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### CREATON AND MAINTENANCE OF A MOTOR VEHICLE TRAFFIC ACCIDENT FILE

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### FOREWORD

The highway transportation system is comprised of three elements; the vehicle, the facility, and the facility user. A lack of proper performance on the part of any or all of the three elements results in a traffic accident. Society uses the accident report form to record this lack of proper performance and, of course, the agencies concerned with highway safety have dealt with accident reports in an effort to gain insight into accident causation, and, hopefully, gain similar insight as to accident prevention. Crude as they seem to be, and are in terms of sophisticated research effort, accident reports are a means of studying causes and are helpful for the application of accident reducing remedies.

Many state highway departments, in cooperation with the Bureau of Public Roads, are stepping up activity in the utilization of accident reports. This Circular presents a case study of assimilation of accident reports into, and development of, a computerized accident record system for use by one state highway department. While not directly applicable to, and of prime value for, every state highway department, the setting up and use of such a system is explained. This Circular should be of help to other agencies that are either operating accident record systems or getting ready to establish such systems.

### CREATION AND MAINTENANCE OF A MOTOR VEHICLE TRAFFIC ACCIDENT FILE

by

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### INTRODUCTION

On the average, 175 motor vehicle accidents occur in the State of Connecticut every day of the year. Whether such an occurrence takes place on Main Street in the center of town, on a suburban residential street, or on a rural highway, it sets in motion machinery which through various procedures converts it into a statistic or record usable in engineering studies.

Each such occurrence triggers into action the services of a staff ranging from file clerks to computer programmers, who perform some 35 separate operations utilizing 11 different types of machines ranging from hand numbering devices to electronic computers, and numerous standard paper forms especially planned and created for these procedures.

When a motor vehicle accident finally becomes a permanent part of the Connecticut State Highway Department accident file, it is the result of the cooperative efforts of the motoring public, three state agencies (Motor Vehicle, Highway, and State Police Departments) and the local enforcement authorities of 169 Connecticut towns.

In this joint effort, the state and town police act as reporting agencies, the Motor Vehicle Department acts as the collecting agency and the State Highway Department acts as the engineering agency.

The highway department maintains accident records almost solely for engineering uses. This report examines and illustrates these uses utilizing the high-speed electronic computer.

Engineering uses, however, are only the end result of a necessary program for the assimilation of such data. Both aspects are considered to be of equal importance in the accident field. As a result, this report is presented in two parts, as follows:

- 1 Assimilation of accident data and processing into usable form.
- 2 Use of accident data for accident studies conducted through the use of the high-speed electronic computer.

In order to describe the procedures properly, it will be necessary to dwell at some length on operations performed by other agencies involved.

### OPERATOR'S MOTOR VEHICLE ACCIDENT REPORT

On the reporting of motor vehicle accidents, the Connecticut Motor Vehicle Laws stipulate the following (in part):

Jurisdiction and Procedure - Sec. 14-108. Report of accidents. Any operator, whether resident or nonresident, of any motor Vehicle or any road roller involved in an accident on a highway in this state or in an off-street parking area offered for public use with or without payment of a fee in which any person is killed or injured, or in which damage to the property of any one person, including the operator, in excess of two hundred dollars is sustained, shall, within .... five days thereafter, make a written report of the circumstances thereof to the commissioner and shall supplement such report by a detailed statement, on .... forms of the type prescribed in section 14-108a and provided by the commissioner, which report shall state as accurately as possible the time, place and cause of such accident the injuries occasioned thereby and such further facts as the commissioner may require. The commissioner may require such report from the owner of such motor vehicle, and may make such investigation of such accident as seems to him advisable, and for such purpose he may require the assistance of the state police. The commissioner shall take such action as may be necessary to enforce a strict compliance with the provisions of this section, and shall report any failure to make any such report to a prosecuting officer having jurisdiction in the town in which the accident occurred.

The Operator's Motor Vehicle Accident Report is a standard printed form prepared and issued by the Connecticut Motor Vehicle Department, and is designed to aid motor vehicle operators who are involved in accidents to comply with the regulations as stated in the statutes. The form is the product of years of refinement accomplished by experts in the field of highway safety, who recommend and incorporate changes and improvements through the process of cumulative experience.

The report form is intended to be a model of simplicity. It is prepared with the knowledge that on the average the person using it performs this function just once in a lifetime. An entire section is devoted to instructions

which serves to erase any doubts regarding proper procedures on the part of the user. Its planned simplicity invites the user to cooperate in providing all the information desired by the collecting agency.

The operator's accident report is one of the foundations on which good accident records and statistics are built. Proper completion and submission of these reports is necessary for the following reasons:

- 1. Approximately 13 percent of the motor vehicle accidents which occur in Connecticut are not investigated by a police officer at the scene. Ideally, all accidents should be so investigated, but this is both an economic and a physical impossibility even for such a relatively small state. This situation places the burden of accurate reporting on the operator(s) involved.
- 2. If a police officer is at the scene of the accident and submits a police accident report, it is eventually processed into the same file as the operator's report. The police report corroborates the operator's report. In some cases, the operator's report provides additional information.

Information requested on the operator's report (Fig.1) may be separated into the following general categories:

- I. Driver and vehicle information:
  - A. Driver information:

Name and address

Sex

Occupation

Driving experience

Student driver (Yes) (No)

B. Vehicle information:

Name and address of owner

Year

Make

Body style

License plate number

C. Property Damage and liability insurance information:

Amount of coverage

Policyholder's name and address

Policy number and effective dates

II. The accident setting:

Date

Day of week

Weather condition

Light condition

## MOTOR VEHICLE ACCIDENT REPORT

STATE OF CONNECTICUT

READ CAREFULLY

FILL IN COMPLETELY

AN ACCIDENT CAUSING DEATH OR PERSONAL INJURIES IN ANY DECREE OR DAMAGE TO THE PROPERTY OF ANY ONE PERSON IN EXCESS OF \$100.00 MUST BE REPORTED WITHIN 5 DAYS TO THE COMMISSIONER OF MOTOR VEHICLES, STATE OFFICE BUILDING, HARTFORD, CONN. FAILURE TO REPORT MAY RESULT IN THE SUSFENSION OF OPERATOR'S LICENSE.

