ORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION PROJECT ADMINISTRATION DATA SHEET ORIGINAL REVISION NO.  $N_0$  E-20-647 (R6109-0A0) DATE 5 / 7 / 86 GTRC XXX t Director: John Moskaluk School/XXX CE Georgia Department of Transportation Type Agreement: \_ Task Order No. 5 under BOA #90 Award Period: From 3/1/86 To 4/1/87 (Performance) 1/1/87 (Reports) Sponsor Amount: This Change Total to Date **Estimated:** \$ 93,750 93,750 Funded: \$ 93,750 93,750 \_\_\_\_\_ Cost Sharing No: <u>E-20-325 (F6109-0A0)</u> Cost Sharing Amount: \$ 18,205 Technology Transfer Program for Local Transportation Agencies (4th year Program) **ADMINISTRATIVE DATA** OCA Contact Brian J. Lindberg ¥4820 2) Sponsor Admin/Contractual Matters: 1) Sponsor Technical Contact: Sam Volo Percy B. Middlebrooks, Jr. Chief, Operations Research Branch Georgia Dept. of Transportation Office of Materials & Research Office of Materials & Research 15 Kennedy Dr. 15 Kennedy Dr. Forest Park, GA 30050-2599 Forest Park, GA 30050-2599 363-7567 363-7567 N/A Defense Priority Rating: \_\_\_\_\_N/A \_\_\_\_\_ Military Security Classification: \_ N/A (or) Company/Industrial Proprietary: \_ **RESTRICTIONS** See Attached \_\_\_\_\_\_ N/A \_\_\_\_\_ Supplemental Information Sheet for Additional Requirements. Travel: Foreign travel must have prior approval - Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of \$500 or 125% of approved proposal budget category. Equipment: Title vests with Sponsor. However, none proposed or anticipated. **COMMENTS:** Follow-on to Project E-20-624 02.300.000.86.011 COPIES TO: SPONSOR'S I. D. NO. **Procurement/GTRI Supply Services GTRC** Project Director Research Administrative Network Research Security Services Library Research Property Management Reports Coordinator (OCA) **Project File** Other A. Jones/Legal Accounting Research Communications (2)

## GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

### SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

	Date5-22-87	
Project No. E-20-647	School ALSS	Œ
Includes Subproject No.(s) N/A		
Project Director(s) M.J. Moskaluk		- GTRC / ĕ₩
Sponsor Georgia Department of Transportation	on	
Title Technology Program for Local Transport	tation Agencies (4th year Program	n)
Effective Completion Date: 4/1/87	4/1/87 (Performance)	(Reports)
Grant/Contract Closeout Actions Remaining:		
None		
X Final Invoice or Final Fiscal Repo	ort	
X Closing Documents		
X Final Report of Inventions	Questionnaire sent to P.I.	. 9
X Govt. Property Inventory & Relat	red Certificate	
Classified Material Certificate		
Other_		
Continues Project No. E-20-624	Continued by Project No.	E-20-606
COPIES TO:		
Project Director	Library	
Research Administrative Network	GTRC	
Research Property Management	Raseace NO COUNTRO BENEVICO CO	<b>OK</b>
Accounting Procurement/GTRI Supply Services	Project File	
Research Security Services	Other <u>Duane H.</u> Angela DuBose	<del></del>
Reports Coordinator (OCA)	Russ Embry	
KATH KSAKJOKASXX	Russ Emery	

# RESEARCH PROJECT PROGRESS REPORT DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

Project No.	Project Tit	tle		Report No. 14
RTA-HPR(1)		LOGY TRANSFER PROGRAM CAL TRANSPORTATION AGENC	IES	Report Period from 1 April 1986 to 30 June 1986
Research Agency(s)			Project	Director(s)
GEORGIA INSTITU ATLANTA, GA 303	INSTITUTE OF TECHNOLOGY GA 30332			OHN MOSKALUK
Starting Date  1 March 1986  Completion Date  31 December 19	% Time. Expended 40%	Schedule Status ☑ On □ Ahead □ Behind		Sources(s)
Funds Authorized Total \$93,750	Ft Total, \$31,40	1 '	·	Fiscal Year Funding Drized Expended, % \$31,409

PROJECT GOAL: To communicate to local transportation gencies the availability and application of new technology that bridges the gap between research and implementation in the area of roadways, bridges, and transit.

Report Date

July 31, 1986

### **OBJECTIVES:**

Project Objectives, Status, Progress

- o To enhance the existing programs of technology services of GDOT and Georgia Tech.
- o To improve and further promote communication on technical transportation issues between GDOT/Georgia Tech and the local agencies.
- o To help insure that appropriate technology consistent with the needs of the local agencies in mind is made available.
- o To encourage implementation of effective procedures, practices, and materials at local levels.

STATUS: A report on the third year activities of the Center was completed and submitted to the Deorgia DOT on March 10, 1986. Since then, the Center has responded to 43 requests for technical assistance, and prepared the Spring and Summer issues of Tech Trans. In addition, seven sessions of the Roadway Maintenance Workshop were held between April and June, 1986. A total of 332 participants from 57 counties and 87 cities attended the seven sessions. A statewide summary of the workshop is attached. A seminar on "Transportation Resource Management" was held at the Radisson Inn Hotel on April 17-18, 1986. The seminar was attended by 11 people.

WORK PLANNED FOR NEXT PERIOD: In response to several requests from local officials, the Center will build a videotape library to include training presentations on subjects of interest. The tapes will be made available to local agencies on free loan. Seven sessions of a workshop on Traffic Applications of Microcomputers is scheduled for August, 1986

PROBLEMS: None

M. John Moskaluk, Director Georgia Tech

Technology Transfer Center

### WORK PLAN SCHEDULE

# TECHNOLOGY TRANSFER PROGRAM FOR LOCAL TRANSPORTATION AGENCIES

Research Tasks	l l 1	2	3	4	hs of 5	6	7	8	9	10
Task A: Conpile & Maintain Mailing List						   				
Task B: Publish Quarterly Newsletter						 				;
Task C: Provide Technology Transfer Materials	! ! !	~		AS	REQU	   RED 	~ ~ =			
Task D: Provide Information Service	       			AS	REQU	I I IRED I				<b></b>
Task E: Conduct Seminars and Training Sessions			RKSHOP				R YEAR DATE	<b>!</b>		
Task F: Evaluate Effectiveness of Program	11	_   _   _	<b></b>			,       	<del></del> -		1)	
Approved Schedule			_   Wor	k Com	plete	d Sci	nedule	e		

### ROADWAY MAINTENANCE WORKSHOP

APRIL - JUNE, 1986

### SUMMARY

CONTENTS

Statewide

Gainesville

Tennille

Thomaston

Tifton

Jesup

Cartersville

Atlanta

### ROADWAY MAINTENANCE WORKSHOP

### STATEWIDE SUMMARY

WORKSHOP LOCATIONS AND DATES HELD	PEOPLE ATTENDING	COUNTIES REPRESENTED	CITIES REPRESENTED
1. Gainesville May 20-22, 1986	54	9	10
2. Tennille May 6-8, 1986	45	9	13
3. Thomaston May 13-15, 1986	50	10	17
4. Tifton April 29-May 1,	50 1986	11	14
5. Jesup April 22-24, 198	<del>5</del> 5 6	9	16
6. Cortersville May 27-29, 1986	13	4	3
7. Atlanta June 3-5, 1986	65	5	14
	332	 57	 87
	33∠	2).	<b>6</b> 3.

- percent of state's 159 counties represented: 35.85
- average workshop : 47.4 persons, 8.1 counties, 12.4 cities
- comparison to 1983/84 Roadway Maintenance Workshop:
  - \* 10.3% more persons (332 vs. 301)
  - \* 12.3% fewer counties (57 vs. 65)
  - \* 52.6% more cities (87 vs. 57)

# RESEARCH PROJECT PROGRESS REPORT DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

RTA-HPR(1)	•	TRANSFER PROGRAM FOR LOCATION AGENCIES	Report Period from July 1, 1986 to December 31, 1986
Research Agency(s)			Project Director(s)
GEORGIA INSTITUTE OF ATLANTA, GEORGIA 30			M. JOHN MOSKALUK
Starting Date	% Time	Schedule Status	Funding Sources(s)
March 1, 1986  Completion Date  December 31, 1986	Expended 100% TIME EXTENDED 4/1/87	X⊠x On □ Ahead □ Behind	100% FHWA FUNDING
Funds Authorized	Fu	unds Expended	Fiscal Year Funding
<b>Total</b> \$93,750	Total, \$81,818, 87	1	Authorized Expended, % 50,409, 54%

Project Objectives, Status, Progress

| Project Title

Report Date 2/2/87

Report No. 15

PROJECT GDAL: To communicate to local transportation agencies the availability and application of new technology that bridges the gap between research and implementation in the area of roadways, bridges, and transit.

### OBJECTIVES:

Project No.

- o To enhance the existing programs of technology services of GDOT and Georgia Tech.
- o To improve and further promote communication on technical transportation issues between GDOT/Georgia Tech and the local agencies.
- o To help insure that appropriate technology consistent with the needs of the local agencies in mind is made available.
- o To encourage implementation of effective procedures, practices, and materials at local levels.

STATUS: The three major tasks of the project are: conduct training seminars, publish a quarterly newsletter, and respond to requests for information and assistance. Four training workshops were held during 1986. A total of 930 participants attended the sessions and 3480 publications were distributed at the workshops. Four quarterly newsletters were published and a total of 7,100 copies of those newsletters were distributed. In addition, the Center received 23 requests for technical assistance and 410 requests for publications. Technical requests included assistance in such topics as drainage, road surface treatment, geotextiles, traffic signal timing, and downtown traffic circulation planning.

The Center has also assisted the GDOT Bureau of Public Transportation in the selection and specification of microcomputers for several local transit operations. Local agencies assisted are Albany, Athens, Augusta, Macon, and Savannah. For several agencies, microcomputer insatallation and training assistance was also provided.

PROBLEMS: None

M. John Moskaluk, Director Georgia Tech Technology Transfer Center

### FOURTH YEAR WORK PLAN SCHEDULE

								•			•	
Research Tasks	  1 	2	3	4	Months 5		the 7			10	11	12
Task A: Compile & Maintain Mailing List									A London			
Task B: Publish Quarterly Newsletter												
Task C: Provide Technology Transfer Materials	       				AS	REQ	JIREI	)	· · · · · · · · · · · · · · · · · · ·			
Task D: Provide Information Service	     				AS	REQ	JIRED	)				
Task E: Conduct Seminars and Training Sessions	.   	10	, wo	RKSH	OPS RE	QUI	RED F	ER	YEA!	R		
'ask F: Project Documentation Quarterly Progress Report Evaluation Report	           		9.						• Fir	nal l	Repo	<b>s</b>

GEORGIA TECH TECHNOLOGY TRANSFER CENTER

> FOURTH YEAR Annual Report

Prepared By:

Georgia Tech
Technology Transfer Center

Submitted To

Georgia Department of Transport
Office of Materials and Resear

MARCH, 1987

GEORGIA INSTITUTE OF AUNIT OF THE UNIVERSITY BY SCHOOL OF CIVIL EN ATLANTA GEORG



# GEORGIA TECH TECHNOLOGY TRANSFER CENTER

ANNUAL REPORT

MARCH, 1987

SCHOOL OF CIVIL ENGINEERING
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30032

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### INTRODUCTION

The performance of the Georgia Tech Technology Transfer Center remained high during the fourth year of operations.

The Center sponsored several training courses, published four quarterly newsletters, responded to numerous requests for technical information and publications.

This report presents counts and summaries of the units (i.e. publications distributed, workshops conducted, on-site visits, etc.), associated with each activity as maintained by the Center.

### BACKGROUND

In Georgia, there are 159 county and 310 city jurisdictions that have been defined as local agencies to participate in the Technology Transfer to Local Transportation Agencies. All of these jurisdictions are included on the Center's mailing list. In fact, many of the agencies are represented on the list by multiple individuals.

There is no standardized form of government for local agencies. For counties, the form can be one commissioner to a board of commissioners. Larger counties have a board of commissioners with 3 to 7 people on the board. Counties may or may not have a county manager. In the case of only one commissioner, there would be no manager. In fact, this elected official could be the roadway superintendent, the

garbage collection crew, as well as the motor grader operator. Small jurisdictions have a rather small agency budget with no budget dedicated to roadway maintenance or operation. Cities operate much like counties. The smaller the city, the smaller the budget, therefore, the smaller the roadway maintenance crew will be.

The GDOT has divided the State into 7 Districts. Each GDOT District is staffed with a District Engineer,
Maintenance Engineer, Construction Engineer, Traffic
Engineer and a Training Officer. Within any particular
District, there are a number of counties for which the
District has GDOT responsibility. In addition, there are
District Resident Engineers which have GDOT responsibility
for four to five counties. Resident Engineers work on a
daily basis with their assigned counties. During the years,
a strong working relationship has developed between the
local agency staff and the GDOT District Engineers. Much of
the technical assistance received by the local agencies
occurs because of the omnipresence of the GDOT Engineers
working in each District. Scheduled training courses
(workshops) are not presented to local agencies by GDOT.

When the Center started its operation, it quickly realized the advantage of using the GDOT relationship with the local jurisdictions as a vehicle to get the Program underway and to began establishing credibility. To this end,

the Center has developed a strong working relationship with each District Engineer, GDOT liaison person (Mr. Sam Vollo) and with many other GDOT Engineers. Further, a strong working relationship has been established with the FHWA liaison person (Mr. Andy Hughes) and other FHWA staff.

Center activities are monitored by two committees.

These committees are the Technical Advisory Committee and Policy Advisory Committee. The Technical Advisory Committee is composed of Mr. Andy Hughes (FHWA), Mr. Sam Vollo (GDOT) and M. John Moskaluk (Georgia Tech). The prime function of this committee is to oversee the daily activities of the Center and to provide guidance to the Center Director.

The Policy Advisory Committee is composed of
Commissioner Thomas Moreland (GDOT), Mr. Thomas Stapler
(GDOT), Mr. Louis Papet (FHWA), Mr. Erwin Kee (FHWA
Advisory), Mr. Jerry Griffin (Association County
Commissioners), Mr. James Burgess (Georgia Municipal
Association), Dr. J. Edmund Fitzgerald (Georgia Tech), and
the Technical Advisory Committee. The function of this
committee is to provide policy guidance to both the
Technical Advisory Committee and to the Center Director. For
example, the final decision to conduct a particular workshop
rests with the Policy Committee. Further, the committee
deals with the broad issues about how the Center conducts

its business and determines if a particular issue is worthy of the Center's attention.

Center Staff consists of John M. Moskaluk, Center Director, and his assistant, Marty Milliner.

### CENTER ACTIVITIES

The following is a brief description of the third year activities undertaken by the Center.

### Mailing List

The mailing list has grown since March 1986 from approximately 1500 to over 1800 addresses. This represents a 20% increase. The Mailing List can be sorted by employee type, agency, and district category.

Included on the Mailing List are Street

Superintendents, City and County Engineers, City and County

Maintenance Personnel, Law Enforcement Officials, County

Commissioners, Area Planning and Development Commissions

(APDC's), State Legislators, City Mayors, County Road

Advisors, Georgia District Engineers, Federal Coordinators,

Technology Transfer Centers, and others.

The Center has during the past year updated the mailing list after obtaining current directories from the Georgia Municipal Association, Association County Commissioners, Georgia State Capitol, and the Federal Highway Administration.

### Publication List

The Microcomputer software for the IBM-PC which was developed by the Center staff to maintain, update, revise, and print the mailing list has been improved to include the Center's publication list. This list currently includes over 308 publications and can be sorted by subject and author.

### Video Tape Library

The Center is currently in the process of building a video tape library. At the present time, the Center has twenty-two video tapes (VHS) which may be borrowed two at a time for a two week basis. The tapes are loaned free of charge to anyone who requests them. Updates on available tapes are made in the newsletter.

### Workshops

Workshops are the most important service provided by the Center. Therefore, discussions are held before each workshop with local officials, GDOT, FHWA, and others to evaluate topics of potential benefits to local agencies. These discussions, along with summaries of returned questionnaires, provide the Policy Committee with the necessary information to make the final decision on workshop topics. The workshop duration and schedule for all 7 Districts are then selected so that maximum participation

can be achieved. Finally, instructors are chosen from GDOT, FHWA, local agencies, or consultants. To date most of the workshop instructors have been GDOT personnel.

The criteria used in making each of the above decisions are shown below:

DECISION	CRITERIA				
- Workshop topic	- Potential benefits - Needs - Maximum participation				
- Duration	<ul><li>Maximum participation</li><li>Efficient coverage</li></ul>				
- Schedule	- Maximum participation				
- Instructors	<ul><li>Knowledge of subject</li><li>Understanding of local agency needs</li><li>Cost</li></ul>				

Sixteen workshop sessions were held during the last year with a total attendance of 579 averaging 36 participants per workshop. The following is a list of the workshops and the corresponding number of participants:

WORKSHOP	TITLE	TIMES	HE	LD	PART	ICIPAN	TS
Mic	rocomputers		8 -	-	 	195	
Road	d Surface Management		1 -	-	 - `-	52	
Road	lway Maintenance		7 -		 	332	

### Newsletters (TECH TRANS)

Four quarterly newsletters were published by the center and distributed as shown below:

1986	_	_	_	_	_	_	_	1650
1986	_	_	-	_	_	_	_	1800
1986	_	_	-	_	_	_	-	1800
1986	-	-	-	-	_	-	-	1850
	1986 1986	1986 - 1986 -	1986 1986	1986 1986	1986 1986	1986 1986	1986 1986	1986

Total 7100

COPIES

The contents of each Newsletter include the following:

- o Editor's Note: This column is devoted to informing the readers about what is happening at the Center and reporting on past events.
- o Articles: Each Newsletter contains two or more articles. Topics for these articles are selected by the season of the year or by what events are occurring in the State.
- o Maintenance Tips: Selected maintenance tips are published. Tips are obtained from the State maintenance personnel and from other publications.
- o Briefs, Trends, and Facts: On the lighter side, several short news worthy topics are published. Some of the items included under this heading are: historical facts, miscellaneous trends, general transportation related news, financial data, and humorous items.
- o Publications: Newly obtained or previously not advertised research reports and articles are listed so that local agencies can obtain a copy by requesting it from the Center.
- o Meetings and Seminars: A selective list of upcoming meetings, seminars, or conferences are listed so that the local agencies are aware of future events and can attend if they desire.

The newsletter has given the Center the opportunity to reach out to local officials and announce our services as

well as other Rural Technical Assistance Program (RTAP) services which are of great benefit to them.

### Publication Distribution

Publications are distributed in two ways. 1) During seminars and workshops, publications related to the subject area are handed out to each of the participants. 2) Publications are sent by request to local officials. The same software used for the mailing list has recently been updated to maintain the Center's publication list in order to speed up the retrieval of information when a request for publication is received. The Center has during the past year distributed 3890 publications.

### Technical Assistance

The Center has during the past year responded to 36 requests for technical assistance. Requests for assistance are made during workshops, by telephone, or by mail.

Typical areas of technical assistance provided were in microcomputer applications in transportation, roadway surface treatment, signalized intersection analysis, drainage, highway geometric design, vehicle maintenance, risk management, pavement and roadway maintenance, and traffic control and operations. Responses to these requests were provided by telephone, by mail, or by on-site visits.

In addition to the technical assistance provided in response to the 36 requests made last year, the center assisted Georgia Transit Authorities in their microcomputer operations. This assistance was provided thru eleven on-site visits made by the Center Director, M. John Moskaluk, to the Cities of Albany, Athens, Augusta, Macon, and Savannah.

### CONCLUSION

The general feeling among local officials in Georgia is that the Center provides needed services. These services allow local agencies to benefit from the latest advances in both technologies and methodologies.

Benefits of the Center's services are not realized by local agencies until these services had been rendered. Once an agency has taken advantage of a service provided by the Center, it always seeks additional assistance.

In most cases, local officials do not have an opportunity to learn about "better" techniques for conducting their everyday activities. The Center provides these officials with such opportunity by reaching out to them through newsletters and training courses. On the whole, the Center has been able to contribute to the betterment of transportation in the State of Georgia.

It is expected that more services will be provided by the Center during the next year. The Center is receiving

more requests for technical assistance, it is gaining momentum in establishing credibility with local agencies, and it still enjoys an excellent working relationship with FHWA and the Georgia DOT. A lot of work has yet to be completed. The Center is relatively young and is still growing.

### APPENDIX A

# MAILING LIST

CLYDE HARDIN POLICE CHIEF 2721 WASHINGTON ST. S.W. AUSTELL, GA 30001	HON. JOHN L COLLAR MAYOR 2722 BROAD STREET S.W. CITY HALL AUSTELL, GA 30001	HON. STEVE THOMPSON DISTRICT 20 POST 4 4265 BRADLEY DR. AUSTELL, GA 30001
FOLICE CHIEF 10 N. CLARENDON RD.	DISTRICT 20 FOST 5 4887 MOSLEY RD.	HON. ERNIST WHALEY MAYOR 3921 CHURCH ST. CITY HALL CLARKSTON, GA 30021
THOMAS TAYLOR POLICE CHIEF 3921 CHURCH ST CLARKSTON, GA 30021	DIR. RDADS & DRAINAGE CALLAWAY SQ. BLDG. DECATUR, GA 30030	PAT JARVIS SHERIFF 556 N. MCDONOUGH ST. DECATUR, GA 30030
HON. MANUEL MALDOF CHM. DEKALB CD. COMM. COUNTY COURTHOUSE DECATUR, GA 30030	G. E. MATTHEWS POLICE CHIEF 420 W. TRINITY PLACE DECATUR, GA 30030	HDN. PEGGY CHILDS DISTRICT 53 520 WESTCHESTER DR. DECATUR, GA 30030
W. J. HUMMA PURCHASING DIRECTOR FOURTH FLOOR - ROOM 409 ONE CALLAWAY SQUARE 120 WEST TRINITY PLACE DECATUR, GA 30030	HOW EDONY DETAINS	HON. FAT SWINDALL U.S. REP. 4TH DIST 160 CLAIRMONT AVE SUITE 140 DECATUR, GA 30030
CITY ENGINEER P.O. BOX 220 DECATUR, GA 30031	DIETRIET EI	F. D. HAND FUBLIC SAFETY DIR. 4400 MEMORIAL DR. DECATUR, GA 30032
MR. BOBBY WESTBROOKS 3449 BENNINGTON DR. DECATUR, GA 30032	HON. ELEANOR RICHARDSON DISTRICT 52 755 PARK LANE DECATUR, GA 30033	HON. THOMAS SCOTT DISTRICT 43 2887 ALAMEDA TR. DECATUR, GA 30034
	HON. WILLIAM MANGUM JR. DISTRICT 57 POST 2 4320 PLEASANT FOREST DR DECATUR, 6A 30034	
STREET SUPERINTENDENT P.O. BOX 69 FOREST PARK, GA 30050	JOE PICARD POLICE CHIEF 785 FOREST PARKWAY FOREST PARK, GA 30050	O. L. BERRY JR. DIRECTOR DEPT. OF F.W. 5230 JONES ROAD FOREST PARK, GA 30050
	HON, TERRELL STARR DISTRICT 44 P.G. BOX 545 FOREST PARK, GA 30050	
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JEROME WOODS HON. ROY BARNES
FOLICE CHIEF DISTRICT 33
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WILLIAM ANDREWS TRAFFIC SUPERVISOR CITY OF MARIETTA TRAFFIC SUPERVISOR CITY OF MARIETTA 725 PAGE STREET MARIETTA, GA 30060

HDN. EARL E. SMITH CHM.

COBB CO. COMM.

COUNTY ENGINEER

COUNTY COURTHOUSE BOX 649

MARIETTA, GA 30060

RICK BRUN

CITY HALL

CITY HALL

205 LAWRENCE STREET

MARIETTA, GA 30060

MARIETTA, GA 30060

MR. JIMMY PRUITT

HDN. JDE WILSON ASPH SUPER MS. SHARDN BOX

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77 CHURCH ST. 1890 COUNTY FRAM RD 1624 SQUIRE DRIVE

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COBB COUNTY DOT COBB COUNTY DOT STREET SUPERINTENDENT
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MR. JOHN W. WADE JR.

H. P. CRAFT
POLICE CHIEF
COBB COUNTY D.O.T.
COBB

MR. ART WINE

MR. R. L. GENSEL DIV. MGR. MR. DOUGLAS E. HEFTY

DIV. MGR. /ADM. & CONTROL ROADS DIV. TRAFFIC ENGINEER

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PO BOX 649 PO BOX 649

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DISTRICT 37
DISTRICT 20 POST 2
DISTRICT 21 POST 5
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MARIETTA, GA 30062
MARIETTA, GA 30065
HON. THOMAS WILDER JR.
DISTRICT 21 POST 5
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PATRICK M. WRIGHT
TRAFFIC ENGINEER
HON. JOHNNY ISAKSON JHK AND ASSOCIATES GERALD BALAS
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5274 HAMPTON FARMS DR SUITE 330 4470 MARIETTA ST.
MARIETTA, GA 30067 NORCROSS, GA 30071 POWDER SPRINGS, GA 3007

MON. W.L. MABRY
MAYOR
DIRECTOR OF P.W.
SIT ATLANTA ST.
CITY OF ROSWELL
FOLICE CHIEF
CITY FALL
617 ATLANTA ST.
100 MOUNTAIN PARK RD.
ROSWELL, GA 30075
ROSWELL, GA 30075

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HON. FRED EIKEN DISTRICT 21 POST 1 4020 PINEVIEW DR. SE SMYRNA, GA 30080

HON. WILLIAM ATKINS DISTRICT 21 POST 3 4719 WINDSOR DR. SMYRNA, GA 30080	HDN. FRANK JDHNSON DISTRICT 21 PDST 4 436 CONCORD RD. SMYRNA, GA 30080	HON. ARTHUR BACON MAYOR F.D. BOX 1226 CITY HALL SMYRNA, GA 30081
MIKE HUTCHINSON CITY ENGINEER CITY OF SMYRNA P.O. BOX 1226 SMYRNA, GA 30081	R. E. LITTLE POLICE CHIEF 1286 BANK ST. S.E. SMYRNA, GA 30081	HDN. JOE THOMPSON DISTRICT 32 P.O. BOX 1045 SMYRNA, GA 30081
HON. LAWRENCE STUMBAUGH DISTRICT 55 1071 YEMASSEE TR. STONE MOUNTAIN, GA 30083	HON. GAS ROBINSON DISTRICT 58 4720 FELLSWOOD DR. STONE MOUNTAIN, GA 30083	DANIEL HAZIM PROJECTS DIRECTOR STARLING ENTERPRISES 2022 WEEMS ROAD TUCKER, GA 30084
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HON. CHARLES KERSEY MAYOR P.O. BOX 672 CITY HALL THOMASTON, GA 30286	HON. W. F. HARRIS DISTRICT 27 1261 WILLINGHAM SPRS RD. THOMASTON, GA 30286	HON. MARTIN ADAMS DISTRICT 79 709 GREENWOOD RD. THOMASTON, GA 30286
MR. ALTON DAWSON SUPERINTENDENT OF ROADS UPSON COUNTY P.D. BOX 889 THOMASTON, GA 30286	MAYOR MARY BROWN CITY OF TURIN P.O. BOX 86 TURIN, GA 30289	MAYOR HOMER MURDOCH TOWN OF TYRONE P.O. BOX 262 TYRONE, GA 30290
DITY ENGINEER 5047 UNION STREET UNION DITY, GA 30291	BOBBY FRONEBARGER POLICE CHIEF 5047 UNION ST. UNION CITY, GA 30291	JOHN MORRIS PUBLIC WORKS DIR. 5047 UNION STREET UNION CITY, GA 30291
EMERSON ESTERLINE SUPERVISOR UNION CITY POLICE 5047 UNION STREET UNION CITY, GA 30291	HON. FRED ETRIS MAYOR 5047 UNION ST. CITY HALL UNION CITY, GA 30291	MR. BOBBY HARRISON MAYOR PIKE COUNTY WILLIAMSON, GA 30292
HON. BOBBY BROWN MAYBR P.O. BOX 267 CITY HALL WOODBURY, GA 30293	CD. ROAD SUPERINTENDENT P.O. BOX 377 ZEBULON, GA 30295	HON. MARION E. KING PIKE COUNTY CHAIRMAN P.G. BOX 377 ZEBULON, GA 30295
MAYOR HOWARD M. RAWLINS P.D. BOX 385 ZEBULON, GA 30295	CITY ENGINEER P.O. BOX 385 ZEBULDN, GA 30295	MR. BRENT KELLER DIRECTOR OF PUBLIC WOR P.O. BOX 2371 PEACHTREE CITY, GA 308

MR. HERSCHEL CLARK PROGRAM MANAGER OFFICE OF SAFETY P.D. 1497 ATLANTA, GA 30301	MINUARD C. MCGUIRE 959 E. CONFEDERATE AVE. P.O. BOX 1497 ATLANTA, GA 30301	STREET SUPERINTENDENT 68 MITCHELL STREET ATLANTA, 6A 30303
LERDY STYNCHCOMBE SHERIFF 136 PRYOR ST. S.W. ATLANTA, GA 30303	COUNTY ENGINEER 165 CENTRAL AVE. S.W. ATLANTA, GA 30303	CLINTON CHAFIN POLICE CHIEF 183 CENTRAL AVE. S.W. ATLANTA, GA 30303
HON. MICHAEL LOMAX CHM. FULTON CO. COMM. 65 CENTRAL AVENUE SW 409 COURTHOUSE ANNEX ATLANTA, GA 30303	MORRIS REDDING POLICE CHIEF 175 DECATUR ST. S.E. ATLANTA, GA 30303	MR. JAMES BURGESS DIRECTOR GEORGIA MUNICIPAL ASS 34 PEACHTREE STREET SUITE 2300 ATLANTA, GA 30303
MR. HILL HEALAN DIRECTOR ASSOC. COUNTY COMM. 134 PEACHTREE STREET SUITE 1201 ATLANTA, GA 30303	HON. JOHN GREER DISTRICT 39 925 HEALY BLDG. ATLANTA, GA 30303	MAYOR ANDREW YOUNG CITY HALL ATLANTA, GA 30303
HONORABLE SAM NUNN SEDERAL DEFICE BLDG ROOM 930 275 PEACHTREE ST NE RTLANTA, GA 30303	10 PARK PLACE SUITE 210	WINSTON PARKER FULTON. CO. LAND DEPT WILLIAM OLIVER BLDG. SUITE 403 32 PEACHTREE ST. ATLANTA, GA 30303
HON. PAUL COVERDELL DISTRICT 40 2015 PTREE RD. NE ATLANTA, GA 30309	HON. JULIAN BOND DISTRICT 39 361 WESTVIEW DR. SW ATLANTA, GA 30310	HON. TYRONE BROOKS DISTRICT 34 STA. A P.O. BOX 11185 ATLANTA, GA 30310
HON. DOUGLAS DEAN DIGHAIOT BS DEC ARTHUR ST SW ATLANTA, GA 30310	HON. HORACE TATE DISTRICT 38 621 LILLA DR. SW ATLANTA, GA 30310	SPENCE JUNIE JR. TECHNICIAN I 954 LAURELMONT DR. ATLANTA, GA 30311
RDN. LORENZO BENN DISTRICT 38 576 FIELDING LA. SW DELENTA, SA 30311	HON. J. C. DOUGHERTY DIST 33 15 CHESTNUT ST ATLANTA, GA 30314	CYNTHIA TEASLEY CREW SUPERVISOR ATLANTA P.W. 1150 NORTH AVENUE ATLANTA, GA 30314
HARCLD MCELROY STOREKEHPER 111 ANLANTA P.W. 1150 NORTH AVENUE ATLANTA, SA 30314	PRISCILLA PORTER RESOURCE MANAGER ATLANTA P.W. 1150 NORTH AVENUE ATLANTA, GA 30314	MARSHALL MAHAFFEY PLANT SUPERINTENDENT ATLANTA P.W. 1150 NORTH AVENUE ATLANTA, GA 30314
FUN. GRADE HAMILTON DABTRIDT B: DBS UNIVERBITY PI NA ETIRETE. BO BORIA	223 CAESTNUT STREET ATLANTA DRIVERSITY	MARVIN BARBER ASS'T SUP'T CITY OF ATLANTA 120 CLAIRE DR. SW ATLANTA, SA 30315
HON. DAVID SCOTT DIBTRICT 36 183 WENDELL DR. SE ATLANTA, BA 30315	HON. GEORGANNA SINKFIELD DISTRICT 37 179 TONAWANDA DR. ATLANTA, GA 30315	HON. PAUL BOLSTER DISTRICT 30 1043 ORMEWOOD AVE. SE ATLANTA, GA 30316

