

Accident Investigation and Reconstruction

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A Personal Introduction

Graduate Pace University, Pleasantville, NY
Town of Bedford Police Department - 18 years
Police Academy Instructor
Accident Reconstructionist
Member of the Bedford PD Accident Investigation Unit
12 years
Coordinator of the AIU 6 years
Member of New York State Traffic Accident
Reconstruction Society

Presentation Overview

Introduction to Accident Investigations
Initial Response by Police
Physical Evidence from Roadway and Vehicle
Skid Marks and Vehicle Speed
Mathematical Principles and Equations
Information Analysis

Tabletop Exercise

Break into groups and analyze data gathered from an accident scene.
Utilize equations to determine vehicle speeds and the cause of the accident.
Determine whether the accident could have been avoided.

Basic Definition:

"Accident"

An unforeseen event, which occurs without the will or design of the parties involved.

Basic Definition:

"Accident Reconstruction"

Figure out what happened, based upon available data.

First Responding Officers

- Traffic Control
- First Aid
- Protection of the Scene
- Evidence Preservation

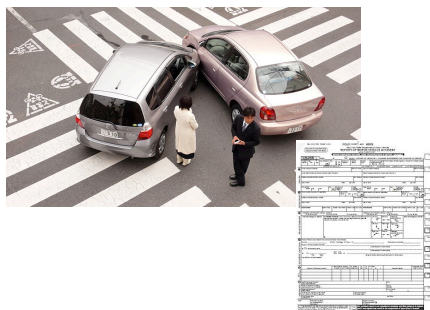
Scene Safety - Flaring Formula

- MPH Traffic Speed X First Digit = Distance to stop.
- 50 MPH Traffic Speed
- X 5 (First Digit of Traffic Speed)
- 250' (Distance a vehicle will need to stop from 50MPH)
- + 10
- 260' (Placement of First warning device)

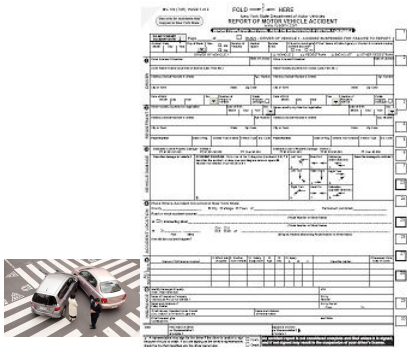
5 Stages of an Accident Investigation

- Basic Data Collection
- Extended Data Collection
- Specialized Examination
- Professional Reconstruction
- Cause Analysis

Basic Data Collection



Basic Data Collection



Extended Data Collection

Accident Investigation Unit

- Measurements to locate final rest of vehicles, marks, grade, debris
- Photos of the scene, vehicles, marks, gouges
- Description and matching contact of vehicles
- Identify Witnesses, obtain statements
- Friction tests of road surface
- Vehicle Examinations

Roadway Marks



Roadway Marks



Roadway Evidence - Skids & Gouge Marks



Roadway Evidence - Yaw Marks

Created by a tire that is free to rotate, without braking or power and is sliding or slipping sideways.
There will usually be diagonal striations across the mark
These marks offer a unique means of calculating speed