### INSTRUCTIONS

THIS FORM MUST BE PRINTED IN INK OR TYPE WRITTEN. ALL SIGNATURES MUST BE IN INK.

- If You Neglected To Write Down Necessary Information At the Scene Of The Accident You May Be Able To Obtain Same By Confacting The Operator Or Owner Of Other Vehicle Involved Or Police Who Investigated Accident.
- Under "Location" Of Accident And On The Diagram Show Sufficient Information To Locate Exact Scene.
  - The Nature And Extent Of All Injuries And Damages Must Be Clearly Stated.
- 4. Use Plain Paper The Same Size As This Form For Additional Vehicles, Injuries, Etc., And Attach To This Form.
- If Accident Occurred While Student Operator Was Driving, Both Licensed Operator And Student Must Sign.
- It is Suggested That You Use Carbon Paper To Make An Exact Duplicate Of Your Report To Keep For Your Own Use Or Yo Give To Your Insurance Agent Or Your Attorney At Law.

## (TEAR OFF BEFORE MAILING REPORT)

License Plate (State)	No	Ye	Year	License Plate (State)	No	Year
Vehicle (Year) M	Make	Type		Vehicle (Year) M	Make	Туре
Parts of Vehicle No. 1 Damaged	maged	-		Parts of Vehicle No. 2 Damaged	page	
			Approx. Cost To Repair \$			Approx. Cost To Repair \$
Other Property Damage (1	Name Objects, S	State Name	Other Property Damage (Name Objects, State Name and Address of Owner, and Nature of Damage)	Nature of Damage)		Approx. Repair Cost
Name of Injured				Address (Street City	· State)	Operator In Vehicle
Age	Injured Taken To	en To				Passenger No.
Did Person Die? Na	Nature and Extent of Injuries	nt of Injuri	89			Pedestrian
Name of Injured			Address (Street — City —	- State)		Operator Translete
Age	Injured Taken To	n To				Passenger No.
Did Person Die? Na	Nature and Extent of Injuries	nt of Injuri	64			Pedestrian
Form No. S.R. 21			Property Damage and Liab	Property Damage and Liability Insurance Information		
Is There on File With The Commissioner Fleet Coverage (Form SR 23)?	(Form SR 23)		Yes No Cer	P. U. C. Yes No	Certificate Of Self-Insurance?	e Of Yes No
If "Ye Was An Automobile Liability Policy Providing You With At Le Liability Insurance in Effect On the Date of Accident? Yes	Policy Providi	ing You Wi	If "Yes" The Following Fith At Least \$20,000/20,000 It? Yes No	If "Yes," The Following Rems Need Not Be Completed  Was An Automobile Liability Policy Providing You With At Least \$20,000/20,000 Bodily Injury and \$1,000 Property Damage Liability Insurance in Effect On the Date of Accident? Yes No No No NES THE FOLLOWING MUST BE	erty Damage	MUST BE COMPLETED
Name of Insurance Company Which Issued Policy	Which Issued P	olicy	]			
Policy No.			Policy Effective From	шо	To	
Name of Policyholder			Address	ress		
IF THE VEF	HCLE YO FORM	U WEE BELO	RE OPERATING W W THE SAME AS	IF THE VEHICLE YOU WERE OPERATING WAS INSURED YOU MUST COMPLETE THIS FORM BELOW THE SAME AS ABOVE BUT DO NOT DETACH	J MUST CO	MPLETE THIS
CONNECTICUT N	MOTOR VI	EHICLE	CONNECTICUT MOTOR VEHICLE PROPERTY DAMAGE	MAGE AND LIABILITY	LITY INSUR	INSURANCE INFORMATION
Date of Accident			Place of Accident	sident		
	[Q MUST (	ESCRIP	DESCRIPTION OF VEHICLE INVOLVED MUST CORRESPOND TO VEHICLE No. 1 ON		IN ACCIDENT ACCIDENT REPORT	ORT
Make	Year		Type of Body		Identification or Engine No.	gine No.
Name of Operator			Address	ress		
Name of Owner			Address	1683		
Name of Insurance Company Which Issued Policy	Which Issued P	olicy				
Policy No.			Policy Effective From	om	To	
Name of Policyholder				Address		

THIS ACCIDENT SHOULD ALSO BE REPORTED DIRECTLY TO YOUR INSURANCE REPRESENTATIVE FORM NO SR 21 FAILURE TO REPORT MAY JEOPARDIZE YOUR AUTOMOBILE LIABILITY INSURANCE. Operator's motor venicle accident report form (front). Figure 1.

Address

Name of Agent or Insurance Representative Who Issued Policy

IMPORTANT

Your Signature

# INSTRUCTIONS FOR LOCATING ACCIDENT AND MAKING DIAGRAM

- What To Show On the Diagram:

  (1) The directions from which the vehicles were approaching before the collision. The same for any pedestrian. (2) The point of collision. This can often be determined from the debris on the street or roadway.

  (3) Any objects such as bridges, buildings, poles, guard rail, animals, etc. that were involved.

  (4) Where the vehicles came to rest after the collision.

What To Select As A Landmark From Which To Messure Distances:

(1) Good landmarks in rural areas are: Highway junctions, bridges (number or name), railroad crossings, town lines, city limits, historical markers, permanent public buildings, or other well established, easily recognized points.

