were the people in town who had some money. We could rent a place and buy our food and the local people were always glad to see us because we had some money to spend." (Orville L. Lund, 1985 Interview)

The depressed prices of goods greatly benefited the department's construction program. The cost of materials for highway construction began to decline after the stock market crash which occurred on October 24, 1929 (Black Thursday). State Engineer Robert L. Cochran reported that the average cost of highway construction for the 1929-30 biennium was 10 percent lower than during 1927-28, 15 percent lower than during 1925-26, and 30 percent lower than during 1923-24. While the size of the state highway system remained constant at 9,752 miles from 1930 to 1932, the mileage actually maintained increased 13 percent from 6,882 to 7,809. In 1932, Mr. Cochran reported that:

> "Very favorable prices have permitted maximum construction for the dollars available. Due to reduced prices, total maintenance costs have not increased even though we had increased mileage to maintain and an unprecedented snowfall during the winter of 1931-32."

In addition, the continued research and development of highway materials in the testing laboratories proved that a bituminous surface would stand up to the weather and traffic in many areas of the state. This surfacing material was considerably less expensive than concrete paving. During most of the thirties, it was estimated to be over five times less expensive to pave with bituminous material than with concrete. In 1940, State Engineer Albert C. Tilley estimated that paving with bituminous material had cost $4,727 per mile

compared to $24,745 per mile for concrete. In the same year, bituminous material accounted for almost 70 percent of the paved highways in Nebraska. However, economy had its price:

> "In the thirties, we under-designed the asphalt highways and tried to do everything cheaply. We always seemed to be short of money. On highways where the soil was firm, we tried to eliminate the use of asphalt throughout the pavement depth. We called this soil aggregate base course. It would have been much better material had we added asphalt as a cementing agent to hold it together. Yet, that cost a lot of money so we tried it without. We placed a thin layer of asphalt on top which we called an 'armor coat'. It would be one-half inch thick. Of course, we didn't get much performance and we might have to patch them the first year." (Orville L. Lund, 1985 Interview)

The armor coats described by Mr. Lund quickly became known as "slobber coats" among the engineers.

Reduced costs also allowed the purchase of additional equipment. In 1930, the state was able to purchase 38 new trucks which it equipped with snow blades. Perhaps the most ingenious device developed by the Division of Maintenance was the road magnet, built as an experiment to clean the highways of nails and metal parts which inevitably shook loose or bounced off farm wagons, machinery, and motor vehicles. This was no small matter and in its first year of operation, it cleaned 2,105 miles, picking up a total of 6,022 pounds of metal, an average of 2.9 pounds per mile:

> "It was quite successful and picked up a lot of nails from the highways. Tires lasted longer and people liked to see it come. It was mounted under a truck and at the end of the mile, they would put a canvas down underneath this big magnet, turn off the juice, and the metal would drop down on it. It sure saved a lot of punctures." (Stephen R. Gilbert, 1985 Interview)

The magnets continued to prove their worth, picking up 7,643 pounds in 1933, 8,569 pounds in 1934, and 20,226 pounds in 1935. In the latter year, a pick-up of 18.9 pounds per mile occurred on Highway 82 (now N-103) between Wilber and Crete, a distance of only 10 miles.

From 1929-33, the department conducted a special study of the cracks in concrete pavement. It was found that concrete made from sand-gravel aggregate is subject to considerably more cracking than concrete made from sand and crushed limestone. The study showed that at a pavement age of 2.5 years, the average distance between transverse

cracks was 20 feet for the sand-gravel aggregate mix as compared to 93 feet for the sand and crushed limestone mix.

Federal funding played a significantly greater role in highway construction in the thirties. In 1931, the federal government made $80 million in emergency federal-aid available to the states to supplement their required matching expenditures to receive regular federal-aid. This greatly relieved the burden on state appropriations and allowed highway construction to continue uninterrupted. State Engineer Robert L. Cochran reported that in 1931-32, Nebraska received $4.25 million in emergency federal-aid. He noted that "for the first time in many years, all federal-aid apportioned to Nebraska has either been spent for construction or has been placed under contract." This allowed more construction than would otherwise have taken place since Nebraska had generally been unable to appropriate enough money in previous years to match the full amount of federal-aid available to the state.

The impetus behind the Emergency Federal-Aid Act of December 1930 was to create and maintain as high a level of employment as possible to offset increasing unemployment. A second Emergency Federal-Aid Act was passed by Congress in July 1932, which set forth stipulations and requirements to guarantee that end. States were required to adhere to minimum wage rates of 30 cents per hour for unskilled labor and 50 cents for skilled labor. In order to place as many people as possible on the job, workers were prohibited from working more than 30 hours a week. Preference was to be given to local labor and to ex-servicemen with dependents. With few exceptions, most work was to be done by hand, even mixing concrete. According to John W. Hossack, the department attempted to comply with these requirements:

> "Within two weeks after we arrived on the job, we had hired 200 local people to work for us. We wanted to put as many men to work as possible. The work was done with teams of horses to pull the Fresnos and the dump wagons that hauled the dirt. We did the finishing work with shovels, rakes, and wheelbarrows. We hired the farmers' horses... rented three and four-horse teams. The only mechanized equipment that we had were two Caterpillar tractors. By today's standards, they would be little but they were considered fair-sized then... CAT 60's... and they pulled the elevating grader that loaded the dirt into the wagons to be hauled to where they needed it for the grade... and they also pulled the blade grader." (John W. Hossack, 1985 Interview)

The new requirements also meant more paperwork, according to George J. Welty, who later served as the department's Controller:

"The contracts required the contractor to use at least a stipulated number of man-hours on the job. If he didn't use that many man-hours, penalties were assessed. The contractors were also required to give us certified copies of their payrolls showing names, job classifications, hours worked, rate per hour, and amounts paid as proof of required pay rate and man-hour requirements. These large sheets, which we called 'horse blankets', became a part of the project documents and were a basis for assessing penalties, if necessary." (George J. Welty, 1985 Interview)

Federal programs incorporated numerous requirements that increased the workload for administrative personnel, who found some of the requirements curious:

"Besides the limited number of hours that you worked a man and the fact that you had to pay him a minimum wage, the government set a lot of jobs up with man-hour requirements. They would require the grading contractor to employ at least so many hundred or thousand man-hours and the culvert contractor had to employ so many men for so many hours. That meant the grading contractor was limited on the machinery he could use. If he used too much machinery, he would have to put these men out there and give them rakes. They would go out and put in time raking and fine grading. And, the same way with the culvert contractor. If he was too efficient and got the job done without using his required number of man-hours, he had to give his men coarse rubbing stones and they went out and polished the concrete. They rubbed it so it was smoother than it would have otherwise been, just to get in his number of man-hours because his payroll had to document that he had employed that many men for that many hours." (Oliver W. Johnson, 1985 Interview)

Nebraska's most famous bridge (based upon beauty, uniqueness of design, compatibility with its surrounding environment, age, durability, and national recognition) is the Bryan Bridge, which spans the Niobrara River on US-20 southeast of Valentine. In May 1995, a State Historical Marker with the following inscription was installed in a small parking area near the east end of the bridge:

"This arched cantilever truss bridge, connected in the center with a single pin, is the only one of its kind in the United States. It was built in 1932 by the Department of Public Works and named by the local citizenry in honor of Governor Charles Wayland Bryan. The bridge is 289 feet long, has a 24-foot roadway, and cost $55,564. It was designed by Josef Sorkin, who immigrated from Russia in 1923 and graduated from the University of Nebraska College of Engineering in 1929. This particular design was chosen because it was aesthetically compatible with the surrounding environment of the Niobrara River Valley. The Bryan Bridge was selected as the 'Most Beautiful Steel Bridge of 1932 in Class C' by the American Institute of Steel Construction and was the first bridge between Wisconsin and the Pacific Coast to receive such an award. In 1988, the bridge was listed in the National Register of Historic Places and, in 1995, it was designated as a State Historic Civil Engineering Landmark by the Nebraska Section of the American Society of Civil Engineers."

According to designer Josef Sorkin (age 89 in 1995), when the Bryan Bridge was dedicated on September 30, 1932, dignitaries came from far and wide, including Governor Bryan and a number of Sioux Indians dressed in full regalia. At the beginning of the ceremony, the Sioux Chief, Jake Left-Hand-Bull, met Governor Bryan at the center of the bridge and offered him a "pipe of peace" to smoke, thus making the governor a member of the Sioux tribe and symbolically welcoming the white man to the land west of the Niobrara River. Then, to the syncopated beat of the tom-toms, the Indians chanted and danced on the bridge, joined by Governor Bryan. At that point, State Engineer Robert L. "Roy" Cochran said (in a low voice) to Chief Bridge Engineer John G. "Glen" Mason that this was "a good test to see if the S.O.B. would collapse." Mr. Cochran was, of course, referring to the bridge and not Governor Bryan. An original steel historical plaque is attached to the bridge and reads:

> "Bryan Bridge - Named in honor of Governor Charles W. Bryan - September 30, 1932 - By the Valentine Chamber of Commerce, the Cherry County Board of Commissioners, and the Sioux Indians."

As the Depression continued in 1933, Nebraska and other states found it increasingly difficult to maintain wage and employment levels on public works projects and began trimming budgets severely. The Nebraska Legislature lowered motor vehicle registration fees, a move designed to lessen the tax burden on individuals, but which at the same time reduced the amount of funds available for highway construction. In addition, the Legislature increased the counties' share of the gasoline tax by one-half cent. Designed to help alleviate the revenue problems in the counties, this also compromised funds that would normally have been allocated to state highway construction. Also in 1933, the Legislature changed the name of the Department of Public Works to the Department of Roads and Irrigation, and provided that the title of Secretary be discontinued and the official in charge of the department would be known as the State Engineer.

The concern over unemployment continued throughout the thirties. With the inauguration of President Franklin D. Roosevelt on March 4, 1933, there was an increase in federal legislation designed to meet this problem. Public works programs and state highway departments were natural beneficiaries of much of this activity. For the man on the street,

there was renewed hope of finding a job and an entire generation of Americans had a new anthem:

> "Happy days are here again!
> The skies above are clear again!
> Let's all sing a song of cheer again,
> Happy days...are...here...a-gain!"

Early "New Deal" legislation such as the National Industrial Recovery Act (NIRA) of June 1933, and the Civil Works Administration (CWA) of November 1933, contributed to the further development of Nebraska's highways while seeking to reduce unemployment. Under the NIRA, Nebraska received $7.8 million for the improvement of state highways. This money did not require state matching funds and was put into use almost immediately. In June 1934, Nebraska received an additional grant of $3.9 million under the Hayden-Cartwright Act, which also required no state matching funds.

Nebraska benefited from the CWA, which provided funds for hiring laborers to engage in maintenance and repair work that would not normally have been done for lack of funds. These jobs ranged from ditch cleaning and bridge repair to tree planting. Although CWA work was suspended on March 31, 1934, the monthly average on state CWA projects was 6,065 men. W. H. Mengel, a 1922 graduate of the University of Nebraska College of Engineering who was hired by the department as an engineer in 1931 and became Design Division Engineer in 1952 and Right-of-Way Division Engineer in 1959, commented on the ability of the CWA to put people to work:

> "The CWA recognized the highway departments as operating organizations that could put people to work in short-order on direct-labor projects where plans were available, but had not been used due to a lack of funds. These plans were used all over the state for the beginning of work for local people." (W. H. Mengel, 1985 Interview)

A long period of drought in the thirties created a new challenge for highway construction personnel. David O. Coolidge, who was hired by the department as a chainman in 1928 and served as the State Engineer from 1977 to 1983, described how difficult it was to be at a construction site during the dust storms that plagued Nebraska:

> "It was very uncomfortable to be working in those conditions of dust and dirt. You couldn't see and it was a complete blackout. You just couldn't be out in it. It was pretty rough!" (David O. Coolidge, 1985 Interview)

Arthur B. Chaplin agreed. He recalls the devastating wind while working in the Platte Valley:

> "If the wind was blowing strongly from the northwest, you knew you were going to have to put on a new windshield because it was just like glazed glass after those wind storms with that sand and gravel blowing. Tumbleweeds, the fences were full of them. Drifts and dirt buried all of the fences and those tumbleweeds would break the fences down. They were so thick and heavy in those days, and dry... then the dirt would drift over. We didn't have modern air cleaners on the engines and the fellows operating them just didn't realize what dirt did to an engine. I went out many times when they couldn't get them started and the filter would be clogged with dirt. You had to dig it out with a putty knife." (Arthur B. Chaplin, 1985 Interview)

Even the materials and techniques of highway construction were affected, according to Oliver W. Johnson:

> "The dustbowl years made work harder because in grading, you had to use water to get compaction. Concrete would also dry out. If you were doing any paving, you had to keep the surface wet for so many hours and in that dry, dusty, windy weather, it took more work." (Oliver W. Johnson, 1985 Interview)

John W. Hossack also recalled what it was like to work under those conditions in the thirties:

> "One day, I was at Beaver City when the dust rolled in. We quit about 5:00 and went to town. Three of us were going into the restaurant to eat supper and all at once we looked out and couldn't see across the street. They turned on the street lights and you couldn't see them in front of the restaurant. One fellow and I, we were single at the time, roomed about three or four blocks away and we had to walk home after supper because we didn't have a car. By the time we got home, we were covered with dirt. From then on that spring, it was dust, dust, and more dust. The dust storms would roll in sometimes in the middle of the afternoon, sometimes around noon. We had to shut the paving down because the visibility was so poor." (John W. Hossack, 1985 Interview)

In 1934, the federal government became involved in highway beautification. Under the National Recovery Act, the federal Bureau of Public Roads required "the appropriate landscaping of parkways or roadsides ... involving not less than one percent of the total apportionment to each state." This program was intended to become an integral part of road construction. The preservation of scenic features was addressed during the field location of highways and involved soil conservation, selective tree cutting, rounding slopes, seeding, and planting. When possible, roads were designed to conform with the natural setting.

The department's first Landscape Engineer, William L. Younkin, was hired in February 1934 and placed in charge of the new Roadside Improvement Unit in the Construction Division. Born at Iowa City, Iowa in November 1885, he graduated from high school at San Diego, California and attended Columbia University in New York City. From 1922-33, Mr. Younkin served as the Supervising Architect of the Nebraska State Capitol Commission and was directly in charge of the capitol's construction. In 1938, be became a Registered Professional Architect in Nebraska and was assigned license number A-18. He died in February 1947 while still employed by the department.

In the summer of 1934, the department built a roadside park (rest area) on the south side of US-20 near the east end of the Bryan Bridge southeast of Valentine. This marked the first time that the department used state highway funds for this purpose. The land for the park was leased by the department in March 1934 and measured 230 feet by 280 feet (1.478 acres). The lease expired in March 1939 and although the department had an option to purchase the tract, it did not exercise the option or renew the lease. Therefore, the department's legal interest in the property ended in 1939. According to the department's 1933-34 Biennial Report:

> "The area has been fenced and provided with benches, trails, a foot-bridge, and a well. Some cedar trees and many native shrubs have been planted in it, making the park a pleasant place for highway travelers to stop for an outdoor meal or for a fine view of the Niobrara River."

Spring flooding in the Republican River Valley in 1935, severe cold and deep snow during the winter of 1935-36, flooding in the spring of 1936 in the Elkhorn and Lower Platte Valleys, and drought again in the summer of 1936 made the problems of the Depression even worse. For the Department of Roads and Irrigation, the elements of nature created a severe drain on available resources. In addition to 94 persons drowned and three tornado deaths, the 1935 Republican River flood damaged 341 miles of highways and destroyed 307 bridges. Also lost were 3,227 cattle, 1,007 buildings, 290 horses, and 46,507 chickens. A total of 54,479 acres of cropland and an additional 617 buildings were damaged. Geoffrey R. King recalls the suddenness with which the flood began on May 31:

> "In the spring of 1935, my future wife had just bought a new car out of her teacher's savings. The night of the flood, she, her mother, and I took a ride between Holbrook and Cambridge over a state highway that had just been built and graveled. We noticed that the water was almost up over the railroad tracks and so we went back to

> Holbrook. By dark, the town was under water. It hit just like that. This new highway simply disappeared along with the railroad tracks." (Geoffrey R. King, 1985 Interview)

There were many miraculous escapes and heroic rescues. In addition, the department was quick to offer assistance to the people affected, according to Arthur B. Chaplin, who worked at Grand Island:

> "I took a number of our men and trucks and we helped get the families out. Then, we'd go back and get what personal things they wanted out of their houses. There were three men with every truck and we had trucks there from Hastings and Grand Island. We sent everything that we could to help out." (Arthur B. Chaplin, 1985 Interview)

In bringing order out of chaos, the highways of the region played an important part. Detours were established around washouts and temporary bridge repairs were made so that mail and supplies could move by truck. Materials and men were trucked-in to start repair work on the railroad and telephone lines. Trucks also brought men of the Civilian Conservation Corps to hunt for bodies, bury animals, and perform other emergency sanitation work.