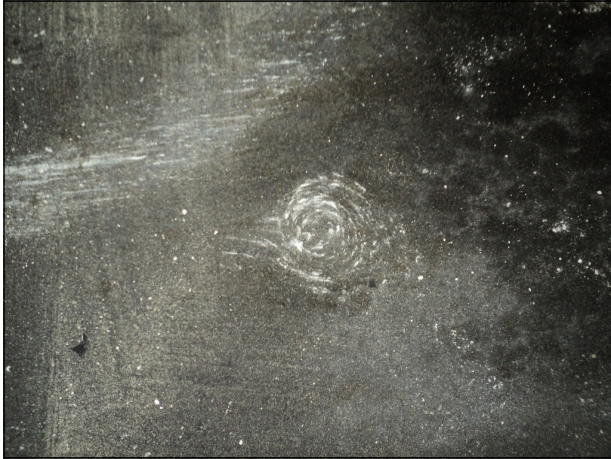
Evidence from Accident Scenes







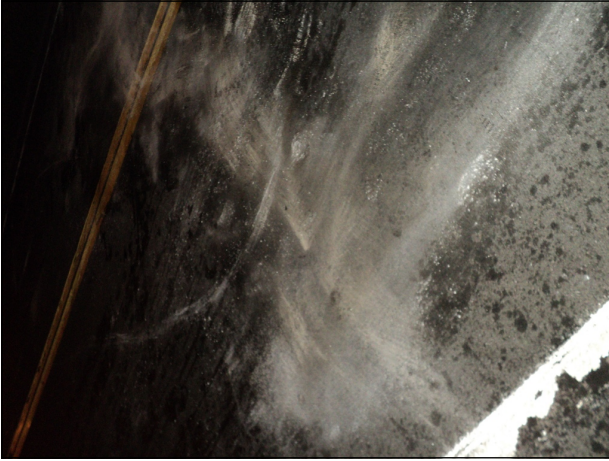


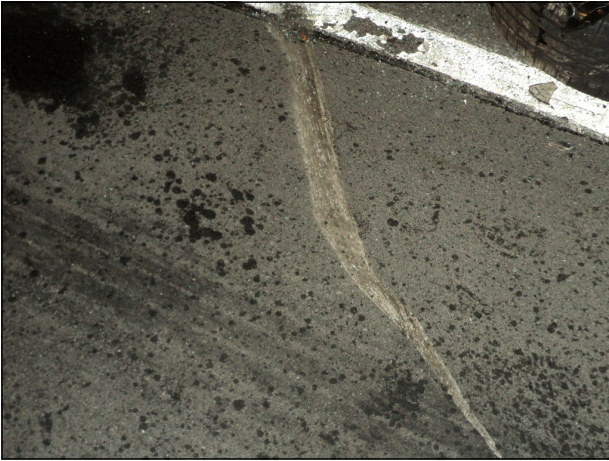










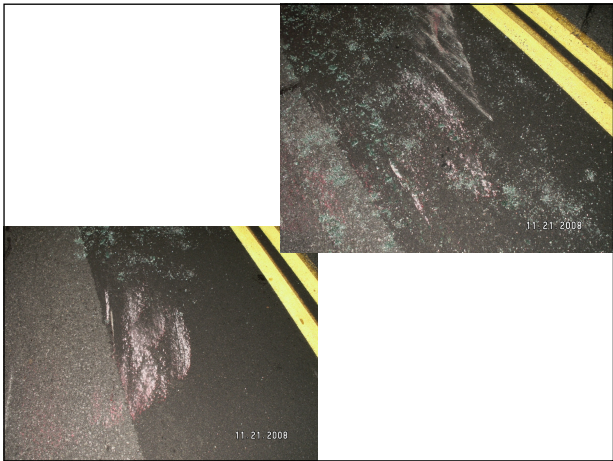




Evidence from Accident Scenes - Vehicle











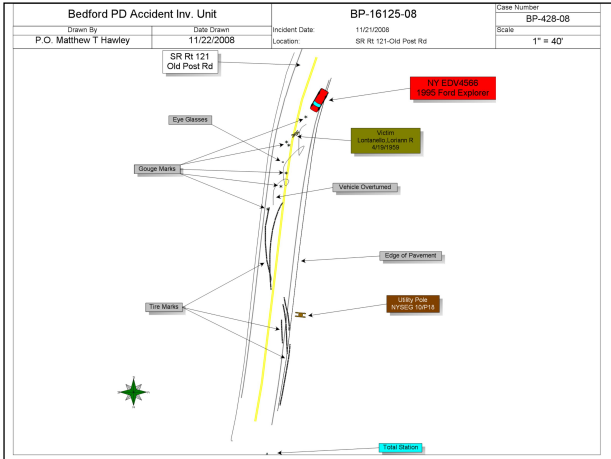






Scene Diagramming Roadway Measurements

Hand Measure the Scene
Total Station Survey Tool











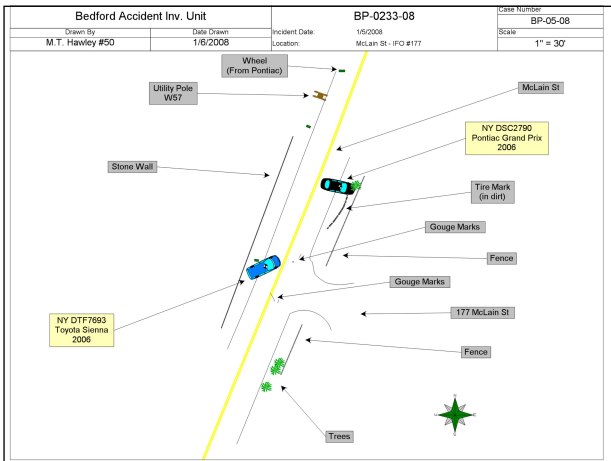


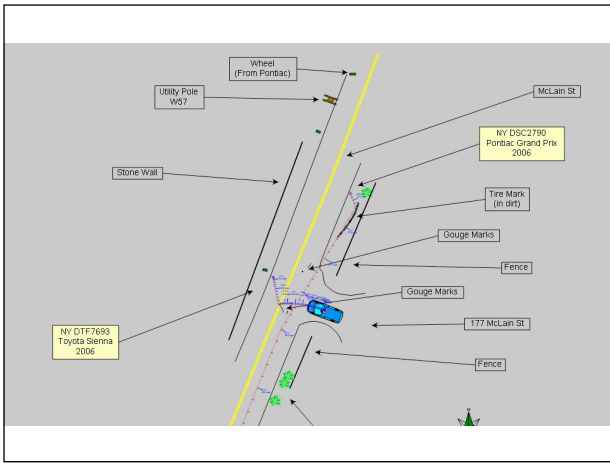


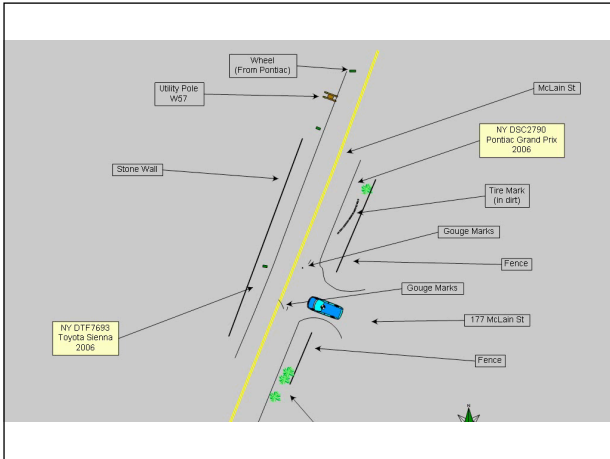












Using the Evidence Newton's Laws of Motion

*First Law - Law of Inertia

A body at rest remains at rest, or a body in motion remains in motion at a constant speed along a straight line unless acted upon by an outside force.

$$\sum F_n = 0$$

Using the Evidence Newton's Laws of Motion

*Second Law

If acted upon by an outside force, the center mass of the body will accelerate in the direction of the force. The acceleration of the center of mass is directly proportional to the force acting upon it and inversely proportional to its mass.

$$F = Ma \quad a = F/M$$

Using the Evidence
Newton's Laws of Motion

*Third Law

For every action there is an equal and opposite reaction. These opposing Forces are equal in magnitude and opposite in direction.

$$(F_1) = (-F_2)$$

Questions??
