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Crash Scene Printout - Table of Contents

Section 1: Evidence Collection

Report completed: ☐ At Station **X** At Scene
Time report completed: 12:30 PM (military time)
County: Duval in Township of Lincoln, Ohio
Crash Occurred on: _____ (road)
At the intersection of: _____ (cross street)

Unit 1 Overview

Number of occupants: 3
Driver Name: Smail, Michael S.
Age: 18
Sex: M
Weight: 205 lbs
Occupation: Student
Dr. License #: RS45967823

Direction traveling: S to N
Vehicle Year: 2002
Make: Chevrolet
Model: Cavalier
Color: Blue
Style: 2 door
State: OH
License: DAT1900

Passengers for Unit 1

Name: Banbury, Randall R.
Age: 18
Sex: M
Weight: 200 lbs

Name: Davis, Elizabeth M.
Age: 17
Sex: F
Weight: 110 lbs

Damaged Areas on Car (Unit 1)

*Circle the appropriate damage description for this unit below.

Areas of Vehicle Damaged: Front Rear Top Underside
Damage Severity: Non-Functional Functional
Damage Scale: None Light Moderate Heavy
Headlights: Both Intact Both Damaged Neither Damaged Rt damaged Lft damaged
Front Tires: Both Intact Both Flat Neither flat Rt damaged Lft damaged
Rear Tires: Both Intact Both Flat Neither flat Rt damaged Lft damaged
Windows (circle damaged only): Windshield Rear Front Rt Front Lft Rear Rt Rear Lft
Vehicle Disposition: Driven away - Remained at Scene - Towed
Fire: No Fire - Fire due to Crash - Other Fire

Other Notes Regarding Car (Unit 1)

Unit 2 Overview

Number of occupants: 2
Driver Name: Alexander, Nicholas J.
Age: 18
Sex: M
Weight: 180 lbs
Occupation: Student
Dr. License #: WN25899345

Direction traveling: E to W
Vehicle Year: 2004
Make: Oldsmobile
Model: Alero
Color: Green
Style: 4 door
State: OH
License: KAT2397

Passengers for Unit 2
Name: Hunston, Jeremy P.
Age: 17
Sex: M
Weight: 150 lbs

Damaged Areas on Car (Unit 2)