The floods in the Elkhorn and lower Platte River valleys also caused substantial destruction to highways and bridges. While Congress allotted $276,000 to Nebraska in an Emergency Flood Relief Appropriation, repairs and reconstruction necessitated by these disasters absorbed most of the state's resources for new highway construction in these years. W. H. Mengel recalls working on the highway surveys after the 1935 flood in the Republican River Valley:

> "A day or two after the Republican River Valley flood, I was told to stop the job I was on near David City and go to the McCook Division and start some surveys to relocate Highway 6 because of flood damage. My first assignment was at Cambridge. I also had to go up and down the river and get an inventory of the damage to the bridges over the Republican." (W. H. Mengel, 1985 Interview)

In addition to the expenses incurred because of the flood, heavy snows during the winter of 1935-36 also taxed the department's resources. From January 15-28, 1936, the eastern half of the state received approximately 24 inches of snow. Snow removal during the winter of 1935-36 cost $270,000, compared to $58,000 for 1934-35 and $13,000 for 1933-34. The normal problem of drifting was compounded by the failed corn crops of 1935. Normally, rows of standing cornstalks provided a natural snow fence which helped control drifting. And because of the dust storms, the man-made snow fences in other areas had been buried in

dust, making them ineffective. George J. Welty recalls the problems of keeping the highways open during the winter of 1935-36:

> "It was one-way traffic for long stretches between Tekamah and West Point with passing provided about every half-mile. The snow was over 10 feet deep in places. It was just like going down a trench, an open tunnel. A lot of that snow removal was done by hand-shovel. In many cases, a group of shovelers would toss the snow up the side to another group who would toss it higher. It wasn't until 1937 that the department used rotary snow blowers." (George J. Welty, 1985 Interview)

Due to the sub-zero temperatures which prevailed from January 22 to February 19, 1936, the Division of Road Construction and Maintenance was severely handicapped in its efforts to open and clear the highways of snow. All available equipment was transferred to the snow area from those sections of the state where no snow had fallen. Approximately 150 trucks and tractors equipped with snow plows were in action day and night. These units were assisted by over 200 regular maintenance tractor units and about 3,000 men were employed for shoveling.

While the decade of the thirties, taken as a whole, witnessed a substantial increase in mileage added to the state highway system, over 70 percent of the construction took place in the years of emergency federal funding. In the last four years of the decade, annual construction activity was only two-thirds of what it had been previously. With the resumption of regular federal-aid in 1936, Nebraska was again faced with the problem of appropriating enough state dollars to match federal funds on a 50-50 basis. Still committed to "pay as we go" highway construction, the state continuously fell short of the full amount of federal funds apportioned to it. By the end of the decade, State Engineer Albert C. Tilly reported that Nebraska was unable to match some $2 million in federal highway funds, representing $4 million in terms of actual construction dollars when or if matched by the state. In a 1940 report to the Governor, he campaigned vigorously for the state to find a way to provide the necessary funds.

In 1937, the Legislature passed a law which created the state Board of Examiners for Professional Engineers and Architects. Composed of three engineers and two architects appointed by Governor Robert L. Cochran, the board was responsible for registering qualified engineers and architects, and revoking registrations when necessary, in conformity with law. Of course, the board initially had to formulate criteria and make judgements on candidates who could automatically be registered by virtue of education and/or experience, and also

those candidates who would be required to pass an examination. This was no easy task. After assigning registration numbers (E-1, A-1, etc.) to the initial group of engineers and architects, the board members suddenly realized that they had forgotten to assign numbers to themselves. They solved the problem by assigning themselves B-1 thru B-5, the "B" meaning "board." The engineers on the board were Roy M. Green (B-1), Lincoln; David L. Erickson (B-3), Lincoln; and Albert L. Turner (B-5), Omaha. The architects were William L. Steele (B-2), Omaha; and Charles W. Steinbaugh (B-4), Omaha. Governor Cochran received E-1 and James C. Stitt of Norfolk received A-1. In December 1938, there were 184 engineers and architects in the department who had received professional registration.

The average number of Registered Professional Engineers (PE's) at the department has fluctuated over the years as shown below:

Year	PE's	Year	PE's
1940	180	1970	148
1945	118	1975	114
1950	107	1980	100
1955	106	1985	114
1960	143	1990	125
1965	145	1995	134

The 1937 Legislature also created within the department, the Division of Highway Safety and Patrol, to be known as the Nebraska Safety Patrol. By law, the State Engineer was the Director of the Motor Vehicle Division and the State Sheriff was the chief officer of the Safety Patrol. The latter position was first assigned to Raymond F. Weller, who had previously served as the field Division 1 Engineer and who would later become the Chief Highway Engineer of the Department of Roads and Irrigation. In order that he might acquire a thorough knowledge of the requirements, duties, and functions of a traffic control organization, Mr. Weller attended the Iowa Highway Safety Patrol training camp, assuming the role of a candidate for the seven-week training period. This practical experience was of great value in planning the organization of the Nebraska Safety Patrol. Captain Weller was assisted by one lieutenant, one sergeant, and four corporals. Approximately 3,500 men applied for positions as patrolmen. After five weeks of training, 44 patrolmen were assigned to the field on November 22, 1937 wearing distinctive uniforms tailored at the State

Penitentiary. Equipped with 28 patrol cars and six motorcycles, their primary mission was to reduce the number of motor vehicle accidents on Nebraska's highways.

Legislation in 1941 provided that the chief officer of the Nebraska Safety Patrol shall be the Superintendent of Law Enforcement and Public Safety. However, the administration and approval for expenditures of funds by the Safety Patrol was still, by law, the responsibility of the Director of the Motor Vehicle Division (State Engineer).

In 1940, the Bureau of Roads and Bridges had eight field divisions and the state highway system totaled 11,220 miles, of which only 9,000 miles were actually maintained. Of the latter, 4,784 miles were graveled, 3,804 miles were hard-surfaced, and 412 miles had dirt surfacing.

CHAPTER 4

THE WAR YEARS

If highway construction activity slowed in the late thirties, it almost came to a standstill in the early forties after World War II began. Even before the December 7, 1941 Japanese attack at Pearl Harbor in the Hawaiian Islands, the American economy was feeling the impact of the war in Europe. Responding to President Franklin D. Roosevelt's campaign to aid the Allied cause, Congress authorized an expansion of defense activities and by 1940, materials needed for highway construction were also considered vital for defense. By the summer of 1941, steel and lumber were in such short supply that the federal Office of Production Management established priorities on these and other materials. In September 1941, a Preference Rating System was established for highway projects to determine which were important enough to receive materials. According to George J. Welty, these shortages and priority systems severely restricted highway construction in Nebraska:

> "The only construction was on strategic network highways or other roads that were necessary to serve the war effort. Maintenance was limited to that which was required to keep the roads usable. During the first few years after the war, the emphasis was on planning. Construction was limited to emergency projects." (George J. Welty, 1985 Interview)

Because of a growing concern for national security, the War Department and the Public Roads Administration identified a system of highways throughout the nation which was considered important for military purposes. Referred to as the Strategic Network of Highways, these routes would be given top priority for materials and federal funds for maintenance. In Nebraska, this involved three main routes: (1) US-75 from the Kansas line north to Omaha, (2) US-30A west from the Missouri River at Omaha to the junction of US-30 west of Clarks, then west on US-30 to the Wyoming state line, and (3) US-81 from the Kansas line north to Norfolk, US-275 from Norfolk to O'Neill, and US-281 from O'Neill to the South Dakota line. State highway departments were restricted even further by the Defense Highway Act of 1941. Under this Act, federal highway funds were limited to the Strategic Network of Highways, construction of roads to military establishments and defense manufacturing plants, construction of air bases, and advanced engineering surveys for projects to be undertaken after the war. During 1943, the use of federal highway funds, with the exception of four emergency flood projects, was restricted entirely to the construction of

access roads leading to war industries, air bases, and other work considered essential to the war effort.

The first four-lane, divided highway in Nebraska was completed on December 8, 1941 on Highway 73/75 from the south city limits of Omaha, south to Fort Crook. The project consisted of six miles of twin 22-foot concrete lanes separated by a 10-foot grass median with 10-foot stabilized soil shoulders surfaced with prime and armor coats. Traffic-actuated traffic control signals were installed at the entrance to the Glenn L. Martin Bomber Plant at Fort Crook. In the spring of 1945, this plant manufactured the B-29 aircraft, Number 82, which was to drop the first atomic bomb on the Japanese Empire. This B-29 was later named the "Enola Gay" by its pilot, Colonel Paul W. Tibbets, in honor of his mother, the former Enola Gay Haggard of Glidden, Iowa.

After America's entry into the war, federal government policies continued to dictate highway construction projects, even those not dependent upon federal funds. In fact, on April 9, 1942, the War Production Board issued orders prohibiting highway construction starts estimated to cost more than $5,000 in a 12-month period, unless a Preference Rating Order was issued for the project or specific authorization was obtained from the Director of Industry Operations. The use of steel, lumber, asphalt, and cement, all of which had been added to the list of materials vital to the national defense, was restricted. Efforts were made by the Bureau of Highways to modify highway design in order to reduce or eliminate the use of these critical materials.

Commenting on the West 0 Street access to the Lincoln Army Air Force Base, Oliver W. Johnson describes the challenges of highway construction under these restrictions:

> "There was no steel used in that pavement and there were some box culverts which were built without steel. We had never built a box culvert without steel and were now doing so since steel was in short supply because of the armament industry. There was no steel used in the pavement, no mesh or reinforcement of any kind." (Oliver W. Johnson, 1985 Interview)

Steel reinforcement was eliminated from concrete slabs and asphalt coats were applied thinner in an attempt to maintain a reasonable level of construction activity. But, by the end of 1942, most construction had been curtailed and only a small amount was let to contract.

The Bureau of Highways shifted its energies from road construction to defense-related activities. The engineering staff became deeply involved with Army and Navy engineers who were constructing ordnance plants and airfields in Nebraska. Department engineers performed valuable service by providing soil samples, survey information, testing facilities, and equipment. In fact, a much greater amount of research and testing was taking place in the face of the construction decline. This increase in activity led to a new agreement between the University of Nebraska and the Department of Roads and Irrigation in May 1942, whereby the department leased the laboratory, office space, and equipment from the university, thus making the testing facility a more integral part of the department.

In September 1942, the Federal Works Agency announced a $500 million post-war highway program and provided funds for preliminary surveys and plans. Planning for this program became a major activity of the department for the duration of the war. In addition to these activities, the establishment of war plants created special problems of traffic control. The department's design engineers became involved in a major way, designing special intersections to accommodate traffic around the Martin Bomber Plant at Fort Crook, the Nebraska Ordnance Plant at Mead, and the Naval Ammunition Depot at Hastings.

Because of the cutback in design and construction, some employees were reassigned to other activities. Such was the case with Stephen R. Gilbert, who was a graduate engineer:

> "There wasn't much highway work and we didn't have much money. Most of the work was maintenance and other work related to the war. I was assigned to the Bureau of Highways and my job was reconditioning and fixing trucks at the Lincoln Fairgrounds. About 75 trucks had been on WPA and they were sending them north to assist with the construction of the Alcan Highway." (Stephen R. Gilbert, 1985 Interview)

During World War II, military construction teams performed many incredible feats. One of the most spectacular was the 1942-43 construction of the 1,530 mile Alaska Highway from Dawson Creek, British Columbia to Big Delta, Alaska. Constructed through virgin wilderness, the highway was completed in 20 months (eight working months) and has been termed the greatest engineering feat since the construction of the Panama Canal.

Many department employees were shifted to repairs and maintenance. Arthur B. Chaplin, who was the Superintendent of Equipment and Shops, commented about the increase in employees under his supervision at the 6th and South Streets shop in Lincoln and the increased demand for locally produced parts:

> "I had three welders before the war. During the war, I had 29 people working in the shop. It was quite an increase. Because you couldn't get them, we had to make a lot of parts. We made timing gears and even poured aluminum and machined them. At that time, we were even taking care of the dies and everything for the Lincoln Reformatory. We were also making braces and things for hospital kids. Departments worked among themselves in those days, helping each other out." (Arthur B. Chaplin, 1985 Interview)

The Division of Maintenance was an exception. Overall, the number of personnel in the Department of Roads and Irrigation declined dramatically during the war. Between July 1941 and May 1945, the department lost 310 employees. Almost half of these were inducted into the Armed Forces:

> "I think I was the first one in the department to get drafted. The morning that I left home, my dad took me down to the Lincoln depot. He had to go to work at 8:00 and I got on the train. Bob Riddle was down there. He was my boss and a nice guy. Anyway, Bob gave me some candy bars and a couple of packs of cigarettes. He stood there waiting until the train pulled out." (Malcolm A. Gabel, 1985 Interview)

Some who received the "call to colors" were veterans of World War I, such as Arthur T. Lobdell, who was a 1916 graduate of Cornell University at Ithaca, New York. After serving with the U.S. Army in France, former Second Lieutenant Lobdell was hired by the department as a project engineer in August 1919. He was promoted to Division Engineer at York in 1921 and to Chief of the Bureau of Roads and Bridges in 1927. He served in this position until 1941 and was also acting State Engineer from July 1934 to January 1935. In March 1941 at age 46, Major Lobdell was recalled to active duty in the Army. At the end of the war, Colonel Lobdell was the commanding officer of the prisoner-of-war camp at Algona, Iowa, which held over 3,000 German military prisoners. He returned to the department in 1946 and served in Lincoln as the Administrative Engineer, Chief of Personnel, and as a Special Assistant until his 1965 retirement. He authored the "Nebraska Department of Roads - A History," covering the 1895-1965 era.

During World War II, many department employees requested leaves of absence or simply resigned to take better paying jobs in defense-related industries. Higher pay in the private sector attracted employees at all levels and grades. This was made worse, according to accountant George J. Welty, because department wages were frozen except for promotions:

> "Everyone's pay was frozen for about four years. During the war, I worked almost every Saturday. We just didn't have the help to do the work. It would have been worse had we not been able to hire the wives of some military personnel stationed at the Lincoln Air Base. I put in very long hours for a long time." (George J. Welty, 1985 Interview)

The number of employees in the Department of Roads and Irrigation dropped from 990 in 1941 to 770 in 1942, a decline of 22 percent. By the end of the war in 1945, the department was down to 661 employees. During the war, the department tried to hire high school students for summer work but many students were able to secure employment in the war industries at higher rates of pay. From 1941-48, the average number employed by the Bureau of Highways during each of those years was: 1941 (835), 1942 (638), 1943 (529), 1944 (545), 1945 (535), 1946 (736), 1947 (843), and 1948 (952).

Perhaps the most adverse effect of the war on Nebraska's highways was simply neglect and deterioration. When asked to submit its post-war highway report to the roads committee of the U.S. House of Representatives in 1944, Nebraska painted a bleak picture of its highway conditions. The state highway system comprised 9,119 miles by 1944 and only 4,050 miles (44 percent) were paved. Nebraska had 1,200 miles of concrete pavement and half of it was over 10 years old and in need of repair. Most of the remaining 2,850 miles of pavement consisted of bituminous surfacing, 40 percent of which was deemed inadequate by the department. State Engineer Wardner G. Scott was quick to note that the inadequacies of Nebraska's highways was not a reflection of the department's engineers, but the result of many years of inadequate funding made even worse by the war restrictions on materials and construction activities.

While highway improvements were badly needed in Nebraska and nationwide, the U.S. still had a good transportation network when compared with those in other countries. Despite the trials, tribulations, and growing pains inherent in any large organization, AASHO had been a driving force for many years in the development of better highways across the country. This fact was eloquently described by Fred R. White, State Highway Engineer of Iowa, upon the retirement of William C. Markham of Kansas, the first Executive Secretary of AASHO from 1922-43:

> "As in the case with most of such organizations, the American Association of State Highway Officials did not spring into full maturity overnight. It had to grow up the hard way. Organized in 1914, the organization represented only the framework or pattern of an ideal. It had neither the substance nor the sinew for the struggle ahead, or the

shape of things to come. But it did bring together the wisdom and organizing genius of the farsighted highway officials of the pioneer day. Most of these founders of the association have now passed on to their reward, but their ideal lives on. The foundation they laid still stands. And on that foundation, there has been built in this nation a highway system second to none that the world has ever seen!"

The 1944 Federal-Aid Highway Act implemented the post-war highway program which was designed to address the inadequacies of the nations's highways. Three categories of funding were established. The first category was federal-aid primary routes. Based on the old Seven Percent System, Nebraska had 5,630 miles of such highways eligible for federal funds. The second category included farm to market, RFD, and public school bus routes. Referred to as secondary or feeder roads, Nebraska had some 9,800 miles which qualified under this category. The third category attempted to address the problem of urban highways and funds were specified for highways in urban areas of 5,000 or more in population. Eighteen cities in Nebraska were eligible under the guidelines.

On July 16, 1945, history was in the making northwest of Alamogordo, New Mexico in an area which 16th Century Spaniards called the Jornada del Muerto (Journey of Death). At 5:29 a.m., a physicist flipped a switch which would free an elemental force from its bonds after being chained for billions of years. At 5:29:45, there was a flash and explosion such as the world had never seen. The bomb's plutonium core had produced a temperature of millions of degrees Fahrenheit and an energy release equivalent to 18.6 kilotons of trinitrotoluene (TNT). On August 6 and 9, atomic bombs yielding 12.5 and 22.0 kilotons, respectively, were dropped by B-29 aircraft on the cities of Hiroshima and Nagasaki, Japan. Those bombs proved to be the coup de grace and the war would soon end.

While the 1944 Act identified major areas of need within the states, the condition of the nation's highways was much worse than the Act's sponsors anticipated and funding was far from adequate. Nebraska was scheduled to receive an annual appropriation of $8.5 million to address a problem estimated by the Bureau of Highways to cost over $140 million. But, even this funding was not destined to remain and Congress curtailed the entire post-war highway program in 1946.

During World War II, U.S. railroads carried almost 98 percent of all military personnel traveling in organized groups and more than 90 percent of all military freight handled by inland transportation.

The condition of Nebraska's highways became even worse in the next several years and funding was only part of the problem. Even though the war was over, it was more difficult to obtain materials than before. Steel, cement, lumber, and asphalt remained in short supply and at inflated prices. Post-war inflation continued to erode department funds as the need for replacing old and obsolete equipment increased and labor costs rose. By 1948, maintenance costs were $3 million above the pre-war level and consumed over half of the department's budget. Equipment was difficult to obtain and spare parts were almost impossible to acquire. The demand for materials also overtaxed the ability of the railroads to move materials and equipment. And, to make matters worse, the nation's railroads suffered from both a car and labor shortage in the post-war period.

