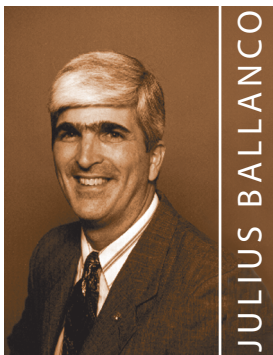


The Verdict Is In



JULIUS BALLANCO

The dimensions of a water closet are an important factor for the forensic engineer to consider in evaluating the possibility of a crime.

You may recall that last month I provided the basic information in a murder trial. Did the husband drown his wife in the water closet, or did she commit suicide by taking a drug overdose? The dimensions of a water closet became an important factor for the forensic engineer to consider in evaluating the possibility of a crime.

Another factor that is extremely important in evaluating a situation is whether a similar event has occurred in the past. The Internet is a wonderful tool for doing research. For this case, the Internet provided a wealth of information on deaths in and around a water closet. What may surprise many is the number of deaths that have been recorded in a bathroom.

If you think back to the 1960s, during the era of heavy drug use, there were a number of deaths by drug overdose that occurred in a bathroom. A person would shoot up and then die of an overdose. There were recorded cases of people dead, sitting on the water closet, slumped over against the wall. Many cases found the victim lying alongside the water closet, dead. Some very old cases were recorded of drunks falling and hitting their head on the vitreous china bowl, and found lying dead beside the water closet.

There were also accounts of drowning in the water closet. The most prevalent were of small children or babies drowning in the bowl. This, of course, made sense, since the size of a small child would allow the entire body to enter the bowl. Some cases were accidental, while others were of children being murdered.

Of all of the deaths in the bathroom, there was not one recorded case of an adult female (or male) being found dead with her/his head still in the bowl of the water closet. The laws of gravity work against this possibility by pulling the body away from the bowl and onto the floor.

This was important information that would support the testimony of other experts that could explain the movements of a

human body. Remember that the husband had testified that he found his wife with her head in the toilet.

Autopsy reports and crime scene reports can also provide important information to the forensic engineer. Most autopsy reports and crime scene reports include photographs. A stack of these photos and reports arrived in my office from the district attorney. The first photograph I looked at was an autopsy photo of the neck of the victim. What was immediately obvious was the bruise on the victim's neck. But it wasn't just any bruise; this bruise was clearly in the shape of the rim of the water closet bowl. As soon as I looked at the photo, I could see the rim of the bowl.

The autopsy report indicated no other outward signs of damage around the head or neck. There is always the possibility of a bruise occurring when someone falls and hits the rim of a water closet. However, the placement of the bruise was such that the victim would have had to fall in the exact position onto the bowl. The bowl opening is also small, as we previously identified—14 inches wide. If someone fell and received such a bruise, or had convulsions from taking a drug overdose, you would also expect to see other bruising or bumps on the head. There were none.

Considering the information on the bowl dimensions, the size of the human head and shoulders, the research of past deaths in a bathroom, and the bruise on the neck, it would be easy for a forensic engineer to sit back and think that this is enough to prove that someone drowned in the water closet. However, that's a mistake that cannot be made in forensic engineering. You never stop looking and evaluating.

As the trial began, I started to re-review the crime scene photos and reports. That is when I had an "Oh my God!" moment. As I looked at the photo of the water closet, I quickly realized what I had missed all along. The photograph showed the bowl with vomit still visible—an indication that the water closet had not been flushed.

Codes

I looked closer at the bowl and noticed that the water (and possible lack of routine cleaning) had left a distinctive water level mark. This is a clear indication of where the water level is situated in the bowl. In the photograph, the water level was approximately 1/4 inch below the watermark. This means that water had been displaced from the bowl.

It would be easy to jump to conclusions and determine that the water displacement was from the victim's head being forced under the water. But, again, the job of the forensic engineer is to determine every other possible cause of water displacement. This is where the plumbing code comes into play.

The reason the drainage system is vented is to protect the trap seal. However, it is still possible to lose water in a trap seal with a properly vented system. The first possibility would be that the vent system allowed a pressure fluctuation of 1/4 to 1/2 inch of a water column. This is permitted by every plumbing code. The problem with this consideration was that the watermark in

the bowl would not be located at the upper level. If such fluctuation occurred, the watermark should be at the lower level.

The other possibility was a strong wind condition that created a venturi effect, siphoning off a part of the trap seal. For a venturi effect on most drainage system installations, the wind would have to be very strong—in the neighborhood of 45 to 50 mph. Hence, it was important to check the weather conditions on the morning of the murder or suicide. The investigating detective indicated that there was wind that morning, but only about 10 to 15 mph. Clearly not strong enough for a venturi effect to siphon 1/4 inch off the trap seal.

Next, it was important to determine how much water was displaced in the bowl. When something is forced into the water spot

of the water closet, the water rises on both sides of the trap. At the weir of the trap, the water flows down the drain while the trap seal attempts to equalize. When doing a calculation of the water displacement, it was determined that between 16 and 24 oz. of water was displaced. Using the lower value, that equates to a pint of water. Without saying, imagine how much of your face can account for a pint of water.

All of this information was brought out during the trial. The district attorney used this testimony and the testimony of the other experts to show how the wife could not have possibly committed suicide. He concluded that the husband tried to first drug his wife, and then when she went to vomit the drugs in the water closet, the husband panicked and forced her head under water in the bowl, drowning her.

The jury deliberated for nine hours before returning a verdict of guilty of murder one. All of the forensic evidence assisted the district attorney in proving, beyond a reasonable doubt, that the husband murdered his wife.

As you can see, the codes and standards play an important role in forensic engineering. **PME**

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