



Communicating in the Wildland Urban Interface

By Rick Lynsky & Quinn MacLeod

Communicating during emergency operations is a constant challenge for those in the fire service. Nowhere does that become more evident than during a wildland urban interface (WUI) incident. Structural firefighters who find themselves participating in these incidents for either the first time or very infrequently will likely find the communications environment challenging; i.e., quite different from what they are used to. The good news is there are some basic concepts, terminologies and hardware that can be utilized, thus allowing communications in the WUI to become more effective.



Shawn Winder, Park City Fire District

The following topics will be discussed:

- Frequency Bands
- Hardware
- Frequency Use
- Topography and Distance

Frequency Bands

When multiple agencies come together for an incident, regardless of the nature, one challenge is ensuring that everyone is operating on the same frequency band. On a typical structure fire, the agency with jurisdictional authority typically makes this decision.

With the WUI and the associated topographical obstacles often found in that environment, the VHF frequency band is generally considered the best choice. VHF frequencies are a wider radio wave which offers an advantage when traveling over and around topographical features. It is for this reason that most federal and state agencies, chose to remain on this frequency band.

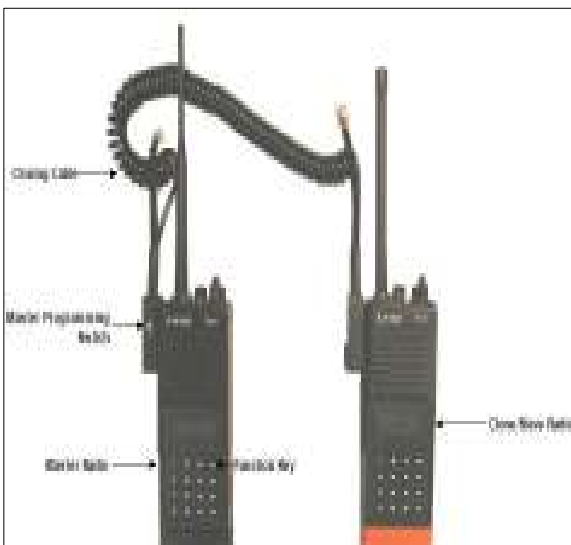
According to Mark Hall with First Responder Communications, many changes are on the horizon, but VHF is likely to be around for some time. One recent change in VHF is the narrow banding of frequencies which creates more channels. Be aware, however, that older radios need to be upgraded or reprogrammed to be able to utilize these frequencies. Narrow banding, along with the advent of digital VHF radios, are some of the ways that technicians can increase the effectiveness and efficiency of this popular radio band. If your agency is apt to respond to fires in the wildland environment and those responses are often on state or federal lands, you will be well served to invest in radios with VHF capabilities. (Reference <http://www.fireradios.net/> for additional information.)



Hardware

Since we still have our “tech” hats on, let’s dive a little deeper into this discussion of VHF and which hardware will serve you best. Portable radios come in every style and configuration imaginable, with the Bendix King (BK) still the most commonly found radio on wildland incidents. According to Hall, the newer models have a vast amount of untapped technology held within which will allow them to work with future system upgrades.

One reason for the Bendix King’s popularity is the fact that these radios are field-programmable, which means that a channel/frequency can be entered directly into the radio by hand. Better yet, a “group” of channels can be transferred from one radio to another via a method called “cloning.” This cloning process requires a “cloning cable” which connects the two radios together and allows the channels to be transferred. Both portable and mobile radios have the ability to hold hundreds of channels which are arranged into groups. Most agencies leave Group 15 blank, thus allowing incident frequency groups to be entered without overwriting a pre-set group.



Another reason to become familiar with the BK radio is that most federal, state and local radio caches consist of BK radios. If you arrive at a larger fire and need a VHF radio, you’ll likely be handed a Bendix King.

A few basic skills you will need to know are:

- Change the radio from one channel group to another
- Enter and delete scan channels
- Set the priority channel

[BK Radio Operations](#) – contains this information.