Prior to May 1942, the Testing Laboratory had been operated by the University of Nebraska for the Department of Roads and Irrigation. From May 1942 until November 1948, the Testing Laboratory was operated by the department as the Division of Tests and was located at the university. Space and part of the equipment were leased from the university. Grading work began on the department's grounds at 14th and Burnham Streets in south Lincoln in November 1945. The culverts and pavement were constructed in 1946 and the new Testing Laboratory Building was completed in October 1948. The Division of Tests finally had a home of its own.

The post-war economy continued to affect the department's ability to hire qualified personnel. It was hoped that many experienced employees would return to the department at the end of the war, but that didn't happen. The public sector was unable to compete effectively with the private sector as the post-war building boom began. In fact, the department continued to be plagued with a high turnover of personnel into the post-war period. From 1941 to 1948, the department averaged 859 employees. During that same period, 1,375 employees left the department. Dividing 1,375 by 859 equals 1.6, or a turnover of 160 percent. The department's ability to carry out its planning and maintenance programs was adversely affected by this 20 percent annual turnover. The heaviest losses were in the engineering grades, which reduced the number of engineers by half. In 1941, there were about 180 registered engineers in the Bureau of Highways and by the summer of 1948, only 99. In an effort to rebuild its staff, the department established an expanded On-The-Job Training Program in 1946. On-the-job training was not a new operation for the department. It was the method by which chainmen became rodmen, instrumentmen, and engineers since 1919; and by which laborers became surface patrolmen, mechanics, and skilled maintenance

employees since 1927. John W. Hossack talked about the department's increased efforts to attract and train veterans by offering this training:

> "We had an On-The-Job Training Program for those who didn't attend college. I think it was a four-year program. Many of our people went through the program and in quite a few instances, they got enough education to pass a professional engineer's exam and become registered engineers." (John W. Hossack, 1985 Interview)

This program attracted 195 trainees in the first year and from 1946 to 1950, a total of 431 veterans received training. Geoffery R. King was one who benefited and talks about his advancement:

> "After returning from the war, I entered the training program and became a junior engineer automatically on completion. I started one project as a junior engineer and was promoted to associate engineer shortly thereafter. Then, when I received my license, I became a senior engineer." (Geoffrey R. King, 1985 Interview)

Additional programs were initiated by the department to help alleviate the loss of skilled engineers. In the spring of 1947, a program was started in conjunction with the Lincoln Public Schools to provide training for engineering assistants. Seventy-five department employees, most of whom were veterans, attended this program at Park School, which was repeated again the following spring for 95 persons. Most of the on-the-job training courses at Park School, according to John W. Hossack, were taught by department employees:

> "Most of the teachers came from within the department and were experienced engineers. Some had been college professors. They were interested in the program and liked people. It was an adult education program, kind of like a Community College today." (John W. Hossack, 1985 Interview)

Orville L. Lund was one of the teachers and recalls the experience at Park School:

> "They brought in a lot of field people, most of whom were veterans, and we gave them a good basic education in engineering. Representatives from Materials and Tests, Design, Construction, etc. would lecture and give examinations, very similar to university classes. From that program, many of the leaders in the department today became engineers by passing the engineering test. For instance, Charles Nutter, who is now the Deputy Director-Operations, is one who studied engineering over there." (Orville L. Lund, 1985 Interview)

Charles F. Nutter, who was hired by the department as a junior engineering assistant in 1946 and who would rise to the position of Deputy State Engineer in 1971, was a U.S. Army veteran who received engineering training at Park School. He also participated in another department program which provided correspondence courses in civil engineering:

> "We had a school of two months duration over at the old Park School at 7th and F Streets. At that time, they were teaching us the basics of surveying and earth work. Our instructors were department employees. Z. N. Dewey was one of them, also Bob Riddle, H. T. Ball, and Orville Lund. A lot of us signed up for the International Correspondence School course. A. T. Lobdell, our Personnel Director, encouraged us to do that and we did. They were trying to help us get our engineering licenses." (Charles F. Nutter, 1985 Interview)

The Department of Roads and Irrigation had reached another critical point in its history. With federal funds drying up, high inflation, and deteriorating roads, Chief Highway Engineer Raymond F. "Bub" Weller expressed the following to Governor Val Peterson:

> "Nebraska has reached a point, in the cycle of its highway development, where it has become necessary to review the entire problem of highway transportation from the standpoint of public demand for new roads; the vital and urgent need for repairing, improving, and modernizing the present system; the inadequacy of available funds; and the increased volume of traffic."

In July 1947, Governor Peterson appointed a 35-member Highway Advisory Committee which was chaired by George W. Holmes of Lincoln. The other members of this historic committee were: C. J. Abbott, Hyannis; Fred Barclay, Pawnee City; Everett Barr, Liberty; M. F. Bell, Holdrege; Mrs. Arthur Bowring, Merriman; Lawrence Brock, Wakefield; Tom Coffey, Alma; Julius Cronin, O'Neill; Mrs. Essie Davis, Hyannis; State Senator John F. Doyle, Greeley; Harry Gantz, Alliance; Roy M. Green, Lincoln; C. E. Haley, Hartington; Robert D. Harrison, Norfolk; H. B. Hill, Superior; Roman Hruska, Omaha; Dr. C. R. Ivins, Crawford; Hans Jensen, Aurora; John Jirdon, Morrill; Gerald McGinley, Ogallala; J. E. McNally, Schuyler; Carl Marsh, McCook; Arthur W. Melville, Broken Bow; William Mitten, Fremont; Charles R. Moon, Fairbury; Walter O'Connor, North Platte; Pete Parkert, Hooper; James S. Pittenger, Lincoln; J. C. Quigley, Valentine; State Senator Fred A. Seaton, Hastings; W. H. Smith, Seward; Oliver Stevenson, Nebraska City; H. L. Van Amburgh, Omaha; and Fred Wallace, Gibbon.

The Highway Advisory Committee was charged with assessing Nebraska's present and future highway needs and possible means of financing them. The creation of this

committee, composed of private citizens, was a prelude to the later establishment of the State Highway Commission. The committee represented an awareness that the public had to become more actively involved in determining the direction of highway development in Nebraska. W. H. Mengel had recently been transferred to the Highway Planning Survey and recalls the committee's work:

> "The federal Public Roads Administration encouraged state highway departments to study the needs of their highway systems and prepare a program for bringing their systems into shape to handle anticipated increases in traffic and to study the need for adopting higher standards for construction. After the war, the Nebraska Highway Planning Survey participated in an engineering study to provide factual data on the existing systems." (W. H. Mengel, 1985 Interview)

The Highway Advisory Committee held numerous public hearings across the state and made its initial report to Governor Peterson on November 29, 1948. Over 6,500 miles of the state highway system were considered to be defective and the estimated cost of bringing this system up to standards exceeded $259 million, a king's ransom in those days!

During 1948, the road magnets continued to "earn their keep." One of the heaviest pick-ups of metal was made on Highway 66 east and west of Hordville, where 41.3 pounds per mile were collected.

Although most people speak of the "Blizzard of 1949," the weather during November and December 1948 aggravated the tie-up of the transportation system of the state which came several months later. Light rain began to fall in the afternoon of November 16, 1948 and falling temperatures made the highways extremely icy. This was followed by snow and winds of 50-60 miles per hour and the highways were soon blocked by deep drifts. The storm moved slowly and it was November 20 before the snow and wind abated. From 4-16 inches of snow had fallen and with the exception of routes in the extreme southeast, all highways in Nebraska were closed. As the wind subsided, snow removal progressed and by November 22, all state routes were open to at least one lane of traffic. David O. Coolidge was the Division 6 Engineer at McCook and recalls the difficulties of clearing the highways:

> "We had this old, worn-out, thirties-vintage equipment and tried to clear the roads but it was impossible. The wind was blowing so hard that a highway cut would fill up. Those little snow plows weren't getting the job done and we had people out in front helping us with shovels and that still wasn't getting it. Then, a contractor told me I could get it done with a bulldozer. I think that was the first time we ever used a bulldozer in the state to get the roads open. Of course, there was a lot of dirt mixed

with the snow and it was pretty solid but we finally got the job done." (David O. Coolidge, 1985 Interview)

However, winds and new snows, some of blizzard proportion, persisted and continuous trouble was encountered by those clearing the highways. On December 24, 8-12 inches of snow fell over most of the state and the highways were blocked again. For six weeks, a large part of Nebraska had been blanketed in deep snow and buffeted by strong winds. State maintenance crews would open a few miles of highway and the winds would quickly drift them closed. People driving over open highways enroute to town would find all routes blocked when they tried to return home. State highway maintenance workers were tired and their equipment began to fail after day and night operation.

Those were the existing conditions when the "Blizzard of 1949" struck. New Year's Day was fair and warm but on January 2, winds of 50-60 miles per hour roared across the plains and gusts reached 75 miles per hour. With the wind came snow, falling as if there were no limit to the amount the sky could release. Raging for five days without let-up, the storm was described by old-timers as the worst in the history of the state. Up to 44 inches of snow was reported in the north and west. Eighty percent of Nebraska's state highways, or about 8,000 miles, were blocked. Traffic was paralyzed and many snow plow crews on rescue missions were stranded, unable to proceed or turn back. All available snow removal equipment in the southeast part of the state was dispatched to the disaster areas. New equipment was purchased and delivered from factories in the East. Snow removal equipment was rented and sent into the worst areas. Four large rotary snow plows were loaned to Nebraska by the State of Iowa.

State highway maintenance crews, superintendents, and engineers fought the drifts despite inconveniences and hardships; but the strain of operating day and night for weeks at a time began to show on both men and machines. At the height of the operation, however, there were 46 rotary snow plows, 125 heavy-duty, all-wheel-drive trucks with V-plows, 325 smaller trucks, and other auxiliary equipment employed in the battle. Good progress was made despite the tremendous volume of snow, low temperatures, and equipment breakdowns. By the second week in January, nearly all state highways were again open to one-way traffic although vehicles moved with difficulty due to ice and packed snow. In answer to calls for assistance, state forces opened many roads and streets that were not on the state system. The state maintenance forces had been working 12-16 or more hours a

day, including Sundays and holidays, since the first storm on November 17 and they began to sense that victory was within their grasp.

The battle, however, had just begun. On January 15, a few hours of new snow and high winds undid the work that had required hundreds of men and machines weeks to accomplish. Newly plowed highways were drifted deeper than before and all traffic halted. Low temperatures and intermittent high winds continued through January, February, and most of March. In the areas hardest hit, highways would remain open only a few hours or days before drifting closed them again. And some highways remained closed, according to Charles F. Nutter, who was working in Thedford at the time:

> "There was nothing that you could do during that blizzard. You just had to sit it out. I was working out of Thedford when the blizzard hit. There was a fellow working for us by the name of Armond Kuehn and he lived in Crofton. There was a period of six weeks that he didn't get home because the roads were never open. That was a bad storm. There were people north of O'Neill whose roads were not open for 60 days. They had to use airplanes to deliver groceries to them." (Charles F. Nutter, 1985 Interview)

The last major storm of the year occurred on March 30-31. After days of warm thawing weather, 16-18 inches of wet snow fell over much of the disaster area. Truck plows were of little value in this later work and breakdowns of lighter equipment became more frequent. It was April 7, 1949 before all state highways were open to two-way traffic for the first time since November 17, 1948. The winter of 1948-49 was one of the worst that Nebraska has endured since record-keeping began. The cost of snow removal from the state highway system was about $1.2 million, shattering the previous record of $270,000 from the winter of 1935-36.

By 1950, the availability of construction materials, equipment, and labor was considered adequate for the first time since before World War II. Inflation remained a problem, however, with highway construction costs more than double what they had been in 1940 and engineers still in high demand by private contractors. With the outbreak of hostilities in South Korea on June 25, 1950, the department again suffered a loss of personnel as employees volunteered or were called to active duty in the Armed Forces. There also was renewed anxiety that U.S. involvement in South Korea would cause increased prices and new material shortages, but these concerns proved unwarranted as the nation entered the building boom of the fifties. The previous decade of planning and design activities meant that construction could begin almost immediately. In 1950, the Bureau of

Highways had eight field divisions and the state highway system totaled 9,578 miles. Of the latter, 5,062 miles were graveled, 4,386 miles were hard-surfaced, and 130 miles had dirt surfacing.

In Nebraska, the economic climate looked positive and the times appeared right for addressing the ability of the state to finance improvements to its highway system. Responding to the revenue needs estimated by the Highway Advisory Committee, Governor Val Peterson signed legislation in 1949 to increase the finances available to the Bureau of Highways, raising the gasoline tax by one cent and increasing motor vehicle registration fees. Together, these measures promised to annually produce $5 million in new revenues, $4.5 million of which would be earmarked for matching federal-aid highway funds to provide $9 million for state highway construction. This legislation, however, was repealed by the voters in a referendum during the general election of November 1950:

> "The public wanted better highways but there was a shortage of funds for such purposes. The issue of a gas tax increase was put on the ballot and worded in such a way that if you wanted the increase, you voted 'against'. I think that it was worded that way because someone figured that Nebraskans traditionally vote 'against' on everything. However, the scheme didn't work. I think that the people really wanted the increase, so they voted 'for'. Of course, the legislation was repealed and the revenue shortage continued." (Kenneth J. Gottula, 1986 Interview)

To repeal the gas tax increase, the vote was 207,408 (51.5%) to 195,130 (48.5%). To repeal the increase in motor vehicle registration fees, the vote was 202,098 (51.9%) to 186,854 (48.1%). Thus, the Bureau of Highways found itself in a no-win position. More than a few called the Department of Roads and Irrigation the "Department of Ruts and Irritation." The future of Nebraska's highways appeared to be "a riddle wrapped in a mystery inside an enigma." The public demand for highway improvements was not matched by its willingness to pay or understanding of the complexities of highway financing. According to Merle Kingsbury of Ponca, who was appointed to the original State Highway Commission in September 1953, the latter was probably the greater problem:

> "The referendum was premature in 1950. It was submitted to the people without concrete evidence of how it was to be accomplished. However, it did succeed in alerting the people to our problems." (Merle Kingsbury, 1985 Interview)

And the problems were real, according to G. C. Strobel, who after wartime service as a captain in the U.S. Army and graduating from the University of Nebraska College of

Engineering in 1947, was hired by the department that same year as a junior engineer and appointed Deputy State Engineer on January 1, 1960 at age 38:

> "We had about 5,000 miles of gravel highways on the state system in the early fifties. In the spring, you had to be careful which state highway you took because you couldn't always get through on gravel. Moisture would come up to the surface during the frost period. When the frost went away, the roadway support would disappear. It was often wiser to select another highway or even use the county road system to avoid getting into trouble." (G. C. Strobel, 1985 Interview)

In order to establish ratings within the Nebraska Safety Patrol that would be comparable to the ratings held by administrators and division heads of patrol organizations in other states, the rank of the Superintendent of Law Enforcement and Public Safety was advanced from captain to colonel in June 1951. In turn, lieutenants became captains, sergeants became lieutenants, corporals became sergeants, and the corporal rating was discontinued. This change of ratings, however, was not accompanied by any corresponding increase in pay.

Investigations conducted by the department from 1943-50 indicated that many sand-gravel aggregates produced over a large area of Nebraska were more or less reactive with cements in concrete structures and pavement. This reaction generally caused "map-cracking" of the surface and often caused excessive expansion which could destroy the concrete, necessitating expensive repair or replacement of structures and pavement.

Converting Nebraska's gravel highways to hard-surfacing became the priority issue of the department in the 1950's. To Gerald Grauer, who was hired by the department as an engineering assistant in 1951, appointed Program and Planning Division Engineer in 1968, Project Development Division Engineer in 1974, and Roadway Design Division Engineer in 1989, the goal was "to get Nebraskans out of the mud."

In order to function with the limited finances at his disposal, State Engineer L. N. Ress initiated a two-fold program. The immediate need for highway improvements would be determined by the establishment of a Sufficiency Rating, which would determine the relative priority of projects. The rating would include, but not be limited to surface condition, economic factors, safety, and service:

> "About 1952, we developed a Sufficiency Rating. Basically, you drove every mile of highway in the state and analyzed it as to its condition, width, and all the various

> things that would have to do with the condition, life, and service rating of that particular section. Then, every highway got a grade. Kind of like a report card, it got a grade from 0 to 100." (John W. Hossack, 1985 Interview)

An administrative reorganization of the department was effected in 1952 to promote more efficient use of manpower and better coordination of services. The position of Chief of the Bureau of Highways was replaced by that of the Deputy State Engineer. Under this new structure, the Deputy State Engineer had full authority, in the absence of the State Engineer, in matters concerning both bureaus, the Motor Vehicle Division, and the Safety Patrol. A streamlining of the divisions in the Bureau of Highways was also accomplished.

Along with constructing and maintaining adequate highways, the department had been involved with roadside development projects and reducing soil erosion since 1934:

> "An effort is made to obtain a growth of vegetation on the highway shoulders, slopes, and roadsides to prevent wind and water erosion. Brome grass is sowed generally throughout the state and provides an excellent sod with ample root growth to materially assist in the prevention of erosion and to discourage the growth of weeds. Each year, the department harvests brome grass seed from the rights-of-way where good stands are available. During 1953, over 40,000 pounds of such seed were harvested and in 1954, over 65,000 pounds. Most of this seed is planted on recently constructed highways. Much improvement has been made not only in the appearance of the rights-of-way, but also the reduction of soil erosion."

