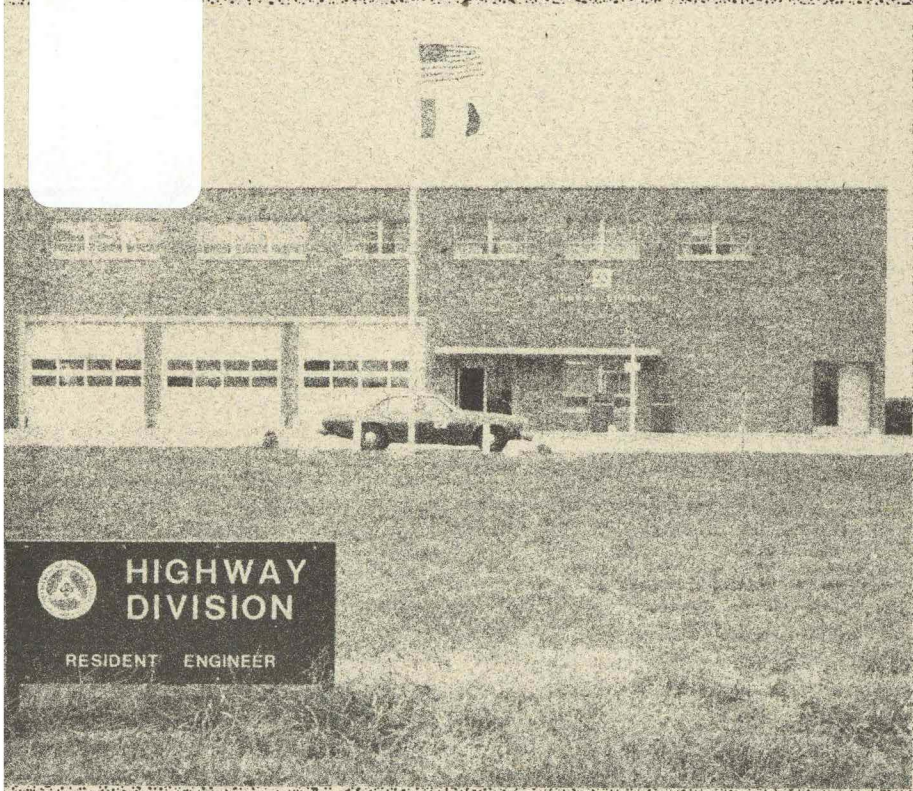


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**HIGHWAY
DIVISION**

RESIDENT ENGINEER



Highway Maintenance In Iowa

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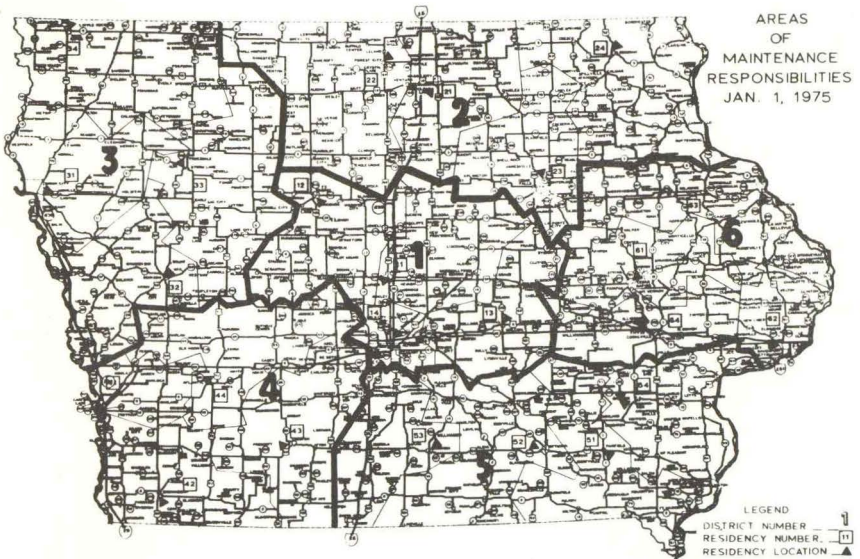


HIGHWAY
MAINTENANCE
IN IOWA

Introduction

The purpose of the maintenance operation is to economically preserve primary and interstate highways and provide the road user with a safe and smooth riding surface on an adequately signed, well kept roadway. The maintenance operation employs 1,750 people and utilizes over 3,000 pieces of mobile equipment to assure the integrity of the road system.