Frequency Use

The simple fact is that although you may have all the high-tech radio gadgetry in the palm of your hand, a communication error chain can begin from a misunderstanding of the limitations of the channel/frequency you are on. Radios transmit in two modes: “direct” and “repeated.” A direct channel transmits from radio “A” directly to radio “B” and is commonly used as a tactical channel within divisions and in air operations. A



repeated channel transmits from radio “A” through a repeater unit to radio “B,” which allows for a long distance transmission, and is often used as an incident “command” channel when the direct channels are incapable of clear transmission. The basic understanding is that direct channels operate via “line of sight.” Repeated channels are reliant upon the actual repeating unit, and it is not uncommon to have multiple repeater units (fixed or portable) to spread the signal around an incident. Repeated channels are vital in the urban interface. Unfortunately these systems are subject to failure by overuse and improper positioning of the repeater unit itself.

A Note on Repeater Tones: a repeater tone is a sub-audible tone that is broadcast as soon as you depress the push to talk button, which then “unlocks” the repeater unit for use. This allows for the usage of more repeaters. Spend some time with your radio technicians to learn more on this subject. It is important!

If you arrive on an established WUI incident that is being managed by an Incident Management Team (IMT), many of your radio concerns will likely be addressed. The incident will have an assigned Communications Unit Leader who can program/clone your radio as well as answer any questions you have regarding incident communications. A cache of radios will be on hand for those in need. With the arrival of the IMT, a formal incident action plan (IAP) will be produced which will contain the “Incident Communications Plan.” The communications plan will contain the information you will need to know regarding incident communications.

Topography and Distance

Radio transmissions are subjected to challenges presented by terrain variations and distance. Even with the placement of repeaters you will at some point find yourself in a radio “dead zone.” It is important that you are aware when this happens and have a plan to correct the problem. If you find yourself on the edge of the “dead zone” where radio transmissions are intermittent, the following options may be of assistance.

- Switch the transmit power to “high.” This puts more battery power towards transmitting a signal.
- Try a vehicle/mobile radio if available. These radios are more powerful than the typical handheld portable radio.
- Check your battery. If using a clamshell (BK battery case that holds AA batteries) replace the batteries.
- Go to high ground. Sometimes this is as simple as standing on top of an engine, holding the radio higher, or even relocating a few feet away.
- A longer antenna can help, but they are susceptible to breakage. These are sometimes available through the Communications Unit.
- Consider using a person positioned such that they can be used as a mobile repeater, otherwise known as the “human repeater.”

Note: upon return to base camp, notify the Communications Unit Leader of any dead spots you found on your assignment.



Final Thoughts

First the good news. With the advent of mobile repeaters and hardware “technological advances,” communications on wildfires is better than it’s ever been. The bad news is it’s still not perfect! The following tips will keep almost any loss in communications to a minimum.

- Know the “three” key incident frequencies (which are listed on the communications plan):
 1. The division/group tactical channel.
 2. The command channel.
 3. The air-to-ground channel.

- Perform constant radio checks if you suspect your movement on the fire could place you in a dead zone. If you lose communications on your division/group tactical “direct” channel, your next move is to try to get out on the command “repeated” channel. Your third choice, in the case of an emergency is to use the “air-to-ground” channel to relay important radio traffic via aircraft.

- To check if you are in range of hitting a repeater, a simple test can be performed. Press the “push to talk” button briefly, once you release the button, a faint audible “click” should be heard. This brief noise is an indicator that you have unlocked the repeater unit and have a useable repeated channel.



Firefighter safety is and always has been directly connected to our ability to communicate clearly and effectively during difficult situations. The wildland is no exception. The time spent educating yourself and honing your wildland radio skills will keep you and those around you safer in the dangerous environment we call the wildland urban interface.

Rick Lynsky is currently a Battalion Chief for the City of Montebello Fire Department in Southern California. He started his fire service career in 1982 and has a BA in Public Administration and an AS in Fire Science. He is NWCG qualified as a Division Supervisor and Structure Protection Specialist.

Quinn MacLeod, owner and lead instructor of Integrated Fire Solutions, has been in the fire service since 1985 which includes 20 years on the line with the Parker Colorado Fire District. He is NWCG qualified as a wildfire Division Supervisor and holds an Associates Degree in Fire Science along with numerous state and national certifications, including Fire Officer and Fire Instructor.