HON. BETTY CLARK DISTRICT 55 P.O. BOX 17852 ATLANTA, GA 30316	HON. HOSEA WILLIAMS DISTRICT 54 8 E LAKE DR NE ATLANTA, GA 30317	CHARLIE REEVES JR. CREW MAINT. SUPERVISOR CITY OF ATLANTA 1587 HORTENSE PT. NW ATLANTA, GA 30318
HON. J. E. MCKINNEY DISTRICT 35 765 SHORTER TER NW ATLANTA, GA 30318	HON. MAX DAVIS DISTRICT 45 1177 W NANCY CR. DR NE ATLANTA, GA 30319	HON. JAMES TYSINGER DISTRICT 41 3781 WATKINS P1 NE ATLANTA, GA 30319
HON. BARBARA COUCH DISTRICT 40 2854 W ROXBORO RD NE ATLANTA, GA 30324	HON. CATHEY STEINBERG DISTRICT 46 1732 DUNWOODY P1 ATLANTA, 6A 30324	HON, SIDNEY MARCUS DISTRICT 26 845 CANTERBURY RD NE ATLANTA, GA 30324
	HON. DOROTHY FELTON DISTRICT 22 465 TANACREST DR NW SANDY SPRINGS, GA 30328	
RICHARD COMBES DIVISION CHIEF INDUSTRIAL EXT. DIVISION EDL-SES GEORBIA TECH ATLANTA, GA 30332	DR. EDMUND FITZGERALD DIRECTOR SCHOOL OF CIVIL ENG. GEORGIA TECH ATLANTA, GA 30332	DR. THOMAS STELSON VICE PRES. RES. VP RES ADMINISTRATION GEORGIA TECH ATLANTA, GA 30332
DR. WILLIAM SANGSTER DEAN COL. OF ENG. DEAN OF ENG - ADMIN. GEORGIA TECH ATLANTA, GA 30332	DR. HENRY BOURNE VICE PRES. ACAD. AFF CARNEGIE BUILDING GEORGIA TECH ATLANTA, GA 30332	DR. QUENTIN L. ROBNETT PROFESSOR SCHOOL OF CIVIL ENG. GA INSTITUTE OF TECHNO ATLANTA, GA 30332
DR. ALBERT SHEPPARD ASSO. VICE PRES. RES. VP RES ADMINISTRATION GEORGIA TECH ATLANTA, GA 30332	DR. W. FREESTON ASSO. DEAN OF ENG. COL. DEAN COL. OF ENG ADMIN. GEORGIA TECH ATLANTA, GA 30332	DR. WARREN HEEMANN VICE PRESIDENT INST. REL. AND DEV. VP INST. REL & DEV. GEORGIA TECH ATLANTA, GA 30332
MERCY EDWARDS CONTINUING EDUCATION 308 SWARN BLDG. DEPT. OF CONT. EDUC. GEORGIA TECH ATLANTA, GA 30332	DR. JAMES LAI PROFESSOR SCHOOL OF CIVIL ENG. GEORGIA TECH ATLANTA, GA 30332	DR. PAUL WRIGHT PROFESSOR SCHOOL OF CIVIL ENG. GEORGIA TECH ATLANTA, GA 30332
	HDN. WAYMOND HUGGINS SEN. DIST. 53 122 STATE CAPITOL ATLANTA, GA 30334	
PHIL BRYANT TRAINING PROGRAM DIR. ROOM 268 BDDT NC. 2 DAPITOL BOUARE ATLENTA. GA 30334	GERALD MASON BUREAU OF HWYS AND ST. CITY OF ATLANTA DEPT. OF PUBLIC WORKS 224 CENTRAL AVE. SW ATLANTA, SA 30335	MR. HARRY WEST EXECUTIVE DIRECTOR ARC 100 EDGEWOOD AVE. N.E. GUITE 1801 ATLANTA, GA 30335
MR. NAYEF H. HADDAD TROFFIC ENGINEER FELTON COUNTY 155 DENTRAL AVE ROOM 300 ATLANTA, GA 30335	CITY ENGINEER P.O. BOX F COLLEGE PARK, GA 30337	G. L. GLOVER POLICE CHIEF 1871 COLUMBIA AVE. COLLEGE PARK, GA 30337

MR. LYNN B. CURRY JR. P.E. CITY ENFINEER F.O. BOX F COLLEGE PARK, GA 30337	P. W. PERSONNEL CITY HALL P.O. BOX F COLLEGE PARK, GA 30337	MR. BILL ALLGOOD GA DEPT OF TRANSPORTA 2 CAPITOL SQUARE ATLANTA, GA 30337
HON. JOHN LINDER DISTRICT 44 P.D. BOX 88298 DUNWOODY, GA 30338	TONE GARRETT EXECUTIVE DIRECTOR GA ASPHALT PAVEMENT ASSOC 1000 CIRCLE 75 PARKWAY SUITE 630 ATLANTA, GA 30339	HONORABLE MACK MATTING 380 INTERSTATE NORTH SUITE 195 ATLANTA, GA 30339
MR. CECIL PEARCE DISTRICT ENGINEER GDOT DISTRICT 7 5025 NEW PEACHTREE RD. CHAMBLEE, GA 30341	3518 BROAD ST.	MR. JAMES E. DEAN 5025 NEW PEACHTREE ROX CHAMBLEE, GA 30341
WILLIAM PONDER MAYOR CITY HALL 2777 SAST POINT ST. EAST POINT, GA 30344	CITY ENGINEER 2777 EAST POINT STREET EAST POINT, GA 30344	JOHN MCCLENDON POLICE CHIEF 1637 CLEVELAND AVE. EAST POINT, GA 30344
HON. DICK LANE DISTRICT 27 2704 HUMPHRIES DR. EAST POINT, GA 30344	HON. JOE BURTON DISTRICT 5 2598 WOODWARDIA RD. NE ATLANTA, GA 30345	MR. GWYN SANDELIN TRAFFIC SYSTEMS INT. 2538 RAINTREE COURT ATLANTA, GA 30345
HOM. BETTY WILLIAMS DISTRICT 4B E024 CASTLEWAY DR NE ATLANTA, GA 30345	CITY ENGINEER P.O. BOX 82311 HAPEVILLE, GA 30354	JAMES CLAY POLICE CHIEF 3468 N. FULTON AVE. HAPEVILLE, GA 30354
MBY. BARNEY BULLIVAN MAYUR P.C. FOX 82311 CITY HALL HAPEVILLE, GA 30354	HDN. G. D. ADAMS DISTRICT 36 3417 NORTHSIDE DR. HAPEVILLE, GA 30354	F. E. SANDERS CITY OF ATLANTA 4358 WINTERS CHAPEL RI DORAVILLE, GA 30360
HON. GENE LIVELY MAYDR P.O. BOX 47096 DITY HALL DORAVILLE, GA 30362	GEORGE EVERETT FOLICE CHIEF 3760 PARK AVE.	MR. LOUIS PAPET DIVISION ADMINISTRATOR FEDERAL HWY. ADMIN. 1720 PEACHTREE RD. NW SUITE 300 ATLANTA, GA 30367
NR. BROVER D. SOWMAN PLANNING ENGINEER FHWA 1780 PEACHTREE RD. NW SUITE 200 ATLANTA, GA 30367	で177年 つめめ	MR. HARVEY PHLEGAR FEDERAL HWY. ADMIN SUITE 200 1720 PEACHTREE ROAD N. ATLANTA, GA 30367
CO. ROAD SUPERINTENDENT CO. RTHOUSE SW41 NORDAS, SA 30401	STREET SUPERINTENDENT P.D. BOX 600 SWAINSBORD, BA 30401	HON. SAM SMITH CHM. EMANUEL CO. COMM. COUNTY COURTHOUSE SWAINSBORO, SA 30401
HON. JAMES BUCKLEY HAYOR 101 MAIN ST. CITY HALL SWAINSBURD, GA 30401	HON. BILL ENGLISH DISTRICT 2: 2:4 GOLD DR. SWAINESBORG, GA 3040:	HON. NATHAN DEAN DISTRICT 31 340 WINGFOOD ST. ROCKMART, GA 30401

GENT DONNELTH PARKET		
HON. RANDOLPH CARRH DISTRICT 109 P.O. DRAWER K SWAINSBORO, GA 30401	CO. ROAD SUPERINTENDENT COURTHOUSE ALAMO, GA 30411	W. H. THOMAS JR. COMM. OF WHEELER CO. P.O. BOX 181 ALAMO, GA 30411
HON. W. H. THOMAS CHM. WHEELER CO. COMM. COUNTY COURTHOUSE ALAMB, GA 30411	HON. JOHN GODBEE DISTRICT 110 401 LANE ST. BROOKLET, GA 30415	COUNTY ENGINEER COURTHOUSE CLAXTON, GA 30417
HON. WILLIAM DELOACH CHM. EVANS CO. COMM. COUNTYCOURTHOUSE CLAXTON, GA 30417	HON. PERRY DELDACH MAYDR P.O. BOX 829 CITY HALL CLAXTON, GA 30417	HON. JOSEPH KENNEDY DISTRICT 4 P.O. BOX 246 CLAXTON, GA 30417
HON. CHARLIE ROWLAND MAYOR 134 SOUTH MAIN ST. CITY HALL GLENNVILLE, GA 30427	DAYNE DELDACH WATER & SEWER SUP'T CITY OF GLENNVILLE 134 S. MAIN ST. GLENNVILLE, GA 30427	HON. CLINTON OLIVER DISTRICT 121 P.O. BOX 237 GLENNVILLE, GA 30427
CO. ROAD SUPERINTENDENT COURTHOUSE LOUISVILLE, GA 30434	CITY ENGINEER CITY HALL LOUISVILLE, GA 30434	HON. T. E. BUCHANAN CH JEFFERSON CO. COMM. P.D. BOX 658 LOUISVILLE, GA 30434
HON. JULIAN VEATCH MAYOR P.O. BOX 527 CITY HALL LOUISVILLE, GA 30434	HON. EMORY BARGERON DISTRICT 108 P.O. BOX 447 LOUISVILLE, GA 30434	STREET SUPERINTENDENT 417 N. STATE ST. LYONS, GA 30436
	HON. W.T. AIKEN MAYOR 417 NORTH STATE ST. CITY HALL LYONS, GA 30436	HON. GEORGE BIRD CHM. CANDLER CO. COMM. COUNTY COURTHOUSE METTER, GA 30439
CD. ROAD SUPERINTENDENT COURTHOUSE MILLEN, SA 30442	HON. CHARLES BRAGG CHM. JENKINS CO. COMM. COUNTY COURTHOUSE MILLEN, GA 30442	HON. ROBERT FRIES MAYOR P.O. BOX 929 CITY HALL MILLEN, GA 30442
CO. RDAD SUPERINTENDENT COURTHOUSE Mt. VERNON, GA 30445	HON. JULIAN WARNOCK CHM. MONTGOMERY CO. COMM. COUNTY COURTHOUSE MT VERNON, GA 30445	HON. J.M. FOUNTAIN MAYOR P.O. BOX 237 CITY HALL MOUNT VERNON, GA 30445
RESTRICT	CO. ROAD SUPERINTENDENT COURTHOUSE REIDSVILLE, GA 30453	J. W. KEARNS ASS'T CHIEF OF POLICE REIDSVILLE P.D. P.O. BOX 830 REIDSVILLE, BA 30453
HON. CECIL TOBTLE CHM. TATTNALL CO. COMM. P.O. BOX 25 REIDSVILLE, GA 30453	ROBERT EDEN VICE PRESIDENT PLANNING AND DEVELOPMENT CAT INC. P.O. BOX 466 MEDICAL ARTS DR REIDSVILLE, GA 30453	HON. CHARLES REWIS MAYOR F.O. BOX 830 CITY HALL REIDSVILLE, GA 30453

PUBLIC WORKS SUPT. P.O. BOX 238 SOPERTON, GA 30457	CO. ROAD SUPERINTENDENT COURTHOUSE SOPERTON, GA 30457	HON. JIM GILLIS CHM. TREUTLEN CO. COMM. COUNTY COURTHOUSE SOPERTON, GA 30457
HDN. FRANK RADFORD MAYDR P.D. BOX 238 CITY HALL SOPERTON, GA 30457	HON. HUGH GILLIS SR. DISTRICT 20 F.O. BOX 148 SOPERTON, GA 30457	HON. L. L. PHILLIPS DISTRICT 120 BOX 166 SOPERTON, GA 30457
DITY ENGINEER P.O. BOX H SPARTA, GA 30458	CITY ENGINEER F.O. BOX 348 STATESBORO, GA 30458	CO. ROAD SUPERINTENDER COUNTY COURTHOUSE STATESBORO, GA 30458
HON. THURMAN LANIER MAYOR P.O. BOX 348 CITY HALL STATESBORG, GA 30458	HON. LINDSAY THOMAS US REF DIST 1 ROOM 220 FEDERAL BLDG STATESBORD, GA 30458	C.A. BIRD JR MAINT. SUPT. CITY OF STILLMORE PO BOX 147 STILLMORE, GA 30464
MR. E. K. DVERSTREET CITY MANAGER P.D. BOX 555 SYLVANIA, GA 30487	CO. ROAD SUPERINTENDENT COURTHOUSE SYLVANIA, GA 30467	STREET SUPERINTENDENT P.O. BOX 555 SYLVANIA, GA 30467
HON. W.H. LARISCY MAYOR P.C. BOX 555 DITY HALL SYLVANIA, GA 30467	STREET SUPERINTENDENT P.O. BOX 280 VIDALIA, GA 30474	HON. NORWOOD RHODES MAYOR F.O. BOX 280 CITY HALL VIDALIA, GA 30474
HON. T. A. JOHNSON MAYOR P.O. BOX 219 CITY HALL WADLEY, GA 30477	CITY ENGINEER P.D. BOX 2496 GAINESVILLE, GA 30501	MR. JOHNNIE VICKERS CONST. SUPT. PUBLIC WORKS DEPT. HALL COUNTY CALVARY CHURCH RD. GAINESVILLE, GA 30501
MR. HARDLD GAINES DIST. SUPERVISOR PUBLIC WORKS DEPT. HALL COUNTY CALVARY CHURCH RD. SAINESVILLE, SA 30501	MR. JOHNNY H. FREE PUBLIC WORKS DEPT. HALL COUNTY CALVARY CHURCH ROAD GAINESVILLE, SA 30501	HON. GRADY SAVAGE DIST. SUPERVISOR HALL CO. COURTHOUSE GAINESVILLE, GA 30501
HON. JERRY NIX DHM. Hall dd. ddmm. ddunty ddurthouse Gainesville, ga 30501	MR. JIM SCHULER DIRECTOR OF PUBLIC WORKS COUNTY COURTHOUSE GAINESVILLE, SA 30501	HOM. JOHN MORROW MAYOR P.O. BOX 2496 CITY HALL GAINESVILLE, GA 30501
KR. GEORGE AUSTIN P.D. BOX 8495 CATAESVILLE, PA 3050)	MR. SAM DAYTON EXECUTIVE DIRECTOR GEORGIA MOUNTAINS APDO P.O. BOX 1720 GAINESVILLE, GA 3050:	HON. JERRY JACKSON DISTRICT 9 POST 3 P.O. BOX 7275 CHESTNUT MTN. SA 30502
MR. HUSH TYNER DISTRICT ENBINEER SDOT DISTRICT 1 P.O. BOX 1057 GAINESVILLE, GA 30503	MR. PHILIP LOVELESS STRI-BAINESVILLE BOX 3015 GAINESVILLE, GA 30503	HON. NATHAN DEAL DISTRICT 49 P.O. BOX 2522 GAINESVILLE, GA 30503

HON. JOE WOOD DISTRICT 9 POST 1 P.O. BOX 1417 GAINESVILLE, GA 30503	HON. BOBBY LAWSON DISTRICT 9 POST 2 P.O. BOX 53 GAINESVILLE, GA 30503	HON. EDGAR L. JENKINS US REP DIST 9 301 GREEN ST PO BOX 1015 GAINESVILLE, GA 30503
MR. LARRY CAUDELL GEORGIA DEPT. OF TRANS. P.O. BOX 1057 GAINSVILLE, GA 30504	HON. JACK ERVIN DISTRICT 11 POST 2 ROUTE 1 BOX 217 BALDWIN, GA 30511	CITY ENGINEER P.O. BOX 396 BLUE RIDGE, GA 30512
CO. ROAD SUPERINTENDENT COURTHOUSE BLAIRSVILLE, GA 30512	HON. GLEN GOOCH UNION CO. COMM. COUNTY COURTHOUSE BLAIRSVILLE, GA 30512	HON. CARLTON COLWELL DISTRICT 4 POST 1 P.O. BOX 850 BLAIRSVILLE, GA 30512
CO. ROAD SUPERINTENDENT COURTHOUSE BLUE RIDGE, GA 30513	HON. RICHARD STANLEY CHM. FANNIN CO. COMM. P.O. BOX 487 BLUE RIDGE, GA 30513	STREET SUPERINTENDENT 30 GARNETT STREET BUFORD, GA 30518
HON, THOMAS HUGHES MAYOR 30 GARNETT STREET CITY HALL BUFORD, GA 30518	HON. CHARLES MARTIN DISTRICT 60 470 HILL ST. BUFORD, GA 30518	CO. ROAD SUPERINTENDE COURTHOUSE CARNESVILLE, GA 30521
HON. RON MILLER CHM. FRANKLIN DO. COMM. BOX 156 CARNESVILLE, GA 30521	HON. OLIVE FORDE CHM. HABERSHAM CO. COMM. COUNTY COURTHOUSE CLARKESVILLE, GA 30523	EARL ROBERTS COMMISSIONER HABERSHAM CO. CO. COURTHOUSE CLARKESVILLE, GA 3052:
DI. ROAD SUPERINTENDENT DOUNTY OBURTH <b>OUSE</b> DLARKESVILLE, <b>GA 30523</b>	MR. LEWIS CANUP COUNTY ADM. HABERSHAM CO. PO BOX 227 CLARKESVILLE, GA 30523	HON. WILLIAM DOVER DISTRICT 11 POST 1 TIMBROOK ROUTE 2 HOLLYWOOD, GA 30523
CC. ROAD SUPERINTENDENT ODURTHOUSE CLAYTON, GA 30525	HON. MAX WATTS CHM. RABUN CO. COMM. COUNTY COURTHOUSE CLAYTON, GA 30525	MR. CLIFTON RAMEY ROAD SUPT. RABUN CO. PO BOX 925 CLAYTON, GA 30525
HON. TOM RAMEY MAYOR P.O. BOX 702 CITY HALL CLAYTON, GA 30525	HON. THOMAS DOSTER MAYOR P.O. BOX 257 CITY HALL CLERMONT, GA 30527	CITY ENGINEER P.O. BOX 277 CLEVELAND, GA 30528
DD, RDAD SUPERINTENDENT DOURTHOUSE CLEVELAND, SA 20528	HON. LANIER CHAMBERS CHM. WHITE CO. COMM. COUNTY COURTHOUSE CLEVELAND, GA 30528	STREET SUPERINTENDENT P.O. BOX 348 COMMERCE, GA 30529
GERALD MOON WINDER POLICE DEPT. P.O. BOX 293 COMMERCE, GA 30529	HON. TOMMY STEPHENSON MAYOR P.O. BOX 348 CITY HALL COMMERCE, GA 30529	HON. LAUREN MCDONALD . DISTRICT 12 RT. 5 DOGWOOD TR COMMERCE, GA 30529

HDN. DON HIGGENS MAYDR P.D. BOX 217 CITY HALL CORNELIA, GA 30531	HON. JOHN FOSTER DISTRICT 50 P.O. BOX 100 CORNELIA, GA 30531	CO. ROAD SUPERINTENDEM COURTHOUSE DAHLONEGA, GA 30533
STREET SUPERINTENDENT P.O. BOX 565 DAHLONEGA, GA 30533	HON. J. B. JONES LUMPKIN CO. COMM. COUNTY COURTHOUSE DAHLONEGA, GA 30533	HDN. HAINES HILL MAYOR 201 WEST MAIN ST. CITY HALL DAHLONEGA, GA 30533
CITY ENGINEER P.O. BOX 6 DAWSONVILLE, GA 30534	CO. ROAD SUPERINTENDENT COURTHOUSE DAWSONVILLE, GA 30534	HON. JOE LANE COX CHM. DAWSON CO. COMM. COUNTY COURTHOUSE DAWSONVILLE, GA 30534
CITY ENGINEER P.O. BOX 128 DEMOREST, BA 30535	CO. ROAD SUPERINTENDENT COURTHOUSE ELLIJAY, GA 30540	HON. BEN WHITAKER CHM. GILMER CO. COMM. COUNTY COURTHOUSE ELLIJAY, GA 30540
HON. HENRY GARTRELL MAYOR 35 SOUTH DALTON ST. CITY HALL ELLIJAY, GA 30540	MICHAEL WATERS GA D.O.T. 4770 STRICKLAND RD. FLOWERY BRANCH, GA 30542	GILBERT PAUL BUILDING INSPECTOR CITY OF HELEN PO DRAWER 280 HELEN, GA 30545
REN HULSEY CITY MANAGER P.O. BOX 146 HELSN, GA 30545	CO. ROAD SUPERINTENDENT COURTHOUSE HIAWASSEE, GA 30546	HON. TRUMAN BARRETT PROBATE JUDGE/COMM. TOWNS CO. COMM. COUNTY COURTHOUSE HIAWASSEE, GA 30546
HOM. RALPH TWIGGS DYSTRICT 4 HOST 2 F.C. BOX 432 HIAWASSES, GA 30546	HON. HAROLD WATKINS CHM. BANKS DS. COMM. COUNTY COURTHOUSE HOMER, GA 30547	MR. MILTON PATTERSON CHAIRMAN BANKS COUNTY COMM PO BOX 1686 HOMER, GA 30577
CO. ROAD SUPERINTENDENT COUPTHOUSE OSTERNSON, BA 30549	HON. HENRY ROBINSON CHM. JACKSON CO. COMM. COUNTY COURTHOUSE JEFFERSON, GA 30549	HON. BYRD BRUCE MAYOR 139 ATHENS ST. CITY HALL JEFFERSON, GA 30549
STREET SUPERINTENDENT P.B. BEX 184 LAYENIA, GA 30553	HON. HERMAN AYERS MAYOR P.O. BOX 564 CITY HALL LAVONIA, GA 30553	HON. STANLEY MOORE DIST. SUPERVISOR HALL COUNTY BOX 4503 OAKWOOD, GA 30566
MOM. D. B. MURLIO SR. DHM. BOYEMEN DD. DOMM. COLMIY COURTHOUSE GYLVANIB. BA BOSE7	PUBLIC WORKS BURT. P.C. BOX E79 TBCCGA, GA BRE77	DO. ROAD SUPERINTENDS: COURTHOUSE TOCCOA, GA 30577
HDN, EVATT THOMASON CHWM. STEPHENS DO. COMM. DOUNTY COURTHOUSE TOCCOA, GA 30577	HON. LEE BOWEN MAYOR P.O. BOX 579 CITY HALL TOCCOA, GA 30577	CITY ENGINEER CITY HALL ATHENS, BA 30601

SR. OFERATOR ST. CONST. MAINT. CITY OF ATHENS 305 POUND ST. ATHENS, GA 30601	HON. JAMES HOLLAND CHM. CLARKE CO. COMM. P.O. BOX 448 ATHENS, GA 30601	MR. CLINT LANE EXECUTIVE DIRECTOR NORTHEAST GEORGIA APD 305 RESEARCH DRIVE ATHENS, GA 30601
HON. DOUGLAS BARNARD US REP DIST 10 STEPHENS FED BLDG BOX 3 ATHENS, GA 30601	DISTRICT 68 P.O. BOX 509	MR. GERALD W. TORBERT AREA ENGINEER GA D.O.T. PO BOX 387 ATHENS, GA 30603
MR. ED STANDERA DIRECTOR PUBLIC WORKS CLARKE COUNTY 2915 LEXINGTON RD. ATHENS, GA 30605	HON. HUGH LOGAN DISTRICT 67 1328 PRINCE AVE. ATHENS, GA 30606	HON. PAUL BROUN DISTRICT 46 165 PULASKI ST. ATHENS, GA 30610
SCOTT MORGAN NORTHEAST GA. AREA PLANNING AND DEV. COMM. 305 RESEARCH DRIVE ATHENS, GA 30610	MAVAD	LAMAR G. BROWN ASST STREET SUPT STREET DEPT PO BOX 1868 ATHENS, GA 30613-4199
DITY ENGINEER P.O. BOX 186 BOWMAN, BA 30624	HON. HENERY MOORE CHM. TALIAFERRO CO. COMM. COUNTY COURTHOUSE CRAWFORDVILLE, GA 30631	CO. ROAD SUPERINTENDER COURTHOUSE CRAWFORDVILLE, GA 3063
CO. ROAD SUPERINTENDENT COURTHOUSE DANIELBVILLE, GA 30633	HON. BILL MADDEN CHM. MADISON CO. COMM. COUNTY COURTHOUSE DANIELSVILLE, GA 30633	HON. LOUIE CLARK DISTRICT 13 POST 1 ROUTE 2 DANIELSVILLE, GA 30633
DD. ROAD SUPERINTENDENT DOURTHOUSE ELBERTON, GA 30635	MR. BARNEY R. TAYLOR FUBLIC WORKS SUPT CITY OF ELBERTON 245 N. MCINTOSH ST ELBERTON, GA 30635	HON. BILLY BROWN CHM. ELBERT CO. COMM. COUNTY COURTHOUSE ELBERTON, GA 30635
HON. JOE FENDLEY SR. MAYDR P.O. BOX 746 CITY HALL ELBERTON, GA 30635	HON. CHARLES YEARGIN DISTRICT 14 P.O. BOX 584 ELBERTON, GA 30635	EDWARD SMITH CITY MANAGER F.O. BOX 207 FRANKLIN SPR., GA 3063
FON. HARVEY HIGDON CHM. GREENE CO. COMM. COUNTY COURTHOUSE GREENSBORD, GA 30642	HON. DEAN STEWART MAYOR 212 NORTH MAIN ST. CITY HALL GREENSBORO, GA 30642	STREET SUPERINTENDENT P.O. BOX 309 HARTWELL, GA 30643
CURRAN CABHION JUDGE P. G. HOX 237 HARTWELL, GA 30643	HON. BRUCE TEASLEY ROAD SUPERINTENDENT COUNTY COURTHOUSE HARTWELL, SA 30543	WALTER CLEVELAND HARTWELL POLICE DEPT. F.O. BOX 309 HARTWELL, GA 30643
HON. JOAN SALIBA MAYBR EAST HOWELL ST. CITY HALL HARTWELL, GA 30643	CECIL RENO CHIEF OF POLICE HARTWELL POLICE DEPT. P.O. BOX 309 HARTWELL, GA 30643	HON. PARKS BROWN DISTRICT 47 P.O. BOX 37 HARTWELL, GA 30643

-	HON. BILLY MILFORD DISTRICT 13 POST 2 ROUTE 3 HARTWELL, GA 30643	CO. ROAD SUPERINTENDENT COURTHOUSE LEXINGTON, GA 30648	HON. J. W. GRIFFITH COUNTY COURTHOUSE LEXINGTON, GA 30648
	CO. ROAÓ SUPERINTENDENT COURTHOUSE MADISON, GA 30650	MR. EDWARD ELLINGTON GA. TECH RESEARCH INST. REGIONAL OFFICE 235-8 SOUTH MAIN ST. MADISON, GA 30650	HON. WILLIAM COCHRAN ( MORGAN CO. COMM. COUNTY COURTHOUSE MADISON, GA 30650
	HON. R.L. ALLGOOD MAYOR P.G. BOX 32 CITY HALL MADISON, GA 30650	HON. ROY LAMBERT DISTRICT 66 P.O. BOX 169 MADISON, GA 30650	CITY ENGINEER P.O. BOX 725 MONROE, GA 30655
	JOHN STONE GENERAL MAINTENANCE P.O. BOX 1249 MONROE, GA 30655	CO. ROAD SUPERINTENDENT COURTHOUSE MONROE, GA 30655	STAN HUTCHINGS ASS'T SUPER'T P.O. BOX 1249 MONROE, GA 30655
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		MS. SARA CAMPBELL CITY CLERK CITY OF MONROE	HON. NEAL JACKSON DISTRICT 65 316 N. BROAD ST. MONROE, GA 30655
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	CG. ROAD SUPERINTENDENT CBURTHOUSE WINDER, GA 30690	CLIFFORD SYKES WINDER POLICE DEPT. 320 S. BROAD ST. WINDER, GA 30680	HON. JIM HARWELL CHM. BARROW CO. COMM. 310 SOUTH BROAD STREE WINDER, GA 30680

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CITY CLERK CITY ENGINEER COUNTY ENGINEER
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WINTERVILLE, GA 30683 CALHOUN, GA 30701 CALHOUN, GA 30701 MELVIN GREESON HON. HAROLD FAITH CHM.

