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16. ABSTRACT
The objective of this project was to measure the skid resistance values of the various pavement surfaces for the California cities or counties that requested this service.

Skid resistance measurements for California City and County Agencies were made with towed trailer skid testers. The procedures comply with ASTM E274 Standards. Results of these measurements were forwarded to each respective city or county for evaluation and implementation. A statistical summary of the test data is included in the report.

A total of twenty-three counties, one city/county and six cities participated in this project with approximately 9200 lane miles of roadways being represented.

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TRANSPORTATION LABORATORY
RESEARCH REPORT

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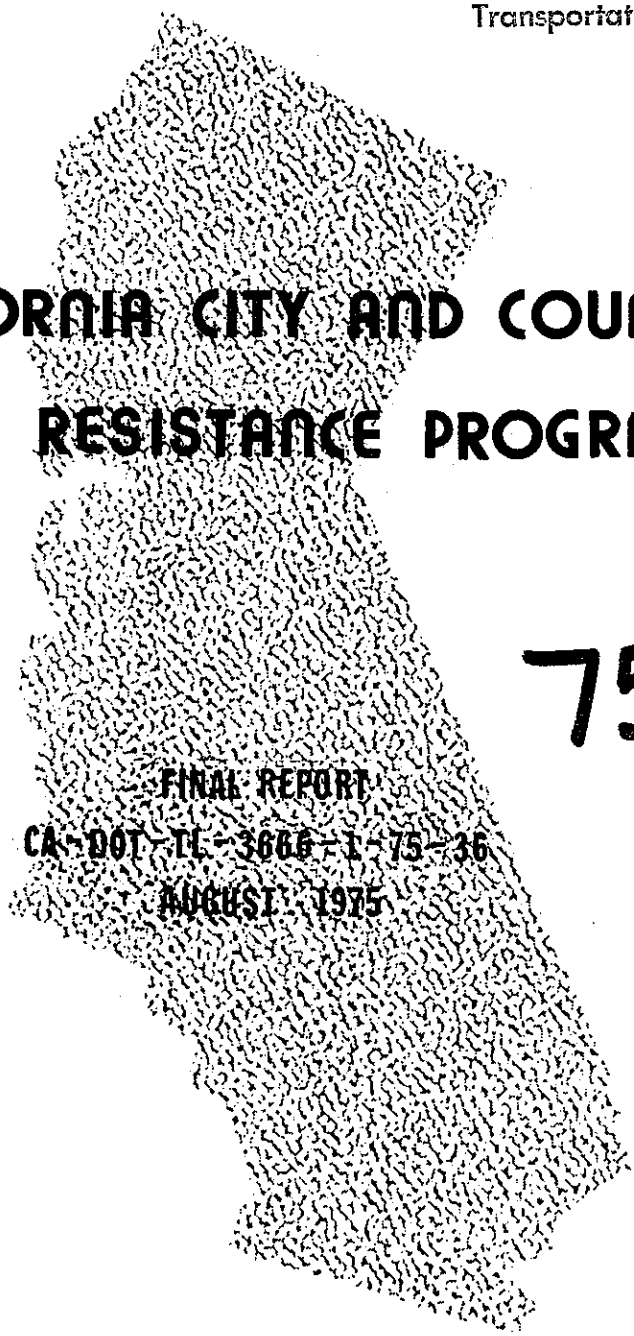

CALIFORNIA CITY AND COUNTY SKID RESISTANCE PROGRAM

75-36

FINAL REPORT
CA-DOT-TL-3666-1-75-36
AUGUST 1975

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CALIFORNIA DEPARTMENT OF TRANSPORTATION

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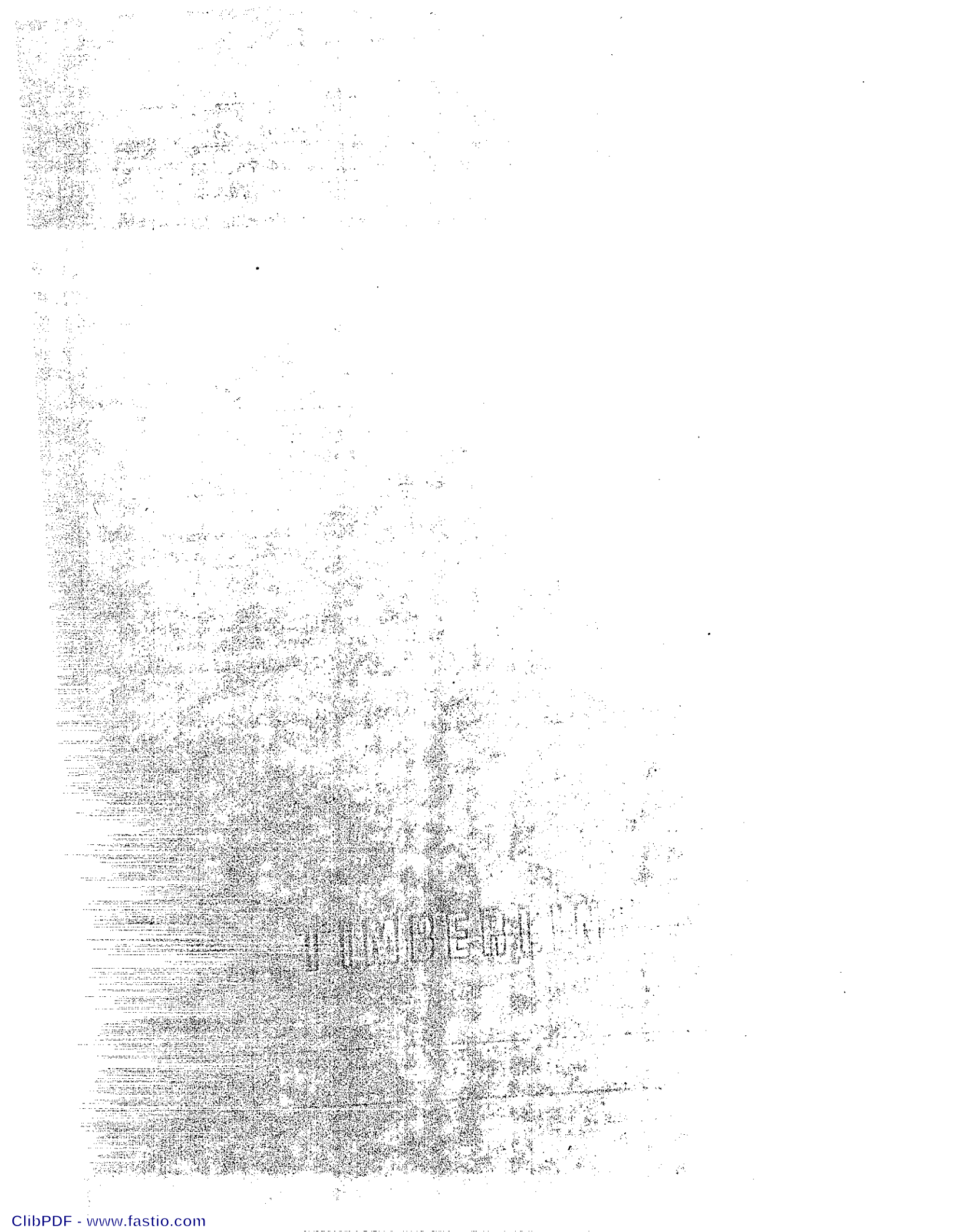