(2) In cities use house numbers, entrances to public or well-known buildings, or measurements to the curb line of the nearest

cross street.

(3) Good location descriptions are extremely important to accident prevention. Please be as accurate as possible.

(4) Use an automobile speedometer to measure long distances. Report miles and tenths or fractions (1.4 miles north of "Sometown" rite limit)

	EXAMPLE OF A DIAGRAM FOR A	BETWEEN
Indicale narih by orrow	D I	Pine Crark bridge
INDICATE ON THIS DIAGRAM Indicate north WHAT HAPPENED By orrow	TELEPHONE POLE	30 Meps (mon

ZWAGA .Te SIGN MAIN ST. Indicate north by arraw INDICATE ON THIS DIAGRAM WHAT HAPPENED EXAMPLE OF A DIAGRAM FOR A TYPICAL ACCIDENT AT AN INTERSECTION

The right front wheel of No. 1 slipped off the edge of the pavement. The driver turned too sharply and allowed his car to go to
the wrong side of the road where it struck the left rear side of
No. 2. Both vehicles left the roadway after the collision, and No.
1 then struck a telephone pole. (You are Vehicle No. 1.)

The podestrian was crossing Main Street from the
Northeast corner.

No. 2 was going south on Adams Street failed to stop before
ment. The driver the right rear side of No. 1 and then
went over the curb of the Southeast corner after striking a
Northeast corner.

The podestrian was crossing Main Street from the
Northeast corner.

The podestrian was crossing Main Street from the
Northeast corner.

ACCIDENT HAPPENED	Angle   Other	CHECK ROAD CONDITIONS	Road Location		Holes Straight	ហ្វីស្វី	Shoulders Driveway	PEDESTRIAN	Coasting in street	At work in road	Moving traffic	Hitching on vehicle	Walking on rural road	Across traffic	Against traffic	Sidewalk available	Sidewalk not available	,	NOTE TOTAL	Business district	Factory district	Residential area	Bural area	Public park
E CONDITIONS WHEN	Sideswiped Backed-into	CHECK ROAI	Surface Condition	Concrete Dry			Ult Dand	PEDE	Crossing at intersection	With eignal	No signal	Between	Intersections	Public bus	School bus	Standing on safety isle	Playing in street	Physical defect   Odor of	TRAFFIC CONTROL	None	Stop sign	Danger sign	Blinker	Rotary
EMS WHICH DESCRIBE	Head-on CRear end CRear	DIRECTION OF Car	Coing straight	Turning left		Up hill Down hill	Making U turn	CONDITION OF CAT	VEHICLE 1 2	Good condition	Steering defective	One headlight out	Both headlights out	Tail-light obscure	Puncture or blowout	Other defects	WEATHER AND LIGHT	Clear	Cloudy	Raining	Snowing	Sleet	Дамп	Daylight
CHECK (√) THOSE ITEMS	MANNER OF COLLISION	CONDITION OF Car OPERATOR 1 2	Odor of Liquor Driver was intoxicated .	Asleep Fatigued Physical defect—		OPERATOR Car DRIVING 1 2	Wrong side of road	Without right of way	Cutting in	on curve	standing vehicle	Failed to signal	Саг тап амау, по	Off roadway	Following too closely	Parking at curb	Backing out of	ACCIDENT INVOLVED	Other motor vehicle	Horse-drawn vehicle		Sled	School bus	Fixed object

Turned over   Dark   Dark
S DIAGRAM WHAT HAPPENED  Street or highway reases of your of tracef  S Show distance and direct of tracef  S Show distance and direct ion to landmarks, identify to contain the parrow ass  Street or highway  By—v
DESCRIBE WHAT HAPPENED Refer to vehicles by number You are Vehicle No. 1
I declare under the penalties provided by law that this report has been examined by me and to the best of my knowledge and belief is complete and the statements made herein are true and correct.
THIS REPORT WILL NOT BE ACCEPTED UNLESS PROPERLY SIGNED
COMMISSIONER TO RETURN THIS STUB TO INSURANCE COMPANY FOR VERIFICATION. RETURN THIS FORM WITHIN 15 DAYS IF NO POLICY WAS IN EFFECT AS ALLEGED BY MOTORIST
TO: COMMISSIONER OF MOTOR VEHICLES STATE OFFICE BUILDING HARTFORD 15, CONNECTICUT With regard to an automobile liability insurance policy for the policyholder named on the reverse side hereof, the undersigned insurance company advises you in accordance with the items checked below.
KEMAKKS:
Name of insurance company By

Figure 1. Operator's motor vehicle accident report form (back).

