Impressive Evidence

Continued...

Toolmarks

Tools are often used by criminals to force entry to premises and can leave behind evidence for the forensic scientist to find.

Two tools of the same kind and made by the same manufacturer may look the same, but through use each tool can acquire differences. It is these differences that makes them unique. Forensic Scientists are able to help the courts convict criminals by matching the marks on tools to those found at crime scenes.

Characteristics

The examination of tool marks, as with other physical evidence, is based on two characteristics - class characteristics and individual characteristics.

Class characteristics are those characteristics that are common to a group of objects. For example, a hammer has a distinctive shape and typical size.

Individual characteristics are those characteristics which are unique to a given object. They are generally as a result of wear and tear or may be caused by isolated incidents during manufacture. For example, you buy a new pair of shoes and as you wear the shoes, over time you will get scratches and gouges on the soles. These marks are unique to your shoes.

Tool Mark Impressions

Caused by the interaction of two objects, tool mark impressions are distinguished in a variety of ways:

Indentation marks are made when the tool is pressed into a softer material and leaves an impression. A good example is a crow bar being used to force open a window and a subsequent impression is left in the softer surface of the wood. The Forensic Scientist will examine the marks and may be able to identify what type and size of tool caused the damage.

Abrasion marks are made when a tool slides or scratches across a surface. Think of a key being dragged along the side of a car; such an instrument leaves behind a pattern of lines or striations in the metal of the car. The pattern of striations may be enough for the examiner to identify a match with the tool belonging to a suspect.

Cutting marks are a result of tool leaving behind marks and striations along the cut edges of the material. Scissors, saws, and wire cutters will leave these types of marks.

Examination

The Scene Examiner will examine and photograph the tool marks in situ. If appropriate, the Scene Examiner will remove the object with the marks and take it to the lab for further analysis. If this is not possible they will make a cast of the marks, generally using a silicone rubber.

A tool may be recovered that is suspected to have caused the damage and this will also be taken to the lab for further analysis.

The Forensic Scientist will make test marks using the suspect implement. The test mark and the mark recovered from the crime scene will then be compared.

The Forensic Scientist will examine and compare the striation patterns using the comparison microsope. By comparing and matching the striations the scientist can prove whether the tool is responsible for the impression.

Tools can also have trace evidence, such as paint flakes adhering, or in the case of a human victim, blood or other body fluids. This evidence greatly assists in the investigation of a crime.