The state is divided into 6 districts with each district subdivided into 4 residences. Field operations are conducted out of 148 area garages strategically located throughout the state. A central coordinating office in Ames provides technical and administrative assistance to the field operations as well as supervising the State Services and Bridge Inspection special crews.



The maintenance function is the largest single budgeted activity within the Department of Transportation. In an average year field maintenance will spend over \$37,000,000 for labor, equipment, and materials and an additional \$3,000,000 for contract maintenance. These expenditures are necessary to maintain the following major roadway features:

- * 24,642 lane miles of interstate and primary highways
- * 22,922 miles of roadway shoulders with 26,904 acres of mowable shoulder
- * 1,068 miles of divided highway median with 4,755 acres of mowable median
- * 20,163 miles of roadside ditch

- * 4,248 primary bridges with floor area of 2,290,188 square yards
- * 361,488 highway signs
- * 97,983 roadway culverts
- * 1,473 miles of access control fence
- * 1,470,961 feet of guardrail
- * 7,696 Luminaires for intersection and rest area lighting
- * 40 interstate rest areas

To effectively monitor the field operations and provide performance guidelines, a Highway Maintenance Management System was developed dividing work activities into 10 major categories. These categories are Supervision and Support, Roadway Surface, Shoulders and Approaches, Roadside, Drainage, Traffic Service, Snow and Ice Control, Bridges, External Services, and Work For Others.

Supervision and Support

Within this activity are included the administration of the Resident Engineer's Office, safety education, training, and the garage and yard operation.

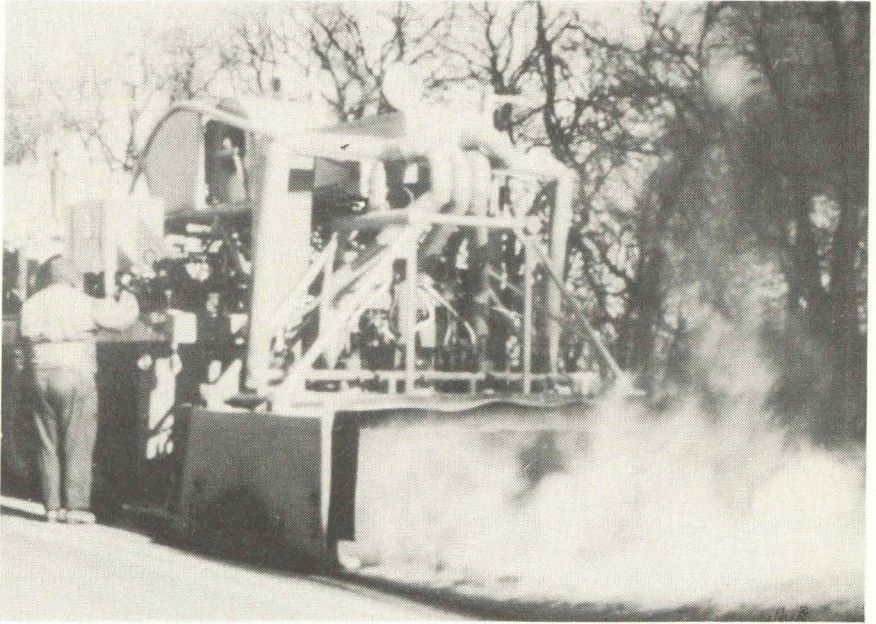
Training programs provided maintenance employees include equipment operation, welding, mechanics, and techniques of supervision. Safety meetings are held regularly in each district for inspection of work areas and to provide training in accident prevention, first aid, and defensive driving.

Roadway Surface

The repairing of the roadway is an essential task and any disruption in the surface can affect the safety and convenience of the motoring public.