### STATE OF CONNECTICUT DEPARTMENT OF MOTOR VEHICLES POLICE REPORT OF MOTOR VEHICLE TRAFFIC ACCIDENT

TIME	DATE OF Day of ACCIDENT Hour Hour	.м			
	PLACE WHERE ACCIDENT OCCURRED: County				
	If accident was outside city limits, indicate distance from nearest town	Town		IOT ₩R HIS SP.	
LOCATION	ROAD ON WHICH ACCIDENT OCCURRED  Give name of street or highway number (U.S. or State). If no highway number		No	44	
Lo	AT ITS INTERSECTION WITH				
	IF NOT AT INTERSECTIONfeet ef	way, house no., bridge, AR cross-, underpass, or other landmark.			
	YEHICLELicense PlateLicense PlateYear Make Type (sadan, truck, taxi, bus, etc.)	State	Number		
- 6	Parts of vehicle damaged	By:		*********	,
VEHICLE NO.	OWNERAddress	.D. City and State			
VEH	Print or type FULL name  Priver's Regular Operator's License	D	AGE		YRULNI
	License State Number Other Typo License Spacify Type and/or Restrictions OCCUPANTS	Bleth	1		
Total	Front Center	City and State			
ber vehl- cles	Front Right	10.000.000.000.000	8		
-nl bevlev	Rear Loft		-		
	Rear Conter				
	Rear Right				
	YEHICLE		Number		
z	OWNER Print or type FULL name Address Street or R.				
2 or PEDESTRIAN	DRIVERAddressAddress			SEX	ץ אטנאו
2 or PED	Driver's Regular Operator's License License Other Type License Specify Type and/or Restrictions	Date of Birth	-		
EHICLE NO.	OCCUPANTS	City and State	-		
/EHICL	Front Right		-		
	Rear Left		-	$\vdash$	
	Rear Center		.		
	Rear Right	CODE FOR IN	.		
DAMA OTHE Name	AID Injured I BY: Taken to: Taken to:  When to: Taken to: Taken to: Taken to: Taken to: Taken to: Taken to:	CODE FOR IN  K-Dead before report mode,  A-Visible signs of injury, as bit member or bad to be certied is  B-Other visible injury, as bruise limping, etc.  C-No visible injury but compiain unconsciousness.  O-No jablecation of injury.	eding would rom scene.	nd or dis	storted Iling,
WITM	ESSES  Address  Address	1		AGE	SEX
No			Children in the		
-					

Figure 2. Police report form for motor vehicle traffic accidents (front).

TURN THE PAGE - COMPLETE BOTH SIDES

KIND OF LOCALITY (Check one)	WEATHER (Chart and)	WHAT DRIVERS WERE GOING TO DO BEFORE ACCIDENT
Apartments, Stores,	(Check one)	Driver No. 1 was headed
Factories one-family homes	Raining	The state of the s
Farms, Fields	Snowing Fog	(Street or highway)
No marginal development		Driver Driver Driver Driver 1 2 (Check one for each driver) 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1
ROAD SURFACE (Check one)	Specify other	Go straight ahead Make left turn Start in traffic lane Remain stopped in traffic lane Make U turn Start from parked position Remain parked
ITI DIA	TRAFFIC CONTROL (Check one or more)	Make right turn   Slow or stop   Back
Snowy or ley	Stop sign  Stop-and-go signal	WHAT PEDESTRIAN WAS DOING Along
	Officer or	Pedestrian was going Across or into From To
Specify other	watchman R.R.gates or signals	(Check ane) NSEW Street name, highway No.) (N.E. corner to S.E. corner, or west to east side, etc.)  Crossing or entering at intersection Walking in roadway—with traffic Pushing or working on Other in roadway
LIGHT CONDITIONS (Check one)		Crossing or entering not at Walking in roadway—against vehicle Not in roadway
Daylight Dawn or dusk	Specify other  No traffic control	Intersection traffic Other working in roadway
Darkness	ROAD CHARACTER (Check two)	Getting on or off vehicle Standing in roadway Playing in roadway
ROAD TYPE	Straight road	CONTRIBUTING CIRCUMSTANCES  Driver Driver Driver
(Check one or more) Driver	Curve	Driver   1 2 (Check one or more for each driver)   1 2 (Check one for each driver)   1 2   1   1
1 2	Level	Falled to yield right of way
2 driving lanes	On grade	Drove left of center Followed too closely Improper lights
3 driving tanes	Hillcrest	☐ Improper overtaking ☐ Made improper turn ☐ Under infl. of liquor or drugs
☐ 4 or more lanes ☐ ☐ Divided roadway		
Expressway, parkway,		
toll road	SHOW NORTH	
	BY ARROW	
INDICATE ON THIS DIAGRÁ	ima.	
WHAT HAPPENED		
		Street or highway
<u> </u>		
		Street or highway
Street or h	Nghway	i i
DESCRIBE WHAT HAPPEN		
(Refer to vehicles by num	mber)	
	Minister Programme	
**************************************		
#-//ull-gruun-ulman-um	***************************************	
POLICE ACTIVITY		
Time notified of ac	cldent	What was the source of accident information?
Arrests	Date Hou	(Officer at scene, No.) driver contacted station, both drivers contacted station, etc.)
Nome		Charge
Name		Charge
Other		AND SECRETARY OF THE PROPERTY AND SECRETARY OF THE PROPERTY OF
Other action takens	***************************************	
SIGN HERE	***************************************	
	Offi	cers rank and name Badge No. Department Date of report

Printed in U.S.A.

Figure 2. Police report form for motor vehicle traffic accidents (back).

### III. The accident location:

Street name or highway number
Intersecting street name or number (if any)
Rural or urban area
Zone location (business district, school zone, etc.)
Type of traffic control
Roadway surface (composition)
Surface condition (dry, wet, etc.)
Roadway defects
Roadway alignment

### IV. The accident occurrence:

Accident involved (other vehicle, fixed object, etc.)
Type of collision (rearend, sideswipe, etc.)
Pedestrian action (if pedestrian involved)
Abnormal condition of pedestrian
Sketch of accident
Summary of accident

### V. Post-accident data:

Amount of property damage (to vehicles)
Other property damage
Injuries (identify as operator, passenger, or pedestrian)
Was police officer at scene (name)
Name and address of person summoned to court
'Condition of both operators
Condition of both vehicles
Maneuvers of both vehicles
Cause of accident (both vehicles)

### POLICE REPORT OF MOTOR VEHICLE ACCIDENT

A high standard of motor vehicle traffic accident reporting is the basic ingredient in the creation of useful and efficient accident records. The police accident report provides this element. It is prepared by trained personnel experienced in the field of accident investigation and whose job and duty it is to be exact. The state police and the enforcement authorities of 169 towns investigate and report on approximately 87 percent of some 63,759 accidents occurring yearly in Connecticut. Even when the operator's report is available, the police report is preferred by the highway department as the standard for extracting accident information. Although operators are encouraged in every way to supply complete information, omissions on their part are numerous. As a result of negligence, indifference, inexperience, or even innocent error, the completed operator's report does not, in most cases, measure up to the police report for completeness and accuracy. To be useful, accident records require thoroughness in their preparation.

