Investigation: Set Up to Fail? Some Say WV's New Radios Are Flawed

Posted: 11:18 AM Jul 10, 2008
Last Updated: 11:34 AM Jul 10, 2008
Reporter: Mike Waterhouse
Email Address: mike.waterhouse@wsaz.com

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CHARLESTON, W.Va. (WSAZ) -- Reports say that the same multi-million dollar digital radio system that West Virginia is currently implementing could fail during emergency situations. One post-incident report out of Virginia claims the failure of the radios contributed to a firefighter's death. The concerns have some in Kanawha County taking proactive measures to make sure that doesn't happen here.

Kanawha County Emergency Operations Center Coordinator, Dave Erwin, tells WSAZ.com that the county is aware of reports of radio problems in other states that use the same Motorola P25 digital system that West Virginia has in place. Those reports mostly pertain to the inability to hear radio transmissions in high-noise environments, and radios receiving "out of range" signals when inside buildings.

The national reports are making their rounds with concerned firefighters in the Kanawha Valley, although not everyone is included in the discussion. One of those not in the loop is the president of Kanawha County's Metro 911 Board. Kent Carper tells WSAZ.com he is not aware of any issues with the digital radios nationally. Still, Erwin says the 911 center is working on the issue.

Digital Radio Studies and Reports

The International Association of Fire Chiefs (IAFC) recently studied the differences between analog and digital radio systems after departments brought their concerns to the organization.

In its interim report dated May 2008, the IAFC found that analog communication was more intelligible than digital in 6 of 9 high-noise environment tests. It has come up with a "best practices" guide for users of digital radios and is working to develop audio-intelligibility standards. (read the report here)

Without a current standard in place, the IAFC came up with this desired outcome for digital radios: "Analog voice intelligibility quality or better in digital radios, particularly in those areas tested where firefighter communication is paramount to their survival."

MRT, a Mobile Radio Technology publication, reported that the Prince William County Department

of Fire and Rescue in Woodbridge, Virginia, released a report that claims problems associated with the county's digital radio system contributed to the death of one of its firefighters. (read the article here)

And in Indianapolis, Indiana, TheIndyChannel.com has reported that that firefighters have questioned the safety of the their digital radio system, and have asked the county to delay their switch from analog to digital. (read the story here)

Kanawha County's Digital Radios

Erwin says the technology in the radios that recognizes and converts a person's analog voice into a digital signal hasn't been perfected yet, but he says the state has been lobbying radio manufacturers to come up with a fix.

"I feel the manufacturers are working hard," said Erwin, who also sits on the state's Interoperable Working Group, the organization that oversees the statewide radio network.

High noise environments are common for firefighters, who often use saws, pumps, fans, and generators while working at emergency situations.

It's a matter of the radio manufacturers writing new software for the radios and then uploading it to each radio, says Erwin. One company, EF Johnson, claims to have a fix for the high-noise issue, but Erwin says he wants to see how it does in field tests.

Only three radio manufacturer's radios are currently permitted on the state's network: Motorola, EF Johnson, and Kenwood. Erwin says he's confident that once one comes out with a solution, the others will quickly follow.

He says despite these concerns from departments in other states, tests completed by the city and county show the new radios did "as good as, if not better than, the current analog system." Erwin added that the clarity of the digital radios is a significant improvement over analog.

So, on July 1, 2008, the Charleston Fire Department switched over to the digital radios. The only other agency that had been solely using this system in Kanawha County up until this point was the Charleston Police Department Traffic Division.

"The benefits of the new radios far outweighed the risk," said Erwin.

Erwin says he and the fire department were aware of the issues, but they conducted their own tests of the radios in a high-noise environment – and found that there was little difference between analog and digital.

Assistant Charleston Fire Chief Steve McClure says converting to digital has been a 5-6 year process – and all of the department's concerns were addressed during testing. However, he said they're able to switch back to the old system in a matter of minutes, if necessary.

"We're still on a learning curve," said McClure.

The radios actually work better for building penetration, according to Erwin. He said that while the analog radios had no coverage inside the Diamond Building on Capitol Street, the new radios work everywhere inside the building except in a metal elevator shaft. Similar coverage differences are seen

in the state capitol complex, too, according to Erwin.

McClure also says the benefits of the new system far outweigh the cons, but he understands the concerns of others.

