Report No.CDOT-DTD-R-92-8

UNBONDED PCCP OVERLAY PROJECT IR-25-3(77)

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Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222

Final Report
JANUARY, 1993

Prepared in cooperation with the
U.S. Department of Transportation
Federal Highway Administration

The contents of this report reflect the views of the author who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views of the Colorado Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Technical Report Documentation Page

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16. Abstract

This report describes the testing, construction, and 7 years of performance evaluations of an unbonded concrete overlay with and without tied shoulders. Unbonded concrete overlay was used successfully on a thirteen mile stretch of I-25 north of Denver in Colorado.

Visual investigation and distress survey was performed and results are summarized. In general, the unbonded overlay has performed quite well, with little distress to date. It appears that tied shoulders are doing what is expected, increasing the load carrying capacity of the driving lane by transferring the load to the shoulder.

Implementation: The results of this study demonstrated that unbonded overlays, if properly constructed, can be a viable method for resurfacing badly deteriorated rigid pavements. The use of unbonded overlays, where suitable, is recommended, along with close attention being paid to design and construction details.

17. Key Words	18. Distribution Statement
Unbonded overlays, debonding medium, resurfacing, thermal curling	No restrictions: This report is available to the public through the National Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	37	

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Table of Contents

Evaluation of Unbonded Concrete Overlay
Project IR-25-3(77)

Final Report
May 1992

I. Literature Review and Problem Discussion

One of the proven, but not widely used methods, in rehabilitation of concrete pavements is unbonded concrete resurfacing. Many types of concrete resurfacing has been used since early 1900's in almost every state. Performance data indicates that a relatively low-maintenance service life of twenty years can be expected using variety of concrete resurfacing techniques. These findings are documented in the Transportation Research Board (TRB) Synthesis Report number 99, "Resurfacing With Portland Cement Concrete".

One of the primary reasons that concrete resurfacing is not as popular as asphaltic resurfacing, is their higher initial cost and the complexity of their construction. However, longer life and lower cost of maintenance associated with concrete resurfacing have caused many states to re-evaluate and choose concrete resurfacing over the traditional asphaltic resurfacing.

A review of literature on the subject of concrete resurfacing revealed that the performance of a resurfacing is closely related to the condition of the existing pavement. In general there are three types of resurfacing techniques termed bonded, partially bonded, and unbonded. Selection of each technique requires a thorough investigation of the existing pavement condition. The following is a brief description of each resurfacing technique.

Bonded Overlays:

The procedure for using bonded overlays includes meticulous cleaning of the existing pavement surface, application of a bonding medium, and careful placement and consolidation of the resurfacing concrete (1). The condition of the underlying pavement plays a major role in overlay performance. The joints for the bonded overlay must match the joints of the existing pavement. The use of bonding grout may not be necessary to achieve adequate bond and when used, is best applied through mechanical sprayers (2). This type of rehabilitation technique should not be used for severely distressed pavement.

Partially Bonded Overlays:

No special attempt to achieve or prevent bond between the resurfacing and existing pavement is required. Minimal surface preparation is necessary and normal concrete mixture, construction practices, and curing procedures are used. This method of rehabilitation was primarily used to increase the load-carrying capacity of structurally sound concrete pavements during the 1950s and early 1960s (3).

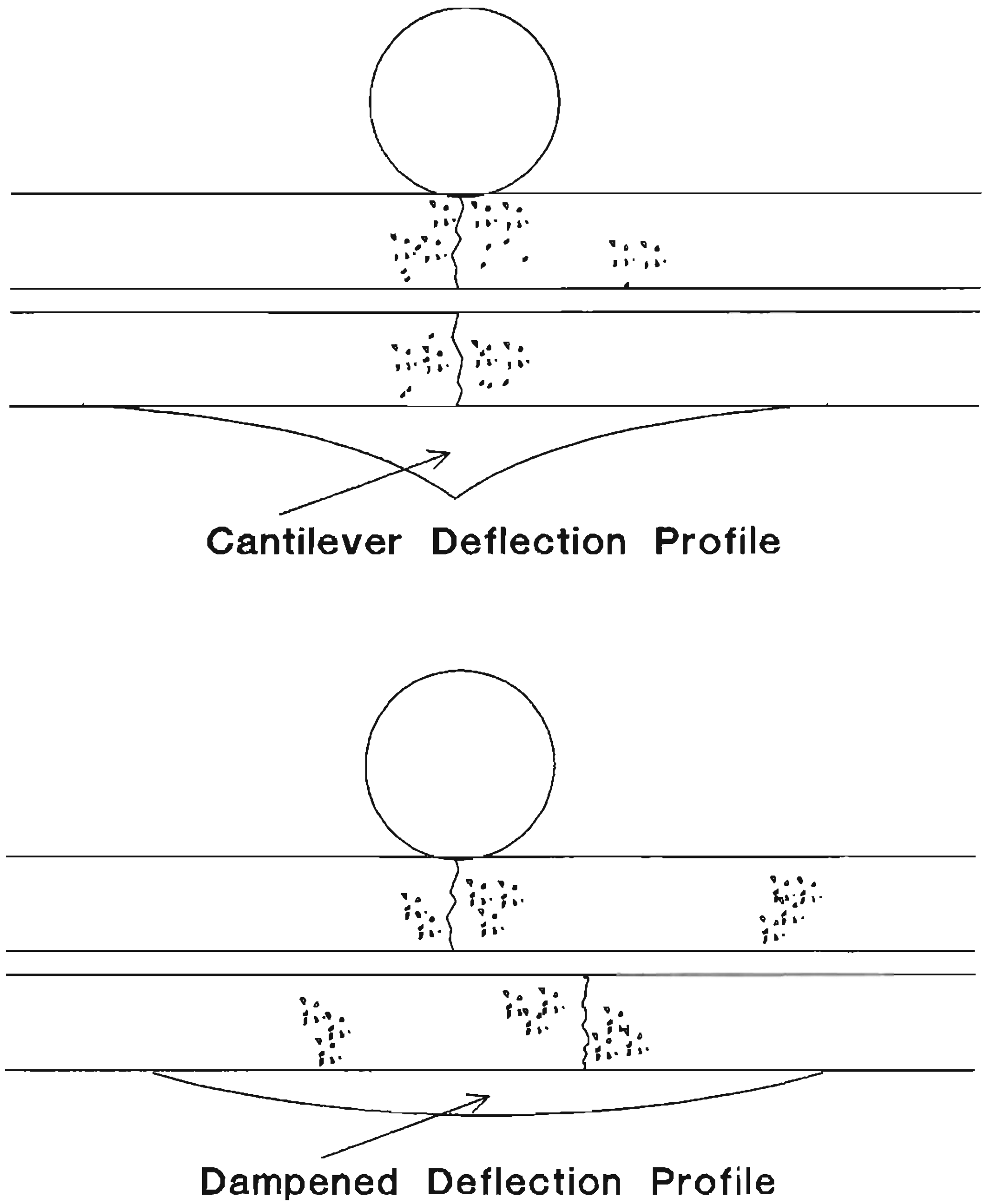
Unbonded Concrete Overlays:

Unbonded overlays are primarily used for resurfacing of existing pavements in which distress is so advanced that it cannot be economically eliminated by repair before resurfacing (1). Unlike bonded overlays, the unbonded overlays do not require meticulous cleaning of the existing surface pavement, other than the removal of any loose or foreign materials.

One the significant advantage of the unbonded overlay over the bonded overlay is that it does not require matching of the existing joints. According to reference (4), deliberate mismatching of the overlay joints could extend the service life of the overlay. Mismatching of the joints allows the leave slab to bridge the joint or crack and avoid cantilever deflections and pumping action beneath the existing slab. This phenomenon is schematically shown in Figure 1.

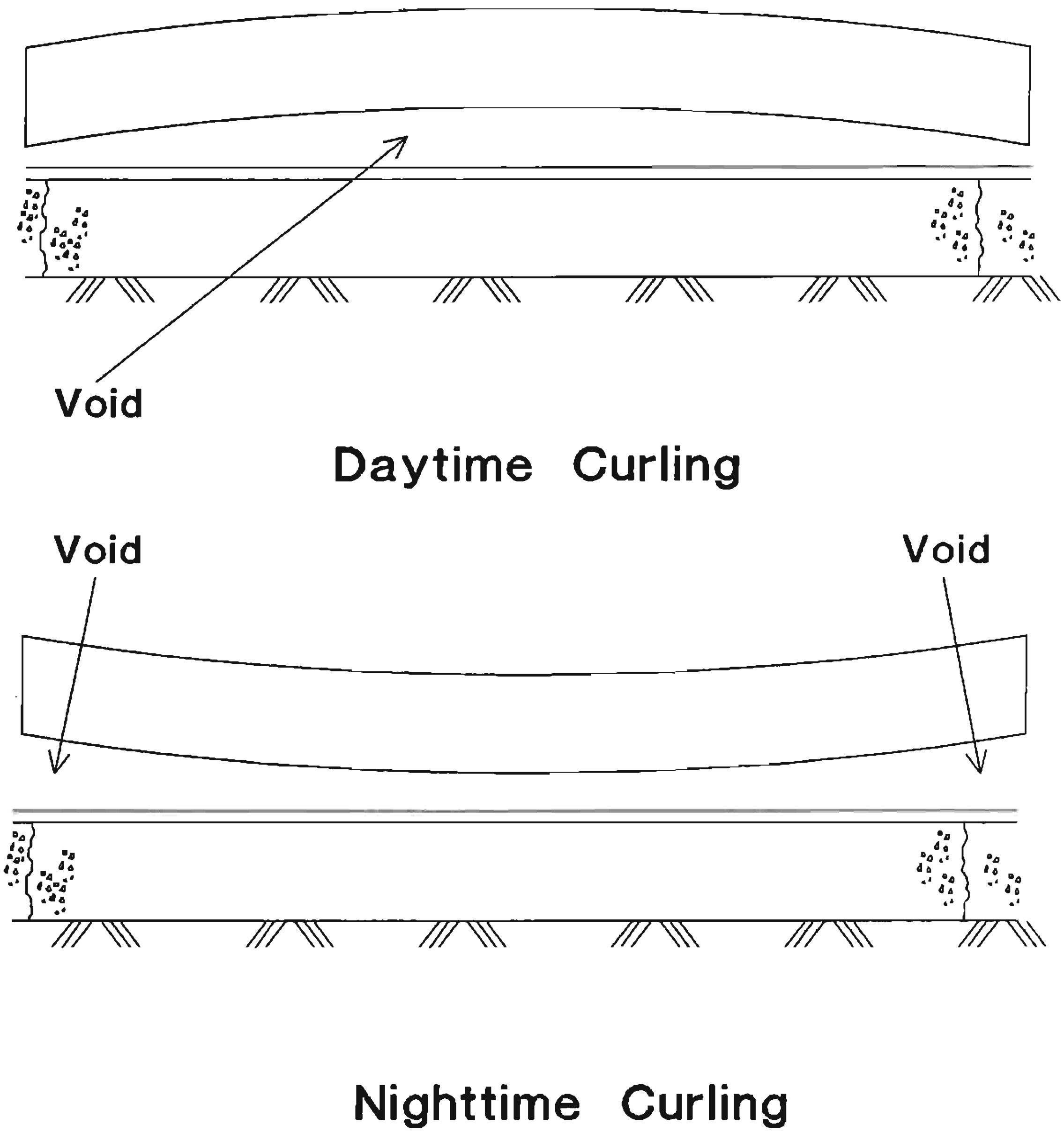
Selecting a proper interlayer material plays an important role in the performance of unbonded overlays. There are many types of separation mediums; however, studies show that bituminous based materials provide the best results as an interlayer material. The separation medium should cover deterioration in the existing slabs and ensure isolation of the overlay (5). Reflective cracking can be minimized or totally eliminated using a proper and adequate amount of interlayer materials. It is deemed necessary to repair the unstable area of the existing pavement prior to resurfacing. Badly shattered and deflecting slabs require full-depth replacement.

One of the primary problem associated with the unbonded overlay is the development of the transverse cracking caused by thermal" curling" (Figure 2). Thermal curling is the result of temperature differential through the depth of the unbonded overlay slab. The curling action of the unbonded overlay is not significantly restrained at the interface, as it is on a bonded concrete overlay; therefore, the slab may actually lift off the underlying slab (4). lifting will cause a void between the existing pavement and the overlay. In a heating situation



Effectiveness of mismatched joints in inhibiting development of faulting and pumping

Figure 1



Development of void under unbonded concrete pavement from the differential curling phenomenon

Figure 2

(daytime curling), the slab curls upward creating a void in the center. In a cooling situation (nighttime curling), the slab curls downward creating voids at the corners. Curling stresses in conjunction with load-related stresses eventually cause the overlay slab to develop transverse cracking. The transverse cracks are normally initiated at mid-slab, where the tensile stresses are the greatest during rising temperature Conditions.

To mitigate the problems associated with high thermal curling, short joint spacing or continuously reinforced design is recommended. According to reference (4), the joint spacing, in feet, should not exceed 1.75 times the overlay thickness, in inches, for the unbonded overlays.

II. Objectives

The primary objectives of this study were:

1- Compare and evaluate the performance of an unbonded overlay (7-3/4 inch) with and without tied shoulders.

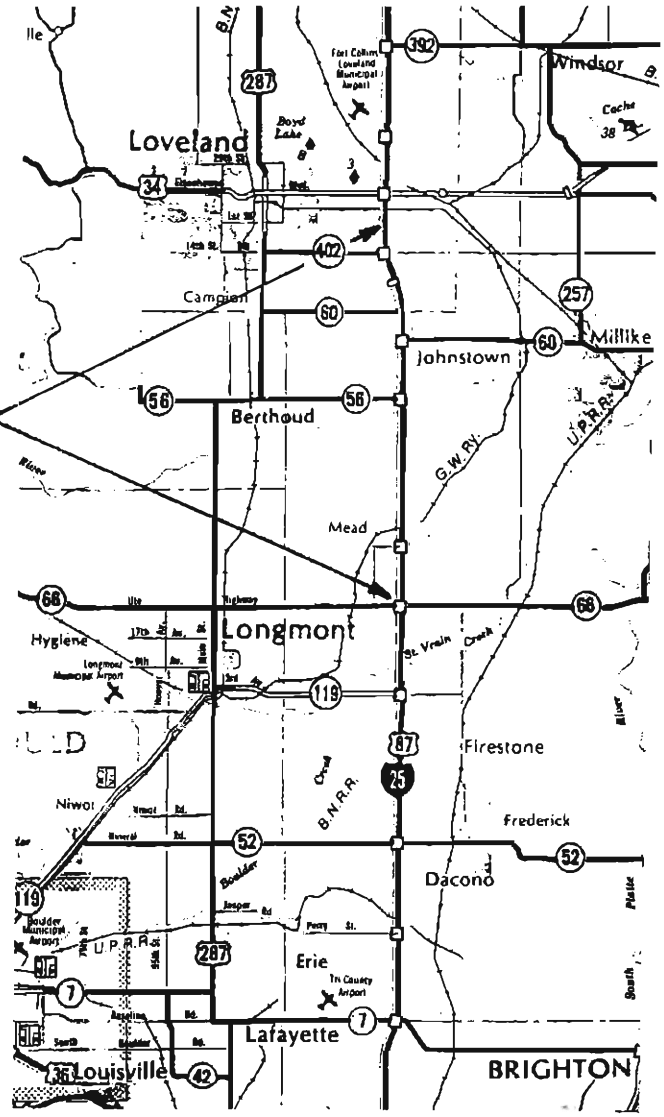
2- Monitor the performance of a thinner slab section (6-1/4 inch) with tied shoulders.

III. Unbonded Concrete Overlay In Colorado

A. Site Description:

The subject project is located on a gently rolling terrain 50 miles north of Denver between mileposts 243 and 254, and was built in the early 1960's (see Figure 3). The eleven-mile roadway was experiencing an Average Daily Traffic (ADT), in excess of 29,000 vehicles with 15 percent of that volume consisting of heavy vehicles. The four-lane highway had concrete

Figure 3



IR 25-3(77)
Project Limits

slabs that were eight inches thick and constructed on an untreated aggregate base (6). Joints were plain and non-reinforced, with transverse joints spaced every 20 feet.

There was no load transfer across these joints except that provided by the aggregate interlock at the broken joint faces (6). The roadway had ten-foot outside and four-foot inside asphalt shoulders (three inches thick). A review of the existing pavement showed that approximately 90 percent of the slabs in the driving lane were cracked and the serviceability index of the pavement was rapidly declining. The passing lane was in much better shape than the driving lane. Only 3 percent of the slabs in the passing lane were cracked. Only the critically unstable and broken slabs in the driving lane required removal and replacement.

B. Design Procedure:

The pavement design approach used for this project is presented in Appendix A. The design criteria used to compute the thickness, included visual evaluation of the entire existing pavement, traffic analysis, and structural evaluation. To alleviate the high tensile stresses caused by nighttime and daytime curling action, a shorter joint spacing was specified. A random joint spacing of 12', 15', 13', and 14' was established for the entire project.

Appendix B shows a typical joint sequence and joint design. Also included in Appendix B is a copy of the mix design and aggregate gradation for the project. A Class F Fly Ash was added to the concrete mixture to resist the alkali/silica reactions that had previously occurred on portions of this interstate highway.

C. Pre-Overlay Repair:

The twenty-five year old portland cement concrete pavement with high traffic volumes as well as heavy truck traffic performed quite well over the years. Badly broken, shattered, and unstable slabs were removed and replaced as part of construction. Only one percent of the slabs in the travelled lane required removal. Photograph 1 shows a typical slab that required removal. None of the slabs in the passing lane required removal.

No improvement were made to the underlying base course, but replaced slabs received improved load transfer across their transverse joints with the addition of inserted dowels - three in each wheel path (Photograph 2).

Appendix C shows the mapped areas of the slab removal and details of patching for the entire project.

D. Separation Medium:

Prior to the placement of the new pavement a thin bond breaker consisting of emulsified asphalt with minus 3/8 of an inch chips was placed over the existing pavement. The primary reason for applying the thin bond breaker (1/4 of an inch thick) was to prevent bond and reduce the possibility of reflecting cracks from the underlying PCCP.

The emulsified asphalt was applied at the rate of 0.4 gallon per square yard.

E. Construction:

The IR 25-3(77) project was the state's first thick-unbonded concrete rehabilitation over PCCP. The nominal thickness of the

Photo 1: A typical slab that required removal

Photo 2: Insertion of dowels - three in each wheel path to improve load transfer for the replaced slabs.

overlay was 7-3/4 inches and the standard section included tied shoulders. Photographs in Appendix D demonstrate parts of the construction and paving operation.

The mainline 7-3/4" concrete pavement overlay was poured in two phases. The first phase consisted of overlaying twenty-eight feet of the roadway, including the two travel lanes and the inside shoulder. The second phase consisted of overlaying the ten-foot outside shoulder.