Each year approximately 85,000 manhours are used to place an average of 7,000 tons of premix to repair holes in the pavement surface. Machine leveling of the roadway to correct deterioration or uneven surface conditions require another 20,000 tons of material each year. Approximately 60 lane miles of roadway is burner-planed each year to correct heaved or wheel-rutted surfaces. This process will also increase surface traction by eliminating excess surface oils.

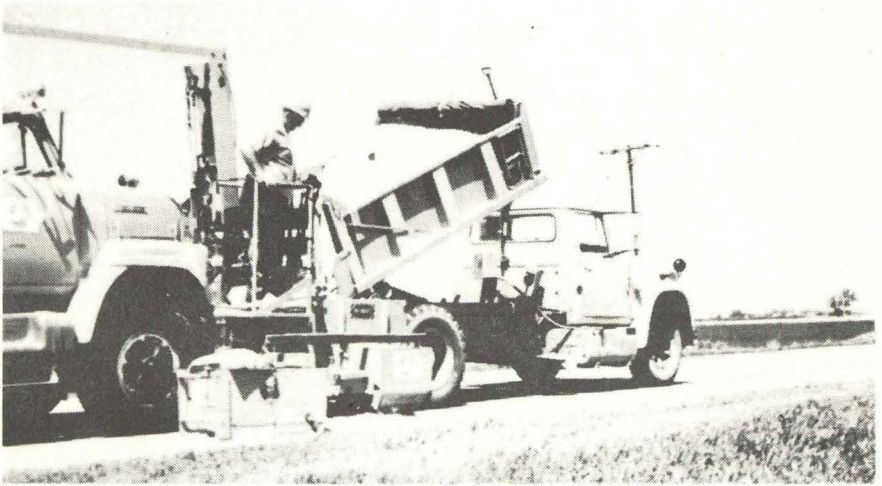


Shoulders and Approaches

Maintenance within this category includes repair with bituminous materials, repair with aggregates, vegetation control, shoulder reshaping, and miscellaneous work including maintaining frontage roads and extended drives.

A shoulder level which is lower than the roadway surface is termed an edgerut which can present a particularly hazardous situation to motorists who wander off the road and attempt to return quickly. During wet periods rock shoulders can be damaged quickly requiring reshaping and replacement of materials. Each year it is anticipated that 300,000 tons of shoulder rock will need to be replaced and 12,000 manhours required for blading shoulders to a proper contour.

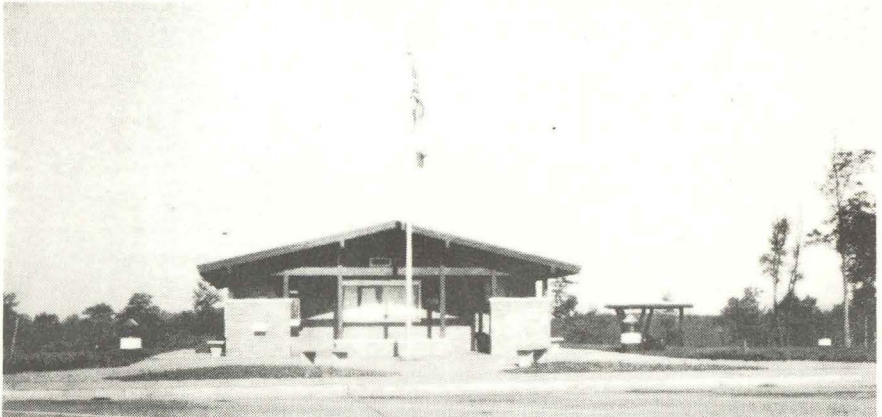
Bituminous materials are placed on shoulders on which treatment with aggregates is impractical due to persistent traffic, wind erosion, or where washing is common.



Shoulders are mowed to present a pleasing appearance to the highway and to eliminate tall grasses which will cause snow to drift onto the roadway or effect visibility at intersections.

Roadside

The portion of the right-of-way from the outside shoulder line to the boundary is termed "roadside" for work identification. The control and maintaining of vegetation, litter pickup, erosion control, rest areas, and fence repair are included within this category.



Interstate rest areas are provided the traveling public to offer an easily accessible stopping place for rest rooms, water, and relaxation from driving. A state map of Iowa and other informational aides are provided to make the journey more enjoyable and safe.