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MAYDR

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HON. ROBERT KNOX MAYOR S.O. BOX 1017 DITY HALL THOMSON, SA 30824	HON. WARREN EVANS DISTRICT 84 P.O. BOX 535 THOMBON, SA 30884	CG. ROAD SUPERINTENDEN COURTHOUSE WARRENTON, GA 30828
JULIAN ABBOTT STREET SUPT. CLTY OF WARRENTON PO BOX 23 WARRENTON, GA 30828	HON. ALLEN MAY WARREN CO. DOMM. P.O. BOX 46 WARRENTON, GA 30828	HON. D. E. PHELPS BR. MAYOR P.O. BOX 103 CITY HALL WARRENTON, GA 30828

HON. RAY DELAIGLE CHM. BURKE CD. COMM. P.O. BOX 62 WAYNESBORO, GA 30830	CO. ROAD SUPERINTENDENT P.O. BOX 62 WAYNESBORD, GA 30830	HON. GEORGE DELOACH MAYDR 628 MYRICK ST. CITY HALL WAYNESBORD, GA 30830
STREET SUPERINTENDENT P.O. BOX 125 WRENS, GA 30833	HON. CHARLES WALKER DISTRICT 85 1402 12TH ST. AUGUSTA, GA 30901	DAVID POSS II AUGUSTA AREA OFFICE GEORGIA TECH 500 BLDG. SUITE 217 AUGUSTA, GA 30901
COUNTY ENGINEER CITY-COUNTY BLDG. AUGUSTA, GA 30902	HON. DAVID SHERROUSE CHM RICHMOND CO. ADM. COUNTY/CITY BLDG. Rm 605 AUGUSTA, GA 30902	U(3) B(L) (3)
CITY ENGINEER 530 GREEN STREET AUGUSTA, GA 30903	HON. THOMAS F. ALLGOOD DISTRICT 22 P.O. BOX 1523 AUGUSTA, GA 30903	HON. GEORGE BROWN DISTRICT 88 P.O. BOX 1114 AUGUSTA, 6A 30903
HBN. JACK CONNELL DISTRICT B7 P.O. BOX 308 AUGUSTA, GA 30903	W.S. JOHNSON SUPT. OF PUBLIC WORKS CITY OF AUGUSTA 1568 BROAD ST. AUGUSTA, GA 30904	MR. TIM MAUND EXECUTIVE DIRECTOR CENT. SAV. RIVER APDO P.O. BOX 2800 AUGUSTA, GA 30904
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DOUNTY ENGINEER A.O. BOX 11024 MARTINEZ, GA 30907	HON. WILLIAM JACKSON DISTRICT 83 3907 WASHINGTON RD. MARTINEZ, 6A 30907	T. R. SWEENEY CHIEF OF ENG. SERVICES F.O. BOX 11024 MARTINEZ, GA 30907
MR. DON BARTLES P.D. BOX 11024 MARTINEZ, BA 30907	MR. LARRY MATTHEWS PE GDOT ROUTE 2 4260 FRONTAGE ROAD AUGUSTA, GA 30909	HON. TRAVIS BARNES DISTRICT 90 407 AUMOND RD. AUGUSTA, GA 30909
HDN. DONALD CHEEKS DISTRICT 89 714 WESTMINSTER CT. AUGUSTA, SA 30909	CO. ROAD SUPERINTENDENT COURTHOUSE ABBEVILLE, GA 31001	HON. HARRY WALKER CHM. WILCOX CO. COMM. COUNTY COURTHOUSE ABBEVILLE, GA 31001
KENNETH HENRY SEST. SUPT. EMANUEL DOUNTY ROUTE 12 ROBERN, SA 31002	JOHN NEELY P.O. BOX 118 BUTLER, GA 31206	COUNTY MANAGER TAYLOR COUNTY COUNTY COURTHOUSE BUTLER, GA 31006
CC. ROAD SUPERINTENDENT DOURTHOUSE BUTLER, GA 31006	HON. RUFUS GREEN CHM. TAYLOR CO. COMM. COUNTY COURTHOUSE P. O. BOX 148 BUTLER, GA 31006	WILLIE MCCRARY ASST. SUPT. CITY OF BUTLER PO BOX 1809 BUTLER, GA 31006

HON. JAMES SPILLERS MAYOR P.O. BOX 476 CITY HALL BUTLER, GA 31006	HON. WARD EDWARDS DISTRICT 112 F.O. BOX 145 BUTLER, GA 31006	MAYOR O. W. KITCHENS F.O. BOX 36 BYROMVILLE, GA 31007
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CO. ROAD SUPERINTENDENT COUNTY COURTHOUSE COCHRAN, GA 31014	HON. CHARLES KILLEBREW MAYOR P.O. BOX B CITY HALL COCHRAN, GA 31014	CITY ENGINEER P.O. BOX 569 CORDELE, GA 31015
HON. W. M. DAVIS JR. CHM. CRISP CO. COMM. COUNTY COURTHOUSE CORDELE, GA 31015	DIRECTOR OF PUBLIC WORKS COUNTY COURTHOUSE CORDELE, GA 31015	HON. PERRY CULPEPPER MAYOR P.O. BOX 569 CITY HALL CORDELE, GA 31015
HON. HOWARD RAINEY DISTRICT 135 913 3RD AVE E CORDELE, BA 31015	TOMMY TRUITT PUBLIC WORKS SUPT. CITY OF CULLODEN PO BOX 37 CULLODEN, GA 31016	MAYOR CHARLES NORRIS P.O. BOX 38 CULLODIN, GA 31016
MAYOR H. J. CHANCE P.O. BOX 157 DANVILLE, GA 31017	HON. KENNITH MCNEELY MAYOR F.O. BOX 534 CITY HALL DAVISBORD, GA 31018	PUBLIC WORKS SUPT. COURTHOUSE DUBLIN, SA 31021
CITY EMBINEER F.D. BOX 890 DURLIN, GA 31021	HON. ALBERT FRANKS MAYOR P.O. BOX 690 CITY HALL DUBLIN, GA 31021	HON. BEDRGE GORNTO MAYOR 119 SOPERTON AVE. CITY HALL EAST DUBLIN, GA 31021
HON. DUBDSE PORTER DISTRICT 119 1771 BELLEVES RD. DUBLIA, GA 31021	CO. ROAD SUPERINTENDENT BOX 564 EASTMAN, GA 31023	HON. GUY TRIPP CHM. DODGE CO. COMM. BOX 564 EASTMAN, GA 31023
JOE NELSON OTROET SUPT. P.O. BOX 40 EASTMAN, GA 31023	GREG IVEY FOREMAN CITY OF EASTMAN PO ROX 40 EASTMAN, GA 31023	HON. MARVA MCBRIFF MAYOR P.O. DRAWER 40 CITY HALL EASTMAN, GA 31023
ADN. TERRY COLEMAN DISTRICT LLS E.S. BOX 187 DASTMAN, SA BLORS	MR. NICKY CABERD EXECUTIVE DIRECTOR HEART OF BEORGIA 501 DAK STREET EASTMAN, GA 31023	CO. ROAD SUPERINTENDE COURTAOUSE EATONTON, BA 31024
OBN. RDY VINING JR. CHM. RUTHUY OB. CGMM. DOUNTY COURTHBUSE EATENTON, GA. 31024	HON. J. P. MARGHALL MAYOR P.O. BOX 191 CITY HALL EATONTON, GA 31024	HON. JESSE COPELAN JR. DISTRICT 106 P.C. BCX 109 EATONTON, GA 31024

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HON. LINDA ARTHUR CHWM. MONROE CO. COMM. COUNTY COURTHOUSE FORSYTH, GA 31029	HON. RICHARD TRUITT MAYOR P.O. BOX 1447 CITY HALL FORSYTH, GA 31029	HON. KENNETH WALDREP DIST 80 87 N LEE ST P.O. BOX 657 FORSYTH, GA 31029
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MR. JERRY C. BRYAN COUNTY ENGINEER P.O. BOX 468 FORT VALLEY, GA 31030	P.U. BUX 336 CITY HOLL	HON. ROBERT RAY DISTRICT 98 ROUTE 1 FORT VALLEY, GA 31030
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CD. ROAD SUPERINTENDENT DOURTHOUSE JEAFERSONVILLE, GA 31044	MAYOR W. E. HAMRICK P.O. FOX 223 JEFFERBONVILLE, GA 31044	HDN. FREDDIE TIDWELL CRAWFORD CO. COMM. COUNTY COURTHOUSE KNOXVILLE, GA 31050
CC. ROAD SUPERINTENDENT COUNTY COURTHOUSE KNOXVILLE, GA 31052	HON. BILL CUMMINGS DISTRICT 17 508 MORGAN VALLEY RD. ROCKMART, GA 31053	CITY ENGINEER P.O. BOX 157 MCRAE, GA 31055

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HON. BOBBY PARHAM DISTRICT 105 P.D. BOX 606 MILLEDGEVILLE, GA 31061	MR. JIM GENTRY EXECUTIVE DIRECTOR OCONEE APDC P.O. BOX 707 MILLEDGEVILLE, GA 31061	STREET SUPERINTENDENT CITY HALL MONTEZUMA, GA 31063
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HON. JIMMY LORD DISTRICT 107 F.D. BOX 254 SANDERSVILLE, GA 31082	HON. GEORGE LOTT CHM. HANCOCK CO. COMM. P.O. DRAWER I SPARTA, GA 31087	CO. ROAD SUPERINTENDER COUNTY COURTHOUSE SPARTA, GA 31087
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CD. ROAD SUPERINTENDENT COURTHOUSE VIENNA, 6A 31092	MAYOR JOHN BRADLEY CITY OF LILLY LILLY, GA 31092	HON. WAYNE J. WEST DOOLY CO. COMM. COUNTY COURTHOUSE P.O. BOX 322 VIENNA, GA 31092
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HON. TED WADDLE DISTRICT 113 115 TANGLEWOOD DR. WARNEP ROSING, GA 31093	. HDN. ARTHUR WHITE HOUSTON CO. COMM. 900 CARL VINSON PKWY WARNER ROBINS, GA 31093	CO. ROAD SUPERINTENDE COURTHOUSE WRIGHTSVILLE, GA 3109
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	HDN. RALPH JOHNSON MAYOR DITY DY WARNER ROBINS P.O. BOX 1480 WARNER ROBINS, SA 31099	HON. ROY WATBON JR. DISTRICT 114 F.O. BOX 1905 WARNER ROBINS, GA 310
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COUNTY ENGINEER COUNTY COURTHOUSE ROOM 408 MACON, GA 31201	HDN. RICHARD GREENE DISTRICT 26 SUITE 517 TRUST CD. BANK BUDG. MACON, GA 31201	HON. FRANK HORNE JR. DISTRICT 103 850 WALNUT ST. MACON, GA 31201
HON. DAVID LUCAS DISTRICT 102 448 WOOLFOLK ST. MACON, GA 31201	HON. FRANK PINKSTON DISTRICT 100 852 WALNUT ST. MACON, GA 31201	MR. CHARLES HOWELL EXECUTIVE DIRECTOR MIDDLE GEORGIA APDC 711 GRAND BUILDING MACON, GA 31201
DITY ENGINEER P.O. BOX 247 MACON, GA 31202	HON. DENMARK GROOVER DISTRICT 99 P.O. BOX 755 MACON, GA 31202	HON. WILLIAM RANDALL DISTRICT 101 P.O. BOX 121 MACON, GA 31202
LINDA HAMPTON BERVICES DIRECTOR GLDER AMERICANS COUNCIL OF MIDDLE GEORGIA P.O. BOX 6766 MACON, GA 31208	GEORGE LEE CENTRAL GEORGIA AREA OFFICE GEORGIA TECH 1818 FORSYTH ST. SUITE 105 P.O. BOX 5105 MACON, GA 31208	HON. J. RDY ROWLAND US REP 8TH DIST 451 COLLEGE ST PO BOX 6258 MACON, GA 31208
SST. ALLEN BUSBEE BIBB CO. SHERRIFF DEPT. 728 WIMMISH ROAD MACON. GA BIB10	WALTER R. CENTER OPERATIONS OFFICER BIBB COUNTY 4520 KNIGHT RD. MACON, GA 31210	HON. GEDRGE ISRAEL MAYOR P.O. BOX 247 MACON, GA 31298
JEE WITHERINGTON DITY ENGINEER F.G. BOX 247 MACON, GA 31296	HON. EMBRY GREENE CHM. BIBB CO. COMM. P.G. BOX 4708 MACON, GA 31298	BOB FBUNTAIN BIBB COUNTY MANAGER P.D. BOX 4708 MACON, GA 31298
MR. BILL WIKLE TRAFFID ENBINEER P.C. BOX 4708 MEDDY, BR BIRBS	HDN. W. E. TAYLOR MAYDR P.B. BOX 216 CITY HALL BLOOMINBDALE, GA 31382	CD. ROAD SUPERINTENDE COURTHDUSE DARIEN, GA 31305
L. E. OWENS DEMISE OF POLICE DITY OF DARIEN P.O. BOX 458 DARIEN, BA 31305	HON. R. D. GARDNER CHM. McINTOSH CO. COMM. P.O. BOX 584 DARIEN, GA 31305	HON. STEWART CARROLL MAYOR F.O. BOX 452 CITY HALL DARIEN, GA 31305
MR. RICHARD MOORE DIR OF PUBLIC WORKS DITY IF POOLER COD EQUITY ROSERS ST COULTY, PA BUDIE	CD. ROAD SUPERINTENDENT P.O. BOX 81 HINESVILLE, GA GIBID	FUBLIC WORKS SUPT. 15 E. SOUTH STREET AINESVILLE, BA BIBIR
HON. JAMES FLOYD CHM. LIPERTY DO. DOMM. DOUNTY COURTHOUSE HINESVILLE. GA 31313	HON. CARL DYKEE MAYOR 115 E. SOUTH ST. CITY HALL HINESVILLE. GA 31313	HON. GLENN BRYANT DISTRICT 3 P.O. BOX 585 HINESUILE BO 31313

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STREET SUPERVISOR
PUBLIC WORKS
CO. ROAD SUPERINTENDENT
LONG COUNTY COMM.
SIB E.G. MILES PKWY
COURTHOUSE
HINESVILLE, GA 31313
LUDOWICI, GA 31316

SAMUEL PARLIN
CHIEF OF POLICE

HON. LONNIE SKEENS CHM.
LONG CO. COMM.
CDUNTY COURTHOUSE
LUDOWICI, GA 31316

CO. ROAD SUPERINTENDENT
COUNTY COURTHOUSE
PEMBROKE, GA 31321

SAMUEL PARLIN
CHIEF OF POLICE
PEMBROKE P.D.
PEMBROKE P.D.
P.O. BOX 128
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PRATT LOCKWOOD

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DIRECTOR

SENIOR CITIZEN & RECREATION

DRYAN CBUNTY

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BRYAN CO. COMM.

COUNTY COURTHOUSE BOX

RICEBORO, 5A 31323

RICHMOND HILL, 5A 3132

HON. GEORGE SARAF

MAYOR

P.D. BOX 232

P.D. BOX 128

CITY HALL

RINCON, GA 31326

HON. CHARLES HOSTI

MAYOR

CO. ROAD SUPERINTENDER

COURTHOUSE

SPRINGFIELD, GA 31329

LLOYD FULCHER

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HON. NOEL CONAWAY CHM.

EFFINGHAM CO. EFFINGHAM CO. COMM.

P.O. BOX 341

SPRINGFIELD, GA 31329

BRADWELL USHER

SUP'T OF P.W.

CITY OF SPRINGFIELD

P.O. BOX 377

SPRINGFIELD, GA 31329

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ROUTE#1
BPRINGFIELD, GA 31329
DARIEN, GA 31331

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CHATHAM DD. COMM. DISTRICT 127 CHATHAM DOUNTY ENSINES
COUNTY COURTHOUSE 1406 LAW DR. 133 MONTGOMERY ST.
SAVANNAH, GA 31401 SAVANNAH, GA 31401 SAVANNAH, GA 31401

TED R. GAMMON MR. BILL LECHER
ASST. COUNTY ENGINEER ASST COUNTY ENGINEER MICHAEL JOYNER
CHATHAM COUNTY CHATHAM COUNTY VEH. MAINTENANCE DIR.
133 MONTGOMERY STREET 133 MONTGOMERY STREET CITY OF SAVANNAH
PODM 502 ROOM 602 1100 W. GWINNETT ST.
PAYRNARA, SR 31401 SAVANNAH, SA 31402

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CITY OF SAVANNAH GAMBLE BUILDING EAST BAY STREET
FO BOX 1027 P.D. BOX 1027 P.D. BOX 1027
SAVANNAH, GA 31402 SAVANNAH, GA 31402

FREEXAN CROSS JR.

DIR. OF PORT PLANNING

ASS'T TRAFFIC ENGINEER

AND HARDOR DEVELOPMENT

STREET SUPERINTENDENT

DITY OF SAVANNAH

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P.O. BOX 1027

SAVANNAH, BA 31402

SAVANNAH, BA 31402

SAVANNAH, BA 31402

SCHN ROUBAKIS

MAYOR

P.O. BOX 1027

P.O. BOX 8161

P.O. BOX 9586

SAVANNAH, GA 31402

HON. TOM TRIPLETT

DISTRICT 128

P.O. BOX 9586

SAVANNAH, GA 31402

SAVANNAH, GA 31402

HDN. F DISTRI P.D. E SAVANA	ALBERT SCOTT LOT 2 HDX 1704 NAH, GA 31402	HON. TOM COLEMAN DISTRICT 1 P.D. BOX 22398 SAVANNAH, GA 31403	HON. JAMES PETREA MAYDR 2702 MECHANICS AVE. CITY HALL THUNDERBOLT, GA 31404
DHATHS PUBLIC P.D. B	WILLIAMSON AM COUNTY C.WORKS BOX 13236 NAH, GA 31404	DISTRICT 153	HON. DEWAYNE HAMILTON DISTRICT 124 P.O, BOX 14562 SAVANNAH, GA 31406
RAVANN	EDENS NAM AREA OFFICE (A TECH RBERCORN ST. BOX 13817 NAM, GA 31406	DISTRICT 126	HON. BOBBY PHILIPS DISTRICT 125 9219 MELODY DR. SAVANNAH, GA 31406
MAYOR T.O. I CITY F	80% 4085 KALL	5 5 55V 75.45	HON. RONALD GINSBERG DISTRICT 122 P.D. BOX 10105 -SAVANNAH, 6A 31412
48709 5177 : 90 80)	4811 X 7 <b>54</b> 8	MR. R. P. SCHWARTZ CITY ADMINISTRATOR PO BOX 7548 GARDEN CITY, GA 31418-7548	CITY ENGINEER P.O. BOX 198 WAYCROSS, GA 31501
OD. RO DBYRTH MMYORI	DAD SUPERINTENDENT HOUSE DBS, G9 31501	HON. THOMAS GRAY CHM. WARE CO. COMM. COUNTY COURTHOUSE WAYCROSS, GA 31501	HON. TOM CROSBY JR. DISTRICT 150 705 WACONA DR. WAYCROSS, GA 31501
	PORRY DIXOM IOT (Bi IOTRAL RD, ISB, <b>BA Bi501</b>	KENNETH HAYES SOUTHEAST SA APDO 3243 HARRIS RD. WAYDROSS, SA 31501	JIMMY MCCALL AREA ENGINEER GEORGIA DOT 104 NORTH NICHOLS ST. WAYORDSS, GA 31501
왕우래王 ( 학생의 학)	KILMARK DD. PLANNING DEPT POVE AVENUS DPR, GP BISOI	DERRELL McDANIEL WARE CD. MANABER P.O. BCX 1069 WAYCROSS, GA 31501	C. B. HEYS CITY MANASER P.O. DRAWER :99 WAYDROSS, SA 31501
90, <b>0.</b> I	OPRIMER 198	HARRY HUGHES P. W. DIRECTOR WARE DOUNTY ROUTE 1 BOX 24 WAYORGSS, SA 31501	C. B. HEYS CITY MANAGER CITY OF WAYERDSS PD BOX 198 WAYERGSS, GA 31502
কা প্ৰাক্তি কিল্পিড	ASH WILLIAMS Tive Director Part Seneria appo Part Prae Tea, Tea Biori	MR. SAM RAY TROFFIC ENGINEER DITY OF WAYDRORS P.O. DRAWER 198 WAYDROSS, FR 2:509	CO. ROAD BUPERINTENDEN COURTHOUSE P.MP. SR 315:0
	DIEDN DARVER CHM. OD. DOMM. Y DOURTHOUSE GR 31510	HON. JAMES DEEN MAYOR F.O. BOX 429 CITY HALL ALMA, GA 31510	PON. TOMMY SMITH DISTRICT 152 ROUTE 1 ALMA, GA 31510

STREET SUPERINT F.O. BOX 180 BAXLEY, GA 3151	ENDENT	MARSHA BLISS ALTAMAHA GA SOUTHERN AFDC P.D. BOX 328 BAXLEY, GA 31513	HON. E.F. HUNTER CHM. APPLING CO. COMM. COUNTY COURTHOUSE
HON. WILLIAM T. MAYOR P.D. BOX 180 CITY HALL BAXLEY, GA 3151	TURNER	HON. LUNSFORD MODDY DISTRICT 153 POST 1 P.O. BOX 32 BAXLEY, GA 31513	BAXLEY, GA 31513  MR. TED FORTING EXECUTIVE DIRECTOR ALTAMAHA GA. SOUTHERN APDC P.O. BOX 328 BAXLEY, GA 31513
CO. ROAD SUPERI COURTHOUSE BLACKSHEAR, GA	NTENDENT 31516	HON. FORREST SWEAT CHM. PIERCE CO. COMM. COUNTY COURTHOUSE BLACKSHEAR, GA 31516	HON. HARRY G. ADAMS MAYOR P.O. BOX 268 CITY HALL BLACKSHEAR, GA 31516
COUNTY ENGINEER COURTHOUSE BRUNSWICK, GA 3	1520	JIMMY HORTON TRAFFIC SAFETY ENG. GLYNN CO. P.W. NORWICH ST. EXT. BRUNSWICK, GA 31520	HON. JOHN MCCLURD CHM. GLYNN CO. COMM. COUNTY COURTHOUSE BRUNSWICK, GA 31520
V. D. BESSING SLYNN DB. P.W. NORWICH ST. EXT BRUNSWICK, SA 3	1520	ROY BROGDON COUNTY ENGINEER 1803 GLOVCESTER ST. BRUNSWICK, GA 31520	ED STELLE COMMUNITY DEVELOPMENT 1803 GLOVCESTER ST. BRUNSWICK, GA 31520
HON. DEAN AUTEN DISTRICT 156 628 KINS COTTON BRUNSWICK, BA 3	ROW	MR. GEORGE RIVERS GA. TECH RESEARCH INST. REGIONAL OFFICE ZELL BUILDING-OFFICE 5 502 GLOUCESTER STREET BRUNSWICK, GA 31520	ELLEN CHAMPOUX PROGRAMS COORDINATOR VOLUNTEER ASSISTANCE L 1326 UNION STREET BRUNSWICK, GA 31520
FON. SHAW MOVET DIGTRIOT (55 BEGE BASS ST. BRUNSWICK, SA Z	5H 1520	9. E. GRINER DISTRICT PROGRAM MANAGER P.D. BOX 1219 BRUNSWICK, GA 31520	MR. JIMMY HORTON GLENN CO. PUBLIC WORKS P.O. BOX 879 BRUNSWICK, GA 31520
DICK NEWBERN CDASTAL APDD P.C. BCX 1917 PRINEWICK, BA 3	1521	CHAIRMAN COUNTY COMMISSION P.C. BOX 879 BRUNSWICK, BA 31521	COUNTY PLANNING DEPT. P.G. BOX 1495 BRUNSWICK, GA 31521
DITY ENGINEER 9.C. BDX 550 BRUNSWICK, SA 3	1521	GERALDINE KENNEDY SERVICES COORDINATOR COASTAL GEORGIA APDC P.D. BOX 1917 BRUNSWICK, GA 31521	HON. ALBERT KNIGHT III MAYOR P.O. BOX 550 CITY HALL BRUNSWICK, GA 31521
BRUDE BLIAS TRANSPORTATION DDASTAL BEORGIA P.S. BOX 1817 BRUNSWIDM, GA B	PLANNER APDE 1521	MR. VERNON MARTIN EXECUTIVE DIRECTOR COASTAL APDC P.C. DRAWER 1917 BRUNSWICK, GA 31521	MAREIA TUTTLE GOLDEN ISLES BICYCLE CLUB ROUTE 9 P.O. BOX 287 ST. SIMONS IS., GA 315
CITY ENGINEER P.O. BCX 470 DOUGLAS, GA 315	33	SHERMAN DUDLEY SE GEORGIA AREA OFFICE 405 N. PETERSON AVE. P.O. BOX 1244 DOUSLAS, GA 31533	JOHN SWEAT ASS'T CHIEF OF POLICE DOUGLAS POLICE DEPT. 225 W. BRYAN ST. DOUGLAS, GA 31533

BRANTLEY CO. COMM. COUNTY COURTHOUSE NAHUNTA, GA 31533	HON. FRANK JACKSON CHM. COFFEE CO. COMM. COUNTY COURTHOUSE DOUGLAS, GA 31533	CO. ROAD SUPERINTENDEN COUNTY COURTHOUSE DOUGLAS, GA 31533
HDN. JIM MINIX MAYOR P.D. DRAWER 470 CITY HALL DOUSLAS, GA 31533	HON. JESSE CREWS CHM. CHARLTON CO. COMM. 100 THIRD STREET FOLKSTON, GA 31537	WILLIAM CARTER CHAIRMAN CHARLTON CO. COMM. 100 3RD STREET FOLKSTON, GA 31537
COUNTY ENGINEER 100 3RD. STREET FOLKSTON, GA 31537	CO. ROAD SUPERINTENDENT COURTHOUSE HAZLEHURST, GA 31539	STEVEN LAND CHIEF OF POLICE HAZLEHURST P.D. 132 LATIMER ST. HAZLEHURST, GA 31539
STREET SUPERINTENDENT P. S. BOX 396 HAZLEHURST, GA 31539	HON. DAN MIMS CHM. JEFF DAVIS COMM. COUNTY COURTHOUSE BOX 652 HAZLEHURST, GA 31539	HON. LARRY CONTOS MAYOR P.O. BOX 396 CITY HALL HAZLEHURST, GA 31539
HON. ROGER BYRD DISTRICT 153 POST 2 302 N. ROGERS ST. HAZLEHURST, GA 31539	CO. ROAD SUPERINTENDENT COURTHOUSE JESUP, GA 31545	MARTHA BURNS DIRECTOR WAYNE CD. DAY CARE CEN P.D. BOX 1163 JESUP, GA 31545
	ELIZABETH PEACH	MR. JUAN DURRANCE
STREET SUPERINTENDENT R.C. BOX 427 JECUP, BA 31545	COMMUNITY COORDINATOR WAYNE CO. CAC	DISTRICT ENGINEER GDOT DISTRICT 5 GENERAL DELIVERY JESUP, GA 31545
DOYTE STEN DISECTES LAYNE DD. SERVICE CTR. ROUTE 1 BOX 47 JESJP, GA 31545	HON. JOHN TYRE CHM. WAYNE OD. COMM. COUNTY COURTHOUSE JESUP, GA 31545	HON. JERRY McDANIEL MAYOR P.O. BOX 427 CITY HALL JESUP, GA 31545
KR. KERNY BERTON A.D. Rox Løsz Jedut, er Biba	CD. RDAD SUPERINTENDENT COURTHOUSE A R1547	HON. FRED SUTTON MAYOR P.O. BOX 397 CITY HALL KINSSLAND, GA 31548
DE. ROAD SURE COUNTY DEURTH NAHONTA, BA 3	3 1 HUNTA 56 A 31553	CITY ENGINEER 418 OSBORNE ST. SAINT MARYS, SA 31558
HILL GERD HE NAMES NAMES DEBINE NAMES OF SECURITY	8 MBCRE 129 W, 33 Dtt57	HON. HARRY DALLAHAN DA DAMDEN DO. COMM. DOUNTY DOURTHOUSE WOLLDINE, GA BISSS
OT, READ BU BOLATY DOUR UNKNEYNE F	NGINEER, 1349	BRAYBON POWELL JR. BOYTH BA. AREA PLANNING & DEV. DOMM. P.O. BOX 1223

HON. JIMMY WOODARD CHM. HON. FRANK JACKSON CHM.

WALTER WACTER CHIEF DEPUTY LOWNDES CO. SHERIFF 111 ROSWELL DR. VALDOSTA, GA 31601	CITY ENGINEER P.O. BOX 1125 VALDOSTA, GA 31601	VICKIE ELLIOTT COMM. SERVICES COORDI P.O. BOX 1645 VALDOSTA, GA 31601
HON. FRED DELOACH CHM. LOUNDES CO. COMM. ROX 1349 VALDOSTA, GA 31601	HON. ERNEST NIJEM MAYOR P.O. BOX 1125 CITY HALL VALDOSTA, GA 31601	HON. JAMES BECK DISTRICT 148 2427 WESTWOOD DR. VALDOSTA, GA 31601
HBN. LOYCE TURNER DISTRICT 8 P.O. BOX 157 VALDOSTA, BA 31601	MR. HAL DAVIS EXECUTIVE DIRECTOR SOUTH GEORGIA AFDC F.O. BOX 1223 VALDOSTA, GA 31601	JOHN LAWSON TRANSPORTATION PLANNE SOUTH GEORGIA APDC P.O. BOX 1223 VALDOSTA, GA 31603
MARTY LEFILES COMPTROLLER SOUTH GEORGIA APDC P.O. BOX 1223 VALDOSTA, GA 31603	STREET SUPERINTENDENT P.O. BOX 409 ADEL, GA 31620	HON. ARLIE WALKER CHM COOK CO. COMM. COUNTY COURTHOUSE ADEL, GA 31620
CO. ROAD SUPERINTENDENT COUNTY COURTHOUSE ADEL, GA 31620	HON. W. F. BOZEMAN MAYDR P.O. BOX 658 CITY HALL ADEL, GA 31620	WAYNE GIDDENS ASSISTANT PUBLIC WORK CITY OF ADEL P.O. BOX 658 ADEL, 6A 31620
JOHN FLYTHE CITY MANAGER CITY OF ADEL P.O. BOX 658 ADEL, GA 31620	HON. D. E. WEBB MAYDR 102 SOUTH CHURCH ST. CITY HALL HAHIRA, GA 3:532	STREET SUPERINTENDENT 200 W. DAME AVENUE HOMERVILLE, GA 31634
FIN. STIRGE SIRMANS DHM. DLINCH CO. COMM. COUNTY COURTHOUSE HOMERVILLE, GA 31634	CO. ROAD SUPERINTENDENT COUNTY COURTHOUSE HOMERVILLE, GA 31634	HON. CHESTER DAY MAYOR 200 WEST DAME AVE. CITY HALL HOMERVILLE, GA 31634
DO. ROAD BUPERINTENDENT TOURTHOUSE LANGUAND, SA BIBBB	HON. JIM WHITE CHM. LANIER CD. COMM. COUNTY COURTHOUSE LAKELAND, 68 31835	HON. JAMES SHAW MAYOR 122 S. VALDOSTA RD. CITY HALL LAKELAND, GA 31635
HON. RIBERT PATTEN DISTRICT 149 ROUTE 1 BOX 180 LAKELAND, SA 31635	GRADY BRYAN JR. TRAFFIC SIGNAL TECH. GA. DOT RT 1 BBX 1 LENOX, GA 31637	HON. JERRY COFFEE MAYOR P.O. BOX 250 CITY HALL MORVEN, GA 31638
STREET SUPERINTENDENT F.C. RIX 495 FRA FILLE, BA 21639	EVELYN BALDREE COMMUNITY BERVICE 266 NORTH DAVIS NASHVILLE, 64 31839	HON. JOE STALLINGS CH BERRIEN CO. COMM. P.O. BOX 446 NASHVILLE, SA 31635
OO. ROAD SUPERINTENDENT COUNTY COURTHOUSE	HON. DEWEY HAND MAYDR P.G. BOX 495 CITY HALL	HON. HANSON DARTER DISTRICT 146 P.O. BOX 711

HON. ED PERRY DISTRICT 7 ROUTE 2 NASHVILLE, BA 31639	JOHNNY ROSS ROAD SUPT. BERRIEN COUNTY NASHVILLE, GA 31639	CO. ROAD SUPERINTENDEN P.O. BOX 518 PEARSON, GA 31642
	HON. FOSTER DAVIS MAYOR P.G. BOX 295 CITY HALL PEARSON, GA 31642	STREET SUPERINTENDENT P.O. BOX 208 QUITMAN, GA 31643
CD. ROAD SUPERINTENDENT COUNTY COURTHOUSE GUITMAN, GA 31643	ERUUKS CU. CUMM. COUNTY COURTHOUSE	HON. WAYNE CARROLL MAYOR P.O. BOX 208 CITY HALL GUITMAN, GA 31643
HON. HENRY REAVES DISTRICT 147 ROUTE 2 GUITMAN, GA 31643	JUANELLE S. WILSON MAYOR P.O. BOX 128 RAY CITY, GA 31645	CO. ROAD SUPERINTENDEN COURTHOUSE STATENVILLE, GA 31648
HON. DAN DELGACH CHM. ECHBLE CD. COMM. CLUMTY COURTHOUSE STATENSVILLE, SA 31648	HDN. CHARLES HATCHER US REP 2ND DIST 225 PINE AVE ROOM 201 PO BOX 1932 ALBANY, GA 31701	CITY ENGINEER P.O. BOX 447 ALBANY, GA 31702
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-11. TOXXY CHAMBLESS DISTRICT 133 F.G. BOX 2008 ALFANY, GA 31702	HON. AL HOLLAWAY DISTRICT 12 P.O. BOX 588 ALBANY, GA 31702	HON. JAMES H. BRAY MAYOR P. 0. BOX 447 CITY HALL ALBANY, GA 31703
MR. STU MORING DEBIGN ENGINEER DEPT. OF PUBLIC WORKS 1976 V. YOKROF ST. P.O. SOX 447 ALMAKY. SA D1708	ME SONE DECISE	HDN. MARY YOUNG DISTRICT 134 423 HOLLOWAY AVE. ALBANY, GA 31703
HON. JOHN WHITE DISTRICT 132 P.O. BCX 3506 RLBANY, GA 31706	DOWNA LAUE PROGRAM MONITOR SOWEGA COUNCIL ON AGING 1410 GAKRIDGE DRIVE ALBANY, GA 31708	EDWARD HARDISON III SW GEORGIA AREA DFFICE GEORGIA TECH 2402 DAWSON RD. SUITE DAWSON, GA 31707
TIDETM TREPREER DOURTHOUSE UKRECOLO, SP 31709	DITY ENGINEER P.D. BOX 886 AMERICUS, GA 21709	HON. 3. WADE HALSTEAD SUNTER OO. DOWN. COUNTY COURTHOUSE BOX 235 AMERICUS, GA 31789

