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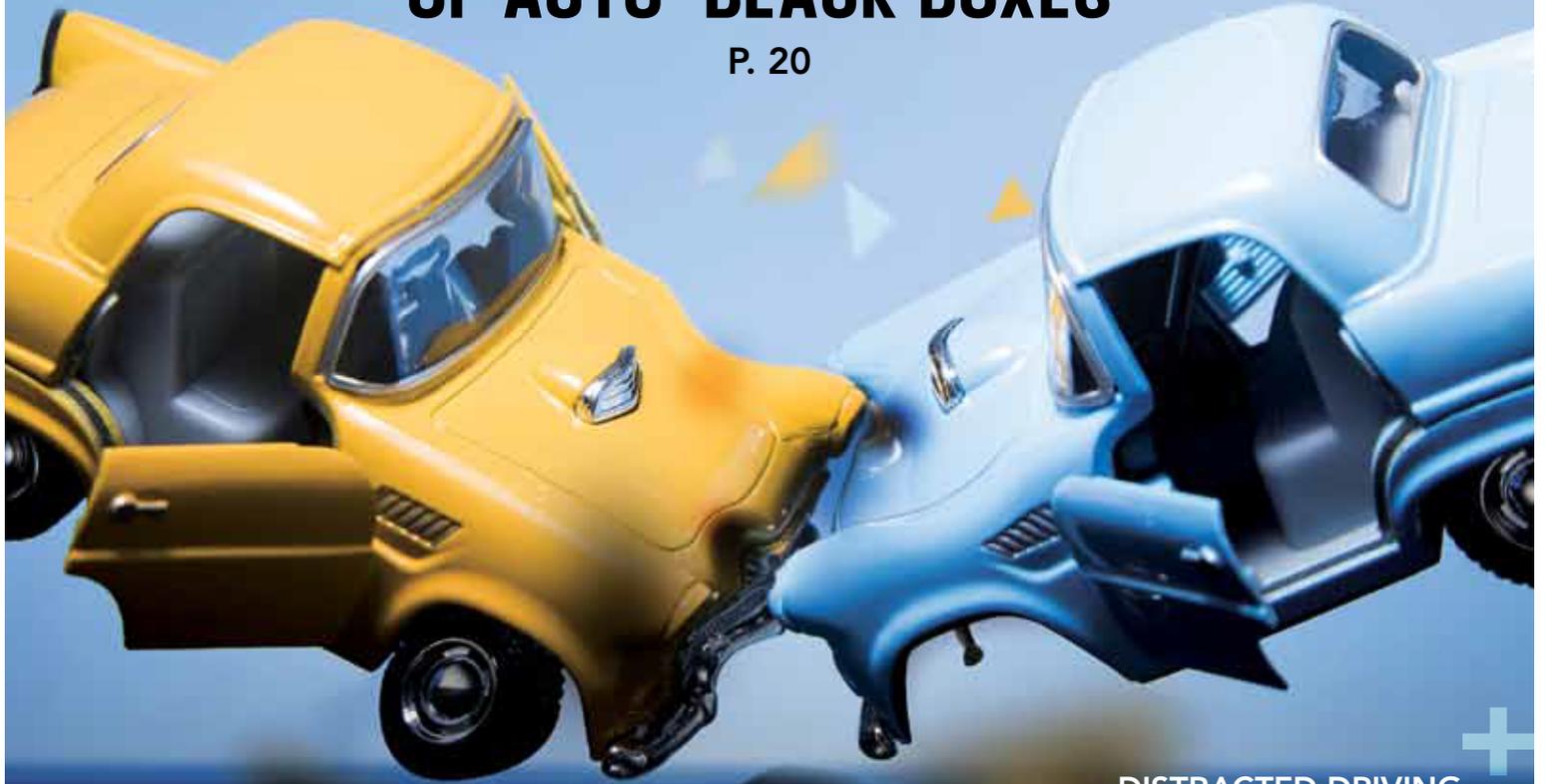
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Shedding Some Light on Auto Accidents



Figure 1

While handling automobile accident claims, the issue of whether lights were on or off at the moment of impact may arise. Inspection of the vehicles involved may provide evidence as to the answer to this question.

The damaged vehicle in Figure 1 has automobile lamps still in the vehicle, allowing physical evidence as to whether the lights were on or off to be identified. This article reviews several case studies of automobile lights and what information can be deduced regarding whether the lights were on or off.

In Figure 2A, the bulb is a standard sealed beam 1157 bulb found in many tail light assemblies. Figure 2B is a bulb extracted from the rear impact area of a vehicle. The bulb was not fractured, but the filament, as indicated by the arrow, is severely deformed.

When the light is incandescent (on), the filament is very hot and ductile, which means it deforms easily. The forces of the impact cause the deformation. If the light had been off, no deformation would be noted since the cold filament is much more rigid.

The deformed filament in Figure 2B suggests that the light was incandescent at the time of impact. Likewise, the halogen lamp on the right in Figure 3 is deformed when compared to a new lamp shown on the left, suggesting it was incandescent at the time of the accident.

Another condition observed in lamps



Figure 2A

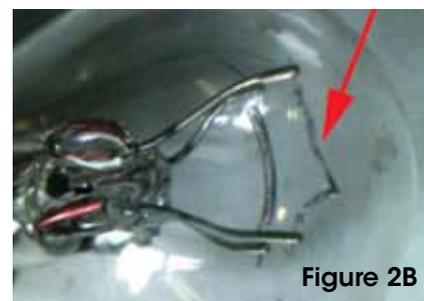


Figure 2B



Figure 3

that were incandescent at the time of the accident is the formation of a small ball of tungsten, as shown by the arrow in Figure 4. During impact, a filament may break, and as this occurs, it generates an electric arc, causing a high temperature and the formation of a melted ball of tungsten. The filament in Figure 4 was incandescent at the time of the accident.

