

OPERATIONAL RADIO FIELD TESTING QUESTIONNAIRE SUMMARY

1. Was training given on the use of the new digital radio?

YES 16 NO N/A

❖ Was training necessary for all members of your crew?

YES 9 NO 4 N/A 3

❖ Do you think training will be needed each year on the use of these radios?

YES 14 NO 4 N/A

❖ Did the training cover local radio practices, off unit radio issues, and air to ground practices?

YES 12 NO 1 N/A

Comments:

Only in context of normal operations.

I did receive training on the Racal radio before use. I also received an instructional video on a CD, which covered all the basic functions and programmable features. This radio is capable of being programmed in so many ways, that I think it does require training every year.

Training was done on a CD.

I was given basic instruction on the use of the Racal radio and reviewed the training CD. I believe training will have to be reviewed on a yearly basis as this radio is a lot different than the radios used in the past.

Limited training was given. I think training is necessary for all members of the crew. I absolutely think training will be needed every year and it should cover local radio practices.

Yes, with the exception of air to ground practices.

Yes, training will be needed for a few more years.

The training consisted of approximately 4 hours. We went through all local and off unit radio practices, including field programming.

Training is necessary for anyone using new equipment and yes training will be required.

4. Was tailgate training required during the fire season on use of the new digital radios?

YES 11 NO 5 N/A 1

❖ Why was tailgate training done?

Tailgate training should be done during fire season to familiarize every one with radio functions. It was not done.

Trying to figure out use of radio.

Because myself and others were having trouble using the radio.

To compare common problems and learn more.

To troubleshoot problems.

To refresh original training.

Fore review.

❖ What topics needed refresher training?

Everything.

Setup, programming, scanning, use.

How to change tones and program channels.

Scan functions.

Scan functions were somewhat confusing. There are a lot more options and functions to be learned than with King radios.

Programming.

Changing zones.

Changing zones.

Field programming, battery consumption (safety), scan and group modes.
Programming, scanning.
Programming, etc.
Programming.

3. Were all crew members capable of using the new digital radio?
YES 10 NO 4 N/A 1

With proper training.

Yes, all that were issued one.

- ❖ If not, what problems were encountered?

Hi-Lo switch.

Scanning.

Weak transmission, hard to hear.

I was not familiar enough with the radio to show them how to program the channels and tones.

Radios only 2 watts on high and do not reach as far as the King.

Programming, menu functions.

- ❖ Did the radio meet your operational needs?

YES 9 NO 4 N/A _____

Comments:

I was a single resource, but had no problems with the radio.

Not enough tones and channels.

I did get the chance to show someone else how to use this radio. After only a few minutes he was capable of changing frequencies and stepping through the program without any help.

The Racal did meet all of my operational needs.

After some trial and error.

Trans. Only 4 seconds or less, tones must be manually input as opposed to Kings. You have to carry a screwdriver for clamshell. Keyboard needs cover.

It was difficult for all of us to use. I was the only crew member who received training from the radio tech. And the only one that could use it with confidence.

Without remote mic., radio is too quiet to hear. Priority channel was often overridden by other scanned channels, resulting in missed traffic.

Yes, except for the battery life. The radio shuts off at $\frac{3}{4}$ battery when transmitting.

Uses too much battery power and volume is not loud enough.

AA clamshells don't last as long as the King. About 2 to 1 vs King.

3. Was the accessory equipment for the new digital radio easy to operate and effective?
YES 6 NO 4 N/A _____

- ❖ Holster, battery clamshell, detachable microphone, and other?

YES 3 NO 3 N/A _____

Comments:

Holster wasn't swivel, clamshell took too long to change out batteries, detachable microphone was extremely difficult to connect to radio-broke side connector plastic, mic wouldn't stay on.

Everything seemed ok. Cloning cables are tricky to put on.

I did not use the holster nor the microphone yet, but I did use the belt clip which made it very easy to carry the radio.

I do not like the design of the side jack of this radio. To insert a cloning cable a lot of force seems to be needed and I believe this will lead to breakage. A clip/spin type holster would be a nice addition for some applications.

Holster is too bulky.

I broke the latching mechanism on the radio trying to attach the mic. The clamshell is a hassle because of the screws you have to loosen to take it apart.

Detachable mic hard to install.

The clamshell is sometimes difficult to remove.

Clamshell requires tools to open.

Yes, the detachable mic was easy to detach.

Holster was difficult to use with fire shelter around waist, it interfered with movement.

The volume on the Racal is limited and hard to hear around engines. It would help with higher volume capability.

I liked the accessory equipment except for the hand mic. It was hard to attach.

Detachable microphone not easy to fit on radio.

