

FORENSIC INVESTIGATION OF PAINT IN TRAFFIC ACCIDENT CASES. Carlos A. Toledo, Laboratorio Central de Criminalística, Zulueta No.465 Ciudad Habana, Cuba. e-mail: gordillo@mnmn.co.cu

In traffic accident cases, frequently a driver left behind him a sad sequel of damage and some times even death. For the order agents is a difficult task to find out the criminal, many times the only relieve for the victim's family.

Normally, bodies' interaction leaves some share of trace evidence [1]. In traffic accident, among many kinds of materials, paint chips play the principal role in most cases.

From the forensic point of view, many times paint analysis begins in the point where the chemical analysis finishes. For a trail it is not enough to show that two paints under comparison have the same chemical elements, it is also necessary to find out if both come from the same source or, at least, to give an idea about the likelihood of a casual coincidence.

Microscopes are the most powerful tools for the forensic expert because, as a rule, paint chips are small, dirty and deform. The optical microscope and specially the scanning electron microscope with an X ray spectrometer give the expert the capability of revealing characteristic features as paint layers, small drops, craters, inclusions, stains, infrequent chemical elements and others.

In cases when there is no information about the kind of vehicle involved in the case, more general features like colour, chemical composition and the availability of a good data base are the principal weapons for the expert [2].

Paint layers arise at the beginning of the examination and some times are the only feature needed to say that you have found the source of the evidence. But first it is necessary to have information about the occurrence frequency of the different colours, which can vary from one country to another [3]. In the Republic of Cuba blue is the most common colour, while violet is very infrequent (Figure 1).

Superficial defects are also very useful in order to establish the singularity of the evidence. Weather, particularly the sun and the rain in our case, age and quality of the paint are factors involved in the occurrence of such defects and their frequency [4]. Figure 2 shows some of these defects seen through the scanning electron microscope. Other useful singularity is the presence of small drops of other paints on the surface of the paint chip. In our case it was found that those singularities appear in more than 21% of the cases, and they can be studied by optical microscope as well as by scanning electron microscope (Figure 3).

Chemical elements are also very important in order to get information about the source of the evidence. Some elements are frequent according the paint colour, it happens with Lead and Chromium in red paints, but other like Manganese are present in our red paints in only 4% and Cadmium in only 3% according a study of 350 red paints made with the scanning electron microscope [3].

In cases where there is no yet a suspected vehicle, particular features are not of interest and the attention should be paid in some general features, like the way that different factories use to paint their vehicles, the pigments and polymers they use, and particularly the body fillers and their sequence [2,5].

References

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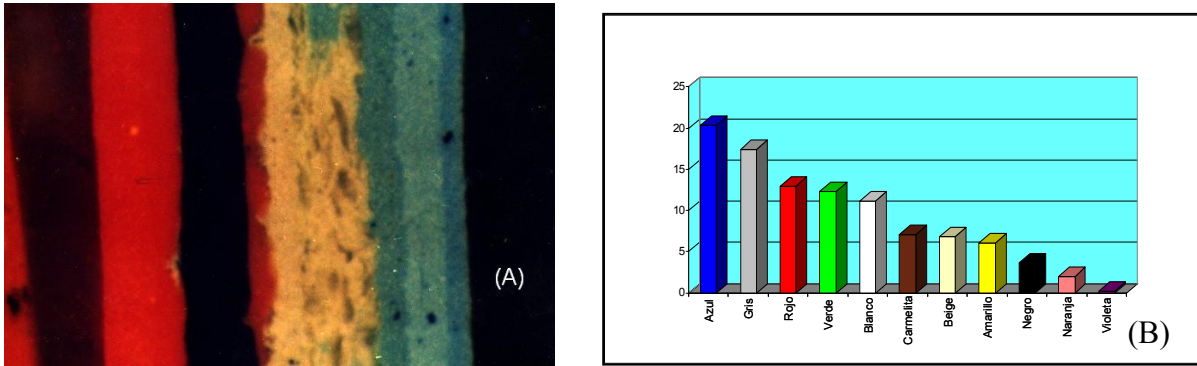


Figure 1. (A) Paint evidence found in the crime scene seen through the optical microscope; it has more than 10 layers. (B) Occurrence frequency of the different colors in the Republic of Cuba.

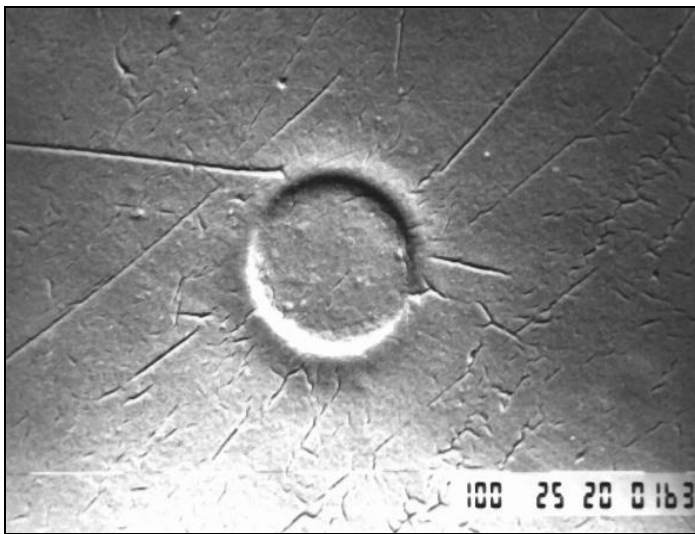


Figure 2. Different defects on a paint chip seen through the scanning electron microscope, they are of particular importance when there are no other features for comparison.

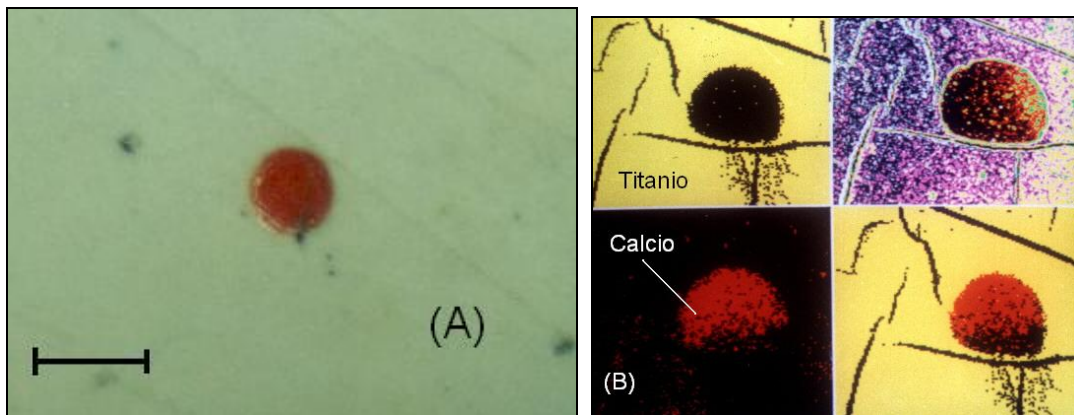


Figure 3. (A) Paint drop on a paint chip surface, they occur when a vehicle is painted in the proximity of another. (B) The X ray mapping shows the chemical elements present in the paint surface and in the drop.