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF CONSTRUCTION AND RESEARCH
TRANSPORTATION LABORATORY

Mr. R. J. Datel
Chief Engineer

Dear Sir:

I have approved and now submit for your information this final project report titled:

CALIFORNIA CITY AND COUNTY SKID RESISTANCE PROGRAM

Study made by . . . . . Pavement Branch

Under the Supervision of . . . . . John B. Skog, P. E.

Principal Investigator . . . . . James A. Matthews, P. E.

Co-Investigator . . . . . Bobby G. Page, P. E.

Report Prepared by . . . . . Bobby G. Page, P. E.

Very truly yours,

George A. Hill

GEORGE A. HILL
Chief, Office of Transportation Laboratory

Attachment

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ACKNOWLEDGMENT

The authors wish to express their appreciation to Henry McCormack, assisted by Sylvester Dalske and Harvey Sterner, for their efforts in summarizing the test data for the individual agency reports. Also appreciated are the clerical efforts by Eileen Avender, Lydia Burgin, Kay Thompson and Tina Clubb, and the data computerization efforts by Kollette Kidd and Ralph Weber.

Lloyd Batham III and Gene Stucky performed the skid testing for the local agencies and Martin Bianco scheduled the testing.

This project is a part of the California Traffic Safety Program and was made possible through the support of the Office of Traffic Safety, State of California, and the National Highway Traffic Safety Administration.

The opinions and conclusions expressed in this publication are those of the Project Director, Coordinator and Supervisor, and not necessarily those of the State of California or the National Highway Traffic Safety Administration.

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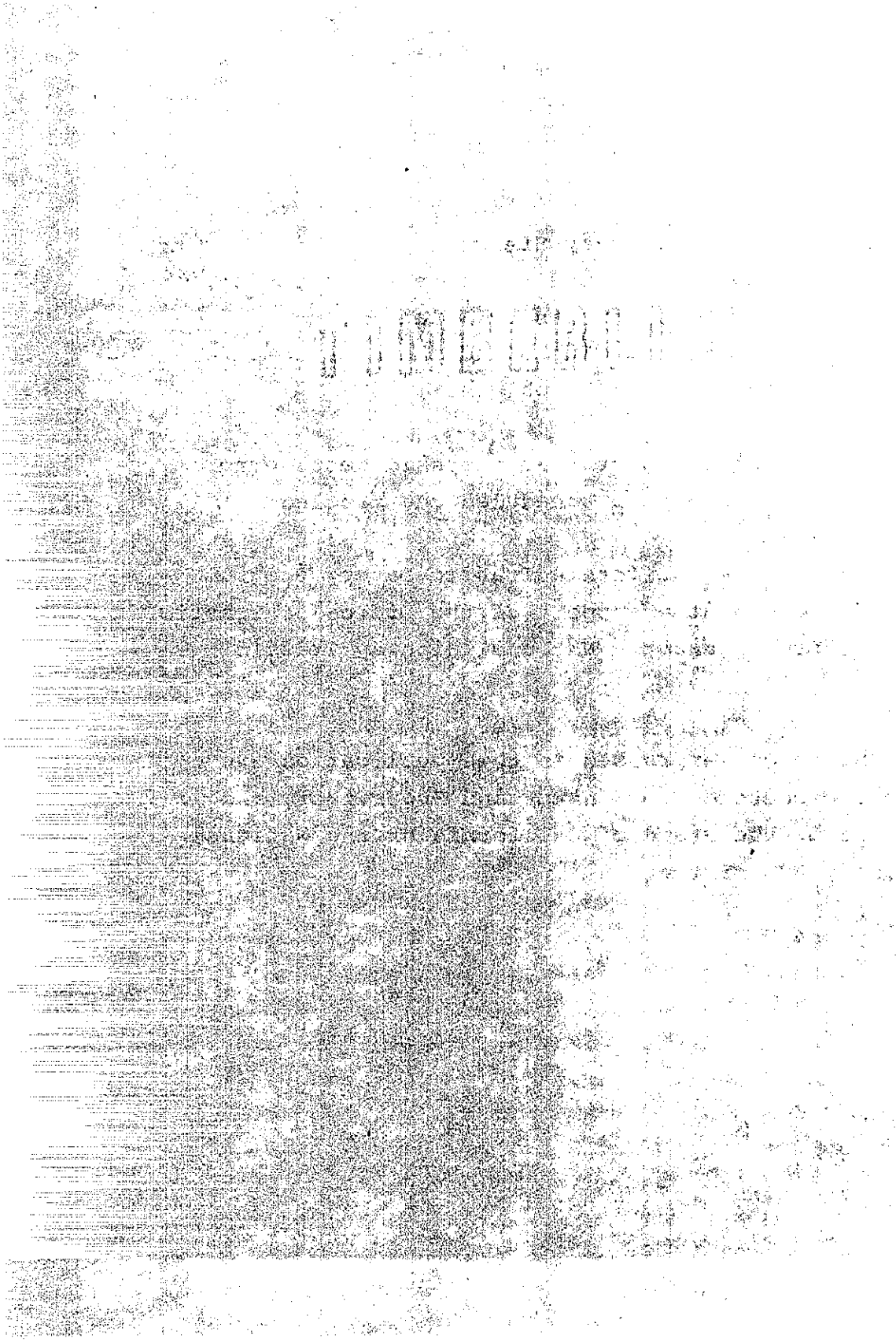