“Anything new is going to be met with resistance,” said McClure.

The other alleged problem with the radios is the "out of range" indicator.

Erwin says he has a workaround for Kanawha County that will ensure that emergency crews will be able to communicate with each other while at the scene of an incident. He is in the process of applying for low power licenses through the FCC to add analog mobile-to-mobile channels to each radio. This means that once crews are at the scene, the radios will not need to communicate with the tower in order to transmit or receive radio signals. Communication to and from dispatchers will still be handled through the digital system, says Erwin.

He said he's applying for 10 frequencies to be shared between police, fire, and EMS, and expects it to be rolled out within six months. The cost of each license is $700.

Erwin, however, considers this a temporary measure until all of the bugs are worked out.

He estimates the county will be fully digital within 3-5 years.

Local Firefighter Concerns

A 23-year veteran of the Sissonville Volunteer Fire Department, Tom Miller, says the digital trunked system that the state of West Virginia is rolling out was never designed for everyday use.

"It was designed for inter-agency communication during federal emergency levels three, four, or five," said Miller. "I have a problem switching over to a system not made for day-to-day operations."

Miller says there are too many unknowns and red flags raised about the digital radio system to be proceeding with further implementation.

When informed about the county's plan to use analog channels as a solution to one of the problems, he admitted it would help, but insisted that a workaround was just covering up a problem with the radios.

"I don't want to find out it doesn't work while on an emergency," said Miller.

Miller says he counts five firefighter deaths in the United States linked to digital radio problems.

"Do we want the sixth to be in Kanawha County?" said Miller. "I am greatly concerned for the safety of firefighters and emergency personnel in Kanawha County."

Why Digital is Inevitable

Erwin says two things have contributed to the start of a digital statewide radio system: 9/11 and FCC bandwidth allocations.

For 9/11, he says firefighters and police officers in New York were not able to talk to each other on the radios when two planes crashed into the World Trade Center. The new system will allow any

agency anywhere in the state to communicate with any other agency anywhere else in the state.

Erwin says the FCC is mandating that radio signals take up less bandwidth, or space, by the year 2013. While analog signals are able to transmit at the new restriction, he says any other further constriction is not possible with analog -- but is possible with digital.

WV's Interoperable Radio System

Governor Joe Manchin announced the statewide radio project publicly at a news conference on December 20, 2006. The system consists of tower sites around the state that are linked together and allow any emergency personnel with a radio to contact any other agency in the state without any other special equipment. The towers are linked via microwave radio signals.

Erwin says the main server for the system is in Harrison County. This means each time any user in the state presses the talk button, their radio communicates to the central system in Harrison County, where the server assigns the radio a frequency and gives it clearance to transmit. This happens in a split second. He says there is a backup to this server in Kanawha County.

This setup is referred to as a trunk system. The concept of such a configuration has a set number of frequencies and assumes that not every agency using the system will transmit at the same time. Each agency doesn't have its own assigned, dedicated frequency like they do in the analog world. Instead, the system dynamically assigns a radio to a particular frequency every time a radio user presses the talk button.

The main benefits for agencies to move to this new system are: inter-agency communication and towers that are maintained by the state. Up until this point, each agency has had to service its own radio equipment, according to Erwin.

“It certainly benefits everyone to be able to talk to each other, especially during emergency situations,” said Joe Thornton, Deputy Secretary for the West Virginia Department of Military Affairs and Public Safety.

Thornton didn’t immediately know of any mandates requiring local agencies to switch over to the state’s interoperable system. Although, he said he believes there would be no issues with day-to-day operations on the system.

"I think it is important to stress our commitment and goal of ensuring emergency situations have effective and seamless communications and an interoperable system, while not flawless, certainly assists first responders and emergency officials statewide and across state borders with the ability to communicate in crises situations," said Thornton. "Communications is critical to the success of any and all operations and we certainly have no desire to implement a system that puts anybody’s life in danger. Continued dialogue among all parties remains necessary as we move forward with the state’s interoperable efforts."

Financially, digital radios cost nearly three times more than analog. That's been one of the biggest complaints about the system, according to Erwin. He says many volunteer firefighters have purchased their own analog radios for about $800, compared to at least $2,000 for digital.

A federal grant paid for each fire department in the county to have at least one radio, says Erwin. Future grants are expected to help provide more radios to emergency responders.

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