At the same time, the department began working on a major report to be presented to the Legislature suggesting revisions to statutes which would make highway funding more efficient and realistic. It was also recognized that the public needed to be more aware of the total picture of highway development and financial needs within the state in order to make more responsible decisions about funding. The Highway Advisory Committee represented a positive step in this direction. Its contacts with people throughout the state had already promoted better relations between the public and the Bureau of Highways. Other states discovered this same need and 32 states had some form of committee or commission acting in this capacity. To further these public relations functions and assure the continuation of a representative group to serve as a liaison between the citizens, Bureau of Highways, and Governor, the 1953 Legislature passed a bill which created the State Highway Commission. The original seven commissioners were: Christian E. Metzger, Cedar Creek (District 1); Arthur L. Coad, Omaha (District 2); Merle Kingsbury, Ponca (District 3); Arthur C. Albrecht, Deshler (District 4); William O. Collett, North Platte (District 5); Don E. Hanna, Brownlee

(District 6); and Fred M. Attebery, Mitchell (District 7). According to Merle Kingsbury, the commission was a response to increased public pressure for better highways:

> "In 1953, Nebraska had a state highway system of over 9,800 miles. About half of it was gravel and the people of the state were very impatient to convert gravel to hard-surfacing. The various communities became insistent that more progress be made and that we move faster. The Legislature decided to create a State Highway Commission consisting of lay-people to advise and assist the department in the public acceptance of a program that would upgrade the state highway system. It was a way of getting the people aware of our problems and then trying to get some public support, to get the people involved. Before that time, it was all engineers." (Merle Kingsbury, 1985 Interview)

In part, this action formalized the function being served by the former committee. Specifically, the State Highway Commission was to act in an advisory capacity to the State Engineer in establishing broad policies and was to advise the public regarding those policies, as well as the activities of the Bureau of Highways. The commission was also charged with the formulation of a trunk highway system to be financed with revenue produced by highway user taxes.

At the commission's first meeting on October 28, 1953, Mr. Kingsbury was twice nominated for chairman and twice declined, citing limited time, the heavy workload of his law practice, and his intent to run for Dixon County Attorney the next year. Thereafter, Arthur L. Coad was elected chairman. Mr. Kingsbury did indeed run for Dixon County Attorney in 1954 and was elected, serving seven terms (28 years) until his retirement from that office in 1983. And, when Mr. Kingsbury retired from the State Highway Commission in November 1987, he had served six terms (one 4-year and five 6-year) for a total of 34 years and 2 months.

Political considerations had played a role in the location of some highway projects, with a few decisions appearing more blatant than others, according to State Senator Jerome Warner of Waverly, who grew up in a farm family where state issues were common topics around the dinner table. He recalled that roads seemed to be subject to political dealings and that the creation of the State Highway Commission was an attempt to lessen the possibility of such happenings and to insure a broader representation of political interests:

> "An example was during one of the governor's elections. The incumbent governor was endorsed by a former governor at the same time that a hard-surfaced highway was completed to that former governors's ranch. It was presumed to be a reward for an endorsement. One of the first steps to help get highway building away from politics

was the creation of the State Highway Commission in the early fifties." (Jerome Warner, 1985 Interview)

Merle Kingsbury agreed that the commission attempted to represent varied business interests as well as geographical districts. From photographs, he describes the original seven commissioners appointed by Governor Robert B. Crosby in September 1953:

> "I see Fred Attebery, who ranched north of Mitchell on Highway 29. Next is Don Hanna, Sr. from Brownlee, who was also a rancher. Next is Bill Collett, who was an insurance man from North Platte. The first chairman of our commission was Art Coad, the president of the Packer's National Bank in south Omaha. Next is Art Albrecht, who was a farmer and businessman from Deshler. Myself, a lawyer from Ponca...and Chris Metzger, a former State Senator who had farming interests near Cedar Creek. Over the years, quite a variety of professions have been represented." (Merle Kingsbury, 1985 Interview)

The 1953 law creating the State Highway Commission was amended in 1955 and provided, in part, that the State Engineer shall be an ex officio, non-voting member of the commission, and the commission, subject to the approval of the governor, shall employ a person who shall act as Secretary to the commission. The first Secretary was Owen J. Boyles, who had served as the Assistant Director of the Motor Vehicle Division from 1942-55. He was hired by the commission on January 1, 1956 and died of cancer on August 11, 1959 at age 53, while still serving.

A major benefit for department employees came on January 1, 1951 when payroll deductions began for coverage under the 1935 Social Security Act. The rate deducted from each employee's pay was 2.5 percent of the first $4,200 in earnings. This did not include the uniformed members of the Safety Patrol because they had the Safety Patrolmen's Retirement System which was established by the 1947 Legislature.

On January 4, 1954, Robert H. Willis died at age 83 while serving in his fifty-ninth year of continuous employment with the department. In 1945, he became the first department employee to log 50 years of continuous service. Mr. Willis, who was educated as a civil engineer at the Rensselaer Polytechnic Institute at Troy, New York, began his service in 1895 as Water Commissioner of the North Platte River Basin for the State Board of Irrigation. He also served as Water Superintendent and, in 1918, as Assistant State Engineer. In 1919, his title was changed to Chief of the Bureau of Irrigation, Water Power, and Drainage. He remained in this position until his "retirement" in 1951. However, Mr. Willis continued his

employment by serving as a consultant to the department until his death. During his long career, he served under 15 state engineers and 18 governors.

On February 15, 1954, the department restricted the weights of truck loads on various state highways across the state. This was necessary after studies revealed that in some areas, freezing and thawing cycles weakened bituminous highways. The 1953 Legislature made these restrictions mandatory when weather conditions caused the weakening of a state highway subgrade:

> "We posted our 'slobber coat' highways, most of which were nothing more than a base and armor coat built to get the public out of the mud. Of course, the farmers used to joke that on these highways, they could only haul their bull to market one-half at a time. By the early seventies, most of these roads had been upgraded so that load-posting was no longer necessary." (Kenneth J. Gottula, 1986 Interview)

On October 1, 1954 and for the first time, the state provided voluntary group medical insurance to all regular state employees.

In December 1955, the officers of the Safety Patrol switched from "garrison" caps to "campaign" hats. This change was made in response to the interest in such headgear by officers within the organization and because of favorable reports from police and patrol organizations in other states.

From November 1948 to October 1959, the department sponsored the 370th Engineer Construction Group, a U.S. Army Reserve Unit manned principally by department employees. The 370th was initially commanded by Colonel Arthur T. Lobdell and later by Lieutenant Colonel Henry G. Schlitt. Colonel Schlitt served as the Deputy State Engineer from 1953-59. On October 1, 1950, there were 16 officers and 22 enlisted men assigned to the unit. Although the "colors" of the 370th have long been retired, there are still a number of department employees who recall "Lobdell's Raiders" with fond memory.

CHAPTER 5

THE INTERSTATE

In what now seems a token gesture, the 1952 Federal-Aid Highway Act authorized $25 million for the nationwide Interstate system for each of Fiscal Years 1954 and 1955, using the traditional 50-50 cost sharing. The 1954 Federal-Aid Highway Act increased the nationwide Interstate funding to $175 million for each of Fiscal Years 1956 and 1957 and changed the cost sharing to 60-40. These Interstate funds for Fiscal Years 1954-57 were apportioned among the states by a formula based on population, land area, and postal route mileage.

Then, on June 29, 1956, President Dwight D. Eisenhower signed the historic 1956 Federal-Aid Highway Act which authorized construction of the National System of Interstate and Defense Highways. And, in doing so, he set in motion the greatest public works program in the history of mankind! President Eisenhower's recognition of the importance of highways was formulated in 1919 when, as Lieutenant Eisenhower, he participated in the U.S. Army's first transcontinental motor convoy from Washington, D.C. to San Francisco, California. This 62-day trek, along with his experiences in World War II, prompted him to later say:

> "The old convoy started me thinking about good, two-lane highways,
> but (the autobahn in) Germany made me see the wisdom of broader ribbons across the land."

But the Army officer who rose to the presidency in 1952 could hardly have visualized the vast network of of multi-lane highways that is today's Interstate system.

With the 1944 Federal-Aid Highway Act, Congress laid the foundation for a 40,000-mile system of Interstate highways within the continental limits of the United States but no funding was provided. Another attempt was made in 1955 to provide adequate Interstate funding, but it too failed. In Nebraska, the State Highway Commission had only begun its work of reviewing the state system and measures to increase funding for converting gravel surfacing to pavement when Congress passed the 1956 Federal-Aid Highway Act. This landmark legislation established a timetable for the completion of the Interstate, substantially increased federal funding for the Interstate and other federal-aid roads, and provided a mechanism for raising the money. The mechanism was the federal Highway Trust

Fund, similar in concept to the highway trust funds which had earlier been established in most states. The plan called for the completion of the Interstate in 16 years, with authorizations spread over 13 years. It was a monumental piece of legislation and one destined to change the landscape of America. Requiring only 10 percent matching funds from the states, it provided an opportunity for the states to address their transportation needs in a more vigorous fashion than ever before. Indeed, it was the most consequential highway legislation since the initial Federal-Aid Road Act of 1916. The 1956 Act created the position of Federal Highway Administrator and also changed the name of the Interstate system to the National System of Interstate and Defense Highways, because of its primary importance to the national defense. For Nebraska, it meant the possibility of $168 million in highway construction over the next three years if state matching funds were available.

After the 1956 Act became law, AASHO issued an immediate call to its Committee on Administration to meet for the purpose of considering and adopting the necessary geometric design standards for the Interstate program. On July 12, 1956, the meeting was held in Chicago and on July 16, AASHO submitted the proposed standards to the Bureau of Public Roads for concurrence. The Bureau approved the standards on July 17. The Act had directed that the standards be those developed by the Secretary of Commerce, in cooperation with the state highway departments, and the AASHO process was the manner which was used to accomplish this requirement.

Much credit for the congressional support of the 1956 Act must be given to William Randolph Hearst, Jr., whose nationwide chain of newspapers ground out the highway story relentlessly between 1952 and 1956. From 1952 to the end of 1955, for example, the Hearst newspapers printed enough highway articles to fill the columns of an average size metropolitan daily with nothing but such articles and editorials for 76 consecutive days. Much of this effort toward an accelerated highway program was directed toward building the Interstate system. For his "outstanding contribution to highway progress," Mr. Hearst was presented AASHO's prestigious George S. Bartlett Award at the 1955 AASHO Annual Meeting in New Orleans.

In 1956, the estimated cost to complete the Interstate was $27 billion. The Interstate was seen as the first step in a grand plan to modernize the entire highway system of the nation. Although the Interstate would comprise only about 1.2 percent of the U.S. road

mileage, it would carry almost 25 percent of the total highway traffic. Thus, it was intended as the foundation of the total modernized highway network.

One enthusiastic engineer called the Interstate program the most extensive engineering project since the Great Pyramid at El Giza, Egypt was built by the Pharoah Cheops in the 2600 B.C. era. The pyramid was constructed 755 feet square at the base, 481 feet in height, and was composed of approximately 2.3 million blocks of stone averaging about 5,000 pounds each. In comparison, the Nebraska State Capitol building is 437 feet square at the base and 405 feet in height, topped by a 13-foot pedestal and 19-foot bronze statue of a "sower." Weighing 15,000 pounds, the "sower" serves not only as a sculpture but also as a lightning rod. The capitol, completed in 1932, has been named among the top five best-constructed buildings in the world by the American Institute of Architects.

The 1956 Act also specified certain control points that the Interstate should go through or near within each state. These points were determined with national defense in mind. In Nebraska, Omaha was a control point because the headquarters of the Strategic Air Command was located nearby:

> "The Interstate was intended to be a defense highway for the movement of troops, materiel, and so forth, in times of national emergency. The Interstate had to go from Omaha to or near Lincoln, then to or near Grand Island, and follow the Platte River and our major cities through Nebraska to the West Coast." (Merle Kingsbury, 1985 Interview)

Beyond these requirements, the actual route was to be determined by the states. The potential for political bickering and maneuvering was great and the State Highway Commission would become the major arbiter in these disputes as it held public hearings across the state:

> "The control points had to be used but the exact location near or around those control points was a matter of considerable dispute. Our commission held many, many hearings in those days. We'd hold hearings, for instance, at Grand Island, Kearney, North Platte, and all the way out, about whether the Interstate would be north or south of the Platte, or whether it would be up on US-30. Those were real contentious days. The public had a lot of input and concern about how it would affect their towns. I think we held several hundred location hearings. The entire commission would go west, for instance, and hold a hearing at North Platte or Kearney. The public would come and give its views about whether the Interstate ought to go north or south of the Platte. The South Platte Chamber of Commerce and various cities were very active. At one time, before the exact location was determined, the chairman of our commission, J. R. McBride, went to Washington with State Engineer L. N. Ress and contacted

> senators and congressmen in an attempt to convince the Washington authorities where the location should be. However, the controversy continued into the sixties." (Merle Kingsbury, 1985 Interview)

Steven R. Gilbert (1900-1996) served as the State Airport Engineer from 1949 to 1957 and was also the Director of the Department of Aeronautics from February 1956 to March 1957. Although the Department of Aeronautics was established as a separate agency in 1945, the engineering expertise was furnished by the Department of Roads and Irrigation. In 1957, Mr. Gilbert was appointed Assistant Design Division Engineer in charge of Interstate design. He recalled many disputes over the location of the Interstate such as the following incident in Omaha:

> "One problem area was Hobo Park. It was a square block where the hobos used to drink wine and lay around. There was a lady, connected with the Omaha World-Herald newspaper, who didn't want us to take Hobo Park and she had quite a bit of clout in Omaha. We proposed a relocation that was close to the World-Herald building and through a section of Omaha that the World-Herald had planned-on for future expansion. She then withdrew her objection and we went over Hobo Park." (Stephen R. Gilbert, 1985 Interview)

Without the State Highway Commission, the disputes would probably have been far worse. According to Merle Kingsbury, the commission attempted to represent the public and lessen controversy:

> "We had some volatile public hearings back in those days for which we had to use the Omaha Auditorium. We had several hundred people there, hostile people, because we were displacing people along I-480 down through town. I-680, around the edge of town, was more wide open and therefore, not quite so contentious. I recall that some of those hearings were very disagreeable. I guess they felt that the state was trying to run roughshod over the local people, homes, businesses, and therefore said, 'Leave us alone'. I think the people became accustomed to the fact that the commissioners were not governmental employees or engineers. We were lay-people from the various communities, exactly like they were, and we were there to hear their problems, their questions, and were trying to get answers from the engineers for them. Therefore, we represented both the people and the public interest." (Merle Kingsbury, 1985 Interview)

Although the department made every effort to accommodate landowners, including the construction of livestock underpasses where feasible, problems arose when the Interstate divided land in such a way that it affected the access. According to Geoffrey R. King, sometimes this was unavoidable:

> "The Interstate takes a wider strip of land than an ordinary road would. People just didn't want you cutting across their place. The alignment of the Interstate is very important and you want as straight a road as you can get. Often, that meant that you would isolate one part of a farm from the rest of it and there would be no way to cross it like on an ordinary road. So, you can't blame the farmer for fighting a situation like that. The judgment that was handed down, when you finally got one, would be to compensate him for his loss of access. The only way you can cross the Interstate, of course, is where you have a bridge. For a farmer with 40 acres on the other side of the road, who has to drive 10 miles to get to it, that's pretty rough." (Geoffrey R. King, 1985 Interview)

There were many other problems in the path of the Interstate. One such case occurred during the mid-1960's and required delicate handling:

> "As we proceeded west from Lincoln to Grand Island, the Interstate alignment followed the quarter-section line. In many cases, we could shift north or south to avoid a farmstead, etc. Near Aurora, we encountered a small pioneer cemetery in which several persons were interred. Assistant Attorney General Harry Salter went to work on the problem and found some descendants who granted us permission to relocate the graves to the Aurora Cemetery. Actually, we found that it was almost easier to relocate a grave than to go through park land." (Kenneth J. Gottula, 1986 Interview)

The first construction on the alignment of the future Interstate in Nebraska, projects F-147(6) and I-316(9), involved the relocation of US-30 between Kimball and the Cheyenne County line. Let to contract in December 1954, this 14.8 mile section was completed in October 1955 and financed with federal funds on a 50-50 matching basis. The project included grading, structures, four lanes of right-of-way, two lanes of asphaltic concrete surfacing, and limited at-grade access. The contractor was the Missouri Valley Construction Company of Omaha. However, this section was designated as US-30 until the early seventies when the additional westbound lanes were constructed and the original lanes were partially reconstructed to Interstate design standards. Upon completion of this work in December 1973, the highway was officially designated as Interstate 80.

With the passage of the 1956 Act, adequate funding was finally available for Interstate construction nationwide. In June 1957, Nebraska's first true Interstate project, I-80-9(1), was

let to contract with 90-10 matching and involved 6.4 miles near Gretna under the supervision of Project Engineer H. Shaw Little. State Engineer L. N. Ress was happy to announce that the Interstate highway program had begun in Nebraska. In November 1959, the Gretna project became the first segment of Nebraska's Interstate to be completed and open to traffic. The contractors were the Western Contracting Corporation of Sioux City, Booth and Olson, Inc. of Sioux City, Capital Bridge Company of Lincoln, Wrenn and Taylor of Grand Island, and the Platte Valley Construction Company of Grand Island. From 1957, it would take 17 years to complete Interstate 80 in Nebraska and during that time, the Interstate would occupy a central focus for the department and State Highway Commission, which continued to conduct hearings relative to Interstate plans.

Consulting engineers, who previously had a rather limited part in the highway program, began to take an extensive interest. By 1957, the consulting firms that specialized in highway work and had highway divisions had increased from some 10 or 15 to over 300 nationwide.