The uniform police accident report (Fig. 2) is a standard lettersize printed form distributed by the Motor Vehicle Department to all police agencies in the State. The present form was conceived and passed into law

by the 1961 Legislative Assembly, acting on a recommendation of the National Safety Council, whose ultimate aim is national uniformity in accident reporting. The form's design is a joint effort by leaders in the fields of enforcement, safety, engineering, and driver education, and partially fulfills the needs of all these agencies.

Basically, the information in the police report is the same as in the operator's report. Some difference contained in the police report are as follows:

- l. Location of accident. Provisions for locating the accident are more detailed and exact. (Exact location of an accident is the most important item for highway engineering studies.)
- 2. Nature of injuries. Description of injuries is more comprehensive. Uniform codes indicate severity of injuries.
- 3. Description and diagram of accident. More space is provided on the report for these items.
- 4. Police activity. Description of the source of accident information and of charges perferred against operators involved.

In general, comparison of the operator's report with the police report indicates that both have enough common statistical data to insure uniformity in accident records when it becomes necessary to use either one as the source.

### FUNCTIONS OF MOTOR VEHICLE DEPARTMENT IN COLLECTION AND CORRELATION OF ACCIDENT REPORTS

The laws of the State of Connecticut delegate the Motor Vehicle Department to be the central bureau for collection of motor vehicle accident reports. Police and motor vehicle operators alike are responsible to the Motor Vehicle Commissioner for reporting accidents which meet minimum requirements as prescribed in the statutes. The maximum time allowed for reporting accidents is within five days of occurrence for operators and withing five days of being notified for police agencies.

The Accident Security Division of the Motor Vehicle Department acts as the accident collector and record keeper. The primary function of this division is to assemble all information relating to an accident occurrence into one unit. To present a hypothetical case, let it be assumed that Operator A was travelling on Route X, lost control and struck a vehicle driven by Operator B going in the opposite direction, then veered off the roadway and struck a utility pole. This accident will eventually appear in the division's accident files as follows: A file jacket with an assigned case number will have as its contents, operators' reports from both operators A and B, a police report from an investigating officer, and a report from the utility company whose property was damaged, identifying the pole and its location and the amount of damage in dollar value. There are many variations

of this example, but the primary goal is the same; i.e., to assemble all possible information relating to a motor vehicle accident for maximum combination of comparative data.

Police and operators' reports are routed separately until they are matched and mated together into a file.

### Operators' Reports

Upon receipt of this report, the Accident Security Division assigns a permanent case number and for every operator involved, types an accident index card (Fig. 3) containing case number, full name and address of operator, license number and accident location. In the lower left corner of the index card is a code number (1, 2, or 3) denoting, respectively, police officer investigated, police officer did not investigate, and not stated.

The Security Division forwards duplicate copies of all index cards to the Accident Coordinating Unit. The newly created case jacket is not put into the permanent Security Division accident file until there is an operator's report to match each index card. It is the responsibility of the Security Division to see that missing reports are submitted by delinquent operators.

### Police Reports

Police reports are received in the Motor Vehicle Department by a subdivision known as the Coding and Re-Entry Section, which extracts Motor Vehicle Department statistical data, assigns a sequence number (as opposed to the case number assigned to operators' reports), and forwards these to the Accident Coordinating Unit.

### Accident Coordinating Unit

The function of this unit is to assign a motor vehicle case number to the matching police report.

A duplicate of each index card is received from the Accident Security Division and entered on the Motor Vehicle Index Card Code Sheet (Fig. 4). Information entered on to this form includes operator's name and first initial, date of accident, case number, and police investigation code (1, 2 or 3).

These forms are submitted daily to the Data Processing Division, where accidents with police investigation codes 1 and 3 are extracted and tabulated (1) in alphabetical order of operator's name and (2) in case number order. Police investigation code 2 is tabulated in case number order only.

Tabulated lists (Fig. 5) are transmitted back to the Accident Coordinating Unit. Code 1 and 3 tabulations are held for matching procedures. Code 2 tabulations are sent to the Coding and Re-Entry Section for reference use.

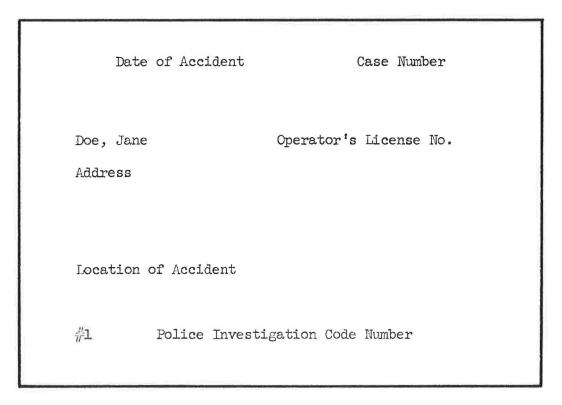


Figure 3. Index card.

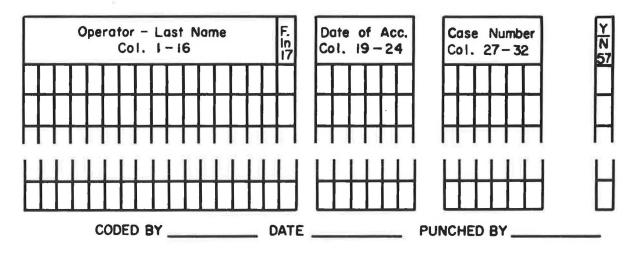


Figure 4. Motor vehicle index card code sheet.