HIN. RUSSELL THOMAS MAYOR. P.O. BOX M. CITY HALL

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DISTRICT 115 MAYOR L. F. EASTERLIN
P. G. BOX 35
OMERICUS CO. 34700

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JAMES DAVIS ASS'T CHIEF ASHBURN POLICE DEPT. EAST MENROE AVE. ASHBURN, GA 31714	CITY ENGINEER F.O. BOX 766 ASHBURN, GA 31714	HON. BENNY DENHAM CHM. TURNER CO. COMM. COUNTY COURTHOUSE ROUTE 2 ASHBURN, GA 31714
HON. J. I. YOUNGBLOOD MAYOR F.O. BOX 766 CITY HALL ASHBURN, GA 31714	CITY ENGINEER P.O. BOX 158 BAINBRIDGE, GA 31717	COUNTY ENGINEER COURTHOUSE BAINBRIDGE, GA 31717
HON. CLIFFORD DOLLAR CHM. DECATUR CO. COMM. COUNTY COURTHOUSE BAINBRIDGE, GA 31717	HON. BILL K. REYNOLDS MAYOR P.O. BOX 158 CITY HALL BAINBRIDGE, GA 31717	HON. WALTER COX DISTRICT 141 202 WEST ST. BAINBRIDGE, GA 31717
JAMES F. TYSON SR. DEPUTY WARDEN CORRECTIONAL INST. DECATUR COUNTY ROUTE #3 BOX 1218 BAINBRIDGE, GA 31717	STREET SUPERINTENDENT P.O. BOX 350 BLAKELY, GA 31723	CO. ROAD SUPERINTENDEN P.O. BOX 525 BLAKELY, GA 31723
HON. ROSCELL ELLIS CHM. EARLY CO. COMM. COUNTY COURTHOUSE BLAKELY, GA 31723	HON. JAMES RICHARDSON MAYOR P.O. BOX 350 CITY HALL BLAKELY, GA 31723	HON. RALPH BALKCOM DISTRICT 140 ROUTE 1 BLAKELY, GA 31723
PON. BIMMY TIMMONS DISTRICT 11 .GR & WOODLAWN ST BLARELY, GA B1723	WAYLON LACEY CITY ENGINEER CITY OF BLAKELY P.O. BOX 350 BLAKELY, GA 31723	STREET SUPERINTENDENT P.O. BOX 29 CAIRO, GA 31728
W. E. BARRINEAU COUNTY ADMINISTRATOR GRADY COUNTY D.D. BOX 90 LAIRC, GA 31788	HON. KELSO COOPER CHM. GRADY CO. COMM. COUNTY COURTHOUSE CAIRO, GA 31728	CO. ROAD SUPERINTENDEM P.O. BOX 90 CAIRO, GA 31728
ADA. FRANK DANNON JR. MAYOR P.D. BOX 29 DITY RALL DAIRO, GA 31728	HON. BOBBY LONG DISTRICT 142 1466 6TH ST. NW CAIRD, GA 31728	CO. ROAD SUPERINTENDER COURTHOUSE CAMILLA, GA 31730
WILLIAM BARTON TRANSPORTATION PLANNER FOUTHWEST GEORGIA APDO P.C. BOX 345 DANIULA, BA 31730	STREET SUPERINTENDENT P.O. BDX 328 CAMILLA, 6A 31730	HDN. CHARLES LODGE CHY MITCHELL CO. COMM. COUNTY COURTHOUSE , DAMILLA, GA 31730
GON. A. A. MONEIL JR. MAYOR P.C. BOX 328 DITY HALL DAMILLA, BA 31730	MS. CARROLL UNDERWOOD EXECUTIVE DIRECTOR SOUTHWEST GEORGIA APDO P.O. BOX 346 CAMILLA, GA 31730	HON. PAUL TRULOCK DISTRICT 10 P.O. BDX 68 CLIMAX, GA 31734

CO. ROAD SUPERINTENDENT COURTHOUSE COLQUITT, GA 31737	STREET SUPERINTENDENT 154 E. COLLEGE STREET COLQUITT, GA 31737	HON. B. A. JONES JR. C MILLER CO. COMM. COUNTY COURTHOUSE COLQUITT, GA 31737
HON. HENRY COOK MAYOR 154 E. COLLEGE AVE. CITY HALL COLQUITT, GA 31737	HGN. ALLEN SHERROD DISTRICT 143 ROUTE 1 COOLIDGE, GA 3173B	CO. ROAD SUPERINTENDEN COURTHOUSE CUTHBERT, GA 31740
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HON. GERALD GREENE DISTRICT 130 RT. 3 BOB 119 CUTHBERT, GA 31740	CO. ROAD SUPERINTENDENT COURTHOUSE DAWSON, GA 31742	DOROTHY WARD TRANSPORTATION COORDIN 433 SOUTH OAK STREET DAWSON, GA 31742
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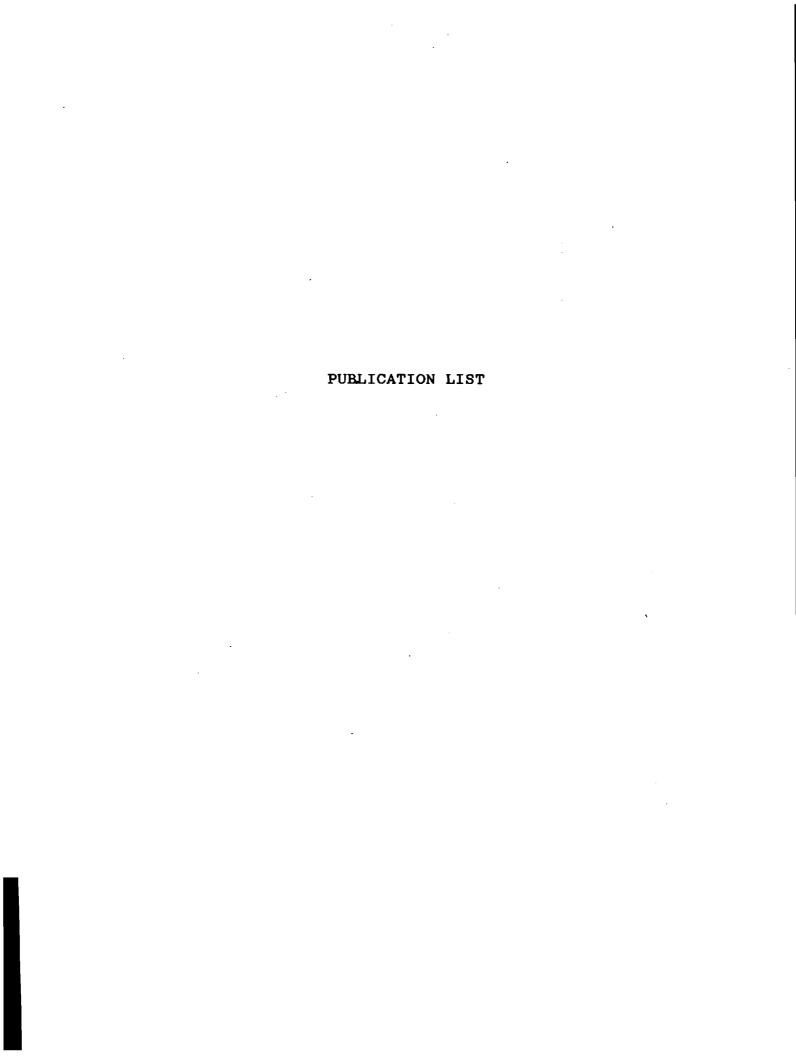
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- FHWA , 1984 20 1 Agency - 6 Subject - 28 Newsletter - 0

COMMUTER AND EXPRESS BUS SERVICE IN THE SCAG REGION

- SCAG TRANSIT SECTION , 1982 58+ 1
Agency - 1 Subject - 1 Newsletter - 0

COMPARISION OF THREE COMPACTORS USED IN POTHOLE REPAIR

- COLD REGIONS LAB , 1984 14 14 Agency - 6 Subject - 21 Newsletter - 14

COMPILATION OF STATE LAWS AND REGULATIONS ON MATTERS AFFECTING RAIL HIGHWAY CROSSINGS

- ASS OF AMER RR , 1983 425+ 1
Agency - 9 Subject - 2 Newsletter - 4

COMPUTERIZED SIGNAL SYSTEMS: OVERVIEW AND PRODUCT SUMMARIES

- FHWA , 1982 100+ 1 Agency - 6 Subject - 10 Newsletter - 0

CONNECTIONS FOR MODULAR PRECAST CONCRETE BRIDGE DECKS

- THE CONSULTING ENGINEERS GROUP INC. IL, 1983 107+ 1
Agency - 6 Subject - 12 Newsletter - 0

### CONSUMER INFORMATION CATALOG

- CONSUMER INFORMATION CENTER, 1986 16 1
Agency - 37 Subject - 24 Newsletter - 0

### CODRDINATION OF TRANSPORTATION RESOURCES: THE GEORGIA EXPERIENCE

- GDDT , 1985 17 1 Agency - 15 Subject - 4 Newsletter - 0

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- NASA , 1984 350 1 Agency - 32 Subject - 22 Newsletter - 0

### COUNTY STORM DRAINAGE MANUAL

- PURDUE UNIV , 1981 300+ 2
Agency - 8 Subject - 13 Newsletter - 0

### CULVERT INSPECTION MANUAL

- FHWA , 1986 205 5 Agency - 6 Subject - 12 Newsletter - 16

#### DECAY IN WOOD BRIDGES

- CLARK AND ESLYN USDA, 1983 49+ 17
Agency - 10 Subject - 12 Newsletter - 14

# DECISION PROCEDURES IN TRANSIT STATION DESIGN

- UNIV OF VIRGINIA , 1981 59 1
Agency - 4 Subject - 1 Newsletter - 0

# DESCRIPTIONS OF TRANSIT MAINTENANCE MANAGEMENT INFORMATION SYSTEMS UMTA

- , 1984 277 1 Agency - 1 Subject - 1 Newsletter - 0

### DESIGN EXAMPLES FOR STEEL BOX GIRDERS

- FHWA , 1986 50+ 1 Agency - 6 Subject - 12 Newsletter - 15

# DESIGN GUIDELINES FOR RAISED AND TRAVERSABLE MEDIANS IN URBAN AREAS

- UNIV OF VA AND VADDT , 1983 44+ 1
Agency - 27 Subject - 22 Newsletter - 0

### DESIGN TECHNICAL BULLETINS

- INT SLURRY SEAL ASSOCIATION , 1984 75+ 1
Agency - 41 Subject - 6 Newsletter - 0

DETERMINATION OF PEAK DISCHARGE AND DESIGN HYDROGRAPHS FOR SMALL WATERSHEDS IN INDIANA

- PURDUE UNIV , 1964 106 1

Agency - 8 Subject - 13 Newsletter - 0

DEVELOPMENT OF A HIGH PRESSURE WATER JET FOR THE RAPID REMOVAL OF CONCRETE

- DAEDALEAN ASS INC. MD, 1983 52+ 1

Acency - 6 Subject - 14 Newsletter - 0

DEVELOPMENT OF A MAINTENANCE MANAGEMENT SYSTEM FOR GA COUNTIES

- UNIV SA , 1975 59 1

Agency - 11 Subject - 8 Newsletter - Ø

DEVELOPMENT OF THE CALIFORNIA PAVEMENT MANAGEMENT SYSTEM VOL. 1

- CA DOT , 1978 198+ 2

Agency - 6 Subject - 6 Newsletter - 0

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- CA DOT , 1978 59 1

Agency - 6 Subject - 6 Newsletter - 0

DIAMOND INTERCHANGE PROGRAM USERS MANUAL

- CALTRANS , 1980 80+ 2

Agency - 6 Subject - 10 Newsletter - 0

DIGEST OF INFORMATION ON

SUPER WATER REDUCERS

- EXPERIMENTAL PROJECTS PROGRAM , 1984 21 1 Agency - 14 Subject - 6 Newsletter - 0

DITCH WITCH

- CHARLES MACHINE WORKS , 1986 100+ 1 Agency - 34 Subject - 11 Newsletter - 0

DRAINAGE OF HIGHWAY PAVEMENTS

- TYE ENG INC VA. 1984 136 2 Agency - 6 Subject - 13 Newsletter - 6

DURABLE POVEMENT MARKING MATERIALS WORKSHOPS

> - DINGLE ASS. INC DC, 1981 19 1 Agency - 6 Subject - 16 Newsletter - 0

### DUST CONTROL ON UMPAVED ROADS

- PUDUE UNIV , 1959 18+ 1
Agency - 8 Subject - 15 Newsletter - 0

EFFECTS OF CONSTRUCTION PROCEDURES ON BOND IN BRIDGE DECKS

- UNIV KANSAS , 1983 28 1 Agency - 12 Subject - 12 Newsletter - 0

EFFECTS OF TRAFFIC INDUCED VIBRATIONS ON BRIDGE DECK REPAIRS

- UNIV KANSAS , 1983 22 1 Agency - 12 Subject - 12 Newsletter - 0

EFFECTS OF TAXI REGULATORY REVISION IN SAN DIEGO CA

- DE LEUW CATHER & CO CA, 1983 216+ 1
Agency - 1 Subject - 1 Newsletter - 0

EFFECTS OF TAXI REGULATORY REVISION IN SEATTLE WASH

- DE LEUW CATHER & CO CA, 1983 160+ 1
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## ENGINEERED WOOD TROSSES

- SE TRUSS MAN. ASS. , 1983 28 1 Agency - 13 Subject - 12 Newsletter - 0

EPOXY THERMOPLASTIC (ETP) PAVEMENT MARKING MATERIAL

- FHWA , 1983 2 6 Agency - 6 Subject - 6 Newsletter - 0

EPOXY THERMOPLASTIC TRAFFIC MARKING MATERIAL

- FHWA , 1982 53 1 Agency - 6 Subject - 6 Newsletter - 0

## EVALUATION OF SNOWPLOWABLE MARKERS

- UNIV KENTUCKY , 1982 36 3 Agency - 6 Subject - 16 Newsletter - 0

EVALUATION OF STREETER AMET 13 CHANNEL VEHICLE TYPE PROGRAM

- KANSAS DOT, 1985 11 1 Agency - 9 Subject - 12 Newsletter - 0 EVALUATION WORKBOOK FOR PUBLIC SAFETY MANAGERS

- VIRSINIA COMM UNIV , 1982 26 1 Agency - 24 Subject - 2 Newsletter - Ø

### EXCELLANCE IN HIGHWAY DESIGN

- FHWA , 1984 20 1 Agency - 27 Subject - 6 Newsletter - 0

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- OFFICES OF RES DEV & TECH D.C., 1982 40 3 Agency - 6 Subject - 17 Newsletter - 0

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- FHWA , 1983 4 1

Agency - 6 Subject - 28 Newsletter - 0

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- DOT , 1980 21 1 Agency - 24 Subject - 17 Newsletter - 0

## FIELD EVALUATION OF A GENERIC THERMOPLASTIC PAVEMENT MARKING MATERIAL

- FHWA , 1984 20 1 Agency - 6 Subject - 16 Newsletter - 0

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- PURDUE UNIV , 1983 78 1
Agency - 8 Subject - 18 Newsletter - 0

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- GA TECH , 1975 184+ 20 Agency - 15 Subject - 19 Newsletter - 12

FIELD MANUAL ON DESIGN AND CONSTRUCTION OF SEAL COATS

- US DOT , 1981 84 1 Agency - 24 Subject - 19 Newsletter - Ø

### FIELD TEST OF THE GRADE SEVERITY RATING SYSTEM

- FHWA , 1988 50 1 Agency - 5 Subject - 22 Newsletter - 0

### FINANCIAL ASSISTANCE GUIDELINES

- FEMA , 1984 150+ 1 Agency - 14 Subject - 8 Newsletter - 0

### FINANCING RURAL ROADS AND BRIDGES

- USDA , 1984 225 2 Agency - 10 Subject - 26 Newsletter - 0

# FLEXIBLE DELINEATOR POST TEST PROCEDURES FHWA-TS-84-225

- FHWA , 1984 85 1 Agency - 6 Subject - 2 Newsletter - 10

# FLEXIBLE PAVEMENT MANAGEMENT SYSTEM MICROCOMPUTER PROGRAM BASED ON CALIFORNIA PMS

- CALTRANS , 1981 15+ 1
Agency - 6 Subject - 8 Newsletter - 0

### FLEXIBLE PARKING REQUIREMENTS

- PUBLIC TECH INC. D.C., 1982 15+ 1
Agency - 24 Subject - 20 Newsletter - 0

### FLY ASH FACTS FOR HIGHWAY ENGINEERS

- FHWA , 1986 25+ 1 Agency - 6 Subject - 14 Newsletter - 0

# FORT DUQUESNE BRIDGE: FRACTURE ANALYSIS OF FLANGE CORES'

- FHWA , 1984 60 1

Agency - 12 Subject - 6 Newsletter - 9

# FRONT END LOADERS 2-3 CYD ARTICULATING RUBBER TIRED 4-WHEEL DRIVE

- PURDUE UNIV , 1983 8 1

Agency - 8 Subject - 11 Newsletter - 0

# FUNDAMENTALS OF TRAFFIC ENGINEERING 11TH EDITION

- UNIV OF CALIFORNIA , 1984 200+ 1 Agency - 19 Subject - 10 Newsletter - 0

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- UNIV OF CALIFORNIA , 1981 200+ 1
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### GASAHOL FACTS ABOUT

- SOLAR ENERGY INF DATA BANK, 1977 5 1
Agency - 24 Subject - 21 Newsletter - 0

### SECRGIA TRUCK WEIGHT LAWS AND TRAFFIC CONTROL WORKSHOP

- GDDT , 1984 15+ 1 Agency - 15 Subject - 28 Newsletter - 12

# GOOD PRACTICES GUIDE FEDERAL AID URBAN SYSTEM PROGRAM

- FHWA , 1985 22 1 Agency - 6 Subject - 28 Newsletter - 0

#### GROWTH MANAGEMENT AND TRANSPORTATION -

- PUBLIC TECH INC. D.C., 1982 29+ 1
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# GUIDELINES FOR DESIGN OF LOCAL ROADS AND STREETS

- PENNDOT, 1983 65+ 1
Agency - 16 Subject - 22 Newsletter - 0

# GUIDELINES FOR MAKING PEDESTRIAN CROSSING STRUCTURES ACCESSIBLE

- FHWA , 1984 27 1 Agency - 6 Subject - 23 Newsletter - 0

## GUIDE MANUAL RECORDS AND REPORTS FOR INDIANA COUNTY HIGHWAY DEPARTMENTS

- PURDUE UNIV , 1981 186 1 . Agency - 8 Subject - 8 Newsletter - 0

# HANDBOOK OF COMPUTER MODELS FOR TRAFFIC OPERATIONS ANALYSIS

- DIAZ SECKINGER & ASS. INC. TAMPA, 1982 285+ 1 Agency - 6 Subject - 10 Newsletter - 11

# HANDBOOK ON DESIGN OF PILES AND DRILLED SHAFTS UNDER LATERAL LOAD

- UNIV TEXAS , 1984 354+ 2 Agency - 6 Subject - 12 Newsletter - 0 HEX-FOAM G-R-E-A-T SYSTEM
DESIGN AND INSTALLATION MANUAL

- ENERGY ABSORPTION SYSTEMS INC., 1984 50 1
Agency - 23 Subject - 2 Newsletter - 2

### HIGHWAY INFRASTRUCTURE: DPPORTUNITIES FOR INNOVATION

- ASCE , 1986 127 1 Agency - 30 Subject - 17 Newsletter - 0

### HIGHWAY SAFETY OVERVIEWS

- OFF OF HW SAFETY , 1984 43+ 2 Agency - 6 Subject - 2 Newsletter - 2

### HIGHWAY STATISTICS 1982

- HW STAT DIV , 1982 181 1 Agency - 6 Subject - 24 Newsletter - 0

#### HIGHWAY STATISTICS 1983

- HW STAT DIV , 1983 181 1 Agency - 6 Subject - 24 Newsletter - 2

### HIGHWAY TAXES AND FEES HOW THEY ARE COLLECTED AND DISTRIBUTED

- FHWA , 1986 88 1 Agency - 6 Subject - 26 Newsletter - 0

### HOT MIX BITUMINOUS PAVING MATERIAL

- FHWA , 1984 100+ 2 Agency - 6 Subject - 6 Newsletter - 0

## HOT MIX RECYCLING

- KANSAS DOT , 1983 26 1 Agency - 12 Subject - 6 Newsletter - 0

### HOUSING REPLACEMENT AT LAST RESORT

- DFF. OF ROW , 1975 22 1
Agency - 6 Subject - 22 Newsletter - 2

# HOW TO SAVE LIVES AND REDUCE INJURIES CITIZEN ACTIVIST GUIDE TO EFFECTIVELY FIGHT DRUNK DRIVING

- NHTSA , 1982 100+ 1
Agency - 2 Subject - 34 Newsletter - 0

#### HYDRAULIC DESIGN OF HIGHWAY CULVERTS

- FHWA , 1985 253 1 Agency - 6 Subject - 13 Newsletter - 0

#### HYDROLOGY

- FHWA , 1984 342 1 Agency - 31 Subject - 6 Newsletter - 8

ICE-MELTING CHARACTERISTICS OF CALCIUM MAGNESIUM ACETATE EXECUTIVE SUMMARY

- FHWA , 1986 10 1 Agency - 6 Subject - 27 Newsletter - 15

IDENTIFICATION ANALYSIS AND CORRECTION OF HIGH ACCIDENT LOCATIONS

- MIDWEST RESEARCH INSTITUTE , 1975 134+ 1
Agency - 8 Subject - 2 Newsletter - 0

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- SW RESEARCH INSTITUTE , 1985 19 1
Agency - 29 Subject - 14 Newsletter - Ø

IMPROVED FABRICATION AND INSPECTION OF WELDED CONNECTIONS IN BRIDGE STRUCTURES

- GARD INC., 1984 111 1

Agency - 12 Subject - 6 Newsletter - 8

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IMPROVING SUBDRAINAGE AND SHOULDERS OF EXISTING PAVEMENTS

- UNIV ILLINOIS , 1982 212+ 2 Agency - 6 Subject - 13 Newsletter - 4

INFLATION-RESPONSIVE FINANCING FOR STREETS AND HIGHWAYS

- PUBLIC TECH INC. D. C., 1982 40+ 1
Agency - 17 Subject - 26 Newsletter - 0

INTERCEPTING DOWNTOWN-BOUND TRAFFIC

- US DOT , 1982 66 1 Agency - 24 Subject - 1 Newsletter - 0

# INTERNATIONAL SLURRY SEAL ASSOCIATION INTERNATIONAL DIRECTORY

- INT SLURRY SEAL ASSOCIATION , 1986 25 1
Agency - 41 Subject - 35 Newsletter - 15

#### INSPECTOR'S MANUAL FOR TRAFFIC SIGNAL CONSTRUCTION

- TEXAS DEPT OF HWAYS , 1985 1 42
Agency - 10 Subject - 15 Newsletter - 0

# JUNKYARDS THE HIGHWAY AND VISUAL QUALITY

- ORG FOR ENVIO GROWTH INC. WASH DC, 1979 129+ 1 Agency - 6 Subject - 27 Newsletter - 0

# LOCAL FUNDING OPTIONS FOR WISCONSIN URBAN TRANSITS SYSTEMS

- WIS DOT , 1982 82 1
Agency - 24 Subject - 2 Newsletter - @

## LONGITUDINAL EDGE DRAINS IN RIGID PAVEMENT SYSTEMS

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# LOW-VOLUME ROADS: THIRD INTERNATIONAL CONFERENCE 1983

- TRANS RES BD , 1983 378+ 2 Agency - 18 Subject - 24 Newsletter - 0

### MAINTENANCE OF HIGHWAY SAFETY HARDWARE

- FHWA , 1983 2 4 Agency - 6 Subject - 19 Newsletter - 0

# MAINTENANCE MANAGING THE MAITENANCE FUNCTION PART C- PREVENTIVE MAINTENANCE

- PLANT ENG LIBRARY , 1981 33 2 Agency - 6 Subject - 19 Newsletter - 0

### MAKING ENERGY REGULATIONS

- US DEPT OF ENERGY , 1979 21 1

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### MANAGING HIGHWAY MAINTENANCE

- FHWA , 1985 20 1 Agency - 6 Subject - 28 Newsletter - 0 - DOT , 1978 25 1 Abency - 15 Subject - 8 Newsletter - 0

## MANUAL ON COUNTERMEASURES FOR SIGN VANDALISM

- FHWA , 1986 152 5 Agency - 6 Subject - 19 Newsletter - 16

### MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

- FHWA , 1986 150 :
Agency - 6 Subject - 28 Newsletter - 0

### MASTERING TRAFFIC ENGINEEERING

- MILITARY TRAFFIC MANAGEMENT COMMAND, 1981 64+ 2 Agency - 10 Subject - 20 Newsletter - 8

## MICROCOMPUTER APPLICATIONS IN TRAFFIC ENGINEERING AGENCIES

- DIAZ SECKINGER & ASS. INC., 1983 50+ 1
Abency - 6 Subject - 10 Newsletter - 0

## MICROSOFT FORTRAN COMPILER

- MICROSOFT CORPORATION , 1984 264 1

Adency - 30 Subject - 32 Newsletter - 0

# MINOR MAINTENANCE MANUAL FOR COUNTY BRIDGES

- HERPICO , 1984 55 1 Agency - 12 Subject - 8 Newsletter - 0

### MODEL COUNTY SUBDIVISION REGULATIONS

- PURDUE UNIV , 1983 55+ 2 Agency - 8 Subject - 28 Newsletter - 0

# MOTORIST DIRECTION-FINDING AIDS RECOVERY FROM FREEWAY EXITING ERRORS

- TURNER-FAIRBANK HW RESEARCH CENTER, 1984 47 2 Agency - 6 Subject - 10 Newsletter - 10

## MTPS MICROCOMPUTERS IN TRANSPORATION

- US DOT , 1984 50+ 1 Agency - 24 Subject - 32 Newsletter - 0

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A REVIEW OF ACCOUNTING SOFTWARE FOR TRANSIT
   - UMTA . 1986 79 1
       Agency - 1 Subject - 32 Newsletter - Ø
MULTIPROJECT PROGRAMMING AND SCHEDULING SYSTEM
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NATIONAL EXPERIMENTAL AND EVALUATION PROGRAM
FINAL REPORT
   - EXPERIMENT PROJECTS PROGRAM , 1984 19 1
       Agency - 17 Subject - 6 Newsletter - 0
NATIONAL EXPERIMENTAL PROJECTS TABULATION
   - FHWA , 1985 453 1
       Agency - 6 Subject - 24 Newsletter - 0
NATIONAL EXPERIMENTAL PROJECTS TABULATION
   - EXP APP AND EVAL , 1984 456 1
       Agency - 6 Subject - 24 Newsletter - Ø
NATIONAL EXPERIMENTAL PROJECTS TABULATION
   - EXP APP AND EVAL , 1982 305 1
       Agency - 6 Subject - 24 Newsletter - 0
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### NATIONAL URBAN MASS TRANSPORTATION STATISTICS

- TRANS SYS CENTER , 1983 34 1 Agency - 1 Subject - 24 Newsletter - Ø

### NATIONAL URBAN MASS TRANSPORTATION STATISTICS

- TRANS SYS CENTER , 1982 400+ 1
Agency - 1 Subject - 24 Newsletter - 0

## NATIONAL URBAN MASS TRANSPORTATION STATISTICS

- TRANS SYS CENTER , 1983 500+ 1
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Agency - 6 Subject - 17 Newsletter - 0

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A REVIEW OF THE LITERATURE

- TURNER-FAIRBANK RESEARCH CENTER, 1984 91 2 Agency - 6 Subject - 10 Newsletter - 10

### OFFICIAL CODE OF GEORGIA: ANNOTATED

- STATE OF GA , 19 75+ 1
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# OPERATION AND PERFORMANCE CHARACTERISTICS OF DRUM MIX PLANTS

- FHWA , 1984 83+ BOX
Agency - 6 Subject - 6 Newsletter - 9

### DUR NATION'S HIGHWAYS

- FHWA , 1981 23 7 Agency - 6 Subject - 24 Newsletter - 0

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- FHWA , 1981 23 1 Agency - 6 Subject - 27 Newsletter - 0

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- MULTISYSTEMS INC. MASS, 1982 88 1

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- URBAN MASS TRANSPORTATION ADMINISTRATION , 1984 106+ 1 Agency - 1 Subject - 1 Newsletter - 0

### PATCHING FLEXIBLE AND RIGID PAVEMENTS

- NY DOT , 1979 20 1 Agency - 6 Subject - 6 Newsletter - 0 PAVEMENT AND SHOULDER MAINTENANCE PERFORMANCE GUIDES

- FHWA , 1984 40 )

Agency - 6 Subject - 6 Newsletter - 8

#### PAVEMENT CONDITION SIRVEY AND RATING PROCEDURES

- APWA , 19 100 1

Agency - 31 Subject - 6 Newsletter - 0

PAVEMENT CUTS FOR UTILITIES:

A GUIDE FOR THEIR MANAGEMENT

- HERPICO , 1984 25 1

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### PAVEMENT MAINTENANCE MANAGEMENT SYSTEMS

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TECHNIQUES USING ASPHALT

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EIGHT STATES' EXPERIENCES

- FHWA , 1983 76+ 1
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- RESOURCE INTER INC.OHIO, 1983 72 2

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- USDOT , 1986 130 1

Agency - 24 Subject - 3 Newsletter - 0

PHASE III FINAL REPORT
RISH ASSESSMENT
VULNERABIL(TY VALIDATION STUDY VOL.2 APPENDICES), I INDIVIDUAL STUDIES
- US DOT , 1983 290 1
Agency - 24 Subject - 3 Newsletter - 0
PHOENIX TRANSIT SUNDAY DAIL-A-RIDE
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Agency - 1 Subject - 1 Newsletter - 0
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PLANNING SERVICES FOR TRANSPORTATION-HANDICAPPED PEOPLE- DATA COLLECTION MANUAL PROJECTION MAN

- PEAT MARWICK MITCHELL & CO. WASH DC, 1983 200+ 1 Agency - 1 Subject - 1 Newsletter - 0

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- CENSUS BUREAU , 1979 18 1 Agency - 15 Subject - 24 Newsletter - 0

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- CDRPS OF ENG. , 1981 23+ 20 Agency - 21 Subject - 19 Newsletter - 14

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- CORPS OF ENG. , 1985 28 BOX
Agency - 21 Subject - 19 Newsletter - 11

# PRACTICAL GUIDELINES FOR MINIMIZING TORT LIABILITY

- TRANS RES BD , 1983 39+ 1 Agency - 18 Subject - 30 Newsletter - 10

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- REG TRANS AUTH LA, 1984.68+ 3
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- CITY OF SEATTLE , 1984 88 3 Agency - 6 Subject - 23 Newsletter - 0

### PROCEEDINGS: FOURTH ANNUAL PEDESTRIAN CONFERENCE

- FHWA , 1984 34: 1 Agency - 5 Subject - 23 Newsletter - 0

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PROCEEDINGS
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- UMTA , 1984 37 :
Agency - 1 Subject - 6 Newsletter - 2

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- BYRD TALLAMY MACDONALD & LEWIS VA, 1983 62+ 2 Agency - 5 Subject - 29 Newsletten - 17

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- US DOT , 1982 82+ i

Agency - 6 Subject - 2 Newpletter - 5

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RAISED PAVEMENT MARKERS AT HAZARDOUS LOCATIONS

- FHWA , 1984 71 1 Agency - 6 Subject - 16 Newsletter - 9

RAPID SET EPOXY ADHESIVE FOR PAVEMENT MARKERS

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- OFFICE OF THE SECRETARY OF TRANSPORTATION , 1986 159 1
Agency - 24 Subject - 2 Newsletter - 0

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- VANCE BILB , 1983 43 1

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- SHWS , 19 6 . Agency - B - Bubject - 14 - Newtletten - 2

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- FHWA , 1984 200 1 Agency - 6 Subject - 18 Newsletter - 0

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- FHWA , 1985 18 2 Agency - 6 Subject - 17 Newsletter - 3

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- FHWA , 1985 55 1
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- ALABAMA T2 DENTER, 1984 138 1
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Adency - 24 Cappedo - 15 Newsletten - 30

### ROADWAY DELINEATION PRACTICES HANDSOOK

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- DFFICE OF RURAL DEVELOPMENT POLICY, 1984 30 1 Acemby - 29 Subject - 10 Newsletter - 2

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### SIGNAL TIMING OPTIMAZATION: 0 816 LTUSKARKY