The 1957 Legislature addressed the increased administrative burden placed on the Department of Roads and Irrigation by dividing it into three separate state agencies: the Department of Roads, Department of Motor Vehicles, and Department of Water Resources. For the first time in its history, Nebraska had a separate agency solely responsible for highway planning, construction, and maintenance.

The Bureau of Highways had previously reorganized and streamlined its operations in 1955 by building-up its field division headquarters and assigning field construction employees to the division offices instead of Lincoln. According to most of the engineers, this decentralization was welcome. Gerald Grauer saw it as the most significant change in his 34 years with the department:

> "The most significant change was the way they treated personnel. We moved a lot and there was no attempt to establish permanent headquarters in the field. We moved all over the state and that's why we had trailer houses." (Gerald Grauer, 1985 Interview)

Orville L. Lund agrees. The following account, which took place in 1936, points out that the frequent moving of personnel sometimes produced real hardships:

> "My future wife and I had gone together a while and I was stationed at Chadron. In those days, contractors worked six to seven days a week, twelve to fourteen hours a day. I had been doing this for months and hardly had a weekend off. So, we decided to get married. The local project engineer gave me four days off, which included Saturday and Sunday, to come to Lincoln to get married. I had an old car and paid-down most of my money on an apartment in which to live after we returned. So, I drove to Lincoln on Friday. Enroute, I burned out a bearing in my car and had to get that fixed at Mullen. We got married Saturday night, started back and arrived in Chadron on Monday morning. Tuesday, I was called into the office and told that I was being transferred to Falls City. I couldn't get my money back on my apartment, having paid that down. When I came through Lincoln on the way to Falls City, I stopped to see the man who made the assignment-switch and as I walked in the door, he saw me and said, 'Hi Orville. I understand that you're doing a lot of traveling now, ha-ha-ha'." (Orville L. Lund, 1985 Interview)

Oliver W. Johnson saw the 1955 policy changes as beneficial to both the department and employees:

> "They would move our employees from one end of the state to the other. They weren't assigned to a field division. It wasn't until after I came to Lincoln that they eliminated the subsistence paid to the men in the field. They eliminated that in 1955 and assigned the men to field divisions instead of moving them back and forth, the idea being that they ought to be better class citizens, they ought to belong to a church, and shouldn't be moving their children from one school to another. In general, the engineering employees welcomed that. I think it has been a benefit to the department because the quality of work and engineering should be better when the engineers are not moved all over, when they know an area, and are acquainted with the local people. I'm sure they are better employees than they were back when they just moved them from one end of the state to the other." (Oliver W. Johnson, 1985 Interview)

Kenneth J. Gottula, who was hired by the department as a junior engineer in 1950 a few days after graduating from the University of Nebraska College of Engineering, comments on the change:

> "After five years of moving from town to town, I was assigned to permanent headquarters at Holdrege in 1955. At the same time, I received my engineering license and a promotion to senior engineer at an increase of $85 a month. But, since the permanent headquarters meant that I would lose my non-taxable subsistence allowance of $105 a month, my take-home pay was actually $30-$35 a month lower. Nevertheless, I think that everyone was happy to get the permanent headquarters." (Kenneth J. Gottula, 1986 Interview)

Also in 1955, the department established the position of Division Construction Engineer in each of the eight field divisions. The positions were immediately filled except for Division 6 at McCook and Division 8 at Ainsworth.

With the Interstate highway program under way in 1958, Congress increased allocations to the states for improving federal primary, secondary, and urban highway systems. Referred to as A-B-C systems, Nebraska received $6.6 million under this appropriation which, by regulation, it matched with $3.3 million to provide $9.9 million to improve these highways which had been in need of repair since World War II.

Because of the dual concern for the Interstate and A-B-C systems, department activities expanded significantly by the late fifties. These activities affected all divisions within the department. Otto B. Griess, a 1941 graduate of the University of Nebraska who was hired by the department in 1946 after wartime service with the Army Air Forces, was directing the geological field work for the Materials and Tests Division:

> "We knew that in order to build the Interstate and start meeting the rapid demand of construction, we had to hire a larger staff in our Soils Section. We had a number of crews and drill trucks. The largest number of drill trucks that we ever owned was through that period starting in 1956 up to the time that most of the Interstate in Nebraska was finished. We needed every truck and sometimes we could have used twice the equipment." (Otto B. Griess, 1985 Interview)

According to Messrs. Lund and Griess, Nebraska's varied geological resources presented a challenge for the Materials and Tests Division:

> "In constructing the Interstate, we had a tremendous research project. Between Lincoln and Omaha, we used limestone as aggregate because it was available in the eastern part of the state. You will find almost no 'joint' problems between Lincoln and Omaha even though that concrete is the oldest. It also has the heaviest traffic. West of Lincoln, you'll see more 'joint' problems, especially in the Platte River Valley where we primarily used Platte River gravel. Close to Wyoming, we used limestone again." (Orville L. Lund, 1985 Interview)

> "As you go further west, the supplies and sources of gravel are limited. In the Grand Island, Kearney, and North Platte areas, there are tremendous amounts of material. Once you get past North Platte and to the South Platte River, supplies dwindle. The contractors had to set up their pits and pump many months ahead in order to produce the gravel that they wanted. For work in that part of the state, the geology and composition of the gravels was different. We had more problems but they were things we could handle with more work to find the right materials. It took longer to do the work." (Otto B. Griess, 1985 Interview)

As a 1935 graduate of the University of Nebraska College of Engineering, Marvin L. Nuernberger found himself fortunate to be hired as a draftsman in June of that year because there was an oversupply of graduate engineers and the department was turning away applicants. Mr. Nuernberger had a break in department employment from 1941-47 because of his work in private industry and wartime service in the U. S. Navy. After World War II, engineers were in very short supply:

> "Years later when I was reemployed by the department, I was subsequently assigned as the Division Construction Engineer at Norfolk. Division Engineer George Koster and I were the only two licensed engineers in the entire division. In the middle to late fifties, I proceeded on my own to school our division construction employees in the fundamentals of engineering to assist them in becoming licensed engineers. Mr. Lobdell, our Personnel Chief in Lincoln, later requested that I include statewide construction employees. The school had phenomenal success with over 75 percent of the attendees becoming licensed engineers." (Marvin L. Nuernberger, 1986 Interview)

In 1956, Division 3 Engineer George E. Koster, Jr. reported on the shortage of experienced engineering employees:

> "During the past two years, our Division Construction Engineer has reduced engineering costs and handled projects with a minimum number of experienced personnel. He was able to shift inspectors and staking parties where they were most needed. His biggest problem has been the shortage of experienced workers. Many projects were handled with the engineer-in-charge being the only experienced employee on the project. We hope that these helpers develop into capable engineering employees in the next two years."

The Bureau of Highways increased its manpower to meet the post-war and Interstate challenges. From an average of 535 employees in 1945, the bureau averaged 1,982 employees in 1957. By 1970, the average number of employees in the bureau was 2,691, an increase of 36 percent in 13 years and 403 percent in 25 years:

> "We were in the State Capitol in 1955-56 and had to expand our work capabilities overnight. In the Bridge Division, we doubled, even tripled our personnel almost on a crash basis. The overall organization grew and entire sections were created with new and different tasks. It was a time when the department changed from a predominately rural-type organization to a large group able to handle Interstate and urban design/construction as well. It was an exciting period!" (G. C. Strobel, 1986 Interview)

Department of Roads employees also received increased benefits including a 40-hour workweek by January 1958. Many of the benefits were the result of federal guidelines that had to be followed to maintain eligibility for federal funds, which provided 90 percent of the Interstate cost. These benefits improved the working conditions for everyone in the department:

> "I think the greatest change was the dramatic improvement in working conditions for not only department employees, but also contractors. We worked a minimum of 60 hours a week back in the late twenties and the thirties, worked hard and didn't have any fringe benefits." (Oliver W. Johnson, 1985 Interview)

Gerald Grauer also remembers the new forty-hour workweek and regular pay periods that came with the Interstate:

> "When I was hired by the department in 1951, we worked 44 hours, which meant we had to work Saturday until noon. When the workweek was shortened to 40 hours, we got the same pay as we previously had received for 44 hours. But, one of the best things they ever did for us was determining a certain day and location where we were going to be paid. It used to be that we would not know, within 10 to 14 days, when we were going to get our paychecks. Of course, when we moved, we never knew where it was going to be mailed. I remember many a time when my bank account was flat and I didn't have a dime in my pocket. I had money floating around the state in the mail, somewhere, but I didn't get it." (Gerald Grauer, 1985 Interview)

The irregularity of pay was a common complaint from those in the field before the new accounting and payroll procedures were instituted:

> "One year, when my family was in North Platte and I was working somewhere else, we hadn't been paid for November and it was nearly Christmas. I had to go to a hock shop and borrow money to buy my little girl and little boy a Christmas present. I didn't get my November paycheck until after December 25th. This was common." (Oliver W. Johnson, 1985 Interview)

Sometimes highway work had a lighter side, including a little humor, as shown by the following 20th Century tombstone epitaph:

> "This is the grave of Michael O'Day,
> Who died maintaining his right-of-way.
> His right was clear, his will was strong,
> But, he's just as dead as if he'd been wrong."

On January 1, 1960, the Social Security deduction from each employee's pay, excluding the Safety Patrol, was increased to three percent of the first $4,800 in earnings.

Also in that year, the department had eight field divisions and the state highway system totaled 9,282 miles. Of the latter, 6,584 miles were hard-surfaced, 2,634 miles were graveled, and 64 miles had dirt surfacing.

Since 1937, the Department of Roads has had a provision in its "Standard Specifications for Highway Construction" that requires contractors to suspend operations whenever excavation uncovers Indian relics, fossils, meteorites, or other items of historical or geological interest. Even prior to 1937, several of the department's engineers who had an amateur interest in archeology and paleontology, encouraged contractors and others to treat such items with care. Pre-eminent among those engineers was Thomas C. Middleswart, who served as the Division 5 Engineer at Scottsbluff from 1927-33 and at Bridgeport from 1933-41 and 1943-64. Mr. Middleswart discovered the fossil remains of a number of previously unknown prehistoric animals, four of which were later named in his honor by the scientific community: (1) Sphenophalos middleswarti (ancestral pronghorn), (2) Satherium piscinaria middleswarti (otter), (3) Megasespia middleswarti (small pig-like animal), and (4) Bathyopsis middleswarti (hoofed herbivore). Mr. Middleswart was also a volunteer part-time Research and Field Associate in the Division of Vertebrate Palentology at the University of Nebraska State Museum. He and his wife, Gwen, discovered many new fossil "beds" and donated a large number of specimens to the State Museum.

In 1959, the Legislature enacted a law authorizing the Department of Roads to enter into agreements with various state agencies to remove and preserve archeological, paleontological, and other historic items when such items are to be disturbed by highway construction. This law also authorizes the use of highway funds for this specific purpose. Thus, in 1960, the department entered into agreements with the State Historical Society and University of Nebraska to survey for and excavate archeological, paleontological, and other historic items on our highway projects. In 1996, as a result of these ongoing agreements, the department pays the salaries and associated costs of four archeologists from the State Historical Society and two paleontologists from the University of Nebraska - Lincoln. In turn, those persons work full-time surveying the rights-of-way and borrow areas, usually well in advance of highway construction.

The Department of Roads is proud of its long and successful association with the State Historical Society and University of Nebraska - Lincoln in this cooperative program of

historical salvage. Indeed, the knowledge obtained enables mankind to learn more about the way things were and from whence we come. It may also provide a window to our future.

With the increased workload brought about by the Interstate, the department was fortunate to hire a few more experienced engineers. One of these was Donald O. Swing, an Indiana native who graduated from the Purdue University College of Engineering in 1951. After working nine years in the private sector, Mr. Swing joined the department in 1960 as an associate engineer. He became the Assistant Design Division Engineer in 1968, Project Development Division Engineer in 1971, Materials and Tests Division Engineer in 1974, and Deputy Director-Operations in 1986.

In addition to work on the Interstate, the department began to address the problem of its unpaved highways and over 650 miles of gravel routes were hard-surfaced in 1959-60. Throughout the early sixties, the department's goal was to provide at least one hard-surfaced highway to each incorporated town. In early 1961, there were 70 towns without a hard-surfaced highway leading to it. According to John W. Hossack, the department was successful in reducing the number of gravel highways to about 10 percent of the state system:

> "During that nine year period (1960-68), we got down to about 10 percent that were gravel. Of course, on a number of them we were only able to provide an oil mat, which was not going to last forever. Our biggest emphasis was trying to get the people out of the mud and then, of course, to keep our other roads in a passable or reasonably decent condition." (John W. Hossack, 1985 Interview)

Interstate construction also had an impact on non-Interstate highways in Nebraska during the 1960's:

> "Highways had stayed much the same for quite a number years until the coming of the Interstate. That stretched the imagination of people, the idea of surfaced-shoulders. Until that time, nobody had ever seen a shoulder that was hard-surfaced. That was a big change. The new safety section also was adopted which meant that there had to be a recovery zone beyond the shoulder to accommodate out-of-control vehicles. There were numerous changes that occurred in a short period of time, right after the Interstate concept came into being." (Gerald Grauer, 1985 Interview)

Throughout the early sixties, the Interstate remained a top priority and federal funding continued at the 90-10 ratio. The department had never experienced such an infusion of

outside funds and this produced its share of problems. According to G. C. Strobel, the year-to-year variance in the allocation of federal funds placed serious strains on the department:

> "There were super problems that we thought were insurmountable. In 1960, we had a large apportionment of Interstate funds, probably about $30 million. I think we had two years of this higher figure. Thereafter, we tapered off to $15 or $16 million a year of federal funds. For some reason, we got two big years and we were really under the gun to try to use it. We started from nowhere picking our alignments and having studies done from scratch. So, we had a very accelerated period when we really had to push our consultants and our own people. We moved some of our jobs from hearings to construction in about 10 or 11 months. It now takes five or six years." (G. C. Strobel, 1985 Interview)

A bitter fight over the allocation of Interstate construction funds between Omaha and most of the rest of Nebraska erupted in late 1959. William O. Dobler, editor of the Lincoln Star newspaper, blamed Lincoln businessmen for the problem. He wrote in an editorial that:

> "The entire issue started with a Lincoln group which, armed with the 'facts' which must have come from a bad dream, told outstate interests that Omaha was getting all the Interstate funds and that there would be no construction outstate until the entire project (Omaha) was finished."

As a result, an organization called Greater Nebraska Interstate, Inc. (GNI) was formed and its president was Eugene O. "Gene" Kemper, publisher of the Alliance Times-Herald newspaper. GNI hired Roy M. Green, Dean of the University of Nebraska College of Engineering, as its consultant. At first, GNI called on Governor Ralph G. Brooks and the department to abandon I-480, the downtown Omaha route. The Lincoln Chamber of Commerce endorsed the group's proposal. When Governor Brooks refused to consider the proposal, GNI pressed for 77 percent of the Interstate money to be spent outstate and 23 percent in urban areas. The State Highway Commission recommended that the 77-23 formula be formally adopted but also pointed out that their recommendation was moot because the department had already been spending 77 percent outstate and 23 percent in Omaha. The controversy raged for years and the ratio was changed to 73.7 percent rural and 26.3 percent urban. It turned out that the department had difficulty keeping up with the 26.3 percent urban allotment. In fact, in April 1968, Mr. Green reported that urban spending was down to 23.43 percent.

The 1963 Legislature created a State Employees' Retirement System which became effective on January 1, 1964. The department had about 1,500 eligible employees, of which

866 qualified for prior-service benefits. With the passage of this law, state employees finally had their own retirement plan in addition to Social Security benefits.

Although the department was rightfully focusing attention on the need to build the Interstate highway across Nebraska, the needs on the balance of the state system continued to grow. Delegation after irate delegation appeared monthly before the State Highway Commission, pleading that scarce funds be allocated to their respective highway needs. While their pleas were met with sympathy, the plain fact was that available revenue could not begin to address the growing highway problems. Numerous efforts to increase highway user taxes were thwarted by special interest groups and the situation was reaching a crisis stage.

In 1965, the Legislature authorized a sweeping study of the needs of every public road in Nebraska: state highways, county roads, and city streets. Chaired during the first two years by Senator Jules W. Burbach of Crofton, the special legislative study committee chose to employ out-of-state consultants to insure objectivity. In September 1967, Roy A. Jorgenson & Associates of Maryland completed the engineering needs study of the then-existing 103,000 miles of public roads. In November 1967, Wilber Smith & Associates of South Carolina completed the financing portion of the study, and in December 1967, Ernst & Ernst of Chicago completed the management study of the Department of Roads, county highway, and city street departments.

Two advisory committees also were named by the legislators: one consisting of groups which had a special interest in highways such as motor carriers, petroleum interests, highway contractors, farm organizations, Chambers of Commerce, etc., and the other composed of representatives of county and city governments. By making these groups part of the study, it was hoped that a broader understanding would develop on the needs of all concerned.

Senator Jerome Warner of rural Waverly was named to chair the special legislative study committee for the second two years, 1967-68 and 1968-69. While it would be nearly four years from its inception before all aspects of the study were acted upon, certain phases were implemented earlier.