A constant problem facing all citizens is litter. It is unsightly and

can damage mowing equipment if left unattended. An average year will see 11,000 cubic yards of materials gathered by state crews.

Mowing roadside areas accomplishes weed control, improves sight distances, and promotes growth of desirable vegetation.



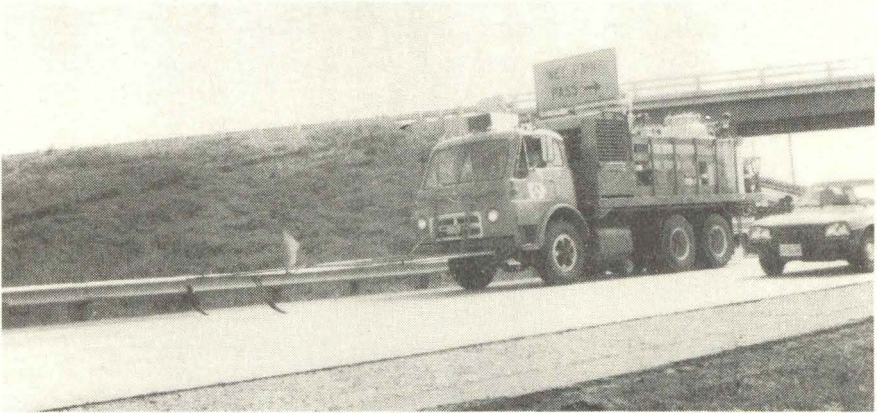
Drainage

To effectively control waterflow, ditches must be maintained by cleaning, repairing, and reshaping. A plugged culvert or silted ditch can cause damage to the roadway, erosion, water ponding, and divert water onto private property or roadway shoulders and surfaces.



Traffic Service

The safe and smooth flow of traffic depends greatly on the directional aids provided to motorists. During the summer months the highway striping crews are busy throughout the state painting center lines, no passing lines, edge lines, and curbs to clearly identify the roadway. Glass beads are embedded into the paint to assist in night time visibility of the lines and during periods of adverse weather conditions.



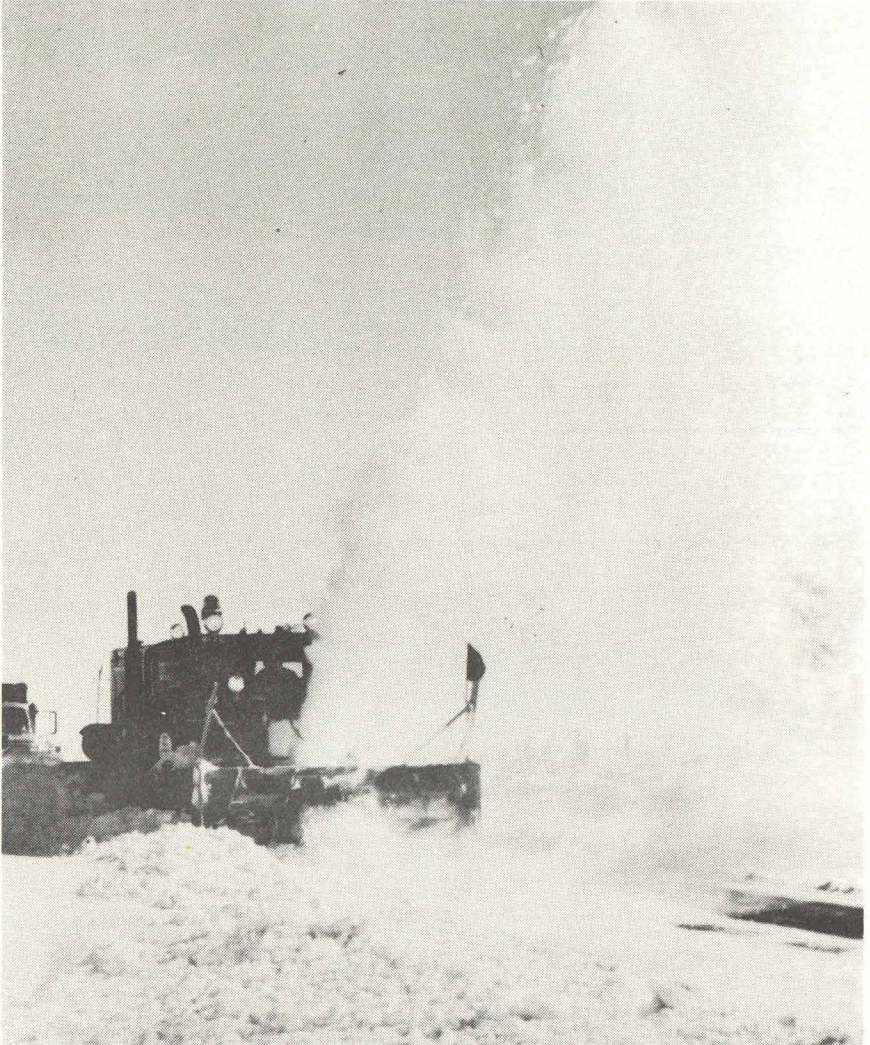
Another means of providing the motorist with advance road condition information is signing. A well signed road gives constant information concerning route identification, and location references. Safety features include advising of unexpected conditions such as road construction, curves ahead, and warning of bumps, narrow bridges, truck crossings, and slippery conditions.