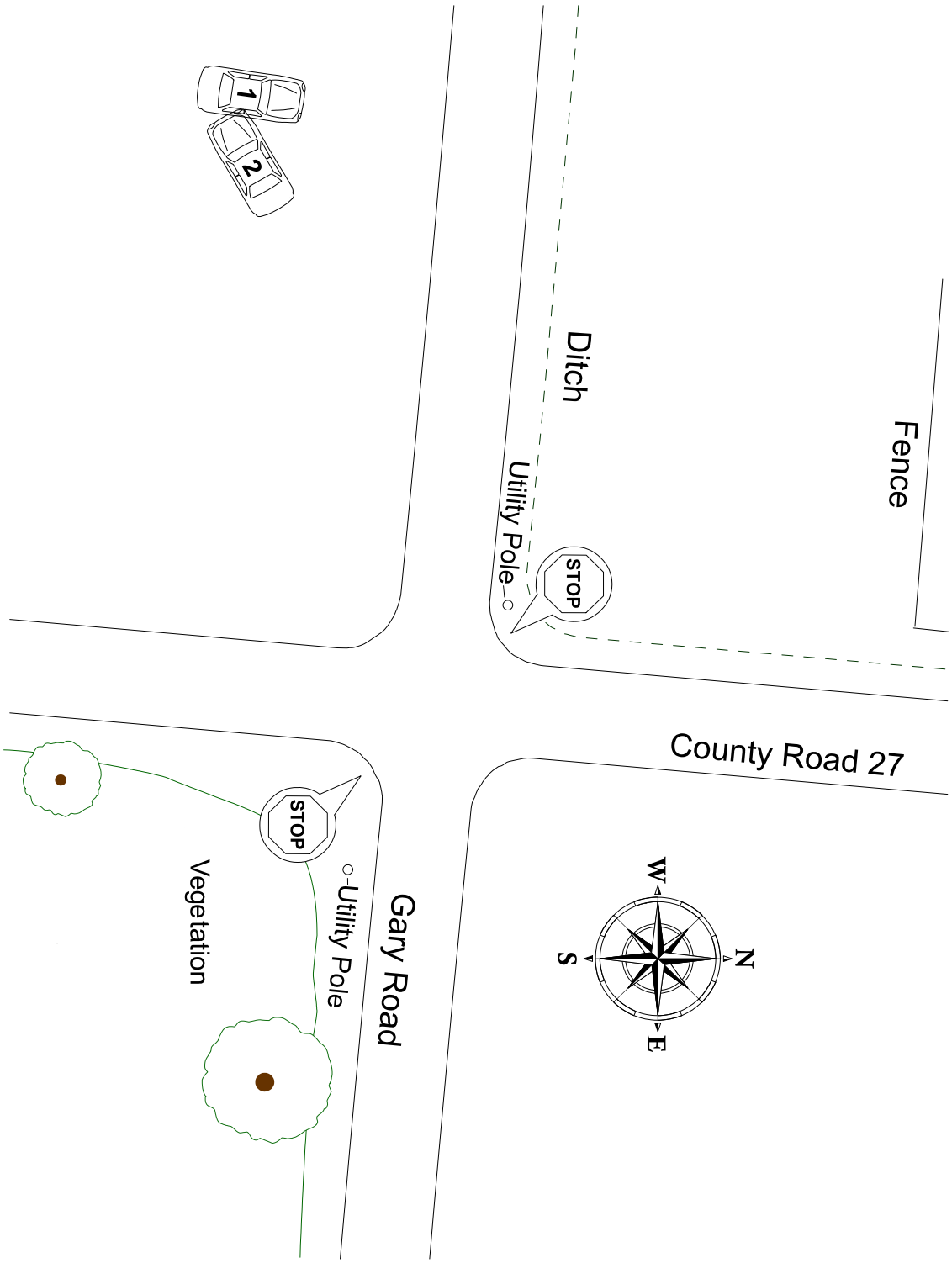
*Circle the appropriate damage description for this unit below.

Areas of Vehicle Damaged: Front Rear Top Underside
Damage Severity: Non-Functional Functional
Damage Scale: None Light Moderate Heavy
Headlights: Both Intact Both Damaged Neither Damaged Rt damaged Lft damaged
Front Tires: Both Intact Both Flat Neither flat Rt damaged Lft damaged
Rear Tires: Both Intact Both Flat Neither flat Rt damaged Lft damaged
Windows (circle damaged only): Windshield Rear Front Rt Front Lft Rear Rt Rear Lft
Vehicle Disposition: Driven away - Remained at Scene - Towed
Fire: No Fire - Fire due to Crash - Other Fire

Other Notes Regarding Car (Unit 2)

Crash Scene Diagram

Write labels and skid measurements on the diagram below.



Interview Witness Statements

Witness Statement #1

* Write down the pertinent witness responses to questions pertaining to the accident.

Name of Witness: Mr. Kevin Seymour
Officer taking statement: Sgt. Peters assisted by new officers
Location of statement: At scene of accident

See statement from driver of Unit 2 on page 7. It was taken at the hospital by a fellow trooper.

Witness Statement #2

* Write down the pertinent witness responses to questions pertaining to the accident.

Name of Witness: Mrs. Joan Harless
Officer taking statement: Sgt. Peters assisted by new officers
Location of statement: At scene of accident

See statement from driver of Unit 2 on page 7. It was taken at the hospital by a fellow trooper.

Witness Statement #3

* Taken at the hospital 10 hours after the accident.