While the department was contemplating changes in its organizational structure, it was making changes in its physical structure. The Testing Laboratory, completed in 1948 at

14th and Burnham Streets in south Lincoln, housed the Materials and Tests Division. The State Patrol/Engineering Building, completed in 1958 at the same address, housed the Construction Division, Right-of-Way Section, Utilities Section, Division 1 and 2 headquarters staffs, and State Patrol. On September 18, 1967, forty-four Design Division employees moved from the State Capitol to the newly constructed Central Office Building located between the Testing Laboratory and the State Patrol/Engineering Building. By December of that year, the remainder of the department employees at the State Capitol had moved to the new building. The completion of this two million dollar, 105,000 square foot structure enabled the department to have all of its administrative home offices in the three-building complex at the south Lincoln location. The project engineer in charge of construction was Daniel J. Sharp. The new building was dedicated by Governor Norbert T. Tiemann in a formal ceremony on September 27, 1968. The Testing Laboratory was the first permanent building at this address and had been constructed under the supervision of George E. "Dutch" Koster, Jr., who was hired by the department as a chainman soon after his 1933 graduation from the University of Nebraska. He served as the department's District 3 Engineer at Norfolk from 1951 until his death of a heart attack during an April 1972 meeting in Lincoln.

Beginning in early 1968 and following the recommendation of the management study, the department underwent the first phase of an extensive reorganization and was divided into four basic areas: planning, design, operations, and administration; each headed by a deputy director.

October 15, 1966 saw the creation of a U.S. Department of Transportation (DOT), composed of the Federal Highway Administration, Federal Railroad Administration, Federal Aviation Administration, and U.S. Coast Guard (in peacetime).

A look at the evolution of the Federal Highway Administration shows that its earliest predecessor was the Office of Road Inquiry, which was created in 1893 as a small unit of the Department of Agriculture. This unit became the Office of Public Road Inquiry in 1899, the Office of Public Roads in 1905, the Office of Public Roads and Rural Engineering in 1915, and the Bureau of Public Roads in 1919. It was renamed the Public Roads Administration (PRA) in 1939 and transferred from the Department of Agriculture to the Federal Works Agency (FWA). When the FWA was disbanded in 1949, the PRA was transferred temporarily to the General Services Administration, a new agency. Later in the same year, the PRA was reidentified as the Bureau of Public Roads and transferred to the Department of Commerce.

In 1966, the Bureau of Public Roads became the Federal Highway Administration in the new DOT.

Creation of the federal DOT inspired an immediate trend toward the establishment of similar organizations at the state level. New York led off the parade in 1967 and was followed that same year by Wisconsin. In 1996, only five states did not have a DOT and Nebraska is among these. Of course, Nebraska has always taken a conservative, "non-bandwagon" approach to government and is the only state to have a one-house Legislature. The latter was approved at the polls on November 6, 1934 by a vote of 286,086 (59.7%) to 193,152 (40.3%).

The 1967 Legislature changed the name of the Nebraska Safety Patrol by creating the Nebraska State Patrol within the Department of Roads. At that time, "patrolmen" became known as "troopers."

As the Nebraska legislative study continued, another portion receiving early consideration was the financial consultant's recommendation that bond financing be considered for major state highway construction. Since Nebraska had a constitutional prohibition against indebtedness exceeding $100,000, it was necessary to put the question before the voters. The 1967 Legislature placed the proposed constitutional amendment on the 1968 general election ballot. Said amendment would allow the state to issue bonds for the construction of highways, if authorized by a three-fifths vote of the Legislature. It was approved by a vote of 224,927 (51.9%) to 208,758 (48.1%). Marvin L. Nuernberger, who was appointed State Engineer on November 1, 1968, gives this recollection:

> "In 1968, the people thought the state highways were in poor shape and that there ought to be a way to improve them. Therefore, the bond issue won and became part of the massive bundle of highway legislation that was developed and passed in 1969. The enactment of this total highway package permitted Nebraska to become progressive in the planning and construction of an integrated network of highways, roads, and streets. Of the 16 bills in the package, six involved increases in and distribution of highway user revenues. New funds and accounts were set up such as the Highway Cash Fund, the Highway Allocation Fund, and the Highway Trust Fund. The department, for the first time, through the Highway Cash Fund, was permitted to invest and collect interest on short and intermediate-term surplus funds. There was a one cent per gallon increase in gasoline and special fuel taxes and an increase in motor vehicle registration fees. There was a general fund appropriation of $1.7 million for recreation roads which passed directly into the Highway Cash Fund. Of special significance and long range importance was the provision for the proceeds of sales and use taxes derived from motor vehicles, trailers, semi-trailers, and certain

appurtenances thereto, to be credited to the Allocation Fund. Also, there was the establishment of the Nebraska Highway Bond Commission for the issuance of limited obligation bonds for highway construction providing the department with considerable versatility for monetary maneuvering with the intricacies of federal funding for Interstate construction. In the late 1960's, the department was in double-trouble in programming Interstate construction. Nebraska's share of Interstate mileage was a single route (I-80) which was predominately rural. Only one other state was limited to a single route. Federal Interstate funding allocations were based on a continually updated remaining cost estimate for the individual states, which theoretically provided for the simultaneous completion of the entire Interstate system. Coupled with this was the department's commitment for the simultaneous completion of all rural and urban Interstate construction in Nebraska. Enactment of federal legislation providing ACI (Advance Construction-Interstate) and state legislation authorizing the issuance of limited obligation bonds for highway construction provided a timely solution for the department. The Legislature authorized a $20 million bond issue for 1969 and an additional $10 million for 1971 for the specific purpose of accelerating Interstate construction. The $10 million was not issued, however. Nebraska was one of the first states to program ACI and the first state to complete its main-line portion of Interstate construction. All federal highway fund apportionments, except Interstate, were based on factors involving comparative needs of the various states, but with the stipulation that the minimum apportionment for any state would be one-half of one percent. With ACI, there was an evident need for such a stipulation for Interstate apportionments. The department directed national attention to this problem and with the assistance of our Washington delegation, one-half of one percent was established as the minimum apportionment factor for Interstate funding. Provisions were included that permitted the one-half of one percent allocation to be used on other federal-aid routes upon any state's Interstate completion. The $20 million bond issue was originally a loan to the federal government. It was totally repaid and used for constructing other Nebraska highways. More important is the fact that one-half of one percent of each Interstate appropriation has been allotted to Nebraska for use on other highways. The $20 million bond issue has been a fantastic investment for highway construction." (Marvin L. Nuernberger, 1986 Interview)

While the impact of this legislation ultimately allowed Nebraska to be the first state in the union to complete its main-line Interstate, it was a major break with precedent by authorizing state indebtedness for highway development. According to G. C. Strobel, the bond issue proved to be a fortunate move:

> "It was a good thing because in later years, when inflation went up in a straight line, the work we did would have cost three or four times more. It gave us a highway across the state and allowed us to be the first state to complete its main-line Interstate." (G. C. Strobel, 1985 Interview)

When these 4000 bonds were sold for $5,000 each on November 6, 1969 by Eastman-Dillon of New York, Nebraska received $20,000,000 in cash for highway construction and incurred a debt of $32,520,415 to be repaid in 20 years. The latter included

$20,000,000 in principal, $12,448,250 in interest at an average rate of 5.926 percent, $52,165 in issuance costs, and $20,000 in agent fees. The Department of Roads made the final payment and retired the debt on November 1, 1989.

In October 1968, the department submitted a request to the Bureau of Public Roads to add 246.3 miles of Interstate in Nebraska. The request included: (1) I-29 in Iowa to South Sioux City, Nebraska, (2) York south to connect with I-35 north of Salina, Kansas, (3) Grand Island to I-80, (4) Hastings to I-80, (5) I-80 near Lincoln to South Sioux City, and (6) Omaha west to connect with the Lincoln-South Sioux City route west of Fremont. Unfortunately, the Bureau approved only the 2.5 mile segment (1.9 miles in Nebraska) from I-29 in Iowa to South Sioux City.

Achieving only a small portion of its request, the department proposed that the state undertake a major project to establish a freeway-expressway system. Using the Interstate as its model, the department designated a system of high-speed highways to link the state's major cities. If adopted, the system would include 775 miles of four-lane freeways and 1,454 miles of two-lane expressways, the latter having four lanes of right-of-way to meet future needs for expansion:

> "When the Interstate was completed, we planned to take $15 million each year to accelerate construction of at least one and possibly two proposed expressway routes in Nebraska. They would be built to Interstate standards and we probably would have got them designated as Interstate. It was my judgment that we should design and construct to Interstate standards and we could do it with the bond issue. It would bring a lot of traffic through Nebraska since there was a natural desire for traffic between Canada and Mexico. I even went up to Canada and promoted it. A mind stretched by a new idea never returns to its original dimension." (Marvin L. Nuernberger, 1985 Interview)

Plans for the proposed expressway system ultimately were reduced in scope, but certain segments have been constructed and others are still on the drawing board. There is no question, however, that the construction of the Interstate brought a new image of highways throughout the nation. Some were directly involved with the development of the Interstate from its beginning to end. One such person was Kenneth J. Gottula, who was assigned to the Interstate Design Section in 1957, promoted to Roadway Design Division Engineer in 1968, became the Construction Division Engineer in 1974, and the Traffic Engineering Division Engineer in 1986:

> "I could probably talk about the Interstate for a couple of days. As a professional engineer, it was a real privilege to be involved with a project of that magnitude!" (Kenneth J. Gottula, 1986 Interview)

During the mid to late sixties, Nebraska was the scene of sweeping changes in many areas of government, not the least of which was the landmark highway legislation enacted in 1969 as a result of the special legislative study. Through extensive public hearings held across the state and the careful nurturing of all factions involved in the study, the legislative committee engendered public support for its program:

> "The Legislature adopted a functional classification system for all public roads; assigned jurisdictional responsibility for each classification; increased funding and divided the revenue between the state, cities, and counties based on needs-formulas; required one-year improvement and five-year planning programs from the state, counties, and cities and for public hearings to be held thereon; required uniform budgeting and accounting procedures for the expenditure of highway user revenue; and established a Board of Public Roads Classifications and Standards composed of representatives of the state, counties, cities, and lay-citizens to help develop an integrated system of public roads throughout the state. After more than 16 years, this legislation still serves Nebraska citizens splendidly. It has provided a rock-solid foundation on which highway decisions are made, it has helped develop cooperation between jurisdictions in road-building, created better understanding among the people of the state, and has thus encouraged their continuing support for highway financing." (Senator Jerome Warner, 1986 interview)

The Board of Public Roads Classifications and Standards held its first meeting on November 21, 1969. Its eleven members appointed by the governor, the board was composed of two persons from the Department of Roads, three persons representing the counties, three persons representing the municipalities, and three lay-persons representing each of the congressional districts. Thus, each governmental entity and the general public, by its representation, had an equal voice in the operation and decisions of the board. The original board members were C. D. Ackerman, Beatrice; Marvin Athey, Imperial; Floyd Burkinshaw, Jamison; Robert Gaukel, Vice-Chairman, Gering; Bruce C. Gillan, Secretary, Lincoln; R. Doyle Hanson, Newcastle; Gene E. Jordan, Omaha; Melvin Ommen, Unadilla; Alfred E. Rasmussen, Grand Island; A. V. Sorensen, Chairman, Omaha; and Donald O. Swing, Lincoln.

By law, the board was charged with the responsibility of developing the specific criteria for each functional classification of road; the minimum standards of design, construction, and maintenance; one and five-year plan procedures; and the standardized system of annual reporting. The 1971 Legislature increased the board's duties by making it

responsible for receiving and reviewing the standardized system of annual reporting and the One and Five-Year Highway, Road, and Street Plans submitted annually by the Department of Roads, the 93 counties, and the 538 incorporated municipalities.

In 1970, the department had six field districts (McCook and Ainsworth were sub-districts) and the state highway system totaled 9,725 miles. Of the latter, 8,909 miles were hard-surfaced, 782 miles were graveled, and 34 miles had dirt surfacing.

On August 1, 1971, the Liaison Services Division was created within the department under the directorship of Carroll J. Story. The main purposes of this division were to: (1) assist the Board of Public Roads Classifications and Standards, (2) provide assistance to the counties and municipalities in their contact with the board, and (3) receive and review report submittals to the board as specified by law. Providing assistance to Nebraska's 93 counties and 535 municipalities was a new concept for the Department of Roads and proved to be indispensable in the establishment of an integrated system of public roads, streets, and highways within the state. In addition to its office staff in Lincoln, the division employed field liaison officers, one in each of the department's then seven field districts. The original liaison officers were: Mark J. Dorcey, District 1 (Lincoln); Kerry J. Taylor, District 2 (Omaha); R. James Pearson, District 3 (Norfolk); Jesse W. Ross, District 4 (Grand Island); Arthur D. Witkowski, District 5 (Bridgeport); George E. Koster, District 6 (North Platte); and Max E. Allen, District 7 (McCook). In addition to his regular duties, Mr. Story was appointed Secretary to the Board of Public Roads Classifications and Standards in December 1971 and served in that capacity until his retirement in December 1980. He was succeeded as Secretary to the Board by Malcolm D. Hardin.

While there were some who said that the department should have sold the additional $10 million in bonds which the 1969 Legislature authorized for 1971, there were others who favored the traditional "pay as we go" method of highway financing. In a January 15, 1973 letter to a constituent, Governor J. James Exon related some of his feelings on deficit spending:

> "One of the things that concerns me most about bond financing is that the people have been led to believe that if we would just issue $10 million more in bonds, we would have our road problems solved. You certainly know that $10 million in bonds would build only about 10 miles of Interstate or 20 miles of expressway-type highways. Therefore, I always insist that this matter of bond financing be put in proper perspective. When we talk about doing the things that some people want, we are

actually talking about bonds of $100 million to $150 million or more, to engage in a crash program. I guess I am still considered old-fashioned in some circles, but I know that it is easier to go into debt and spend money than it is to pay for it. But, I am still seeking constructive suggestions from all in this area (of concern)."

Though in principle the terms "roads" and "highways" are synonymous, in practice "highways" is normally used only for the more important thoroughfares. The term "road" is used in a narrow sense to denote routes of minor or local importance, but it also retains its broader meaning of any prepared route on land destined for the movement of goods and persons. The term "street," formerly of more general significance, now refers to roads lying within the limits of a municipality.

The following is a summary of Interstate completion in Nebraska:

Route	Mileage	Year last segment open to traffic
I-76	3.15	1969
I-80	455.27	1974
I-129	3.21	1977
I-180	3.47	1964
I-480	4.15	1970
I-680	13.43	1975
	482.68	

Throughout the years, most career department employees have shared a camaraderie based upon loyalty, cooperation, and unity of purpose. An example of this team-spirit is found in a tongue-in-cheek highway adage of uncertain origin: "If you don't go to other peoples' funerals, don't expect them to come to yours." Credit for relating the foregoing must be given to William G. "Bill" Hurst, a 1956 graduate of the University of Nebraska College of Engineering, who was hired by the department in 1959 and is presently serving as the Environmental Studies Engineer in the Project Development Division.

CHAPTER 6

BEYOND THE INTERSTATE

The Interstate highway created a national transportation network and dramatically changed the relationship between the states and federal government. Increasingly, the states would be compelled to conform to federal guidelines on a wide range of issues in order to be eligible for federal highway funds. The 1969 Environmental Policy Act was an omen of things to come and the Department of Roads created the Project Development Division in 1971 to deal with the new requirements:

> "The first environmental rules and regulations required an environmental document to be written for every project that we constructed. This included resurfacing projects when there really wasn't much effect on the environment. For the major projects, an Environmental Impact Statement was written and for the minor ones, a Negative Declaration. It required a large staff and there were eight or nine people writing Environmental Impact Statements in those days." (Gerald Grauer, 1985 Interview)

Warren D. "Duke" Lichty, Assistant Attorney General and chief counsel to the Department of Roads, commented on the changing times and federal control:

> "When I began working with the department in 1961, attorneys seldom, if ever, had to consider federal law in connection with the department's litigation. It just wasn't relevant. But by 1971, we found ourselves in Washington, D.C. to defend against a citation for ten percent of Nebraska's federal highway funds for failure to control outdoor advertising. While several states did lose some funds, we were able to convince an administrative judge to give Nebraska an extension to allow the Legislature another crack at passing an advertising control bill. The bill was passed in 1972 and no federal funds were lost. Since that time, of course, the threat of withholding of federal funds has become a common device to control state action in many areas." (Warren D. Lichty, 1986 Interview)

In 1973, Geoffrey R. King was assigned to the Urban and Secondary Roads Division to investigate construction procedures in terms of environmental impact and found himself dealing with a host of new highway-related issues:

> "I had to learn a whole new vocabulary, those words which are peculiar to environmental matters. Then, I wrote letters to the federal engineers regarding the probable effect of the construction on the environment." (Geoffrey R. King, 1985 Interview)

The 1969 Act also created some new concerns for the State Highway Commission and, according to Merle Kingsbury, many of these concerns were justified:

> "Highway development had to comply with environmental requirements and it became urgent and imperative that the department take into consideration some things that hadn't been done before. At our public hearings, we would hear a lot about that. And then, there was an organized group from Nebraska that was very active on preserving the environment. If you wanted to move a bridge, why do you have to move it? Justify it! Be sure you don't affect the fish, wildlife, and habitat! Put it back the way it was! And most especially, don't cut down trees! Up to that time, most of us had never stopped to think how long it takes to grow a tree." (Merle Kingsbury, 1985 Interview)

If the complexities of the new environmental regulations weren't enough to deal with, the states faced another problem because Presidents Lyndon B. Johnson and Richard M. Nixon had been impounding federal highway funds to cool domestic inflation:

> "By 1972, a total of $79 million of Nebraska's highway allocation had been impounded. We brought an action along with Missouri and caused the release of the $79 million of Nebraska's funds, which also resulted in the release of other states' funds. In 1978, the Carter administration attempted a partial impoundment. Again, our legal action in federal court caused the release of these impounded funds." (Warren D. Lichty, 1986 Interview)

Concern fostered concern, and federal regulations in the seventies became increasingly complex. At the same time, while many of the environmental issues had merit, they also slowed the process of highway construction considerably. By mid-decade, many states were complaining about the burdensome "red tape."