Danny Rosenthal Case

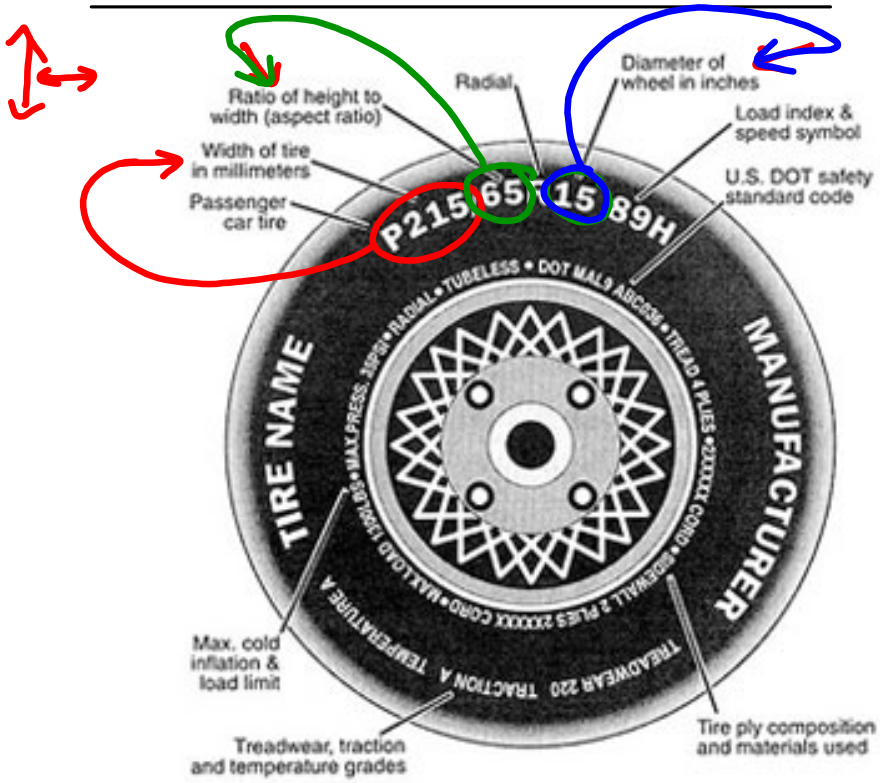
1981 - France

Victims - Milton and Leah Rosenthal

Evidence - Dismembered Body Parts

- Striations on Bones matched a saw in Danny's Possession

Information Gained from Tires



Tire Tread Analysis

Class Characteristics can be used to eliminate a suspected tire or suggest a tire that **could have made** the track.

- > Size
- > Tread Design
- > Overall Wear

Individual Characteristics can be used to **identify** an exact tire.

- > Cuts, Gouges, Chunks, Etc.
- > Specific Wear Details
- > Rock or Other Debris Holds
- > Nails/Screws

(remember, individual characteristics will **change over time**.)

Figure 12. Dental stone cast of impression shwon in Figure 11.

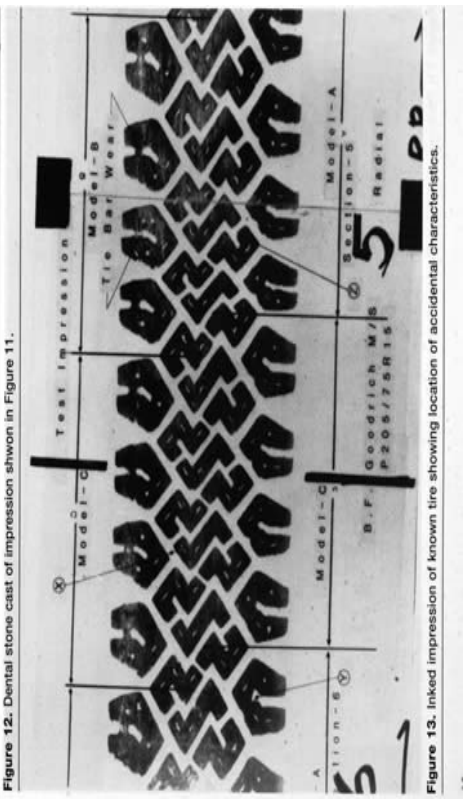
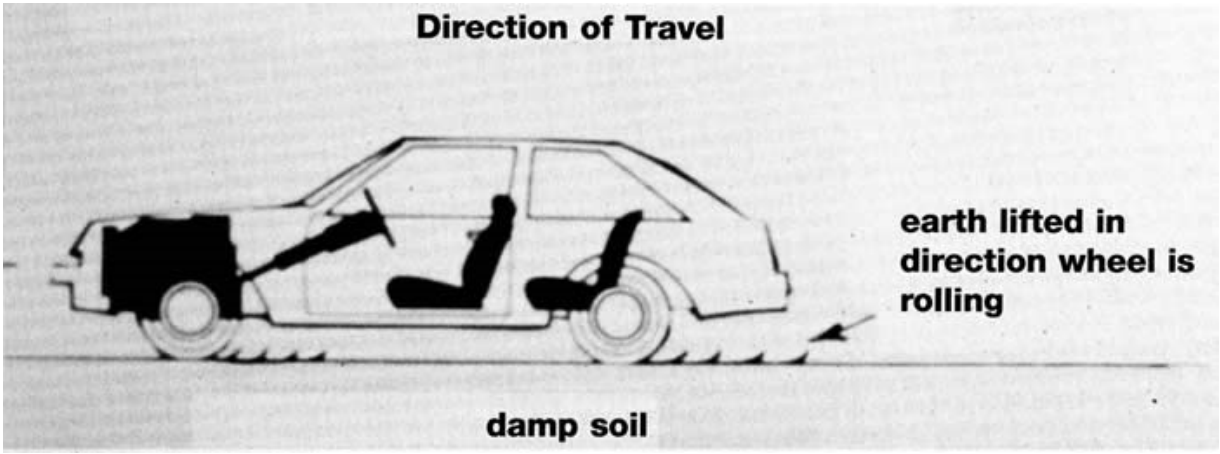


Figure 13. Inked impression of known tire showing location of accidental characteristics.