Three test sections were established on the southbound lanes to evaluate and monitor the overlay's performance with and without tied shoulder and also with a "thinner" slab section (Figure 4). These test sections were established in the following order:

Site # 1 thin section (St. 221+50 - St. 226+26)*

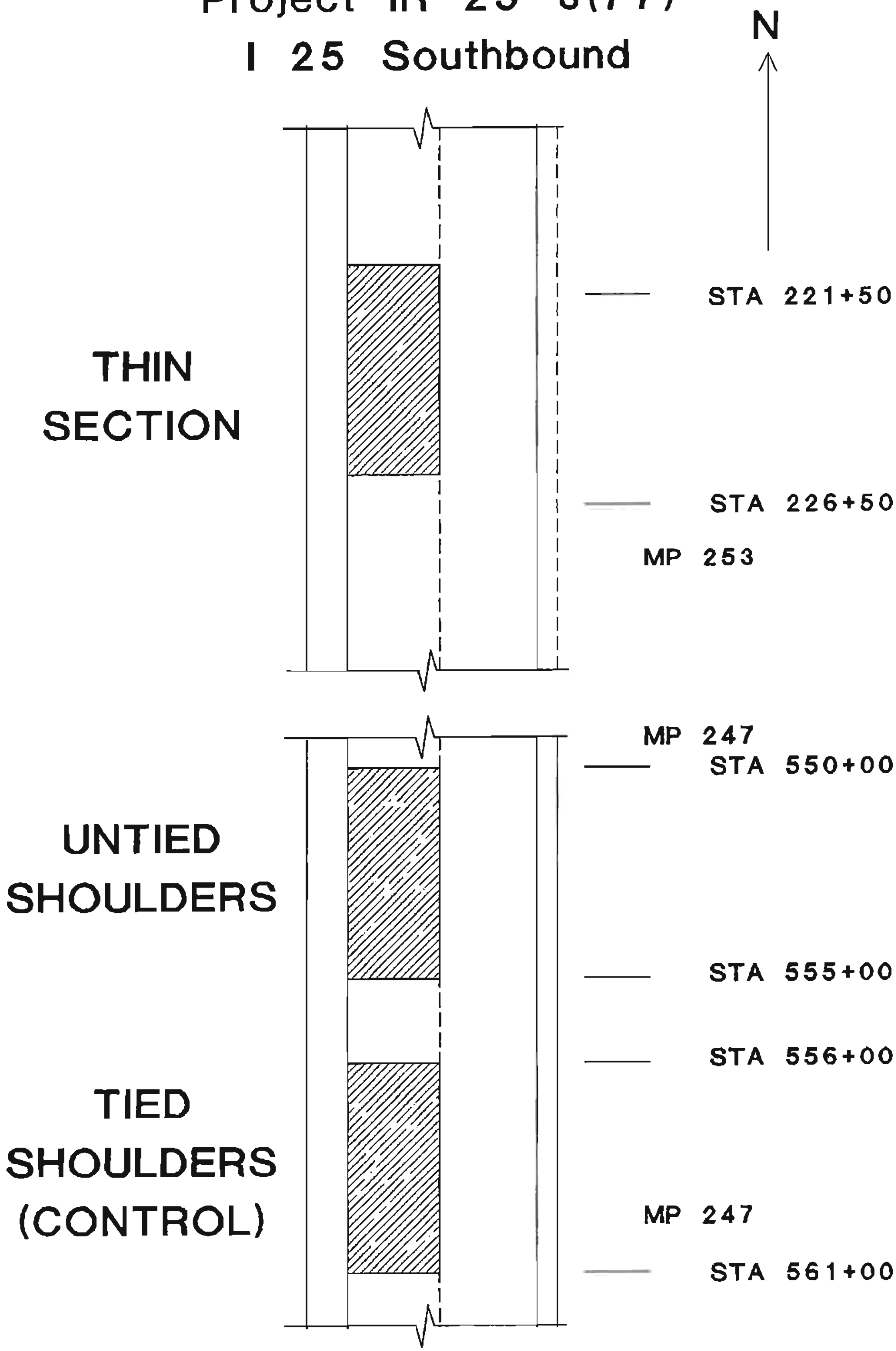
Site # 2, without tied shoulder (St. 550+00 - St. 555+00)

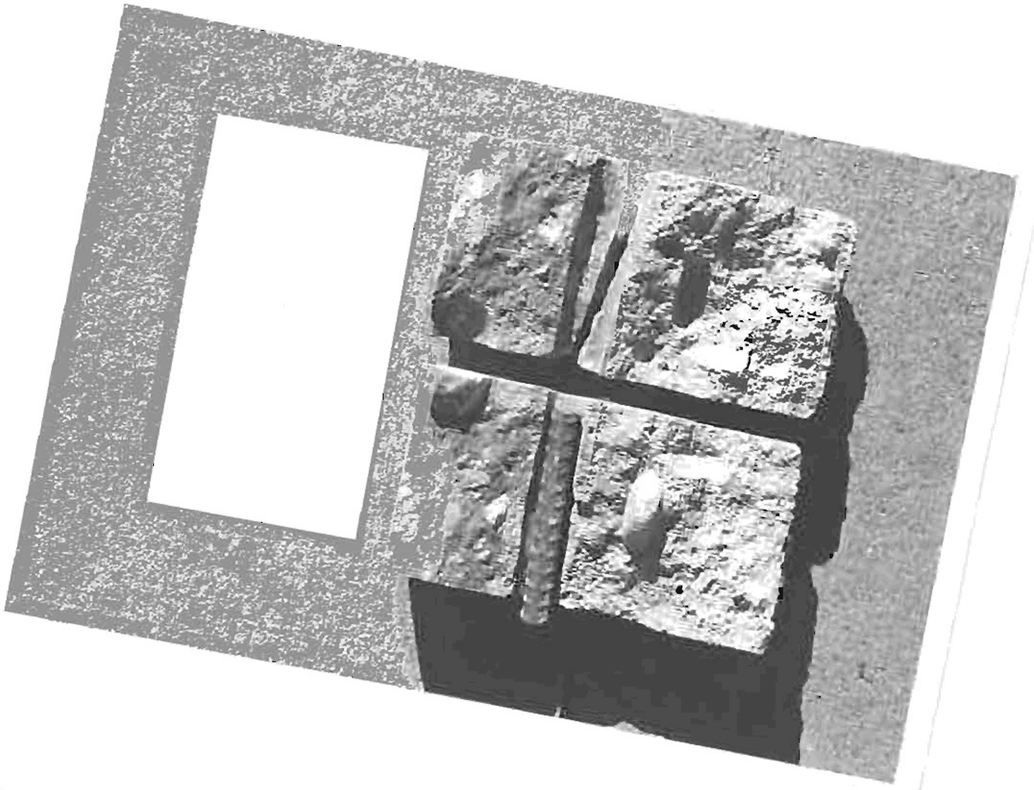
Site # 3, with tied shoulder (St. 561+00 - St. 556+00)

* Note site # 1 (thin section) was omitted from the study. The reason for the omission was that the cores taken from the thin slab section showed that the tie bars were not embedded in the slab but were placed loosely in a drilled hole. This was due to an uncorrected construction error. As a result, the deflection data taken from the thin section showed a much higher deflection (over 100 percent higher) than that of control section.

Failure of the paving equipment combined with improper inspection during shoulder placement resulted in drilled holes for tie bars that were not grouted before shoulder

Figure 4
Project IR 25-3(77)
I 25 Southbound





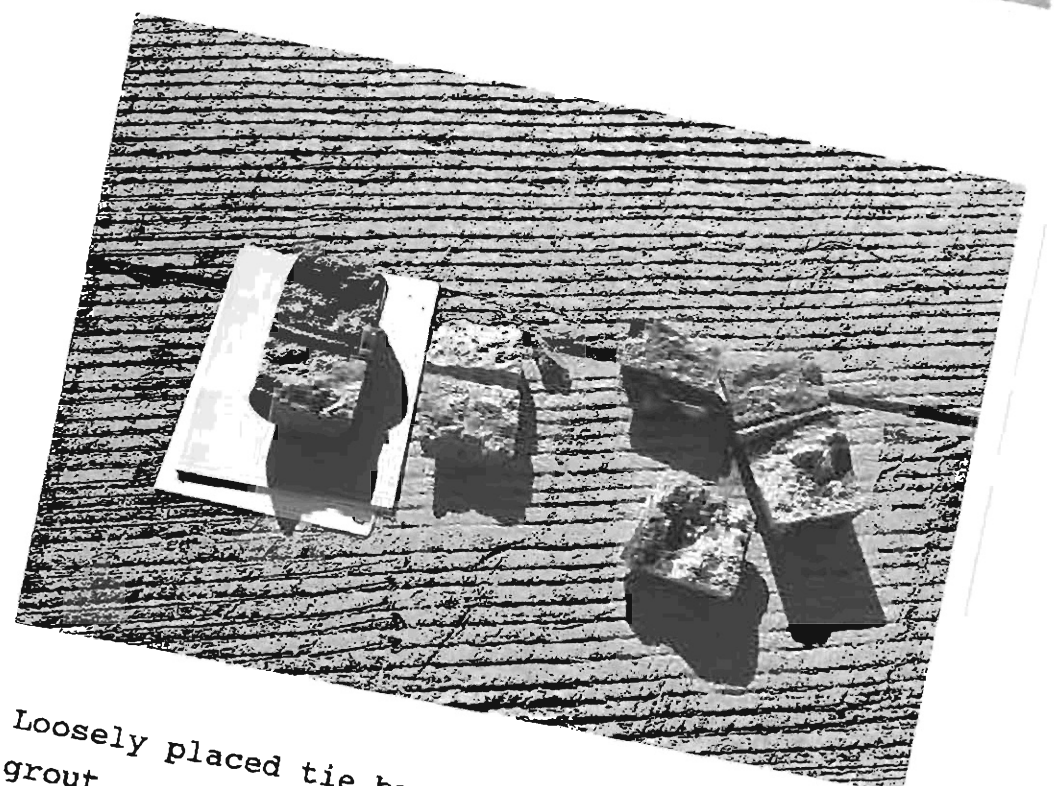


Photo 3 & 4: Loosely placed tie bars in drilled holes without grout.

placement. As a result, the data from the thin slab section is considered invalid. Photograph 3 and 4 show the extracted cores from this section of pavement.

IV. <u>Data Acquisition And Analysis</u>

A. Deflection:

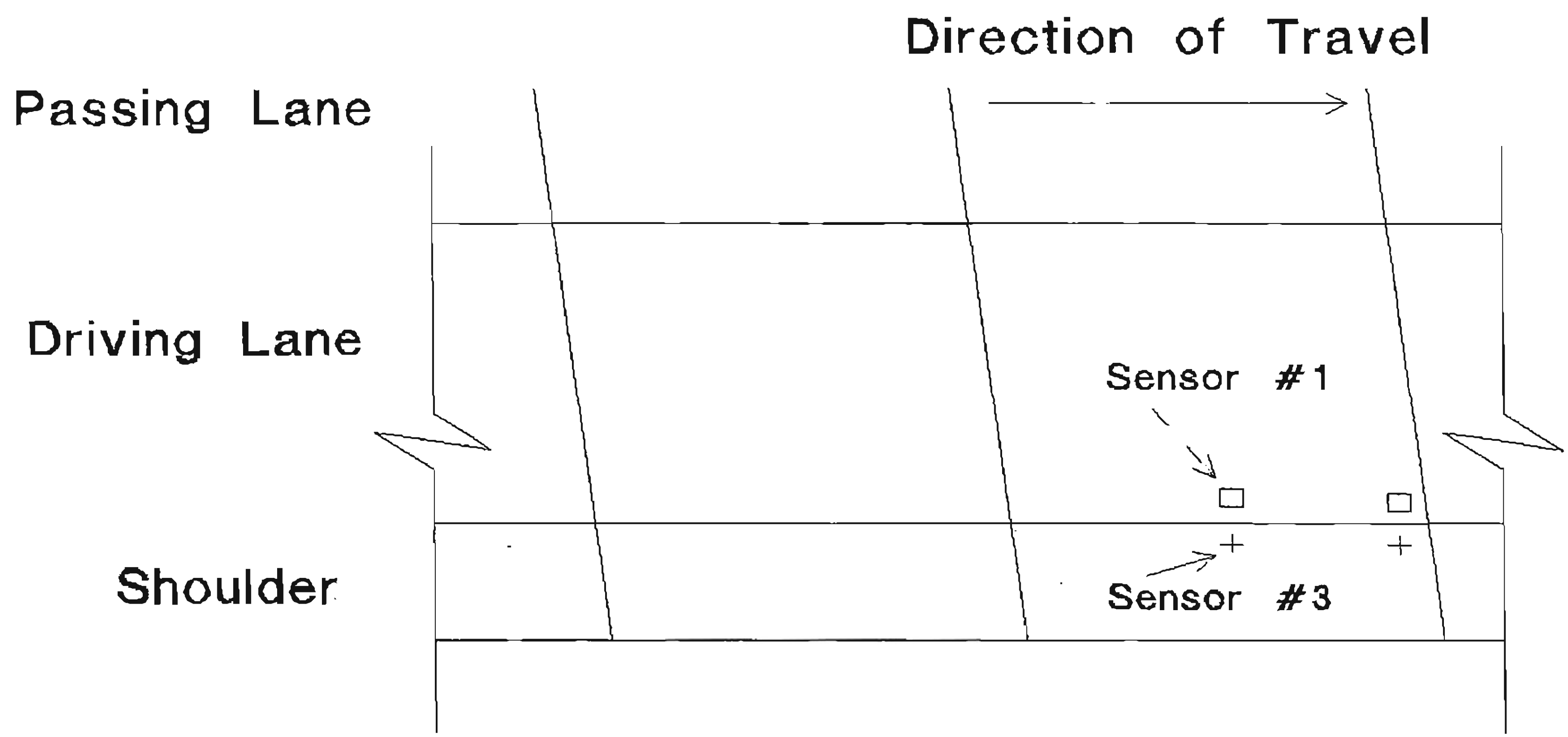
Falling Weight Deflectometer (FWD) deflection data were acquired for individual slab in both the tied and the un-tied shoulder sections. These deflections were acquired at mid-slab and at the corner by applying a dropped weight equivalent to a 9,000 pounds wheel load (Figure 5). Figure 6 through 11 compares the deflections taken at mid-slab and at corner for the tied and the un-tied shoulder.

As it can be seen the magnitude of the deflections for the tied shoulder section are consistently lower (approximately 73 percent lower) than the magnitude of the deflections in the un-tied shoulder section. In addition, the rate of load transfer for the tied shoulder is significantly higher (approximately 260 percent higher) than the un-tied shoulder section. These findings indicate that tied shoulder is doing what is expected, transferring load to the shoulder and increasing the load-carrying capacity of the driving lane.

B. Visual Investigation:

Visual investigation of the pavement surface revealed no appreciable distresses for both the tied and the un-tied shoulder sections. Only one corner break was found in the un-tied shoulder section (Photograph 5). The shoulder/lane drop-off was quite evident in the un-tied shoulder section. In some instances the elevation differences between the shoulder and the