In Figure 5, the bulb has fractured and a small shard of glass is found melted

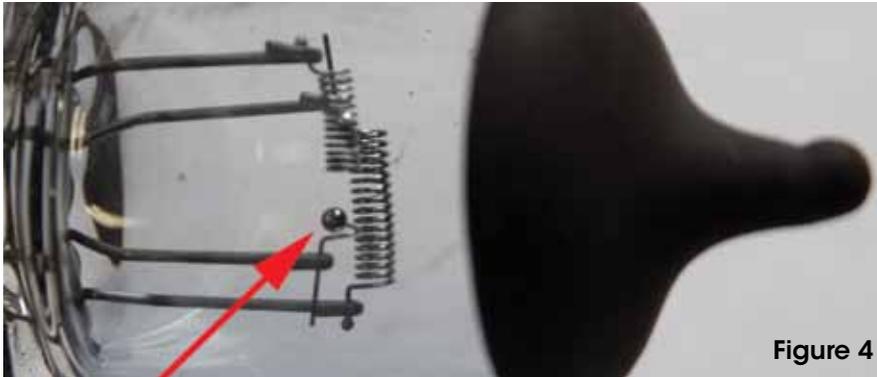


Figure 4

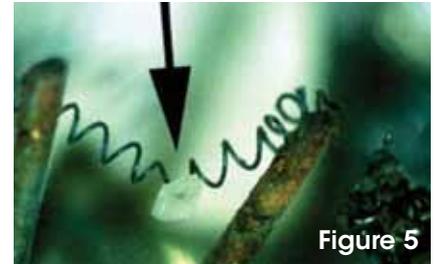


Figure 5

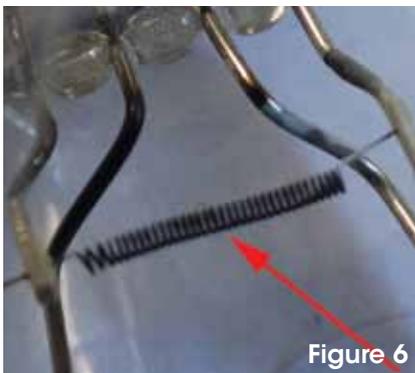


Figure 6

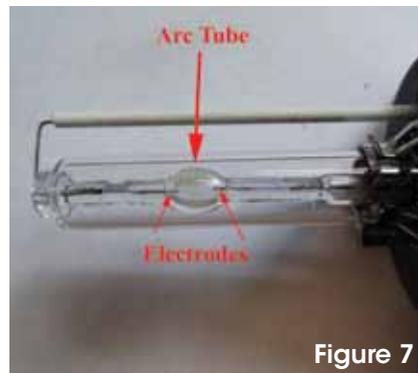


Figure 7

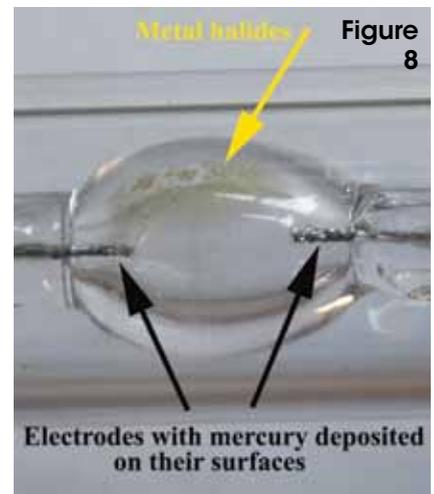


Figure 8

into a filament. This indicates that the filament was incandescent at the time of the fracture.

In some incidents, the glass fractures and the filament remains intact, but is heavily oxidized. The oxidized tungsten surfaces are a result of high temperatures, indicating that the filament was incandescent at one time after the glass fractured.

There are two possibilities in this case. Either the filament was incandescent at the time of the accident, or someone turned on the light switch after the accident. To determine if the light was on in this case, one has to eliminate the possibility of spoliation of the evidence by the intervention of someone turning on the lights post-accident.

Another type of lamp now installed in modern automobiles is the high-intensity discharge (HID) lamp as shown in

Figure 7. The bulb contains an arc tube with electrodes. The arc tube contains xenon gas, mercury and metal halide salts. When voltage is applied, an arc develops providing a bright light.

Figure 8 is a close-up of the arc tube on a new lamp. The metal halide salts have a yellowish color as indicated by the yellow arrow above the arc tube. While in operation, the metal halide salts are vaporized and distributed throughout the arc tube. If the arc tube is fractured from the accident, then these gaseous components escape. Upon cooling, there is very little evidence of deposits on the inside of the fractured arc tube, which suggests the light was on at the time of impact.

Oxidized electrodes (greyish blue in color) and/or ductile deformations are also an indicator that the light was on at the time of impact. Figure 8 also shows mer-

cury deposits on the electrodes of a new lamp. If the lamp is powered at the time the arc tube is fractured, mercury escapes and there is little left on the electrodes.

We have presented several examples of post-accident, lamp examinations. After an accident, the lamps in an automobile often contain evidence as to whether the lights were illuminated at the time of the accident. This evidence will certainly aid in deciding issues regarding whether or not the lights were on at the time of an incident. 🍷

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