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# SINGLE AND/OR TANDEM AXLE DUMP TRUCKS A CHECKLIST

- PURDUE UNIV , 1983 20+ 3

Agency - 8 Subject - 11 Newsletter - ©

### SCAP 84 DATA INPUT MANAGER

- FHWA , 1985 2%+ i Agency - 6 Subject - 32 Newsletter - %

### SDAP 84 USER'S MANUAL

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# STANDARD SPECIFICATIONS -CONSTRUCTION OF ROADS AND BRIDGES

- GA DOT , 1983 880 1 Agency - 15 Subject - 28 Newsletter - 0

### STANDARD SPECIFICATIONS 1983 SUPPLEMENT

- GA DOT , 1983 226 t Agency - 15 Subject - 28 Newsletten - @

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STATE-OF-THE-ART IN ASPHALT
PAVEMENT SPECIFICATIONS
    - SHELADIA ASS. INC., 1984 173 1
       Agency - 6 Subject - 6 Newsletter - 8
STATE OF THE ART REPORT RESIDENTIAL TRAFFIC MANAGEMENT
   - FHWA , 1980 172 1
       Agency - 6 Subject - 10 Newsletter - 0
STATUS OF ALABAMA LAW REGARDING TRAFFIC ACCIDENT LIABILITY
   - AUBURN UNIVERSITY , 1984 138 1
       Agency - 35 Subject - 30 Newsletter - 0
STEEL SHEET PILING DESIGN MANUAL
   - USS STEEL , 1984 132+ 1
       Agency - 6 Subject - 25 Newsletter - 0
STREET CUTS IN CITY AND COUNTY STREETS
   - PURDUE UNIV , 1983 95 2
       Agency - 8 Subject - 22 Newsletter - 0
STREET PATCHING OPERATIONS: FIELD TEST EVALUATION
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PROGRAM: UPM COLD PATCH

- PUBLIC TECH WASH DC, 1981 13+ 1 Agency - 24 Subject - 6 Newsletter - 0

SURVEY OF ALTERNATIVES TO THE USE OF CHLORIDES FOR HIGHWAY DEICING

- OFF. OF R&D , 1977 20+ 1 Agency - 6 Subject - 16 Newsletter - 2

SYNTHESIS OF SAFETY RES. RELATED TO TRAFFIC CON. AND ROADWAY ELEMENTS VOL. 1

- FHWA , 1982 180 1 Agency - 6 Subject - 2 Newsletter - 0

SYNTHESIS OF SAFETY RES. RELATED TO TRAFFIC CON. AND ROADWAY ELEMENTS VOL 2

- FHWA , 1982 180 1 Agency - 6 Subject - 2 Newsletter - 0

### TAMPA SYMPOSIUM HIGHLIGHTS

- PRICE WILLIAMS AND ASS. INC., 1984 58 1 Agency - 1 Subject - 1 Newsletter - 8 MASK FORCE IMPLEMENTATION SUIDCLINES FOR THE DEVELOPMENT OF STATE AND COMMUNITY ALCOHOL HIGHWAY SAFETY PROGRAMS

- NHTSA , 1983 52+ 1

Agency - 2 Subject - 34 Newsletter - M

### TAXI-BASED SPECIAL TRANSIT SERVICES

- UNIV CALF , 1983 101+ i

Agency - 24 Subject - 1 Newsletter - 0

TAXI-BASED REGULATORY REVISION IN DAKLAND AND BERKELY DALF: TWO DASE STUDIES

- CRAIN & ASS. CALF, 1985 56- 1

Agency - 1 Subject - 1 Newsletter - 0

### TECHNICAL ASSISTANCE PROGRAM

- SDOT , 1984 100+ 1 Agency - 15 Subject - i Newsletter - 0

#### TECHNIQUES FOR PAVEMENT MANAGEMENT SYSTEM

- UNIV CALF , 1984 40+1Agency - 19 Subject - 8 Newsletter - 0

### TECHNOLOGY TRANSFER PRIMER

- FHWA , 1985 56 2 Agency - 6 Subject - 9 Newsletter - 0

### TECHNOLOGY TRANSFER PROGRAM FOR LOCAL TRANSPORTATION AGENCIES

- FHWA , 1985 99 1 Agency - 6 Subject - 4 Newsletter - Ø

## TEMPORARY ASPHALT ISLAND

- FHWA , 1983 4 5 Agency - 6 Subject - 5 Newsletter - 0

## TEMPORARY ROAD MARKERS MAINTENANCE TROUBLESHOOTER

- UTAH DOT , 1982 7 1 Agency - 6 Subject - 16 Newsletter - 0

### THE COLLECTION OF WORK ZONE ACCIDENT DATA

- MIDWEST RES. INST. MO, 1982 94 1
Agency - 6 Subject - 2 Newsletter - ②

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THE ENGINEER'S POTHOLE REPAIR BUIDE
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- COLD RESIGNS TECH DIGEST, 1984 18 19 Agency - 21 Subject - 19 Newcletter - 14

### THE ENVIROMENTAL IMPACTS OF BART

- METRO TRANS COMM , 1979 20 1 Agency - 29 Subject - 24 Newsletter - 0

## THE EUROPEAN PARATRANSIT

### EXPERIENCE

- ECOPLAN INTER. FRANCS, 1981 42+ 1
Agency - 24 Subject - 2 Newsletter - 0

### THE HOLE STORY

- AMER PUB WORKS ASS , 1983 20+ 10
Agency - 24 Subject - 5 Newsletter - 12

## THE IMPACT OF TRAFFIÇ ON RESIDENTIAL AREAS

- US DOT , 1982 34 1
Agency - 24 Subject - 1 Newsletter - 2

# THE INTERSTATE HIGHWAY TRADE-IN PROCESS VOL 1

- POLYTECH INST NY, 1982 25+ 1
Agency - 24 Subject - 22 Newsletter - Ø

# THE INTERSTATE HIGHWAY TRADE-IN PROCESS VOL 2

- POLYTECH INST NY, 1982 60+ 1
Agency - 24 Subject - 22 Newsletter - 0

# THE PAVEMENT MANAGEMENT SYSTEM OF MARICOPA COUNTY ARIZONA

- AZ DOT , 1982 13 1 Agency - 24 Subject - 6 Newsletter - 0

### THE PEDESTRIAN SAFETY PROBLEM

- FHWA , 1985 2: 5

Agency - 6 Subject - 2 Newsletter - 0

# THE ROLE OF REHABILITATION IN TRANSIT FLEET REPLACEMENT

- PUGET SOUND COUN OF GOV , 1983 58+ 1
Agency - 24 Subject - 1 Newsletter - 2

THICKNESS DESIGN ASPHALT PAVEMENTS FOR HEAVY WHEEL LORDS

- ASPHALT INST , 1888 72 : Agency - 36 Subject - 6 Newsletten - 0

### TIEBACKS

- SCHNABEL FOUNDATION CO MARYLAND, 1983 219+ 1 Agency - 6 Subject - 18 Newsletter - 0

#### TIEBACKS EXECUTIVE SUMMARY

- SCHNABEL FOUNDATION CO MD. 1982 15 1
Agency - S Subject - 18 Newsletter - 2

# TIME BASED COORDINATION UNIT SPECIFICATIONS

- STORCH ENGS. CT, 1982 39 1
Agency - 5 Subject - 28 Newsletter - 0

# TRAFFIC CONTROL FOR STREET AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS

- BYRD TALLAMY MACDONALD & LEWIS VA. 1978 200+ 1
Agency - 6 Subject - 2 Newsletter - 0

# TRAFFIC CONTROLLER SYNCHRONIZER FIELD TEST EVALUATION

- OFF OF 98D . 1982 20+ 1 Agency - 6 Subject - 10 Newsletter - 0

#### TRAFFIC DETECTOR HANDBOOK

- FHWA , 1985 318 1 Agency - 6 Subject - 10 Newsletter - 0

# TRAFFIC ENGINEERING SERVICES FOR SMALL POLITICAL JURISDICTIONS

- AMER PUB WORKS ASS , 1977 133 2 Agency - 6 Subject - 10 Newsletter - 0

## TRAFFIC SIGN HANDBOOK FOR LOW VOLUME RURAL ROADS

- NY DGT , 1985 103 1 Agency - 32 Subject - 10 Newsletter - 0

### TRAFFIC SIGNAL MAINTENANCE

- GA DOT , 1982 20+ 1 Agency - 15 Subject - 10 Newsletter - 0 TRAFFIC SIGNAL OPTIMIZATION PROBRAMS -A COMPARISION STUDY

- D DLATERBLOS KANSAS, 1984 54 2 Agency - 6 Subject - 10 Newsletter - 2

#### TRAFFIC SIGNAL TIMING A BIBLIOGRAPHY

- UNIV OF CALIF , 1983 20 1
Abency - 19 Subject - 10 Newsletter - 0

TRAFFIC SIGNAL TIMING -- PEFORE AND AFTER STUDIES: A BIBLIOGRAPHY

- UNIV CALF . 1983 6 1

Agency - 19 Subject - 10 Newsletter - 0

### TRAFFIC STRIPE REMOVAL

- FHWA , 1980 60 1 Agency - 6 Subject - 16 Newsletter - 0

### TRANSIT MANAGEMENT WORKSHOP

- UNIV WIS , 1982 5 1
Agency - 1 Subject - 1 Newsletter - 2

## TRANSIT SUBSIDY ALLOCATION TECHNIQUES

- THE OMEGA GROUP INC. WASH DC, 1983 31+ 1
Agency - 24 Subject - 1 Newsletter - 0

#### TRANSIT WORKS: 10 RURAL CASE STUDIES

- IND DOT , 1982 100 1 Agency - 24 Subject - 1 Newsletter - 0

TRANSPORTATION ENERGY CONTINGENCY PLANNING: QUANTIFYING THE NEEDS FOR TRANSIT ACTIONS

- NY DOT , 1983 111 1 Agency - 24 Subject - 21 Newsletter - Ø

TRANSPORTATION ENERGY PLANNING: TRANSIT FUEL SUPPLIES UNDER DECONTROL

- CABOT CONS GROUP WASH DC, 1982 38 1
Agency - 24 Subject - 21 Newsletter - 0

# TRANSPORTATION ENERGY MANAGEMENT: CURRENT TRANSIT OPERATOR ACTIVITIES

- METRO SEATTLE, 1982 24+ 1
Agency - 24 Subject - 21 Newsletter - 0

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TRANSPORTATION ENERGY MANAGEMENT:
TRANSIT OPERATOR FACILITIES VOL. 1 OFFICE GUIDE
    - METRO BEATTLE, 1982 35 1
       Abency - 24 Subject - 21 Newsletter - 2
TRANSPORTATION ENERGY MANAGEMENT:
TRANSIT OPERATOR FACILITIES VGL. 2 FIELD GUIDE
   - METRO SEATTLE, 1982 105 i
       Agency - 24 Subject - 21 Newsletter - 0
TRANSPORTATION INSTITUTIONAL BOTTLENECKS AND BARRIER
TO US EXPORTS THE PORT EXPERIENCE
   - US DOT , 1984 157 1
       Agency - 24 Subject - 33 Newsletter - 2
TRANSPORTATION IN GEORGIA: 1983... A TURNING POINT
   - GDOT , 1983 25 1
       Agency - 15 Subject - 27 Newsletter - 0
TRANSPORTATION OF HAZARDOUS MATERIALS
   - PUBLIC TECH WASH DC, 1980 50 1
       Agency - 17 Subject - 3 Newsletter - Ø
TRANSPORTATION NEEDS AND PROGRAMS
SUMMARY
   - PUBLIC TECH INC., 1982 283 1
       Agency - 24 Subject - 4 Newsletter - 0
TRANSPORTATION SYSTEMS MANAGEMENT
IMPLEMENTATION AND IMPACTS
   - CASE STUDIES US DOT, 1982 300+ 1
       Agency - 24 Subject - 1 Newsletter - 0
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TRANSPORTATION SYSTEMS MANAGEMENT IMPLEMENTATION AND IMPACTS

- FINAL REPORT US DOT, 1982 115 1 Agency - 24 Subject - 1 Newsletter - 0

TRANSPORTATION WORKPLACE SURVEY

- NAT ANALYSTS , 1981 300+ 1 Agency - 15 Subject - 4 Newsletter - 0

TRENDS BEFORE THE SAN DIEGO TROLLEY

- SAN DIEGO , 1982 176 1

Agency - 1 Subject - 1 Newsletter - 2

TRUSS RATING AND ANALYSIS PROGRAM TRAP JR

- RTAP TECH TRANSFER CENTER . 1986 100- C Agency - 40 Subject - 32 Newsletter + 16

UPGRADING DEFICIENT THROUGH TRUSS BRIDGES

- SHELADIA ASS. MD, 1983 122 2

Agency - 6 Subject - 12 Newsletter - 4

URBAN TRANS PLANNING IN THE UNITED STATES: A HISTORIC OVERVIEW

- US DOT , 1986 149 :
Agency - 24 Subject - : Newsletter - 0

USE OF UTPS FOR SUBAREA HIGHWAY ANALYSIS: A CASE STUDY

- USDOT , 1985 56 1 Agency - 24 Subject - 32 Newsletter - 2

UTCS FUNCTIONAL HARDWARE SPECIFICATIONS HANDBOCK

- FHWA , 1986 100+ 2 Agency - 6 Subject - 32 Newsletter - 16

USER-SIDE SUBSIDY PROGRAMS FOR SPECIAL NEEDS TRANSPORTATION

- UMTA , 1983 97+ 2 Agency - 1 Subject - 1 Newsletter - 0

USER'S MANUAL MICROCOMPUTER PROGRAM FOR BRIDGE ANALYSIS AND RATING

- FHWA , 1985 100+ 2 Agency - 6 Subject - 32 Newsletter - 16

ALUE ENGINEERING CONTRACT PROVISIONS ON FEDERAL—AID HIGHWAY CONSTRUCTION PROJEC 5

- FHWA , 1984 24 1 Agency - 6 Subject - 28 Newsletter - 0

VALUE ENGINEERING STUDY OF DRAINAGE MAINTEANCE

- FHWA , 1982 19+ 1 Agency - 6 Subject - 13 Newsletter - 0

VEHICLE MAITENANCE PRACTICES AMONG GRANTEES

- WASH DOT , 1981 27+ 1
Agency - 24 Subject - 1 Newsletter - 0

WAGE SURVEY OF ROAD AND STREET EMPLOYEES
IN INDIANA COUNTIES AND CITIES-1984
- PURDUE UNIV , 1984 34 1

Agency - 8 Subject - 24 Newsletter - 2

WHAT HAPPENS WHEN YOUR PROPERTY IS NEEDED FOR A FEDERAL-AID HIGHWAY

- GA DOT , 1980 20 1

Agency - 15 Subject - 28 Newsletter - 2

WHO'S GOING TO CALL THE FIRST MEETING ACTION GUIDE FOR LOCAL DRUNK DRIVING PROGRAMS

- NHTSA , 1983 50+ 1
Agency - 2 Subject - 34 Newsletter - 0

WILDLIFE CONSIDERATIONS IN PLANNING AND MANAGING HIGHWAY CORRIDORS

- US DEPT OF INTERIOR , 1982 93 1 Agency - 6 Subject - 27 Newsletter - 2

WORK ZONE TRAFFIC CONTROL

- FHWA . 1980 77+ 4

Agency - 6 Subject - 2 Newsletter - 11

WORLD'S FAIR TRANSPORTATION SYSTEM EVALUATION 1982

- TENN DOT , 1982 174 1
Agency - 1 Subject - 1 Newsletter - 2

YOUR RIGHTS AND BENEFITS AS A HIGHWAY DISPLACEE

- OFF. OF ROW , 1981 46 1
Agency - 6 Subject - 28 Newsletter - 0

VIDEO TAPE LIST

- ST-201 The Winners--The Losers (13 minutes)
  Safe use of lift trucks including inspection and hazards facing operators.
- M-201 The Snowfighters (24 minutes)
  Methods, procedures, and equipment for snow removal on streets and highways.
- M-202 Down Is Up (20 minutes)

  Preventive maintenance is stressed to reduce down time on construction sites.
- M-203 The Choice Is Yours (18 minutes)
  Preventive maintenance on diesel engines is stressed to get maximum life from the engine.
- M-204 Signals: Read 'Em or Weep (20 minutes) Indications of problems with equipment.
- M-208 Roadway Maintenance Cost Analysis--Part I (50 minutes)
  Discusses equipment costs including depreciation, fuel, oil, grease, maintenance, repair, and capital investment.
  Roadway Maintenance Cost Analysis--Part II (50 minutes)
  Discusses maintenance operating costs relating to labor, equipment, materials, and overhead.
- M-209 Roadway Maintenance Cost Analysis--Part III
  (50 minutes)
  Discusses the cost of deferred maintenance.
  Roadway Maintenance Cost Analysis--Part IV (50 minutes)
  Gives ideas on how to present budget data to county commissioners and city councils.
- M-210 Maintenance of Highway Safety Hardware (45 minutes)
  How to provide safe roadside environments through
  periodic maintenance of the road side and its safety
  hardware.
- M-211 Maintaining Granular Surfaced Roads (18 minutes)
  Instructional guide to enable road grader operators
  to provide better maintenance of granular sufaced
  roads.
  Snow Removal on Iowa's Secondary Roads (20 minutes)
  Instructional guide for snowplow operators for
  winter road maintenance of secondary roads.

- M-212 Ditchmaster (10 minutes)
   Demonstration of the ditchmaster, a cost effective machine for improving roadside drainage and maintenance.
   Lee-Boy Asphalt Maintainer (15 minutes)
   Demonstration of the Lee-Boy, an asphalt maintenance machine.
   Rosco Asphalite Maintainer (15 minutes)
   Demonstration of a pot hole repair machine.
- M-213 Techniques for Pavement Maintenance and Rehabilitation Using Asphalt--Part I Introduction (15 minutes)
  Introduction to series of tapes dealing with using asphalt for pavement maintenance and rehabilitation.
  Asphalt Components, Materials, Tests and Basics of Design (10 minutes)
  Discusses the components of an asphalt paving structure from subgrade to the asphalt top.
- M-215 Techniques for Pavement Maintenance and Rehabilitation using Asphalt--Part III Sealing of Joints in Portland Cement Concrete (25 minutes)
  Discusses cleaning and sealing of joints in Portland cement concrete. Discusses rehabilitation of Portland cement concrete roadways.

  Surface Treatment of Pavement (54 minutes)
  Discusses objectives and methods of applying seal coats, spraying of liquid asphalt, surface condition variables, spraying oil onto pavement and spreading aggregate.
- M-216 Techniques for Pavement Maintenance and Rehabilitation Using Asphalt--Part IV Cost Analysis (20 minutes)
  Discusses methods and strategies for determining which method of maintenance is needed. Cost analysis is emphasized.
  Recycling Procedures (35 minutes)
  Describes recycling procedures with asphalt and shows some of the equipment used.
- DC-204 Tied Concrete Shoulder (10 minutes)
  Shows construction of tied concrete shoulders,
  undersealing of existing pavement and full-depth
  repair of the pavement.
  Recycling D-Cracked Concrete Pavement (12 minutes)

Discusses the reasons for the use of concrete recycling over conventional methods of construction. Bonded Concrete Overlay (12 minutes) Shows a bonded concrete overlay on existing concrete pavement.

- DC-205 Interstate Reconstruction Part I (12 minutes)
  Recycling existing D-Cracked pavement as aggregate
  for new concrete pavement.
  Whitetopping (7 minutes)
  Discusses placing a concrete overlay on distressed
  asphalt concrete.
  Design for Quality (12 minutes)
  Shows recycling of concrete pavement and replacement
  with continuously reinforced concrete pavement,
  bonded concrete overlay and tied concrete shoulders.
- DC-206 Interstate Reconstruction Part II (13 minutes)
  Shows add-on tied concrete shoulders, diamond
  grinding for smoothness and establishing new
  transverse joints.
  Recycling Continuously Reinforced Concrete Pavement
  (10 minutes)
  Shows the recycling of existing continuously
  reinforced concrete pavement as aggregate for new
  concrete pavement.
  Unbonded Concrete Overlay (12 minutes)
  Construction of a full-depth unbonded overlay over a
  reinforced concrete pavement.
- DC-207 Testing of Asphalt Cement (24 minutes) Procedures for various tests of asphalt cement including flashpoint, penetration, ductility solubility, spot softening point, specific gravity and thin film over tests. Determination of Asphalt Content in Paving Mixtures (20 minutes) Procedures for determining asphalt content for proper life and serviceability of asphalt cement. Budgeting for Rehabilitation (25 minutes) Present economic situation of restoring paved highways and evaluation of pavements for determination of priority for restoration. Asphalt Emulsion Spray Applications (20 minutes) Reasons for using asphalt emulsions, what constitutes asphalt emulsions, how they work, and processes for applying asphalt emulsions. Aggregate Blends (40 minutes) Demonstrates graphical procedure for blending

aggregate sources to meet proper specifications.

#### DC-208 AASHO Road Test

Construction and Materials (27 minutes)
Discusses materials and construction of extensive
test facilities constructed in 1956 by AASHO to test
different types of road surfacings, bases, bridges
and methods of construction.
Pavement Research (37 minutes)
Objectives, methods, and principle results of

pavement research in the AASHO Road Test. The Road to Better Roads (14 minutes) Summarizes the purposes and procedures of the AASHO Road Test and discusses what is being done today to improve roads.

APPENDIX B - NEWSLETTERS



# 2 ECH TRANS



# SCHOOL OF CIVIL ENGINEERING GEORGIA INSTITUTE OF TECHNOLOGY

A UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA

**TECHNOLOGY TRANSFER CENTER** 

VOL. 4 NO. 1

**WINTER 1986** 

### RESEARCH FACILITIES AT THE

### TURNER-FAIRBANK HIGHWAY RESEARCH CENTER

The next time you are in Washington, D.C., you are invited to visit the Federal Highway Administration's (FHWA) research laboratories at the Turner-Fairbank Highway Research Center (TFHRC). TFHRC is located approximately nine miles (15 km) north of the city on the George Washington Parkway.

The laboratories at TFHRC are used for in-house studies of chronic highway problems, quick response to emergency problems, and development of staff capabilities. These indoor and outdoor laboratories provide significant support to the five major research categories—highway operations, pavement technology, safety, traffic operations, and structures and hydraulics.

The laboratories in the Fairbank Building are:

- Aerodynamics Laboratory. The George S. Vincent Memorial Wind Tunnel has been modified to test scale models of suspension and cable-stayed bridges under controlled laminar or turbulent flow conditions. Through the use of the wind tunnel, researchers can check new designs of suspended bridges as well as investigate the aerodynamic behavior of existing long span bridges.
- Bituminous Mixtures Laboratory. The laboratory is used to perform and

determine suitability of mix designs for asphalt concrete using various mixing and compaction procedures; analyze in service asphalt concrete pavements by extraction, recovery tests, and other measurement methods; evaluate the water damage suspectibility of asphalt-aggregate combinations; and determine the effectiveness of various laboratory testing procedures and their relations to field performance.

- o Chemistry Laboratory Complex. This complex consists of the Chemistry; Spectroscopy and Chromatography; Paint and Coatings; Electron Microscopy; and Asphalt Testing Laboratories, which are dedicated to staff research and providing solutions to unique technical problems submitted on a quick-response basis by state highway agencies and FHWA field and headquarters units.
- o Concrete Technology Laboratory. In this laboratory, reinforced concrete bridge corrosion problems are researched, test samples are made for a unique outdoor bridge deck exposure site, and special concrete mixture designs are tested.

The laboraties in the Turner Building

are:

### **EDITOR'S NOTE**

This is the first TechTrans issue of 1986, and as you probably have noticed its color has changed. TechTrans will keep this color throughout 1986.

During the past year, the Georgia Tech Technology Transfer Center conducted various workshops, responded to numerous requests for technical assistance, and distributed over 6,000 newsletters. We hope that 1986 will be a more productive year for the Center and for your agency.

The following is a summary of the Center activities during 1985.

#### **WORKSHOPS**

Title	Participants
Rights-Of-Way Acquisition	<b>- -</b> 363
Hydraulics	31
eotextiles	<b></b> 50
niform Traffic Control	
Devices Manual	
ridge Rehabilitation	51
Total Participant	c = 5.47

#### TECHNICAL ASSISTANCE

The Center responded to 29 requests for echnical assistance.

#### **NEWSLETTERS**

		Copies	Distributed
Spring	1985		1550
Summer	1985		1600

#### TRAFFIC DATA COLLECTION EQUIPMENT

ency	Number of Recorders	1	Counts
ty of ty of ty of	County 8 Carrollton 8 Decatur 2 Dalton 7 Waycross 5	<u>-</u>	41 11 19
,	Total Counts	=	144



# NEWS BRIEFS

- The 1985 American Public Works Association's (APWA) Distinguished Service Award went to Ray Barnhart, Administrator, Federal Highway Administration. Barnhart is the fifth person to receive this award since its first presentation in 1972.
- According to the Federal Highway Administration (FHWA), the nation's highway system will require \$16.5 billion a year through the turn of the century to maintain 1983 road conditions. The figures do not include additional \$10 billion a year for bridge repairs.
- The Road Information Program (TRIP) estimates that driving over bad roads costs the average driver an extra \$210 annually. This is equivalent to a total additional cost exceeding \$30 billion a year. Wasted fuel accounts for approximately 78 percent of the additional cost.
- The latest technology in road testing is a machine that uses laser to measure the roughness, ruts, cracks, surface texture, and cross frofiles of pavements. This Swedish-built machine uses two microcomputers to record data as minute as cracks a tenth the width of a fingernail. Used in Oakland, California to test 822 miles of streets, the machine has saved the city over \$300,000.
- Three communities, two in Virginia and one in California, received Grand Awards from the American Automobile Association (AAA) for their efforts in Pedestrian Protection. The AAA Grand Award was given to Henrico County and the city of Marion, Virginia, and to the city of San Jose, California.

## MAINTENANCE TIPS

#### ABUTMENT REPAIR

Abutment repair is needed when cracks occur at abutments, endwalls, wingwalls, and/or retaining walls. These cracks are the result of base settlement, improper construction techniques, and/or weather deterioration. They are found in bridges with heavy loads or within a year after construction of a new structure.

Abutment cracking is not a severe problem when it is properly repaired and maintained. If not repaired, structural failure may occur, forcing closure of the bridge and extensive structural repairs. The repair method is outlined below.

#### CREW REQUIRED

Skilled laborers	2
Laborers	3
Flagmen	2

#### EQUIPMENT REQUIRED

Tool truck	1
Dump truck	1
Portable concrete mixer	1
Air compressor	1

#### MATERIAL REQUIRED

Cement/sand/aggregate Lumber

#### REPAIR PROCEDURE

- 1. Place signs and other safety devices.
- Remove material from around section to be repaired.
- Apply bonding agent (neet cement can be used).
- 4. Replace deteriorated section with concrete.
- Cure and rub new concrete.
- 6. Clean up area and remove signs.

#### STRUCTURAL PAINTING

Structural painting is needed when there is bridge deterioration due to lack of painting or general unsightliness due to vandalism.

Steel structural members of bridges should be painted every 6-8 years to prevent deterioration and ultimate structural failure. Intermittent painting may be required to correct damage caused by vandalism. While lack of painting over periods exceeding 8 years may create a deficiency, damage by vandalism does not lead to a severe deficiency.

The proper method of painting bridge structures is described below.

#### CREW REQUIRED

Sandblast operator	1
Painters	2
Laborers	2
Flagmen	2

#### EQUIPMENT REQUIRED

Stake truck	1
Dump truck	1
Air compressor	1
Sandblaster	1
Paint sprayers	1

#### MATERIAL REQUIRED

Sand Paint

#### REPAIR PROCEDURE

- 1. Place signs and other safety devices.
- 2. Position scaffold.
- 3. Sandblast only area that can be primed on same day.
- 4. Apply primer.
- 5. Allow drying time. Apply finish coat.
- 6. Remove scaffold and clean up.

# MICROCOMPUTERS, MODEMS HELP ELIMINATE TRAFFIC JAMS

Microcomputers and modems can improve traffic flow and reduce congestion for motorists nationwide. For example, one closed-loop system, using a microcomputer and a modem, helps monitor traffic flow at key intersections. When traffic patterns change because of rush hour or other reasons, the system changes the timing of traffic signals to accommodate the increased traffic. The signals can be changed automatically according to either the time of day or the amount of traffic passing through the intersection. Signals can also be set manually by means of the microcomputer from a central location.

The system saves motorists the time and frustration of traffic jams and helps regional planning by giving officials information on traffic growth and problems.

The system is composed of three elements: local signal controllers, onstreet "masters," and a centrally located Apple IIe microcomputer. The local signal controllers are linked with the "master" by two pairs of dedicated cable while masters communicate with the central microcomputer using a Hayes Micromodem IIe over standard dial-up lines.

The local signal controllers use up to eight sensors embedded in the roadway to letect the volume and speed of traffic. The information is transmitted to a master, which then changes the timing of traffic lights to maintain traffic flow. The timings are set from a library of 60 traffic patterns based on the time of day and sensor lata.

The master continually monitors up to 0 local controllers to ensure that they are orking properly and that traffic is moving ell. Whenever a traffic signal goes out or ther malfunctions occur, an error message s sent through the modem to the micro-omputer in the central office. In many ases, the traffic engineers can correct the alfunction by sending a signal back to the aster. If the controller still does not ork, maintenance personnel can be sent to he scene. In the meantime, faulty traffic ignals automatically begin flashing.



Gwinnett County, a suburb northeast of Atlanta, has supplemented the fail-safe mechanism with a device that "pages" a repairman. When a local controller fails, the modem dials a paging service, which then relays a 10-digit code to a technician. The code tells the technician both the location and cause of the problem, according to James Gawlas, traffic signal engineer for the county.

"The use of computers to control traffic flow is not new," says Joe Thomas, chief traffic engineer for the city of Atlanta. "What's new is the use of a microcomputer and a modem to do a job that used to be done by a mainframe.

In Atlanta, the closed-loop system is currently installed at Hartsfield International Airport and in the Cleveland Avenue neighborhood. The system was installed at the Atlanta airport to accommodate both the unpredictable nature of peak air travel arrivals and departures and employee shift changes resulting from round-the-clock operations. Atlanta is also planning to install another system in the northern part of the city.

The system was first installed in Atlanta in February, 1984, and has been working well, Thomas reports. "At first we had doubts whether the system could withstand the rigors of operating on the street," he said. "In the summer, temperatures inside the master control box hit 130°F and fall to -8°F in the winter. But we've never had a failure with the modem and are extremely pleased with its performance."

From "Better Roads," September 1985.

### HOW CLEAN ARE YOUR STREETS?

by Al Sanders Street Cleaning Administrator City of Savannah, Georgia



How do you determine if your streets re clean? At the 91st Annual APWA Congress n Los Angeles, this question was raised in meeting involving contractors and city One official said "they are fficials. lean if I say they are clean." Another tated that street cleanliness was measured y the number of complaints they received. ome felt that the frequency with which the treets are swept determined the cleaniness. It is difficult to measure street leanliness. The fact that leaves have allen or mud and sand have washed into the iness. It is difficult to measure street treets or litter is up to the curb tops is airly obvious, but does little to determine he cleanliness level or to compare the leanliness of one section of town to thers. When Savannah decided they wanted equal level of street cleanliness through e city, it was apparent that some reliable asure had to be devised to quantify those evels. Savannah's Equal Cleanliness System s been in operation for three years and e rating of the cleanliness level of reets is the key to success.

Savannah is divided into Planning Units r purposes of comparing cleanliness levels different parts of the city. Every rbed and paved street within each of the planning units is scheduled for sweeping a weekly, bi-weekly, or monthly day-time hedule or a weekly, twice a week, or four mes a week night-time schedule. The nedules are set up according to predicted in order to achieve equal cleanliness. E schedules are rewritten if one area of a rated lower than the others.

The rating system is complex and time consuming, but necessary if equal levels of cleanliness is to be obtained. A separate schedule is written annually so that every curbed and paved street is rated once during the year. Four days a week, the day-time supervisor rates approximate ten streets. The rater has pictures and descriptions of cleanliness levels with zero as the worst and four as the best. Except when the supervisor is sick or on vacation, no one else rates the streets. Each street is rated halfway between the time it was last swept and the time it is scheduled to be swept next. Representative streets from all planning units are rated each quarter and trends are plotted to determine which areas need more or less attention.