Figure 5



$$\text{Load Transfer Rate} = \frac{\text{Sensor \#3}}{\text{Sensor \#1}}$$

Figure 6, Mid-Slab Deflection

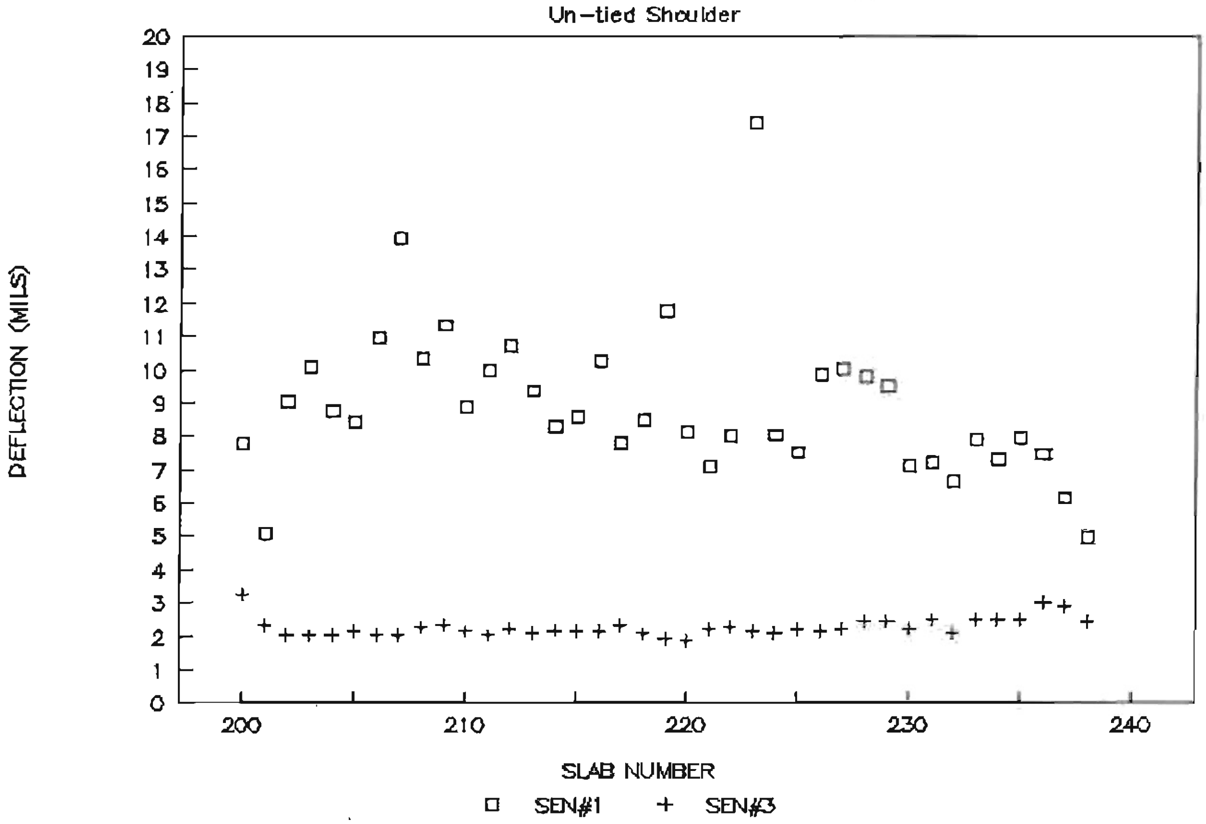


Figure 7, Mid-Slab Deflection

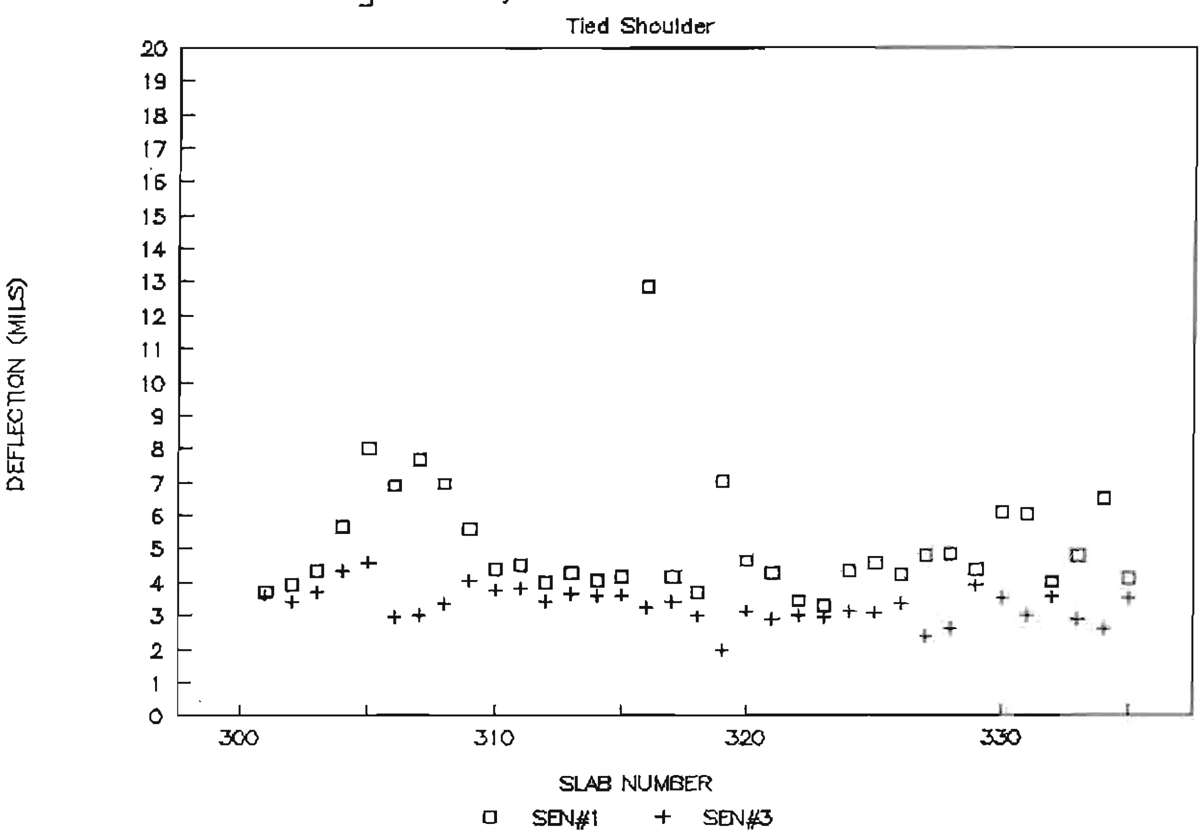


Figure 8, Corner Deflection

Un-tied Shoulder

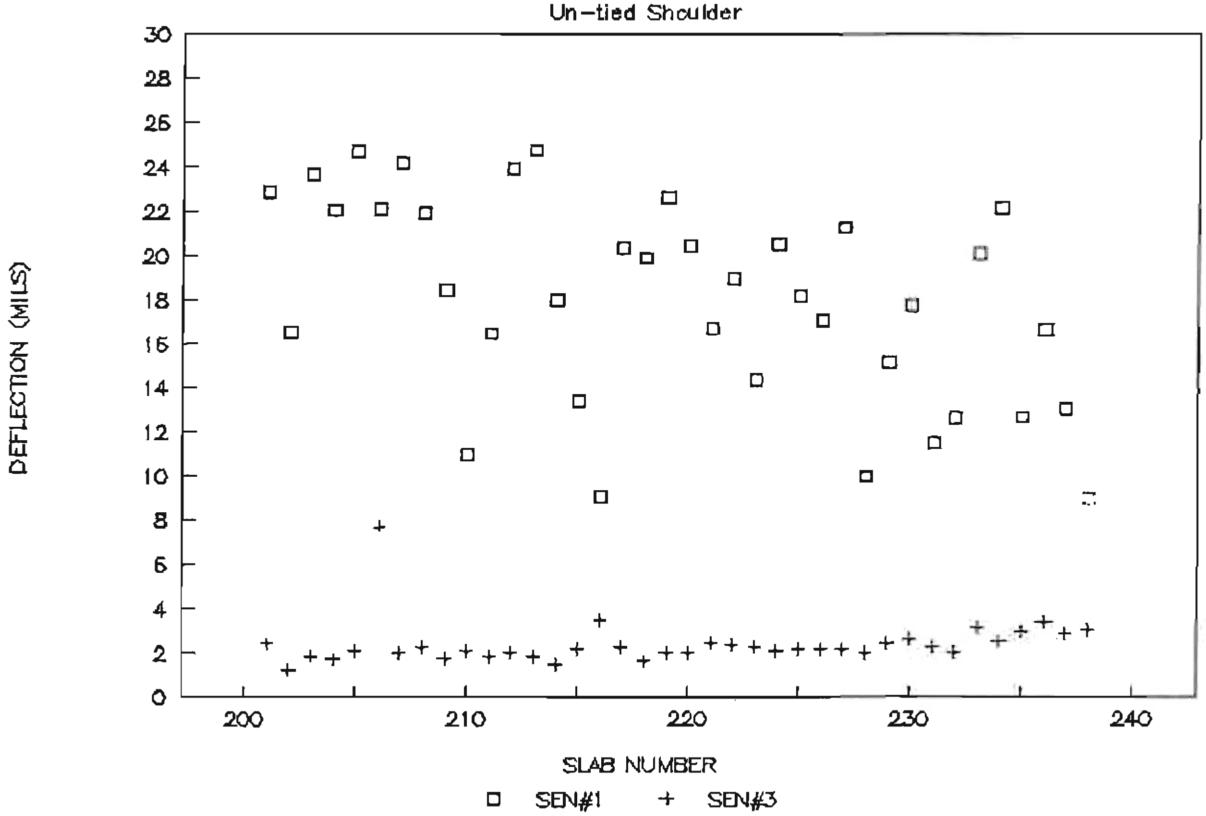


Figure 9, Corner Deflection

Tied Shoulder

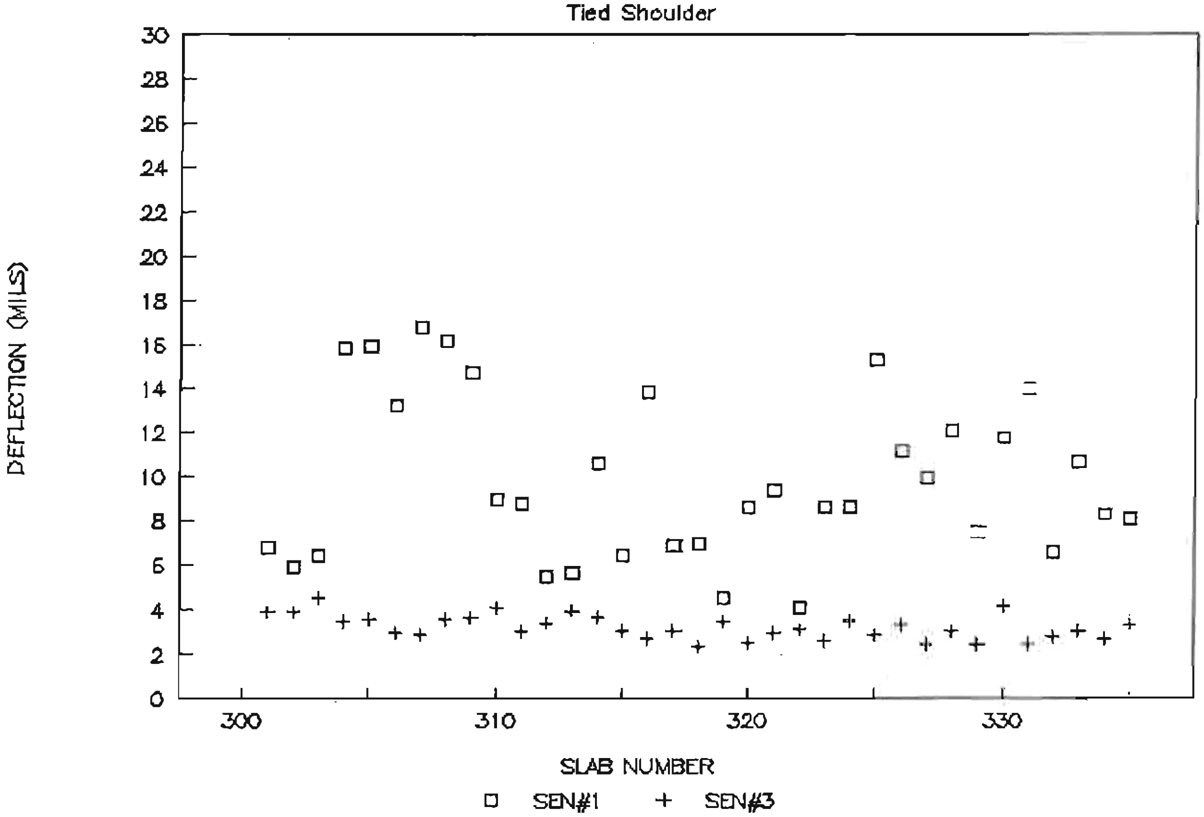


Figure 10, Average Corner Deflection

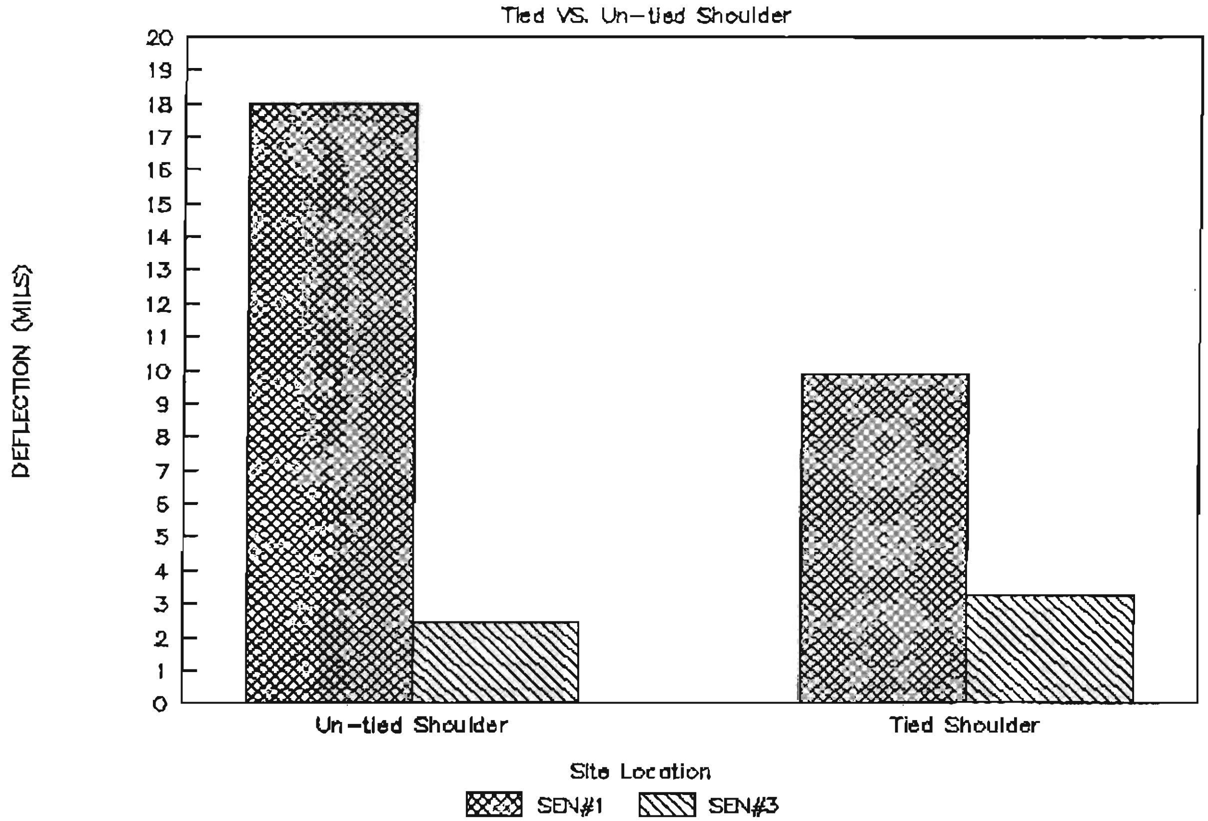


Figure 11, Average Mid-Slab Deflection

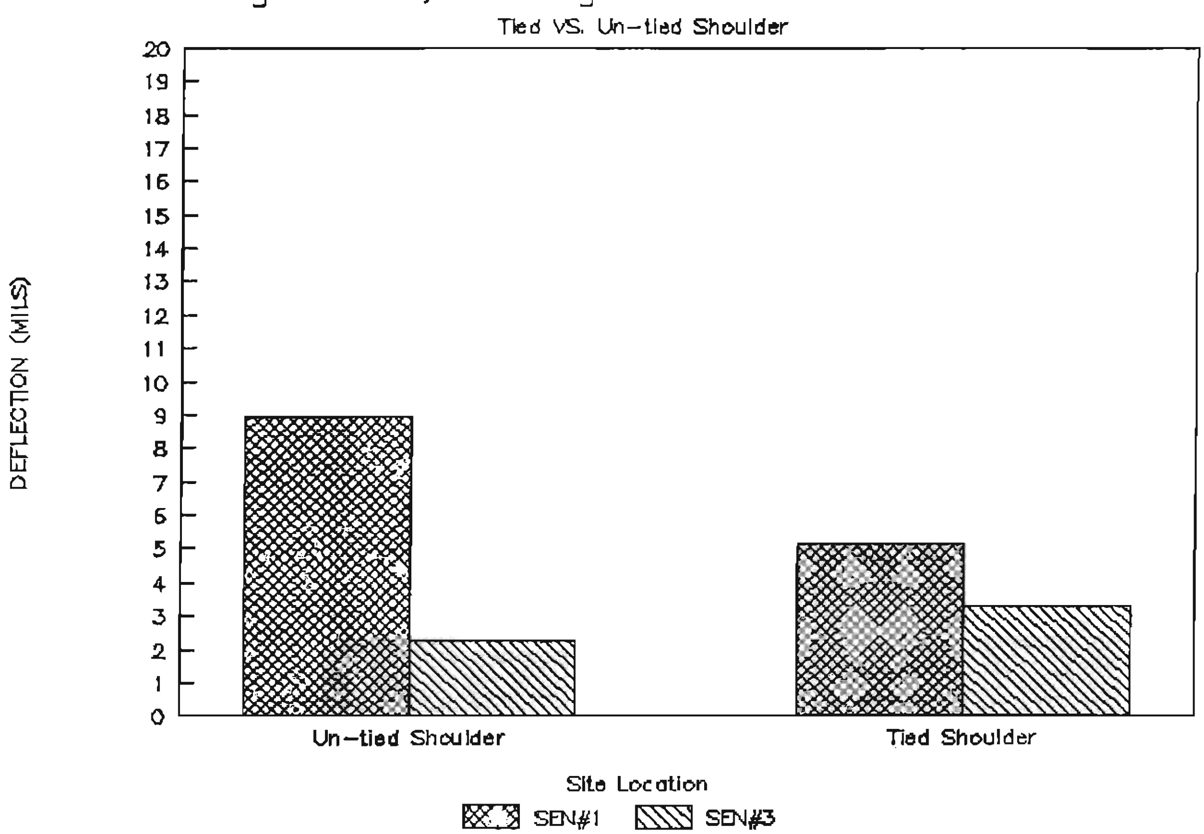


Photo 5: The only corner break in the Un-tied shoulder section.

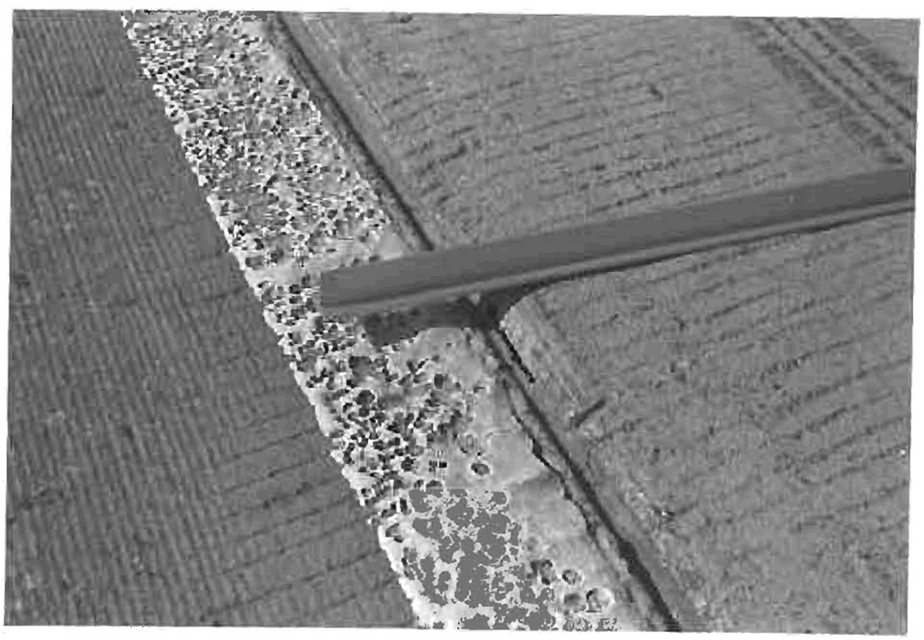


Photo 6: Elevation differential between the driving lane and the shoulder in the un-tied shoulder section.

driving lane was in excess of one inch for the un-tied shoulder section. Photograph 6 clearly demonstrate this elevation differential.

In general, both sections appeared to be in excellent condition after 8 years of service. It is possible that more time is needed for the Un-tied shoulder to show any further distresses.

C. Roughness:

The right wheel path (RWP) and the left wheel path (LWP) roughness was measured using a Ames Profilograph. Figure 12 compares the roughness in the tied and the un-tied shoulder sections. As shown in Figure 12 the magnitude of roughness in the un-tied shoulder section is much higher (approximately 60 percent higher) than the magnitude of roughness in the tied shoulder section. This significant increase in roughness for the un-tied shoulder section suggests that tied shoulder play an important role in keeping the driving lane smooth. The roughness data was acquired 7 years after the construction. There are no roughness data available immediately after the construction.