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INTRODUCTION

The skid resistance of a pavement surface is one important factor that influences highway safety in wet weather. In many cases the occurrence of wet pavement accidents has been necessary before the responsible agency recognized that a skidding problem may exist. A program to locate potential problem areas before accidents occur is very desirable and, therefore, this project was initiated.

The California Department of Transportation Laboratory performed this skid resistance inventory program under the general guidelines and financial support of the National Highway Traffic Safety Administration through the California Office of Traffic Safety.

The Transportation Laboratory has several years' experience in skid resistance research. This previous work, performed with the California portable skid tester, has resulted in development of minimum skid resistance requirements for newly constructed portland cement concrete pavements and in tentative minimum requirements for remedial action on existing state highways (1). Various degrees of polishing occur on the pavement surfaces and some friction factors drop significantly under heavy traffic loads, so an inventory program is desirable to maintain current information on roadway surface values. The Transportation Laboratory completed a skid resistance inventory of the California state highway system in March, 1973 (2).

A comprehensive report that evaluates skid resistance requirements and recommends minimum interim skid numbers is National Cooperative Highway Research Program Report 37 (3). Recommended values in this report compare favorably with California's experience (1) and, therefore, they are suggested as guidelines for surface evaluation. Utilizing these guidelines, it is expected that areas with a potential

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for a high incidence of wet pavement accidents can be located. Also, these guidelines should be helpful in evaluating the more common types of surface treatment, or construction procedure, that could be used to provide a satisfactory level of skid resistance for a minimum expenditure. It is highly probable that the values referred to in these guidelines can be refined to reflect particular variations in city or county requirements by comparing wet pavement accidents to skid number. The ratio of wet pavement accidents to total accidents, roadway geometrics, advisory and regulatory traffic speeds, ADT and age of the pavement surfacing may be important considerations when making a comparison.

The objective of this project was to measure the skid resistance values of the various pavement surfaces for the California cities or counties that requested this service.

The skid numbers of the pavement surfaces were obtained with towed trailer skid testers because they perform at or near existing traffic speeds and do not require lane closure. These test units comply with ASTM E274 Standards. Skid numbers are defined in ASTM E274 as the tractive force between the tire and the wetted pavement multiplied by 100 and divided by the dynamic vertical load on the test wheel. They are obtained with a locked wheel, ribbed tire (ASTM E249) on a 0.02 inch water layer. The tractive force is obtained at a constant velocity and is averaged for a one-second interval. Subscripts are used with the symbol SN to denote the test speed. All skid numbers were measured at 40 MPH or converted to equivalent 40 MPH values and are thus designated SN_{40}.

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Each city or county that requested skid test measurements provided the Laboratory with a list of roadways to be tested. Although emphasis was placed on the selection of roadways with a posted speed of 40 MPH or greater, some roadways with a lower speed limit were tested. In this way, information was provided for a greater variety of surface treatments. The local agencies were encouraged to select recently placed surfaces to compare with those subjected to considerable traffic as well as areas where skid resistance problems might occur. Test data for each agency was summarized and reported to them along with tentative guidelines for minimal skid numbers so that the surfaces could be evaluated. Approximately 9200 lane miles of roadway have been represented under this project.

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SUMMARY

Towed trailer skid tests were performed for California City and County agencies that requested the service. Participation in this program varied considerably, based upon each agency's needs. Test result data representing commonly used surfaces are summarized in this report. Results for each city or county have been transmitted to the individual agency in an earlier report. In general, a rather high level of skid resistance values were measured for the popular or common surface types encountered. Very few of the measured surfaces had minimal values because of aggregate polishing. Each agency is expected to relate the skid numbers to wet pavement accidents for various classes of vehicle maneuvering and either substantiate the values that have been submitted as guidelines or establish minimal numbers that relate better to city and county roadways.

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FINDINGS

In general, the measured skid numbers were higher than the tentative minimum standards as proposed by NCHRP Report 37 (3).