> "There were changes made in the federal regulations because the states complained to the FHWA about the 'red tape' that was involved in developing projects. Because of the environmental process and other requirements, the time to develop projects increased from about one year to six years. There was a review of the rules and regulations and lots of hearings held. Finally, through a 'red tape' committee, more lenient regulations were written." (Gerald Grauer, 1985 Interview)

It was quite different in late 1969 when the department showed its resourcefulness by completing project S-667-A in less than 10 weeks, even though it required a survey, right-of-way, utilities, grading, culverts, and surfacing. The project was to connect the Oshkosh I-80 interchange with US-30 three miles to the north:

> "The 1969 Legislature enacted a bill which made the state responsible for links which connect every rural Interstate interchange with the nearest state highway. In effect,

this added the county road north of the Oshkosh I-80 interchange to the state system. It was in September, 1969 when the department made the commitment to proceed with the project from scratch, which required bending a few rules. A quick preliminary survey was accomplished and the survey notes were flown to Lincoln by our pilot, Millard Bennett. Within a day or so, Ron Debord had the design completed, at least to the extent that we could provide plans for our utilities and right-of-way personnel. What it all amounted to was within a period of 69 days, from the day that we began the preliminary survey, we had that three-mile section surfaced and open to traffic. It could have been completed in 66 days but we lost three days due to snow. It was one of the finest examples of cooperation and teamwork that I've ever seen. Everyone worked toward a common goal and the result was quite an accomplishment!" (Kenneth J. Gottula, 1986 Interview)

Not all environmental disputes could be solved at the conference table. In some cases, litigation was inevitable:

"It was in the seventies that the question of the environmental purity of highway projects hit the courts. We found ourselves often in federal court defending against actions to enjoin highway projects because the Environmental Impact Statement was allegedly improper in some way. Some states had ongoing projects stopped for years, which required settling with the contractor to demobilize and settling with him again, once the project had been cleared, to resume work. Nebraska never had a highway project stopped once the contractor had started." (Warren D. Lichty, 1986 Interview)

In the 1980's, environmental questions were still important but things had changed considerably since the seventies, according to Louis E. Lamberty, who was appointed State Engineer in 1983 at age 43:

"The pendulum has swung back, perhaps in the middle where it belongs, on environmental things. I think everybody went overboard 10 years ago to the point where, in some cases, they were shutting down some of the highway programs around the country. They're back to reasonableness again and that has helped." (Louis E. Lamberty, 1985 Interview)

Another legacy of the Interstate that could be observed in the seventies was the increased complexity of many administrative functions. Nowhere was this more obvious than in the workload of district engineers. Individuals in these positions needed engineering expertise in the entire scope of highway development. With the vast amount of new regulations affecting highway development and construction in the seventies, the knowledge and expertise required of these positions was very demanding.

After Thomas D. Doyle was appointed State Engineer in 1971 at age 39, he was faced with filling vacancies due to the transfer, retirement, or death of key personnel. Finding

individuals with the necessary breadth of experience and knowledge was, quite naturally, a concern. To better prepare for future vacancies, he decided to rotate 15 headquarters division heads on May 1, 1974 so that they could learn other aspects of the highway process. More than a few employees called it the "May Day Massacre." The rotation was meant, however, to provide the division heads with a more well-rounded background:

> "The reorganization was probably not a bad thing for the department. I know we all regretted it and couldn't see why it was necessary at the time, but it didn't hurt us. It broadened people." (Charles F. Nutter, 1985 Interview)

Nine years after he left the department, Mr. Doyle was asked what he would do differently if he could do it all over?

> "Well, I've thought about this from time to time and I'll answer it the way President Truman did. It doesn't serve any useful purpose to talk about what we might have done. Given the same circumstances and conditions, I suspect that I would do it the same way, and stand on the record." (Thomas D. Doyle, 1986 Interview)

In 1973, President Nixon appointed Norbert T. Tiemann to the post of Federal Highway Administrator. Mr. Tiemann had served as the Governor of Nebraska from 1967-71.

In 1974, the name of the American Association of State Highway Officials (AASHO) was changed to the American Association of State Highway and Transportation Officials (AASHTO).

On May 10, 1869, a small celebration was held at Promontory, Utah and a golden railroad spike was tapped into a laurelwood tie. Attended mostly by employees of both the Union Pacific and Central Pacific, the ceremony signified uniting the East and West via a transcontinental railroad. On November 5, 1935, another ceremony was held two miles west of North Platte, Nebraska in celebration of paving the last segment of the Lincoln Memorial Highway (US-30). Bands played, caravans of vehicles came from east and west, there were speeches, letters of congratulations, and a golden ribbon was cut. It was a historic day and the nation had its first transcontinental paved highway. But, Nebraskans would wait another 39 years for their biggest highway celebration of all.

In the late afternoon of October 19, 1974, over 5,000 persons (including Governor J. James Exon and former Governor Frank B. Morrison) gathered about five miles west of Sidney, Nebraska at the "Golden Link" ceremony to witness and celebrate the opening of the

last segment of Interstate 80 in Nebraska. Golden (brass) plates, designed by Department of Roads' engineers Kenneth J. Gottula and O. Franklin Meier, were embedded in and across both the eastbound and westbound driving lanes in keeping with the tradition of the "Golden Spike" in 1869 and "Golden Ribbon" in 1935. It was another historic day and thus, Nebraska became the first state in the nation to complete its mainline Interstate highway (I-80). In the Sidney Eastbound I-80 Rest Area, which overlooks the "Golden Link" location, a permanent historical marker was furnished by the State Historical Society, courtesy of Director Marvin F. Kivett. The inscription on the marker was aptly composed by Robert L. Munger, Assistant Public Information Director for the Department of Roads:

> "The Golden Link embedded in Interstate 80 just north of here commemorates completion of the final portion of Nebraska Interstate Highway 80 between the Missouri River and the Wyoming border. This 455.3 mile ribbon of steel and concrete is more than a smooth, wide roadway. It is a vital link between eastern and western Nebraska; a link that binds our state, culturally and economically, closer together. The Golden Link also commemorates Nebraska's accomplishment of being the first state in the nation to complete its mainline Interstate system. Nebraska's Interstate highway system is the most significant and the largest single public works project ever undertaken in this state. Beginning 19 years ago on March 8, 1955 with a small portion near Kimball, year by year and mile by mile it progressed steadily across the state. In developing fine roadside rest areas and a chain of lakes, our state has demonstrated that highways and the environment can be compatible. This final link in Nebraska's Interstate Highway 80 was formally completed and dedicated on October 19, 1974."

From 1957-1974, the cost to construct I-80 across Nebraska was about $390 million, an average of $857,000 per mile. However, it would take until 1986 for I-80 to be completed all the way across America.

Highway safety was an ongoing issue for the department in the seventies. Safety, resurfacing, and surfaced shoulders became priorities of David O. Coolidge when he was appointed State Engineer in 1977:

> "I put in a program of overlays on all low-type roads. I did more illumination with the new type of reflectorization on our bridges and intersections. Some places, it looks like a lighted freeway, everything was reflectorized. It cost money, but it saved lives." (David O. Coolidge, 1985 Interview)

In 1980, the department had eight field districts and the state highway system totaled 9,880 miles. Of the latter, 201 miles had gravel surfacing. By 1990, the department had the

same eight field districts and the state highway system totaled 9,948 miles. Only 79 miles remained with gravel surfacing:

> "Generally, we have upgraded the roads quite well. Our gravel surfacing is less than 100 miles and I would like to see all of it disappear. But, there are some gravel highways carrying very little traffic and it is debatable whether it would be a prudent expenditure to hard-surface them." (Kenneth J. Gottula, 1986 Interview)

Experience has shown that the uncertainty of funding has been an annual event with the department. Over the years, the department has attempted to develop flexible programs to offset this potentially disruptive factor:

> "I don't worry too much about funding. When you have been with the department over a period of time, you know that our funding changes every year. This will remain true as long as we have a Congress and Legislature. Change is inevitable but that does not necessarily mean that it puts a restraint on you. It means that you must do the best job that you can of using the funds as they become available. One year, a group of us were going to make a presentation to the Legislature relative to the department's needs. At that time, I had worked for the department about 20 years and was about 50 years of age. As we were driving to the State Capitol, one of our young men related how hard he had prepared for our presentation and that he had studied it for the past several evenings. Another said that he had worked on it for three weeks. Then, they asked me how long I had been preparing? I replied, 'Oh, about 50 years'. When you're in the highway business and are dedicated to highway construction, you make enough observations over the years to prepare yourself for whatever comes up next." (Donald O. Swing, 1986 Interview)

At the December, 1971 AASHO Annual Meeting in Miami Beach, Florida, James A. Moe, the California Director of Public Works, explained his philosophy and approach to rising costs and declining revenues:

> "The challenge created for highway managers is to use available resources to achieve the maximum benefit. Highways are for people and in the final analysis, the evaluation of a highway program is based not on how much is saved, but on whether the highway dollars were wisely spent to provide the best public service."

In the 1970's, reduced speed limits, more fuel-efficient motor vehicles, and other energy conservation programs resulted in lower highway fuel consumption and thus, less revenue for highway maintenance and construction. And, despite these decreasing revenues, the needs of the state highway system were gradually increasing. Therefore, in one of the most progressive actions ever taken in support of Nebraska's state highway system, the 1980 Legislature passed a law providing a variable excise tax on motor fuel, effective on October 1 of that year. The main purpose of this legislation was to stabilize

funding for Nebraska's highway program. The revenue generated from this tax allows the Department of Roads to accomplish maintenance and construction programs based on identified highway system needs, and at a level of funding deemed appropriate by the Legislature. The tax rate is set by the State Board of Equalization for a fiscal year. The variable excise tax, which is expressed in cents per gallon at the pump, can be adjusted quarterly. The tax is computed by applying the tax rate to the average price of motor fuel purchased by state government in the first month of the calendar quarter preceding the date that the tax will be implemented. Since 1980, the tax rate has ranged from a low of 2.0 percent in 1981-82 to a high of 18.7 percent in 1996. The cents per gallon tax has ranged from a low of 1.8 cents in 1980 to a high of 14.0 cents in 1991.

By the late 1970's, the maintenance requirements of the Interstate, the older sections reaching 20 years of age, were pressing concerns:

> "Most of the Interstate was built in the sixties. In the seventies, we still thought of it as a new highway. The public was quite surprised when suddenly in the eighties, the roadway was wearing out. Of course, our people knew it because they observed it every day." (Gerald Grauer, 1985 Interview)

The issues related to highway development in the sixties and seventies have altered and expanded the functions and responsibilities of the department. The qualifications for personnel have been altered because of changes within the department's activities. Equipment has also changed. Perhaps the most exciting change in the early eighties, according to Louis E. Lamberty, was the wider extent to which computers were utilized:

> "We've made some progress and there are many more things to do. I suppose the most exciting thing we've done with computers during the last two years is getting ourselves into computerized drafting and, within another year, design. Computer-assisted drafting, design, and mapping will increase our productivity considerably." (Louis E. Lamberty, 1985 Interview)

Computerization was another legacy of the Interstate. While the department had used computers since the mid-fifties, they were generally limited to accounting and tabulating functions. With the Interstate, that changed:

> "At first, the computer was used only in statistical accounting. When we began designing the Interstate, we started using the computer for engineering purposes. Now, it's a major factor in design, bridge work, stresses, volumes, and almost all facets of fund-requirement forecasting and accounting." (George J. Welty, 1985 Interview)

Computers themselves have also changed remarkably since the fifties. Increased capacity and smaller hardware, along with greatly improved software, have significantly impacted the department:

> "The mid-fifties is when our design sections started using computers. We were somewhat of a leader and developed programs that no other state had. Of course, the states traded programs since programming was a major effort in those days. The early computers took a tremendous amount of room, had rotating drums, and had a fraction of the capacity that a computer has today. We thought those old computers were glorious machines. Looking back at them now, they're like Model T Fords." (G. C. Strobel, 1985 Interview)

Another goal for which the department had been striving was upgrading and modernizing its snow removal equipment to increase operational efficiency and productivity:

> "Our field maintenance personnel have done a fine job and should be commended for their efforts, especially during the very difficult winter conditions. We intend to help them get the job done by providing better equipment. In the recent past, our people have made-do with a lot of old plows, some of 1937-39 vintage. They'd get these old plows running in the fall, put them out on the road, and then tow them back after they broke down a few hours later. This didn't do much good and was obviously very inefficient. Our goal is to reduce the total number of units and provide modern equipment which is mobile enough to go from one area to another." (Donald O. Swing, 1986 Interview)

Throughout the years of constructing highways in Nebraska, the public had benefited from the results of aggressive and competitive bidding by contractors. In the early eighties, the illegal actions of a few were threatening the bidding process:

> "In 1982, the question of bid-rigging first arose. It became apparent that certain contractors were making deals with regard to bidding on highway construction projects. As a result, bids had been coming in which were, as time passed, more and more above our estimates. This resulted in federal prosecutions of offending companies and individuals, debarment of many companies from bidding on highway construction contracts, and state prosecution of civil lawsuits which resulted in the aggregate recovery to the state of approximately $6 million." (Warren D. Lichty, 1986 Interview)

Soon after being appointed State Engineer in 1983, Louis E. Lamberty undertook a review of the department, which produced a modest reorganization. He also continued the emphasis on highway safety and attributed much of the decline in accidents to the

department's safer designs and the Legislature's willingness to fund related studies and projects:

> "Over the last 10 years, injury accident rates have decreased by about 21 percent on our non-Interstate highways. We've had the same speed limit, cars have not changed greatly in design, and people haven't used seatbelts. The major change that I can see is the upgrading of the highway system. I think the public bought something more than just a way to get somewhere. They bought some real safety!" (Louis E. Lamberty, 1985 Interview)

On March 1, 1986, Governor Robert Kerrey appointed R. H. Hogrefe as the State Engineer. Formerly employed by the federal government for nearly 33 years, Mr. Hogrefe served as the Nebraska Division Administrator for the Federal Highway Administration (FHWA) from 1972 to 1986. From a federal perspective, he reflected on the past relationship of the FHWA with the Department of Roads:

> "My first direct contacts with the Department of Roads occurred when I was chief of the Design Division at the FHWA Regional Headquarters in Kansas City. After moving to Lincoln in 1972, I confirmed that while the department was thin in staff, the people were dedicated to their jobs, very open in discussions, and forthright in their actions. They were always interested in new technology and methods to improve their design, training, and operations. I was impressed by the number of contractors who had previous employment with the department. Even though they had left, that training and background has been very beneficial in the quality of construction that we see in Nebraska. I was particularly impressed by the spirit of cooperation displayed by the department while working with the FHWA." (R. H. Hogrefe, 1986 Interview)

After his first eight months at the department's helm, Mr. Hogrefe commented from the viewpoint of a State Engineer:

> "The open cooperation continued as I moved from the FHWA to the department. I was truly made to feel welcome. While the department is a relatively small, conservative organization, it is meeting the needs of the state highway system in a very efficient manner. This conclusion is being confirmed by the Highway User Study presently under way." (R. H. Hogrefe, 1986 Interview)

Although the department's problems had been numerous over the years, consistent progress has been evident:

> "When I came to Nebraska in 1960, we had a state highway system which was large, unwieldy, and in less than adequate condition. Since then, we've completed the Interstate, improved our rural and city routes, and have fewer than 100 miles of gravel highways remaining. The latter could have been completed some time ago but consists of very minor routes, some of which probably shouldn't be on the state

> system. We've gone from a highway system with great needs to one capable of sustaining itself within the limits of available funding. We're one of the few states in the whole country that can say that. Coming from as far back as we were, I think it is a great accomplishment and a credit to both the department and Legislature!" (Donald O. Swing, 1986 Interview)

In June 1986, the Department of Roads executed an agreement with the Highway Users Federation of Washington D.C. for the federation to conduct a study of the department. Four main areas were to be reviewed: highway responsibilities, highway conditions and performance, highway needs and programs, and highway management and productivity. At the conclusion of this seven-month study which cost $50,000 ($42,500 federal, $7,500 state), the Highway Users Federation stated the following in its written report to State Engineer R. H. Hogrefe:

> "As a whole, we have found Nebraska's roads to be in good condition. We have also found a well-managed and effective highway program that is a tribute to both the program manager and the elected officials that have given the managers the tools to do the job. The Department of Roads has developed into a highly effective body for the administration of public funds. Highlights included: a sound organizational structure, steadily increasing productivity, low employee turnover, stable leadership, an abundance of future leaders in the pipeline, effective training and career-guidance programs, an exemplary program of participatory management, good morale, satisfactory working conditions, the initiation of a plan to determine future manpower requirements, effective management systems, appropriate application of new technology, effective assistance to local governments, and effective communications with the public."

The United States is the only major country of the world where the title to its major highways rests in the name of the state. In other countries, the major highway networks are under the control of the federal government. This issue was settled in the United States many years ago, soon after AASHO (now AASHTO) was organized. But, there are those who do not understand the importance of this fact and from time to time make suggestions that would change it. The present system has produced the world's finest highways and provided our nation with one of its major advantages over other countries.

In 1988, in an unprecedented show of openness, friendship, and trust, the U.S. government invited the top-ranking military officer of the U.S.S.R. to visit the U.S. and tour various military facilities. During his week-long visit, Marshal of the Soviet Union Sergei Fedorovitch Akhromeyev made some observations which were reported in the editorial section of the July 15, 1988 Lincoln Journal:

"At the conclusion of his visit, Marshal Akhromeyev reported that he had been particularly impressed looking out of airplane windows and seeing section-line roads at mile intervals. These roads give the United States an internal transportation system with a special benefit to agriculture, the Marshal noted. Marshal Akhromeyev is only the latest first-time visitor to remark enviously on the features of the American infrastructure such as roads, bridges, pipelines, power-line networks, water distribution, and sanitary sewer systems. These allow the nation to achieve its highly developed state. Unfortunately, these basics are taken too much for granted in the U.S. But, upon these assets all else depends. Indeed, the American community has and should have a permanent responsibility for maintaining its roads in good order."

