ASPHALT RESURFACING STRUCTURAL RESEARCH

Construction Report
Iowa Department of Transportation
Project HR-556

In Cooperation With The
Federal Highway Administration

April 1995

Project Development Division

Iowa Department of Transportation

Construction Report
for
Iowa Department of Transportation
Project HR-556

ASPHALT RESURFACING STRUCTURAL RESEARCH

By

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April 1995

TECHNICAL REPORT TITLE PAGE

1. REPORT NO.	2. REPORT DATE
HR-556	April 1995
3. TITLE AND SUBTITLE	**4. TYPE OF REPORT & PERIOD COVERED**
Asphalt Resurfacing Structural Research	Construction Report from 9-93 to 3-95
5. AUTHOR(S)	**6. PERFORMING ORGANIZATION ADDRESS**
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7. ACKNOWLEDGEMENT OF COOPERATING ORGANIZATIONS

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8. ABSTRACT

Discarded tires present major disposal and environmental problems. One method of recycling tires is to sue finely ground rubber from tires in asphalt cement concrete (ACC). This process has been researched in Iowa since 1991. There are currently eight projects being researched.

This project involved using crumb rubber modifier (CRM) in ACC using a dry process.

This project is located on US 63 in Howard County. It involved 17 test sections. There were five test sections using 20 lbs of CRM per ton, four test sections using 10 lbs of CRM per ton and eight test sections using a conventional mix. Not only were different mixes used, but the overlay was also placed in various thicknesses ranging from 2" to 8".

The project was completed in August 1994. The project construction went well with only minor problems.

This report contains information about procedures and tests that were completed and those that will be completed.

Evaluation on the project will continue for five years.

9. KEY WORDS	10. NO. OF PAGES
Crumb rubber modifier Recycled rubber Waste products Asphalt cement concrete Asphalt resurfacing Pavement structural research	57

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DISCLAIMER

INTRODUCTION

Discarded tires have become a major disposal problem. Since these tires do present many environmental problems, a way to recycle them became vitally important. Iowa started researching the use of discarded tires as CRM used in ACC in 1991. Since that time, eight projects have been completed. Six of these projects used CRM in ACC using a wet process. This process requires the use of a reactor-blender in which the ACC and CRM are combined in the reactor, at which time the blending and reaction occurs. The liquid is then put into the mix. Two of the projects, including the project this report is pertaining to, have been completed using a dry process. With this process, the CRM is put into the drum in dry form with the baghouse fines.

Seventeen test sections were placed on this project. Some sections contained 1% CRM while others contained only 1/2% CRM. There were also some conventional sections. Also, different depths were used on this project. Sections of the overlay varied from 2" to 8" thick.

OBJECTIVE

The objective of this research project is to evaluate the use of CRM in ACC by the dry process.

CONTRACTOR

The contractor on this project was Carlson Construction Company of Decorah, Iowa.

PROJECT LOCATION

The project was located on US 63 in Howard County from IA 9 north to the Minnesota state line. It was a total of 9.93 miles in length. The locations and descriptions of the test sections are listed in Table I.

SECTION	STATION LOCATION	DESCRIPTION
1	113+78 - 134+75	6" ARC (20 lb CRM/Ton
2	204+00 - 224+00	6" Conventional ACC
3	235+75 - 258+00	4" ARC (10 lb CRM/Ton)
4	258+00 - 281+00	4" ARC (20 lb CRM/Ton)
5	316+25 - 331+00	4" Conventional ACC
6	347+50 - 385+00	4" Conventional ACC
7	402+50 - 416+25	4" Conventional ACC
8	419+50 - 431+50	4" ARC (10 lb CRM/Ton)
9	437+00 - 455+00	8" Conventional ACC
10	455+00 - 469+00	6" Conventional ACC
11	469+00 - 482+00	4" Conventional ACC
12	482+00 - 519+00	6" ARC (10 lb CRM/Ton)
13	519+00 - 529+00	8" ARC (20 lb CRM/Ton)
14	529+00 - 536+00	6" ARC (20 lb CRM/Ton)
15	591+50 - 608+25	4" ARC (10 lb CRM/Ton)
16	608+25 - 626+80	2" Conventional ACC
17	633+82 - 663+64	4" ARC (20 lb CRM/Ton)

PRECONSTRUCTION SURVEY

The existing pavement was a 10" portland cement concrete (PCC) pavement built in 1931. It was widened to 24' in 1972 and overlaid with ACC the same year. The 1990 traffic volume was 2245 vehicles per day with 26% trucks.

A photolog was completed on the project before construction began. The Road Rater was ran on the project prior to construction and again after completion of the project. The Road Rater results are shown in Appendix C.

The existing pavement prior to construction did show moderate signs of distress and wear.

MATERIALS

The CRM used for the majority of the project was a GF60A rubber from Rouse Rubber Industries. The rubber was delivered in bulk and stored in a silo at the project site. An AC5 grade asphalt cement was used with the CRM and AC10 with the conventional mixes.

The aggregates used were a 3/4" clean from Dotzler Quarry, a natural sand from Carlson Materials Soverein Pit, and an AgLime washed from Dotzler Quarry. The recycled asphalt produce (RAP) used on the project was milled from the project.

PLANT OPERATION

The mixes for this project were produced in a single drum mixer. This was the first time in Iowa a single drum plant was used to produce a CRM mix using the dry process.

A deflector shield was placed at the location where the baghouse fines and CRM entered the drum as a precaution that the CRM didn't come into contact with the the flame. This did not happen. Carlson personnel were also concerned that the CRM may enter the baghouse, but this did not appear to happen.

The problem that the contractor did have with the CRM was the plugging of the hose. As stated earlier, the CRM was piped to the baghouse fines, the fines then entered the hose and the CRM and baghouse fines were then blown into the drum. This was too much for the hose to handle and it would plug and blow open. They reversed the hoses and had the baghouse fines enter the hose first and then the CRM would enter second and then they would be blown into the drum. This didn't seem to help either. Carlson's representative said that if they used CRM again, two hoses should be used so the CRM and baghouse fines could be added separately or the CRM should be augured into the drum.

The rest of the plant operation went well.

PAVING OPERATION

The paving operation seemed to go well. The various thicknesses did cause some extra work. They had a few problems with segregation.

The contractor requested the use of a rubber tire roller on the CRM sections. In the past, a rubber tire roller had not functioned well on CRM asphalt. The mix would cling to the rubber tires. When Carlson's tired it on this project, they had no problems and were able to use the rubber tire roller on the entire project.

CONSTRUCTION TESTING

The normal QMA and materials testing was done on this project. Lab results are in Appendix B.

The Iowa DOT Materials Research Department took samples for penetration and viscosity testing. These results are in Appendix B.

Road Rater testing was performed prior to and after construction. Road Rater and friction testing will be done for the next five years. The test results are in Appendix C.

COST COMPARISON

A drawback of using CRM in asphalt mixes has been the cost. It has been as high as 169% more than the conventional mix in one of Iowa's projects. The more tonnage used in a project and the use of the dry process has lowered the cost, but it is still higher than the conventional mix. In this project, the CRM ACC was approximately 26% higher than the conventional mix.

EVALUATION

This project will be evaluated for five years.

Road Rater and friction testing will be performed annually. There will be rut depth checks and a crack survey completed annually also.

CONCLUSIONS

The following conclusions have been made so far.

1. CRM and conventional asphalt seem to perform the same during construction.

2. CRM can be successfully added to a mix with the use of a single drum mixer by the dry process.

3. The appearance of the CRM and the conventional mixes are nearly the same in the roadway.

Appendix A

Iowa Department of Transportation

SPECIAL PROVISIONS

for

ASPHALT CEMENT CONCRETE WITH CRUMB RUBBER MODIFIER

NHS-63-9(17)--19-45, Howard County

January 7, 1994

THE STANDARD SPECIFICATIONS, SERIES OF 1992, ARE AMENDED BY THE FOLLOWING MODIFICATIONS. THESE ARE SPECIAL PROVISIONS, WHICH SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

1127.01 DESCRIPTION.

This work consists of furnishing and placing asphalt cement concrete with Crumb Rubber Modifier (CRM) in accordance with these Special Provisions, the contract documents, and the Iowa DOT Standard Specifications.

The Contractor has the option of incorporating CRM into asphalt cement concrete mixes either by using a wet process or a dry process. The wet process involves mixing asphalt cement and a CRM blend with the specified aggregate to create the mixture. The dry process involves incorporating the CRM as a dry ingredient into a mixture of asphalt cement and specified aggregate to create the concrete mixture.

The work of furnishing and placing asphalt cement concrete with CRM is shown in the contract documents as an alternate grouping of bid items. The bidder shall bid on either the wet process group of bid items or the dry process group of bid items. The bidder shall bid only on one alternate, and the award will be based on that bid.

1127.02 MINERAL AGGREGATE FOR THE ASPHALT RUBBER CEMENT CONCRETE MIXES.

Mineral aggregate shall meet the requirements of Article 2303.02, Paragraph B, of the Standard Specification for the type of mixes specified in the contract documents.