Test values of skid numbers that might be considered minimal or low on asphalt treated or asphalt concrete surfaces appear to be due to an excess of asphalt at the surface.

Portland cement concrete surfaces did reveal some low skid number values believed to be caused by polishing in the outside or truck lanes and at stop approaches where braking and accelerating actions take place.

A statistical listing of the SN_{40} values for the more common surface types follows:

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Surface Type	Number of Tests	Overall Mean Value	Range of Individual Mean Values	Range of Individual Std. Dev.
Dense Graded Asphalt Concrete	14,062	43.8	55.7 - 32.9	11.7 - 5.4
Chip Seal	4,080	50.0	66.2 - 39.0	12.0 - 4.3
Portland Cement Concrete	1,200	38.5	64.0 - 35.3	9.3 - 2.7
Slurry Seal	905	45.7	57.3 - 38.1	18.0 - 4.1
Open Graded Asphalt Concrete	148	46.2	47.9 - 41.5	6.2 - 2.2
Road Mix Asphalt Surfacing	143	54.9	57.8 - 47.2	10.0 - 3.8
Fog Seal	121	37.1	42.0 - 36.3	15.9 - 6.1
Oiled Gravel	76	62.4		11.6
Sand Seal	71	57.0		5.9

Other surface treatments were tested as requested by some of the California cities and counties participating in this program. However, a sufficient amount of testing was not performed that would permit an analysis leading to any specific conclusions relative to the skid resistant qualities of these treatments. Test result data on the limited amount of testing accomplished are on file and available for review at the Transportation Laboratory, 5900 Folsom Boulevard, Sacramento.

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DISCUSSION

The skid test data obtained for local agencies may be useful in two ways. First, areas having relatively low skid numbers may be identified before the occurrence of wet pavement accidents. Each city and county may apply the data toward this goal. Second, commonly used surface types may be compared for their skid resistance characteristics including the polish resistance of aggregate and construction procedures. The extent of comparison data varied considerably for the local agencies depending upon the availability of surface types and the extent that an agency desired to participate. A list of the local agencies and their involvement is shown in Appendix 1.

The test data tabulated in the Findings section of this report shows that the popular or common pavement surface types can be constructed to a satisfactory level of skid resistance with available materials. A rather large variation in the extremes of the individual standard deviation and mean test values for each surface type reflect the many variables that exist in constructing and maintaining a uniform skid resistant surface. Conclusions should not be drawn from this summary regarding a surface type preference or rejection because the surface type test locations were selected for several reasons. Each agency was encouraged to include roadways that might be potential problem surfaces, surface types that are generally used by the agency, and surface types that were recently placed and the same types subjected to considerable traffic so that an evaluation of performance could be made by the agency. Therefore, the lack of uniform representation of pavement surfaces by some agencies may have biased the values in this summary to an extent that they could be misleading. Also, the length of test sections, their age and exposure to traffic and the conditions

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relating to the construction of the surfacing are important considerations for an evaluation. To compare a surface type that has been exposed to light traffic to one subjected to heavy traffic or to one that experienced some unusual construction problems might result in the rejection of a superior surface type that could be placed at less cost than the type accepted. Therefore, each agency should consider all pertinent factors when evaluating the measured test data that has been previously transmitted on data summary sheets like those included in the sample report in Appendix 2. This format is such that average skid numbers are presented for each test section of each roadway. Also, individual test values and the respective locations are listed for any areas of interest within this section. Specifically identified were the test locations of intersections, patched areas, bridge decks, and bleeding asphalt surface areas. In addition to surface type comparisons, this test data can be used in a comparison with wet pavement accidents to substantiate the tentative minimal skid numbers that were proposed in our report, or to establish minimal numbers that relate better to city and county roadways.

In relating skid numbers to wet pavement accidents, several parameters are worth considering. A ratio of the wet pavement accidents to total accidents should provide an indication as to the importance of the pavement surface in an accident area. A relatively low ratio would imply that factors other than skid resistance should be investigated. A second consideration is that of geometric design. It is probable that tight curves, weaving and merging sections and intersection areas were braking is common will require a higher skid number than tangent sections or sweeping curves might require. Other factors that might be considered are the traffic volume, percent of time the pavement is wet, and the consistency in total design.

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A recommendation was made in each individual report that the findings of a skid number to wet pavement accident comparison be transmitted to the Transportation Laboratory. This information will be assessed for the purpose of establishing minimal numbers for city and county roadways in California.

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REFERENCES

1. Zube, E., Skog, J. B., Kemp, G. R., and Stucky, G. J., "Field and Laboratory Studies on Skid Resistance of Pavement Surfaces," State of California, Department of Public Works, Division of Highways, Materials and Research Department, Research Report 633126-2, February, 1968.

2. Sherman, George B., Matthews, James A., Page, Bobby G., "Statewide Skid Resistance Inventory," State of California Department of Public Works, Division of Highways, Materials and Research Department, Report 673500, March 1973.

3. Kummer, H. W., and Meyer, W. E., "Tentative Skid Resistance Requirements for Main Rural Highways," NCHRP Report 37, 1967, Highway Research Board, Washington, D. C.