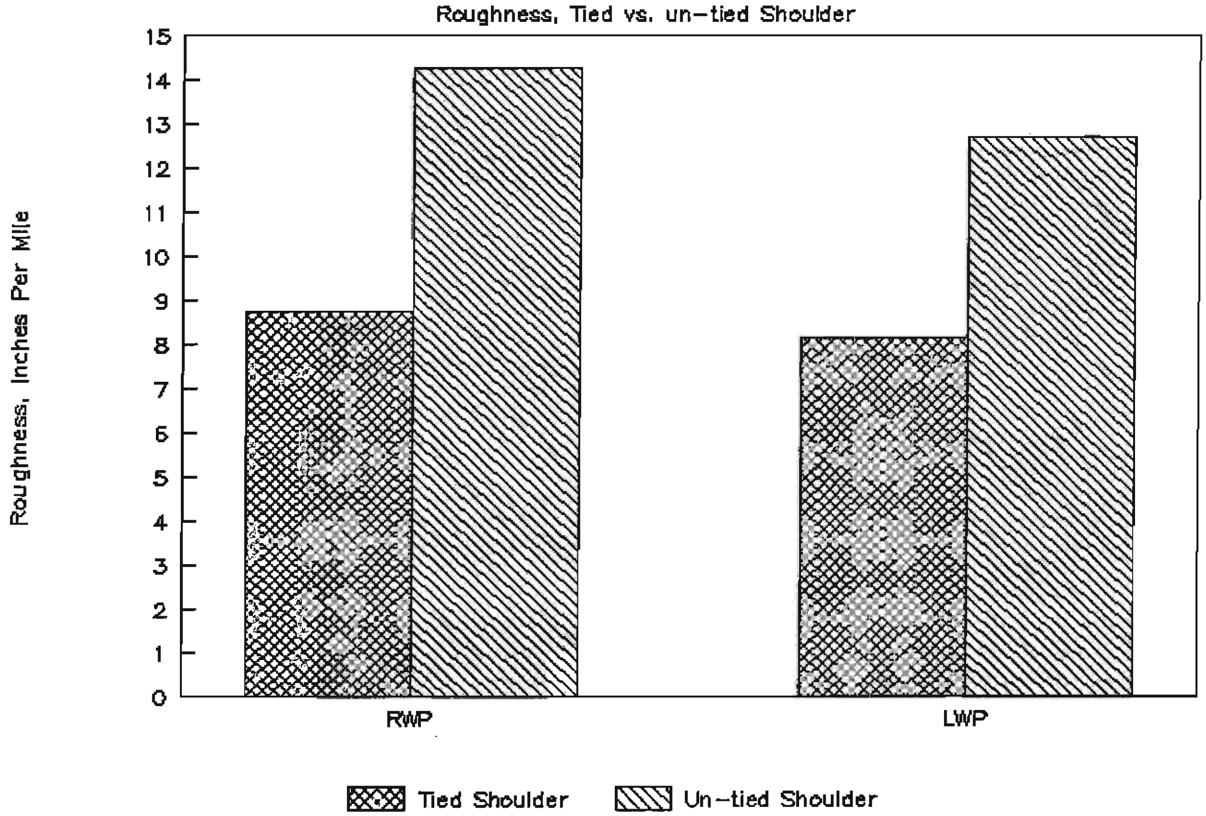
Smoother roadways are less sensitive to the adverse effects of dynamic load exerted by heavy trucks. Tied shoulder should not only provide a smoother pavement surface, but should also increase its performance.

V. Conclusions And Recommendations

Based on the findings of this study and the literature reviewed the following are presented:

Unbonded resurfacing is a viable method for rehabilitating existing rigid pavements that are badly distressed (excessive

Figure 12


Roughness, Tied vs. un-tied Shoulder
Roughness, Inches Per Mile
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
RWP
LWP
Tied Shoulder
Un-tied Shoulder

spall, corner breaks, and cracking) and cannot otherwise be economically repaired. Unlike bonded overlays, the unbonded overlays do not require meticulous cleaning of the existing surface pavement, other than the removal of any loose or foreign materials.

The unbonded overlays do not require matching of the existing joints. Deliberate mismatching of the overlay joints could extend the service life of the overlay by inhibiting the development of faulting and pumping at the base of the underlying slabs.

It is deemed necessary to repair the unstable areas of the existing pavement prior to resurfacing. Badly shattered and deflecting slabs (rocking) require full-depth replacement.

Selecting a proper interlayer material plays an important role in the performance of unbonded overlays. Reflective cracking may results if a proper and adequate amount of debonding medium is not used to separate the overlay from the existing slabs.

Thermal curling stresses are a major problem for the unbonded concrete overlays. To mitigate the problems associated with high thermal curling, short joint spacing is recommended. The joint spacing in feet should not exceed 1.75 times the overlay thickness in inches.

Tied shoulders increase the load-carrying capacity of the driving lane by transferring load to the shoulder. A review of the deflection data taken in the tied and in the un-tied shoulder revealed consistently lower deflections and higher load transfer for the tied shoulder section. Deflections were approximately 73 percent lower and the rate of load transfer were about 260 percent higher for the tied shoulder section.

Elevation differences between the shoulder and the driving lane were quite evident (in excess of 1 inch in some instances) in the un-tied shoulder section.

Roughness data taken using a Ames profilograph showed the magnitude of roughness to be much higher (approximately 60 percent higher) for the un-tied shoulder section.

The preference given by the 1986 AASHTO Design Guide to the tied shoulders were confirmed by the finding of this study.

VI. Implementation

The results of this study demonstrated that unbonded overlays if properly constructed can be a viable method for resurfacing badly deteriorated rigid pavements. This technique has already been used successfully on a thirteen mile stretch of I-25 north of Denver in Colorado.

The use of unbonded overlays, where suitable, is recommended, along with close attention being paid to design and construction details. Furthermore, we recommend the use of tied shoulders over the un-tied shoulders for unbonded overlays.

VII. References

1- NCHRP "Resurfacing With Portland Cement Concrete", Report No. 99, 1982.

2- American Concrete Pavement Association (ACPA), "Guidelines For Bonded Concrete overlay", 1990

3- Hutchinson, R.L., "Basis For Rigid Pavement Design For Military Airfields", Corps of Engineers, Ohio River Division Laboratories MP 5-7, 1966.

4- Voigt, G.F., Darter, M.I, Carpenter, S.H., Field Performance of Unbonded Jointed Concrete Overlays TRB Report No. 1227, 1988.

5- American Concrete Pavement Association (ACPA), " Guidelines for unbonded Concrete Overlay", 1990.

6- Kiljan, John, " Five-Inch Asphalt Overlay Rehabilitation", Reoprt No. CDOH-DTD-R-89-12, 1989.

Appendix A

PROJECT I 25-3(77) SH 66 to SH 60

THICK CONCRETE OVERLAY
THICKNESS

(Unbonded)

---

20 year 18 K EDLA	1696
Sub-Grade Soil (Average)	A-6(10)
Sub-Grade "R" Value (Average)	10
Gravel Base Thickness	6"
Working Stress	500

<u>New Design</u> (on existing support)

K Value on Sub-Grade	110
K Value on Gravel Base	140
Required Thickness (T)	10 1/4"

<u>Overlay Design</u> (unbonded)

$T = 10.25$ $T_o = 8"$

$C = 0.5$

$$TR = \sqrt{T^2 - C\,T_o^2}$$

$$TR = \sqrt{10.25^2 - .5(8)^2}$$

Overlay Thickness Required (T_R) = 8 1/2" Minus 1.3" Reduction for Tied Concrete Shoulder

Use 7 1/4"

Federal Road Region No.	Division	Proj. No.	Sheet No.
VIII	COLORADO	IR 25-3(77)	4

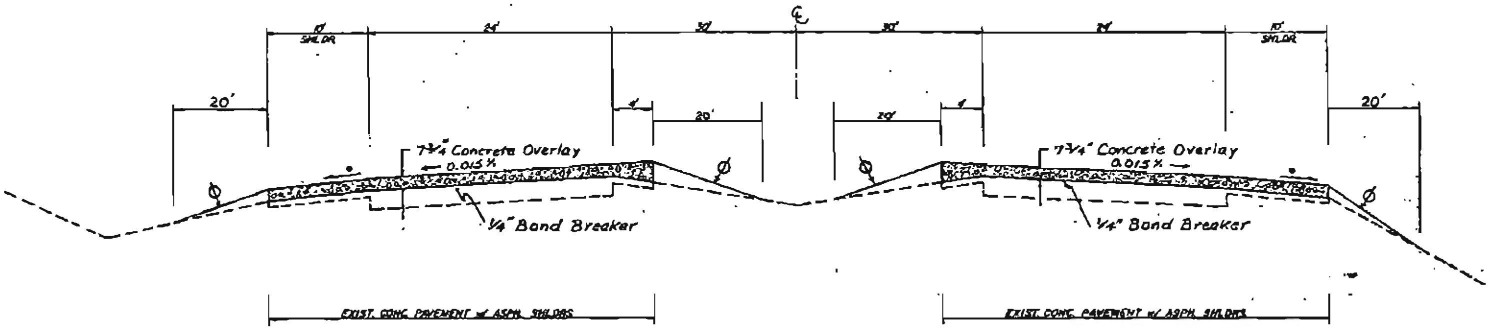
AS CONSTRUCTED

NO REVISIONS 2-23-76 REVISED VOID

TYPICAL SECTION A

NOT TO SCALE

STA. 322+00 TO 736+00

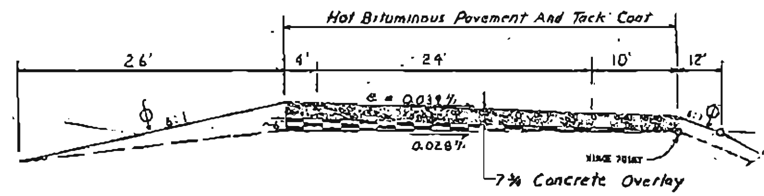


THE CONTRACTOR WILL BE REQUIRED TO PLACE EMBANKMENT MATERIAL TO THIS LINE AFTER COMPLETION OF PAVING OPERATION.

• MATCH EXISTING SLOPE

SUPERERELEVATION CORRECTION

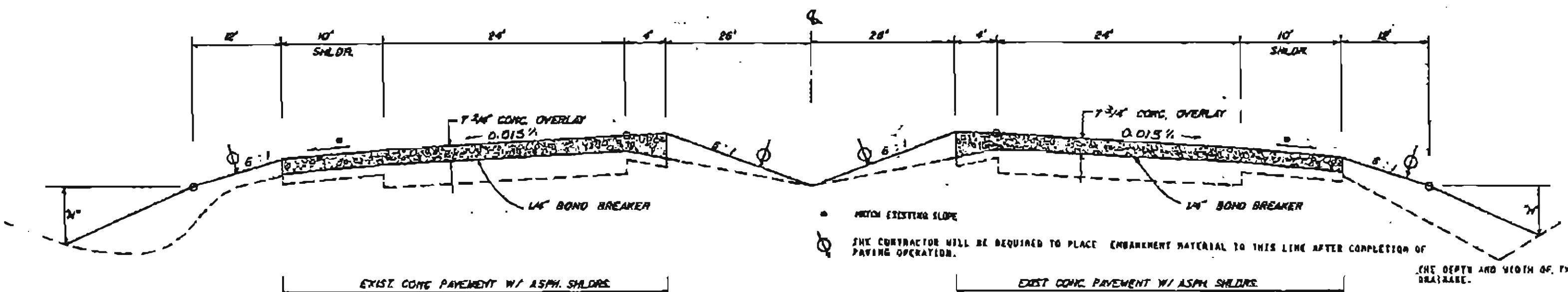
STA. 197+55 - STA. 214+45 And
STA. 249+90 - STA. 257+55



TYPICAL SECTION B

NOT TO SCALE

STA. 195+00 TO 322+00



• MATCH EXISTING SLOPE

THE CONTRACTOR WILL BE REQUIRED TO PLACE EMBANKMENT MATERIAL TO THIS LINE AFTER COMPLETION OF PAVING OPERATION.

FILL "H"	SLOPE
10' OR LESS	6:1
10' TO 25'	4:1
OVER 25'	3:1

THE DEPTH AND WIDTH OF THE SIDE DITCH SHALL BE VARIED WHERE NECESSARY IN ORDER PROVIDE DRAINAGE.

BREAK POINTS ON SLOPES AND IN BOTTOMS OF DITCHES SHALL BE ROUNDED ON CONSTRUCTION FOR A PLEASING APPEARANCES. SEE STANDARDS FOR DETAILS OF CUT SLOPE TREATMENT, FLARING, AND

MEMORANDUM

DIVISION OF HIGHWAYS

P.O. Box 850
Greeley, Colorado 80632
(303) 839-3575

DATE: February 24, 1984

IR 025-3(77)
North of SH 119

TO: K. F. Mauro/P. Hinckley
Room 406

DOH File 44100

FROM: David D. Davis

SUBJECT: Stabilization

The stabilization has been completed on the above-captioned project from Station 176+ to 760+, S.H. 66 to Johnson's Corner. A thick unbonded concrete overlay will be used to rehabilitate the existing concrete pavement. A life cycle cost analysis has been completed and submitted separately to support the choice of the thick unbonded concrete overlay.

Stabilization for the mainline is based on the CDOH Design Manual procedure for new pavements. The equivalent new pavement thickness was then adjusted to determine an overlay thickness using the procedure described in Rehabilitation For Concrete Pavements, Report No. CDOH 83-1 for unbonded thick concrete overlays. The overlay thickness was then modified to account for the tied concrete shoulders. Attached is a tabulation describing the pavement overlay design and the resulting overlay thickness required. The crossroads thicknesses are established from Dynaflect Analyses.

The mainline 7¼" concrete pavement overlay will be poured in two phases. The first phase will consist of overlaying twenty-eight feet of roadway, including the two travel lanes and the inside shoulder. The second phase will consist of overlaying the ten-foot outside shoulder. The old concrete and new concrete will be separated by ¼" bond breaker consisting of Emulsified Asphalt applied at 0.4 gallon per sq. yd. The ramps will also be 7¼" concrete pavement overlay. The crossroads will be overlain with hot bituminous pavement. The source of aggregate will be undesignated. Estimated quantities are: Concrete Pavement Class P (7¼") (Sq. Yd.) - 449,329.

We submit the above data for information and are proceeding with design of the project on this basis.

ROBERT CLEVENGER
CHIEF ENGINEER

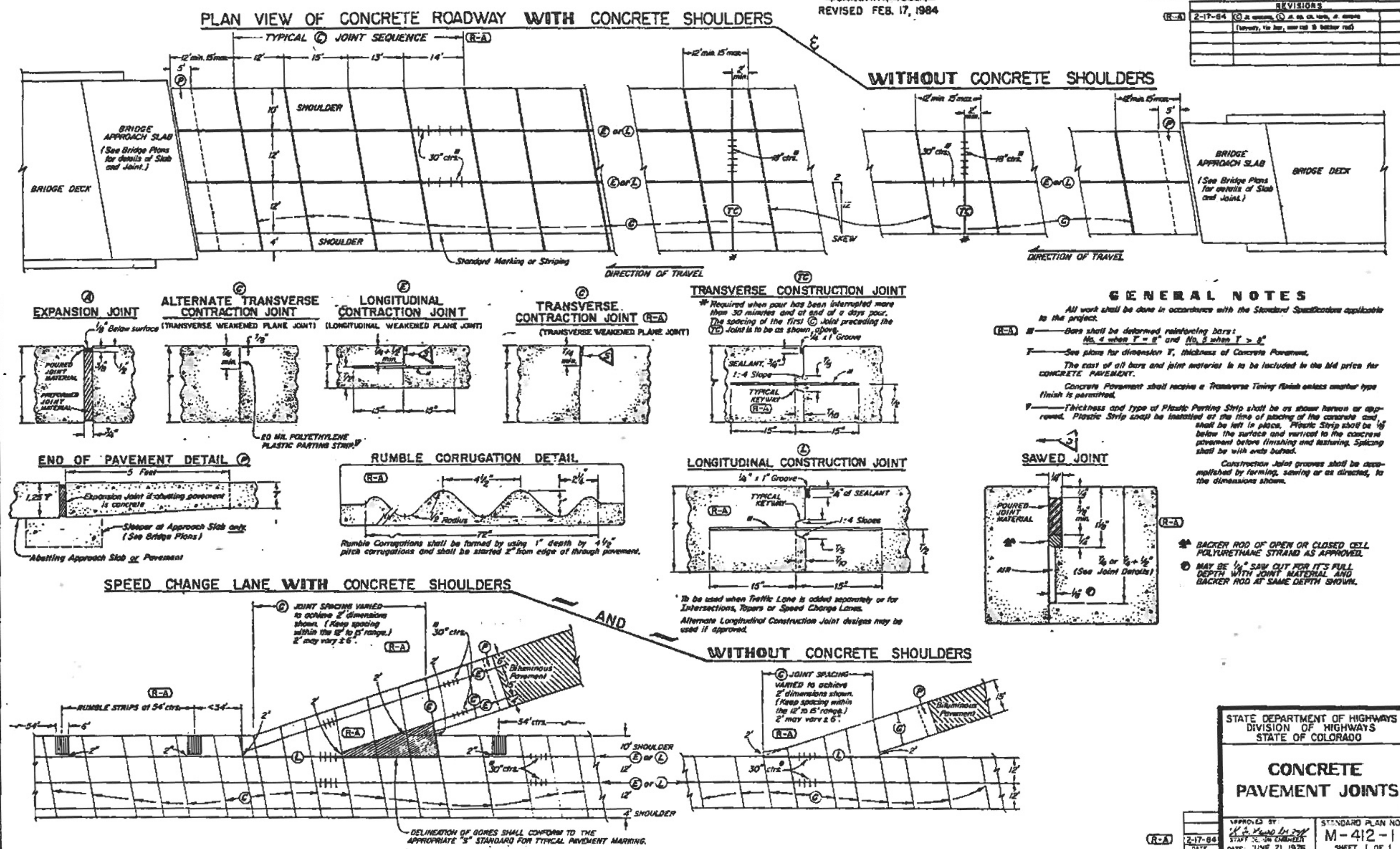
Albert Chotvacs
District Engineer

DDD:mbs
Attachments
cc: R. Clevenger, W. Reisbeck, J. Peterson, L. O'Connor, D. Davis, S. Tapp

Appendix B

STANDARD M-412-1

~~(JANUARY, 1982)~~
REVISED FEB. 17, 1984



GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the project.

(R-A) # —— Bars shall be deformed reinforcing bars: No. 4 when T = 8" and No. 5 when T > 8"

T —— See plans for dimension T, thickness of Concrete Pavement.

The cost of all bars and joint materials is to be included in the bid price for CONCRETE PAVEMENT.

Concrete Pavement shall receive a Transverse Tining finish unless another type finish is permitted.

▼ —— Thickness and type of Plastic Parting Strip shall be as shown hereon or approved. Plastic Strip shall be installed at the time of placing of the concrete and shall be left in place. Plastic Strip shall be 1/8" below the surface and vertical to the concrete pavement before finishing and texturing. Splicing shall be with ends butted.

Construction Joint grooves shall be accomplished by forming, sawing or as directed, to the dimensions shown.

