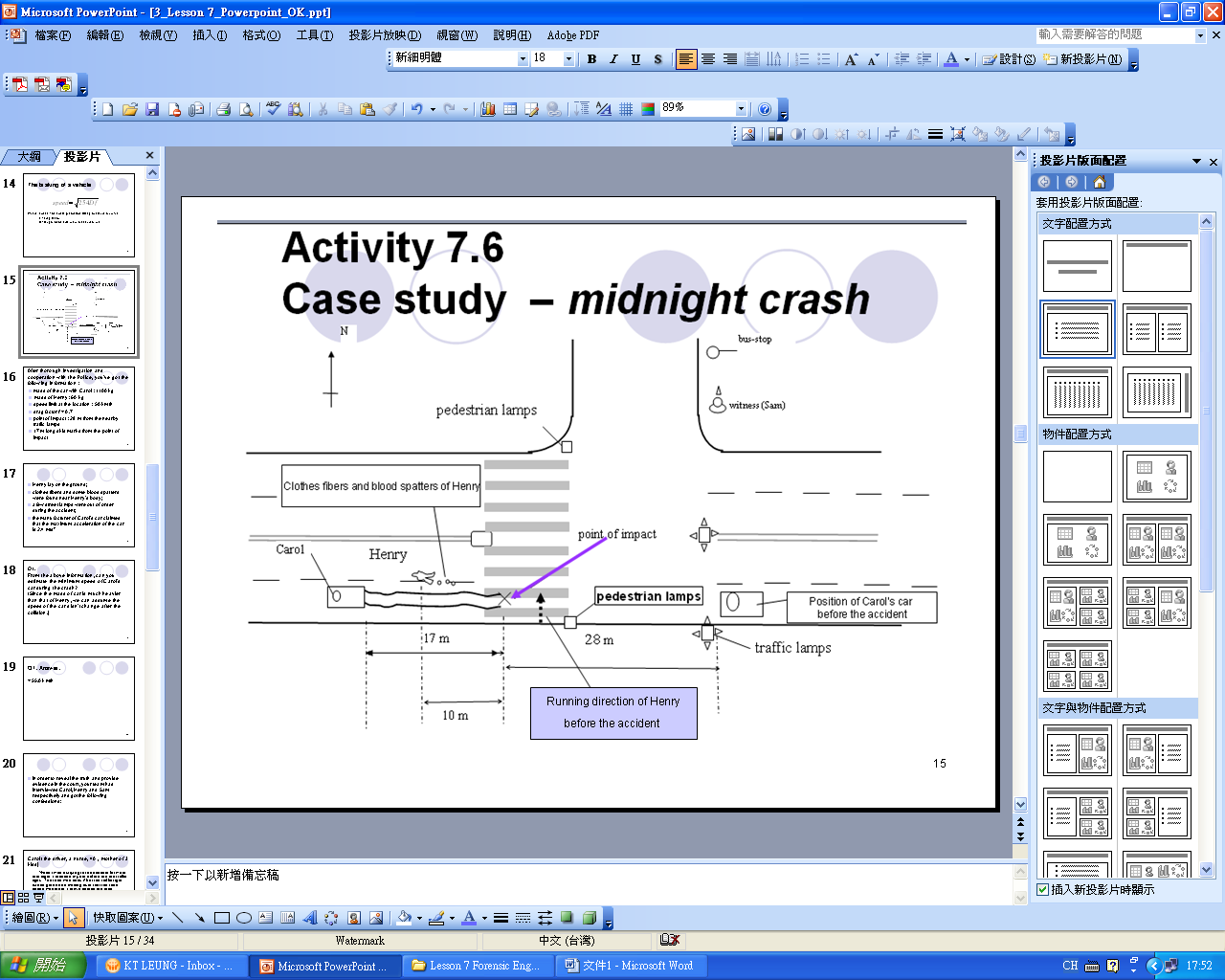
Forensic Science Accident Reconstruction – Case Study: Midnight Crash

Your group is the investigation team providing expert testimony at an automobile accident case in the court. The case involves a lady driver (Carol) driving a red car which knocked down a young male pedestrian (Henry) around midnight at a road junction. The driver was not injured and passed the alcohol test. However, the pedestrian was hurt badly. An eyewitness (Sam) reported to the police that he saw part of the accident. The following sketch was drawn by your colleague (a police officer) 1 hour after the accident



After thorough investigation you get the following information from the site:

* mass of the car and Carol: 1100 kg
* mass of Henry: 60 kg
* speed limit at the location: 30 mi/hr
* drag factor *f =* 0.7
* point of impact: 28 m from the nearby traffic lamps
* 17 m long skid marks from the point of impact
* Henry’s estimated impact location and location on the ground
* clothes fibers and some blood spatters were found near Henry’s body
* a few street lamps were out of order during the accident
* the manufacturer of Carol’s car claimed that the maximum acceleration of the car is 2.4 m/s2

1. From the above information, estimate the minimum speed of Carol’s car during the crash. (Since the mass of car is much heavier than that of Henry, we can assume the speed of the car didn’t change after the collision). Show all work!

In order to reveal the truth and provide evidence in the court, your team had interviewed Carol, Henry and Sam respectively and got the following confessions.

Carol (the driver, a nurse, 40, mother of 3 kids)

*When I was hurrying to the hospital for work that night, I stopped my car before the red traffic light. The road was dark. After the traffic light turned green and making sure that the road ahead was clear, I drove across the road junction. Suddenly, I saw a person wearing dark clothes appearing in front of me. I swear that I couldn’t see him until the last moment. I pressed my horn sharply but he didn’t seem to have any response. Everything was too late and my car knocked him down. I applied the brake immediately to stop my car. I was so scared that I stayed in my car until the police came.*

Henry (the injured person, a salesman, 26, single)

*After drinking with my friends, I left the bar around midnight. I intended to catch the last bus home. The pedestrian lamp was green and flashing when I was running across the road. Suddenly, without sounding its horn a car at high speed came to me from my right hand side and knocked me unconscious.*

Sam (witness, a financial planner, 33, married)

*That was a quiet night. When I was walking towards the bus-stop after meeting with a client, I heard loud sound of a horn from behind. I turned to my left and saw a car knocking down a person. I remember that the pedestrian lamp near the crash scene was still red at that moment. I ran quickly across the road to see how I could help. I saw a man wearing black clothes lying on the road with some bloodstains around him. A car stopped about 10 m away from the injured person. The driver, who was a lady, got out of her car. She was very scared! I called 911 with my cell phone to get help.*

1. Comparing the confessions of Carol, Henry and Sam list out some points that you think are contradictory.
2. After comparing the data and the confessions, who do you believe is at fault for this accident? Explain in detail why you said that.