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APPENDIX 1

City-County Participation

City or County	Surface Type																							
	DGAC	Chip Seal	PCC	Slurry Seal	OGAC	RMAS	Fog Seal	Oiled Gravel	Sand Seal	Rubberized Chip Seal	Reclamite	Heater Remix	Expanded Shale	Sealing Agent	Asbestos AC	Gilsabind	Oiled Dirt	Petroset	Pliopave	Epoxy PCC	Slurry Seal w/rubber	Coal Tar Slurry	RC-10-H	Chevron Jet Seal	Macadam
Alameda Co.	x	x	x	x																x					
Anaheim	x	x		x							x				x						x		x		
Contra Costa Co.	x	x	x	x							x			x		x							x	x	
El Dorado Co.	x	x	x	x																					
Fresno Co.	x	x	x	x																					
Garden Grove	x	x	x		x																				
Imperial Co.	x	x	x	x																					
Kings Co.	x	x		x		x											x							x	
Los Angeles	x	x	x	x	x		x																		
Los Angeles Co.	x	x	x	x	x					x															
Marin Co.	x		x	x																					
Monterey Co.	x	x	x																						
Nevada Co.	x	x		x																					
Orange Co.	x		x	x											x	x		x	x						
Plumas Co.																									
Riverside	x	x	x	x	x		x																		
Sacramento Co.	x	x	x	x	x	x																			
San Benito Co.	x	x	x																						
San Diego Co.	x	x	x	x	x	x	x																		
San Francisco	x	x	x	x																					
San Jose	x	x	x	x	x																				
San Mateo Co.	x		x		x																				
Santa Barbara Co.	x	x	x		x		x						x												
Santa Clara Co.	x	x	x	x	x																				
Solona Co.	x	x	x	x	x																				
Sonoma Co.	x	x	x	x		x																			
Sutter Co.	x	x	x	x			x		x																
Tulare Co.	x	x	x	x			x			x		x													
Ventura Co.	x	x	x	x																					
Walnut Creek	x																								

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APPENDIX 2

SAMPLE REPORT

State of California
Department of Transportation
Division of Construction and Research
Transportation Laboratory

SKID RESISTANCE VALUES OF

PAVED ROADS IN EL DORADO COUNTY

Project Director	John B. Skog, Supervising Materials and Research Engineer, Pavement
Project Supervisor	James A. Matthews, Senior Materials and Research Engineer
Project Coordinator	Bobby G. Page, Associate Materials and Research Engineer
Report by	B. G. Page H. D. McCormack G. S. Stucky

June, 1975

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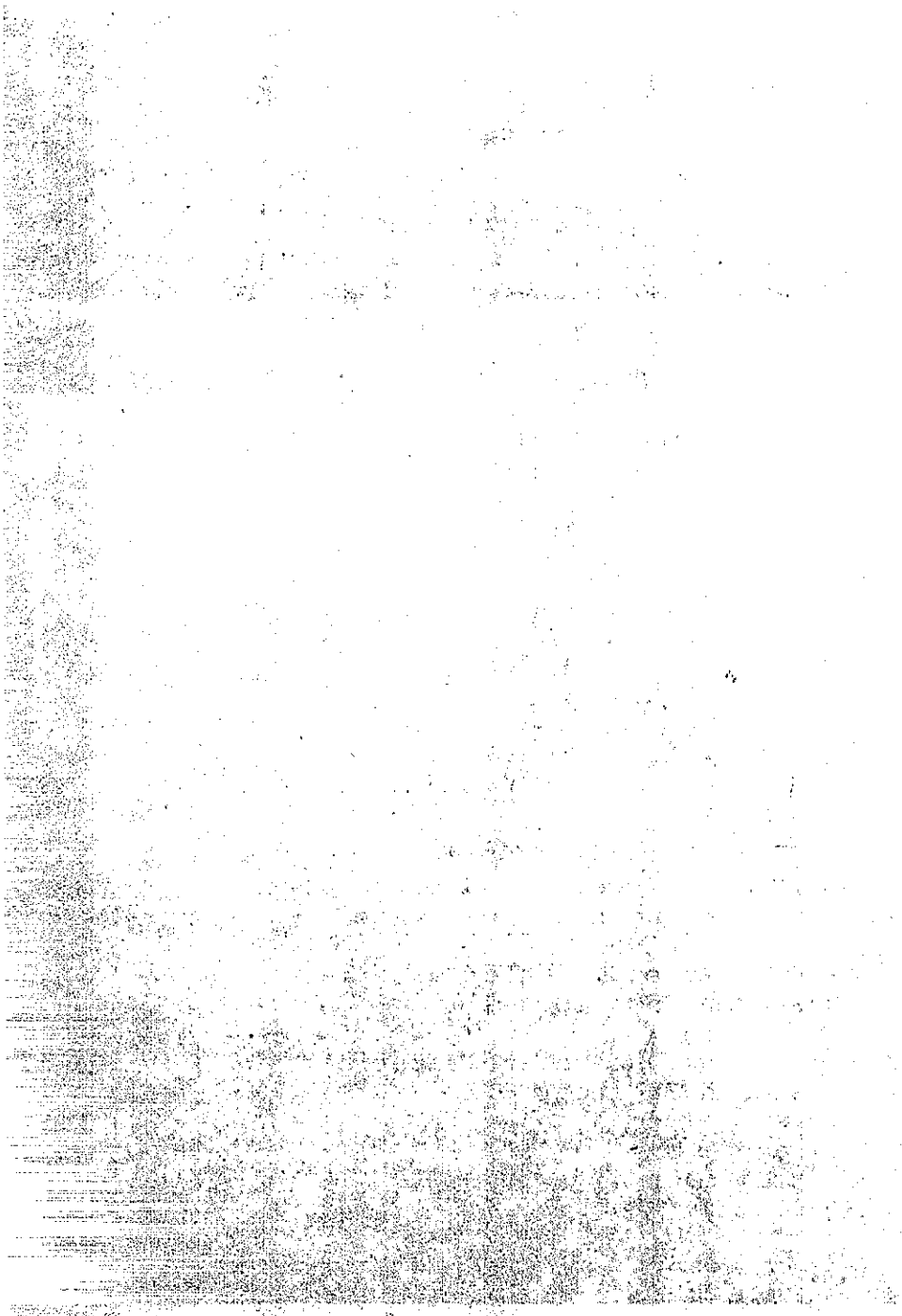