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
XX	COLORADO			

	REVISIONS	
(R-A)	2-17-84	Ⓒ Jt. spacing, Ⓛ Jt. sp. ch. tech, Jt. details (layout, tie bar, saw cut & backer rod)

STATE DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
STATE OF COLORADO

CONCRETE PAVEMENT JOINTS

APPROVED BY: [signature]
STAFF DESIGN ENGINEER
DATE: JUNE 21, 1976

(R-A) 2-17-84 DATE REVISED

STANDARD PLAN NO. M-412-1
SHEET 1 OF 1

ORIGINAL

STANDARD M-412-1

Empire Laboratories, Inc.
GEOTECHNICAL ENGINEERING & MATERIALS TESTING

P.O. Box 429 • (303) 484-0359
214 No. Howes • Fort Collins, Colorado 80522

May 24, 1984

IR 25-3 (77)

Sterling Companies
P.O. Box 2187
Fort Collins, Colorado 80522

Attention: Mr. Roger Sterling

Re: Physical property tests - proposed aggregate for concrete
Three-Bell Pit Stockpile Sample
ELI Project No. 5604

Gentlemen:

Attached are results of laboratory tests performed on the above-referenced aggregate sample received in our laboratory on May 10, 1984. As requested, the following tests were run on the sample: a wash-sieve analysis, L. A. abrasion, sodium soundness, and specific gravity and absorption. The wash-sieve analysis was run on the sample as it was received in our laboratory, while the L. A. abrasion test was performed on the coarse aggregate only. The sodium soundness test was run on both the +#4 and -#4 fractions, and the specific gravity and absorption were determined for the -1" to +#4 material. The tests were performed in accordance with AASHTO procedures.

We appreciate this opportunity to serve you. If you have any questions regarding the test results, please feel free to contact us.

Very truly yours,

EMPIRE LABORATORIES, INC.

Carl Tarantola

Carl Tarantola
Jr. Engineering Geologist

Reviewed by:

Chester C. Smith

Chester C. Smith, P.E.
President
Colorado Registration No. 4808

kah

attachments

Sterling Companies
May 24, 1984
Re: Physical property tests - proposed aggregate for concrete
Three-Bell Pit Stockpile Sample

WASH-SIEVE ANALYSIS

Sieve Size	% Passing
1"	100.0
3/4"	97.8
1/2"	83.4
3/8"	75.2
#4	59.6
#8	50.2
#16	33.2
#30	20.9
#50	10.6
#100	6.2
#200	3.9

AASHTO T 85, Bulk Specific Gravity and Absorption of Coarse Aggregate (Saturated Surface Dry Basis)(-1" to +#4 fraction)

Specific Gravity = 2.64
Absorption = 0.83%

AASHTO T 96, Resistance to Abrasion of Saml1-Size Coarse Aggregate by Use of Los Angeles Machine

Grading B, 500 Revolutions
Weight Before Test = 4990.7g.
Weight After Test = 3251.4g.
Wear = 34.8%

AASHTO M 80 Specification: 50% Maximum

Sterling Companies
May 24, 1984
Re: Physical property tests - proposed aggregate for concrete
Three-Bell Pit Stockpile Sample

AASHTO T 104, Soundness of Aggregates by Use of Sodium Sulfate (5 Cycles)

Sieve Size Passing	Sieve Size Retained	Grading of* Sample, %	Weight of Test Fraction, gram	Loss, %	Weighted Loss, %
Coarse Aggregate:					
1 1/2"	1"	-	-	-	-
1"	3/4"	5.3	509.5	0.1	0.01
3/4"	1/2"	30.2	671.2)	0.1	0.06
1/2"	3/8"	30.3	331.8)		
3/8"	#4	34.2	300.0	1.5	0.51
Totals:		100.0			0.58
AASHTO M 80 Specification:					12% Maximum
Fine Aggregate:					
3/8"	#4	2.5	100.3	1.1	0.03
#4	#8	7.5	100.0	1.1	0.08
#8	#16	27.5	100.1	0.3	0.08
#16	#30	20.0	100.0	1.5	0.30
#30	#50	22.5	100.0	1.8	0.41
#50	#100	14.0	-	-	-
#100		6.0	-	-	-
Totals:		100.0			0.90
AASHTO M 6 Specification:					10% Maximum

* AASHTO M 43 and M 6 averaged gradings

STATE OF COLORADO
DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
DOH Form No. 330
Revised: August, 1982

Project IR 25-3(77)
Location S.H. 119 - No. on I25
Fine Aggregate Field Sheet No. 10015
Coarse Aggregate Field Sheet No. SAME
Date Submitted 6-7-85

C53.85

PAGE 1

TEST OF CONCRETE AGGREGATES

LOCATION OF AGGREGATE SOURCE AND SUPPLIER:

FINE AGGREGATE 3 - Bell
Sterling

COARSE AGGREGATE SAME

SCREEN ANALYSIS (Fine Aggregate)

% Passing	As Rec'd.		Specs.
3/8"	100		100
#4	100		95-100
#8	94		
16	72		45-80
30	44		
50	17		10-30
100	5		2-10
Fineness Modulus	2.69		2.50-3.~~25~~ 50

Sp. Gr. (Bulk, Sat. Surface Dry)	2.64
% -#200	2.0
% Absorption	0.8
Colorimetric	Clear
% Soundness (Sodium Sulfate)	–
Sand Equivalent	79.2 *

SCREEN ANALYSIS (Coarse Aggregate)

Primary Size	1 1/2" to 3/4	3/4" to #4	Combined	Specs. P/A #467	Specs.
Passing					
2"	100		100	100	
1½"	93		97	95/100	
1"	28	100	64	–	
3/4"	4	92	48	35/70	
1/2"	1	41	21	–	
3/8"	1	21	11	10/30	
#4	1	3	2	0/5	
#8					

Sp. Gr. Bulk, SSD 3/4"	2.64
Sp. Gr. Bulk, SSD 1½"	2.64
% Abrasion	38.1
% Absorption 3/4"	0.7
% Absorption 1½"	0.5
% Soundness (Sodium Sulfate)	–

Aggregate Size 1 1/2" to 3/4" 50 %
3/4" to #4 50 %

Dist 4

* Indicates MINOR deviation from specifications.

STATE OF COLORADO
DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
DOH Form No. 330
Revised: August, 1982

Project IR 25-3(77)
Location S.H. 119 - No ON I 25
Sand Field Sheet No. 10015
Gravel Field Sheet No. Same
C53.85

PAGE 2

Class of Concrete		PFA			
% Fine Agg. by Absolute Vol.		38			
Air Entraining Agent		Pave Air			
Quantity of Air Entraining Agent		8.0 ozs.			
Admixture		Master Pave			
Quantity of Admixture		25.0 ozs.			
Cement: Source So. Western Type II					
Cement Utah Clinker	Lbs. L.A	455			
Fly Ash Cherokee Cl.	Lbs. 'F'	110			
Fine Aggregate	Lbs.	1160			
Intermediate Aggregate	Lbs.	945			
Coarse Aggregate	Lbs.	945			
Miscellaneous Aggregate	Lbs.	0			
Water	Lbs.	250			
Water	Gals.	30.0			
Slump	Inches	1.75			
Water Cement Ratio (% by Weight)		.443			
Cement Factor (CWT per Yard)					
Gals/CWT					

WEIGHT PER CU. FT. OF CONCRETE:

T. Theoretical (calculated-air free)	150.9			
C. Theoretical (calculated 5 % air)	143.3			
W. Determined (actual Wt./cu.ft.)	145.7			
Air Content Air Meter (Total Air)	4.3			
Air Content - Gravimetric Method $\% A = \frac{T - W}{T} \times 100$	3.5			

7 days

Compressive Strength (P.S.I.)	2650			
	2960			
Average	2800			

28 days

Compressive Strength (P.S.I.)				
Average				

Dist 4

NOTE: Quantities shown for admixtures are for information only.

REMARKS: trial mix made using South Western type II L.A. (Utah Clinker) cement; new blend made June, 1985. Mix requested by contractor using the newly blended cement.

Staff Materials Engineer

STATE OF COLORADO
DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
DOH Form No. 330
Revised: August, 1982

Project IR 25 - 3 (77)
Location S.H. 119 No. on I-25
Fine Aggregate Field Sheet No. 10015
Coarse Aggregate Field Sheet No. Same
Date Submitted 6 - 6 - 85

CS3-85

PAGE 1

TEST OF CONCRETE AGGREGATES

LOCATION OF AGGREGATE SOURCE AND SUPPLIER:

FINE AGGREGATE 3 - Bell
Sterling

COARSE AGGREGATE Same

SCREEN ANALYSIS (Fine Aggregate)

% Passing	As Rec'd.		Specs.
3/8"	100		100
#4	100		95-100
#8	94		
16	72		45-80
30	44		
50	17		10-30
100	5		2-10
Fineness Modulus	2.69		2.50-3.~~25~~ 50

Sp. Gr. (Bulk, Sat. Surface Dry)	2.64
% -#200	2.0
% Absorption	0.8
Colorimetric	clear
% Soundness (Sodium Sulfate)	—
Sand Equivalent	79.2*

SCREEN ANALYSIS (Coarse Aggregate)

Primary Size	1 1/2" to 3/4"	3/4" to #4	Combined	Specs. P #467	Specs.
Passing					
2"	100		100	100	
1½"	93		97	95/100	
1"	28	100	64	—	
3/4"	4	92	48	35/70	
1/2"	1	41	21	—	
3/8"	1	21	11	10/30	
#4	1	3	2	0/5	
#8					

Sp. Gr. Bulk, SSD 3/4"	2.64
Sp. Gr. Bulk, SSD 1½"	2.64
% Abrasion	38.1
% Absorption 3/4"	0.7
% Absorption 1½"	0.5
% Soundness (Sodium Sulfate)	—

Aggregate Size 1 1/2" to 3/4" 50 %
3/4" to #4 50 %

Dist. 4

* Indicates Minor deviation from specifications.

Stuart C. Tapps [signature]

STATE OF COLORADO
DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
DOH Form No. 330
Revised: August, 1982

Project IR 25 · 3 (77)
Location S.H. 119 · No. ON I25
Sand Field Sheet No. 1001S
Gravel Field Sheet No. SAME

C53·85

PAGE 2

Class of Concrete	PFA			
% Fine Agg. by Absolute Vol.	38			
Air Entraining Agent	Pave Air			
Quantity of Air Entraining Agent	7.0 ozs			
Admixture	Master Pave			
Quantity of Admixture	25.0 ozs			
Cement: Source Ideal Type 1				
Cement Portland, Co. Lbs.	455			
Fly Ash Cherokee Cl. 'F' Lbs.	110			
Fine Aggregate Lbs.	1160			
Intermediate Aggregate Lbs.	945			
Coarse Aggregate Lbs.	945			
Miscellaneous Aggregate Lbs.	0			
Water Lbs.	250			
Water Gals.	30.0			
Slump Inches	2.0			
Water Cement Ratio (% by Weight)	.443			
~~Cement~~ Factor (CWT per Yard) Cementitious	5.7			
Gals/CWT	5.3			

WEIGHT PER CU. FT. OF CONCRETE:

T. Theoretical (calculated-air free)	150.9			
C. Theoretical (calculated 5 % air)	143.3			
W. Determined (actual Wt./cu.ft.)	145.2			
Air Content Air Meter (Total Air)	4.0			
Air Content - Gravimetric Method $\% A = \frac{T - W}{T} \times 100$	3.8			

7 days

Compressive Strength (P.S.I.)	4000			
	4170			
Average	4090			

28 days

Compressive Strength (P.S.I.)				
Average				

Dist. 4

NOTE: Quantities shown for admixtures are for information only.

REMARKS: Supplier's Requested trial Mix Proportions

Staff Materials Engineer

STATE OF COLORADO
DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
DOH Form No. 330
Revised: August, 1982

Project IR25-3(77)
Location S.H. 119 - No on I25
Sand Field Sheet No. 10015
Gravel Field Sheet No. Same
C53.85

PAGE 2 B

Class of Concrete	AFA			
% Fine Agg. by Absolute Vol.	38			
Air Entraining Agent				
Quantity of Air Entraining Agent				
Admixture				
Quantity of Admixture				
Cement: Source Ideal Type I				
Cement Portland, Co Lbs. LA,	455			
Fly Ash Cherokee Lbs. Cl. F	110			
Fine Aggregate Lbs.				
Intermediate Aggregate Lbs.				
Coarse Aggregate Lbs.				
Miscellaneous Aggregate Lbs.				
Water Lbs.				
Water Gals.				
Slump Inches				
Water Cement Ratio (% by Weight)				
Cement Factor (CWT per Yard)				
Gals/CWT				

WEIGHT PER CU. FT. OF CONCRETE:

T. Theoretical (calculated-air free)				
C. Theoretical (calculated ___ % air)				
W. Determined (actual Wt./cu.ft.)				
Air Content Air Meter (Total Air)				
Air Content - Gravimetric Method $\% A = \frac{T - W}{T} \times 100$				

7 days

Compressive Strength (P.S.I.)				
Average	4090			

28 days

Compressive Strength (P.S.I.)	4740			
	4700			
Average	4720			

Dist 4

NOTE: Quantities shown for admixtures are for information only.

REMARKS:

Staff Materials Engineer

Appendix C

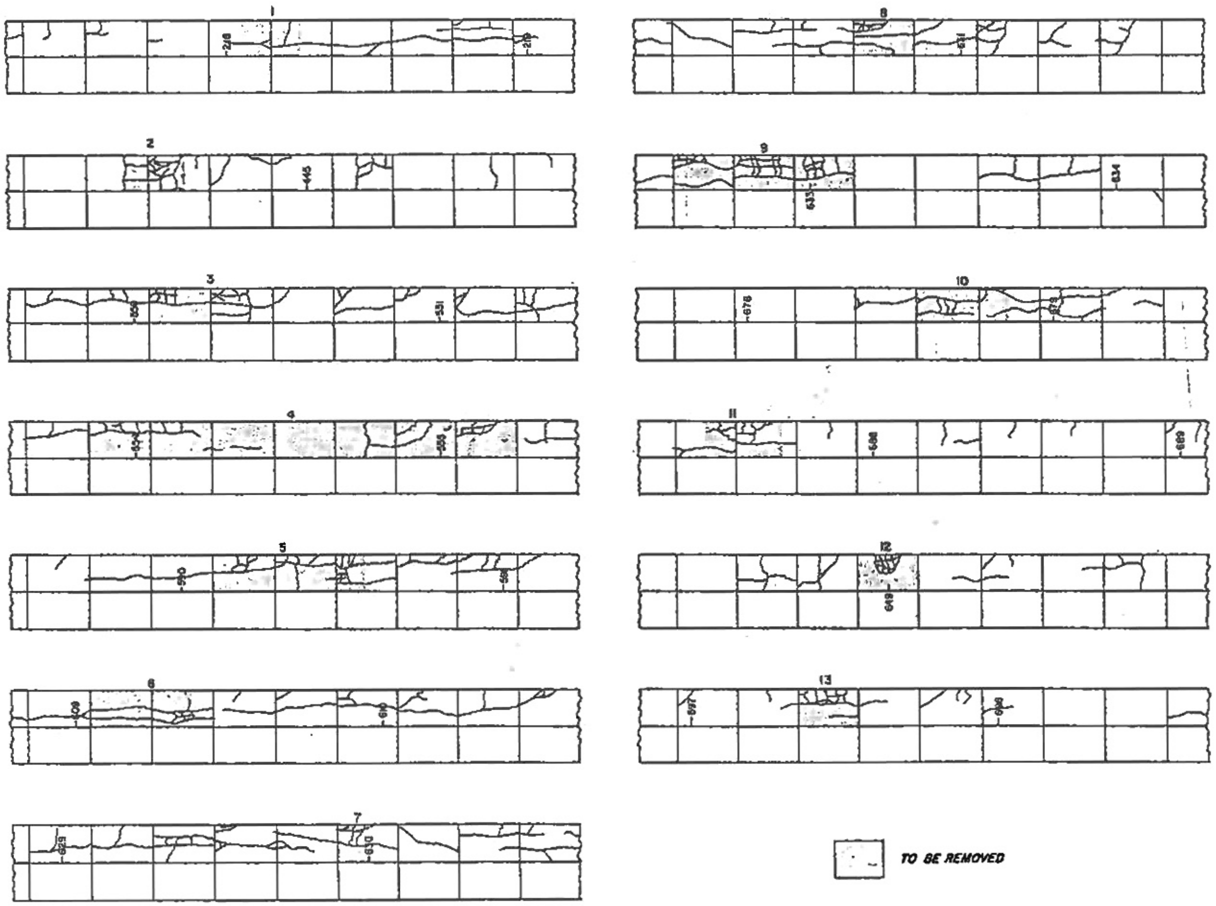
FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	IR 25-3(77)	31	120

AS CONSTRUCTED

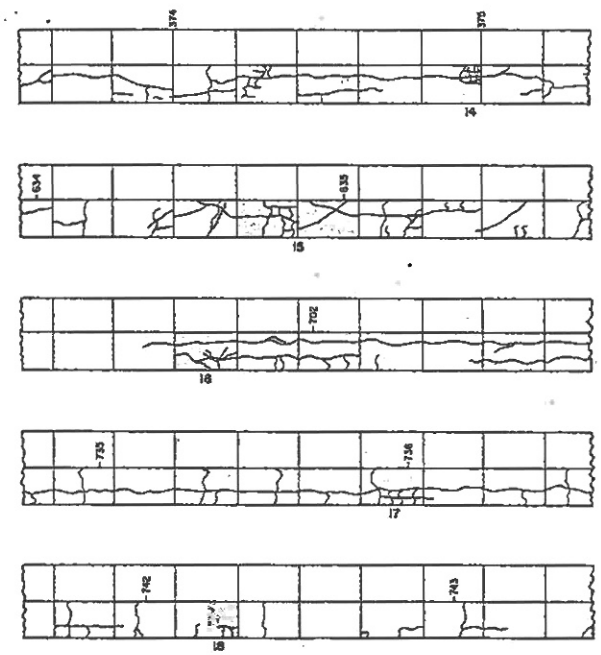
NO REVISIONS [ ] REVISED [2-29-96] VOID [ ]

MAPPED AREAS OF CONCRETE SLAB REMOVAL

NORTHBOUND



SOUTHBOUND



TO BE REMOVED

TABULATION OF CONCRETE

LOC.	REMOVAL & PLACE SQ. YDS.	FURNISH CU. YDS.
1	27	8
2	27	8
3	54	15
4	187	52
5	67	19
6	54	15
7	14	4
8	27	8
9	80	23
10	40	12
11	34	10
12	27	8
13	27	8
14	14	4
15	54	15
16	27	8
17	27	8
18	14	4
TOTAL	801	229