BK Radio Operations

BENDIX-KING RADIO Basic Operations

Change Groups/Zones

- Press # on Key pad
- Use numbers on key pad to select new group/zone

Add a Channel to Scan List

Move scan selector out of scan mode (selector towards front of radio)

- Select channel with channel selector/knob
- Press “ENT” on key pad
- “SCN” will appear in display (solid – not blinking)

Place Radio in Scan Mode

- Move scan switch on top of radio to back/rear position
- “SCN” in display will blink when radio is in scan mode

Note: simply entering a channel into the scan list does not mean the radio is scanning. Radio must be switched into the scan mode.

Remove a Channel from Scan

- Move scan selector out of scan mode (selector towards front of radio)
- Select a channel with channel selector/knob
- Press “CLR” on key pad

Add Priority Scan Channel

- Select the channel you wish to be the priority channel (set and leave the channel selector/knob on desired channel)

- Move the PRI switch on top of radio to the back/rear position
- “PRI” will appear in the display
- Radio will now scan all set channels with the priority channel being the one the channel selector knob is turned to.

Add Priority Scan Channel – Option #2 (depends on how the priority option has been programmed into the radio)

- Move scan and priority selector towards front of radio (off)
- Select your priority channel with the channel selector knob
- Move scan and priority selector towards back of radio “on”
- Press the “priority” option on the front key pad (PRI should appear in the upper left corner of front view screen)
- To change your priority channel – move channel selector to desired channel and press the priority option on the key pad

CAUTION: During emergency operations, never use the scan mode unless you also enter the channel you are operating on into the priority mode. **YOU MAY MISS CRITICAL INFORMATION BY ONLY OPERATING THE SCAN AND NOT SETTING THE PRIORITY!!!**

Recommended to always have both SCN and PRI switches forward(off) or back (on)



BENDIX-KING
Programming Instructions

1. Turn on radio and verify charged battery (do not program with “LOWBATT” showing).
2. Select desired group by hitting the “#” key and then the 2 digit group number.
3. Push and hold programming switch or short back 2 terminals and “FCN” key. “-- -- ID” will be displayed.
4. Type in “000000” and hit “ENT”. The display should say “CH 00”
5. Enter the desired 2 digit channel number you want to program and hit the “FCN” key.
6. For “RX” frequency, hit “CLR” key, then enter the new freq. and then hit “ENT” key. If the freq. displayed is the desired display, hit “ENT”. To skip to the next step, hit “FCN”.
7. Enter receive Code Guard (normally 000000) and hit “ENT”
8. For “TX” frequency, hit the “CLR” key, then enter the new freq. and then hit the “ENT” key. If the freq. displayed is the desired display, hit “ENT”. To skip to the next step, hit “FCN”.
9. Enter the transmit Code Guard if needed and hit “ENT”
10. If there is a label, it can be cleared with “CLR” or left alone with “ENT”
11. At the CHxx” display, hit “#” to toggle for wide/narrow for that channel.

Note: Normal frequency range is 148.0000 to 173.9975

Double check your frequencies and know what authority they are under

BENDIX-KING
Cloning Instructions

1. Turn on clone master and verify programming and battery condition.
2. Push and simultaneously hold switch on cable connector and “FCN” key.
3. Release keys and type in “000000” and hit “ENT”.
4. Hit the “*” key and the words “PROG” should appear and flash.
At this point the clone master is ready to clone to other radios
5. Turn on the clone radio and select the appropriate group by pressing the “#” key and then entering the desired two digit group number.
6. Connect the cloning cable to the radio to be cloned.
7. Hit “FCN” key on master. The radio to be cloned should show “VHF-1” (or similar) in the display).
8. If clone master flashes “PROG” again, disconnect the cloned radio and *turn it off* to set the program in memory. The destination radio is properly programmed. If the clone master flashes “FAIL”, disconnect clone, hit “CLR” on clone master and then “*” to reset clone master into programming mode and try again.

Note: a GPH and DPH master must have the “G” end of the Smart Cloning Cable attached to the clone master. All other masters (LPH or EPH) must have the “E/L” end on the master. If the cable does not have a “G” and “E/L” label, then you can only use G-G, etc.

Programming instructions courtesy of: Mark Hall, First Responder Communications