As police reports are received they are arranged in chronological order using date of accident as the key. The final operation involves the following:

- 1. Read date of occurrence and name(s) of operator(s) involved from police report. Use the tabulation of police investigation codes 1 and 3, which lists operators' names in alphabetical order and search for (a) operators' names taken from the police report and (b) date of accident occurrence. If names of operators match, verify the finding by referring to the tabulation of police investigation codes 1 and 3 which lists case numbers in numerical order (Fig. 5).
- 2. Enter case number from tabulated list on upper right corner of police report.
- 3. Submit numbered police reports to Accident Security Division for filing in case jackets with operators' reports.

Unmatched police reports (i. e., those which do not have a corresponding operator's report) are held for an 80-day period (for additional matching with new tabulations) and if they then are not matched they are forwarded to the Accident Security Division. Accident evaluators review the police reports for property damage and/or injury minimums. If, in their judgment, the accident is reportable, the following steps are taken:

- l.  $\cdot$  Action is initiated to induce delinquent operators\* to submit an accident report.
- 2. The Accident Security Division processes the police report through the same channels as the operators' report (as previously described) an creates an accident case, with the police report as the basis.

### MICROFILMING OF ACCIDENT CASES

The transfer of all motor vehicle accident data to the Highway Department is accomplished by the use of microfilm. A microfilmer capable of microfilming both sides of a lettersize document at the rate of 750 per hour is located within easy access of the Accident Security Division's accident files. When a document is fed face up into the machine, it photographs both sides automatically.

The microfilming operation is accomplished in the following manner:

- 1. Take 50 case jackets from the accident files.
- 2. See that the case numbers are in the proper sequence and make a list of the numbers that are not in the file. For cases that are not available, note the numbers on the master "missing from file" listing for future filming

<sup>\*</sup>Results of matching procedures reveal that for the 1964 calendar year 5,190 operators involved in reportable accidents failed to comply with applicable laws.

Police Investigation Code Number	5 mil mil 103 103 103 mil mil	5 and and and and and and and and	s and and and and and			નન નન્છ નન	
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Figure 5. Tabulations of police investigation codes No. 1 and No. 3 alphabetically by operator's name (left) and in case number order (right).

on "missing from file" film roll.

- 3. Remove all documents from one case jacket at a time. Remove all staples and feed all documents, except insurance information tear off slip, into machine one at a time. Re-staple and replace in file jacket.
  - 4. Return all case jackets to point of origin.

With this procedure the machine operator processes about 225 accident cases daily, using a 200-ft roll of film onto which can be recorded about 1,100 cases.

Completed film is encased in boxes labeled with the case numbers of the contents and sent to the vendor for developing. The vendor transmits the developed film to the Accident Coding Unit of the Highway Department.

The flow of matching police and operators' accident reports is shown in Figure 6.

### ACCIDENT CODING UNIT AND PREPARATION OF ACCIDENT DATA FOR ELECTRONIC COMPUTERS

There are about 16,339 miles of improved roadways throughout the State of Connecticut, of which 3,763 miles are maintained under the uniform and exacting standards of the Connecticut State Highway Department. About 37 percent of the 63,759 accidents which occur in Connecticut yearly happen on state-maintained highways. Using a microfilm reader, the accident coders examine the reports of these accident cases, extract all accidents which occurred on state-maintained roads only, classify them per requirements, and then deploy them somewhere along the 3,763 mile network of the state highway system. The accident coders must transfer written information contained in these accident case reports into code numbers to be stored on the electronic computer magnetic tape.

The highway electronic computer installation (Remington-Rand Model Univac III) is capable of storing information in alpha as well as numeric form. Considering the fact that one code number can generate any number of characters or digits, it is obvious that in this particular operation the numeric form can be used to better advantage than the alpha (written) form.

### Accident Code Sheet

The accident code sheet (Fig. 7) is the means of conveying code numbers from the accident reports to the computer via punch cards. It consists of 90 columns of data, part of which is purely statistical and part of which is pertinent to highway engineering studies. A coding manual containing instructions for each code heading is employed for conversion of information into code numbers.

The 90 columns may be divided into three coding groups, as follows:

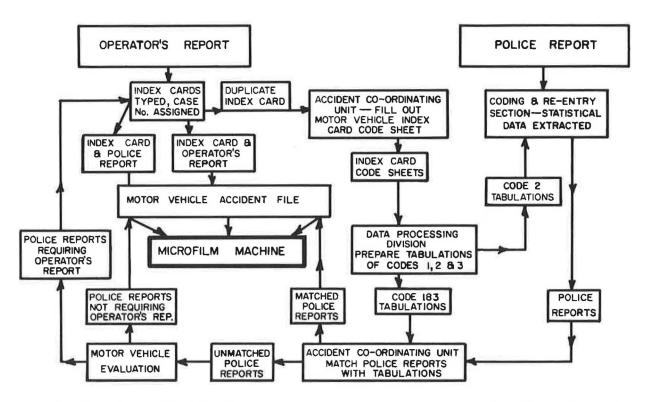


Figure 6. Motor Vehicle Department flow diagram for routing of police and operator's accident reports.

### CONNECTICUT STATE HIGHWAY DEPARTMENT

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### **ACCIDENT ANALYSIS**

CODE SHEET

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Figure 7. Accident analysis code sheet.

- 1. Coding of statistical data. These are categories that are self-evident and their conversion to a code number and subsequent transfer to the code sheet is an automatic operation. Code headings included in this group are (a) case number and dates (Col. 1-14); (b) town (Col. 15-17); (c) driver and vehicle information (Col. 36-57); (d) accident severity (Col. 58-62); (e) road condition, 'ight and weather (Col. 63-66); and (f) traffic control (Col. 79-80).
- 2. Establishment of location (Route number and cumulative mileage). The fundamental element in the preparation of accident data for engineering use is the exact location of the accident. Remedial measures for existing roadways and for those in design cannot be effected otherwise. Coding an accident "near to" or "in the vicinity of" will never help to identify a faulty traffic condition for which solutions may be readily available.