2. How many operational shifts did the batteries last?

½ shift 3 ¾ shift 1 1 shift 7 2 shifts 2 several shifts 1

❖ Was the battery life acceptable?

YES 8 NO 2 N/A _____

❖ Any other issues with the batteries or clamshell?

Comments:

I am looking forward to the new batteries.

Need a pull tab to assist in rapid replacement of batteries.

The batteries on the clamshell lasted a full 12-hour shift for me. I was not transmitting constantly, but I was monitoring at full volume for over the 12-hour shift. I kept the radio on all night and it still transmitted the next day for a few times before having to change the batteries.

The battery life was unacceptable, you have to pack a ton of batteries for 1 shift.

Battery clam is huge, will not fit in chest-pack.

I like the design of the clamshell and the battery life seemed adequate. I also like the visual “fuel gauge” on the LCD.

When batteries are low radio turns off when trying to transmit.

It takes too long for the radio to power up after transmitting.

Battery life was about two shifts and was acceptable. The screws in the clamshell to get it open were inconvenient.

Battery life should last longer.

With the original power setting (1w for low power) the batteries would not even last for a full shift. On ½ W they would last about a shift.

Less than one shift on low power, unacceptable.

The battery life lasted through several shifts until ¾ battery when trying to transmit.

When the battery life read ½ full, you could no longer use the radio, you had to change the batteries, it was misleading.

Batteries lasted 2 clamshells per shift, 2 Racal vs 1 King.

1-2 shifts, battery life was acceptable, no issues.

5. Did your new digital radio come to you programmed with all the frequencies you needed during the test?

YES 7 NO 7 N/A _____

Comments:

Yes and no – tone issue again.

Mostly.

- ❖ If additional frequencies needed to be programmed into the radio for local or off unit assignments, how was this done?

From the Keypad on the radio.

Front panel.

By hand.

On empty channels.

Manually.

Manually, by myself.

Manually

By the user

Programming in the field.

Programmed by myself.

Radio technician programmed.

By hand programming.

Manual and cloning.

Myself.

At the fire.

- ❖ Could you program channels/tones?

YES 16 NO N/A

- ❖ Could you change zones?

YES 18 NO N/A

- ❖ Could you clone the radio without losing home unit channels?

YES 3 NO 5 N/A 8

Comments:

Not enough tones – unable to put all freqs & tones in radio.

The radio was programmed before given to me with 4 banks (Groups). I did want to add more banks into the radio, but it does not have the capability of adding more banks through the keypad. Also, if the radio was cloned, all the original information was lost, there is no capability of only cloning one bank at a time.

The test radio I received came programmed with the frequencies I needed. During a prior test I found field programming, cloning, and zone changing easy to understand and use.

It takes too long for tones.

With some difficulty.

Could program channels/tones with help.

10. While on your unit did you have occasion to call other units-vehicle to vehicle?

YES 12 NO 4 N/A

- ❖ During a wildfire situation, did you conduct administrative and aircraft radio communications?

YES 16 NO N/A

- ❖ Did your crew or you feel the new digital radio operated satisfactorily?

YES 7 NO 8 N/A

- ❖ If not, please give specific examples.

Comments:

Not enough tones/freqs.

I did use this model radio during the Rainbow Incident earlier this summer. It was used to call units in the field, central dispatchers, and other agencies located on this incident. They did not report any difference in audio quality from all the other radios used on this incident. Many repeaters and links were used, this radio communicated well with all the equipment on this incident.

Hi-Low would not switch in many cases, we gave up and just used our King Radio.

I used the radio to contact vehicle to mountain top, and mountain top to mountain top. In those situations the radio performed well.

Not at first, but got better with more studying & understanding.

On an incident it was useless because I could not communicate with my crew & radio is underpowered & cuts out after 4 seconds, then you must wait for power up. I had to borrow a King for obvious safety reasons.

Had a hard time programming frequencies and tones. It's not user friendly.

Overall, yes – the main problem was my priority channel getting walked on and the short battery life.

No, batteries expired too quickly & transmission were frequently inaudible, perhaps due to a weak microphone.

Yes, except for the battery life.

Volume was insufficient and not enough battery power.

I think if you could boost the wattage to 5 watts and increase the volume, this radio would function acceptable.

They were intimidated by the new system at first.

4. Did you use the new digital radio to call dispatch through a repeater?

YES 13 NO 4 N/A _____

❖ Was this during a wildfire situation, for administrative traffic, or another situation?

Wildfire 4 Admin 1 Other 2

❖ Was the experience you or your crew had using the digital radio satisfactory?

YES 8 NO 4 N/A _____

❖ If not, please explain.

Comments:

Not enough tones – unable to put all freqs & tones in radio.

I used the radio to contact a dispatch center and it performed well. The dispatcher did not notice a difference between it and a previous radio. The audio quality was good through the repeater.