Name of Witness: Nicholas J. Alexander, Driver of Unit 2

Officer taking statement: Trooper Fred Cook

Location of statement: Duval County Hospital

Q: What happened?
A: I remember we were going on a trip, but I had forgotten some stuff and was going back to get it. I turned around and headed back into town. I was west of CR 27, going my normal speed, about 55 mph. I remember approaching the intersection and then a blue car was just there, in front of me. I tried to hit the brakes, but I might have hit the gas instead. I couldn't miss them – there was no way.

Q: Where did the blue car come from?
A: My left side.

Q: When did you see the blue car?
A: Not until it was right in front of me.

Q: Did you see the blue car at the stop sign?
A: No. All I saw was it right in front of me a second before we hit.

Q: Were you and your passenger wearing seat belts?
A: Yes, we both were.

Q. Do you have anything to add to this statement?
A. Not really. It all happened so fast.

Address of Witness: 19 Greene Rd., Caesar, OH 43922
Phone number: 615-555-1856

Section 2: Calculations and Forces

Equations

1. Determining Post Collision Speed

Post collision speed of a vehicle: $S = \sqrt{30(d)(f)(n)}$ Where **S =** speed (mph) **d =** distance (ft)**n =** percentage of braking **f =** acceleration/deceleration factor, drag factor, or coefficient of friction

2. Combined Asphalt & Grass Speed

Total post collision speed of a vehicle over two surfaces: $S_c = \sqrt{Sa^2 + Sg^2}$ Where S_c = total speed of a vehicle over two surfaces S_a = speed of Unit 1 on asphalt S_g = speed of Unit 1 on grass

3. Approach Speed for Unit 2

$$S_2 = \frac{(W_1)(S_3)\sin(A_3)}{(W_2)\sin(A_2)} + \frac{(S_4)\sin(A_4)}{\sin(A_2)}$$ (see worksheet for definitions of terms)

4. Approach speed Unit 1

$$S1 = \frac{(S3)\cos(A3)}{\cos(A1)} + \frac{(W2)(S4)\cos(A4)}{(W1)\cos(A1)} - \frac{(W2)(S4)\cos(A2)}{(W1)\cos(A1)}$$ (see worksheet for definitions of terms)

5. Force of impact

Force of impact (F) = $\frac{W}{32.2}(\Delta v^2)(0.5) \div d$ Where W = weight (lbs) d = distance

Δ = (delta) change, such as change in speed v = velocity (fps)

6. Velocity

Velocity (V)= 1.466(S) Where S is Speed

7. Time

Time (t) = $\frac{V}{gf}$ Where V = velocity g = acceleration due to gravity (32.2 ft per s/s) f = drag factor

8. Distance Traveled

Distance traveled (d) = Vt Where V = velocity t = time in seconds

9. Distance to Brake to a Stop

Distance to brake to a stop = $\frac{S^2}{(30)(f)(n)}$ Where S = speed f = drag factor n = braking percentage

Worksheet

Unit 1 – post collision speeds:

Distance on asphalt =_____ **Drag Factor on asphalt** = 0.717 **Percent braking** = 70% or 0.70

Sa (Post collision speed on asphalt) = _____

Distance on grass =_____ **Drag Factor on grass** = 0.45

Sg (Post collision speed on grass)= _____

Post collision speed on both surfaces (also S3 below) = _____

W1 (weight of Unit 1) = _____ **S1** (approach speed of Unit 1) = _____

W2 (weight of Unit 2) = _____ **S2** (approach speed of Unit 2) = _____

A1 (approach angle of Unit 1) = _____ **S3** (post-collision speed of Unit 1) = _____

A2 (approach angle of Unit 2) = _____ **S4** (post-collision speed of Unit 2) = **43 mph**

A3 (post-collision angle of Unit 1) = _____

A4 (post-collision angle of Unit 2) = _____

Reported approach speed of Unit 2 was 55 mph, according to driver testimony.

Forces Impacting People

Driver, Unit 1 weighed 205 lbs. Impact velocity = 63 ft per sec. Distance = 0.2 ft.

