

Crime Scene #3: Road Rage

Context:

Evelyn Horton, a 22-year-old university student at the School of Fabrication and Imagination, drives her car off a bridge located on Interstate 42. Evelyn escapes without serious injury thanks to her seatbelt, air bags, and crumple zones in her car. Evelyn claims she was run off the road by an enraged motorist.

Evelyn testifies that she was traveling exactly 110 km/hr across the bridge when the assailant's vehicle forced her over the edge. Upon first sighting the assailant, Evelyn claims she engaged her brakes for at least one full second before leaving solid ground. Evelyn's car plowed through the guard rail and fell off the 10-m high bridge, landing a horizontal distance of 29 m from the base of the bridge.

Police investigating the scene find no physical evidence to back up this claim, and with no sign of skid marks, they turn to you to assist them. Based on the time of day, it's also possible that Evelyn fell asleep at the wheel and is making up a story to avoid embarrassment, or perhaps dreamed up the assailant. Her insurance company is also interested, as her policy doesn't cover damages due to driving while over-tired.

Police need to know whether this was an accident or a malicious act from an enraged driver, as they will dedicate a large percentage of their investigative resources toward finding Evelyn's attacker if this is indeed a crime scene.

Investigator: _____

Potential Scenarios:

1. Evelyn was forced off the bridge by an enraged motorist (Fig. 2).
2. Evelyn fell asleep at the wheel and drove through the guard rail and off the bridge.

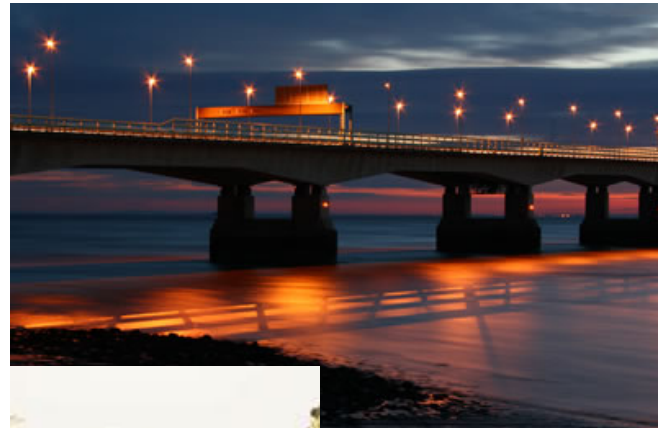


Fig. 2. Road Rage crime scene.

Background Information:

The guard rails along the side of the bridge have been tested and shown to reduce the velocity of any car impacting them by approximately 10 m/s, regardless of incoming velocity. The braking capacity of Evelyn's car, given the road conditions and state of Evelyn's tires, is -8.83 m/s^2 . You may reference this information in your final report.

Your Assignment:

Based on the mock-up created by the crime lab technicians and the data provided, you must assist police in determining whether Evelyn was forced off the road or whether she fell asleep at the wheel. Whatever your conclusion, you must justify it in a report that will be provided to the police, the district attorney, and Horton's insurance company.

Hints:

- 1) How far did the car fall vertically from the bridge to the ground? How long did it take?
- 2) How far from the bridge did the car land?
- 3) What was the car's speed as it left the bridge after hitting the guard rail?
- 4) What was the car's speed right before it hit the guard rail?
- 5) Did Evelyn hit the brakes when she was run off the road, or did she fall asleep at the wheel?