The methods employed in determining the exact location of an accident include:

- (a) Use of an annually updated list of street names of state highways for each town. When a street name instead of a highway number is given on an accident report, reference to this list determines immediately whether the accident should be coded.
- (b) Use of the roadway inventory line diagram (Fig. 8), which is the basic reference used in the location of accidents. It virtually presents a pictorial view of the entire 3,673 mile network of the state highway system. It identifies intersecting streets, roadway geometrics, area characteristics, business establishments, and other landmarks apt to be referred to in the description of an accident location. All identification points (intersecting streets, bridges, etc.) are measured in mileage from the beginning of each route (mileage 0.00) and are marked permanently in hundredths of a mile. These straightline diagrams enable the accident coders to locate each accident within 50 ft of its occurrence.
- (c) Use of a map of each town showing all highway numbers as well as street names. These maps are used to ascertain locations on streets which are partly state and partly town maintained.
- (d) Use of city directories to find locations of street numbers, private residences, and business establishments.
- (e) Use of utility pole inventories to locate a utility pole referred to by number on an accident report. Utility companies are contacted by phone in cases where utility poles are not found in this inventory.

(f) Use of field trips for on-the-spot confirmation of locations when, in spite of all the references provided, locating accidents sometimes presents problems which are insoluble in the office.

All of the foregoing means of locating accidents are directed towards tying in the street number, utility pole, house resident, etc., somewhere on the roadway inventory line diagram (Item b).

It is not until the location has been established that categories which are related to or dependent on it can be coded. These include (a) accident location (Col. 29-30) to show type of intersection (if at intersection); (b) rural or urban (Col. 31); (c) roadway type (Col. 32-33); (d) roadway surface (Col. 34); and (e) roadway alignment (Col. 35).

3. Reconstruction of the accident occurrence. In coding the accident occurrence, it is more desirable to have the location established first. This is particularly true of intersectional-type accidents. Vehicle maneuvers must be realistic for the locations at which they occur. Having a graphic view of the location (in the form of the roadway inventory line diagram) simplifies the task of reconstructing the accident occurrence and reduces the possibility of error.

The facts of the accident occurrence are obtained from both the sketch and the description summary of the accident report (Figs. 1 and 2). The following code headings are applicable:

(a) Vehicle maneuver and direction of travel (Cols. 71-78). The action of every vehicle (or pedestrian) involved in the accident must be assigned a direction of travel and a vehicle or pedestrian maneuver. In actuality, the vehicle maneuver describes the action of vehicles immediately prior to the accident occurrence. For this reason, it is important that the direction of travel (Cols. 71 and 75) be shown as the direction any given vehicle was traveling before the vehicle maneuver started.

Example: Vehicle 1\*, traveling south, violated traffic control and turned right into the westbound lane into the path of westbound Vehicle 2. Although the accident occurred in the westbound lane, the direction of travel assigned Vehicle 1 should be "south".

(b) Type of collision (Cols. 69-70). The type of collision (in multi-vehicle accidents) is chiefly a consequence of the vehicle maneuvers rather than the manner in which the vehicles collided.

Example: Vehicle 1, traveling south, violated traffic control and turned right into westbound lane and was struck in rear by westbound Vehicle 2. Despite the rearend collision, the vehicle maneuver dictates that the type of collision was a "turning movement".

\*Vehicles adjudged to have been the cause of the accident are always coded and referred to as Vehicle 1, with the exception of pedestrian maneuvers, which are all coded as Vehicle 2 (for computer accommodation).

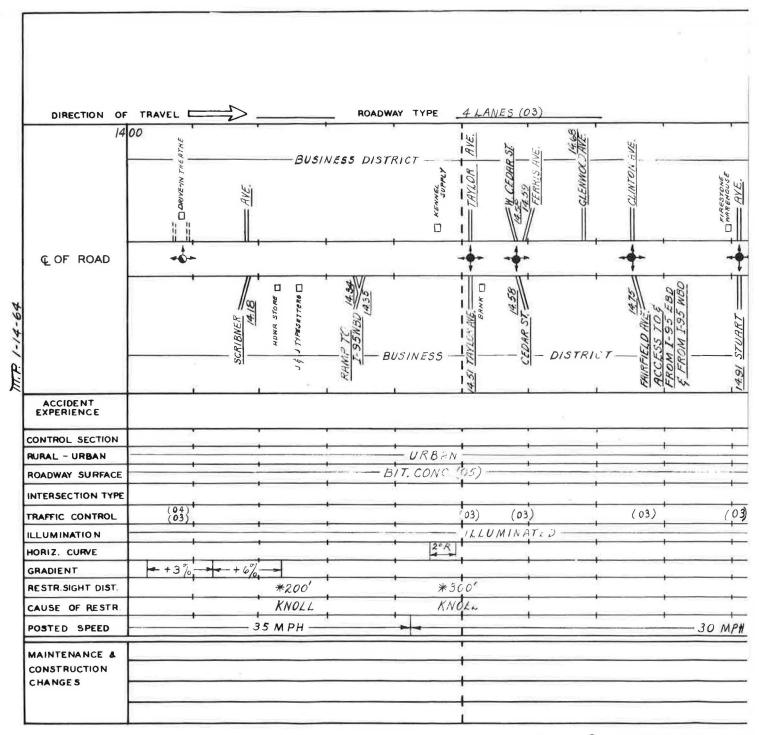
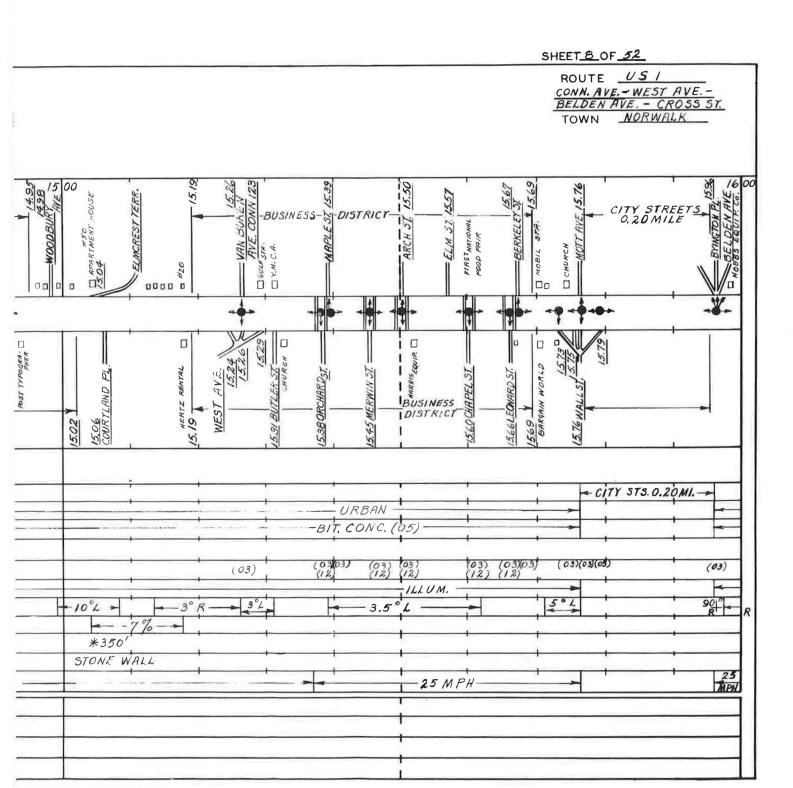