1127.03 CRUMB RUBBER MODIFIER.

A. General.

The Crumb Rubber Modifier (CRM) shall be ground vulcanized rubber produced from the processing of automobile and/or truck tires. The CRM shall be

substantially free from contaminants including fabric, metal, mineral, and the non-rubber substances. The CRM shall be sufficiently dry to be free flowing and not produce foaming when added to asphalt cement. Up to 4 percent by weight of talc or other appropriate blocking agent may be added to CRM to reduce agglomeration of the CRM.

B. Physical Requirements.

1. CRM Gradations

The gradation of CRM incorporated into asphalt cement concrete mixes shall be tested in accordance with ASTM C-136 using a 50 gram sample.

a) CRM Gradation for the Wet Process.

The CRM incorporated in asphalt cement concrete mixes using the wet process shall meet the following gradation and particle length limits:

Sieve Size	Percent Passing
#10	100
#30	26-100
Max. Particle Length	3/16"

b) CRM Gradations for the Dry Process.

The CRM incorporated in asphalt cement concrete mixes using the dry process shall meet the following gradations:

Sieve Size	Percent Passing
#16	100
#50	95-100
#100	30-90
#200	0-50

2. Fiber Content.

The fiber content of the CRM shall be less than 0.3 percent by weight.

3. Moisture Content.

The moisture content of the CRM shall be less than 0.75 percent by weight. The CRM shall be stored so it is protected from precipitation or contamination.

4. Mineral Contaminants.

The mineral contaminant amount of the CRM shall not be greater than 0.25 percent by weight.

5. Metal Contaminants.

The CRM shall not contain visible metal particles as indicated by thorough stirring of a 50 gram sample with a magnet.

B. Packaging.

The CRM may be supplied either by bulk or packaged. If supplied in bulk, the CRM shall be supplied in moisture resistant containers. If the CRM is packaged in bags, they shall be moisture resistant and the maximum allowable tolerance per bag shall be plus or minus 2 pounds for bags weighing 100 pounds or less.

C. Labeling.

Each container or bag of CRM shall be labeled with the manufacturer designation of the size and type of CRM, the net weight of CRM, and the manufacturer lot designation. Palletized units shall contain a label which indicates the manufacturer and production lot number designations, rubber type, and net pallet weight.

D. Certification.

The supplier shall ship certificates of compliance with the CRM, which certify that all requirements of these specifications are complied with for each production lot number of shipment.

The Contractor shall submit to the Engineer the invoice for the CRM. This invoice shall show the amount of CRM delivered to the project.

1127.04 ASPHALT CEMENT CONCRETE MIXES WITH CRUMB RUBBER MODIFIER

A. Asphalt Cement Concrete Mixes with CRM by the Wet Process.

1. General

The Contractor shall use the following provisions to produce asphalt cement concrete with CRM by the wet process.

2. Asphalt Rubber Cement.

The Contractor shall uniformly blend compatible paving grade asphalt cement, CRM and extender oil, if required, to produce asphalt rubber cement. The asphalt cement used in the blend shall be grade AC-5 unless otherwise recommended by the CRM supplier and approved by the Engineer. The Contractor shall add CRM at the rate specified in the contract documents.

The asphalt rubber cement shall meet the following physical requirements:

Apparent Viscosity, 347°F, Spindle 3, 12 RPM cps (ASTM D2669 Brookfield)	Min Max	1,000 4,000
Penetration, 77° F, 100 g, 5 sec.: 1/10 mm (ASTM D5)	Min Max	50 100
Penetration, 39.2° F, 200 g, 60 sec.: 1/10 mm	Min	25
Softening Point: ° F, (ASTM D36)	Min	120
Resilience, 77° F,: % (ASTM D3407)	Min	10
Ductility, 39.2° F: 1 cpm: cm (ASTM D113)	Min	10
TFOT Residue, (ASTM D1754) Penetration Retention, 39.2° F,: %	Min	75
Ductility Retention, 39.2° F: %	Min	50

An asphalt extender oil may be added, if necessary, to meet the above requirements for asphalt rubber cement. Extender oil shall be a resinous, high flash point, aromatic hydrocarbon meeting the following test requirements:

Viscosity, SSU, at 100° F (ASTM D88)	2500 min.
Flash Point, COC, °F (ASTM D92)	390 min.
Molecular Analysis (ASTM D 2007):	
Asphaltenes, Wt. %	0.1 min.
Aromatics, Wt. %	55.0 min.

3. Equipment for Blending and Producing Asphalt Rubber Cement.

Unless otherwise authorized by the Engineer, all equipment utilized in production and proportioning of the asphalt rubber cement shall be described as follows:

a) An asphalt heating tank with a hot oil heat transfer system or retort heating system capable of heating asphalt cement to the necessary temperature for blending with the CRM.

b) An asphalt rubber cement mechanical blender with a two stage continuous mixing process capable of producing a homogeneous mixture of asphalt cement and CRM in accordance with the ACC mix design. This unit shall be equipped with a CRM feed system that will not interrupt the continuity of the blending process when supplying the asphalt cement feed system. A separate asphalt cement feed pump and finished product pump are required. This unit shall have both an asphalt cement totalizing meter calibrated in gallons and a flow rate meter calibrated in gallons per minute.

c) An asphalt rubber cement storage tank equipped with a heating system to maintain the proper temperature for pumping and for adding the asphalt rubber cement to the aggregate with an internal mixing unit, if necessary, for maintaining a uniform mixture within the storage vessel.

d) An asphalt rubber cement supply system equipped with a pump and metering device capable of adding the asphalt rubber cement by volume to the aggregate at the percentage required by the job-mix formula. The interlock of the asphalt rubber cement and aggregate feed system as specified in Article 2001.22 of the Standard Specification will be required, unless otherwise approved by the Engineer.

4. **Asphalt Rubber Cement Blending, Reaction, and Transfer Requirements.**

a) Asphalt Cement Temperature.

The temperature of the asphalt cement shall be between 300 degrees and 425 degrees F at the addition of the CRM.

b) Blending and Reacting.

The asphalt cement and CRM shall be combined and mixed together in a blender unit, pumped into the agitated storage tank, and then allowed to react for a sufficient time to meet the property requirements in Part A(2) of this section.

c) Transfer.

The reacted asphalt rubber cement shall be metered into the mixing chamber of the hot mix plant at the percentage required by the job mix formula.

d) Delays.

When a delay occurs in asphalt rubber cement use after its full reaction, the asphalt rubber cement shall be allowed to cool. The asphalt rubber cement shall be reheated slowly just prior to use to a temperature as recommended by the CRM supplier. It shall also be thoroughly mixed before pumping and metering into the hot mix plant for combination with the aggregate. The viscosity of the asphalt rubber cement shall be checked by the Contractor. If the viscosity is out of the range specified in Part A(2) of this section, the asphalt rubber cement shall be adjusted by the addition of either the asphalt cement or CRM as required to produce a material with the appropriate viscosity.

5. Mixing of Asphalt Cement Concrete with CRM by the Wet Process.

The Contractor shall mix the asphalt rubber cement with the specified mineral aggregate to produce asphalt cement concrete with CRM by the wet

process in accordance with Section 2303 of the Standard Specifications and this section of these special provisions.

B. Production of Asphalt Cement Concrete with Crumb rubber Modifier by the Dry Process.

1. General

The Contractor shall use the following provisions for producing asphalt cement concrete with CRM by the dry process.

2. Production Plant Equipment.

The Contractor must use either a dual drum continuous mix plant or a batch plant to produce asphalt cement concrete with CRM by the dry process.

3. Job Mix Formula.

The Contractor shall establish the job mix formula for asphalt cement concrete with CRM by the dry process using a conventional volumetric design procedure in accordance with Materials I.M. 510. The Contractor shall use grade AC-5 asphalt in the job mix formula, unless otherwise recommended by the CRM supplier and approved by the Engineer.

4. Mixing of Asphalt Cement Concrete With CRM by the Dry Process.

The Contractor shall incorporate the CRM as a dry ingredient into the asphalt cement concrete during plant production. The Contractor shall add the CMR at the rate specified contract documents. The Contractor shall not allow the CRM to come in contact with the dryer flame and not allow CRM to be taken in the baghouse.

1127.05 PLACEMENT.

The Contractor shall place asphalt cement concrete with crumb rubber modifier (CRM) using conventional paving equipment in accordance with Section 2303 of the Standard Specifications.

1127.06 COMPACTION.

The Contractor shall compact asphalt cement concrete with crumb rubber modifier (CRM) in accordance with Article 2303.12, except that compaction with pneumatic tired rollers will not be allowed. The Contractor shall furnish a minimum of two rollers meeting the requirements of Article 2001.05, Paragraph B or Paragraph F, of the Standard Specifications for compaction.

1127.07 METHOD OF MEASUREMENT.

A. Asphalt Cement Concrete With Crumb Rubber Modifier (CRM) by the Wet Process.

When the wet process is used for producing asphalt cement concrete with crumb rubber modifier, the following items will be measured for payment:

1. Asphalt Cement Concrete/Crumb Rubber Modifier - Wet Process.

The Engineer will measure for payment the number of tons of Asphalt Cement Concrete/Crumb Rubber Modifier - Wet Process placed in accordance with Article 2303.25, Paragraph A(1) of the Standard Specifications.

2. Asphalt Rubber Cement - Wet Process.

The Engineer will measure for payment the number of tons of Asphalt Rubber Cement - Wet Process used in accordance with Article 2303.25, Paragraph B, of the Standard Specifications. The quantity of Crumb Rubber Modifier blended in the asphalt rubber cement will not be measured for payment.