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The Transportation Laboratory has several years experience in skid resistance research. This previous work, performed with the California portable skid tester, has resulted in development of minimum skid resistance requirements for newly constructed portland cement concrete pavements and in tentative minimum requirements for remedial action on existing state highways(1). Various degrees of polishing occur on the pavement surfaces and some friction factors drop significantly under heavy traffic so an inventory program is desirable to maintain current information on roadway surface values. A skid resistance inventory of the California state highway system was completed by the Laboratory in March, 1973(2).

Excluding structural overlays and overlays to improve the riding qualities, the primary justification for corrective treatment of pavement surfaces has been the occurrence of accidents, especially wet weather accidents. A program to locate potential problem areas before accidents occur is very desirable and, therefore, this project was established.

Towed trailer skid testers are used because they perform at or near existing traffic speeds and do not require lane closure. These test units comply with ASTM E274 Standards. Values measured with these units are termed skid numbers and are defined in ASTM E274 as the tractive force between the tire and the wetted pavement multiplied by 100 and divided by the dynamic vertical load on the test wheel. They are obtained with a locked wheel, ribbed tire (ASTM E249) on a 0.02 inch water layer. The tractive force is obtained at a constant velocity and is averaged for a one-second interval. Subscripts are used with the symbol SN to denote the test speed. All skid numbers in this report were measured at 40 MPH or converted to equivalent 40 mph values and are designated SN_{40}.

A comprehensive report that evaluates skid resistance requirements and recommends minimum interim skid numbers is National Cooperative Highway Research Program Report 37(3). Recommended values in this report compare favorably with California's experience(1) and, therefore, they are suggested as guidelines for surface evaluation.

The objective of this project was to measure the skid resistance values of the various pavement surfaces within the County.

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Utilizing the established criteria, it is expected that areas with a potential for a high incidence of wet pavement accidents can be located. Surface treatments that have been subjected to considerable traffic, and recently-placed new surfaces and surface treatments were specifically tested to aid your agency in optimizing resurfacing recommendations.

CONCLUSIONS

For most of the pavement surfaces tested, the skid numbers exceed the tentative minimum skid number requirements for rural highways as defined by National Cooperative Highway Research Program Report 37.

Some of the pavement surfaces appear to have marginal skid resistance values. Areas having a high ratio of asphalt to aggregate at the surface, referred to as bleeding or rich (impending bleeding), exhibit lower skid numbers.

RECOMMENDATIONS

It is recommended that a comparison of wet weather accidents to skid numbers be made for the purpose of comparing the proposed minimal skid numbers to local data. The ratio of wet weather accidents to total accidents, geometric considerations, ADT and age of the pavement surfacing may be of particular importance for this comparison. We request that these findings be transmitted to the Transportation Laboratory for a compilation of city-county minimum skid number for intersections, curves and urban locations.

PROCEDURE

As requested by Mr. G. Arthur Court, Director of Public Works, tests were performed on selected pavement surfaces within El Dorado County.

Skid test values and their respective locations are listed in the attached data sheets.

The numeric average and the range of skid number values are listed for each test section. In addition, the location and the skid number is listed for special individual tests. Generally, special tests were made for intersections and areas having a surface type different from the usual such as a patch or a bleeding asphalt surface. The odometer mileage listed is referenced from the first street noted in the test limits. Tests were performed in the right wheel track at 40 mph unless situations such as a curve required a lower test speed. Using previously standardized conversion charts, all low speed test values have been converted to equivalent 40 mph skid numbers.

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DISCUSSION

The interpretation of the measured skid data can best be made by comparing test values with proposed minimal skid numbers for the same test speed. National Cooperative Highway Research Program Report 37, "Tentative Skid-Resistance Requirements for Main Rural Highways(3) lists minimal numbers as follows:

Mean Traffic Speed	SN_{40}
30	31
40	33
50	37
60	41

These recommended skid numbers should meet the frictional needs of normal vehicle maneuvers, assuming that the vehicle is in good mechanical condition and that the tires have a tread depth of at least 1/10 inch. Roadway geometrics may influence the minimal numbers somewhat. Higher skid numbers may be required in areas where sudden vehicle maneuvers are probable. Therefore, a visual inspection to determine the likelihood of normal or severe vehicle movements is important in the implementation of a corrective treatment program. Locations having a comparatively high ratio of wet weather accidents to total accidents can be used to assist your agency in determining critical or minimal skid numbers, providing the roadway geometrics are considered.

The measured SN_{40} values for each surface type tested in El Dorado County are as follows:

Surface Type	Number of Tests	Mean SN_{40}	Standard Deviation
Chip Seal	239	43.6	14.0
DGAC	194	45.7	11.7
Slurry Seal	26	57.3	7.3
PCC	2	56.0	-

Based on the proposed minimal skid numbers, most of the pavement surfaces exceed the minimum requirements for main rural highways. A few areas have a high ratio of asphalt to aggregate at the pavement surface. This condition is referred to as bleeding and generally results in low skid numbers. A chip seal is a poor corrective treatment for a severe or moderate bleeding condition because the new chips soon become imbedded, resulting

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in little or no skid resistance improvement. Successful correction has been realized by heating and scraping the excess asphalt prior to a thin asphalt concrete overlay.