Years after he retired from the department, Oliver W. Johnson related some fond memories of the past:

"One of the pleasant things to look back on is the privilege of working with so many nice people. I recall some of the young men who worked for me and their successes in later life. One was from Thedford and he became a Deputy State Engineer...Charles Nutter. Another was from North Platte and went on to graduate from the Harvard Law School. That was Bob Crosby...Governor Bob Crosby. Then, of course, there was the young man from Emerson who worked for me one summer and was going to a seminary in the fall to study for the priesthood. That was Dan Sheehan...Archbishop Daniel Sheehan, head of the Roman Catholic Archdiocese of Omaha." (Oliver W. Johnson, 1985 Interview)

Since the Village of Emerson was mentioned in the preceding paragraph, it is interesting to note that Emerson is the only Nebraska municipality which is located in three counties (Dakota, Dixon, and Thurston). And, the population of Emerson (1990 Census), by county, is Dakota (282), Dixon (416), and Thurston (93), for a total of 791. But, most interesting of all, if a person stood in the center of the Main Street (N-9) and First Street intersection in Emerson, that person would be physically located in three counties at the same time.

Federal funding has produced a magnificent national highway network and, of course, brought more federal control. Warren D. Lichty served as a Dawes County Judge from 1958-61, joined the Attorney General's staff in 1961, and served as chief counsel to the department from 1968-96. Having worked on both sides of the "bench," he related the following:

"We preserved the integrity of state control of the Interstate system in Wherret & Turpin v. Department of Roads. This was an action brought by individuals in federal court, in which we successfully defended the department's right to prohibit bicycles on our Interstate highway system. But in Exon v. Tiemann, we were told that if the state

didn't want federal control, its remedy was to not take the federal money. In the past quarter-century, highway law, like everything else, has become much more complicated. I predict that in the next 10 years, we will see more change, more complications, and more federal control at the expense of state control than we have seen in the last 25." (Warren Lichty, 1986 Interview)

Since 1937, when highway safety statistics were first kept, the death rate on Nebraska's highways, roads, and streets has steadily declined. This rate is obtained by computing the number of traffic deaths per 100 million vehicle miles traveled. A history of Nebraska's death rate shows: 1937 (12.6), 1940 (9.0), 1950 (6.0), 1960 (4.3), 1970 (4.3), 1980 (3.5), 1990 (1.9), and 1995 (1.6). For example, 254 traffic deaths occurred in Nebraska during 1995, resulting in a death rate of 1.6. If the 1937 death rate of 12.6 had prevailed during 1995, nearly 2,000 persons would have died on Nebraska's highways, roads, and streets, instead of 254. Marked improvements in highway engineering, vehicle design, emergency medical services, legislation, safety programs, enforcement, education, and driver attitude are significant factors contributing to the lower rate.

Nebraska's speed limits, like Nebraska's roads, have undergone a series of revisions to stay current with public expectations and improved roadway design. The following, although not a complete record, gives a general summary of Nebraska's rural speed limit history:

1905	20 mph. Speed must be reasonable and proper.
1913	20 mph.
1919	35 mph.
1931	45 mph cars, 35 mph trucks.
1937	50 mph. Speed must be reasonable and prudent.
1939	60 mph day, 50 mph night.
1941	60 mph day, 50 mph night. Trucks over five tons: 40 mph.
1945	60 mph day, 50 mph night.
1960	65 mph day, 55 mph night.
1962	Rural interstate: 75 mph cars, 65 mph trucks.
	Other rural highways: 65 mph day, 55 mph night.
1964	Rural interstate: 75 mph cars, 65 mph trucks.
	Other rural highways: Cars 65 mph day, 55 mph night;
	Trucks 60 mph day, 50 mph night.

1966	Rural interstate: 75 mph cars, 65 mph trucks.
	Other rural highways: Cars 65 mph day, 60 mph night;
	Trucks 60 mph day, 50 mph night.
1973	Rural interstate: 75 mph cars, 65 mph trucks.
	Other rural highways: Cars 65 mph day and night; Trucks 65 mph day, 60 mph night.
1974	55 mph national speed limit, effective March 3, 1974.
1987	Rural interstate: 65 mph.
	Other rural highways: 55 mph.
1996	Rural interstate: 75 mph (June 1).
	Four-lane, divided rural highways: 65 mph or as posted (June 1).
	Other rural highways: 60 mph or as posted (September 1).

On August 17, 1986, a five-mile section of highway was opened through suburban Salt Lake City, Utah, thus completing the nation's first transcontinental Interstate highway, the 2,907-mile Interstate 80. The route connected California State Route 480 (the San Francisco Embarcadero Freeway) with Interstate 95 at Teaneck, New Jersey. The total cost of construction was estimated at $3.2 billion. The first segment opened to traffic was the San Francisco/Oakland Bay Bridge in November 1936.

From 1919 to 1997, a summary of the number of department field divisions/districts shows: 1919-25 (5-10), 1925-69 (8), 1969-71 (6), 1971-77 (7), and 1977-97 (8).

When asked if they had any comments, stories, or words of wisdom for the department, former State Engineers Hossack (1960-68), Nuernberger (1968-71), Doyle (1971-77), Coolidge (1977-83), Lamberty (1983-86), Hogrefe (1986-87), and Strobel (1987-91) each responded in his own unique way:

> "I had the opportunity to travel and get acquainted with lots of fine people. As I occasionally travel around the state now, I see that a lot of those old roads are still in service which, of course, is very heartwarming for me. I also note that there are a lot of newer sections that are mighty fine highways. It speaks well of the dedication of the employees which we have today and the job they are doing. I just say, keep up the good work!" (John W. Hossack, 1986 Interview)
>
> "I would say that what is behind you is gone, what is with you is going, and what is ahead of you is coming. Your only defense is to plan. You must set goals and

deadlines. As you accomplish them, pick them up and set them ahead; bigger goals and shorter deadlines!" (Marvin L. Nuernberger, 1986 Interview)

"It's a great privilege to have served as the State Engineer and I recommend it to anyone who would be interested. I don't know of any other position in state government at the administrative, appointed level that gives you the same scope of opportunity to be of real service to the public. Everything that we do in the Department of Roads touches, one way or another, upon the safety, leisure time, or economy of the state. It's a great responsibility and an honor to have served in that capacity!" (Thomas D. Doyle, 1986 Interview)

"One night, Governor Exon called me at McCook and said that he wanted me to come to Lincoln as the State Engineer. Here I was, two years before mandatory retirement and I really wanted to continue working. I replied that I wanted the job but felt an obligation to inform him that I was a Republican and had never been anything but a Republican. The Governor, who was a Democrat, said that he wasn't looking for a politician and that he wanted a highway engineer. He asked if I'd like a little time to think about his offer and I said 'hell no, I accept'. It was the best thing that ever happened to me!" (David O. Coolidge, 1985 Interview)

"Well, I guess that I can sum up my three years in two words. It was exciting and it was fun. We made some significant progress in several areas and had a very good time doing it!" (Louis E. Lamberty, 1986 Interview)

"I see no radical program changes in the near future. The present emphasis is on the existing highway system with little expansion needed to meet future congestion. A major project today is upgrading the Interstate system, with pavement replacement through the rural portion and total reconstruction in Omaha. We must accept that the existing level of funding will be with us for at least the next few years and as a result, we must be a good steward of our resources. This means that we must be extremely careful in maintaining the present size of the state highway system with very few additions. I see additions justified only to make the network more efficient and generally with the elimination of other less important routes. We must maintain a conservative approach to design and give a higher priority to the preservation of our existing pavement." (R. H. Hogrefe, 1986 Interview)

"After the completion of the Interstate highway across the state in the early 1970's, the Department of Roads gradually changed its annual improvement program and emphasis from construction to a maintenance-type program. As a result, complete reconstruction projects in the program were of limited numbers. When I was offered the position of Director-State Engineer in 1987, I proposed and the Governor agreed that the priority during my term would be to review our highway improvement standards and priorities, that our sufficiency rating system be revised, and that safety be given more emphasis in making improvements to the highway system. Many Legislators concurred in our re-evaluation of the department's improvement program but they didn't have a feeling as to how their constituents might react if, as a result of our findings, a change in the highway revenue structure might be suggested. In 1988, after proposing new improvement standards which included a new rating system and freeway-expressway, priority primary, and surfaced shoulder systems, a public input and information effort was conducted. Included in this effort were presentations and

discussions with various committees of the Legislature, numerous public hearings, and my talks to and with any group in the state willing to listen to the proposals. Late in the public information effort, debates were held by the Legislative Transportation Committee in all parts of the state during which I defended and explained the department's standards and system proposals versus a new diagonal radial-type of road system proposed by another group for the entire state highway system. After all of the public contacts, the message was very clear that the public wanted improved highway systems, the freeway-expressway system, the surfaced shoulder system, and they were willing to pay increased fuel taxes to make this all possible. They also wanted the improvements on the timetable proposed and thus, the plan became known as the Accelerated Highway Plan, which set certain goals as far as 20 years in the future. In 1988, the Legislature and Governor approved the improvement standards and the overall system plan, as well as the proposed timetable for completion of the various systems and the financing plan. Through this approval, state statutes require that the Department of Roads advise the Legislature, in submission of the annual budget, whether or not the Accelerated Highway Plan is on schedule. The Legislature and with the Governor's approval can annually determine, due to any major changes in economic conditions or other reasons, what financing adjustments are needed in future years. The 20-year plan, as approved in 1988, has since been followed for improvements of the highway system." (G. C. Strobel, 1997 Interview)

From time to time, it has been suggested that the highway user taxes which the states contribute to the federal Highway Trust Fund should be retained by the states, thus giving the states greater control of their highway programs and individual destinies. In any event, Nebraskans should be aware that in the first 34 years that the federal Highway Trust Fund was in place, 1956-90, Nebraska received $1.09 for every dollar that it contributed to the fund. However, beginning in the early 1990's, this favorable trend has reversed because federal fuel taxes have been diverted and earmarked for federal deficit reduction and mass-transit. Consequently, during 1991-94, Nebraska received only $0.80 of every dollar that it contributed and, naturally, we are quite concerned about this turn of events.

Over the years, the University of Nebraska - Lincoln has had a history of excellence in the classroom as well as success on the gridiron. In this regard, the author is pleased to recognize five department engineers who were members of the Cornhusker football team. Their engineering license numbers and years lettered follow their names: John G. "Glen" Mason (E-12), 1904-05; Raymond F. "Bub" Weller (E-206), 1920-21-22; George E. "Dutch" Koster, Jr. (E-445), 1929-30-31; O. Franklin Meier (E-1454), 1932-33-34; and Mark J. Traynowicz (E-8119), 1982-83-84.

Action by the 1988 Legislature continues to have a far-reaching effect on the department and state highway system. At that time, lawmakers directed that the department

study the state's highway needs and by December 1 of each year, prepare a report to the Legislature addressing those needs. This document, entitled the State Highway Plan and Highway Needs Report, has become commonly known as the "Accelerated 20-year Highway Improvement Program." Increases in the variable tax on motor fuels have enabled Nebraska to make significant progress on the accelerated program. However, it is anticipated that additional funding will be required to complete the original 20-year program on schedule.

The need for an expressway system was formally identified by the department in 1969. By 1988, the system was designated at 365 miles and later expanded to 600 miles. Connecting urban centers of 15,000 population or greater to the Interstate system, these expressways are a high priority for the department. At the end of FY-1996, 41 percent of the system was completed or under contract. This would increase to 48 percent during FY-1997.

Initiated in 1988, the Priority Commercial System (PCS) provides a continuous network of routes which are designed to carry larger traffic volumes, especially of commercial vehicles. The PCS, which includes expressways, was established at about 3,300 miles in 1988. Currently, 2,600 miles of the PCS meet Nebraska's shoulder standards. Improved design standards call for 12-foot lanes, 10-foot shoulders (8 feet paved), and bridges widened to the shoulder width. This greatly improves the safety of such highways.

Considerable accomplishments have been made since the Accelerated 20-year Highway Improvement Program was initiated. During this period, the department has encountered many obstacles, such as material shortages and the uncertainty of federal funding. To overcome these obstacles, changes in strategy and the development of innovative programs have been instrumental in allowing the accelerated program to continue as scheduled. However, changes in strategy may not be enough to overcome future funding uncertainties, particularly at the federal level. As the department strives to meet the changing needs of the state highway system, its primary goal remains the same: "To maintain a safe, efficient, and affordable transportation system that meets Nebraska's essential economic needs."

In 1975, paleontologists from the University of Nebraska discovered the fossilized remains of a previously unknown species of prehistoric mouse while excavating in Dawes County about 20 miles south of Chadron. This excavation was in cooperation with Department of Roads' project RF-76(19), Dunlap North and South, which consisted of

9.5 miles of grading, structures, and surfacing of US-385 in that area. This mouse species lived about 18-19 million years ago and, in 1990, was officially named "Stratimus strobeli" by the scientific community. This name was meant to honor State Engineer G. C. Strobel for his long-standing support of paleontology in Nebraska. The word "Stratimus" comes from the Latin "strata" (paved road or street) and "mus" (mouse). Therefore, "Stratimus strobeli" means, literally, "Strobel's paved road mouse."

In July 1993, the Department of Roads adopted a revolutionary program called Continuous Quality Teamwork (CQT). Following a briefing by Nebraska's Adjutant General on the Military Department's quality initiative called Total Quality Teamwork (TQT), an eleven-member executive leadership team was formed to guide the initiative within the Department of Roads. This "Quality Council" consists of the director, three deputies, five division heads, and two district engineers. The program is administered by a Quality Coordinator who is assisted by three staff persons. CQT is revolutionary because it brings together many concepts that have previously received limited attention, such as department Mission and Vision Statements, continuous improvement of processes, and a focus on customer service. A data-based decision-making process was also implemented, using teams of employees to evaluate and improve department processes. In addition, it was recognized that since employees are the department's most important resource, improving the work environment should be an ongoing priority. This included, but was not limited to improving the rewards and recognition, training, and communication processes. Since CQT's inception, numerous processes have been improved through increased customer service and the reduction of waste, redundancy, and rework. In 1997, CQT continues to enjoy success and has become the department's normal, day-to-day way of doing business.

State Engineer Allan L. Abbott comments on the need for CQT within the department:

> "There are a lot of reasons that I pushed, prodded, or sometimes insisted that the department needed to embark on a 'Quality' movement. One of the biggest reasons, however, came from my trips around the state and my conversations with many of our dedicated employees. These employees were from all levels of responsibility in the districts as well as the central office. They indicated again and again that they did not understand why things had to be done a certain way and why nobody ever listened, let alone asked for their opinions on how things could be improved. It appeared that we had procedures in effect to get public input on various projects and activities, but none for getting input from our own employees. It also appeared that we were, in fact, an organization of many independent operations with only the most rudimentary coordination between them. This was resulting in a lot of effort being wasted. At times, the workload was expanding and the work force was either shrinking or at least

> not getting any bigger. The end result was that we were not delivering the program promised or serving the citizens of Nebraska as well as we should or could."

In honor of President Eisenhower's contributions to the Interstate System, federal legislation was enacted in 1990 renaming the system as the "Dwight D. Eisenhower System of Interstate and Defense Highways." The first Eisenhower Interstate System sign was officially unveiled on July 29, 1993.

Betty Warner's death in March 1994 was a sad day for Nebraska government. She was a seasoned journalist, reporter, and legislative research analyst prior to marrying State Senator Jerome Warner in 1970. She then concentrated on homemaking and volunteer work. In 1981, Governor Charles Thone personally asked her to serve at the Department of Roads in a liaison capacity with the Governor's Office. And, serve she did in this important, part-time position until shortly before her death. Betty was a principled government employee and a knowledgeable and vitally interested Nebraska citizen. She was warm and caring, but also tough, level-headed, and unafraid to say what she thought. She helped to instill greater credibility into the department's annual construction plan by urging that the projects be built as promised and on schedule. Jack F. Pittman, Finance Administrator for the Department of Roads, later said of Betty, "She taught a lot of us how important it is to have integrity, to feel strongly about something and to stand up for one's principles."

When State Senator Jerome Warner died in April 1997, a 35-year legislative career ended during which he left his mark on many of the state's key public policy areas. On July 7, 1997, the Lincoln Journal Star gave Senator Warner the following tribute:

> "His legacy stretched from state-aid to schools to a nonpolitical roadbuilding system and from property tax relief to support for higher education... He was also one of the Legislature's most respected members, earning that position early-on because of his wisdom, honesty, strong sense of fairness, and ethics."

During the fiscal year ending June 30, 1996 (FY-96), the Department of Roads let a record $294.5 million worth of construction projects to contract. Only one FY-96 project worth $1.0 million was carried-over. This was a tremendous achievement and could not have been accomplished without strong leadership, teamwork, and dedication to duty.

The 21st Century is almost upon us and with the rapid passage of time, generations yet unborn will soon be carrying the baton. The past teaches that the only two constants are divine truth and, of course, continuing change. While there are some who say that the next

100 years will bring mostly maintenance of our existing highways, yours truly predicts that we are approaching an era in which the changes and accomplishments in surface transportation will be mindboggling. Surely, the next century will produce exciting times for the department with highways retaining their pre-eminence in the master plan. With this in mind, the following remarks by British Prime Minister Winston S. Churchill, spoken during the uncertain days of 1942, are indeed appropriate:

> "Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning."

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