Force exerted on 205 lb Driver of Unit 1 at time of impact = _____

Force exerted on 200 lb front passenger, Unit 1 at impact = _____

Force exerted on 110 lb back seat passenger, Unit 1 at impact = _____

Force exerted on 180 lb Driver of Unit 2 at impact = _____

Force exerted on 150 lb front passenger, Unit 2 at impact = _____

Force that would have been exerted on YOU had you been in Unit 2 = _____

Falls of more than 20 feet are potentially fatal.

A fall of how many feet equals the force on the Driver of Unit 1? _____

A fall of how many feet equals the force on the Driver of Unit 2? _____

Section 3: Officer's Notes and Further Research

Driver and Passenger Information

Name	Pos. in Vehicle	Restraints	Injuries	Ejected	Prior health	Disposition
Smail, Michael	Driver	Seatbelt & Airbag	Fatal	No	Normal	Taken to morgue
Alexander, Nicholas	Driver	Seatbelt & Airbag	Minor, visible injuries	No	Normal	To hospital by EMS
Banbury, Randall	Front Passenger	Seatbelt & Airbag	Fatal	No	Unknown	Taken to morgue
Davis, Elizabeth	Right Rear Passenger	Seatbelt	Fatal	No	Unknown	To hospital via Lifeflight
Hunston, Jeremy	Front Passenger	Seatbelt & Airbag	Serious, visible injuries	No	Normal	To Hospital by EMS

Call received: 12:10 **Dispatched:** 12:10 **Cleared:** 14:40

Weather: No adverse weather **Road Conditions:** Dry **Light:** Daylight

Road Contour: Straight Grade **First Harmful Event:** Angle **Location:** Intersection

Pre-Crash Actions: Unit 1: Going straight **Unit 2:** Going straight

Vehicle Weights Taken at Scene

Unit 1

Make: Chevrolet **Model:** Cavalier **License:** DAT1900

Wheel	Weight
Left Front	1035 lbs
Right Front	700 lbs
Left Rear	675 lbs
Right Rear	530 lbs

Unit 2

Make: Oldsmobile **Model:** Alero **License:** KAT2397

Wheel	Weight
Left Front	1025 lbs
Right Front	875 lbs
Left Rear	490 lbs
Right Rear	610 lbs

Test Skids and Drag Factor

Test skids were conducted on Gary Road at the area of impact, westbound. Anti-lock braking system was disabled. Weather was clear, 65 degrees F., and 90% humidity according to Duval Weather Service. **Drag Factor was calculated at 0.717.**

Tire and Damage Analysis

Unit 2: Green Oldsmobile Alero **License:** KAT2397
Right Front: Tire pressure: deflated & large laceration outside wall due to crash – metal of fender caused laceration.
Right Rear: Tire pressure: 29 lbs & in good condition
Left Rear: Tire pressure: 35 lbs &in good condition
Left Front: Tire pressure: deflated & laceration in outside wall due to crash – metal of fender caused laceration.

- **Odometer:** 41,462
- **Lamp Analysis:** Vehicle equipped with daytime driving lights. Left side bulb in contact and found to be in working order. Heavy damage to right side. Unable to locate lamp filament.
- **Damage Analysis:** Heavy contact damage to entire front. Induced damage to windshield, roof, and driver/passenger doors. Both airbags deployed.

Unit 1: Blue Chevrolet Cavalier **License:** DAT1900
Right Front: Tire pressure: 27 lbs & in good condition
Right Rear: Tire pressure: 24 lbs & gouges in rubber on inside tire due to post-crash.
Left Rear: Tire pressure: 28 lbs & in good condition
Left Front: Tire pressure: 29 lbs & in good condition

- **Odometer:** 8,888
- **Lamp Analysis:** Vehicle equipped with daytime driving lights. Left side headlight assembly still intact and found to be in working order. Heavy damage to right side. Lamp was located at scene and filament connected.
- **Damage Analysis:** Extensive contact damage to right side passenger door, rear quarter and front fender. Some damage to top and remainder of vehicle. The passenger door was removed by EMT and top cut by Jaws of Life. Heavy interior damage. Both airbags deployed.

