

# The Power of Words

By **Kevin Rokosh**

As one of Transport Canada's radar engineers I went to the London (Ontario) radar site to do some set-up work. Ontario Region's lead project technician, Dan Epple, was helping me.

Naturally we still had concerns about the combiner slabs. A failing slab would crackle and pop, sounding like it had slices of bacon frying inside. I suppose a piece of burned out micro-strip didn't look too much different from a slice of crispy bacon either.

Like most radio transmitter installations, the radar site was a noisy place. Huge, loud HVAC units ran noisy blower fans to cool the equipment.

To listen for the crackle and pop of a failing combiner, I had to move in close. I squeezed behind the radar transmitter cabinet, put my ear to the cabinet and listened. Dan was watching from behind my back.

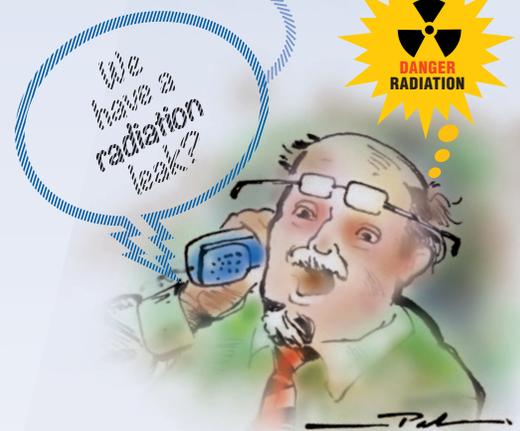
I didn't hear anything from the combiner. But I did hear the sound of snapping static coming from somewhere else. At its top, the combiner slab transitioned to a rectangular waveguide. I reached overhead and put my hand on it.

"Whoa!" Dan shouted. A big white arc of electricity jumped out of a waveguide joint to one of its holding bolts. We had an electromagnetic (EM) radiation leak, almost literally on my hands.

Immediately Dan backed out and shut the system down.

We found a few loose bolts on that waveguide flange joint. We easily tightened them, but couldn't simply turn the system back on and continue our work. We needed an EM field meter to probe around the joint to make sure it wasn't still leaking. An EM field meter is not standard equipment for a radar site. We had to phone around to find one.

Within about two hours, the phone rang at the site and I answered it.



"It's Atomic Energy Canada here. We understand you've had a radiation leak and need some help."

I paused to think about what I just heard. "No, no. Not a nuclear radiation leak. We've had an electromagnetic radiation leak. Very different and not so grave."

It took a little more talking, but I was able to reassure the caller we didn't need any help from Atomic Energy, and thanked him for his concern.

As I recall, by the next day we were able to courier an EM field meter from my headquarters in Ottawa. A little later than expected, we verified that the waveguide joint was well sealed.

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This little story was one of the lessons I learned about the power of words. It helped pique my interest in working more with words. So today, I've moved on from hands-on engineering work. Now I help engineers make themselves clearly understood when communicating to other engineers or industry professionals.

And if I'm ever struggling to explain a critical concept — and need motivation to find just the right words — I recall that day at the London radar site. I remember how I was almost greeted by a posse of hazmat suits at a radar shelter door. All because of a few misinterpreted words! ■

For Kevin Rokosh's biography, please see link.



*If you've ever been in a conversation and you didn't quite grasp the meaning of a few words, then you know how frustrating that can be.*

*Maybe you knew the words, but in that context they meant something different. That's one of the strange things about the English language. The same words can carry quite different meanings.*

*Let me tell you what happened when a word shifted context when I was tuning up a radar site in the early 1990s.*

**T**RANSPORT CANADA was commissioning the world's first solid state transmitter radar system for civilian air traffic control. Up until this time, radars used tube-based technologies to generate high power radar pulses. Transport's RAMP system used 14 solid state amplifier modules, all running in parallel. A six-foot by three-foot passive slab of micro-strips combined the outputs of these amplifiers into one coherent 28kW pulse.

But the original design of the combiner slab had a flaw. Part of its internal cavity would arc-over and burn up its micro-strip. Raytheon, the system designers, solved the problem and delivered re-worked combiners to the field.

**N.Ed.** "Experiential Learning" shares the real-life lessons of our readers that only experience can teach. If you have a tale to tell, then target it to Bruce Van-Lane, Editor-in-Chief, [vanlane@ieee.org](mailto:vanlane@ieee.org). It can be about your "schooling," or that of a colleague's — all we ask is that it be **true!**