

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

NO ac
204

Date: January 25, 1977

Project Title: Identification of Traffic and Highway Improvements to Reduce Front-to-Rear Accident Rates

Project No: E-20-610

Project Director: Dr. Paul H. Wright

Sponsor: Insurance Institute for Highway Safety

Agreement Period: From 1/1/77 Until 3/31/77

Type Agreement: Letter Agreement

Amount: \$4,900

Reports Required: Final Report

Sponsor Contact Person (s):

Technical Matters

Contractual Matters
(thru OCA)

Brian O'Neill
Vice President, Research
Insurance Institute for Highway Safety
Watergate Six Hundred
Washington, D.C. 20037
(202) 333-0770

Defense Priority Rating: None

Assigned to: Civil Engineering (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director-EES
Accounting Office
Procurement Office
Security Coordinator (OCA)
Reports Coordinator (OCA)

Library, Technical Reports Section
Office of Computing Services
Director, Physical Plant
EES Information Office
Project File (OCA)
Project Code (GTRI)
Other _____

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT TERMINATION

no act
above

Date: 12/6/77

Project Title: "Identification of Traffic and Highway Improvements to Reduce Front-to-Rear Accident Rates."

Project No: E-20-610

Project Director: Dr. P. H. Wright

Sponsor: Insurance Institute for Highway Safety

Effective Termination Date: 3/31/77

Clearance of Accounting Charges: 3/31/77

Grant/Contract Closeout Actions Remaining: **NONE**

- Final Invoice and Closing Documents
- Final Fiscal Report
- Final Report of Inventions
- Govt. Property Inventory & Related Certificate
- Classified Material Certificate
- Other _____

Assigned to: Civil Engineering (School/Laboratory)

COPIES TO:

- Project Director
- Division Chief (EES)
- School/Laboratory Director
- Dean/Director—EES
- Accounting Office
- Procurement Office
- Security Coordinator (OCA) ✓
- Reports Coordinator (OCA)

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- Other _____

GEORGIA INSTITUTE OF TECHNOLOGY

ATLANTA, GEORGIA 30332

SCHOOL OF
CIVIL ENGINEERING

TELEF
(404) 6

November 29, 1977

Dr. Leon S. Robertson
Insurance Institute for Highway Safety
Watergate Six Hundred
Washington, D. C. 20037

Dear Leon:

With further reference to our pilot study of "Identification of Traffic and Highway Improvements to Reduce Front-to-Rear Accident Rates," I regret to advise that I am unable to obtain the desired list of 150 one-tenth mile sections which experienced high frequencies of front-to-rear crashes. Bill Venable is being transferred out of the Accident Analysis Division, and his successor is not presently willing to undertake the special program required to obtain the list. I spoke with Archie Burnham, the Traffic and Safety Engineer, and offered to pay any programming expenses but was told that they are having problems with the system, they are understaffed, short of funds, etc. They told me to ask again in March or April, 1978. That I plan to do. Meanwhile, I am forwarding herewith a Final Report of the pilot study. I regret that I have been unable to obtain the desired list.

I hope you have a happy holiday season.

Sincerely,

^

PAUL H. WRIGHT
Professor

PHW/jcw

Enclosure

Pilot Study

IDENTIFICATION OF TRAFFIC AND HIGHWAY IMPROVEMENTS TO REDUCE FRONT-TO-REAR ACCIDENT RATES

During the months of January through March, 1977, a pilot study for the proposed study "Identification of Traffic and Highway Improvements to Reduce Front-to-Rear Accident Rates" was performed to accomplish the following tasks:

1. Study the accident tape files of the Georgia Department of Transportation,
2. Determine frequencies of front-to-rear accidents along highway sections and at intersections,
3. Prepare field data collection forms,
4. Investigate and evaluate methods for selecting case study sites from accidents of high accident locations,
5. Perform pilot field surveys to identify types of data to collect and data collection problems,
6. Examine alternative methods for choosing control sites.

A computer tape of accident data was obtained from the Georgia Department of Transportation in February, 1977 and mailed to the sponsor. Subsequent examination of the data revealed that it did not include desired information on front-to-rear crashes.

The researchers requested and received from the Georgia Department of Transportation computer printouts showing accident frequencies and rates for 150 intersections and 150 half-mile sections which had experienced high frequencies of rear-end accidents during the year 1974 and 1975. A similar print-out based on the combined data for 1974 and 1975

was also obtained. These lists were comprised of those intersections and 0.5 mile sections in the state which had experienced the worst front-to-rear accident experience based on a severity index employed by the Georgia Department of Transportation.