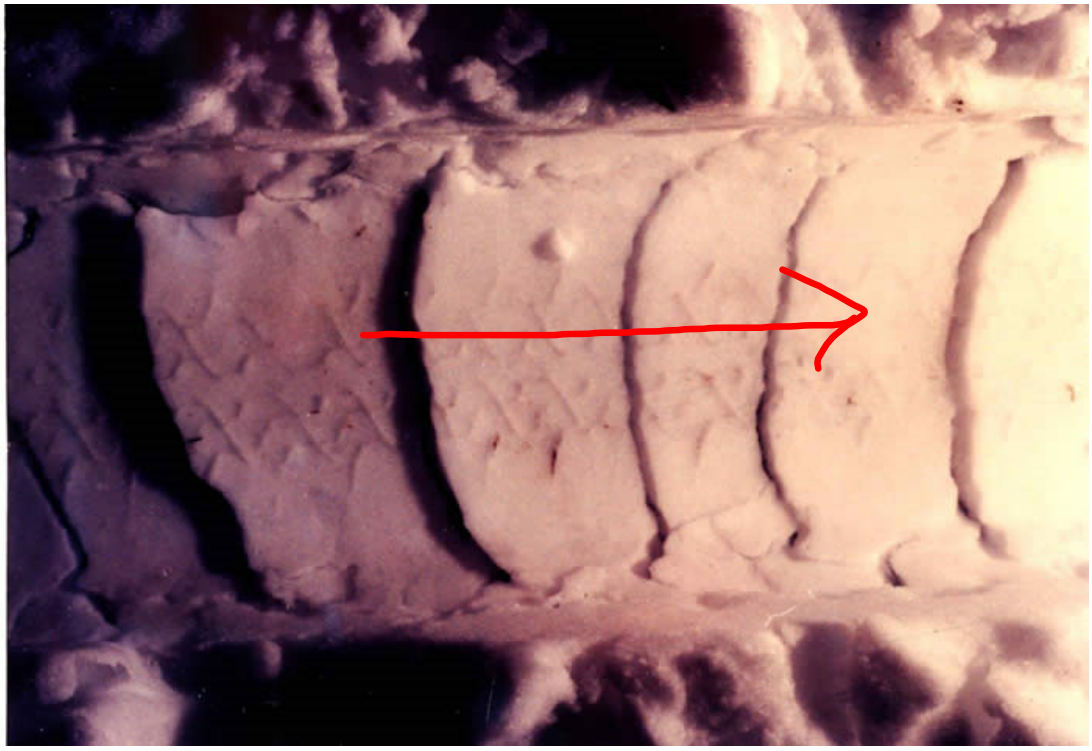
Other Information Gained from Tread Analysis

Direction a vehicle traveled through a crime scene is determined by observing several factors:

- Directional tire tread pattern
- Directionality of flattened plants (bend in direction of travel)
- Snow or damp soil compressed and lifted in direction of travel
- Dirt, mud or water thrown in direction of travel (non-spinning)
- Dirt, mud or water thrown in opposite direction of travel (spinning)



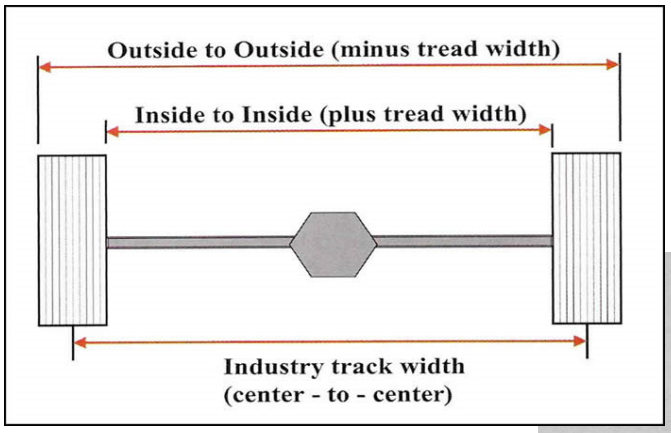
Which way was this vehicle traveling?