A 0.04 ft. to 0.06 ft. overlay utilizing 90 percent crushed particles and an aggregate gradation having a porous or open texture is frequently used to correct a bleeding condition without scraping the excess asphalt. This surface is referred to as open graded asphalt concrete in the California Standard Specifications. Skid numbers for an OGAC usually average about 55 for pavements subjected to light vehicular traffic and about 49 for pavements subjected to considerable truck traffic.

REFERENCES

1. Zube, E., Skog, J. B., Kemp, G. R., and Stucky, G. S., "Field and Laboratory Studies on Skid Resistance of Pavement Surfaces", State of California, Department of Public Works, Division of Highways, Materials and Research Department, Research Report 633126-2, February, 1968.

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
TRANSPORTATION LABORATORY

County El Dorado — Test Method ASTM E-274

Locations and Limits of Test	Test Lane	Wheel Track	Surface Type	No. of Tests	ASTM Skid Numbers Range SN_{40}	Avg SN_{40}	Unusual Cond.	Odom	SN 40	Comments
Cameron Park Drive from U.S.-50 to Green Valley Road	N/B						I*	0.00	-	℄ U.S.-50
	"	Rt	DGAC	1				0.01	40	
	"	"	Slurry Seal	10	58-66	64				Bet. 0.4 & 3.18 miles
	"						I	3.27	-	Green Valley Road
Cedar Ravine Road from Pleasant Valley Road to Darlington	N/B						I	0.00	-	Pleasant Valley Rd.
	"	Rt	CSAC	15	43-68	56				Bet 0.1 & 4.25 miles
	"	"	DGAC	4	35-45	40				Bet. 4.4 & 5.1 miles
	"						I	5.34	-	Darlington
Cold Springs Road from Placerville City Limits to State Rte 49	N/B						I			Placerville City Limit
	"	Rt	DGAC	7	39-57	46	Fog Seal			Bet. 0.07 & 2.0 miles
	"	"	Slurry Seal	6	46-66	53				Bet. 2.3 & 3.8 miles
	"	"	CSAC	2	52-61	57				Bet. 4.1 & 4.4 miles
	"	"	DGAC	3	41-50	45	Overlay			Bet. 4.7 & 5.3 miles
	"	"	CSAC	8	14-64	36				Bet. 5.6 & 7.21 miles
	"	"	"	1			Bl**	6.48	18	
	"	"	"	1			Bl	6.74	22	
	"	"	"	1			Bl	7.04	14	
	"						I	7.34	-	State Rte 49
Jct. State Rte 49 to 0.83 miles south	S/B						I	0.00	-	State Rte 49
	"	Rt	CSAC	6	30-44	34				Bet. 0.29 & 0.83 miles

I* Intersection
Bl** Bleeding

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County El Dorado — Test Method ASTM E-274

Locations and Limits of Test	Test Lane	Wheel Track	Surface Type	No. of Tests	ASTM Skid Numbers Range SN_{40}	ASTM Skid Numbers Avg SN_{40}	Unusual Cond.	Odom	SN 40	Comments
El Dorado Hills Blvd. from U.S.-50 to Francisco Drive	N/B						I	0.00	-	℄ U.S.-50
	"	Rt	CSAC	6	48-56	53				Bet. 0.1 & 1.6 miles
	"	"	Slurry Seal	1				1.9	48	
	"	"	CSAC	5	43-58	53				Bet 2.2 & 3.5 miles
	"						I	3.65	-	Francisco Drive
Francisco Drive from El Dorado Hills Blvd. to Green Valley Road.	N/B						I	0.00	-	El Dorado Hills Blvd
	"	Rt	CSAC	6	33-55	45				Bet. 0.04 & 0.49 mil
	"						I	0.54	-	Green Valley Road
Green Valley Rd. From Francisco Drive to Placerville City Limits	E/B						I	0.00	-	Francisco Drive
	"	Rt	DGAC	10	52-66	59				Bet. 0.1 & 2.8 miles
	"	"	CSAC	48	16-60	45				Bet. 3.1 & 15.9 mile
	"	"	"	1			Rich	4.29	27	
	"	"	"	1			Rich	9.04	19	
	"	"	"	1			Rich	9.1	16	
	"	"	"	1			Rich	9.7	28	
	"	"	"	1			Rich	10.9	32	
	"	"	"	1			Bl	15.14	28	
	"	"	"	1			Bl	15.25	19	
	"	"	"	1			Bl	15.31	25	
	"						I	15.99	-	Debbie Lane

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Green Valley Road from	W/B						I	0.00	-	Debbie Lane
Debbie Lane to Francisco	"	Rt	CSAC	1			Rich	0.7	27	
Drive.	"	"	"	9	26-52	40				Bet. 1.52 & 4.04 miles
	"	"	DGAC	1			Patch	3.06	60	
	"	"	CSAC	2	26-30	28	Rich			Bet. 4.78 & 4.87 miles
	"	"	"	14	14-44	30	Bl			Bet. 6.48 & 12.14 mile
	"						I	17.44	-	Sac/E.D. County Line
Latrobe Road From U.S.-50	S/B						I	0.00	-	℄ U.S.-50
to South Shingle Road		Rt	CSAC	1				0.21	56	
	"	"	DGAC	11	49-56	52	Overlay			Bet. 0.5 & 3.5 miles.
	"	"	"	1			Patch	3.8	76	
	"	"	"	1			Bl	4.14	28	
	"	"	CSAC	12	53-66	60				Bet. 4.67 & 8.4 miles
	"	"	DGAC	1			Patch	5.9	70	
	"						I	8.53	-	S.Shingle Springs Rd.
Lotus Road from State Rte 49	S/B						I	0.00	-	State Rte. 49
to Green Valley Road	"	Rt	DGAC	1			Bl	0.05	30	
	"	"	CSAC	2	42-50	46				Bet. 0.3 & 0.55 mile
	"	"	"	5	21-35	29	Bl			Bet. 0.8 & 1.32 miles
	"	"	"	1		49		1.6		
	"	"	"	2	30-32	31	Rich			Bet. 1.7 & 1.99 miles
	"	"	DGAC	4	47-55	51	Overlay			Bet. 2.3 & 3.2 mile
	"	"	"	12	32-43	38	New			Bet. 3.5 & 6.6 mile
	"						I	6.88	-	Green Valley Road