CONC. SLAB REMOVAL = 801 SQ. YD. *
PLACE CONC. PAVEMENT = 801 SQ. YD. *
FURNISH CONC. PAVEMENT = 229 CU. YD. *

* QUANTITIES CARRIED TO TABULATION OF CONCRETE PAVEMENT

HIGHWAYS, STATE OF COLORADO
NO. 136
77

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
VIII	COLORADO	IR 25-3(77)	32	

AS CONSTRUCTED

NO REVISIONS 2-28-86 REVISED VOID

DETAILS OF CONCRETE REMOVAL AND PATCHING

NO SCALE

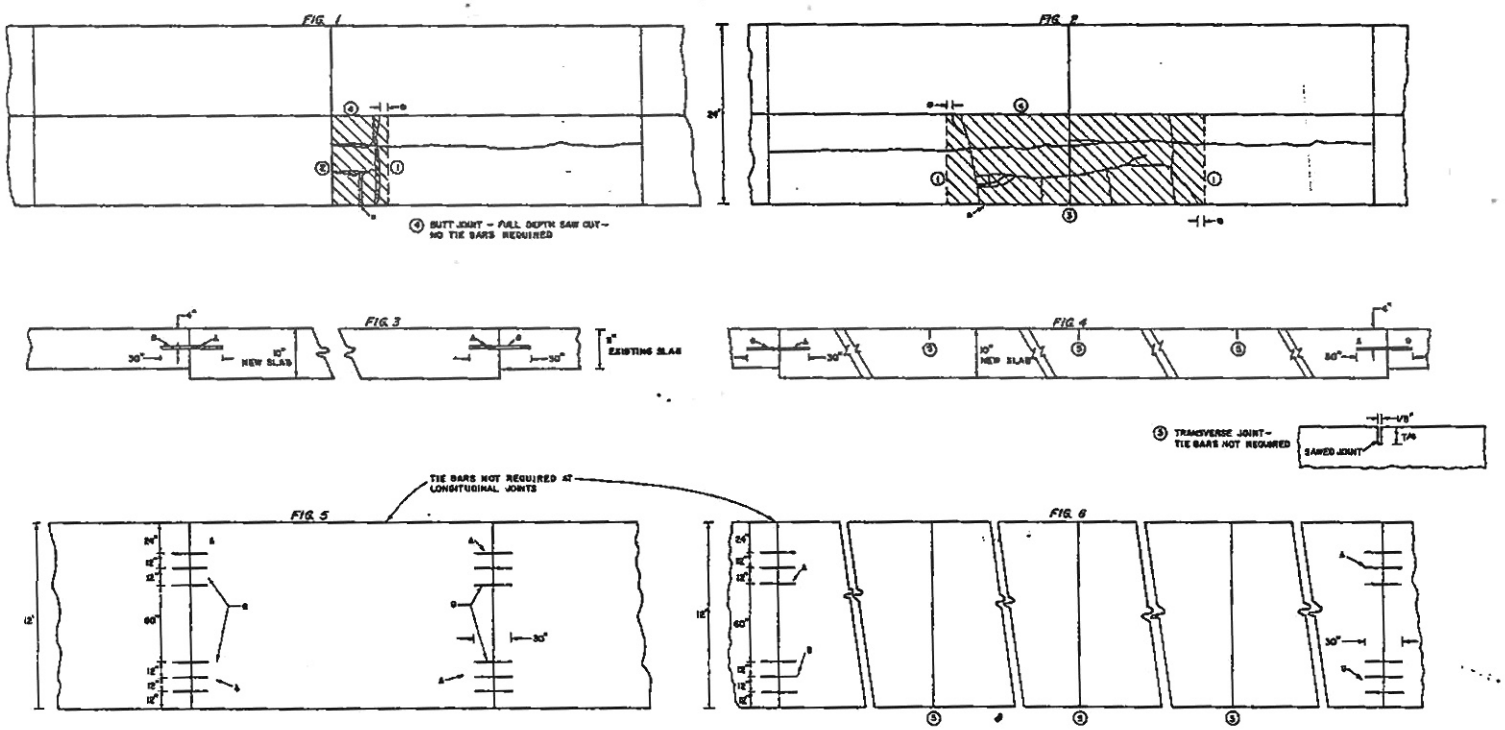
① FULL DEPTH CUT WITH NO. 8 DEFORMED BARS.

② BUTT JOINT – FULL DEPTH SAW CUT WITH 1-1/4" DIA. SMOOTH DOWEL BARS.

● THE PATCH BOUNDARY (SAWED CUT) SHALL BE A MINIMUM OF 6 INCHES FROM EDGE OF CRACKS IN THE SLAB.

■ NO MORE THAN 18 INCHES OF ADJACENT ASPHALT SHOULDER SHALL BE REMOVED FOR CONCRETE FORMS USED ON THE OUTSIDE SLAB BOUNDARY. THIS MATERIAL SHALL BE REPLACED WITH HOT BITUMINOUS PAVEMENT GRADING EX, PAID FOR AS HOT BITUMINOUS PAVEMENT (PATCHING) (HAUL AND ASPHALT).

③ TRANSVERSE JOINT WITH 1-1/4" DIA. SMOOTH DOWEL BARS.



▲ LIGHTLY GREASE EXPOSED ENDS OF SMOOTH DOWELS.

■ ALL SMOOTH AND DEFORMED BARS SHALL BE 30 INCHES LONG. DEFORMED BARS SHALL BE NO. 8 SMOOTH DOWELS SHALL BE 1¼" DIA.

BAR SPACING

PATCH WIDTH 12 FEET (FULL LANE) – SPACE ALL BARS AS SHOWN IN FIG. 5.

TRANSVERSE AND LONGITUDINAL BOUNDARIES MUST BE SAWN FULL DEPTH WITH DIAMOND BLADES. CARBIDE TIPPED BLADES MUST BE USED INSIDE THE PATCH BOUNDARIES FOR CUTTING LARGE SLABS.

PATCHING SHALL BE PERFORMED IN ACCORDANCE WITH DETAILS SHOWN.

LOCATIONS MAY BE REVISED BY THE ENGINEER TO ACCOMMODATE THE EXISTING PAVEMENT CONDITION.

CONCRETE REMOVAL

CONCRETE SHALL BE REMOVED IN SUCH A WAY THAT THERE IS NO DAMAGE TO ADJACENT CONCRETE SLABS. THE ENGINEER SHALL APPROVE THE METHOD BEFORE THE WORK BEGINS. THE CONCRETE IN THE PATCH AREA SHALL NOT BE REMOVED UNTIL THE DAY THE PATCH IS PLACED.

AN EPOXY ADHESIVE SHALL BE USED TO PLACE DOWELS AND DEFORMED BARS IN THE EXISTING SLAB FACE. IT SHALL MEET THE REQUIREMENTS OF AASHTO M 235.

ALL PATCHES MUST BE FINISHED LEVEL WITH THE EXISTING CONCRETE.

ALL PATCHING SHALL BE 10" THICKNESS.

SUBEXCAVATION

THE 2 INCHES OF EXCAVATION REQUIRED IN THE AREAS OF SLAB REMOVAL WILL NOT BE PAID FOR SEPARATELY BUT WILL BE INCLUDED IN THE WORK. ADDITIONAL SUBEXCAVATION GREATER THAN 2 INCHES WILL NOT BE REQUIRED IN AREAS OF SLAB REMOVAL UNLESS ORDERED BY THE ENGINEER AND, IF NECESSARY, WILL BE PAID FOR AS UNCLASSIFIED EXCAVATION.

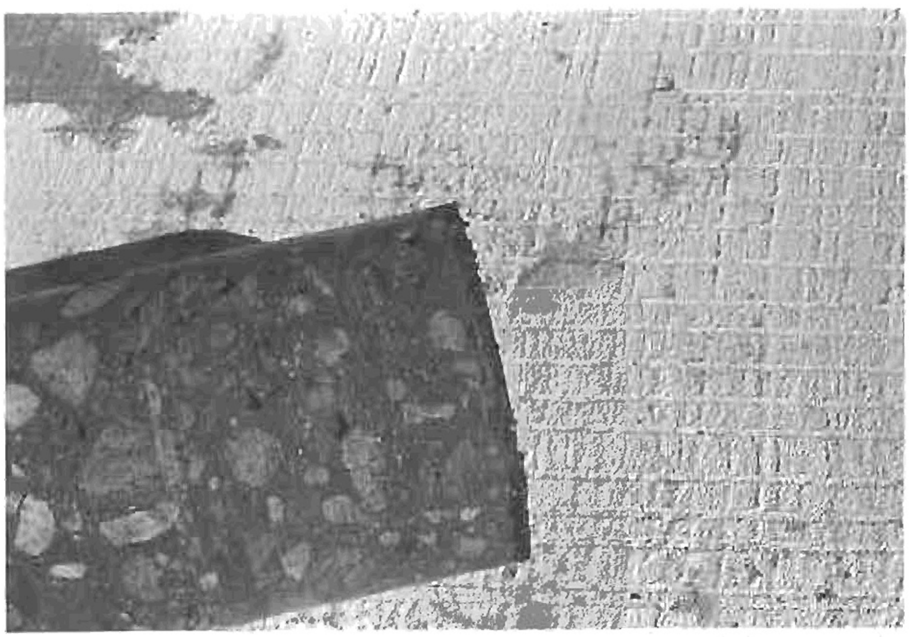
Appendix D

Concrete is mixed, vibrated, leveled, screeded and burlap drug in one operation.

A mechanical tining device provides a textured surface, curing compound is also applied from this machine.

The 24 foot driving and passing lane has been completed, looking north from Johnstown Interchange.

Rumble corrugations were formed using 1" depth by 4 1/2" pitch corrugations.



This core has the chip seal bond breaker attached.

Appendix E

FWD DEFLECTION READINGS NORMALIZED TO 9,000 LBS
I-25 SOUTHBOUND
SITE# 1 ON MAY 16,1988 SITES #2 AND #3 ON MAY 17, 1988

SLAB#	LOCATION	ACT WT	NORM WT	SEN# 1	SEN# 2	SEN# 3	SEN# 4	SEN# 5	SEN# 6	SEN# 7	TIME
101	M	8386	9000	21.86	22.93	1.41	20.49	22.97	23.38	2.47	06:08:32
102	M	8472	9000	17.80	18.23	1.73	17.92	17.37	14.43	17.62	06:18:25
103	M	8850	9000	15.53	16.25	1.64	17.36	17.57	17.31	10.38	06:23:41
104	M	8752	9000	16.24	16.16	1.46	14.59	13.94	13.51	14.07	06:28:03
105	M	8826	9000	18.53	17.92	1.67	16.33	15.83	15.51	15.93	06:31:17
106	M	8411	9000	18.50	18.20	1.49	16.72	16.34	15.99	16.12	06:36:59
107	M	8337	9000	18.68	17.64	1.56	14.15	12.78	12.31	12.11	06:39:30
108	M	8057	9000	19.89	18.79	1.50	14.49	12.64	11.59	10.78	06:43:25
109	M	7959	9000	24.24	17.21	1.53	4.91	0.81	0.07	2.05	06:45:53
110	M	8252	9000	19.16	19.37	1.52	16.23	15.75	15.46	15.89	06:49:06
111	M	8313	9000	17.92	15.37	1.62	12.35	10.34	8.75	7.98	06:51:57
112	M	8191	9000	16.11	15.93	1.31	14.81	14.82	14.99	14.09	06:54:34
113	M	8508	9000	10.48	9.33	1.92	9.38	9.24	9.12	1.48	06:56:45
114	M	8789	9000	9.06	8.76	1.85	6.77	6.08	5.61	6.77	06:59:46
115	M	8679	9000	7.79	8.40	1.74	6.93	6.99	7.00	7.40	07:04:36
116	M	8667	9000	6.93	7.06	1.44	5.19	4.47	3.81	3.22	07:06:52
117	M	8655	9000	8.35	7.76	1.93	5.96	5.36	4.82	1.68	07:09:32
118	M	8398	9000	9.81	7.91	2.15	5.96	4.48	3.74	3.40	07:11:43
119	M	8044	9000	11.96	11.30	1.73	9.06	8.25	7.34	6.83	07:14:11
120	M	8350	9000	11.76	10.01	1.95	7.79	6.85	6.05	5.66	07:16:13
121	M	8069	9000	16.28	18.38	1.81	19.24	19.11	20.20	1.10	07:18:31
122	M	8032	9000	14.58	11.58	2.01	6.97	5.44	4.10	3.34	07:20:59
123	M	8191	9000	14.69	15.72	2.09	15.00	15.43	16.05	3.18	07:23:14
124	M	7947	9000	15.04	13.94	2.11	11.80	10.84	9.92	9.59	07:25:27
125	M	8118	9000	12.16	11.68	2.24	10.81	10.67	10.45	1.75	07:27:34
126	M	7727	9000	15.44	14.54	1.90	13.62	13.13	12.69	12.75	07:29:46
127	M	8154	9000	15.56	14.82	2.27	12.31	12.00	11.53	7.30	07:31:56
128	M	8191	9000	15.48	12.98	2.00	6.94	4.57	2.85	1.71	07:33:59
129	M	8240	9000	16.04	15.26	1.98	13.75	13.28	12.84	1.89	07:36:04
130	M	8130	9000	13.69	13.25	2.32	10.29	9.92	9.48	9.04	07:39:07
131	M	8130	9000	11.67	9.42	2.03	6.37	4.71	3.38	2.38	07:41:18
132	M	8020	9000	13.06	10.80	1.74	7.36	5.68	4.31	3.38	07:44:23
133	M	8228	9000	10.52	9.66	1.74	8.92	8.91	8.80	9.22	07:46:50
134	M	8130	9000	10.85	9.68	1.98	9.33	8.61	7.94	7.59	07:49:11
135	M	8008	9000	9.83	8.56	1.92	7.16	6.04	4.98	2.32	07:51:31
136	M	7849	9000	13.35	10.13	2.46	5.92	4.20	2.38	2.87	07:53:40
200	M	9216	9000	7.77	7.44	3.24	6.28	5.75	5.06	4.80	06:34:41
201	M	7690	9000	5.10	4.88	2.31	4.18	3.77	3.38	3.18	06:28:41
202	M	9094	9000	9.04	9.24	2.05	9.47	9.55	9.63	9.97	06:37:28
203	M	9204	9000	10.09	9.83	2.01	9.03	8.40	7.81	4.57	06:40:00
204	M	9375	9000	8.77	8.27	2.03	6.86	6.19	5.60	5.30	06:44:44
205	M	9534	9000	8.42	8.28	2.13	7.84	7.65	7.51	7.71	06:47:11
206	M	9253	9000	10.95	11.03	2.03	10.68	10.59	10.64	11.29	06:49:50
207	M	9290	9000	13.94	13.86	2.04	13.32	13.47	13.37	4.32	06:52:02
208	M	9375	9000	10.33	9.81	2.27	8.26	7.55	6.95	6.72	06:54:22
209	M	9607	9000	11.33	11.77	2.31	12.16	11.95	12.04	2.16	06:56:45
210	M	9546	9000	8.89	8.23	2.12	6.56	5.89	5.25	4.82	06:59:00
211	M	9326	9000	9.96	9.78	2.01	9.08	8.81	8.45	1.69	07:01:09
212	M	9521	9000	10.73	9.82	2.24	7.85	7.10	6.48	6.28	07:03:13
213	M	9241	9000	9.37	8.93	2.11	7.29	6.54	5.80	1.54	07:05:34

214 M	9363	9000	8.32	8.02	2.18	6.98	6.67	6.36	6.36	07:07:38
215 M	9204	9000	8.57	8.02	2.16	6.06	5.14	4.33	1.57	07:09:53
216 M	9326	9000	10.28	10.07	2.15	5.37	2.95	2.23	1.71	07:12:11
217 M	9326	9000	7.79	7.36	2.30	5.72	4.80	3.99	3.31	07:14:27
218 M	9106	9000	8.47	8.50	2.07	7.94	7.40	7.15	9.26	07:16:53
219 M	9326	9000	11.76	11.75	1.93	10.68	10.36	9.79	1.90	07:19:20
220 M	9290	9000	8.14	7.54	1.89	5.76	4.95	4.15	3.53	07:21:38
221 M	9253	9000	7.12	6.89	2.23	6.19	5.83	5.44	3.68	07:24:08
222 M	9546	9000	8.03	7.58	2.27	6.74	6.12	5.73	5.53	07:26:27
223 M	8997	9000	17.41	9.04	2.16	8.39	7.86	3.01	2.74	07:28:40
224 M	9387	9000	8.05	7.51	2.09	5.99	5.19	4.41	3.86	07:30:56
225 M	9082	9000	7.53	7.26	2.19	6.31	5.38	4.84	4.50	07:33:24
226 M	9216	9000	9.87	9.82	2.17	9.06	8.84	8.56	8.73	07:44:17
227 M	9326	9000	10.02	9.86	2.21	8.70	8.10	3.09	2.73	07:46:22
228 M	9326	9000	9.82	9.01	2.42	8.64	8.13	7.74	3.03	07:48:34
229 M	9338	9000	9.49	8.88	2.42	7.61	6.92	6.18	1.70	07:51:06
230 M	9070	9000	7.10	6.55	2.22	4.95	4.03	3.31	2.71	07:53:31
231 M	9363	9000	7.24	7.14	2.49	6.77	6.51	6.24	1.79	07:57:09
232 M	9009	9000	6.66	6.44	2.09	5.44	4.89	4.37	1.58	07:59:37
233 M	9277	9000	7.90	7.57	2.51	6.08	5.31	4.53	1.94	08:02:02
234 M	9216	9000	7.35	6.76	2.50	5.10	4.32	3.65	3.14	08:04:09
235 M	9094	9000	7.98	7.16	2.52	4.86	3.83	2.94	2.40	08:09:28
236 M	9326	9000	7.47	7.21	3.00	5.89	5.17	4.54	1.58	08:13:31
237 M	9363	9000	6.15	5.76	2.92	4.46	3.78	3.18	1.69	08:15:40
238 M	9265	9000	4.97	4.46	2.44	3.22	2.58	2.11	1.77	08:18:20
301 M	8606	9000	3.71	3.46	3.62	2.78	2.40	2.07	1.60	08:23:59
302 M	9290	9000	3.92	3.59	3.40	2.76	2.34	2.05	1.80	08:26:12
303 M	9424	9000	4.36	3.95	3.70	3.03	2.57	2.23	1.71	08:28:27
304 M	9436	9000	5.67	5.30	4.34	3.90	3.26	2.73	1.81	08:30:36
305 M	8728	9000	8.02	7.59	4.59	5.52	4.56	3.75	1.73	08:32:41
306 M	8862	9000	6.90	6.62	2.98	5.18	4.81	4.36	4.15	08:34:45
307 M	8826	9000	7.68	7.15	3.02	5.48	4.81	4.15	1.84	08:36:51
308 M	8862	9000	6.95	5.97	3.35	3.77	3.03	2.32	1.89	08:39:35
309 M	8923	9000	5.60	5.21	4.03	3.66	3.02	2.53	2.19	08:41:49
310 M	8826	9000	4.38	3.84	3.76	3.13	2.60	2.24	1.93	08:50:56
311 M	9192	9000	4.53	4.11	3.80	3.26	2.84	2.41	1.64	08:53:05
312 M	8740	9000	3.98	3.65	3.44	3.10	2.33	2.22	1.28	08:55:17
313 M	9216	9000	4.30	4.02	3.64	6.71	2.57	2.17	6.98	08:57:38
314 M	9180	9000	4.06	3.78	3.61	2.96	2.53	2.17	1.90	08:59:48
315 M	9033	9000	4.15	3.80	3.62	2.92	2.48	2.15	1.48	09:02:01
316 M	8984	9000	12.88	3.89	3.23	2.85	2.28	1.90	1.37	09:04:46
317 M	9351	9000	4.18	3.78	3.42	2.79	2.33	1.90	1.54	09:07:05
318 M	9009	9000	3.71	3.39	2.99	2.55	2.13	1.80	1.51	09:09:40
319 M	8984	9000	7.02	3.52	2.00	2.41	1.89	1.62	1.36	09:12:39
320 M	9167	9000	4.65	4.41	3.16	3.42	2.86	2.30	1.79	09:15:59
321 M	9106	9000	4.27	3.92	2.89	2.86	2.40	1.96	1.62	09:18:35
322 M	8899	9000	3.45	3.01	3.01	2.25	1.89	1.48	1.30	09:25:47
323 M	9167	9000	3.33	3.14	2.98	2.48	2.06	1.74	1.52	09:28:04
324 M	9045	9000	4.36	4.06	3.12	3.05	2.55	2.14	1.66	09:30:24
325 M	8923	9000	4.58	4.19	3.06	3.07	2.55	2.11	1.70	09:32:32
326 M	9033	9000	4.24	3.87	3.37	2.81	2.25	1.76	1.46	09:34:38
327 M	8301	9000	4.78	4.62	2.38	3.43	2.91	2.52	2.78	09:36:50
328 M	8801	9000	4.86	4.46	2.59	3.32	2.75	2.03	1.38	09:39:23
329 M	8313	9000	4.40	4.04	3.91	2.83	2.30	1.84	1.65	09:41:38
330 M	8594	9000	6.14	5.54	3.53	3.70	3.07	2.51	1.33	09:43:48
331 M	8862	9000	6.05	5.52	3.02	4.01	3.28	2.68	2.29	09:46:10