Intersection lighting, delineators, and guardrail are also erected and maintained to provide additional safety for the motorist. An average of nearly 6 miles of guardrail is repaired or replaced each year.

Snow and Ice Control

Snow or ice covered highways constitute an emergency condition. Primary concern is to restore traffic lanes to near normal conditions as soon as possible. To obtain this desirable road surface, a combination of snow plowing, ice blading, chemicals, and abrasives are used as surface and climatic conditions dictate.



A weather advisory service is contracted annually to provide predictions of snow storms and frost potential to assist local foreman in work scheduling. A "GO" condition for frost will prompt the scheduling of frost runs to detect and treat frost on bridge floors.

After the initial road clearing is accomplished, it is necessary to push snow back from the roadway to provide storage for the next storm's snowfall. Bridge intakes, guardrails, and railroad crossings are then cleaned to prevent ice spots and provide an outlet for melting snow.

The amount of snowfall varies from year to year and is not the total measure for resources required to maintain passable traffic lanes. The effects of sleet, wind, and temperature all effect the numbers of people, equipment, and tons of chemicals required. A typical Iowa winter produces an average of 34 inches, but may vary from as little as 10 inches to as much as 80 inches at a specific location. The average annual costs for treating frost, snow and ice approaches \$10 million.

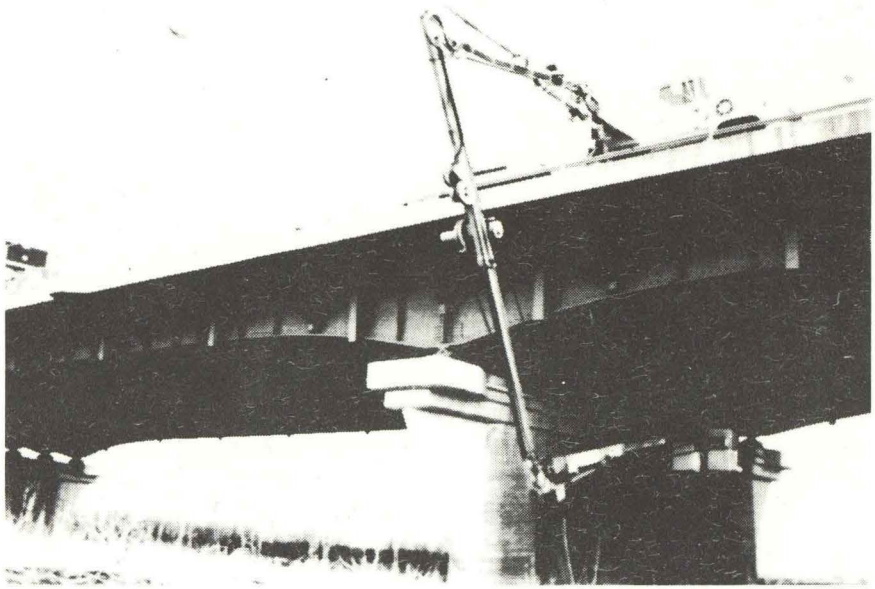
Highways within the state have been classified to more effectively utilize the manpower and equipment available at any one time. The roads with the highest volumes of traffic are generally scheduled for first priority clearing and lower traffic volume roads next in a sequential order with continuity of the roadway system of primary concern.