B. Asphalt Cement Concrete with Crumb Rubber Modifier (CRM) by the Dry Process.

When the dry process is used for producing asphalt cement concrete with crumb rubber modifier the following items will be measured for payment:

1. Asphalt Cement Concrete/Crumb Rubber Modifier - Dry Process.

The Engineer will measure for payment the number of tons of Asphalt Cement Concrete/Crumb Rubber Modifier - Dry Process placed in accordance with Article 2303.25, Paragraph A(1) of the Standard Specifications. The quantity of CRM incorporated as a dry ingredient into the mix will not be measured for payment.

2. Asphalt Cement - Dry Process.

The Engineer will measure for payment the number of tons of Asphalt Cement - Dry Process used in accordance with Article 2303.25, Paragraph B, of the Standard Specifications.

1127.08 BASIS OF PAYMENT

A. Asphalt Cement Concrete with Crumb Rubber Modifier by the Wet Process.

When the wet process is used for producing asphalt cement concrete with crumb rubber modifier, payment will be made for the following items.

1. Asphalt Cement Concrete/Crumb Rubber Modifier - Wet Process.

For the quantity of Asphalt Cement Concrete/Crumb Rubber Modifier - Wet Process placed, the Contractor will be paid the contract unit price per ton in accordance with Article 2303.26, Paragraph A, of the Standard Specifications.

2. Asphalt Rubber Cement - Wet Process.

For the quantity of Asphalt Rubber Cement - Wet Process used, the Contractor will be paid the contract unit price per ton in accordance

with Article 2303.26, Paragraph B, of the Standard Specifications. This payment includes full compensation for furnishing and blending the crumb rubber modifier into the asphalt rubber cement.

B. Asphalt Cement Concrete with Crumb Rubber Modifier by the Dry Process.

When the dry process is used for producing asphalt cement concrete with crumb rubber modifier, payment will be made for the following items.

1. Asphalt Cement Concrete/Crumb Rubber Modifier - Dry Process.

For the quantity of Asphalt Cement Concrete/Crumb Rubber Modifier - Dry Process placed the Contractor will be paid the contract unit price per ton in accordance with Article 2303.26, Paragraph A, of the Standard Specifications. This payment includes full compensation for furnishing and incorporating crumb rubber modifier into the mix.

2. Asphalt Cement - Dry Process.

For the quantity of Asphalt Cement - Dry Process used, the Contractor will be paid the contract unit price per ton in accordance with Article 2303.26, Paragraph B, of the Standard Specifications.

Appendix B

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 1 DAILY REPORT OF ASPHALT PAVING PLANT 05-10-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINTON-BEERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		20			3.0
MAX.	100	100	100	99	90	70	58		30			8.0
LOT 1	100	100	99	90	82	62	50	39	33	8.7	5.6	4.7

DENSITY RECORD LAB DENSITY: 2.252 SOLID DENSITY: 2.447 SPEC. % DENS.:
LAB VOIDS: 0.0 8.0 INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID	BASE	BASE	BASE	BASE	BASE	BASE	BASE
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: 5.80 INTENDED TOTAL PERCENT A.C.: 5.8
PERCENT A.C. BY TANK STICK: 5.95 TOTAL PERCENT A.C.: 5.95
FILLER/BITUMEN RATIO: .79 NUCLEAR PERCENT A.C.: 5.32

COMMENTS: FULL DEPTH PATCHING HWY. 63

(CORRECTED REPORT)

PLANT INSPECTOR Kim Murphy
CERTIFICATION NO 173

PLANT MONITOR Larry Bowman
CERTIFICATION NO 610

REPORT NO: 1 NHS-63-9(17)--19-45 05-10-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	54	65	72	76	82	80
A.C.	270	270	270	275	270	270
AGGR.						
MIX	295	310	320	305	285	310
MAT						

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4432917	25.30
3/4STONE	21 TCK'S	344.9
3/4STONE	8 TCK'S	195.3
3/8STONE	23 TCK'S	378.5

RECYCLED MIX ONLY

TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

SAMPLES SUBMITTED MATERIALS	SENDERS NO.	SAMPLES SUBMITTED MATERIALS	SENDERS NO.
HOT MIX-1	M-10-1	HOT MIX	
HOT MIX		COLD FEED-1	KM-10-2
AC-10	KM-10-1		

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHES SBL	173.98	173.98

TIME PLANT OPERATED: 7:30 AM - 6:00 PM LBS. MIX WASTED: 64200

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM %AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR Kim Murphy
CERTIFICATION NO 173

PLANT FOREMAN Larry Barnett
CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 2 DAILY REPORT OF ASPHALT PAVING PLANT 05-11-1994

PROJECT NUMBER: NHS-63-3(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1	1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		20				2.0
MAX.	100	100	100	99	90	70	58		30				8.0
LOT 1	100	100	99	91	82	64	54	43	36	8.9	5.1	4.3	

DENSITY RECORD LAB DENSITY: 2.256 SOLID DENSITY: 2.458 SPEC. % DENS.:
LAB VOIDS: ~~8.3~~ 7.0 INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: 5.80 INTENDED TOTAL PERCENT A.C.: 5.8
PERCENT A.C. BY TANK STICK: 6.12 TOTAL PERCENT A.C.: 6.12
FILLER/BITUMEN RATIO: .7 NUCLEAR PERCENT A.C.: 5.71

COMMENTS: FULL DEPTH PATCHING HWY. 63

PLANT INSPECTOR Kim Murphy
CERTIFICATION NO 173

PLANT MONITOR Larry Bowman
CERTIFICATION NO 616

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	62	64	75	78	74	74
A.C.	250	250	280	280	280	280
AGGR. MIX	280	315	320	350	340	
MAT						

RECYCLED MIX ONLY
TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4433076	25.26

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
HOT MIX	
AC-10	KM-11-1

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
COLD FEED-1	KM-11-2

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHES	253.69	437.67

TIME PLANT OPERATED: 7:00 AM - 5:00 PM LBS. MIX WASTED: 0

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM %AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR Kim Murphy
CERTIFICATION NO 173

PLANT MONITOR Larry Bunt
CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 3 DAILY REPORT OF ASPHALT PAVING PLANT 05-12-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	998	85	76	56	46		30			2.0
MAX.	100	100	100	99	90	70	58		30			8.0
LOT 1	100	100	99	90	82	62	52	41	24	8.6	5.3	4.5

DENSITY RECORD LAB DENSITY: 2.280 SOLID DENSITY: 2.419 SPEC. % DENS.:
LAB VOIDS: ~~3.2~~ 5.7 INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: 5.8 INTENDED TOTAL PERCENT A.C.: 5.8
PERCENT A.C. BY TANK STICK: 5.87 TOTAL PERCENT A.C.: 5.87
FILLER/BITUMEN RATIO: .77 NUCLEAR PERCENT A.C.: 6.21

COMMENTS: FULL DEPTH PATCHES HWY. 63

PLANT INSPECTOR Mike Tollefsrud PLANT MONITOR Larry Lamm
CERTIFICATION NO 1122 CERTIFICATION NO 612

REPORT NO: 3 NHS-63-9(17)--19-45 05-12-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	58	62	66	70	71	70
A.C.	280	280	275	280	275	275
AGGR.						
MIX	305	305	305	305	305	305
MAT						

RECYCLED MIX ONLY
TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4433093	25.71

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX-1	M-12-1
HOT MIX	
AC-10	MF-12-1

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
COLD FEED-1	MF-12-2

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHES	298.74	736.41

TIME PLANT OPERATED: 7:00 AM - 5:30 PM LBS. MIX WASTED: 240800

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM %AC FOR THIS AGGREGATE COMBINATION IS 5.32%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR [signature] PLANT MONITOR Larry Burns
CERTIFICATION NO 1122 CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 4 DAILY REPORT OF ASPHALT PAVING PLANT 05-13-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	998	85	76	56	46		30			2.0
MAX.	100	100	100	99	90	70	58		30			8.0
LOT 1	100	100	99	89	80	60	50	40	24	8.8	5.0	4.2

DENSITY RECORD LAB DENSITY: N/A SOLID DENSITY: N/A SPEC. % DENS.:
LAB VOIDS: 0.0 N/A INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID	BASE	BASE	BASE	BASE	BASE	BASE	BASE
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: INTENDED TOTAL PERCENT A.C.: 5.8
PERCENT A.C. BY TANK STICK: 5.97 TOTAL PERCENT A.C.: 5.97
FILLER/BITUMEN RATIO: .7 NUCLEAR PERCENT A.C.: N/A

COMMENTS: FULL DEPTH PATCHES HWY. 63

PLANT INSPECTOR Mike Falkenhahl
CERTIFICATION NO 1122

PLANT MONITOR Larry Bunck
CERTIFICATION NO OIC

REPORT NO: 4 NHS-63-9(17)--19-45 05-13-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	54	60	66	72	74	78
A.C. AGGR. MIX MAT	270	270	275	270	270	270

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4433139	25.69

RECYCLED MIX ONLY

TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

SAMPLES SUBMITTED MATERIALS	SENDERS NO.	SAMPLES SUBMITTED MATERIALS	SENDERS NO.
HOT MIX		HOT MIX	
HOT MIX		COLD FEED	
AC-			