I hit repeater but still don't fully understand how to use tones on this radio. I still have a lot to learn about the radio.

As an IC on wildfire I could not make contact, but with a King – no problem.

Too difficult to change tones.

Most of the time I didn't use it, because I couldn't hear it.

Yes, for the most part. Again, it needs to be 5 watt capable & the volume be boosted.

I was happy with the new radio.

3. Did you use the new digital radio off unit with another agency unit or an off unit cooperator?

YES 10 NO 4 N/A _____

❖ Were there any programming issues?

YES 1 NO 12 N/A _____

Comments:

Yes, radio techs couldn't clone it.

- ❖ Were you and the other unit able to communicate satisfactorily to get the assignment completed?

YES 11 NO 2 N/A _____

- ❖ Did you have occasion to contact off unit aircraft?

YES 8 NO 5 N/A _____

Comments:

I used this radio during a law enforcement incident where the dispatch center was not experienced with our equipment. The radio performed well.

Yes, other than volume again, hard to hear in noise situations.

4. Did you use the new digital radio to call an off unit dispatch center?

YES 6 NO 10 N/A _____

- ❖ Was this a wildfire assignment, administrative traffic or another situation?

WILDFIRE 3 ADMIN 1 OTHER 2 _____

Comments:

I used this radio during a law enforcement incident where the dispatch center was not experienced with our equipment. The radio performed well.

2. Was the audio quality sufficient?

YES 5 NO 3 N/A _____

- ❖ Was it clear?

YES 16 NO 1 N/A _____

- ❖ Was it loud enough?

YES 6 NO 11 N/A _____

- ❖ Did you use the radio in a high noise environment?

YES 14 NO 1 N/A _____

Comments:

I did notice a bit of audio problem while receiving a message. It is not loud enough. Even with the new software on this radio, it is still hard to hear in noisy conditions.

I have some reservations about the audio strength of this radio. I had an occasion to compare it to 3 other radios at the same time and there was a definite difference in audio strength. The audio quality was very good with the Racal, but the strength (loudness) seemed to be lacking.

Seemed clearer than Kings.

It was clear when they were close enough, not at all loud enough compared to Kings.

Used it around chainsaws and heavy equipment.

Somewhat muffled.

With a remote mic near your head you could hear, otherwise it was not loud enough.

With the use of the attachable mic the radio was loud enough, but not through main radio speaker. Radio used near pumps and engines.

It needs to be louder. Volume was not sufficient.

Somewhat hollow, echo sounding.

6. Were the switches and keypad usable?

YES 13 NO 1 N/A _____

- ❖ Was the radio easy to change functions i.e. frequencies, zones, tones?

YES 13 NO 2 N/A _____

- ❖ Was the radio easily put into a mode/function that wasn't intended?

YES 11 NO 2 N/A _____

Comments:

PTT Button too small. Too many keystrokes to change functions. Zone switch was easily bumped and changed zones when unintended. Keypad lockout didn't protect the side buttons. No positive detent on volume/on/off switch.

The radio was programmed to easily change banks in the program.

I found the keypad and switches easy to use and understand. I think a standard will need to be written for the programming of the switches to make them more user friendly.

The programmable 3 position toggle switch was moved easily when walking through brush. Keypad and buttons too exposed.

Buttons are easily hit, changing low to high power, changing scan mode, etc.

Needs keyguard.

Yes, very user friendly.

Sometimes the radio was easily put into a mode/function that wasn't intended.

3. Any other suggestions or comments to the fire program before implementation of new digital radios?

Testing them in digital mode, especially in mountainous terrain.

Smaller battery packs, Hi-Low switch. Needs to be better on battery life.

I think that a protective faceplate might be needed in the future if the key lock function is not used. This will help prevent inadvertent keystrokes from resetting functions. A slight redesign on the side jack would also be helpful.

Further field testing. A more comprehensive training program before radios go into the field.

I would suggest numbers on the channel selection knob, better speaker microphone attachment, and the capability to hold more tones. I would like to see it more user friendly and operate more like the King radios we are using now.

Longer battery life, better sound quality, protect buttons from unintentional programming. Improve battery life.

I like the feature that while scanning a zone when called on a channel if answered back within 5 seconds you don't have to change the channel.

Much more training is needed before a full switch over is to occur.

Smaller, if possible, smaller battery clamshells.

More training, at least 2-4 hours.

4. Is there any reason the new digital (P-25) radios should not be used for fire operations?

YES 2 NO 5 N/A

Comments:

Not that I can see at this time.

Not enough tones and freqs for California. Too many keystrokes to program options.

Antenna only threaded in 2-21/2 turns – potential failure. PTT button too small. Keypad & display not protected.