Figure 8. Typical roadway



inventory straight line diagram.

- (c) Contributing factor (Cols. 87-88). The contributing factor is derived from either (1) the investigating officer's opinion, or (2) thorough scrutiny of all facts of information on the accident report (weather, speed, mechanical conditions of vehicles, etc.).
- (d) Location of occurrence (Col. 67). The location of occurrence identifies (1) the directional lane in which the accident occurred if the accident happened in the roadway or (2) where the accident occurred if the vehicle left the roadway (near side, far side or on median).
- (e) Object involved and object location (Cols. 81-83). These columns are coded in one-vehicle collisions only. Object location (to right, to left, on median, etc.) is of the utmost importance in engineering accident studies (median accidents, cross median accidents, etc.).
- (f) Second involvement and location (Cols. 84-86). When a vehicle strikes an object and then veers and strikes another vehicle (either stationary or moving) the vehicle that was struck is treated as an object and is so coded in Cols. 84-86 (second involvement). This column can also be used (a) when an object is struck after a two-vehicle collision and (b) when a vehicle strikes a second object in a one-vehicle collision.

### Computer Updating

The computer updating code (Col. 89) is used for all accidents and for all cards for each accident as follows:

- Code 1 To delete a case now on file, code Cols. 1-5 (case number) and Cols. 18-28 (route number and cumulative mileage).
- Code 2 To add a new case, code the case in its entirety.
- Code 3 To change\* information or add information on a case previously filed, code the case with the connected information in its entirety.

### Card Control

The card control code Col. 90 is used for all accidents and for all cards for each accident to indicate accidents of more than 2 vehicles, as follows:

- Code 1 The first card of the accident, which is coded completely and has the vehicle and driver information for Vehicles 1 and 2.
- Code 2 For card 2; driver and vehicle information for Vehicles 3 and 4
- \* If a change is to be made in route number, cumulative mileage date or case number, it is necessary to first delete (Code 1) the case and then add (Code 2) the case again with the corrected an/or additional information.

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Typical motor venicle accident listing by Connecticut State Highway Department. Figure 9.

Code 3 - For card 3; driver and vehicle information for Vehicles 5 and 6. Etc.

(Note: For cards coded 2-9 in Col 90, the only other columns to be coded are 1-5 (case number), 6-11 (date and time), 12 (day of week), 13-14 (hour of day), 15-17 (town), 18-27 (route number and cumulative mileage), the same as coded for card with Code 1.)

The completed code sheets are transmitted to the Data Processing Division of the highway department, where the coded information is transferred to punch cards. The punched cards are fed into the computer and the accidents are made a permanent record on the master magnetic tape of the state highway motor vehicle accident.

The master tape contains the most current five years of accident data. Inasmuch as it requires about six months for an accident to be processed as outlined to here (collection, matching, coding, punching, filing on tape), the accidents in file are six months behind the current data.

When accidents for a whole new calendar year are incorporated onto the master tape, the oldest calendar year of data is transferred to a storage tape for reference use if needed.

Accidents are filed on the master tape in order (a) by route number and (b) by cumulative mileage within each route. With each updating, the Accident Analysis Unit of the highway department is furnished with a 5-year listing (Fig.9) of accidents for all routes, to be used as a visual reference.

### SUMMARY

The material contained in the foregoing presents the method which the State of Connecticut employs in the assimilation and storage of motor vehicle accident data. This state has always regarded such data to be an integral part of highway engineering and has attempted to keep pace with all advanced systems in this field. It has, in addition introduced some original conceptions of its own, in the hope that they may be reviewed by other states for solutions to possible existing problems.

The two key factors upon which this system is based are as follows:

- 1. In the assimilation of data phase, all efforts are directed towards the use of the police report as a foundation. This is to insure accuracy and uniformity. In addition, because the uniform police report is now in statewide use, this is in step with the eventual standarization of accident records nationally.
- 2. In the accident data storage phase, adapting sophisticated electronic equipment to full capability enlarges the potential uses of accident records and at the same time simplifies their utilization.

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