The application of chemicals, primarily salt, has been carefully analyzed to insure a proper balance between environmental considerations and safety. A 50/50 mixture of sand and salt has been utilized to provide traction and promote the melting of snow and ice and thereby reduce the quantity of chemicals applied to the roadway. Application rates are controlled by utilizing ground speed oriented spreaders which are calibrated each year to insure proper application rates.

Bridges

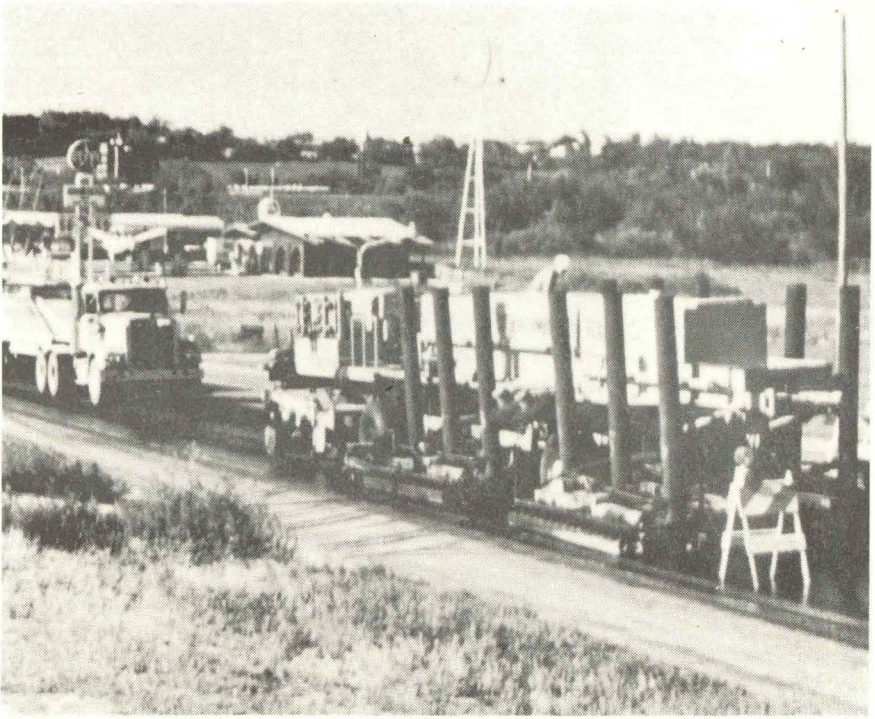
The State of Iowa has 4,200 bridges to maintain. The maintenance of these bridges includes deck and structure repair, surface sealing, cleaning, painting, and intensive inspection for structural safety.



Each bridge is formally inspected biennially by bridge inspection crews and routinely by resident engineers for signs of deterioration in either the structure or deck. Routine repairs are performed by local bridge crews and repairs requiring specialized equipment are completed under contract.

External Service Contracts

Maintenance work required on highways and bridges which is too extensive to be performed by local crews or can be done more economically by contract are awarded to private contractors through a low bid letting process. This type of work generally includes resurfacing projects, full depth pavement repair, and bridge painting.



Work For Others

Occasionally maintenance forces are called upon to do other than normally prescribed work. Work on toll bridges, facilities, service and repair of equipment, removal of illegal advertising devices, or emergency assistance are typical illustrations under this category.

Summary

The maintenance of Iowa's roadways is a never ending task. The effects of nature and man continually wear down and erode away our highway system. The high level of maintenance achieved becomes in reality a direct reflection upon the people who through their dedication and persistence produce an outstanding level of performance and whose competence serve the citizens of Iowa well. When blow-ups, blizzards, and emergencies arise these people respond at all hours of the day and night. In weather many times too hot or too cold a welcome sight to motorists is that orange colored truck on the job.



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