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHES	181.87	918.88

TIME PLANT OPERATED: 7:00 AM - 5:00 PM LBS. MIX WASTED: 64700

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM %AC FOR THIS AGGRGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR M Caldwell
CERTIFICATION NO 11274

PLANT MONITOR Larry Brunk
CERTIFICATION NO

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 5 DAILY REPORT OF ASPHALT PAVING PLANT 05-16-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1	1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	75	56	46		20			2.0	
MAX.	100	100	100	99	90	70	58		50			8.0	
LOT 1	100	100	99	92	83	63	52	41	25	9.3	5.3	4.4	

DENSITY RECORD LAB DENSITY: N/A SOLID DENSITY: N/A SPEC. % DENS.:
LAB VOIDS: 0.0 N/A INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: INTENDED TOTAL PERCENT A.C.: 5.8
PERCENT A.C. BY TANK STICK: 5.07 TOTAL PERCENT A.C.: 5.07
FILLER/BITUMEN RATIO: .72 NUCLEAR PERCENT A.C.: N/A

COMMENTS: FULL DEPTH PATCHING HWY. 63

PLANT INSPECTOR Mike Falkedahl CERTIFICATION NO 1122
PLANT MONITOR Larry Lamb CERTIFICATION NO 616

REPORT NO: 5 NHS-63-9(17)--19-45 05-16-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	50	54	58	60	65	70
A.C.	270	270	275	280	285	285
AGGR.						
MIX	315	335	340	340	345	345
MAT						

RECYCLED MIX ONLY

TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY

SAMPLES SUBMITTED MATERIALS	SENDERS NO.	SAMPLES SUBMITTED MATERIALS	SENDERS NO.
HOT MIX		HOT MIX	
HOT MIX		COLD FEED	
AC-			

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHING	284.72	1203.0

TIME PLANT OPERATED: 7:30 AM - 5:30 PM LBS. MIX WASTED: 401650

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM %AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR [signature] CERTIFICATION NO [illegible]

PLANT MONITOR [signature] CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 6 DAILY REPORT OF ASPHALT PAVING PLANT 05-17-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		30			2.0
MAX.	100	100	100	99	90	70	58		50			8.0
LOT 1	100	100	99	90	82	52	52	41	24	8.7	5.0	4.4

DENSITY RECORD LAB DENSITY: N/A SOLID DENSITY: N/A SPEC. % DENS.:
LAB VOIDS: ~~0.0~~ N/A INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: INTENDED TOTAL PERCENT A.C.: 5.8
PERCENT A.C. BY TANK STICK: 5.91 TOTAL PERCENT A.C.: 5.91
FILLER/BITUMEN RATIO: .74 NUCLEAR PERCENT A.C.: N/A

COMMENTS: FULL DEPTH PATCHING HWY. 63

PLANT INSPECTOR Mike Folkedahl CERTIFICATION NO 1122

PLANT MONITOR Larry Brown CERTIFICATION NO 616

REPORT NO: 6 NHS-63-9(17)--19-45 05-17-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	50	55	60	65	70	70
A.C.	285	285	285	290	290	295
AGGR.						
MIX	300	310	315	310	315	315
MAT						

RECYCLED MIX ONLY
TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4433194	25.68
3/4STONE	23 TCK'S	403.95
3/8STONE	6 TCK'S	99.45

SAMPLES SUBMITTED MATERIALS	SENDERS NO.	SAMPLES SUBMITTED MATERIALS	SENDERS NO.
HOT MIX		HOT MIX	
HOT MIX		COLD FEED	
AC-			

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHING	259.78	1462.78

TIME PLANT OPERATED: 7:00 AM - 5:30 PM LBS. MIX WASTED: 561400

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM % AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR [signature] CERTIFICATION NO [illegible]

PLANT MONITOR [signature] CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 7 DAILY REPORT OF ASPHALT PAVING PLANT 05-18-1994

PROJECT NUMBER: NHS-63-3(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006R1 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX:

SIEVE	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		30			2.0
MAX.	100	100	100	99	90	70	58		50			8.0
LOT 1	100	100	99	90	82	62	52	41	35	8.3	5.3	4.3

DENSITY RECORD LAB DENSITY: 2.310 SOLID DENSITY: 2.433 SPEC. % DENS.:
LAB VOIDS: ~~2.2~~ 5.1 INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: 6.1 INTENDED TOTAL PERCENT A.C.: 6.1
PERCENT A.C. BY TANK STICK: 5.89 TOTAL PERCENT A.C.: 5.89
FILLER/BITUMEN RATIO: .76 NUCLEAR PERCENT A.C.: 6.01

COMMENTS: FULL DEPTH PATCHING HWY. 63

PLANT INSPECTOR Mike Goltz CERTIFICATION NO 1122

PLANT MONITOR Larry Braak CERTIFICATION NO 616

REPORT NO: 7 NHS-63-9(17)--19-45 05-18-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	50	60	73	76	78	78
A.C.	290	285	285	295	295	295
AGGR.						
MIX	300	300	305	305	310	310
MAT						

RECYCLED MIX ONLY

TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4433236	25.39
AC-10	4433253	25.80

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
HOT MIX	
AC-	

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
COLD FEED	

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHING	347.48	1810.26

TIME PLANT OPERATED: 5:15 AM - 7:15 PM LBS. MIX WASTED: 519550

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM % AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR Mike Schmidt
CERTIFICATION NO 1152

PLANT MONITOR Larry Bauer
CERTIFICATION NO OK

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 8 DAILY REPORT OF ASPHALT PAVING PLANT 05-19-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 R1 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX: 0.0

SIEVE	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		30			2.0
MAX.	100	100	100	99	90	70	58		50			8.0
LOT 1	100	100	99	90	82	61	49	38	22	8.4	5.6	4.7

DENSITY RECORD LAB DENSITY: 2.361 SOLID DENSITY: 2.470 SPEC. % DENS.:
LAB VOIDS: ~~0.0~~ 4.4 INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY D.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW D.I.: N/A

INTENDED ADDED PERCENT A.C.: 6.10 INTENDED TOTAL PERCENT A.C.: 5.1
PERCENT A.C. BY TANK STICK: 5.90 TOTAL PERCENT A.C.: 5.90
FILLER/BITUMEN RATIO: .8 NUCLEAR PERCENT A.C.: 5.32

COMMENTS: FULL DEPTH PATCHING HWY. 63
MIX NO. ABD4-2006R1

PLANT INSPECTOR Mike Falkenhainer
CERTIFICATION NO. 1192

PLANT MONITOR Larry Bruns
CERTIFICATION NO. 6/C

REPORT NO: 8 NHS-63-9(17)--19-45 05-19-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	60	73	76	81	81	84
A.C.	290	290	290	290	300	300
AGGR.						
MIX	300	305	310	310	315	315
MAT						

RECYCLED MIX ONLY

TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
AC-10	4433271	25.78
3/4STONE	30 TCK'S	476.3

SAMPLES SUBMITTED MATERIALS	SENDERS NO.	SAMPLES SUBMITTED MATERIALS	SENDERS NO.
HOT MIX		HOT MIX	
HOT MIX		COLD FEED	
AC-			

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHING	264.32	2074.58

TIME PLANT OPERATED: 6:15 - 4:15 PM LBS. MIX WASTED: 338900

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM % AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR [signature] CERTIFICATION NO 1122

PLANT MONITOR [signature] CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 9 DAILY REPORT OF ASPHALT PAVING PLANT 05-20-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006 R2 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX: 0.0

SIEVE	1 1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		30			2.0
MAX.	100	100	100	99	90	70	58		50			9.0
LOT 1	100	100	99	90	82	62	50	38	23	8.5	5.3	4.5

DENSITY RECORD LAB DENSITY: 2.329 SOLID DENSITY: 2.443 SPEC. % DENS.:
LAB VOIDS: ~~5.2~~ 4.7 INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID STATION CL REFERENCE THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: 6.30 INTENDED TOTAL PERCENT A.C.: 6.30
PERCENT A.C. BY TANK STICK: 5.80 TOTAL PERCENT A.C.: 5.80
FILLER/BITUMEN RATIO: .79 NUCLEAR PERCENT A.C.: 5.77

COMMENTS: FULL DEPTH PATCHING HWY. 63
MIX NO. ABD4-2006R2

PLANT INSPECTOR Mike Falkenhahl CERTIFICATION NO 1126
PLANT MONITOR Larry Bowman CERTIFICATION NO 616

REPORT NO: 9 NHS-63-9(17)--19-45 05-20-1994

TEMPERATURE RECORD						
TIME	7	9	11	1	3	5
AIR	60	70	75	80	82	82
A.C.	280	280	290	280	275	270
AGGR.						
MIX	305	310	310	310	310	310
MAT						

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
3/4STONE	19 TCK'S	290.9
AC-10	4433318	25.7
AC-10	4433335	26.08

RECYCLED MIX ONLY

TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
HOT MIX	
AC-	

SAMPLES SUBMITTED

MATERIALS	SENDERS NO.
HOT MIX	
COLD FEED	

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHING	213.41	2287.99

TIME PLANT OPERATED: 6:00 AM - 4:30 PM LBS. MIX WASTED: 150950

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM % AC FOR THIS AGGREGATE COMBINATION IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR ____ PLANT MONITOR ____
CERTIFICATION NO 1122 CERTIFICATION NO 616