The data revealed that the front-to-rear accident problem is heavily concentrated in high population density areas. It was observed during the field studies that the classification system used by the Georgia Department of Transportation did not accurately determine the distinction between urban and rural locations. For this reason, two tables, breaking down by category the percentages mentioned above are presented here. Table 1 shows these percentages as classified by the Georgia Department of Transportation, and Table 2 shows these percentages as classified by high population density. The high population density areas were determined to be the five counties comprising the metropolitan Atlanta area (Fulton, Cobb, DeKalb, Douglas and Clayton counties) and the counties in which the cities of Albany, Columbus, Macon, Savannah and Augusta are located.

For the half-mile road sections, the average frequency and average rate for each roadway category, as classified by the Georgia Department of Transportation, for 1974 and 1975 are given in Tables 3 and 4.

The original project proposal submitted to the sponsor included a list of examples of data to be collected. This listing was in terms of physical design features, traffic control measures and devices and traffic characteristics. Before any data collection form was prepared, the researchers visited eight one-half mile sections and eight intersections included in the top 150 listings to try to examine the appropriateness of the data items on the preliminary list and to identify other measures

of interest. In the course of these visits, it was noted that some of the high-accident intersections were included in the high accident half-mile sections. For this reason, and in view of the arbitrary definition of an intersection by state officials, it was decided to subsequently focus attention on the high accident half-mile sections.

The first field data form was prepared, then tested in the field, revised, and again field tested and revised. Field surveys were made at six locations, including a high accident location along an arterial street, a high accident location along a major collector roadway, and at four control locations. The revised survey form was submitted to the sponsor for review and further modification. The final data collection form is appended to this report.

Using Cobb county as the study area, two selection plans, described below, were chosen for further evaluation. Two control sites were identified using each of the selection plans, and field studies were made for each site.

Selection Plan I. To select a control section, divide the county into one hundred zones of approximately equal area, and number the zones, 00 to 99. Identify a control zone on the basis of a random number. Then, choose a control section of highway within the control zone provided:

- a. The control section has the same functional class (arterial, major collector, etc.) as the high accident section.
- b. The control section has an average daily traffic (ADT) within the range, ADT, high accident location (1 ± 0.10) .

If a suitable control section is not found in the control zone, select

another random number, and repeat the procedure until a suitable control section can be selected.

Selection Plan II. This plan is the same as Plan I, except the requirement for similar average daily traffic (item b) was omitted.

While either of these plans is considered to be sound, Plan I is the preferred plan, being more in keeping with the objectives of the proposed study.

Finally, to pin-point more closely high accident locations and the related traffic and highway conditions, a list of 150 one-tenth mile sections which had experienced high frequencies of front-to-rear crashes during 1974 and 1975 was requested from the Georgia Department of Transportation. Because of problems with the computer program, transfers of key DOT computer personnel, and limitations of funds, the Department has not provided the desired list. The researchers have been told that such a list can probably be provided in March or April, 1978.

PAUL H. WRIGHT

November 28, 1977

TABLE 1

PERCENTAGES OF HIGH ACCIDENT LOCATIONS
AS CLASSIFIED BY THE GEORGIA DEPARTMENT OF TRANSPORTATION

Class	Urban Locations	Rural Locations
Freeways	18.0	8.7
Divided, 30' or more	12.7	21.3
Undivided, 30' or more	8.7	19.3
Less than 30'	<u>11.3</u>	<u>-</u>
TOTALS	50.7	49.3

TABLE 2

PERCENTAGES OF HIGH ACCIDENT LOCATIONS
CLASSIFIED ON THE BASIS OF KNOWN HIGH POPULATION AREAS

Class	Urban Locations	Rural Locations
Freeways	26.0	0.7
Divided, 30' or more	32.0	2.0
Undivided, 30' or more	22.7	5.3
Less than 30'	<u>11.3</u>	<u>-</u>
TOTALS	92.0	8.0

TABLE 3
 GEORGIA FRONT-TO-REAR ACCIDENT EXPERIENCE, 1974

TYPE OF FACILITY	AVERAGE FREQUENCY Accidents/0.5 mile	AVERAGE RATE Accidents/100,000,000 veh.-mi.
Rural freeway	0.87	0.66
Urban freeway	6.00	0.76
Rural divided, 30' or more	1.23	0.48
Urban divided, 30' or more	5.33	1.03
Rural undivided, 30' or more	1.29	0.79
Urban undivided, 30' or more	6.51	1.70
Rural, less than 30'	12.33	14.86
Urban, less than 30'	2.49	1.22