The goal is to have all the curbed and paved streets in each Planning Unit at the 3.0 level. Special attention is given to neighborhoods with ratings significantly below 3.0, and sweeping frequencies are changed if they remain low.

Changes in schedules are not made based on any one quarterly rating. The ratings fluctuate in a fairly predictable pattern throughout the year depending on rainfall patterns, wind patterns, and leaf fall patterns. Neighborhoods that are being monitored are compared during the same quarter of two successive years, since the conditions are assumed to be similar.

Whenever unpredictable rainfall patterns are encountered, it is extremely difficult to make a statistical determination of the cause of a low quarterly rating in any given neighborhood. During period of unseasonable heavy rain and wind, all neighborhoods fall below the predicted rating for that quarter.

The leaf fall pattern varies from year to year. If we have heavy winds when the leaves first start to fall, they pile up deep and are extremely difficult to sweep up. The result is low ratings for a short

#### FROM PAGE 1

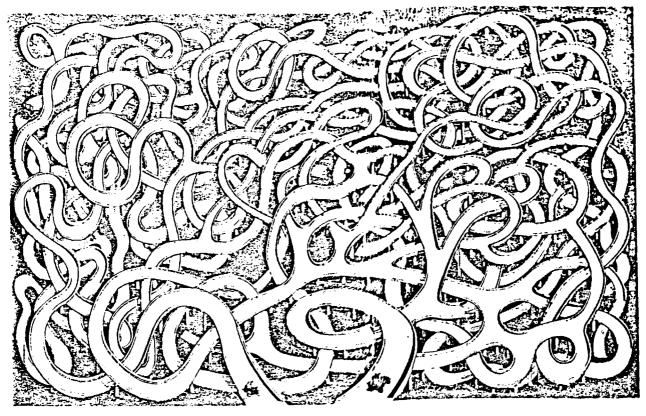
- o Environmental Instrumentation Laboratory. Designed to operate in conjunction with a mobile field measuring laboratory, the laboratory serves principally to develop instrumentation systems for traffic noise research and analysis of field data using noise simulation models and desktop computer systems.
- Human Factors Laboratory. Fundamental studies conducted in this laboratory evaluate the potential effectiveness of new or modified traffic control devices through improvements in conspicuity, legibility, and message identification and comprehension.
- Highway Driving Simulator (HYSIM)
  Laboratory. HYSIM, a first generation,
  fully interactive research simulator,
  is used to evaluate drivers' reactions
  to new or modified highway signs, signals, markings, or other traffic
  control devices; measure driver performance in various roadway situations
  and environmental conditions; and
  review the relative effectiveness of
  developmental traffic control systems.
- o Highway Electronics Laboratory. This laboratory is used to conduct staff studies and provide electronic support to the Offices of RD&T and other elements of FHWA; to develop prototype traffic control devices; and to design, fabricate, and maintain specialized instrumentation systems for other laboratories at the TFHRC.
- o Hydraulics Laboratory. A 6-ft x 70-ft (1.8 m x 12.3 m) tilting flume with a 15-ft<sup>3</sup>/s (0.42 m<sup>3</sup>/s) flow capacity is used for scale modeling of highway drainage design problems associated with large drainage structures and culverts, storm water runoff from highways or adjacent watersheds, and streambed stability near bridge piers.
- Pavement Performance Laboratory. Evaluations of both pavement material components and full-scale pavement sections are conducted in this laboratory to verify design procedures and develop predictive design equations.

- o Roadside Safety Library (RSL). This data library serves as a central clearinghouse for all analysis, design, and testing information related to highway safety appurtenances.
- o Structures Laboratory. This laboratory permits environmentally controlled static and dynamic load experiments of large-scale bridge models or full-scale bridge sections or components to identify and solve serviceability and load capacity problems of highway bridges and to evaluate new concepts for inspecting, strengthening, and rehabilitating bridges and increasing their load capacity.

The outdoor laboratories are:

- o Bridge Foundation Test Facility. This is a foundations testing facility for evaluating new design and construction concepts for spread footings and pile foundations.
- o Federal Outdoor Impact Laboratory (FOIL). This specialized crash impact testing facility is used for inexpensive physical testing of sign and luminaire supports using a reusable "bogie" test vehicle.
- Pavement Test Facility. This facility is for accelerated mechanical testing of pavements to determine their field performance.

In addition, TFHRC houses the following general support facilities: the RD&T Computer Center; a mechanical design and fabrication shop; the RD&T Report Center; the Technical Reference Section; a vehicle preparation area in which vehicle data collection instrumentation systems or special test vehicles are developed, calibrated, and maintained; and the Technology Laboratory to determine better methods for timely technology transfer and to establish improved methods for using microcomputer technology and communicating new technology to field users.



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#### TRAFFIC ENGINEERING SERVICES FOR SMALL POLITICAL JURISDICTIONS

The report, Traffic Engineering Services for Small Political Jurisdictions, coscribes several ways in which smaller jurisdictions, less than 50,000 copulation, can obtain traffic engineering services. The more beneficial and productive methods for obtaining these needed services are:

- 1. increasing emphasis on training programs for in-house staff.
- increasing emphasis on the use of in-house traffic engineering technicians, supplemented by outside professional level traffic engineers.
- 3. Using regional or "circult" traffic engineers who serve a number of jurisdictions on a part-time or as-needed basis, and who may be funded by a consortium of local jurisdictions, or by any combination of funding sources.
- Using traffic engineers employed by larger jurisdictions and State agencies by formal contract or other type of agreement.
- Using private traffic engineering firms on an as-needed basis.
- 5. Using coilege and university traffic engineering professionals.
- Using automobile associations, insurance companies, service clubs, and the media to gain support of the citizenry for improved services.
- Seeking an exchange of ideas and possible solutions to problems of attending professional association meetings, seminars, and workshops.

Tody of this report, PHWA-RO-IP-77-6, may be obtained from this Technology Tension Center. Additional information about the findings of this report ser a cotained from Mr. Howard H. Bissell, Traffic Safety Research Division, IR-30, 6300 Georgetown Pike, McLean, Virginia 22101; Mr. Bissell's telephone tumber is (703) 285-2428.

# **GEORGIA TECH**

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DIRECTOR: M. JOHN MOSKALUK

EDITOR : WASSIM SELMAN

ASSISTANT: SASHI AMATYA

period of time. A steady leaf fall over a long period results in low ratings over the entire period.

In analyzing the results of the ratings, it is important to look for trends over a long period of time. The need for change in a particular neighborhood that is rated low every quarter is easy to recognize. The neighborhoods that get statistically close to 3.0 must be closely monitored and the seasonal variations considered before schedule changes are made.

In order for a rating system to work, every paved and curbed street must be scheduled for sweeping and must be swept when it is scheduled. This can only be accomplished if the department responsible for sweeping has enough personnel and equipment to meet the schedules every single sweeping day. The cooperation of the laintenance Department is essential. Sweepers must receive priority maintenance. They must be repaired as soon as they break own, even if the repairs must be made on eekends. The parts historically required to keep sweepers operating must be purchased and stocked locally.

How clean are your streets? Do you ave a way to measure the levels of clean-iness and document the results? Are steps aken to increase sweeping in areas that do by the meet the minimum standards? Is your ty willing to invest the money required to tain a high level of cleanliness in all reas of the city? If equal levels of eanliness are important in your city, all these questions need to be addressed and swered. Savannah is committed to equal eanliness at a high level, and the rating stem current in use is the key to success-lacocmplishment of our goal.

m "Urban Georgia," November 1985.

pretimed controllers, attention turns to synchrolizers and the concept of the back-ground cycle as the foundation for learning the operation of advanced traffic-adjusted systems. Other topics include system features of NEMA controllers, before and after studies of effectiveness, communication-system technology, sensor location, zone delineation, and others.

There will be six hours of hands-on workshop sessions, supplemented by several written work problems, two field trips, and several films. Also each participant receives a computer solution of the optimal timing of an arterial of his or her own.

#### REGISTRATION

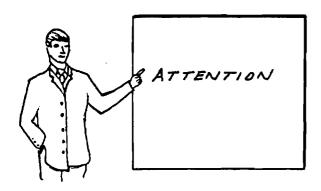
The fee for the course is \$550. This amount includes all necessary classroom materials. For registration information write to: Department of Continuing Education, Georgia Institute of Technology, Atlanta, Georgia 30332-0385. Telephone, 404/894-2400

#### **ACKNOWLEDGMENT**

The Technology Transfer (T<sup>2</sup>) Program is a nationwide effort financed joints by the Federal Highway Administration and individual State Departments of Transportation. Its purpose is to translate into understandable terms the latest state-of-the-art technologies in the areas of roads, bridges, and public transportation, to local and county highway and transportation personnel.

The T<sup>2</sup> Center at (Georgia Tech) is sponsored by the Georgia Department of Transportation and provides information and counsel to more than 500 municipalities and counties in our state. This newsletter is designed to keep you informed about new publications, new techniques, and new training opportunities that may be helpful to you and your community. Individuals wishing to receive future copies of this newsletter at no cost may send their requests to Mr. John Moskaluk, School of Civil Engineering, Georgia Tech, Atlanta, Georgia 30332.

# WORKSHOPS...CONFERENCES...SEMINARS



#### PORTLAND CEMENT ASSOCIATION COURSE

# Troubleshooting Concrete Field Problems April 7-11, 1986 Skokie, Illinois

Cement and concrete industry customers and technical problem-solving personnel will benefit from this Portland Cement Association class.

The course is designed especially for those responsible for handling field problems for contractors, precasters, inspection and testing agencies, architects, and federal, state, county and city engineering departments. It will focus on identifying and discussing problems of durability, ready mix concrete production and transportation, admixture use, concrete placement, fabrication and construction and precast prestressed concrete structures, slabs on grade, quality control procedures, strength test evaluation, repair and maintenance of concrete surfaces and structures, and ways to determine in-place concrete strengths.

The five-day course will be conducted at the Portland Cement Association Cement and Concrete Center, Skokie, Illinois. Enrollment is limited to 28 to assure individual attention. The registration fee is \$975.

For more information, contact the registrar, Educational Services Department, Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 60077 - Telephone (312) 966-6200.

"The Fourth International Conference on Low-Volume Roads" August 16-20, 1987 Ithaca, New York

This five-day conference provides an opportunity for the exchange of up-to-date information on research that is applicable to the problems of low-volume roads. The conference is sponsored by the Transportation research Board (TRB), National Research Council and is held once every four years. The previous conference was held in Tempe, Arizona and was attended by over 185 people, representing nearly all of the states in the U.S. plus 20 foreign countries.

A meeting announcement and a call for papers will be published before the end of the year. If you are not a member of TRB, but you would like to receive the meeting announcement, write to Neil Hawks, Transportation Board, 2101 Constitution Avenue N.W., Washington, DC 20418 - Telephone (202) 334-2957.

TRAFFIC SIGNAL OPERATION IN COORDINATED SYSTEMS
March 17-21, 1986.
Atlanta, Georgia

This Workshop will be held at the Traffic Signal Laboratory of the School of Civil Engineering - Georgia Institute of Technology, Atlanta. Dr. Peter S. Parsonson, Ph.D., P.E., a professor at Georgia Tech, will direct the workshop assisted by Mr. Joe Thomas, Chief, City of Atlanta Traffic Engineering Division.

The workshop is open to nationwide enrollment and aimed at professional engineers and signal-design technicians. It begins with the construction of time-space diagrams, manually and by computers, for preferencial and balanced flows, and then proceeds to the methods for implementing these time-space relationships on the street by means of various types of controllers, coordination units of computer software. After the treatment of the coordination of

# AVAILABLE FREE FROM THE TECHNOLOGY TRANSFER CENTER

The following publications are available free from the Georgia Tech Technology Transfer Center. If you would like to have any of these publications, please let us know. You can call the Center at (404) 894-2360 or 1-800-282-1275.

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Upgrading Deficient Through Truss Bridges	FHWA, 1982	6
Rail-Highway Crossing Resource Allocation Procedure Users Guide	FHWA, 1982	6
Field Maintenance Manual for Georgia Counties Local Roads and Streets	Georgia Tech, 1975	8
The Hole Story	APWA, 1983	17
Decay in Wood Bridges: Inspection and Preventive and Remedial Maintenance	U.S. Dept. of Agriculture, 1983	13
Our Nations Highways- Selected Facts and Figures	FHWA, 1981	150
UMTA Technical Assistance- A Guide for Users	UMTA, 1984	17
Pothole Primer, Special Report	U.S. Corps of Engineers, 1985	200
Guidelines for Making Pedestrian Crossing Structures Accessible	FHWA, 1984	4
Hydrology	FHWA, 1984	7
Highway Safety Overviews	FHWA, 1984	2
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TITLE	PUBLISHER NO	. OF COPIES
A Procedure for Determining Frequencies to Inspect and Repair Highway Safety Hardware	ЁН₩А,1983	4
Georgia Truck Weight Laws and Traffic Control Workshop	Georgia Department of Transportation	117
Practical Guidelines for Minimizing Tort Liability	NCHRP 106, 1983	20
Synthesis of Safety Research Related to Traffic Control and Roadway Elements Volume 1	FHWA, 1982	9
Volume 2	FHWA, 1982	9
Compilation of State Laws and Regulation on Materials Affecting Rail-Highway Crossings	Association of America RailRoads, 1983	n 14
Paying for Transportation at Local Level: 17 Strategies	APWA	50
Value Engineering Contract Provisions on Federal-Aid Highway Construction Projects	FHWA, 1984	5
PROCEEDINGS: Fourth Annual Pedestrian Conference	FHWA, 1984	6
Operation and Performance of Drum Mix Plants	FHWA, 1984	4
√ Accident Research Manual	FHWA, 1980	13
A Basic Asphalt Emulsion Manual	The Asphalt Institute, 1980	30
Quality Assurance for Local Governments	FHWA, 1983	25
Handbook of Computer Models for Traffic Operation Analysis	FHWA, 1982	. 11
Road Surface Management for Local Governments	U.S. DOT	20
Mastering Traffic Engineering	Military Traffic Management Command, 19	81 3
Pavement and Shoulder Maintenance Performance Guides	FHWA, 1984	23

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TITLE	PUBLISHER	NO. OF COPIES
Reflective Cracking on Bituminous Overlays on Rigid Pavements	FHWA, 1984	7
The Engineers Pothole Repair Guide	U.S. Corps of Engine 1984	eers, 10
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SPRING 1986

# STREET MAINTENANCE BEGINS WHEN CONSTRUCTION ENDS

by Joe D. Hindman
Public Service Director, City of Hapeville

When a city street construction project has been completed, accepted from the contractor, and final payment has been made to him, a new facility is available for use by the traveling public. By the same token, a new responsibility is created to preserve the new investment and to serve and protect the interests of the traveling public. This is true not only of newly constructed streets but also for all streets of our ities and towns. Sudden failures, damage y storms, gradual deterioration, and nexpected obstructions can cause personal njury, death, or delay. "Street Maintenance" is defined as the function of rotecting the street structure and keeping it in condition for safe use.

Maintenance Budgets: A certain portion of the street department funds should be set uside for street maintenance and may be referred to as the "Maintenance Budget." The amount of this portion of the budget is sually determined by making a study of cost records of previous years and estimating the mount of money needed to maintain the treets through the coming year. These stimates are made on an annual basis.

Maintenance Operations: Maintenance ork in most cities follows the same general attern. Much of it consists of maintaining he road surfaces or that portion of the treet used by the moving vehicle. Estiates show that almost half of the total

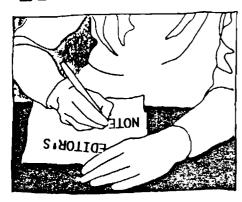
maintenance budget is used for this purpose. The remainder is spent on maintaining shoulders, drainage structures, curbing repair and special services. Special services include such items as street sweeping which eliminates a build up of dirt and sand along the shoulder or curbline that tends to narrow the usable street surface. This build up also holds moisture which causes damage to the pavement edges. Another major item under special services is the maintenance of traffic and street signs and pavement marking, including crosswalks.

Pavement Rating Systems for Asphalt Streets: For those individuals with the responsbility of maintaining city streets, deciding which streets should get first attention is often difficult. One factor complicating the decision is the variety of types of pavement distress; some serious, others rather insignificant. This sytem utilizes the experience of an Engineer, Maintenance Superintendent, or Foreman to assign a numerical value to each type of pavement defect, taking into account both the extent of distress and its relative seriousness. The sum of these numerical values provide a fairly accurate, though subjective index of the general condition of the road. The index can be useful in setting maintenance priorities.

The rating system is intended for cities not having the benefit of specialized street engineering experience and without

CONTINUED ON PAGE 5

# EDITOR'S NOTE



As you probably know, publications availble at the Georgia Tech Technology Transfer enter were advertised in the Winter issue f Tech Trans. The Center has during the ast two months received numerous requests or these publications. While we were leased to receive that many requests, we nfortunately have depleted all available opies of several publications. Consequently, there remains a few unanswered equests.

The Center has ordered additional copies f publications in heavy demand so that all equests can be satisfied. We regret not eing able to provide all publications romptly.

Traffic data collection equipment is vailable at the Center for use by local gencies. If your agency has a need for such quipment, please contact us. We will train ou in the use of the equipment and allow ou to keep it for a period of time. The coner you request the equipment, the sconer ou will get it. This service, like all our ervices, is free of charge. Call us now at 4(4) 894-2360 or 1-800-282-1275.

The Center is currently building a videoape library for use by local agencies. Ideotapes on various subjects of interest o transportation officials in Georgia will e made available for free loan. These tapes hould provide you with convenient, cheap, nd effective training of your personnel. We ish to thank Mr. Don P. Bartles, Columbia ounty Public Works Director, who suggested he videotape library for the center.

If you have any ideas, suggestions, or pinions on how we can best serve you and thers in Georgia, please let us know.

# MANAGEMENT VS. CRISIS REACTION

by Barbara Gole Director of Public Works Indianapolis, Indiana

Some organizations react to problems only when there is a crisis such as a break in a sewer line. This method of managing complex capital plants tends to consume most resources in putting out fires.

Addressing infrastructure problems on a policy rather than on a project basis is an important aspect of capital budgeting at all levels of government.

Assessment is the first step in infrastructure management. Information needed to determine requirements for repair, renovetion, and replacement must be obtained. The degree of success depends in part upon as organization's ability to know the condition of its existing capital infrastructure. Assessments yield important information without which it is almost impossible to determine the requirements for replacement and renovation. You must have up-to-date information in a variety of categories such as inventory of assets, condition of assets, needs and wants, fund availability, operating costs, and available alternatives. The information gathered and the results and data base generated are then used in the planning process and ultimately fed into the organization's budget.

Extensive planning characterizes successful organizations. Successful organizations prepare long-range master plans and link these, multi-year plans, and mid-year plans with annual capital and operating budgets. Multi-year capital plans serve as the 'critical link between an organization's goals, objectives, and outputs and its anticipated revenues or resources. Multiyear capital plans are quides for identifying current and future fiscal requirements. They offer decision makers a long-range perspective without which they cannot readily see implications of their Many other benefits accrue from multi-year capital planning including development of a preferred scenario for the future, working out priorities among wants



- State truck and bus safety programs will receive \$17 million in fiscal year 1986 in grants from the Federal Highway Administration's Motor Carrier Safety Assistance Program. The safety programs include roadside spot checks, safety audits of intrastate trucking firms, and enforcement of hazardous materials regulations. Georgia will receive \$408,403.
  - Highway and bridge experts from the United States and 23 other Western Hemisphere nations gathered in Los Angeles last September at the Pan American Highway Maintenance Conference.

The four-day conference covered all aspects of road maintenance administration, including such topics as resource management, prioritization of needs, equipment management, increasing manpower efficiency, and exchanging the latest state-of-art highway technologies.

The conference provided an excellent opportunity for member nations to exchange ideas, experiences, and technologies on a wide range of topics of common interest. It also helped in a significant way to strengthen the bonds of friendship among all of the participating countries by making them focus on common solutions to common problems. Several delegations suggested that a next step might be to hold a series of regional workshops to address some of the problems which are unique to each particular geographic area.

- Lester P. Lamm, formerly with the FHWA, succeeded John A. Clements, to become the new president of the Highway Users Federation (HUF). The HUF is a national coalition of 400 businesses, industries, and associations promoting improved highway transportation safety and efficiency.

Mr. Lamm had been an FHWA executive for 13 years during which he worked with six Secretaries of Transportation and five Federal Highway Administrators in directing more than \$100 billion in highway and bridge improvements. He began his public career with the forerunner of the Federal Highway Administration in 1955. He became the FHWA's executive director, the agency's top career official, in 1973. In 1982, he was appointed FHWA deputy administrator.

 National Roadside Vegetation Management Association (NRVMA) has announced the first awards program to recognize outstanding roadside vegetation management programs called the "Excellence in Roadside Vegetation Management" awards.

The competition is open to all qualified candidates from state, county or municipal agencies, universities and industry. The association is planning to conduct the competition in four categories: state transportation departments; cities and municipalities; and academic or industry contributors. Winners will be announced at the 1986 NRVMA convention in St. Louis in October. Further information is available from:

NRVMA Awards Program c/o Dorf & Stanton 111 Fifth Ave New York, NY 10003

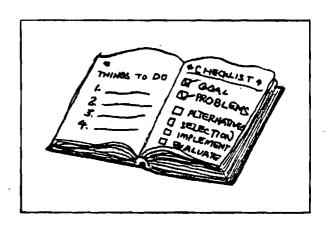


# CHECKLIST FOR PUBLIC MEETINGS AND PRESENTATIONS

# BOOK ADDRESSES SPEAKER'S NIGHTMARE: WHAT HAVE I FORGOTTEN?

A guide book prepared for the Federal Highway Administration by Helen Heuhaus Consulting provides insights into Improving the Effectivness of Public Meetings and Hearings. The following is a checklist taken from this publication which may be useful to those persons who are preparing a public meeting or presentation.

- o Become thoroughly familiar with the proposed project and its geographic area.
- o Define the goals and objectives of the meeting.
- o Define the project community.
- o Inventory in-house resources and limitations (including budget, time, equipment, and people's skills).
- o Develop a project mailing list.
- o Determine the meeting format.
- o Select a site, date, and time for the meeting.
- o Inspect the proposed meeting site.
- o Confirm the meeting site in writing.
- o Complete all administrative details (including paper work related to insurance, fees, licenses, parking, custodial services, and security provisions).
- o Select and begin to prepare appropriate displays, handouts, and audio-visual aids.
- Identify the meeting panel, select a conductor, and firm up overall staffing arrangements.
- Begin to prepare the technical presentation. Determine how and by who it will be given.



- o Establish and formalize the guidelines and procedures for meeting conduct (including time limits, speaking order, and recording techniques).
- o Select and begin to prepare appropriate notification documents.
- o Develop the meeting agenda.
- o Review displays, handouts, and audiovisual aids and revise them as necessary.
- o Complete an in-house briefing.
- o Revise the technical presentation, if necessary.
- o Test all audio-visual equipment to make sure that it is in good working order.
- o Arrange for the transport, display, and/or use of exhibits, handouts, audiovisual equipment, and other meeting aids.

From: Northwest Technology Transfer Center Bulletin, Winter 1986.

access to conventional testing facilities. It is desinged to apply to relatively low-volume streets that carry fewer than 1,000 cars and 50 trucks per day.

Making the Inspection: An effective way of inspecting pavement is first to drive slowly over the street to get an overall impression of its condition; then to make a thorough inspection on foot, making rough notes on the type and extent of the distress as he goes along. When the inspection is completed, the rating form is filled out. It may be useful to drive again slowly over the pavement after filling out the rating form. Since the system is based on personal judgment, better results are obtained when two or more experienced individuals independently rate the pavement and the results are averaged.

Rating a Street: As mentioned earlier, some defects affect the performance of a pavement more than others. Under this rating system, the less serious problems are assigned values between 0 and 5. Defects of a more serious nature, those directly related to the strength of the pavement are rated 0 to 10. A rating of 0 means that the pavement is free of that particular type of distress.

When assigning a rating to a particular type of defect, it is important to consider oth its extent and severity. For example, a rating of 10 for "rutting" would indicate that it occurs on much or all of the road, and that the ruts are probably deep enough to be a safety hazard, especially during ain, and an impediment to traffic at all imes. On the other hand, a rating of 1 for corrugations" would indicate that currugations, although evident, are not numerous and that at present the distortions are not ery large.



After each defect is rated, the individual rating is added. This sum is then subtracted from 100, and the result is simply called the "condition rating."

Interpreting the Condition Rating: There are two ways that the condition rating can be used. First, as a relative measurement; it provides a rational method for ranking roads and streets according to their condition. Secondly, as an absolute measure, the condition rating provides a general indicator of the type and degree of repair work necessary. As a general rule, if the condition rating is between 80 and 100, normal maintenance operations such as crackfilling, pot hole repair, or perhaps a seal coat are usually all that is required. If the condition rating falls below 80, it is likely that an overlay will be necessary. In this event, it may be advisable to contact your Department of Transportation District Engineer for assistance. If the condition rating is below 30, chances are that major reconstruction is necessary.

Causes of Pavement Defects: A general understanding of the cause of a pavement defect is essential before an attempt is made to remedy it. Similarly, efficient use of the maintenace budget requires that proven methods be used to prevent recurrence of a problem. Listed are the most common defects and a brief statement of their usual cause and the suggested means of repair. If more detailed assistance is needed in determining either the cause of a defect or the proper method of its repair, it may be advisable to contact your District Maintenance Engineer.

1. Transverse Crack. A crack that follows a course approximately at right angles to the pavement center line.

This frequently is caused by movement in the pavement beneath the asphalt layer (reflection cracking). Can also result from stresses induced by low-temperature contraction of the pavement.

Requires filling with asphalt emulsion slurry. This is usually (but not necessarily) followed by a seal coat or overlay over entire surface.

2. Longitudinal Crack. A crack that follows a course approximately parallel to the center line.

#### FROM PAGE 5

This usually results from a weak joint between paving lanes. These cracks can also result from earth movements, particulary on embankments. Two close-spaced longitudinal cracks in a wheel path usually indicate bending stress induced by rutting. Longitudinal cracks can also occur as a result of movement in the pavement beneath the asphalt layer (reflection cracking). For repair, see "Transverse Crack."

3. Alligator Cracks. Interconnected cracks forming a series of small polygons, the pattern resembling an alligator's skin.

Caused by excessive deflection of the surface over unstable subgrade or lower courses of the pavement. The unstable support usually is the result of saturated granular bases or subgrade. Requires deep patching.

4. Shrinkage Cracks. Interconnected cracks forming a series of large polygons, usually having sharp angles at the corners. Caused by volume change in the asphalt mix or in the base subgrade.

Requires crack filling with asphalt emulsion slurry followed by a surface treatment or a slurry seal over the entire surface.

5. Rutting. Longitudinal depressions that form under traffic in the wheel paths and have a minimum length of approximately 20 feet. Caused by consolidation or lateral movement under traffic in one or more of the underlying courses, or by displacement in the asphalt surface layer itself.

Ruts should be filled with hot plant mixed material to restore proper cross section. This should be followed by a thin overlay.

6. Corrugations. Transverse indulations at regular intervals in the surface of the pavement consisting of alternate closely spaced valleys and crests.

Caused by a lack of stability in sphalt layers. Requires repair before esurfacing. If the corrugated pavement has n aggregate base with a thin surface treatent, a satisfactory corrective measure is o scarify the surface, mix it with the ase, and recompact the mixture before esurfacing. If the pavement has more than

two inches of asphalt surfacing and base shallow corrugations can be removed with pavement planing machine, better known as "heater-planer." This is followed with seal coat or overlay.

7. Raveling. The progressive disintegration from the surface downward or edge: inward by the dislodgment of aggregate particles.

Caused by lack of compaction during construction, construction during wet of cold weather, dirty or disintegrating aggregate, too little asphalt in the mix, or overheating of the asphalt mix. Usually requires a seal coat.

8. Showing. Lateral displacement of paving material due to the action of traffic, generally resulting in the bulging of the surface. Caused by lack of stability in asphalt layers.

Requires removal of affected area, followed by deep patching.

9. Pot Holes. Bowl-shaped holes of varying sizes in the pavement, often the result of progressive deterioration of other defects such as alligator cracking.

Usually caused by a combination of weaknesses in the pavement resulting from

NEXT PAGE PLEASE

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EDITOR : WASSIM SELMAN

ASSISTANT: SASHT AMATYA



con as too little asphalt, too thin an examalt surface, too many fines, too few times, or poor drainage and traffic. Equires deep patching.

10. Polished Aggregate. Aggregates in the surface of a pavement that have been colished smooth. Caused by naturally smooth uncrushed gravels and crushed rock that rears down quickly under action of traffic.

Requires covering the surface with a skid resistant treatment.

11. Excess Asphalt (Bleeding). Free asphalt on the surface of the pavement. Daused by too much asphalt in one or more of the pavement courses.

In many cases, bleeding can be corrected by repeated applications of hot sand, not slug screenings or hot rock screenings to blot up the excess asphalt. Sometimes, when bleeding is light, a plant-mixed surface treatment or an aggregate seal coat, using absorptive aggregate, is the only treatment needed. In rare instances of neavily over-asphalted surfaces, the surface should be completely removed.

12. Deficient Drainage. Drainage roblems may be considered in two cate-ories: surface and subsurface. Proper urface drainage efficiently removes runoff rom the pavement and the nearby ground. tanding water on the pavement or the side itches indicates surface drainage eficiency.

Proper subsurface drainage keeps roundwater away from the pavement tructure.

Conclusion: The city street system must be maintained with as much wisdom as we can offer since it is vital to the life of a community. It is necessary for the city to be aware of the citizen's feelings and to be receptive of their ideas and proposals. When a bad condition is reported by a citizen, it is necessary to take prompt action on their complaints.

#### References:

Urban Public Works Administration, The Asphalt Institute, Highway Engineering

From <u>Urban Georgia</u>, March 1985

#### **ACKNOWLEDGEMENT**

The Technology Transfer (T2) Program is a nationwide effort financed jointly by the Federal Highway Administration and individual State Departments of Transportation. Its purpose is to translate into understandable terms the latest state-of-art technologies in the areas of roads, bridges, and public transportation, to local and county highway and transportation personnel.

The T2 Center at Georgia Tech is sponsored by the Georgia Department of Transportation and provides information and counsel to more than 500 municipalities and counties in our state. This newsletter is designed to keep you informed about new publications, new techniques, and new training opportunities that may be helpful to you and your community. Individuals wishing to receive future copies of this newsletter at no cost may send their requests to:

M. John Moskaluk Technology Transfer Center School of Civil Engineering Georgia Tech Atlanta, GA 30332

## MAINTENANCE TIPS

#### LITTER REMOVAL

Litter along the shoulders and right of way due to inconsiderate motorists is a major maintenance problem. It is normally found along any stretch of roadway but is more common along roads with high or very low volumes of traffic.

Litter does not create a severe problem unless objects are large enough to do damage to mowers or clog side ditches that may result in drainage problems. Litter removal is normally performed to provide a pleasing roadway to the motorists. The requirements for cleaning roadside litter is outlined below.

#### CREW REQUIRED

Laborers	;	2
Truck dr	iver	1
		3

#### EQUIPMENT REQUIRED

Dump truck ]

#### DAILY PRODUCTION PER CREW

4 - 7 miles of roadway

#### REPAIR PROCEDURE:

- Place signs and other safety devices.
   Equip truck with flashing red light.
- 2. Place large items in truck.
- 3. Collect small items in litter bags. Place full bags along shoulder. Truck driver empties litter bags into truck and returns empty bags to laborers.
- 4. Cover truck bed to contain litter.
- 5. Dump litter at designated site.
- 6. Remove signs.

#### MACHINE MOWING

Machine mowing is the proper method of maintaining high grass. High grass, as a result of insufficient mowing during the growing season, is defined as roadside vegetation with an overall height of 12 inches or a condition where roadway visibility is reduced.

High grass causes an unpleasing roadway and may block visibility. If not maintained, it will cause shoulders to become overgrown and may also create poor drainage ditch erosion and pavement failures. More importantly, it can result in a serious safety hazard by restricting sight distance. The maintenance method is outlined below.