IOWA DEPARTMENT OF TRANSPORTATION

REPORT NO: 10 DAILY REPORT OF ASPHALT PAVING PLANT 05-26-1994

PROJECT NUMBER: NHS-63-9(17)--19-45 CONTRACT NUMBER: 40411
CONTRACTOR: CEDAR FALLS CONSTRUCTION CO. COUNTY: HOWARD
MIX TYPE: B CLASS: 1 SIZE: 3/4 COURSE: BASE
MIX DESIGN NUMBER: ABD4-2006R2 RESIDENT ENGINEER: DECORAH RCE
PLANT TYPE: BATCH PLANT MAKE: HETHERINGTON-BERNER
POLLUTION CONTROL EQUIPMENT TYPE: BAGHOUSE
ASPHALT SOURCE: KOCH GRADE: AC-10
AGGR. SOURCES: A96017 A96017 A96502
RECYCLE SOURCE: N/A PERCENT OF RAP IN MIX: 0.0

SIEVE	1	1/2	1	3/4	1/2	3/8	4	8	16	30	50	100	200
MIN.	100	100	98	85	76	56	46		30				2.0
MAX.	100	1	100	99	90	70	58		50				8.0
LOT 1	100	100	99	89	79	61	51	41	24	8.5	5.2	4.3	

DENSITY RECORD LAB DENSITY: N/A SOLID DENSITY: N/A SPEC. % DENS.:
LAB VOIDS: ~~0~~ N/A INTENDED LIFT THICKNESS: inches

	#1	#2	#3	#4	#5	#6	#7
COURSE LAID							
STATION							
CL REFERENCE							
THICKNESS							
CORE DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
% OF DENSITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PERCENT VOIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LOT 1 AVG. DENSITY: 0.000 AVG. % DENSITY: 0.000 AVG. % VOIDS: 0.0
DENSITY Q.I.: 0.00 LOW OUTLIER: 0.00 HIGH OUTLIER: 0.00 NEW Q.I.: N/A

INTENDED ADDED PERCENT A.C.: 6.30 INTENDED TOTAL PERCENT A.C.: 6.30
PERCENT A.C. BY TANK STICK: 6.07 TOTAL PERCENT A.C.: 6.07
FILLER/BITUMEN RATIO: .71 NUCLEAR PERCENT A.C.: N/A

COMMENTS: FULL DEPTH PATCHING HWY. 63 - MIX NO. ABD4-2006R2
MAY 23 - 30.3 TONS, MAY 24 - 30.75 TONS, MAY 25 - 47.3 TONS,
MAY 26 - 10. 53 TONS. THIS REPORT REPRESENTS THESE FOUR DAYS

PLANT INSPECTOR Kim Murphy
CERTIFICATION NO 73

PLANT MONITOR Larry Bramble
CERTIFICATION NO

PAGE 2
REPORT NO: 10 NHS-63-9(17)--19-45 05-26-1994

TEMPERATURE RECORD

TIME	7	9	11	1	3	5
AIR	60	65	70			
A.C.	255	265	275			
AGGR.						
MIX	305	305	305			
MAT						

MATERIALS DELIVERIES

TYPE	TICKET NO.	QUANTITY
3/4STONE	27 TCK'S.	448.55
3/8STONE	13 TCK'S.	215.34
AC-10	4433405	25.60
AC-10	4433439	25.77

RECYCLED MIX ONLY
TOTAL RAP USED TONS:
TOTAL AGGR. USED TONS:
RAP USED PERCENT:
AGGR. USED PERCENT:

SAMPLES SUBMITTED MATERIALS	SENDERS NO.	SAMPLES SUBMITTED MATERIALS	SENDERS NO.
HOT MIX		HOT MIX	
HOT MIX		COLD FEED	
AC-			

COURSE LAID	FROM STATION TO STATION	TONS TODAY	TONS TO DATE
BASE	VARIOUS PATCHING	116.88	2406.87

TIME PLANT OPERATED: VARIOUS LBS. MIX WASTED: 2230785

SPECIFICATIONS APPLICABLE TO THIS PROJECT
SS-5105

OTHER PROJECT DATA HYDRATED LIME SRC
AS PER SS-5105 THE GRADATION TOLERANCE CANNOT EXCEED THE MASTER RANGE BY MORE THAN 3% ON ANY SCREEN #30 AND LARGER.

MINIMUM % AC FOR THIS AGGREGATE IS 5.33%.
AN ASPHALT CONTENT OF 5.8% IS RECOMMENDED TO START THIS JOB.

PLANT INSPECTOR Kim Murphy
CERTIFICATION NO 173

PLANT MONITOR Larry Bowyer
CERTIFICATION NO 616

Appendix C

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN01
PAVEMENT TYPE... COMP

BEGINNING MP... 116.00
ENDING MP..... 133.00
COMPUTED MILES.. 17.00

LAB NO..... RA4-5339
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

	N/E BOUND						S/W BOUND						
M-P	SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
116.000	2.01	1.78	1.40	1.06	3.13	156.							
117.000							1.57	1.23	1.00	0.81	3.86	225+	
120.000	3.42	2.13	1.73	1.30	2.08	225+							
121.000							2.78	1.97	1.46	1.02	2.49	225+	
124.000	4.27	2.89	2.60	2.10	1.75	151.							
125.000							1.92	1.51	1.30	1.09	3.31	225+	
128.000	3.04	2.23	1.80	1.40	2.27	213.							
129.000							2.68	2.06	1.59	1.22	2.56	212.	
132.000	3.81	2.22	1.60	1.19	1.91	225+							
133.000							1.86	1.02	0.88	0.72	3.39	225+	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	0.86	4.27	2.01	3.31	4.03	2.25	1.83	1.41	1.06	0.320	2.23	1.78	194.	80.	80.
S/W	0.54	2.78	1.57	2.16	2.61	1.56	1.25	0.97	0.60	0.279	3.12	2.63	223.	84.	84.
COMB	0.91	4.27	1.57	2.74	3.50	1.90	1.54	1.19	0.83	0.304	2.68	2.08	209.		

* * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN02
PAVEMENT TYPE... COMP

BEGINNING MP.... 206.00
ENDING MP..... 222.00
COMPUTED MILES.. 16.00

LAB NO..... RA4-5340
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
206.000	6.53	4.20	3.32	2.64	1.28	50.							
207.000							2.12	1.70	1.52	1.28	3.06	225+	
210.000	4.19	2.45	2.36	1.78	1.78	225+							
211.000							1.63	1.49	1.43	1.27	3.75	165.	
214.000	2.70	2.18	1.79	1.68	2.49	172.							
215.000							3.38	2.69	2.28	1.86	2.15	95.	
218.000	5.98	4.12	3.83	3.02	1.37	50.							
219.000							3.00	2.68	2.45	2.08	2.35	50.	
220.000							2.62	1.92	1.56	1.30	2.61	225+	
222.000	3.48	2.37	1.87	1.60	2.05	221.							

* * * * * * * * * * * * * * * * * * * SUMMARY OF DATA *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.63	6.53	2.70	4.58	5.95	3.06	2.63	2.14	1.51	0.330	1.79	1.37	144.	80.	80.
S/W	0.69	3.38	1.63	2.55	3.13	2.10	1.85	1.56	0.45	0.178	2.79	2.25	152.	84.	84.
COMB	1.59	6.53	1.63	3.56	4.90	2.58	2.24	1.85	0.98	0.276	2.29	1.66	148.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

FORM GREV

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN03
PAVEMENT TYPE... COMP

BEGINNING MP.... 236.00
ENDING MP..... 240.50
COMPUTED MILES.. 4.50

LAB NO..... RA4-5341
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %.... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
236.000							2.34	2.02	1.68	1.39	2.84	144.	
237.500	6.84	4.95	3.11	2.28	1.24	50.	3.32	1.85	1.70	1.31	2.18	225+	
238.000	5.44	4.64	3.08	2.44	1.46	50.							
238.500	6.34	3.04	2.69	2.27	1.31	155.	1.92	1.71	1.35	1.12	3.31	160.	
239.000	3.57	2.55	2.12	1.71	2.01	185.							
239.500							2.42	1.19	1.04	0.88	2.77	225+	
240.000	2.52	2.27	1.95	1.53	2.63	50.							
240.500							2.55	1.17	1.08	0.93	2.66	225+	

* S U M M A R Y O F D A T A *

DIRECTION	STD.DEV.	SENS1 MAX.	MIN.	AVE.	80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.84	6.84	2.52	4.94	6.49	3.49	2.59	2.05	1.45	0.294	1.73	1.24	98.	80.	80.
S/W	0.51	3.32	1.92	2.51	2.94	1.59	1.37	1.13	0.92	0.367	2.75	2.41	197.	84.	84.
COMB	1.81	6.84	1.92	3.73	5.25	2.54	1.98	1.59	1.19	0.319	2.24	1.64	147.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

PROGRAM NUMBER- P2220050 HR556 OFFICE OF MATERIALS
COMPUTER RUN DATE- 08-18-94 ROAD RATER TESTS

COUNTY- HOWARD	BEGINNING MP.... 243.00	LAB NO..... RA4-5342	WEATHER SUNNY		FREQ. HZ... 30
U.S. ROUTE..... SN04	ENDING MP..... 261.00	YEAR BUILT.. 19	OBS.... BROWN ANDERSON		DISP %..... 68
PAVEMENT TYPE... COMP	COMPUTED MILES.. 18.00	DATE TESTED. 05-09-94	TIME... 14:09		TEST TYPE..