TABLE 4
 GEORGIA FRONT-TO-REAR ACCIDENT EXPERIENCE, 1975

TYPE OF FACILITY	AVERAGE FREQUENCY Accidents/0.5 mile	AVERAGE RATE Accidents/100,000,000 veh.-mi.
Rural freeway	0.92	0.71
Urban freeway	6.19	0.78
Rural divided, 30' or more	1.16	0.45
Urban divided, 30' or more	5.39	1.04
Rural undivided, 30' or more	1.44	0.89
Urban undivided, 30' or more	6.26	1.64
Rural, less than 30'	12.46	15.02
Urban, less than 30'	2.68	1.31

CAPTIONS FOR PHOTOGRAPHIC SLIDES

A. FULTON COUNTY PHOTOGRAPHS

<u>Slide No.</u>	<u>Caption</u>
1.	Section #1, looking north from Alexander St.
2.	SR9, looking north from 14th St.
3.	Section #2, looking north from Brookwood Dr.
4.	SR9, looking north from Brighton St.
5.	SR13, looking north from Sheridan Rd.
6.	Intersection Lenox Rd. and Cheshire Bridge Rd., looking north
7.	Looking north, Intersection of Whitehall and Northside
8.	Looking west, Intersection of Whitehall and Northside
9.	Intersection of Northside & MLK, looking north
10.	Intersection of Northside & MLK, looking west
11.	Looking north, Intersection of Northside and Lambert St.

B. COBB COUNTY PHOTOGRAPHS

<u>Slide No.</u>	<u>Caption</u>
1.	Road Section #1, looking north from Herodian Way
2.	Road Section #1, looking north from Herodian Way
3.	Railroad Crossing near Gramling St., road section #2, looking north
4.	Road Section #2, looking north from Lafinier St.
5.	Road Section #3, looking south from Jones Shaw Rd.
6.	Road Section #3, looking south from Hicks and 340
7.	Road Section #4, looking north from Doby Lane
8.	Intersection #2, looking north from SR3
9.	Intersection #1, looking north from SR3
10.	Intersection #3, looking south
11.	Intersection #3, looking south
12.	Intersection #3, looking south

Georgia Tech Civil Engineering Field Survey Form

Date _____ Case No. _____

1. GENERAL INFORMATION

High accident location _____ Control location _____

Road name _____ County _____

Road classification _____ Milepost _____

Location _____ ADT _____

2. DESIGN FEATURES

No. of lanes _____ One-Way _____ Two way _____

Divided _____ Undivided _____ Median width, ft. _____

Pavement width, ft. _____ Posted speed limit, MPH _____

Predominant type of cross section: Curb & gutter _____ Swale ditch _____

Roadway surface: Concrete _____ Bituminous _____ Skid No. _____

Maximum gradient, percent _____ Shoulder width, ft. _____

Sight distance restrictions: Yes _____ No _____

Number of at-grade railroad crossings _____

Number of intersections with right turn markings _____

Number of intersections with left turn markings _____

Number of intersections with pedestrian crosswalk _____

Passing permitted: Yes _____ No _____

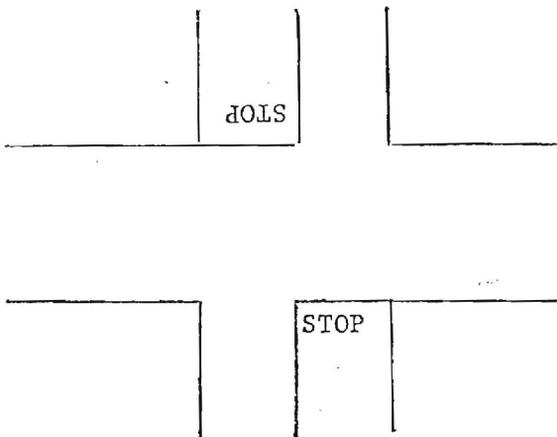
Curb parking permitted: Yes _____ No _____

No. of signalized intersections _____ No. of regulatory signs _____

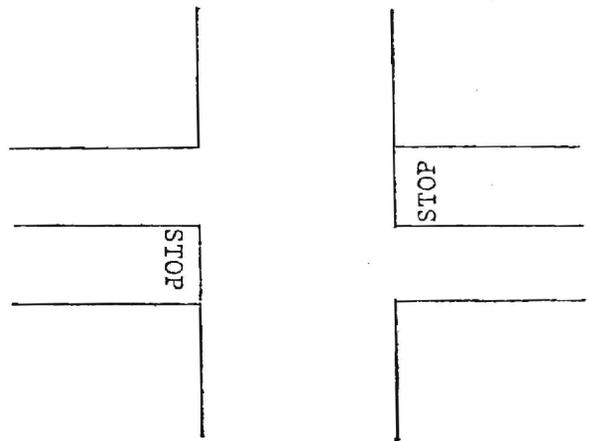
No. of warning signs _____ No. of guide signs _____