#### CREW REQUIRED

Laborers	3
----------	---

#### EQUIPMENT REQUIRED

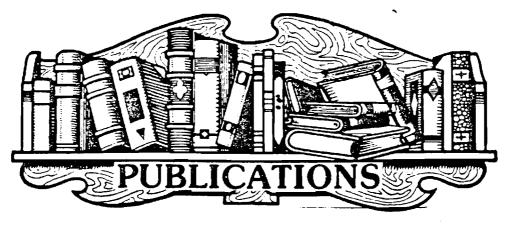
Mowers	2
Truck	1
	3

#### DAILY PRODUCTION PER CREW

15 - 20 acres

#### REPAIR PROCEDURES:

- 1. Place mowing signs.
- Use largest mower first and follow with smaller.
- 3. Cut one swath beyond slope or 50 feet from roadside.
- 4. Mow each section with odd number of swaths. This will help to eliminate "deadheading".
- 5. Mow grass to 5 inches height.
- 6. Remove signs.



Several magazines are available free of charge to qualified individuals in the highway industry. When requesting a subscription, use letterhead and give your title. If your title is not informative, describe your job responsibilities in order to help the publisher decide whether you qualify for a free subscription.

- o American City and County (published monthly). Urban development and street maintenance. For subscription information write to American City and County, 6255 Barfield Road, Atlanta, GA 30328.
- o Better Roads (published monthly). Rural road construction, maintenance, and innovation. Write to Better Roads, P.O. Box 558, Park Ridge, IL 60068.
- o Public Works (published monthly). Primarily urban public works. Write to Public Works Journal Corporation, Box 688, Ridgewood, NJ 07451.
- o **Roads** (published bi-monthly). Road construction and maintenance. Write to Scranton Gillette Communications, Inc., 380 Northwest Highway, Des Plaines, IL 60076.
- o **Highways and Heavy Construction.** A nationally distributed monthly publication. Write to 875 3rd Avenue, New York, NY 10022.
- o Airport Services Management. A nationally distributed monthly publication. Write to Fulfillment Department, Airport Services management, 731 Hennepin Avenue, Minneapolis, MN 55403.
- o Metropolitam. A nationally published monthly magazine on mass transit subjects. Write to Editorial Offices, Metropolitan, Bobit Publishing Company, 2500 Artesia Blvd., Redondo Beach, CA 90278.

o ATSA Signal. A quarterly publication designed for those interested in permanent signing, delineation, and/or traffic control in construction areas. Write to American Traffic Services Association, Inc., Stafford Executive Building, Route 4, Box 18, Stafford, VA 22554.

#### STREET AND HIGHWAY MAINTENANCE MANUAL

The APWA Street and Highway Maintenance manual is an in-depth study of the changes in management systems and highway technology which have advanced the practice of street maintenance since the publication of the APWA's first guide to the field in 1963. The practical, hands-on information included in the Manual reflects the state of the art in management practices and operations procedures.

Part I includes topics such as Administration and Management, Operating Policies and Procedures, and Maintenance Management Systems, as well as Pavement Management Systems. Part II covers topics such as Maintenance of Roadway Surfaces, Aggregate Surfaces, Maintenance of Drainage Facilities, Bridge Maintenance, Maintenance of Traffic Control and Safety Devices, and Snow and Ice Control.

This publication is available in a threering binder containing over 550 pages of operating procedures, forms and standardized repair methods. An invaluable publication for cities and counties, it can be obtained for \$50 (or \$65 to non-APWA members) from:

> American Public Works Association Publications Department 1313 East 60th Street Chicago, IL 60637

# COURSES...MEETINGS...CONFERENCES

# AIRPORT PAVEMENTS - BUILDING FOR THE FUTURE May 22 - 23, 1986 ATLANTA, GEORGIA

The purpose of this course is to provide consulting engineering firms, contractors, airport authority personnel and others interested in airport pavements with the latest in airport design, construction and rehabilitation techniques. Brief overview of the topics to be covered in the course is as follows:

#### A. DESIGN AND CONSTRUCTION OF NEW PAVEMENTS

- Future Pavement Needs and Funding for Civil Airports
- 2. Future Pavement Needs for Military
- 3. Airport Pavement Construction
- 4. Report on Atlanta Airport Construction
- 5. Airport Pavement Design and Jointing
- B. GENERAL AVIATION AIRPORTS PROJECTS
- C. DESIGN OF GENERAL AVIATION AIRPORTS
- D. PROPOSED CHANGES FAA DESIGN PROCEDURES
- E. REBUILDING AND RESTORATION OF AIRPORT PAVEMENTS
  - 1. Concrete Resurfacing Design
  - Concrete Resurfacing Construction and "Fast Track" Concrete Resurfacing
  - Elsworth Air Force Base Concrete Overlay
  - Overview of Concrete Pavement Recycling
  - Restoration of Martin State Airport Runway, Maryland
  - Installation of Load Transfer Devices, St. Louis Airport
  - Specifications for Concrete Overlays, Recycling and CPR

The course is sponsored by The Federal Aviation Administration, The American Concrete Pavement Association, and The Portland Cement Association. The two day course will be held at the Atlanta Airport Hilton in Atlanta, Georgia.

The registration fee is \$45.00 per person For further information on registration please write to:

American Concrete Pavement Association 2625 Clearbrook Drive Arlington Heights, IL 60005

#### ROADWAY MAINTENANCE WORKSHOP

By the time you get this newsletter, the Roadway Maintenance Workshop sponsored by this Technology Transfer Center will be underway. The workshop covers topics such as asphalt maintenance deficiencies, asphalt pavement repair methods, unpaved roadways, off-road maintenance, roadside maintenance, equipment selection and maintenance, and bridge structures deficiencies and repair.

If you have not attended the workshop yet, and wish to attend, check the schedule below and make plans to participate in one of the remaining sessions. For further information, please call the Center at (404) 894-2360 or 1-800-282-1275.

GDOT DISTRICT OFFICE	WORKSHOP DATE
Jesup - District 5	April 22-24
Tifton - District 4	April 29-31
	May 1
Tennille - District 2	May 6-8
Thomaston - District 3	<b>May 13-1</b> 5
Gainesville - District l	<b>May 20-22</b>
Cartersville - District 6	May 27-29
Atlanta - District 7	June 3-5



and needs, determining what part of the ...isting capital infrastructure it would be to save, developing long-range financial requirements, and providing a vehicle for presenting the organization's direction to its members and interested parties. Inort-term plans generally consist of letailed descriptions of projects that form the basis of the budget and set in motion the organization's day-to-day operations.

Preparation of short-term plans should asult in an annual update of multi-year When an organization plans for sysical capital needs, it is important for t to consider whether future needs and --sources will grow, remain relatively table, or decline. This helps determine the pest mix of capital investments. An intanization in a declining cycle would ropably choose mainly to maintain, preerve, and replace existing capital stock ather than add to its current inventory. A .rowing organization would tend to add new apital items, while a stable one would uncentrate on balancing preservation and acquisition.

Successful organizations select their projects in a logical sequence from their multi-year plans. Generally, once a project is in a multi-year plan, it moves forward ach year in the plan until it is in the lapital budget. Sometimes, however, projects in a plan are dropped and other projects appear in the budget without having seen in the plan previously. This is to be expected in the case of emergencies or changes in priorities and financing. It is not expected that the multi-year plans be ignored in selecting projects for funding. There is a tendency for some organizations to select projects based upon availability of funds rather than on identified needs. Usually, these organizations have not gathered information on existing assets or identified current and future needs.

The final element of a successful infrastructure maintenance program is controlling funds for and time expended on apital acquisition projects. This is done maximize benefits from limited resources redicated to capital improvements. Controls relp identify and alleviate inefficiencies rule to poor management practices. Projecting funds for capital investment, reviewing status of on-going projects,

determining causes of deviations from schedules, and performing post-completion studies are all characteristic of good control.

Growing organizations have abundant resources and can afford fewer controls than organizations in a stable or declining cycle. Regardless of the growth stage, controlling funds for and time expended on capital acquisition projects helps maximize benefits of the limited resources dedicated to capital improvement.

Successful organizations set priorities for long-range capital improvements and go a step further by designating funding mechanisms to protect funds allocated for priority capital projects. A continuous review of the status of ongoing physical capital projects to ensure that previously established targets of time, money, and scope are being met are found in successful organizations. The most important element is the reporting system to inform top management when project targets are not being met or cannot be met, in addition, the determination of the causes for both cost and time variances are an important factor.

In summary, the differences between management and crisis reaction consists of following a four-part framework:

- Assessing the condition of the infrastructure and identifying short- and long-term goals.
- Planning alternatives to satisfy the organization's short— and long-term goals.
- Selecting alternatives and setting priorities among the various short— and long-term needs and establishing short term funding allocations.
- Monitoring and controlling work schedules and financing.

From APWA Reporter, August, 1985.



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TECHNOLOGY TRANSFER
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TECHNOLOGY TRANSFER CENTER

VOL. 4 NO. 3

**SUMMER 1986** 



- A stripe painting device developed in Australia has an electronic brain that automatically activates and aligns the sprayguns. The RCA Super Striper uses a hydraulically operated airless paint system, can operate at speeds of up to 50 mph, and has a built-in sensing system to permit operation day or night. The paint is heated and mixed by a stalled torque converter, which has sensors to maintain the temperature of the paint at optimum spraying consistency.
- Iowa is the latest state to adopt a mandatory seat belt law. The law went into partial effect on July 1, with warnings given to violators. Beginning on January 1, 1987, drivers and front seat passengers will be fined \$10, plus court costs, if not wearing their belts.

State governments have been adopting seat belt laws since a July 11, 1984, ruling by U.S. Secretary of Transportation Elizabeth Dole. Unless two-thirds of the nation's population is covered by state seat belt laws by April 1, 1989, mandatory restraint systems will be required of 1990 model year cars.

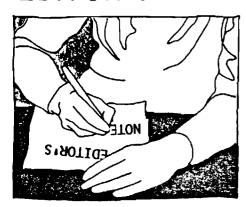
Seat belts improve safety in two ways. They protect a passenger from hitting the windshield or dashboard of the car. At 30 mph, this "second collision" has the same impact as falling off of a 3 story building. The second benefit of seatbelts is that they prevent a passenger from being thrown from the car.

- Saved by a seat belt? The Automotive Safety Foundation and the Highway Users Foundation are offering a free lapel pin and certificate to anyone who submits a written statement describing how a seat belt saved his or her life.

Include circumstances of the crash, the date, location, names and addresses of persons involved, and send to:
Saved-by-the-Belt, Automotive Safety Foundation, 1776 Massechusetts Avenue NW, Washington, DC 20036.

- Bobby Jackson of Villa Rica, Georgia, won the \$10,000 first prize at the Case Excavator Rodeo in Phoenix, Arizona. He guided a bowling ball hung from a bucket lip through a maze of obstacles. This was the fourth consecutive year that he

### EDITOR'S NOTE



Between April and June, 1986, seven sessions of the Roadway Maintenance Workshop were held in the GDOT district offices. These sessions attracted a total of 332 participants from 57 counties and 87 cities.

The Georgia Tech Technology Transfer Center appreciates the cooperation of all individuals who were involved in coordinating, instructing, and attending the workshop. Special thanks are due to the GDOT District Engineers and to Mr. Stanley Lord, State Maintenance Engineer, and his staff.

A workshop on traffic engineering applications of microcomputers is scheduled for all GDOT district offices during the nonth of August. Make plans now to attend. fore information on this workshop is included in the workshop announcement section of this newsletter.

Many retired engineers around the state have years of valuable traffic engineering experience. Those engineers are sometimes willing to provide traffic engineering services to small political juristictions on an intermittent basis.

The Technology Transfer Center would ike to develop a list of such individuals for use by local agencies. If you know someone who is retired, or will be retiring this year, please have him/her contact this Center. Your cooperation will be greatly ppreciated. If everyone cooperates in leveloping this list, many small political urisdictions will benefit.

reached the championship round of competition. The event recognizes the top hydraulic excavators in the country.

- A bill to raise the speed limit on interstate highways to 70 mph has been introduced by Senator J. James Exon, Jr. (D-NB). The bill was sent to the Senate Committee on Commerce, Science, and Transportation.

In Nebraska, the state legislature passed a bill raising the limit to 70 mph on Interstates within the state. If signed by Governor Bob Kerry, Nebraska could lose some of its federal-aid highway funds.

Under the 55 mph national speed limit law, a state could lose up to 10% of its federal-aid highway funds if more than half of its drivers exceed 55 mph. Three states, Arizona, Maryland, and Vermont, have action pending against them by the FHWA concerning this provision.

 Raising the drinking age has reduced by 13% the number of young drivers involved in fatal highway crashes, according to a study by the National Highway Traffic Safety Administration. The study included thirteen states that recently raised the drinking age to 19, 20 or 21.

# **GEORGIA TECH**

TECHNOLOGY TRANSFER CENTER SCHOOL OF CIVIL ENGINEERING ATLANTA, GEORGIA 30332

(404) 894-2360

1-800-282-1275

DIRECTOR: M. JOHN MOSKALUK

: WASSIM SELMAN

ASSISTANT: STEPHEN CELNIKER

# INFORMATION FOR FLAGGERS

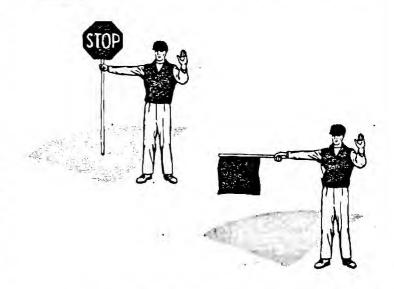
Flagging is provided at worksites to stop traffic intermittently as necessitated by work progress or to maintain continuous traffic flow past the worksite at reduced speeds to help protect the work crew. Flagging is one of the most important duties at the worksite since the lives of workers and the travelling public are in the hands of the flagger.

The flagger must, at all times, be clearly visible to approaching traffic for a sight distance sufficient to permit proper response by the motorist to the flagging instructions and to permit traffic to reduce speed before entering the worksite area. This sight distance will vary according to the operational speed of traffic. When on duty, the flagger should be appropriately dressed to alert the motorist to his/her presence. clothing such as vest shirt or jacket shall be worn during daylight. The use of orange head gear is encouraged. At night, this clothing should be reflectorized. Immodest or sloppy dress should not be permitted. Neat appearance helps gain respect and makes the flagger's job more effective.

Hand signaling devices, such as red flags, STOP/SLOW paddles and lights are used in controlling traffic through work areas. The flag is the most common device used during daylight hours. Flags used for signaling purposes must be a minimum of 24 inches by 24 inches square, made of good grade red material, and securely fastened to a staff approximately 3 feet in length. The free edge should be weighted or staves placed in the flag diagonally to ensure that the flag will hang vertically, even in heavy winds.

Sign paddles must be at least 18 inches wide, with 6-inch letters. A rigid handle must be provided. This combination sign may be fabricated from sheet metal or other light, semi-rigid material. The background of the STOP face should be red with white letters and borders. The background of the SLOW face is orange with black letters and borders. All such paddle signs should be reflectorized, unless the paddle will only be used during daylight hours. Paddle signs are most effective.

Keep an extra one handy and keep them clean.



One consideration in choosing the flagging position is to maintain color contrast between the flagger's garments and the background. While awaiting traffic, the flagger should stand in a conspicuous position on the right edge of the travelled lane facing the direction of approaching traffic. At a "spot" worksite, the flagger may need to stand on the shoulder to the left of the travelled lane or opposite the barricaded section in order to operate effectively. The flagger should NEVER STAND IN AN OPEN TRAFFIC LANE. should be clearly visible to approaching traffic at all times. A position should be taken so that motorist visibility is not impaired by curves, hills, and parked vehicles or equipment. The flagger must stand alone and not permit other workers to stand around him or her.

To give sufficient warning to workers at the worksite of approaching danger, such as an out-of-control vehicle, the flagger should stand at least 150 feet from the worksite and not further than 250 feet. Flagging stations must be adequately protected and preceded by proper advance warning signs.

From <u>Country Roads</u> and <u>City Streets</u>, West Virginia University, Vol. 2, No. 1.

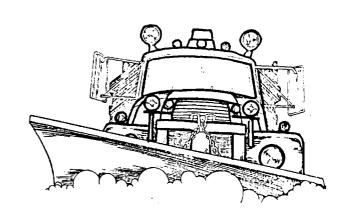
# GASOLINE OR DIESEL -- WHICH ENGINE IS THE MOST ECONOMICAL FOR A HEAVY DUTY CITY VEHICLE?

Written by Thomas M. Wilcox, P.E. City Engineer, Fulton, Missouri

What type of engine will you specify for your next dump truck or heavy duty vehicle? Why? Can you justify your These questions were recently choice? foremost in my mind when a member of the Fulton City Council questioned my recommendation to specify a two-ton dump truck with diesel engine and automatic transmission. The councilman raising the question believed we could save the city money (and of course, our budget was tight) by specifying a gasoline engine and a fivespeed transmission with two-speed rear axle. According to the councilman's sources, the savings could amount to approximately \$5,000.

The vehicle specifications we were using had been used for the last four years without any major changes and the street department personnel were pleased with the vehicles they had been receiving. I hadn't analyzed the economic advantage or disadvantage of the various heavy duty vehicles lately. However, I remembered thinking about this four years ago when we switched from gasoline to diesel engines and concluding that we would definitely save money and have a more dependable vehicle as well. It was clearly appropriate at this time to justify my previous beliefs on this subject.

Our office keeps daily records of the costs of operation and repair on all of our vehicles, so the information was readily available for comparing the annual costs on the two types of vehicles. The results were indeed surprising! The numbers shown in the truck operating costs comparison table included all costs of operating and repairs, such as: Fuel, lubricants, filters, tires, parts and labor for the necessary repairs. Items not included are taxes, insurance, storage and cost of drivers. Truck Number 1 is a 1980 Ford gasoline V-8, 270-2v with manual transmission; Truck Number 2 is a 1982 Ford diesel V-8, 8.2 liter, with an automatic transmission.



#### TRUCK OPERATING COST COMPARISON TABLE

Truck	No.	1:	Gaso'	line	Engine
-------	-----	----	-------	------	--------

Year	Operating Cost, \$	Miles Driven	Cost/Mile
1982	3,565	8,969	0.3975
1983	2,428	5,206	0.4664
1984	2,352	2,784	0.8450
1985*	6,307	3,309	1.9061
TOTAL	14,652	20,268	0.72

Truck No. 2: Diesel Engine

Year	Operating Cost, \$	Miles Driven	Cost/Mile
1982	2,906	11,919	0.2438
1983	3,308	10,830	0.3054
1984	2,876	15,612	0.1842
1985*	4,784	9,296	0.5146
TOTAL	13,874	47,657	0.29

<sup>\*1985</sup> figures are for first 10 months only.

The net difference in the operational costs/mile of the two trucks based on almost four years of data is:

\$0.72 - \$0.29 = \$0.43 per mile

Assuming an average mileage driven of 10,000 miles per year, the diesel engine would save \$4,300 per year. Since we normally keep our dump trucks 10 years, the savings over the service life of the truck would be as much as \$43,000 ignoring any potential advantage due to added trade—in value.

Based on this analysis, it appeared to be a wise investment to spend \$21,347 for a new diesel truck as compared to \$18,900 for a new gasoline powered truck (these prices included a trade-in allowance). Apparently, the diesel truck would pay back the \$2,447 cost difference at a time about 2/3 the way through the first year of use, and then continue to save the city approximately \$358 per month.

At the next city council meeting, I distributed my cost analysis and recommended that we proceed with the purchase of the new diesel truck. The council agreed, and even the councilman who had questioned the wisdom of the purchase voted for it!

From <u>Missouri Transportation Bulletin</u>, March 1986.

### GEORGIA TECH

# TECHNOLOGY TRANSFER CENTER

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### GLOSSARY OF

### **GOVERNMENT TERMS**

- CONCUR GENERALLY--I haven't read the document, don't know what it's all about and don't want to be bound by anything I say.
- IN CONFERENCE--I don't know were he is, probably out for coffee.
- PASSED TO HIGHER AUTHORITY—Pigeonholed in a more sumptuous office.
- APPROPRIATE ACTION--Do you know what to do with it, we don't.
- PAST PRACTICE--Any one of 40 ways, take your pick.
- HAVE YOU ANY COMMENTS?—Give me an idea of what it's all about.
- TRANSMITTED TO YOU--You hold the bag awhile. I'm tired of it.
- FOR NECESSARY ACTION--We don't know what they want, you figure it out.
- REORIENTATION--Getting used to work again.
- RELIABLE SOURCE--The guy you just met.
- INFORMED SOURCE--The guy who told the guy you just met.
- UNIMPEACHABLE SOURCE--The guy who started the rumor in the first place.
- NOTE AND INITIAL--Let's spread the responsibility for this.
- WILL ADVISE IN DUE COURSE--If we figure it out, we'll let you know.
- SPEARHEAD THE ISSUE--You be the goat.
- From "Technology Transfer Update," FHWA Region 9, April 1986.

# MAINTENANCE TIPS

### LEVELING WITH PREMIX

Leveling is required when there is rutting or corrugations.

Rutting is a longitudinal depression that forms in wheel paths. It is caused when pavement is permanantly deformed under traffic. It normally occurs in wheel paths of a new pavement due to improper compaction during construction or in wheel paths of older pavements because of inadequate thickness for the traffic volume on the road.

Corrugation is pronounced ridges and valleys (ripples) occuring less than 2 feet apart, crosswise to the direction of traffic. This distress is sometimes referred to is "washboarding". Corrugations are normally caused by unstable mixes produced by a) in excess of asphalt, b) an asphalt cement that is too soft a binder, c) a mix with soo many fines in the aggregate, or d) a lix with rounded aggregate. Corrugations formally occur where a bump causes vehicles to spring or where there is braking and coeleration of vehicles such as at interections.

rew required for leveling with premix:

Equipment operators	3
Truck drivers	3-5
Rakemen .	2
Laborers	2
Flagmen	2
	12-14

#### quipment required:

Dump trucks	3-5
Distributor truck	1
Roller	1
Power broom	1
Motor grader	1
Asphalt spreader	1
	8-10

aterial required:

Hot premix asphalt conrete Liquid asphalt tack coat

#### Repair procedures:

- 1. Place signs and other safety control devices.
- 2. Clean loose material off surface with power broom.
- 3. Apply light uniform coat of tack material covering entire surface to receive leveling course.
- 4. Spot dump premix from trucks along area to be leveled.
- Spread premix with motor grader; layers should be less than 3 inches thick.
- 6. Hand rake excess premix over the butt joints and feather the edges.
- 7. Roll each layer of premix immediately after spreader
- 8. Clean loose materials from roadway with power broom.
- 9. Clean up area and remove signs.

# COMPLETE OVERLAY WITH PREMIX

Complete overlay is required when there is extensive cracking or potholes, or insufficient roadway profiles.

Potholes are small (less than 3 feet in diameter) depressions in the pavement surfaces. They are normally irregular in shape, have sharp edges, and vertical sides near tha top. Potholes are usually caused by poor design practices such as too thin an asphalt surface, poor drainage, or inadequate base. Potholes are liable to occur in any location. Further, localized distress such as alligator cracking can quickly develop into pot holes when water is present.

Poorly designed or constructed roadway profiles allow water to pond on the pave-

ment due to insufficient crown and/or low points in the pavement grade. Insufficient roadway profiles are caused by improper techniques in placing the pavement surface or inadequate design for drainage. They are normally found on old sections of road, but may occur on roads recently resurfaced.

Crew required for complete overlay with premix:

Equipment operators	3
Truck drivers	3-5
Rakemen	2
Laborers	2
Flagmen	2
	12-14

#### Equipment required:

Dump trucks	3-5
Distributor truck	1
Roller	1
Power broom	1
Asphalt spreader	1
	7-9

#### Material required:

Hot premix asphalt Liquid asphalt tack coat

#### Repair procedure:

- 1. Place signs and other safety control devices.
- 2. Close the lane being repaired to traffic.
- 3. Clean loose material from surface using a power broom.
- Apply a light but uniform covering of asphalt tack material from distributor truck.
- 5. Spread mix in place with asphalt spreader; no lift should be placed that exceeds 3 inches in thickness; care should be taken to assure proper roadway profile (e.g. a crown greater than 1% and no low spots in pavement).

- Rake edge of pavement to prevent sudden drop off.
- Roll each layer immediately after placement.
- 8. Repeat for other lanes as necessary.
- 9. Broom area to remove loose material from roadway surface.
- Clean up area and remove signs.

ACKNOWLEDGEMENT

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The T2 Center at Georgia Tech is sponsored by the Georgia Department of Transportation and provides information and counsel to more than 500 municipalities and counties in our state. This newsletter is designed to keep you informed about new publications, new techniques, and new training opportunities that may be helpful to you and your community. Individuals wishing to receive future copies of this newsletter at no cost may send their requests to:

M. John Moskaluk Technology Transfer Center School of Civil Engineering Georgia Tech Atlanta, GA 30332

# AVAILABLE FREE FROM THE TECHNOLOGY TRANSFER CENTER

DECAY IN WOOD BRIDGES: INSPECTION AND PREVENTION & REMEDIAL MAINTENANCE

Joe W. Clark & Wallace E. Eslyn Forest Products Laboratory Forest Service, USDA

Considerations for wood decay, conditions and casual organisms, are presented for the engineer as basic information for the inspection and maintenance of wood bridges. Included are the requirements for fungus growth conditions conductive to decay, natural decay resistance of wood used in bridge construction, wood preservation treatments, and limitations for such treatments.

Inspecting bridges for decay covers preparation for inspection, visual search for evidence of decay and conditions conductive to decay, equipment required, and the mechanics of detailed examinations.

Maintenance and preventive maintenance measures for the control of decay are considered in regard to member replacement and structural modification.

Moisture control and in-placetreatment methods are recommended with details for their application to prevent initiation of decay or to arrest decay before it causes significant structural damage.

#### THE ENGINEER'S POTHOLE REPAIR GUIDE

R.A. Eaton, E.A. Wright & W.E. Mongeon Cold Regions Technical Digest 84-1

The purpose of this booklet is to provide facts about the causes and costs of potholes in a short and easy-to-understand format. It is intended for highway engineers, superintendents, and maintenance managers.

FIELD MAINTENANCE MANUAL FOR GEORGIA COUNTIES LOCAL ROADS AND STREETS

R. G. Hicks, D. Rosenbaum, & D. O. Covault Georgia Office of Highway Safety Georgia Department of Transportation

This manual has been prepared to assist maintenance personnel in Georgia counties to identify roadway deficiencies and to determine the best procedures for correcting them. The manual is intended for use on a daily basis by field personnel and not as a shelf reference by top management.

The first chapter of the manual defines its purpose and scope and provides a glossary of terms to insure a common vocabulary for all users. The second chapter discusses typical maintenance problems faced by county highway maintenance personnel and defines the types of maintenance, giving the importance of each. The third chapter lists the work activities involved and describes the various maintenance functions included in each.

The fourth chapter provides a detailed listing of the types of deficiencies found in Georgia counties and gives a photograph of each to assist in identification. It includes a discussion of the cause and severity of each deficiency and references the correct repair procedure to use. The fifth chapter gives detailed step-by-step maintenance procedures for each type of repair complete with photographs and illustrations. It includes crew sizes, equipment, material requirements, and average production rates. The appendix includes a listing of standard aggregate sizes, specifications for asphalt concrete and surface treatment materials, signs and markings for usual roadway conditions and maintenance operations, and guidelines for installing guardrails.

# IMPROVING GUARDRAIL INSTALLATIONS ON LOCAL ROADS AND STREETS Federal Highway Administration Office of Highway Safety Office of Engineering

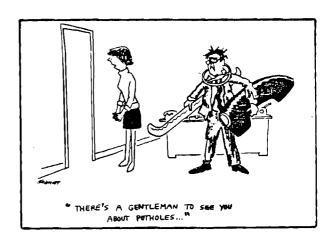
This pamphlet is intended as a general guide to effective, low cost methods of enhancing highway safety with guardrails. It is not intended as a design manual or a substitute for engineering knowledge, experience, or judgment. The guidelines and recommendations included in this pamphlet are based on actual situations and observations found in a series of national reviews. They reflect the actual needs and opportunities for highway safety improvements existing on many local roads and streets.

# POTHOLE PRIMER: A PUBLIC ADMINISTRATOR'S GUIDE TO UNDERSTANDING AND MANAGING THE POTHOLE PROBLEM

## R. A. Eaton, R. H. Joubert & E. A. Wright US Army Corps of Engineers Special Report 81-121

Many factors contribute to the increase in pothole occurrence. This pamphlet consolidates these factors into 11 manageable categories so that readers could focus on each seperately. The categories are:

- 1. Financing
- 2. Traffic growth
- 3. Safety, legal and public relations
- 4. Weather
- 5. Identifying and cataloging causes
- 6. Drainage
- 7. Preventive maintenance programs and pavement inventories
- 8. Utility cut control
- 9. Pothole patching procedures
- 10. Special focus on intersections and utility castings
- 11. Training and education



## COMPARISON OF THREE COMPACTORS USED IN POTHOLE REPAIR

## M. A. Snelling and R. A. Eaton US Army Corps of Engineers Special Report 84-31

This report is a summary of the results of a compaction study using recycled hot mix asphalt concrete conducted during August 1983. This study compared three kinds of compactors for optimum performance, and also considered such factors as temperature of the asphalt concrete mix, number of passes, size and depth of patches, and the number of lifts to fill the holes. Results showed that a vibratory roller and vibratory plate compactor could both compact patches to the desired 98% of laboratory density, but that a 200-lb lawn roller could not.

Temperature of the hot recycled mix is critical, with 250 F being the cut-off temperature. It was shown that if the mix is not compacted promptly after placement and is allowed to cool below 250 F, proper compaction may not be attained. Single lifts of 3-in., 6-in., and 9-in. depth were compacted to 98% density using the vibratory plate compactor on mix above 250 F in 18-x-24-in. holes. In larger 3-x-4-ft. holes, 98% density was obtained only with the steel wheel vibratory roller on patches placed in two 3-in.-thick lifts. The number of coverages of the compactors influences densities obtained. By doubling coverages of the steel wheel vibratory compactor from 6 to 12, the density increased from 96.9% to 99.0%.

## SEMINARS...COURSES...CONFERENCES

## TRAFFIC ENGINEERING APPLICATIONS OF MICROCOMPUTERS AUGUST, 1986

The Georgia Tech Technology Transfer Center invites you to participate in the forkshop "Traffic Engineering Applications of Microcomputers". Sponsored jointly by the Technology Transfer Center, GDOT, and THWA, the two-day workshop is planned for all seven Georgia DOT districts.

The objectives of the workshop are:

- To introduce and orient local transportation agencies to microcomputer systems and programs.
- To demonstrate the usefulness of microcomputers for traffic engineering tasks.
- To provide local officials with handson experience with microcomputers.

ince spaces are limited to 30 participants er workshop, please register as soon as ossible. No registration fee is required, or registration information call your istrict office or contact the Georgia Tech echnology Transfer Center at (404) 894-360 or toll-free at 1-800-282-1275.

#### WORKSHOP SCHEDULE

DOT District Office	Workshop Date		
esup			
District 5	August 4-5, 1986		
ifton			
District 4	August 7 <b>-</b> 8, 1986		
ainesville			
District 1	August 11-12, 1986		
artersville			
District 6	August 14-15, 1986		
ennille	A 10 10 1006		
District 2	August 18-19, 1986		
nomaston District 3	August 21, 22, 1086		
tlanta	August 21-22, 1986		
District 7	August 25-26, 1986		
013611667	Mugust 25-20; 1900		

#### TRAFFIC ENGINEERING August 11-15, 1986 Atlanta, GA

This course is designed to help those people responsible for traffic engineering learn more about the basis of their work. The five-day program's main emphasis is on general principles of traffic engineering.

The course is open to nationwide enrollment, and is primarily intended for those persons responsible for traffic engineering with limited training in the field. It will be especially useful to consultants, city engineers, new members of the traffic engineering staff, and traffic officers responsible for traffic operations. Because enrollment is limited to allow opportunity for class discussions, participants should register as far in advance as possible.

Georgia Tech faculty and experienced traffic engineering personnel will teach the course. Dr. Donald O. Covault, Professor of Civil Engineering, is the academic administrator and prime instructor. Other traffic engineers from municipal, state and private organizations will also participate as lecturers.

The program includes the fundamentals of traffic flow, statistics, volume and speed studies, speed and delay studies, accident studies, intersection control, the Manual on Uniform Traffic Control Devices, highway and intersection capacity, traffic signalization, computer control of signals, traffic data acquisition equipment, and traffic planning studies.