ROAD RATER DEFLECTION (MILS)

	N/E BOUND						S/W BOUND						
M-P	SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
243.000	4.28	3.51	3.38	2.46	1.75	50.							
245.000							1.53	1.03	1.01	0.92	3.94	225+	
246.000	4.37	2.91	2.43	1.95	1.72	153.							
249.000							1.86	1.66	1.59	1.42	3.39	165.	
250.000	2.32	2.27	1.95	1.69	2.80	50.							
253.000							2.16	1.91	1.85	1.60	3.02	138.	
254.000	3.54	2.28	2.06	1.70	2.02	225+							
257.000							2.37	1.75	1.53	1.25	2.81	225+	
258.000	8.59	4.30	3.16	2.48	1.05	50.							
261.000							2.23	1.86	1.61	1.42	2.95	191.	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	2.37	8.59	2.32	4.62	6.61	3.05	2.60	2.06	1.57	0.339	1.87	1.34	106.	80.	80
S/W	0.34	2.37	1.53	2.03	2.31	1.64	1.52	1.32	0.39	0.191	3.22	2.84	189.	84.	84.
COMB	2.10	8.59	1.53	3.32	5.09	2.35	2.06	1.69	0.98	0.294	2.55	1.80	148.		

* * * * * H I S T O R Y * * * * * REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

DATE TESTED	AVE.SR	AVE.SOIL K

FORM GR5Y

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN05
PAVEMENT TYPE... COMP

BEGINNING MP.... 263.00
ENDING MP..... 279.00
COMPUTED MILES.. 16.00

LAB NO..... RA4-5343
YEAR BUILT..... 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
263.000							3.54	3.06	2.57	2.15	2.08	50.	
264.000	4.17	3.15	2.48	1.99	1.79	50.							
267.000							2.95	2.32	1.79	1.34	2.38	169.	
268.000	3.17	2.59	2.19	1.82	2.20	93.							
271.000							2.88	1.22	1.16	1.00	2.43	225+	
272.000	4.88	3.45	2.80	2.26	1.59	50.							
275.000							5.08	1.98	1.68	1.45	1.60	225+	
276.000	2.41	1.92	1.63	1.28	2.72	210.							
278.000	2.59	1.69	1.42	1.14	2.57	225+							
279.000							6.76	2.81	1.85	1.28	1.31	184.	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.06	4.88	2.41	3.44	4.33	2.56	2.10	1.70	0.88	0.257	2.17	1.76	126.	80.	80.
S/W	1.66	6.76	2.88	4.24	5.64	2.28	1.81	1.44	1.96	0.463	1.96	1.55	171.	84.	84.
COMB	1.38	6.76	2.41	3.84	5.00	2.42	1.96	1.57	1.42	0.371	2.07	1.67	148.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

PROGRAM NUMBER- P2220050 HR556
COMPUTER RUN DATE- 08-18-94

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN06
PAVEMENT TYPE... COMP

BEGINNING MP.... 318.00
ENDING MP..... 330.00
COMPUTED MILES.. 12.00

LAB NO..... RA4-5344
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
318.000	9.53	2.68	2.15	1.36	0.98	50.							
319.000							2.32	1.94	1.83	1.67	2.86	180.	
321.000							1.93	1.74	1.62	1.32	3.29	145	
325.000	2.40	1.87	1.82	1.22	2.73	224.							
326.000	4.95	3.46	2.53	1.28	1.57	50.	1.58	1.37	1.31	1.22	3.84	216.	
328.000							2.68	1.61	1.47	1.26	2.56	225+	
329.000	3.20	2.88	1.90	1.41	2.18	50.							
330.000							2.02	1.55	1.39	1.15	3.18	225+	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	3.19	9.53	2.40	5.02	7.70	2.72	2.10	1.32	2.30	0.458	1.87	1.23	93.	80.	80.
S/W	0.42	2.68	1.58	2.11	2.46	1.64	1.52	1.32	0.46	0.220	3.15	2.74	198	84.	84.
COMB	2.50	9.53	1.58	3.40	5.51	2.12	1.78	1.32	1.28	0.376	2.58	1.83	152.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

FORM GREY

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94 HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN07
PAVEMENT TYPE... COMP

BEGINNING MP.... 349.00
ENDING MP..... 357.00
COMPUTED MILES.. 8.00

LAB NO..... RA4-5345
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
349.000	2.82	2.49	2.27	1.85	2.41	50.							
350.000							1.99	1.22	0.88	0.69	3.22	225+	
351.000	5.43	3.19	2.20	1.52	1.47	122.							
352.000							1.65	1.29	1.16	0.85	3.72	225+	
353.000	2.50	1.77	1.54	1.26	2.64	225+							
354.000							1.85	1.31	1.14	0.92	3.40	225+	
355.000	2.82	2.14	1.64	1.24	2.41	209.	2.16	1.70	1.49	1.26	3.02	225+	
356.000	4.43	1.88	1.23	1.09	1.71	225+							
357.000							1.93	1.52	1.32	1.10	3.29	225+	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.27	5.43	2.50	3.60	4.67	2.29	1.78	1.39	1.31	0.363	2.13	1.70	167.	80.	80.
S/W	0.19	2.16	1.65	1.92	2.07	1.41	1.20	0.96	0.51	0.265	3.33	3.11	225+	84.	84.
COMB	1.23	5.43	1.65	2.76	3.80	1.85	1.49	1.18	0.91	0.329	2.73	2.11	196.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN08
PAVEMENT TYPE... COMP

BEGINNING MP.... 360.00
ENDING MP..... 383.00
COMPUTED MILES.. 23.00

LAB NO..... RA4-5346
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
360.000	2.33	1.26	1.15	0.91	2.79	225+							
361.000							2.58	1.50	1.39	1.21	2.64	225+	
364.000	1.33	1.13	0.92	0.86	4.34	225+							
365.000							2.11	1.84	1.57	1.26	3.07	161.	
368.000	4.65	3.54	2.92	2.56	1.65	50.							
371.000							2.37	1.81	1.59	1.38	2.81	225+	
372.000	2.11	1.83	1.71	1.51	3.02	167.							
376.000	5.55	4.28	3.92	3.16	1.44	50.							
380.000							4.78	1.85	1.30	0.97	1.67	225+	
383.000							2.21	1.87	1.78	1.65	2.97	181.	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.81	5.55	1.33	3.19	4.71	2.41	2.12	1.80	0.79	0.246	2.65	1.66	144.	80.	80.
S/W	1.12	4.78	2.11	2.81	3.75	1.77	1.53	1.29	1.04	0.369	2.63	2.16	204.	84.	84.
COMB	1.43	5.55	1.33	3.00	4.20	2.09	1.82	1.55	0.91	0.303	2.64	1.91	174.		

* * * * * H I S T O R Y * * * * *

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

DATE TESTED	AVE.SR	AVE.SOIL K

FORM GREY

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN09
PAVEMENT TYPE... COMP

BEGINNING MP.... 404.00
ENDING MP..... 414.00
COMPUTED MILES.. 10.00

LAB NO..... RA4-5347
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
404.000	2.92	2.40	2.09	1.69	2.34	125.							
405.000							3.42	2.40	1.88	1.42	2.13	210.	
406.000	1.68	1.23	1.07	0.86	3.61	225+							
407.000							2.84	1.28	1.01	0.78	2.45	225+	
408.000	2.02	1.66	1.38	1.09	3.12	219.							
409.000							2.53	1.65	1.32	1.03	2.68	225+	
410.000	5.08	3.67	2.83	2.15	1.54	50.							
411.000							2.52	1.43	1.20	1.01	2.68	225+	
412.000	3.70	2.10	1.61	1.23	1.96	225+							
414.000							1.62	1.59	1.49	1.31	3.77	54.	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.37	5.08	1.68	3.08	4.23	2.21	1.80	1.40	0.87	0.282	2.51	1.80	169.	80.	80.
S/W	0.65	3.42	1.62	2.59	3.13	1.67	1.38	1.11	0.92	0.354	2.74	2.23	188.	84.	84.
COMB	1.04	5.08	1.62	2.83	3.71	1.94	1.59	1.26	0.89	0.315	2.63	2.03	179.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN10
PAVEMENT TYPE... COMP

BEGINNING MP.... 420.00
ENDING MP..... 429.00
COMPUTED MILES.. 9.00

LAB NO..... RA4-5348
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %.... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
420.000							1.07	0.78	0.71	0.56	5.22	225+	
421.000	1.52	1.34	1.20	0.99	3.90	209.							
422.000							0.86	0.77	0.72	0.61	6.20	225+	
423.000	1.05	0.86	0.77	0.74	5.24	225+							
424.000							2.57	0.81	0.64	0.58	2.64	225+	
425.000	1.45	1.19	1.01	0.88	4.05	225+							
426.000							1.57	1.17	1.01	0.80	3.86	225+	
427.000	1.76	1.24	0.98	0.79	3.48	225+							
428.000							1.23	0.76	0.68	0.55	4.67	225+	
429.000	2.10	1.39	1.18	0.96	3.03	225+							