332 M	8533	9000	4.02	3.59	3.56	2.36	1.92	1.57	1.14	09:49:52
333 M	8667	9000	4.77	4.38	2.91	2.77	2.13	1.63	1.65	09:55:17
334 M	8838	9000	6.54	5.93	2.59	4.17	3.33	2.61	1.55	09:58:48
335 M	8667	9000	4.11	3.60	3.55	2.61	2.15	1.75	1.43	10:01:35
101 E	7947	9000	28.84	15.48	1.39	5.86	6.59	0.19	1.12	06:16:13
102 E	7336	9000	24.85	2.93	1.13	5.31	6.24	0.07	0.85	06:21:26
103 E	7812	9000	31.65	16.55	1.54	34.45	0.10	1.51	2.55	06:26:18
104 E	7739	9000	28.45	17.02	1.38	23.03	2.14	5.87	4.43	06:29:39
105 E	8105	9000	25.22	4.27	2.03	3.70	2.98	0.37	0.02	06:33:10
106 E	9924	9000	16.11	12.04	1.02	4.77	0.96	0.80	3.36	06:38:19
107 E	8130	9000	24.82	2.27	0.50	2.17	1.90	0.91	0.32	06:42:18
108 E	7605	9000	26.88	3.28	1.72	1.64	2.42	0.94	0.78	06:44:42
109 E	8411	9000	10.19	5.44	1.53	5.72	4.32	4.37	4.71	06:47:55
110 E	7336	9000	31.72	16.67	1.03	34.10	1.99	1.24	3.72	06:50:12
111 E	8276	9000	15.60	2.42	1.23	1.32	0.45	0.48	0.52	06:53:23
112 E	6982	9000	21.11	0.73	1.13	2.48	1.90	1.43	1.17	06:55:41
113 E	8276	9000	24.65	1.87	2.05	0.22	0.97	0.59	1.64	06:58:39
114 E	8386	9000	21.65	5.61	1.64	1.80	7.88	0.15	0.23	07:00:48
115 E	8154	9000	23.67	2.00	1.71	1.42	1.13	0.90	0.99	07:05:44
116 E	8252	9000	22.38	1.75	1.78	0.91	0.46	1.19	0.42	07:08:24
117 E	8167	9000	19.35	0.78	0.47	1.59	0.55	1.36	0.12	07:10:39
118 E	8118	9000	19.40	0.61	2.53	2.38	1.67	1.47	45.84	07:13:04
119 E	7947	9000	17.60	2.45	1.13	0.49	0.61	0.69	0.60	07:15:12
120 E	8069	9000	16.64	2.11	0.85	1.12	0.62	1.61	0.21	07:17:28
121 E	7617	9000	20.86	2.22	1.71	2.17	1.72	1.28	1.09	07:19:53
122 E	8167	9000	14.95	1.64	0.26	0.23	0.51	0.77	0.12	07:22:07
123 E	7507	9000	23.06	1.90	2.71	1.02	3.38	0.20	0.29	07:24:21
124 E	7617	9000	25.57	17.04	1.46	19.31	0.98	0.68	0.80	07:26:32
125 E	7556	9000	19.44	1.46	2.10	1.62	1.30	1.10	1.10	07:28:38
126 E	7214	9000	27.34	1.30	2.22	1.33	0.53	0.40	0.15	07:30:52
127 E	7861	9000	22.24	1.02	2.19	2.20	2.14	1.55	1.12	07:32:59
128 E	8179	9000	12.56	4.45	1.87	1.83	0.35	1.06	0.75	07:35:02
129 E	7263	9000	25.92	1.35	1.60	2.10	1.68	1.23	0.98	07:38:04
130 E	7690	9000	21.03	2.07	2.23	2.95	2.64	2.30	1.92	07:40:11
131 E	7898	9000	12.73	3.15	1.86	0.44	1.27	1.20	1.69	07:43:19
132 E	7983	9000	12.27	3.52	1.95	2.47	1.91	1.46	0.78	07:45:28
133 E	7483	9000	25.24	8.17	1.35	0.33	0.44	0.47	1.65	07:48:06
134 E	7935	9000	15.24	2.79	2.46	0.86	2.88	2.12	0.36	07:50:21
135 E	8228	9000	14.87	2.01	0.91	0.93	0.71	1.75	0.79	07:52:33
136 E	8105	9000	10.74	6.49	2.78	4.40	3.50	2.70	2.03	07:54:44
201 E	9119	9000	22.88	8.61	2.43	2.66	1.96	2.63	0.24	06:36:15
202 E	8850	9000	16.55	5.83	1.26	7.48	3.52	0.91	2.20	06:38:44
203 E	8972	9000	23.65	9.96	1.89	42.88	1.62	1.19	0.71	06:43:12
204 E	9216	9000	22.04	4.15	1.73	0.33	1.48	1.18	0.47	06:45:58
205 E	8960	9000	24.66	6.73	2.09	0.99	1.36	0.87	0.89	06:48:40
206 E	9131	9000	22.08	1.66	7.71	0.83	0.21	1.32	2.45	06:50:57
207 E	8911	9000	24.19	8.18	2.03	1.65	0.51	1.32	0.88	06:53:15
208 E	9387	9000	21.90	9.56	2.29	25.01	10.56	2.17	0.18	06:55:38
209 E	9253	9000	18.41	6.45	1.78	3.53	1.70	1.21	2.22	06:57:56
210 E	9204	9000	10.94	3.92	2.09	0.12	0.80	0.34	0.10	07:00:07
211 E	9021	9000	16.47	8.96	1.86	0.23	0.39	2.36	0.21	07:02:08
212 E	9009	9000	23.89	14.80	2.06	42.88	4.40	8.95	0.04	07:04:20
213 E	8923	9000	24.73	3.52	1.88	0.27	0.31	0.31	0.25	07:06:34
214 E	8887	9000	18.04	3.50	1.47	4.72	1.14	1.30	1.28	07:08:51
215 E	9167	9000	13.43	7.92	2.23	7.39	5.20	0.76	5.60	07:11:07

216 E	9424	9000	9.05	9.87	3.48	5.77	4.16	3.03	2.30	07:13:18
217 E	9058	9000	20.31	10.16	2.30	38.57	0.47	1.94	0.31	07:15:46
218 E	8765	9000	19.86	10.32	1.64	4.22	1.23	0.31	0.96	07:18:07
219 E	9131	9000	22.58	19.19	2.00	11.11	7.92	5.86	11.50	07:20:29
220 E	9094	9000	20.41	4.05	2.04	1.03	0.38	0.45	1.03	07:22:50
221 E	9412	9000	16.73	4.22	2.47	1.81	0.19	0.63	0.92	07:25:16
222 E	9131	9000	18.93	10.13	2.36	28.88	1.74	0.34	0.52	07:27:37
223 E	9009	9000	14.36	7.17	2.28	0.89	2.25	0.15	1.40	07:29:48
224 E	8606	9000	20.53	3.98	2.12	0.14	0.41	0.18	1.04	07:32:21
225 E	9009	9000	18.21	10.72	2.19	25.63	0.71	1.38	0.30	07:43:03
226 E	9021	9000	17.02	5.15	2.17	8.87	6.24	0.26	1.03	07:45:23
227 E	9180	9000	21.25	4.99	2.24	4.93	0.72	0.11	0.22	07:47:24
228 E	8740	9000	9.97	4.23	2.07	0.88	0.13	1.48	0.72	07:49:57
229 E	9155	9000	15.12	4.49	2.44	0.78	0.22	0.11	1.47	07:52:16
230 E	8545	9000	17.71	4.15	2.61	0.11	0.60	0.57	0.48	07:56:00
231 E	8801	9000	11.46	5.21	2.31	0.81	1.21	0.47	1.54	07:58:18
232 E	8887	9000	12.61	11.17	2.00	6.54	4.86	2.63	5.46	08:00:58
233 E	9070	9000	20.06	3.36	3.19	1.00	0.45	0.87	0.02	08:03:05
234 E	8887	9000	22.16	4.42	2.58	0.71	1.81	0.41	0.88	08:07:54
235 E	9045	9000	12.66	3.71	2.98	2.44	0.23	0.38	0.37	08:12:15
236 E	9155	9000	16.64	2.66	3.44	2.28	1.99	1.81	1.62	08:14:34
237 E	9375	9000	13.03	3.82	2.94	3.76	3.00	1.22	0.53	08:16:44
238 E	9180	9000	8.98	2.95	3.10	2.32	1.92	1.67	1.42	08:19:43
301 E	9229	9000	6.79	3.28	3.90	2.42	2.08	1.72	1.59	08:25:09
302 E	8704	9000	5.93	4.32	3.90	2.81	2.33	1.88	1.51	08:27:17
303 E	9314	9000	6.50	4.40	4.56	2.99	2.43	1.98	1.70	08:29:30
304 E	9167	9000	15.83	4.95	3.54	3.38	2.68	2.15	1.91	08:31:39
305 E	8435	9000	15.95	6.00	3.62	3.38	2.45	1.91	1.88	08:33:40
306 E	8875	9000	13.26	2.79	2.97	2.10	1.87	1.58	1.17	08:35:51
307 E	8691	9000	16.76	4.33	2.94	7.25	0.24	0.07	0.11	08:37:54
308 E	8789	9000	16.15	3.80	3.63	2.93	2.45	1.99	1.68	08:40:44
309 E	8606	9000	14.73	4.75	3.72	2.68	1.98	1.70	1.38	08:49:50
310 E	8667	9000	8.99	2.69	4.11	2.28	1.96	1.71	1.50	08:52:00
311 E	8594	9000	8.80	3.47	3.10	2.57	2.16	1.86	1.70	08:54:12
312 E	8777	9000	5.50	2.98	3.45	2.41	2.02	1.99	1.22	08:56:34
313 E	9180	9000	5.67	2.61	3.99	2.08	1.83	1.64	1.46	08:58:46
314 E	9131	9000	10.62	3.56	3.67	2.64	2.17	1.80	1.54	09:00:54
315 E	8704	9000	6.45	4.51	3.10	2.40	2.04	1.70	1.45	09:03:35
316 E	8936	9000	13.82	2.44	2.73	1.92	1.77	1.50	1.41	09:05:58
317 E	9119	9000	6.88	3.62	3.10	2.47	1.94	1.56	1.26	09:08:08
318 E	8752	9000	6.97	4.46	2.41	3.01	2.36	1.89	1.52	09:11:06
319 E	8997	9000	4.55	3.90	3.53	2.65	2.11	1.77	1.51	09:14:55
320 E	8911	9000	8.63	3.51	2.56	2.50	2.00	1.79	1.88	09:17:30
321 E	9131	9000	9.41	3.44	2.98	2.63	2.16	1.77	1.49	09:19:43
322 E	9253	9000	4.13	3.21	3.12	2.44	2.05	1.73	1.50	09:26:52
323 E	9070	9000	8.66	3.40	2.65	2.37	1.93	1.60	1.36	09:29:18
324 E	8923	9000	8.60	3.88	3.54	2.92	2.48	2.05	1.77	09:31:28
325 E	8752	9000	15.30	3.08	2.89	2.38	1.96	1.70	1.62	09:33:36
326 E	8826	9000	11.12	4.39	3.31	2.57	2.01	1.60	1.36	09:35:44
327 E	8472	9000	9.92	3.09	2.45	2.29	1.91	1.56	1.27	09:38:12
328 E	8459	9000	12.10	4.72	3.10	2.80	2.18	1.73	1.58	09:40:35
329 E	8411	9000	7.52	4.09	2.49	3.22	2.95	2.45	2.19	09:42:42
330 E	8545	9000	11.80	3.26	4.17	2.33	1.95	1.55	1.27	09:45:06
331 E	8435	9000	14.03	6.66	2.48	3.59	2.64	2.00	1.53	09:47:13
332 E	8655	9000	6.66	4.72	2.81	2.68	2.12	1.72	1.45	09:54:16
333 E	8289	9000	10.74	3.03	3.10	2.01	2.58	1.59	0.99	09:57:43

133	M	11499	13000	13.59	13.37	2.43	11.52	11.35	11.03	11.28	07:47:05
134	M	11328	13000	13.31	13.1	2.64	11.13	10.41	9.52	9	07:49:27
135	M	11169	13000	12.76	13.59	2.61	8.97	7.51	5.99	2.96	07:51:47
136	M	11304	13000	16.53	15.72	3.38	7.5	4.86	3.06	3.46	07:53:56
200	M	12537	13000	9.48	9.08	4.16	7.52	6.91	6.14	5.88	06:34:56
202	M	12292	13000	11.21	11.41	2.88	11.52	11.39	11.71	12.27	06:37:45
203	M	12573	13000	12.32	12.04	2.84	10.9	10.18	9.53	4.42	06:40:16
204	M	12830	13000	11.08	10.3	2.87	8.69	7.92	7.12	6.86	06:45:01
205	M	12854	13000	10.56	10.26	2.93	9.76	9.51	9.32	9.53	06:47:28
206	M	12756	13000	13.95	13.94	2.88	13.47	13.44	13.18	13.9	06:50:07
207	M	12634	13000	16.13	15.87	2.78	15	13.83	14.13	1.67	06:52:19
208	M	12817	13000	12.96	12.23	3.11	10.02	9.27	8.58	8.18	06:54:39
209	M	13098	13000	13.81	14.29	3.06	14.42	14.17	14.51	2.82	06:57:02
210	M	13196	13000	11.42	10.43	2.9	8.23	7.52	6.69	6.1	06:59:17
211	M	12793	13000	12.45	12.1	2.76	11.31	10.9	10.46	2.23	07:01:25
212	M	12769	13000	13.32	12.14	2.94	9.45	8.74	7.97	7.69	07:03:30
213	M	12708	13000	12.03	11.32	2.91	9.26	8.37	7.63	2.16	07:05:51
214	M	12744	13000	10.57	10.06	2.87	8.61	8.26	7.83	7.83	07:07:55
215	M	12732	13000	11.09	10.63	2.92	7.77	6.79	6.43	2.91	07:10:10
216	M	12549	13000	12.67	12.47	2.88	6.85	3.78	2.9	2.24	07:12:27
217	M	12817	13000	9.95	9.36	3.01	7.26	6.29	5.26	4.51	07:14:44
218	M	12585	13000	11.25	10.77	2.69	3.43	8.95	13.1	5.4	07:17:10
219	M	12573	13000	13.9	13.77	2.37	12	11.72	10.8	1.96	07:19:37
220	M	12793	13000	10.31	9.51	2.5	7.26	6.6	5.98	6.12	07:21:55
221	M	12988	13000	9.32	8.98	2.75	7.88	7.48	7.05	5.69	07:24:25
222	M	12830	13000	9.88	9.35	2.59	7.79	7.15	6.43	6.14	07:26:44
223	M	12256	13000	19.74	11.32	2.47	10.59	9.91	4.6	2.11	07:28:57
224	M	12817	13000	10.15	9.46	2.54	7.52	6.52	5.55	4.89	07:31:13
225	M	12439	13000	9.66	9.12	2.57	7.54	6.81	6.11	5.83	07:33:41
226	M	12988	13000	12.67	12.53	2.85	11.18	10.9	10.38	10.47	07:44:35
227	M	12756	13000	12.44	12.27	2.67	10.77	10.16	3.49	3.07	07:46:39
228	M	12500	13000	10.95	10.96	2.7	10.12	9.74	9.23	2.76	07:48:51
229	M	12598	13000	11.42	10.68	2.72	8.95	8.24	7.17	1.04	07:51:23
230	M	12610	13000	9.1	8.34	2.73	6.16	5.12	4.23	3.33	07:53:48
231	M	12683	13000	8.84	8.65	2.87	8.01	7.9	7.58	2.49	07:57:26
232	M	12244	13000	8.27	7.42	2.48	6.66	5.95	5.15	2.41	07:59:54
233	M	12646	13000	9.45	8.95	3.04	6.82	5.85	4.88	1.85	08:02:19
234	M	12292	13000	8.79	8.13	2.95	6.13	5.17	4.34	3.72	08:04:27
235	M	12585	13000	10.09	9.03	3.2	5.98	4.82	3.7	4.23	08:09:45
236	M	12671	13000	8.76	8.31	3.74	6.44	5.46	4.71	1.86	08:13:49
237	M	12805	13000	7.5	7.02	3.63	5.3	4.6	3.83	1.92	08:15:57
238	M	12927	13000	6.43	5.72	2.82	3.96	3.24	2.61	2.08	08:18:37
301	M	12903	13000	5.27	4.86	5.03	3.92	3.37	2.95	2.17	08:24:17
302	M	13269	13000	5.2	4.75	4.61	3.6	3.09	2.58	2.27	08:26:29
303	M	13123	13000	5.58	5.06	4.85	3.84	3.27	2.79	2.11	08:28:44
304	M	12952	13000	7.14	6.74	5.64	4.73	3.96	3.36	2.24	08:30:53
305	M	12708	13000	10.16	9.55	6.62	7.2	5.87	4.75	2.05	08:32:58
306	M	12073	13000	8.36	8.1	4.09	6.24	5.76	5.04	4.83	08:35:02
307	M	12000	13000	9.68	9.06	3.79	6.97	6.09	5.27	2.18	08:37:09
308	M	12378	13000	8.84	7.57	4.71	4.85	3.81	2.99	2.54	08:39:52
309	M	12244	13000	7.05	6.5	5.32	4.64	3.92	3.18	2.62	08:42:06
310	M	12891	13000	5.93	5.45	5.08	4.2	3.48	2.97	2.54	08:51:13
311	M	12671	13000	5.7	5.28	4.85	4.24	3.59	3.09	2.21	08:53:23
312	M	12646	13000	5.28	4.76	4.55	3.81	3.54	5.8	0.5	08:55:35
313	M	12598	13000	5.3	4.93	4.48	5.06	3.19	2.56	0.25	08:57:56
314	M	12634	13000	5	4.63	4.43	3.56	3.06	2.62	2.27	09:00:06