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Missouri Flat Road from	N/B						I	0.00	-	State Rte 49
State Rte 49 to Green Valley		Rt	DGAC	5	43-48	45	Overlay			Bet. 0.08 & 1.3 miles
Rd.	"	"	"	1			Bl	1.54	31	
	"	"	PCC	1				1.7	56	
	"	"	DGAC	5	51-65	58				Bet. 2.0 & 3.2 miles
	"						I	3.46	-	Green Valley Road
Mt. Aukum Road from Amador	N/B						I	0.00	-	Ama. Co. Line
Co. Line to Pleasant Valley		Rt	CSAC	2	64-65	65				Bet. 0.03 & 0.14 mile
Rd.	"	"	DGAC	4	33-36	34				Bet. 0.4 & 1.3 miles
	"	"	"	6	57-64	60	Pavement Change			Bet. 1.6 & 3.1 miles.
	"	"	CSAC	6	29-39	35	Rich			Bet. 3.23 & 4.64 mile
	"	"	"	4	37-58	49				Bet. 4.9 & 5.93 miles
	"	"	DGAC	19	33-64	55				Bet. 6.2 & 12.38 mile
	"	"	PCC	1			Bridge	7.06	56	
	"						I	12.47	-	Pleasant Valley Road
Newtown Road from Broadway	S/B						I	0.00	-	Broadway
to Pleasant Valley Road	"	Rt	CSAC	1			Bl	0.10	11	
	"	"	"	8	37-64	54				Bet. 0.4 & 2.55 miles
	"	"	"	11	18-35	25	Bl			Bet. 2.71 & 4.77 mile
	"	"	"	4	39-58	46				Bet. 5.37 & 6.30 mile
	"						I	6.53	-	Pleasant Valley Rd.

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Newtown Road										
From Pleasant Valley Rd.	N/B						I	0.00	-	Pleasant Valley Rd.
to Broadway	"	Rt	CSAC	1				0.52	37	
	"	"	"	17	8-36	22	Bl			Bet. 0.68 & 3.75 miles
	"	"	"	1				1.87	55	
	"	"	"	1				2.52	53	
	"	"	"	8	47-59	54				Bet. 3.95 & 6.40 miles
	"	"	"	2	16-34	25	Bl			Bet. 5.93 & 6.05 miles
	"						I	6.49	-	Broadway
North Shingle Road from	S/B						I	0.00	-	Green Valley Rd.
Green Valley Rd. to U.S.-50	"	Rt	DGAC	14	41-62	49				Bet. 0.10 & 3.94 miles
	"						I	4.11	-	℄ U.S.-50
Pleasant Valley Road from	W/B						I	0.00	-	Mt. Aukum Road
Mt. Aukum Rd. to State	"	Rt	DGAC	15	43-57	49	Overlay			Bet. 0.1 & 5.0 miles
Rte 49	"	"	Slurry Seal	3	50-58	53				Bet. 5.32 & 5.85 miles
	"	"	DGAC	2	55-61	58				Bet. 6.1 & 6.5 miles
	"	"	Slurry Seal	6	44-61	55				Bet. 6.9 & 8.6 miles
	"	"	CSAC	3	38-45	42				Bet. 9.0 & 9.4 miles
	"	"					I	9.51	-	State Rte 49

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Ponderosa Road from	N/B						I	0.00	-	℄ U.S.-50
U.S. Hwy 50 to Green Valley	"	Rt	DGAC	1				0.10	45	
Rd.	"	"	"	4	19-24	22	Bl			Bet. 0.35 & 0.9 miles
	"	"	CSAC	9	44-58	51				Bet. 1.1 & 3.6 miles
	"	"	"	1			Bl	2.4	20	
	"						I	3.66	-	Green Valley Road
Sly Park Road from Mt. Aukum	N/B						I	0.00	-	Mt. Ackum Rd.
Rd. to U.S.-50	"	Rt	DGAC	37	21-57	46				Bet. 0.11 & 11.44 mile
	"						I	11.44	39	U.S.-50 U.C.
South Shingle Road from	N/B						I	0.00	-	Latrobe Road
Latrobe Rd. to Mother Lode	"	Rt	CSAC	16	40-62	54				Bet. 0.06 & 4.8 miles
Drive	"	"	DGAC	8	21-29	26	Rich			Bet. 5.1 & 7.5 miles
	"	"	"	2	42-44	43				Bet. 7.74 & 7.88 miles
	"						I	8.02	-	Mother Lode Drive
From Mother Lode Drive to	S/B						I	0.00	-	Mother Lode Drive
2.55 miles South	"	Rt	DGAC	3	42-47	45				Bet. 0.02 & 0.2 miles
	"	"	"	10	21-29	25	Rich			Bet. 0.35 & 2.55 miles

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