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	0.39	2.10	1.05	1.58	1.90	1.20	1.03	0.87	0.37	0.236	3.94	3.24	223.	80.	80.
S/W	0.67	2.57	0.86	1.46	2.03	0.86	0.75	0.62	0.60	0.412	4.52	3.39	225+	84.	84.
COMB	0.52	2.57	0.86	1.52	1.96	1.03	0.89	0.75	0.49	0.321	4.23	3.31	224.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

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FORM DEV

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER · TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN11
PAVEMENT TYPE... COMP

BEGINNING MP.... 440.00
ENDING MP..... 480.00
COMPUTED MILES.. 40.00

LAB NO..... RA4-5349
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
440.000	3.10	1.44	1.20	0.99	2.24	225+							
442.000							1.14	0.98	0.88	0.72	4.96	225+	
445.000	2.70	1.92	1.57	1.29	2.49	225+							
450.000	3.99	1.64	1.36	1.13	1.85	225+							
452.000							1.77	1.38	1.26	1.08	3.52	225+	
455.000	1.41	1.15	1.06	0.87	4.14	225+							
460.000	2.82	1.88	1.60	1.24	2.41	225+							
465.000							2.30	1.98	1.81	1.52	2.88	153.	
470.000							3.28	1.19	1.11	0.92	2.20	225+	
480.000							5.51	2.16	2.01	1.86	1.51	225+	

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DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	0.93	3.99	1.41	2.80	3.58	1.61	1.36	1.10	1.20	0.427	2.62	1.88	225+	80.	80.
S/W	1.71	5.51	1.14	2.80	4.23	1.54	1.41	1.22	1.26	0.451	3.01	1.90	211.	84.	84.
COMB	1.29	5.51	1.14	2.80	3.89	1.57	1.39	1.16	1.23	0.439	2.82	1.91	219.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN12
PAVEMENT TYPE... COMP

BEGINNING MP.... 490.00
ENDING MP..... 534.00
COMPUTED MILES.. 44.00

LAB NO..... RA4-5350
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
490.000	0.49	0.41	0.39	0.24	9.66	225+							
495.000							7.47	2.13	2.10	1.89	1.22	225+	
500.000	2.19	1.62	1.30	0.96	2.93	225+							
505.000							1.88	1.35	1.11	0.84	3.36	225+	
510.000	1.62	0.90	0.76	0.62	3.71	225+							
515.000							1.36	1.11	1.05	0.92	4.32	225+	
520.000	2.09	1.81	1.73	1.48	3.04	171.							
525.000							4.15	3.34	2.66	2.14	1.85	50.	
530.000	3.93	3.41	2.83	2.45	1.87	50.							
534.000							3.37	1.57	1.47	1.31	2.16	225+	

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DIRECTION	SENS1 STD.DEV.	MAX.	MIN.	AVE.	80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.24	3.93	0.49	2.06	3.11	1.63	1.40	1.15	0.43	0.210	4.24	1.63	180.	80.	80.
S/W	2.41	7.47	1.36	3.65	5.68	1.90	1.68	1.42	1.75	0.479	2.58	1.53	191.	84.	84.
COMB	1.99	7.47	0.49	2.85	4.53	1.76	1.54	1.28	1.09	0.382	3.41	1.40	185.		

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* * * * * H I S T O R Y * * * * *

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

DATE TESTED	AVE.SR	AVE.SOIL K

FORM GREY

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN13
PAVEMENT TYPE... COMP

BEGINNING MP.... 593.00
ENDING MP..... 605.00
COMPUTED MILES.. 12.00

LAB NO..... RA4-5351
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS.... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

	N/E BOUND						S/W BOUND						
M-P	SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
593.000	3.03	2.00	1.47	1.08	2.28	225+							
594.000							1.11	0.90	0.80	0.65	5.07	225+	
595.000	2.74	1.93	1.36	0.97	2.46	225+							
596.000							0.90	0.61	0.54	0.44	5.98	225+	
597.000							1.18	0.93	0.83	0.68	4.83	225+	
598.000	5.41	3.07	2.60	1.39	1.47	154.							
599.000	3.45	3.18	2.64	2.15	2.06	50.							
601.000	1.78	1.37	1.10	0.84	3.45	225+							
602.000							1.23	1.01	0.95	0.83	4.67	225+	
605.000							6.03	2.21	2.00	1.73	1.42	225+	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	1.34	5.41	1.78	3.28	4.41	2.31	1.83	1.29	0.97	0.296	2.34	1.74	176.	80.	80.
S/W	2.21	6.03	0.90	2.09	3.95	1.13	1.02	0.87	0.96	0.458	4.39	2.93	225+	84.	84.
COMB	1.83	6.03	0.90	2.69	4.23	1.72	1.43	1.08	0.96	0.359	3.37	1.98	201.		

* * * * * H I S T O R Y * * * * *

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

DATE TESTED	AVE.SR	AVE.SOIL K

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 08-18-94

HR 556

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... SN14
PAVEMENT TYPE... COMP

BEGINNING MP.... 635.00
ENDING MP..... 660.00
COMPUTED MILES.. 25.00

LAB NO..... RA4-5352
YEAR BUILT.. 19
DATE TESTED. 05-09-94

WEATHER SUNNY
OBS... BROWN ANDERSON
TIME... 14:09

FREQ. HZ... 30
DISP %..... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
635.000	9.98	2.52	2.18	1.86	0.95	50.							
639.000							1.53	1.01	0.91	0.77	3.94	225+	
640.000	2.05	1.68	1.49	1.29	3.08	218.							
645.000	1.85	1.60	1.40	0.95	3.34	196.							
649.000							2.30	0.82	0.71	0.56	2.88	225+	
650.000	1.13	0.89	0.76	0.61	4.94	225+							
653.000							5.23	1.84	1.61	1.06	1.57	225+	
655.000	2.28	1.13	0.77	0.60	2.84	225+							
657.000							1.13	0.84	0.73	0.61	5.00	225+	
660.000							1.04	0.91	0.84	0.71	5.34	225+	

* S U M M A R Y O F D A T A *

DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	3.67	9.98	1.13	3.46	6.55	1.56	1.32	1.06	1.89	0.548	3.03	1.83	183.	80.	80.
S/W	1.74	5.23	1.04	2.25	3.71	1.08	0.96	0.74	1.16	0.517	3.74	2.44	225+	84.	84.
COMB	2.78	9.98	1.04	2.85	5.19	1.32	1.14	0.90	1.53	0.536	3.39	2.16	205.		

* * * * * H I S T O R Y * * * * *

DATE TESTED	AVE.SR	AVE.SOIL K

REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

FORM GREY

PROGRAM NUMBER- P2220050
COMPUTER RUN DATE- 01-06-95

OFFICE OF MATERIALS
ROAD RATER TESTS

COUNTY- HOWARD
U.S. ROUTE..... 0063
PAVEMENT TYPE... COMP

BEGINNING MP.... 100.00
ENDING MP..... 700.00
COMPUTED MILES.. 600.00

LAB NO..... RA4-5422
YEAR BUILT.. 19
DATE TESTED. 10-06-94

WEATHER cloud
OBS.... frette anderson
TIME... 11:00

FREQ. HZ... 30
DISP %.... 68
TEST TYPE..

ROAD RATER DEFLECTION (MILS)