No. of unsignalized intersections

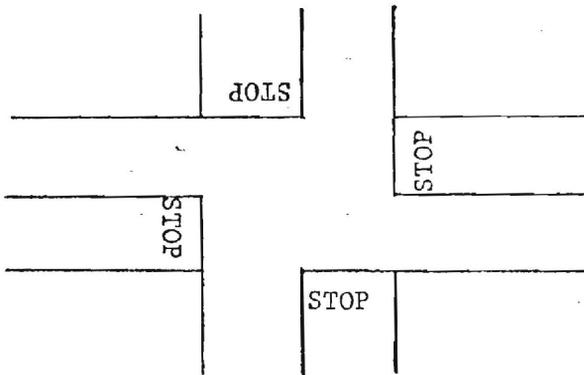
(a) _____



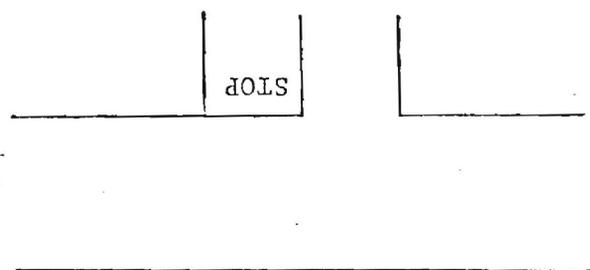
(b) _____



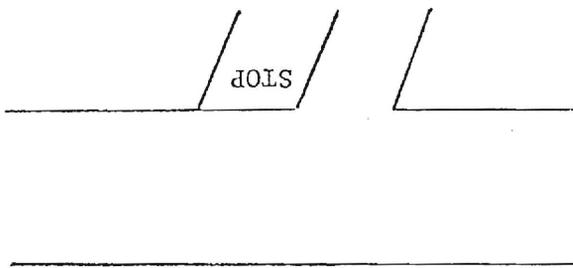
(c) _____



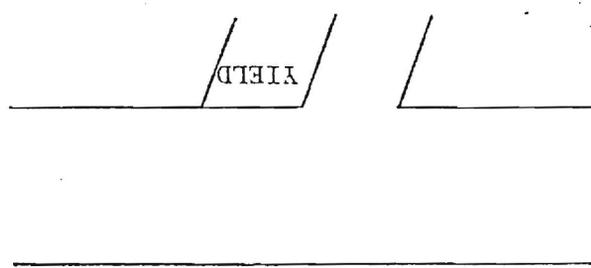
(d) _____



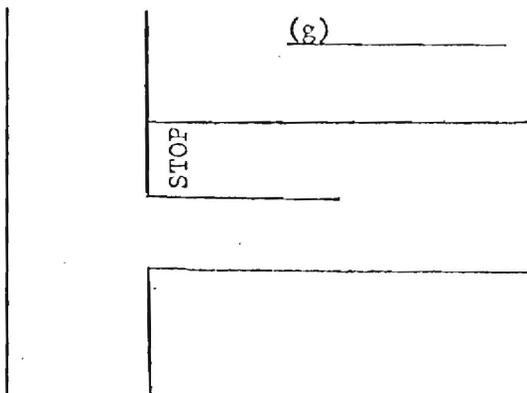
(e) _____



(f) _____



(g) _____



3. INDICATE NO. AND WIDTH OF DRIVEWAYS/0.5 MI. SECTION WHICH SERVE:

<u>Residential areas</u>	<u>Number</u>	<u>Total Width</u>
Single family residences	_____	_____
Multiple family residences	_____	_____
<u>Industrial areas</u>	_____	_____
<u>Service-Office areas</u>		
Single story office building	_____	_____
Two to six story office building	_____	_____
More than six story office building	_____	_____
<u>Commercial areas</u>		
Fast food restaurants	_____	_____
Motels and sit-down restaurants	_____	_____
Service stations	_____	_____
Light commercial areas, e.g., bank	_____	_____
Community shopping centers (e.g., Peachtree Battle)	_____	_____
Regional shopping centers (e.g., Cumberland Mall)	_____	_____