



WARREN

The Scientific Method

By Daniel N. Olson, M.S.M.E., P.E., CFEI, CVFI

Whether we are always conscious of it or not, we practice the scientific method every day.

For example,

THE PROBLEM:

- I can't find my keys.

GATHERING THE FACTS:

- I had the keys to get to work.
- I didn't lend the keys to anyone.
- I skipped lunch today.
- I walked to Food Lion to buy a snack.
- I showed my MVP card to cashier.
- My MVP card is on my key ring.

HYPOTHESIS:

- I left the keys at Food Lion.

TEST THE HYPOTHESIS:

- I walk back to Food Lion to find my keys.

NFPA 921, Guide for Fire and Explosion Investigations, Chapter 4, has a great primer on The Scientific Method.

Any of us who work at adjusting, reconciling, or otherwise helping people figure out what went wrong and who is at fault, should regularly review the chapter. The chapter applies to all of us, not just fire investigators.

Lately, I have come across reports prepared by competent and capable engineers and investigators who did great jobs of proving their hypotheses; however, their hypotheses failed when tested with all of the facts.

Case in point: a collision reconstructionist analyzed a car/motorcycle collision with accepted techniques. He concluded that the motorcycle was traveling so fast and was below the crest of a hill and not visible when the car driver pulled out in front of the motorcycle. His hypothesis failed because if the reconstructionist had been correct about the high speed, the motorcycle rider would have come to rest more than 100 feet away.

Second case in point: a fire investigator concluded from his assessment of fire patterns that the origin of a fire in a large articulated loader was in the field debris that had collected under the engine. Note that there are no competent ignition sources in the region that he called the origin. He then concluded that a short circuit in the starter cable, located just above the origin, and subsequent arcing ignited and caused the fire. His analysis "proved" his hypothesis but did not adequately rule out the ignition of field debris by the engine exhaust. In that case, the short circuit would have been a result of the fire and not the cause.

We may have facts that support and "prove" a hypothesis; however, the hypothesis must be tested with all of the facts available.