M-P	N/E BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	S/W BOUND SENS 1	SENS 2	SENS 3	SENS 4	S.R.	SOIL K	REMARKS
116.000	0.63	0.55	0.46	0.39	7.60	225+							NOTE
120.000	0.83	0.67	0.57	0.49	6.03	225+							
124.000	0.69	0.63	0.57	0.50	7.04	225+							
128.000	1.03	0.90	0.72	0.59	5.03	225+							
132.000	0.86	0.77	0.63	0.53	5.85	225+							
206.000	1.26	1.15	0.96	0.82	4.24	203.							
210.000	0.85	0.80	0.72	0.66	5.91	211.							
214.000	0.94	0.87	0.76	0.67	5.43	217.							
218.000	1.19	1.09	0.94	0.83	4.45	206.							
222.000	0.84	0.77	0.68	0.61	5.97	225+							
237.500	1.72	1.48	1.17	0.95	3.25	210.							
239.000	1.49	1.36	1.16	1.00	3.68	182.							
243.000	1.32	1.20	1.01	0.87	4.07	201.							
246.000	1.40	1.22	0.97	0.76	3.88	225.							
250.000	1.32	1.25	1.13	1.02	4.07	161.							
254.000	1.13	1.05	1.01	0.90	4.65	199.							
263.000							1.81	1.54	1.26	1.07	3.40	211.	
264.000	1.75	1.47	1.11	0.90	3.20	224.							
267.000							1.61	1.47	1.19	0.94	3.73	169.	
268.000	1.58	1.42	1.14	0.96	3.50	188.							
271.000							0.87	0.83	0.75	0.67	6.09	199.	
272.000	1.76	1.53	1.20	0.98	3.19	200.							
275.000							1.16	1.00	0.81	0.68	4.84	225+	
276.000	1.12	0.96	0.76	0.63	4.68	225+							
278.000	1.23	1.03	0.83	0.69	4.33	225+							
279.000							1.32	1.17	0.95	0.80	4.36	220.	
318.000	1.18	1.08	0.92	0.80	4.48	207.							
319.000							1.21	1.07	0.89	0.76	4.68	225+	
321.000	0.96	0.88	0.73	0.64	5.34	222.	1.08	0.93	0.80	0.69	5.12	225+	
324.000							1.20	1.07	0.89	0.76	4.71	224.	
325.000	1.22	1.15	0.96	0.81	4.36	177.							
326.000	1.22	1.12	0.95	0.81	4.36	201.							
328.000							0.87	0.81	0.72	0.63	6.09	218.	
329.000	0.89	0.82	0.69	0.59	5.69	223.							
330.000							0.92	0.87	0.79	0.70	5.82	202.	
349.000	1.29	1.17	0.98	0.84	4.16	205.							
350.000							1.27	0.98	0.70	0.55	4.50	225+	
351.000	1.74	1.52	1.22	0.99	3.22	197.							
352.000							1.16	1.06	0.90	0.78	4.84	210.	
353.000	1.25	1.10	0.84	0.66	4.27	225+							
355.000	1.25	1.15	0.98	0.83	4.27	197.	1.35	1.20	0.98	0.82	4.29	216.	
356.000	1.32	1.18	0.98	0.83	4.07	214.							
357.000							0.58	0.53	0.45	0.38	8.43	225+	
361.000							1.31	1.15	0.93	0.78	4.39	225+	
364.000	0.83	0.71	0.57	0.47	6.03	225+							
371.000							1.10	1.05	0.96	0.87	5.05	176.	
376.000	2.09	1.92	1.62	1.40	2.75	92.							
383.000							0.97	0.86	0.73	0.65	5.58	225+	
404.000	0.84	0.74	0.64	0.56	5.97	225+							
405.000							1.30	1.20	1.04	0.91	4.42	190.	

FORM CMT-

406.000	0.62	0.55	0.48	0.43	7.70	225+						
407.000							1.40	1.28	1.07	0.92	4.17	189.
408.000	0.76	0.70	0.62	0.56	6.49	225+						
409.000							1.64	1.52	1.27	1.09	3.68	147.
410.000	0.94	0.88	0.75	0.66	5.43	209.						
411.000							2.89	1.54	1.40	1.06	2.36	225+
412.000	0.79	0.69	0.60	0.54	6.29	225+						
414.000							1.23	1.14	0.98	0.85	4.62	192.
420.000							0.63	0.60	0.53	0.44	7.89	219.
421.000	1.19	1.09	0.94	0.82	4.45	206.						
422.000							0.77	0.71	0.65	0.57	6.71	225+
423.000	1.02	0.90	0.71	0.57	5.07	225+						
424.000							0.64	0.59	0.52	0.46	7.79	225+
425.000	1.07	0.92	0.76	0.64	4.87	225+						
426.000							0.89	0.82	0.72	0.63	5.98	223.
427.000	0.95	0.86	0.67	0.55	5.38	225+						
428.000							0.63	0.57	0.50	0.43	7.89	225+
429.000	0.66	0.60	0.51	0.44	7.31	225+						
438.000							0.68	0.59	0.51	0.45	7.42	225+
440.000	0.78	0.68	0.56	0.48	6.35	225+						
442.000							0.65	0.53	0.47	0.42	7.69	225+
443.000	0.93	0.88	0.72	0.63	5.48	201.						
445.000	0.86	0.67	0.57	0.49	5.85	225+						
446.000							0.79	0.69	0.61	0.54	6.58	225+
449.000							0.74	0.65	0.55	0.49	6.93	225+
450.000	0.66	0.61	0.55	0.50	7.31	225+						
452.000							0.78	0.72	0.64	0.58	6.64	225+
453.000	0.94	0.85	0.72	0.61	5.43	225+						
457.000	0.79	0.73	0.63	0.53	6.29	225+						
458.000							0.92	0.74	0.64	0.57	5.82	225+
460.000	0.71	0.62	0.52	0.43	6.88	225+						
461.000							0.65	0.58	0.51	0.44	7.69	225+
463.000	0.71	0.55	0.49	0.44	6.88	225+	0.98	0.87	0.73	0.61	5.53	225+
465.000	1.24	0.99	0.90	0.91	4.30	225+	0.89	0.81	0.73	0.66	5.98	225+
468.000							0.81	0.77	0.71	0.63	6.45	207.
470.000							0.85	0.77	0.67	0.57	6.20	225+
471.000	0.95	0.86	0.74	0.64	5.38	225+						
472.000							0.87	0.79	0.68	0.58	6.09	225+
473.000							0.68	0.62	0.55	0.48	7.42	225+
474.000	0.73	0.66	0.58	0.51	6.72	225+						
475.000							0.59	0.54	0.46	0.40	8.32	225+
477.000	0.96	0.85	0.70	0.59	5.34	225+						
480.000							1.50	1.35	1.09	0.91	3.94	194.
484.000	0.41	0.36	0.34	0.31	10.88	225+						
488.000	0.41	0.33	0.28	0.25	10.88	225+						
490.000	0.37	0.31	0.27	0.23	11.84	225+						
493.000	0.69	0.61	0.56	0.52	7.04	225+						
495.000							1.19	1.15	1.04	0.96	4.74	151.
500.000	0.76	0.68	0.55	0.45	6.49	225+						
505.000							0.73	0.62	0.50	0.41	7.01	225+
508.000							1.48	1.34	1.16	1.03	3.99	190.
510.000	0.68	0.57	0.45	0.37	7.13	225+						
512.000							2.36	2.16	1.90	1.71	2.76	50.
515.000							0.60	0.54	0.48	0.44	8.21	225+
517.000	0.85	0.79	0.68	0.60	5.91	220.						
520.000	0.97	0.85	0.70	0.58	5.29	225+	0.95	0.83	0.67	0.56	5.67	225+
521.000							1.09	0.94	0.76	0.64	5.08	225+
522.000	0.84	0.80	0.72	0.66	5.97	203.	0.96	0.85	0.70	0.60	5.63	225+
524.000	1.16	1.06	0.88	0.74	4.55	210.						
525.000							1.06	0.97	0.84	0.74	5.20	216.
526.000	1.12	1.04	0.94	0.87	4.68	200.						
528.000	0.99	0.92	0.82	0.75	5.20	210.	1.46	1.39	1.28	1.20	4.03	135.
530.000	1.42	1.34	1.19	1.09	.83	153.						
531.000	1.87	1.77	1.59	1.48	3.03	78.	1.58	1.51	1.39	1.31	3.79	112.

532.000	1.19	1.18	1.05	0.94	4.45	113.	0.83	0.75	0.63	0.54	6.32	225+	
533.000							0.78	0.72	0.63	0.56	6.64	225+	
534.000	1.78	1.64	1.39	1.21	3.16	136.	1.89	1.75	1.50	1.31	3.29	113.	
535.000	1.65	1.50	1.28	1.12	3.37	169.	0.82	0.71	0.56	0.46	6.38	225+	
594.000							0.74	0.58	0.44	0.36	6.93	225+	
596.000							0.61	0.52	0.44	0.38	8.10	225+	
597.000							0.66	0.59	0.52	0.46	7.60	225+	
602.000							0.76	0.70	0.63	0.55	6.78	225+	
605.000							1.15	1.08	0.94	0.85	4.87	188.	
611.000							0.66	0.59	0.48	0.40	7.60	225+	
616.000							0.73	0.69	0.62	0.55	7.01	217.	
619.000							0.58	0.55	0.49	0.44	8.43	225.	
622.000							0.76	0.75	0.69	0.59	6.78	176.	
625.000							0.86	0.68	0.52	0.41	6.14	225+	
639.000							0.89	0.81	0.66	0.56	5.98	225+	
649.000							0.82	0.71	0.57	0.47	6.38	225+	
653.000							0.80	0.71	0.61	0.53	6.51	225+	
657.000							0.86	0.84	0.70	0.51	6.14	177.	
660.000							0.74	0.70	0.63	0.57	6.93	216.	

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DIRECTION	SENS1 STD.DEV.	SENS1 MAX.	SENS1 MIN.	SENS1 AVE.	SENS1 80%	SENS2 AVE.	SENS3 AVE.	SENS4 AVE.	SCI	SCI/SENS1	AVE. SR	80% SR	AVE. SOIL K	BEG. TEMP	END TEMP
N/E	0.37	2.09	0.37	1.06	1.37	0.95	0.81	0.70	0.11	0.103	5.39	3.92	208.	60.	60.
S/W	0.42	2.89	0.58	1.02	1.37	0.91	0.78	0.67	0.12	0.113	5.85	4.60	209.	80.	80.
COMB	0.39	2.89	0.37	1.04	1.37	0.93	0.79	0.68	0.11	0.107	5.62	4.25	209.		

* * * * * H I S T O R Y * * * * * REMARKS: SECL- SUPERELEVATED CURVE, LOW SIDE. SECH- SUPERELEVATED CURVE, HIGH SIDE

DATE TESTED	AVE.SR	AVE.SOIL K

NOTE- REASEARCH PROJECT HR556