The course fee of \$600 includes all necessary classroom materials. For registration information, write to: Department of Continuing Education, Georgia Tech, Atlanta, GA 30332-0385.

To register by telephone, please call (404) 894-2400. Payment should be mailed immediately to ensure receipt before the course begins. If you must register within the 10 days prior to the course, please do not mail payment, but bring it with you on the first day of the class.

### PORTLAND CEMENT ASSOCIATION COURSES

For information, contact the Registrar, Educational Services Department, Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077, telephone (312) 966-6200.

Controlling Concrete Quality in Production and Construction October 27-30, 1986 Skokie, Illinois

Employees of cement, aggregate and mixture suppliers, ready-mixed concrete producers, or anyone who needs to be certified as a Concrete Field Testing Technician - Grade I will benefit from the course.

Classroom work will cover materials, specifications and requirements for concrete inspection, records and reports, and inspection and testing of concrete before, during and after placement. Laboratory sessions will provide practice in determining unit weight, and casting compressiontest cylinders.

The ACI Certification examination and performance evaluation will be conducted. Those individuals who pass will be awarded ACI Certification as a Concrete Field Testing Technician - Grade I.

The class is limited to 24 to ensure individual attention and the registration fee for the course is \$800. The program is accredited by the Council for Noncollegiate Continuing Education, a national organization recognized by the U. S. Department of Education.

Use of High-Strength Concrete September 29 - October 1, 1986 Skokie, Illinois

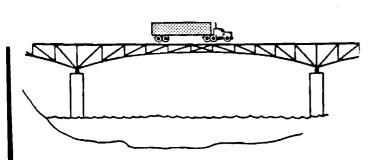
This new course will benefit owners; consultants; specifying engineers; readymixed concrete producers; cement, aggregate and admixture suppliers; testing laboratories; contractors; and others who need information and background on the use of high-strength concrete.

The program will address the latest technology relating to the design, material selection, production, testing, economics, and application of normal weight concrete with compressive strengths in the 9,000-12,000 psi range.

Specialists from PCA and and the concrete industry, with backgrounds in concrete technology, ready-mixed concrete production and construction, will instruct and conduct laboratory demonstrations for the participants.

The three-day program will be conducted at the Portland Cement Association Cement and Concrete Center in Skokie, Illinois. Enrollment is limited to 28 to ensure individual attention. The registration fee is \$800.

### 1ST "SHOP BUILT BRIDGE" COMPLETED



Oklahoma's first bridge using a new deck design was recently completed in Pottawatomie County. This design uses precast, steel reinforced, concrete beams, set side by side for the deck. The beams are poured in reusable steel forms at the maintenance yard.

Work started on the first set of forms in

May of 1985. County employees, under the supervision of County Commissioner James Cravens, performed the majority of the work. Technical assistance was provided by 0.S.U. staff as needed. Once the forms were completed, eight beams were cast. They were poured two at a time and left in the forms until flexural strength specimens indicated a strength of 500 psi. A bridge just north of the community of Bethel in Pottawatomie County was selected for replacement. County forces removed the old bridge. O.S.U. purchased the materials necessary for the abutments and a contract was let for the labor and equipment to drive piling. Vertical walls, sheet piling type abutments, with HP 10\*42 bearing piles and 45 degree wings were constructed. Once the abutments were completed, the prefabricated deck was hauled to the site and set in less than a day. The epoxy grout was then placed in the shear key block-out and the bridge was completed.

The total cost of the pilot bridge, excluding the cost of forms, was \$30,600. This represents very little savings over a concrete box of comparable opening. However, on this first bridge, there was considerable

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ATLANTA, GEORGIA 30332

wasted motion since everyone was inexperienced. This, coupled with unusually deep bedrock (bearing piles were 43' - 45' long), elevated the cost. It is still strongly felt that this design can produce savings of 15-20 percent over more conventional designs. Two more bridges of this design are presently under construction, one with Commissioner Jack Hayes in Pottawatomie County and one with Commissioner Harold Muran in Osage County. A fourth is being planned with Commissioner Glendon Combs in Pottawatomie County.

All participating Commissioners agree that this design is going to be a cost effective, fast method of small bridge replacement. They have also perceived a fringe benefit of having beams stock-piled in their yards. As Commissioner Muran said, "If I have some of these beams in the yard when one of those overweight oilfield trucks breaks all the stringers on a wooden deck, I can grab four or five of them and have that bridge open for the school buses the next day."

From: Oklahoma T2 Center Newsletter - October 1985.

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# SCHOOL OF CIVIL ENGINEERING GEORGIA INSTITUTE OF TECHNOLOGY UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA

TECHNOLOGY TRANSFER CENTER

VOL. 4 NO. 4

**FALL 1986** 

### **EDITOR'S NOTE**

Technology Transfer is not new. Perhaps, it is better known as information sharing, information exchange, or just assistance. Georgia Tech began its Technology Transfer Center for local transportation agencies in 1983 in cooperation with the Georgia Department of Transportation (GDOT) and the Federal Highway Administration (FHWA). It continues today, and its services are available to all local agencies.

Because of the Center's close association with the GDOT for the past several years, it is often mistakenly assumed to be part of the Department. It is not. While it is true that Georgia Tech is under contract with and receives much of its guidance from the GDOT as well as the FHWA, the Georgia Tech Technology Transfer Center is administered and operated by Georgia Tech at the School of Civil Engineering.

Center activities are oriented to provide a service to local agencies. They take the form of workshops, problem solving assistance, publication of a quarterly newsletter, and availability of reports. It is further acknowledged that the Center continues in operation because there is general agreement that local agencies NEED the kind of assistance that is provided by the Center.

Many of the local agencies have told us that the Center provides value through its assistance. In fact, some have said that benefits have been gained in the form of increase production and dollar savings.

If you agree that the Center provides a beneficial service or if you desire more information about how the Center can better serve your agency, please contact the Georgia Tech Technology Transfer Center. We are interested in your comments.



## **NEWS BRIEFS**

Nominations are being accepted for the 1987 National Public Service Awards Program sponsored by the American Society for Public Administration and the National Academy of Public Administration. These awards pay tribute to public service practitioners whose careers exhibit the highest standard of excellence, dedication, and accomplishment.

Up to five awards are presented annually to public service practitioners who now work or who have spent most of their careers in public service. Awards recognize individuals who have made outstanding contributions on a sustained basis rather than those who have performed a single exceptional public service deed. Award winners are selected from all levels of public service (local, state, and federal governments, international and nonprofit organizations), but awards are not chosen by category. Nominees should have responsibility for accomplishing or causing to be accomplished significant programs or projects benefitting the general public.

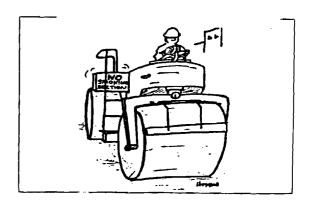
Nominations are due by November 14. For information, contact National Public Service Awards, 1120 G Street, N.W., Suite 500, Washington, D.C. 20005; telephone (202) 393-7878.

Bridge repairs increased 56% during 1985 according to the Federal Highway Administration's annual report to The National Bridge Congress. Inventory lists 574,729 bridges, of which 243,917 were cited as structurally deficient or functionally obsolete. Under the Surface Transportation Assistance Act of 1982, \$2.3 billion in federal funds were distributed in 1985 to help repair 16,550 structurally deficient bridges. Copies of the report are available from the FHWA Bridge Division in Washington, D.C.

Many motorists are willing to pay a toll for a road that offers faster and easier travel, according to a survey performed by the Roper organization. The survey results were recently published by the American Association of State Highway and Transportation Officials.

The toll survey was commissioned by the Transportation Infrastructure Advisory Group, AASHTO reports. Some 1,035 drivers were presented with four situations. In two, they were asked if they would choose to use an existing toll road or a nearby free highway. In two other cases, they were asked how they would vote - for or against a new toll road. Only 12% opposed toll roads in all four situations, while 88% favored the toll option in at least one of the four cases. The survey found that in every case drivers living in states that now have toll roads are more favorable to the toll road option than drivers in non-toll states. Those who actually use toll roads are more favorable to toll road options than those who do not.

Vibration shields made of plastic foil filled with air bubbles are now being used in Sweden to protect populated areas from vibration caused by adjacent heavy traffic. The shields, similar to the bubble wrappings used to protect delicate objects in the mail, are placed in trenches 5 to 20 meters in depth, and reduce the vibration in the area by 70 to 80 percent. The shields will make it possible to greatly reduce the width of highway and railroad rights-of-way.



# NEW MICROCOMPUTER USER SUPPORT CENTER OPENS

The Federal Highway Administration (FrmA) has announced the opening of its new atcrocomputer user support center at the infersity of Florida Transportation accearch Center, effective July 14, 1986. The new service is called the Center for Microcomputers in Transportation (McTrans).

The McTrans Center replaces three carlier microcomputer support centers perated by the Transportation Systems Jenter in Cambridge:

- Microcomputer Applications in Highway Projects (MAHP) which dealt with local, regional and statewide highway planning;
- Microcomputers in Transportation Planning (MTP), which dealt with urban and rural planning and TSM (Transportation Systems management); and,
- Safety and Traffic Engineering Applications for microcomputers (STEAM) which dealt with general traffic engineering and safety.

In the interim period since these services ended, primary distribution of software has been handled jointly by the FHWA Offices of Traffic Operations and Highway Planning.

The primary role of McTrans will be to serve as a center for technology exchange for microcomputer software in the areas of transportation under the purview of the Federal Highway Administration.

The functions of the Center will be to distribute public domain software at a minimal cost to the user and to provide technical assistance in the use of the software.

In carrying out these functions the McTrans Center will facilitate the flow and exchange of microcomputer resources among professionals nationwide and abroad. The Center will reduce duplication of effort and standardize procedures.

Initially, the McTrans Center will offer, by and large, the same product line previously distributed by the three earlier services. There have been several updates and additions made.

Three new programs also will be distributed. First the microcomputer version of the NETSIM (Network Simulation) model will be available. NETSIM is a microscopic, stochastic simulation model that is the most widely accepted simulation model for network operations.

Another new product is the Signalized Intersection Capacity Analysis (SICA) program. This program, written by the Binghamton (New York) Metropolitan Transportation Study, implements Chapter 9, Signalized Intersection, of the 1985 Highway Capacity Manual.

Finally, the Computer Aided Instructions for NCHRP Report 263, "Simplified Procedures for Evaluating Low-Cost TSM Projects" is available. The documentation for this software includes NCHRP Report 263.

For further information or to get on the McTrans mailing list, write to:

The Center for Microcomputers in Transportation
University of Florida
346 Weil Hall
Gainesville, Florida 32611

Call the McTrans hotline: 904-392-0378



## MAINTENANCE TIPS

# SIGN REPAIR OR REPLACEMENT

Damaged signs are a severe hazard to motorists. They prevent adequate traffic control and do not provide motorists with advisory warning of roadway alignment.

Crew required for sign replacement of repair:

Laborers

Equipment required:

Stake truck 1
Post driver 1
Hand tools

Material required:

Signs Sign posts Paint

Daily production per crew:

7-10 signs

#### Repair procedures:

- 1. Place warning signs and safety devices for motorists and crew protection.
- Note signs requiring replacement.
- 3. Replace signs which are difficult to read.
- 4. Straighten or replace bent posts. Paint as required.
- Remove warning signs and safety devices.

Sign repair or replacement is required when signs are no longer visible or legible to the motorists.

Traffic signs may be damaged by accident, vandalism, or normal deterioration. The most common cause is vandalism, and signs damaged in this way are normally located on roads that have light traffic.

### **GUARD RAIL REPAIR**

Guard rail repair is required when the guard rail is damaged by accident, vandalism, or normal deterioration. Damaged guard rail, with bent or broken sections, prevents the rail from providing its intended purpose and can lead to additional rail deterioration.

Guard rail is normally damaged during vehicular accidents. The damage can be found at any location where guard rail exists.

Guard rail is placed in locations to decrease accident hazards, and any section that does not perform this function constitutes a hazard to motorists. Guard rail that is bent or broken is unsightly and may further deteriorate, resulting in increased maintenance costs.

Crew required for guard rail repair:

Equipment operator	]
Laborers	3
Flagmen	2
-	6

Equipment required:

Stake truck			1
Post driver	or	auger	1

Material required:

Guard rail section Guard rail post Guard rail blocks

Daily production per crew:

60-100 linear feet

#### Repair procedure:

- Place warning signs and other safety devices for motorists' and cres protection.
- 2. Remove damaged parts and straighter when possible.

- 3. Realign loose posts and recompact.
- 4. Install new posts as required.
- 5. Install new rail. All repairs should be made to latest standards. Guard rail ends should turn away from roadway and/or taper down to a buried end. Bridge approach guard rail should be affixed to the bridge railing with no gaps. All guard rails should be offset from rigid posts by wooden 6x6 blocks.

#### **ACKNOWLEDGEMENT**

The Technology Transfer (T2) Program is a nationwide effort financed jointly by the Federal Highway Administration and individual State Departments of Transportation. Its purpose is to translate into understandable terms the latest state-of-art technologies in the areas of roads, bridges, and public transportation, to local and county highway and transportation personnel.

The T2 Center at Georgia Tech is sponsored by the Georgia Department of Transportation and provides information and counsel to more than 500 municipalities and counties in our state. This newsletter is designed to keep you informed about new publications, new techniques, and new training opportunities that may be helpful to you and your community. Individuals wishing to receive future copies of this newsletter at no cost may send their requests to:

M. John Moskaluk Technology Transfer Center School of Civil Engineering Georgia Tech Atlanta, GA 30332

YOU ARE INVITED TO SUBMIT
ARTICLES FOR OUR NEWSLETTER.
DEADLINE IS DECEMBER 5.

## MAINTAINING GRAVEL ROAD SURFACES

#### **GRAVEL**

Gravels differ. Not all gravel is good for roads. Some soils may break into fine pieces under heavy traffic, may swell when wet, or may be so hard they are difficult to work. Good gravel is hard enough so it does not form dust yet loose enough to drain. It supports the weight of traffic and distributes traffic loads sufficiently so it does not destroy the subgrade.

#### BLENDING

To achieve a road that can be used in all types of weather, it is essential to achieve a proper blend of different size materials. Good road gravel contains a uniform mixture of stones with a mixture of sand and fines. Blending different sizes allows the pieces to lock and pack (compact) together to make a strong, tight surface. Usually the size of materials for a wearing surface is 3/4-inch or less.

Fines have the consistency of flour. The fines fill small spaces between the different size stones. It is an important part of the mixture because, with moisture, it acts as a cement to hold the larger materials together. Moist gravel will not dry to form a hard-wearing surface without the proper amount of fines.

#### MAINTAINING GRAVEL SURFACE

To keep a road in good condition, the road surface and shoulders must be periodically smoothed and reshaped with a grader blade.

This should be done when the gravel is moist. The dragging operation also rolls the gravel and helps compact the road surface as it is blended.

Properly-blended gravel and fines will dry to form a hard crust that provides a wearing surface. The crust carries the traffic load and sheds water until it is broken. Traffic and climatic conditions

CONT. ON PAGE #

# TIPS ON PREVENTIVE MAINTENANCE FOR ROAD EQUIPMENT

The purpose of preventive maintenance, or PM, is to keep road equipment in the best possible operating condition at all times. Some useful tips follow:

- 1. USE AS MANY VEHICLES OF THE SAME TYPE AS POSSIBLE FOR YOUR ENTIRE FLEET. It will be easier to find parts and will cut repair time.
- 2. IN CHOOSING YOUR VEHICLES, PAY ATTENTION TO THE AVAILABILITY OF PARTS. Some operators report delays of several weeks on replacement parts in some localities. Try to select a model for which parts can be found with the least possible delay.
- 3. IF POSSIBLE, STOCKPILE FREQUENTLY-REPLACED PARTS. Brake parts are first in this category, followed by exhaust components, filters and lubricants.
- 4. BUY THE BEST QUALITY PARTS AVAILABLE. Parts must at least equal original equipment specifications.
- 5. MAKE SURE THAT WHATEVER EQUIPMENT YOU BUY IS AS TOUGH AND SIMPLE AS POSSIBLE, WHILE STILL AFFORDING DRIVERS A MINIMUM STANDARD OF COMFORT. Be sure that all equipment on your vehicle can stand up to considerable punishment.
- 6. MAKE SURE THAT AS FEW DIFFERENT PEOPLE AS POSSIBLE OPERATE EACH VEHICLE. If possible, make one driver responsible for each vehicle, and let them know that the vehicle is "theirs" to take care of.
- 7. RUSTPROOF EVERY VEHICLE BEFORE IT IS PUT INTO SERVICE.
- 8. WAX EACH VEHICLE AT LEAST ONCE A YEAR.
- 9. IF POSSIBLE, HAND-WASH EACH VEHICLE AT LEAST ONCE A WEEK. Pay attention to wheel wells and the rest of the underside of the vehicle where salt my accumulate.

- 10. MAKE A THOROUGH TIGHTENING AN IMPORTANT PART OF REGULAR MAINTENANCE. At least once a week, go over each vehicle and make sure all screws, nuts, and bolts are properly adjusted to the manufacturer's torque specifications. A common cause of damage is that vehicles literally shake apart. Shock absorbers and steering parts have been known to separate completely and body parts sometimes fall off and get lost. Loose parts should be tightened before nut, bolt, and screw threads become stripped.
- 11. CHECK THE CONDITION OF WIRING AND HOSES. Watch the ammeter; a small, constant discharge may indicate a short circuit. Antifreeze on the floor of the vehicle means a leak in the heater-defroster. Such leaks also cause windows to steam up and heater output to be reduced.

From University of Maryland, <u>Technotes</u>, Winter 1985/1986.

## **GEORGIA TECH**

TECHNOLOGY TRANSFER CENTER SCHOOL OF CIVIL ENGINEERING ATLANTA, GEORGIA 30332 (404) 894-2360

1-800-282-1275

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## PAY ME NOW AND PAY ME LATER: Roadway Neglect Inflates Users' Costs

There is a philosophy being popularized by a commercial for air filters, in which a mechanic, with a wry expression, tells a customer it will cost a few dollars to change the air filter now... or a few hundred dollars to change the motor later. "Pay me now or pay me later."

As a result of this kind of thinking and poor road management practices, the current approach to road maintenance in much of the highway community is "pay me now and pay me later." This attitude, in many instances, is caused by the lack of knowledge of true costs of road deterioration.

There is much waste resulting from deteriorated roadways--excess road maintenance and rehabilitation costs; excess fuel costs; excess vehicle maintenance costs; excess tire wear costs; and excess costs of increased accidents with injuries and death that defy the dollar sign. There are most costs in terms of lost time. Lost time costs vary considerably with the value placed on this time, but certainly commercial and industrial time losses are great, resulting in lower productivity and increased costs to consumers. In spite of this long list of waste caused by poorly managed roads, generally only one parameter, rider comfort, is used to judge road suitability.

Extensive research by The World Bank and others over the past 15 years has shown that the lack of earlier concern about roadway conditions has caused the waste of billions of dollars of scarce funds. Studies indicate that the fuel saving alone, gained by keeping a road in good condition, is sufficient to pay all the costs of maintenance and rehabilitation. The long list of other savings can then be put directly into the consumers pockets and into transporation funds, to be spent in building up the transportation system, instead of watching it crumble.

The studies clearly indicate that if a road agency neglects the roadway, maintenance and overlay costs escalate, fuel

waste soars, injuries increase, time loss increases, and so on. The higher maintenance cost soon causes taxes to increase and more and more dollars to be spent on fuel to travel the same distance on steadily worsening roads.

The citizen has been conditioned to believe that in order to keep costs down, the roadways must be allowed to fall in quality. "We have to reduce the level of service to hold down taxes," is a familiar bromide. Somehow the old saying "a stitch in time saves nine," has become a casualty of our throw-away society.

However, the road, once deteriorated, cannot be thrown away. It provides a basic service to individuals and the commercial/industrial community. When the road has deteriorated to the point of sufficient discomfiture, loud voices will see that it is rehabilitated—at an inflated cost and after huge fuel waste.

For years we wasted untold millions of gallons of fuel due to insufficient building insulation and inefficient furnaces. Finally, we have learned, and a wave of conversion has and is taking place.

CONT. ON PAGE 9



will completely break down the crust over time and reshaping is necessary to rebuild the crust.

The speed at which a grader operates or can blade effectively will depend on the type of grader, its tire pressure, and the condition of the road surface. Going too fast will cause the grader blade to bounce, creating roughness in the road surface.

#### RESHAPING

Reshaping is necessary when the surface cannot be smoothed to an acceptable riding surface. The gravel, 8 inches or more in depth, may have to be reworked to eliminate large potholes, deep ruts, and flattened crown. The grader blade should cut well below the potholes and below the washboards. Reshaping involves remixing the soils to get a proper blend of fines and different size stones and blading and compacting this blended material into a properly crowned road surface. When remixing, it may be necessary to add more gravel or fines. The art of proper blending is not a cut-and-dried proposition. Experience is the best guide to correct blending. The quality of the crust and its length of useful life depend on the skill used in blending coarse and fine materials with moisture to form the desired crust.

#### **CROWN**

After the gravel is remixed, it is reshaped by blading to restore a proper crown and smooth surface. A proper crown has the center of the road higher than the shoulders and a straight, unformly sloped line from the center of the road down to the shoulder edge on either side.

Keeping a crown on the road is probably the most important part of blading. Without a proper crown, water will stand and soak and soften the road surface.

The amount of crown or cross slope in the road should be 1/2 to 3/4 inch for each foot of width measured from the center of the road to the outside edge of the shoulder. This amount of crown should allow good drainage of surface water without washing off surface materials. This slope may vary in special cases.

#### **SHOULDERS**

The shoulders are the additional width along the outside edge of the roadway. These will be either gravel- or grass-covered on most roads. The slope of the should from road edge to ditch foreslope must be equal or slightly greater than the road surface cross slope. This will allow for good drainage of surface water from the roadway. When reshaping the roadway, the shoulders should also be worked in the same manner.

The shoulders should be an extension of the road surface in order to allow water to run in sheets from the center of the road, off the sides of the road and shoulder and into the ditch. Be careful not to form a secondary ditch by leaving a ridge of materials between the road surface and the ditch.

#### DUST CONTROL

When a gravel road has dust blowing from it, the dust is the fines and, therefore, the binder is being lost. The road is eroding away. With an average daily amount of traffic, untreated gravel roads lose about one inch of surface per year. This is equal to about 500 tons of material in a year's time for each mile of unpave road. To replace the lost gravel can cost from \$1,000 to \$1,500 per mile each year for materials alone.

It pays a town to stabilize the gravel with calcium chloride, salt, cements, or other agents. In the long run, it may actually be more cost-effective, while keeping the roads in better condition. Beside stabilizing the soil and reducing maintenance costs, a dust control program improves safety and reduces harmful effects to crops, the environment, and people.

Do not apply used motor oil for dust control. It is toxic and can enter the groundwater.

Reprinted from Fact Sheet T-225, Vermont Local Roads Program. St. Michael's College, Winookski, Vermont.

when will we stop wasting millions of jallons of fuel in order to enjoy the "luxury" of poor roads? We will stop the waste when the public is informed on the basic facts of road users costs.

It should be pointed out strenuously that these inflated costs are not the encine inevitable sequence is that insufficient maintenance funds are allocated and the road deteriorates to failure. This requires reconstruction at a cust up to tentimes the cost of timely rehabilitation.

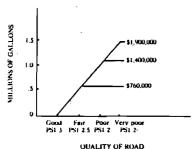
The two graphs below illustrate the rapidly rising cost of vehicle operation and road maintenance/rehabilitation due to neglect of the road system. Graphs are prepared on figures of 425 urban highway riles, 1,818 million vehicle miles peryear, and 178 million gallons of fuel.

The citizen is exposed to double jeopardy: "pay me now" and "pay me later"

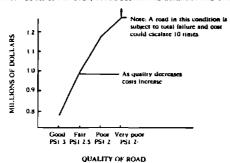
In all other aspects of energy misuse, action is well underway to change wasteful practices. It is time that the one area that uses the largest amount of the scarcest form of energy, cleaned up its act.

From <u>The Wheel</u>, Colorado Transportatio Information Center, Summer, 1986.

#### Fuel Waste Per 100 Miles of Road Per Year — Urbani (Cost et \$:.30 Per Gatton — 1980)



#### 1877 Cost Per 100 Miles Per Year, Urben-Surface Maintenance and Overlay



## **PUBLICATIONS**



ORDER NOW!

STREET AND HIGHWAY MAINTENANCE MANUAL, American Public Works Association, 1985.

This manual was written especially for those involved in roadway maintenance on a day-to-day basis, whether through administration or engineering. It is not only a reference manual but a practical guide with forms and materials that can be reproduced and used directly by the agency. The 698page manual is divided into two sections, one on the administrative end of maintenance and the other on operations. of the administrative topics discussed are reducing liability risks, employee safety, training needs and techniques, types of contracts and pavement management. operational end, the Manual topics include asphalt and PCC pavement maintenance, gravel road maintenance, maintenance of drainage facilities, bridges, roadway appurtenences and traffic control devices. It also includes sections on roadside landscaping and snow and ice control. Manual can be obtained for \$50.00 plus shipping and handling at the following American Public Works address: Association, 1313 East 60th Street, Chicago, IL 60637.

#### ASPHALT CEMENT CONTENT DIAGNOSTIC APPROACH FOR HOT MIX ASPHALT FACILITIES

Variations in asphalt cement content in hot mix asphalt mixes (HMA) can be the result of various problems in the production process, the sampling procedure or the extraction procedure. Such problems can, in turn, lead to costly specification-based penalties.

In an effort to help the hot mix contractor avoid these penalties and produce a top-quality product, the National Asphalt Pavement Association (NAPA) has issued this new publication, a step-by-step analysis of the potential areas where problems might arise and measures to take for correcting them.

### COURSES...WORKSHOPS...SEMINARS

# LOCAL HIGHWAY SAFETY STUDIES AND LOCAL HIGHWAY SAFETY IMPROVEMENT PROGRAM November 18-19, 1986 Atlanta, Georgia

The Federal Highway Administration (FHWA), through the National Highway Institute and the Office of Highway Safety, is offering two training courses on Local Highway Safety. These are special courses developed for the Rural Technical Assistance Program (RTAP) by Goodell-Grivas, Inc. with emphasis on the needs of local personnel responsible for highway safety.

These two presentations are designed for university faculty, Federal, State and local highway professionals who intend to promote and conduct highway safety training for counties, small cities (less than 50,000 population) and townships.

The 1-day presentation on Local Highway Safety Studies for local roads and streets provides simplified methods for analyzing accidents and developing safety and operational improvements. The course combines existing methods with new approaches and emphasizes what can be done with limited time, funds, and engineering equipment.

The 1-day presentation of Local Highway Safety Improvement Program will cover developing safety improvement programs for local highway agencies with due consideration for safety, cost, tort liability, and good planning procedures.

Each participant will receive a Participant Guide, Instructor Guide, 35 mm slides, and other related training material. In return they will be expected to present one or more sessions of the basic courses to representatives of local transportation agencies within their jurisdiction.

The fee for the courses is \$20.00 per course (payable to the Radisson Inn and Conference Center). They are offered separately, but participants are encouraged to

enroll in both. The deadline for registration is November 7, 1986. For further registration information, contact the Georgia Tech Technology Transfer Center at (404) 894-2360 or toll-free at 1-800-282-1275.

## OFFICE AUTOMATION IN PUBLIC WORKS November 17-18, 1986 Atlanta, Georgia

The Institute for Administrative Management Education Foundation of the American Public Works Association is sponsoring a workshop dealing with automated office systems in the public works setting.

"Office Automation in Public Works" is a comprehensive two-day workshop which is designed to identify the need for automated office systems in public works management, and examine the alternatives and solutions to manual systems. This workshop will describe the benefits of the technology of automated systems and provide a step-by-step procedure for getting started in your agency.

APWA will provide each participant with a packet of course materials. It is intended that these materials will share the dual purpose of providing the outlines for the workshop as well as provide additional material which will be a useful resource/reference tool in the future.

Fees for APWA individual members, employees of government units enrolled as either public agency or utility members of APWA, and sustaining members of APWA are \$185.00. Fees for non-members are \$220.00. For more information, call 1-312-2200 and ask for the workshop registrar.

## Troubleshooting Concrete Field Problems November 17-21, 1986 Skokie, Illinois

Cement and concrete industry service and technical problem-solving personnel will benefit. The course is designed especially for those responsible for handling field problems for contractors, precasters, inspection and testing agencies, architects, and federal, state, county, and city engineering departments.

The class will focus on identifying and discussing problems of durability, ready mix concrete production and transportation, admixture use, concrete placement, fabrication and construction and precast prestressed concrete structures, slabs on grade, quality control procedures, strength test evaluation, repair and maintenance of concrete surfaces and structures, and ways to determine in-place concrete strengths.

The five-day class will be conducted at the PCA Cement and Concrete Center in Skokie, Illinois.ag Enrollment is limited to 28 to assure individual attention. The registration fee is \$975.

#### BACK-TO-THE BASICS REPAIR OF CONCRETE November 25, 1986 Birmingham, Alabama

"Back-to-the Basics Repair of Concrete" is sponsored by the American Concrete Institute and the Central Alabama Chapter ACI. The seminar will deal with basic, how-to fundamentals related to concrete deterioration as well as cover current repair methods and materials with proven performance. Actual case histories of repairs will be presented including fire-damaged concrete structures, tunnels, bridges and parking structures. The seminar will conclude with a lecture on the important aspects and applications of corrosion protective systems.

Registration will be held on a first-come, first served basis with limited enrollment. Fees are \$165.00 for ACI members and \$190 for non-members. Group. discounts are available. For further registration information, write to: ACI Education Department, P. O. Box 19150, Detroit, MI 48219.

Basic Concrete and Related Field Practice November 10-14, 1986 Skokie, Illinois and

> Advanced Concrete Technology December 1-5, 1986 Skokie, Illinois

Courses on concrete that range from the basic to the advanced will be offered.

"Basic Concrete and Related Field Practice" is designed to enhance product knowledge of ready-mix producers, contractors, inspection and testing organizations, material suppliers, sales firms, and local, state, and federal agencies.

The five-day class will cover materials, and principles of quality concrete and construction. In laboratory sessions, mix design problems will be worked out and verified with test specimens, and finishing practices will be demonstrated. A special session will cover the mixing and transporting of ready mixed concrete. Sessions will be conducted by persons familiar with field problems to ensure discussions relevant to current construction practices. The registration fee is \$900.

A course in "Advanced Concrete Technology" is being offered for those who have a background in concrete. The advanced class will cover concrete materials, including lightweight concrete, curing requirements, and factors causing concrete strength variations.

The class will cast specimens for later verification, determine in-situ strength of concrete, and perform standard tests for qualifying cement, aggregates, and admixtures used in the production and control of concrete.

The five-day class is limited to 28 and the registration fee is \$900. Both classes are accredited by the Council for Noncollegiate Continuing Education and are approved for college credit. They will be conducted at PCA's Cement and Concrete Center in Skokie, Illinois.

It applies to both batch and drum mix facilities and looks at asphalt cement content problems grouped into three categories: (1) consistently high; (2) consistently low; (3) varying—low to high. Included is a handy diagnostic chart to aid the facility operator in pinpointing the source of the problem.

It is available to non-NAPA members for \$3.00 per copy and can be obtained from NAPA, 6811 Kenilworth Ave., Riverdale, MD 20737.

GUIDE FOR DESIGN OF PAVEMENT STRUCTURES, American Association of State Highway and Transportation Officials, 1986.

The new American Association of State Highway and Transportation Officials (AASHTO) <u>Guide for Design of Pavement Structures</u>, adopted by the members of AASHTO at the October 1985 meeting has now been published. It may be purchased from AASHTO, 444 North Capital Street, NW, Suite 225, Washington, DC 20001. The guide costs \$30.00 plus postage and handling charges of \$3.50. Payment must accompany all orders.

M. JOHN MOSKALUK
TECHNOLOGY TRANSFER
SCHOOL OF CIVIL ENGINEERING
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

The FHWA has begun procedures to adopt the guide for use on federal aid highway projects. In the interim, pending its adoption, the existing pavement design procedures remain in effect.

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