334	E	8936	9000	8.32	6.15	2.75	2.97	2.30	1.74	1.41	09:59:59
335	E	8215	9000	8.12	4.63	3.37	2.63	2.02	1.60	1.32	10:03:41
101	C	8459	9000	2.84	2.17	2.30	2.00	1.62	1.34	1.03	08:12:39
105	C	8264	9000	3.06	2.99	2.75	2.64	2.55	2.52	0.69	08:14:15
110	C	8411	9000	2.92	2.73	2.44	2.12	1.80	1.57	1.38	08:15:30
115	C	8350	9000	3.08	2.64	2.66	2.47	2.32	2.26	1.57	08:16:46
120	C	8191	9000	2.61	2.05	2.09	1.80	1.51	1.29	1.12	08:18:12
125	C	8228	9000	3.15	2.16	2.80	2.69	2.61	2.57	1.59	08:19:26
130	C	8289	9000	3.19	2.77	2.71	2.44	2.22	2.16	2.16	08:20:38
135	C	8337	9000	3.19	2.99	2.76	2.55	2.40	2.28	2.23	08:21:52
101	S	7727	9000	5.31	4.77	3.99	2.89	1.92	1.37	0.96	08:25:32
105	S	7935	9000	6.77	5.30	4.44	3.12	2.06	1.37	0.97	08:26:51
110	S	7825	9000	7.27	5.73	4.70	3.30	2.21	1.45	1.05	08:28:04
115	S	7837	9000	6.63	6.32	4.77	3.42	2.28	1.54	1.11	08:29:20
120	S	7605	9000	6.79	5.29	4.56	3.23	2.15	1.49	1.14	08:31:04
125	S	7568	9000	6.80	5.38	4.28	3.12	2.15	1.52	1.01	08:32:23
130	S	7617	9000	7.91	5.38	4.82	3.45	2.32	1.59	1.19	08:33:37
135	S	7263	9000	7.49	3.25	4.28	3.10	2.22	1.83	1.40	08:34:56

13,000 DROPS FOR THE SAME LOCATIONS ARE LISTED HERE

SLAB#	LOCATION	ACT WT	NORM WT	SEN# 1	SEN# 2	SEN# 3	SEN# 4	SEN# 5	SEN# 6	SEN# 7	TIME
101	M	11633	13000	27.09	21.43	1.98	10.48	27.06	27.1	2.78	06:09:02
102	M	11572	13000	21.79	21.85	2.12	11.75	20.83	15.26	21.47	06:18:55
103	M	11987	13000	18.05	18.77	2.03	11.68	19.87	19.9	3.98	06:24:11
104	M	12073	13000	19.88	19.35	1.88	14.13	16.12	14.37	16.92	06:28:33
105	M	12024	13000	22.1	21.37	2.07	12.38	18.17	18.72	18.93	06:31:47
106	M	11829	13000	23.64	23.28	1.98	14.8	20.51	20.46	11.81	06:37:14
107	M	11560	13000	22.29	20.51	2.03	16.46	14.34	13.54	8.88	06:39:45
108	M	11438	13000	24.8	23.41	1.99	17.9	14.71	14.32	14.1	06:43:40
109	M	11047	13000	25.65	20.07	2.12	5.69	2.01	0.24	2.47	06:46:08
110	M	11597	13000	22.66	21.37	1.96	17.89	18.52	11.69	19.07	06:49:21
111	M	11731	13000	22.33	22.85	2.04	14.53	11.93	9.66	8.51	06:52:12
112	M	11694	13000	20.37	23.93	1.92	19.07	17.47	18.43	11.02	06:54:49
113	M	11877	13000	13.1	12.64	2.51	11.29	11.19	10.77	1.92	06:57:00
114	M	12048	13000	11.19	10.12	2.41	8.22	7.58	6.73	4.77	07:00:01
115	M	12183	13000	10.08	9.37	2.38	8.64	8.7	8.6	9.12	07:04:51
116	M	11926	13000	8.99	9.08	1.93	6.7	5.83	4.88	4.21	07:07:07
117	M	11951	13000	10.43	10.09	2.58	7.16	6.39	5.61	2.11	07:09:47
118	M	11694	13000	12.68	11.96	2.79	8	5.85	4.67	4.29	07:11:58
119	M	11279	13000	15.69	19.32	2.33	11.22	10.07	8.77	8.08	07:14:26
120	M	11353	13000	13.95	14.7	2.5	9.33	8	6.96	6.66	07:16:28
121	M	11218	13000	19.38	22.29	2.49	18.77	20.97	21.94	1.14	07:18:47
122	M	11133	13000	18.3	14.67	2.61	8.21	6.78	5.12	4.04	07:21:15
123	M	11243	13000	17.16	18.88	2.77	13.67	17.77	18.18	3.67	07:23:30
124	M	11169	13000	18.57	18.43	2.32	13.95	12.73	11.68	11.3	07:25:42
125	M	11401	13000	15.28	14.46	2.98	12.8	12.62	12.14	1.95	07:27:49
126	M	10913	13000	19.16	17.36	2.5	13.02	15.96	15.42	15.71	07:30:01
127	M	11414	13000	19.48	18.36	2.97	14.73	14.06	13.46	8.67	07:32:11
128	M	11523	13000	19.38	17.36	2.71	8.83	5.95	3.92	2.47	07:34:14
129	M	11511	13000	19.3	18.92	2.66	13.76	15.8	15.14	2.39	07:36:19
130	M	11133	13000	16.81	18.02	3.01	12.12	11.59	11.11	10.43	07:39:23
131	M	11487	13000	14.93	15.1	2.73	8.15	6.1	4.33	3.14	07:41:33
132	M	11243	13000	16.2	15	2.45	9.15	7.22	5.45	4.28	07:44:39

315 M	12500	13000	5.17	4.76	4.58	3.64	3.06	2.62	1.79	09:02:19
316 M	12341	13000	6.97	4.79	4.05	3.39	2.74	2.29	1.88	09:05:03
317 M	12903	13000	5.18	4.66	4.26	3.41	2.83	2.31	1.9	09:07:22
318 M	12744	13000	4.85	4.37	4.01	3.29	2.73	2.28	2.43	09:09:58
319 M	12610	13000	8.68	4.56	2.64	3	2.38	1.91	1.37	09:12:57
320 M	12793	13000	5.71	5.34	4.32	4.15	3.45	2.77	2.15	09:16:17
321 M	12659	13000	5.38	4.83	3.84	3.65	2.97	2.43	2.04	09:18:53
322 M	12671	13000	4.72	4.21	4.19	3.14	2.65	2.07	1.85	09:26:05
323 M	12634	13000	4.19	3.92	3.77	3.1	2.58	2.15	1.87	09:28:22
324 M	12720	13000	5.6	5.21	3.91	3.9	3.25	2.72	2.07	09:30:42
325 M	12378	13000	5.69	5.2	4.51	3.8	3.2	2.63	2.17	09:32:50
326 M	12280	13000	5.39	4.9	4.4	3.57	2.93	2.32	1.6	09:34:55
327 M	11804	13000	6.2	5.85	3.51	4.58	3.98	3.21	5.79	09:37:08
328 M	12427	13000	6.29	5.79	3.67	4.29	3.51	2.5	2.06	09:39:41
329 M	11646	13000	5.6	5.15	5.03	3.59	2.96	2.4	2.2	09:41:56
330 M	12109	13000	7.63	6.97	5.09	4.65	3.79	3.14	1.62	09:44:06
331 M	12341	13000	7.76	7.27	4.21	5.23	4.27	3.49	2.93	09:46:28
332 M	12146	13000	5.48	4.87	5.11	3.27	2.72	2.26	1.65	09:50:10
333 M	11987	13000	6.07	5.58	4.03	3.61	2.56	1.39	1.48	09:55:35
334 M	12183	13000	8.05	7.3	3.53	5.13	4.14	3.29	2.04	09:59:06
335 M	12366	13000	5.62	4.91	4.81	3.61	2.97	2.37	2.03	10:01:53
101 E	10974	13000	24.65	22.87	2.09	55.22	1.62	3.73	1.9	06:16:44
102 E	10498	13000	9.64	8.74	2.67	2.4	1.39	3.94	3.13	06:21:56
103 E	10571	13000	22.09	21.53	2.06	18.81	20.02	3.67	2.32	06:26:48
104 E	10925	13000	23.56	23.33	1.85	12.62	44.47	1.57	7.29	06:30:09
105 E	11108	13000	19.13	4.71	1.86	9.49	2.88	0.63	7.96	06:33:40
107 E	11401	13000	21.2	4.03	2.24	3.62	3.05	2.48	2.3	06:42:33
108 E	10913	13000	14.74	7.07	1.45	4.87	2.77	2.32	1.63	06:44:57
109 E	11792	13000	12.89	10.74	2.01	7.12	5.62	3.97	3.65	06:48:10
110 E	10156	13000	27.49	11.36	1.55	30.31	20.23	0.18	0.21	06:50:27
111 E	11841	13000	18.87	2.56	2.21	3.79	3.17	2.56	2.54	06:53:39
112 E	10193	13000	10.05	8.27	2.94	30.03	1.67	1.49	0.06	06:55:56
113 E	11548	13000	17.07	5.7	2.64	0.25	0.9	1.52	0.66	06:58:54
114 E	11597	13000	18.64	9.47	2.08	32.45	1.3	0.3	0.05	07:01:03
115 E	11475	13000	15.66	2.45	1.83	1.79	0.87	1.21	1.46	07:05:59
116 E	11523	13000	14.79	4.72	2.68	1.07	0.48	0.92	0.08	07:08:39
117 E	11206	13000	21.9	3.25	2.63	3.92	3.15	2.64	2.22	07:10:54
118 E	11487	13000	17.8	4.25	3.21	2.9	2.45	2.15	45.98	07:13:19
119 E	11145	13000	16.66	2.01	2.75	3	2.49	2.11	1.78	07:15:27
120 E	11194	13000	17.56	3.92	2.53	4	3.46	3	2.65	07:17:43
121 E	10852	13000	15.03	4.44	2.49	3.97	3.19	2.24	1.95	07:20:08
122 E	11230	13000	17.18	3.6	2.93	2.27	2.04	1.88	1.65	07:22:23
123 E	10742	13000	16.23	6.35	2.9	0.39	0.76	0.94	0.66	07:24:36
124 E	10742	13000	22.38	24.02	2.08	12.26	39.4	3.9	5.66	07:26:47
125 E	10815	13000	12.11	2.68	2.92	2.03	1.75	1.68	1.39	07:28:54
126 E	10388	13000	14.77	6.95	2.78	11.96	1.56	3.2	3.46	07:31:07
127 E	10962	13000	13.91	5.97	3.04	1.15	2.14	0.11	1.27	07:33:14
128 E	11133	13000	14.65	7.59	2.78	6.59	0.15	0.76	1	07:35:17
129 E	10461	13000	18.67	3.24	2.18	3.33	2.72	2.15	1.89	07:38:20
130 E	11011	13000	21.65	4.9	3.04	4.23	3.71	3.21	2.73	07:40:26
131 E	11401	13000	16.34	6.11	2.53	4.85	4.11	3.5	3.03	07:43:35
132 E	11133	13000	14.35	7.65	2.59	2.9	2.53	2.25	2.07	07:45:44
133 E	10400	13000	17.87	14.42	1.96	58.99	9.19	0.14	1	07:48:21
134 E	10950	13000	9.36	8.78	2.64	16.29	0.72	1.31	0.78	07:50:36
135 E	11536	13000	17.33	3.52	3.24	3.18	2.67	2.42	2.18	07:52:49

136 E	11584	13000	13.46	7.41	4.21	5.96	4.85	3.76	2.86	07:54:59
201 E	12524	13000	23.05	12.26	3.28	50.67	2.15	2.78	0.47	06:36:32
202 E	12097	13000	9.79	9.38	2.07	4.2	1.84	2.02	1.61	06:39:00
203 E	12354	13000	20.43	12.87	2.67	48.88	10.25	8.52	0.19	06:43:29
204 E	12439	13000	7.86	7.07	2.39	3	3.94	1.57	0.18	06:46:15
205 E	12341	13000	11.96	10.3	2.88	11.67	8.97	3	0.4	06:48:56
206 E	12354	13000	17.05	2.77	2.73	2.19	1.65	1.36	1.28	06:51:14
207 E	12280	13000	15.98	10.99	2.92	53.95	1.86	0.19	0.06	06:53:31
208 E	12805	13000	23.77	12.27	3.09	13.64	16.21	2.02	2.84	06:55:55
209 E	12646	13000	7.27	8.65	2.76	0.59	1.28	2.77	2.23	06:58:13
210 E	12695	13000	5.71	5.06	2.6	1.04	0.45	0.58	0.76	07:00:24
211 E	12415	13000	11.08	12.64	2.72	78.61	30.62	0.36	0.02	07:02:25
212 E	12305	13000	17.87	19.19	2.75	16.15	72.5	2.2	0.67	07:04:37
213 E	12378	13000	16.26	6.52	2.53	0.86	11.18	1.2	9.48	07:06:51
214 E	12317	13000	8.71	6.16	2.19	1.15	2	0.81	1.79	07:09:08
215 E	12537	13000	15.47	10.62	2.93	6.98	19.5	10.78	7.85	07:11:24
216 E	12622	13000	10.21	10.89	5.51	6.48	4.85	3.59	2.87	07:13:35
217 E	12402	13000	14.44	11.94	3.16	34.81	1.88	0.76	0.48	07:16:03
218 E	12097	13000	14.76	15.48	2.34	83.16	25.34	0.58	0.74	07:18:23
219 E	12427	13000	22.36	23.78	2.56	14.08	9.96	5.71	6.94	07:20:45
220 E	12476	13000	6.89	4.84	2.59	4.28	0.11	0.15	0.37	07:23:07
221 E	12927	13000	18.7	5.21	3.07	6.57	0.13	0.25	0.97	07:25:33
222 E	12744	13000	19.42	13.7	2.83	17.55	1.49	2.76	0.79	07:27:54
223 E	12292	13000	11.73	9.47	2.78	3.99	0.47	0.26	3.37	07:30:05
224 E	12146	13000	12.04	5.19	2.74	0.22	0.41	0.46	0.62	07:32:38
225 E	12341	13000	19.13	14.24	2.78	8.56	6.12	4.44	0.4	07:43:20
226 E	12292	13000	7.46	8.11	2.83	2.1	1.03	0.31	0.96	07:45:40
227 E	12390	13000	14.31	5.82	2.73	8.87	0.57	0.59	0.24	07:47:41
228 E	12000	13000	12.11	8.05	2.38	2.53	0.24	1.2	0.03	07:50:14
229 E	12415	13000	17.3	7.65	3.01	28.14	5.47	1.21	0.28	07:52:33
230 E	11707	13000	7.56	4.88	3.07	0.08	0.54	1.15	5.04	07:56:17
231 E	12097	13000	12.42	8.57	2.75	0.85	0.83	0.56	1.71	07:58:35
232 E	12268	13000	15.29	14.16	2.41	8.19	6.26	4.53	2.15	08:01:16
233 E	12146	13000	11.59	8.24	4.06	0.97	3.54	0.57	0.79	08:03:22
234 E	12378	13000	15.65	7	3.1	4.93	0.55	0.39	0.29	08:08:11
235 E	12598	13000	14.67	4.78	3.78	3.71	3.19	2.7	2.85	08:12:32
236 E	12585	13000	18.48	3.57	4.3	2.91	2.44	2.12	1.93	08:14:52
237 E	12915	13000	15.43	4.65	3.63	3.5	2.87	2.4	1.98	08:17:01
238 E	12878	13000	11.35	3.94	4.28	2.94	2.47	2.08	1.73	08:20:00
301 E	12634	13000	7.99	4.58	4.92	3.03	2.59	2.14	1.88	08:25:27
302 E	11987	13000	6.92	5.57	4.91	3.57	2.89	2.32	1.9	08:27:35
303 E	12805	13000	8.01	5.87	5.69	3.87	3.06	2.43	2.07	08:29:47
304 E	12634	13000	19.81	8.9	3.87	5.38	3.95	2.96	2.39	08:31:57
305 E	11694	13000	18.04	8.5	5.45	4.63	3.31	2.54	2.4	08:33:57
306 E	12012	13000	8.38	3.36	3.69	2.77	2.44	2.1	1.88	08:36:08
307 E	12170	13000	9.05	5.71	3.62	4.18	3.38	2.75	2.18	08:38:12
308 E	12366	13000	9.06	5	5.32	3.9	3.21	2.61	2.44	08:41:01
309 E	11963	13000	3.77	7.04	5.61	3.99	2.97	2.42	1.91	08:50:08
310 E	11963	13000	11.87	3.54	5.48	2.85	2.31	2.03	1.7	08:52:17
311 E	12122	13000	11.13	5.29	4.1	3.61	2.85	2.4	2.99	08:54:29
312 E	12488	13000	7.15	4.49	4.4	3.2	2.68	2.48	1.35	08:56:52
313 E	12598	13000	6.75	3.19	4.84	2.49	2.15	1.89	1.71	08:59:04
314 E	12610	13000	11.96	5.46	4.53	3.47	2.79	2.3	1.86	09:01:12
315 E	12256	13000	7.87	5.13	4.26	3.2	2.62	2.22	1.8	09:03:52
316 E	12378	13000	15.06	5.02	3.66	2.75	2.19	1.76	1.55	09:06:16
317 E	12646	13000	8.86	4.33	4.19	2.97	2.37	1.88	1.53	09:08:25