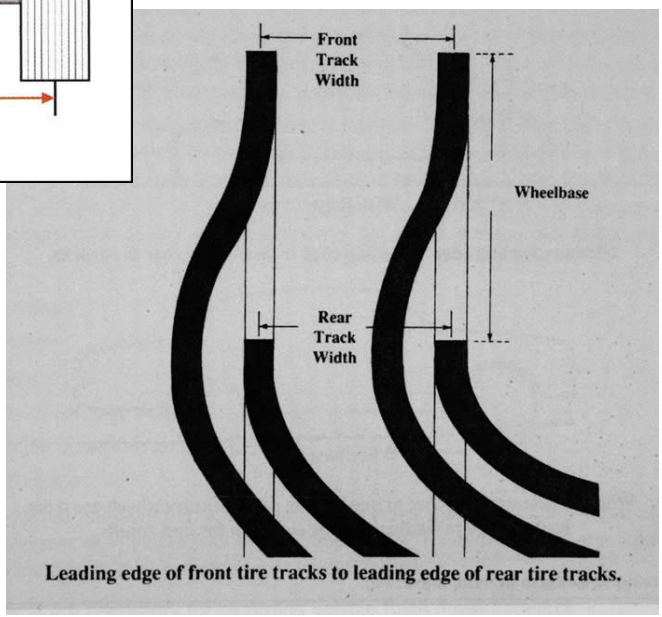


Measurements and Wheelbase

Track Width – measurement made from the center of one track to the center of the opposite track (right side to left side)

- > Also measure inside to inside, outside to outside, and the individual track widths.
- > When the front wheels are making a turn, this will produce unreliable measurements
- > Rear wheels will record accurately in turns



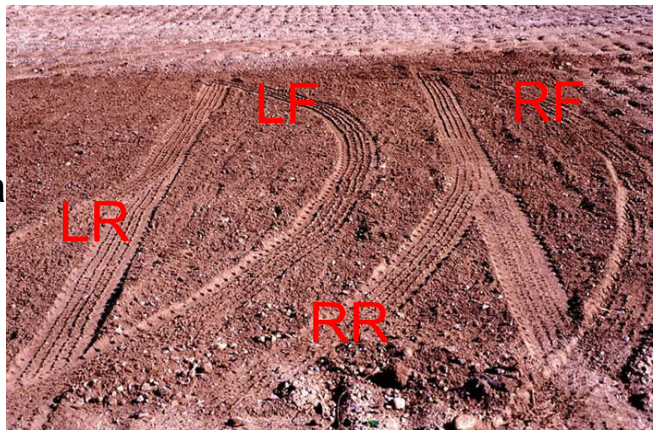


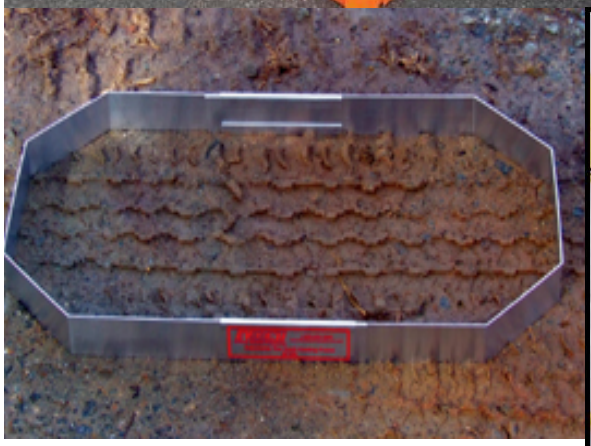
Determining Which Tire is Which

- When a vehicle moves in a straight path, only rear tire tracks are present
- When a vehicle turns, the rear and front tires will separate
- This allows us to determine which tire is which

Tire Positions in a Turn

- If vehicle drives forward, stops, and then reverses while turning, it forms a "D" pattern (outermost curved path will be rt or lt front tire)
- If a vehicle backs in, stops, and then pulls forward, tracks will form a "b" (innermost curved track will be front rt of lt)





Attachments

Forensic Odontology Lab.doc

F30 Article - How Forensic Dentistry Works.docx