Occupant Information from Unit 1

- Driver: Michael S. Smail, 3/10/1989. Seat belt/airbag both in use. Pronounced dead at the scene by Duval County EMS/Fire. Taken to Duval Memorial Hospital by Pleasant Township EMS. Blood drawn at hospital by Dr. Larry Tate, Duval County Coroner. Injuries – massive blunt trauma, brain stem disconnected from spinal column, massive trauma to internal organs.
- Right Front Passenger: Randall R. Banbury, 7/27/1989. Seat belt with airbag deployed. Pronounced dead at the scene by Duval County EMS/Fire. Taken to Duval Memorial Hospital by Pleasant Township

EMS. Blood drawn at hospital by Dr. Larry Tate, Duval County Coroner. Injuries – massive blunt trauma, internal organs damaged, aorta ruptured.

- Right Rear Passenger: Elizabeth M. Davis, 2/15/1989. Seat belt in use. Lifeflighted to Duval Memorial Hospital. Pronounced dead on arrival by emergency room physician, Dr. Joel Politi. Blood was unable to be drawn. Sustained massive internal injuries and brain damage.

Points of Perception

The following measurements of possible points of perception were taken using patrol cars 144 and 257 and Laser 20/20 #5, which was determined to be in proper working order:

- A northbound vehicle positioned so that the driver is even with the stop sign had a view obstructed by the utility pole.
- The line of trees measured from 28 to 18 feet off the roadway along Gary Road east of the intersection.
- A westbound vehicle had 260 ft unobstructed visibility of northbound vehicles.
- The stop sign for northbound vehicles was determined to be clearly visible.

Standard Automobile Statistics

2004 Oldsmobile Alero 4 dr sedan 5sp manual Curb Weight: 2715 lbs 1232 kg.
Curb Weight distribution: Front- 64% Rear: 36%

Acceleration and Braking Information:
Brake Type: Front Disc – Rear Drum ABS System: Unknown

Braking, 60 mph to 0 mph (hard pedal, no skid, dry pavement):
d = 149 ft t = 3.4 sec a = -25.9 ft/sec/sec G-force = - 0.81

Acceleration:
0 to 30 mph: t = 3.5 sec a = 12.6 ft/sec/sec G-force = 0.39
0 to 60 mph: t = 9.7 sec a = 9.1 ft/sec/sec G-force = 0.28
45 to 65 mph: t = 6.5 sec a = 4.5 ft/sec/sec G-force = 0.14

Standard Automobile Statistics

2002 Chevrolet Cavalier 2 dr coupe 5 spd manual Curb Weight: 2537 lbs 1151 kg.
Curb Weight distribution: Front- 64% Rear: 36%

Acceleration and Braking Information: Brake Type: Front Disc – Rear Drum
ABS System: ABS
Braking, 60 mph to 0 mph (hard pedal, no skid, dry pavement):
d = 133 ft t = 3.0 sec a = -29.1 ft/sec/sec G-force = - 0.90

Acceleration:
0 to 30 mph: t = 3.8 sec a = 11.6 ft/sec/sec G-force = 0.36

0 to 60 mph: t = 10.1 sec a = 8.7 ft/sec/sec G-force = 0.27
45 to 65 mph: t = 7.1 sec a = 4.1 ft/sec/sec G-force = 0.13

Crush Evaluation Unit 1

Unit 1 – Chevrolet Cavalier License: DAT1900

Measurements taken from the right side of the car, where it was impacted by Unit 2.

Measurements taken at 12 inch intervals from front bumper to back bumper.

C1 indicates the first measurement and each C number after that is 12 inches farther down the side of the vehicle.

Interval	Crush (inches)	Interval	Crush (inches)
C1	1	C8	37
C2	1	C9	23
C3	7	C10	35
C4	9	C11	9
C5	30	C12	0
C6	42	C13	0
C7	39		

"Crush" indicates the number of inches the side of the car was removed from the normal position.

The car was determined to have met or exceeded all safety requirements for passenger protection.