I do not see anything that should prevent us from using the Racal on fire assignments.

Hard to figure. Maybe better training could simplify things. I've only used this radio for 1 assignment for a couple of days. I had to use a King radio at first until I had less critical situation to figure out new radio. I will have more info later in the season. I did study manual & radio for 1 full day before taking it into the field, but found I didn't understand it as well as I should.

I feel it needs some changes before it's used for fire operations. It needs to be easier to program and have louder volume.

With some improvements.

Needs key guard/longer life batteries.

Why the radio doesn't use the full battery life like the King radio. That is the only thing that would be potential bad if an emergency occurred.

Other than 5 watt capable and more volume.

I think that people will be intimidated at first, but I liked the radio and felt that it's range and ease of use was improved.

5. What make and model of radio did you use?

Racal 25

ADDITIONAL COMMENTS AND FEEDBACK, NOT IN QUESTIONNAIRE FORMAT

We outfitted our BLM rangers with 15 Racal radios for their use during the Sturgis Motorcycle rally (happened this week). The rangers are still over in South Dakota, but early word back from them is that they radio worked well; they were very happy. They ran a joint operation one day and had all participants using our Racals, so we had lots of different folks (State, County, Military) with their hands on them. They were programmed with both analog and digital. I hope to get more information out of them when they get back....

Doug King 8/10/01

Ron, I thought I would provide you with some feedback on the new digital Racal radios. On my most recent fire assignment (DIVS) I used the radio for three days on the fireline and experienced no problems with it. As far as coverage, the Racal was as good or even better than the King radio that I was also using. The battery life was one shift of fairly heavy use since I was out on a Type II Team assignment. While this is less than the analog King I found it to be acceptable. Overall, I was very pleased with how the radio functioned and its reliability.

John Gebhard 8/03/01

I thought I would include some tech notes as you review the user feedback questionnaires. Everyone who originally participated received about a 4 hour training session consisting of the Racal P25 video, copies of the programming and then a walk thru of each function of the radio and proper operation of the radio to include keypad programming and for the Hotshots – cloning (I issued them one of our cloning cables to aid them since they spend most of their time off – district). They all were issued Speaker mics with their radios, I do not know if they used them, or went just with the radio speaker. I do believe the Hotshots rotated one of the radios to an individual that was not part of the original training session, it sounded like he was able to pick it up pretty well in the field- between fires. I issued out 4- to the Hotshots and 1 – FOS for Vale Station and 1 – an Engine driver and 1 – to his crew person. In addition, I issued 1 of ours out to the FCO for the South Half that works with the other Fire personnel. Just from my talking with them over the test time frame, I found that for the most part they liked them, with the FOS wasn't using his as much as he probably should have been for testing purposes. The Engine crew used them exclusively and as did the FCO. I am assuming the Hotshots used them exclusively as well.

Overall I think that battery life is not a big issue, except the need for carrying more batteries and additional expense, but comparing to the rest of the options for portables I feel the Racal has the most battery life. The Audio volume probably the biggest issue from what I read the reviews, in my personal testing I do prefer the speaker mic for audio quality vs the radio speaker and I have not used it in a high noise environment. I do not like that you can still cone the whole radio vs just a

zone, I do believe that is in the works for the next software upgrade. Cloning is extremely easy. Standardization on the programming of the buttons and toggle switches is necessary when everything is said and done, so there are no confusion between District radios and NIFC's to the user when issued a radio on a fire. This is due that the buttons function does not clone over to the new radio.

As for 5-watt power output it is necessary for certain areas on districts operations. I have heard this is in the development for the AA hybrid battery; we have been looking at options for running rechargeable batteries in field conditions.

Dan Hukill 9/05/01

While on the Horse Creed Incident near Imnaha, Oregon, the crew experimented with the new Racal digital radios for line use. During 11 operational shifts some general observations were made concerning the durability of these radios. The first observations was the lack of ease of use. The external mic is difficult to attach and easily broken, first time users can expect to spend 15 minutes attaching the external mic. The external mic can easily be pulled off from the connection point of the radio by snagging the cord on brush and other debris. The clamshell attachment with the screws on the bottom is time consuming to take off, reload with batteries, and replace. This procedure takes 5-7 minutes. The antenna assembly will not stand up to extended fireline activities due to the "cable like" receiver on the radio itself, it will eventually break and become useless. The external knobs will break off when dropped or impacted and need to be shorter and less exposed. Upon programming the radio the screen is "cluttered" with too much information and needs to be simplified. The buttons on the top and side of the radio are sensitive to any stimulus and can be "activated" or "de-activated" by brushing them against rocks, brush, trees, and radio bras. This inadvertent button activation or de-activation can change channels or programming with the operator being oblivious to the status of the radio. This in my opinion the most dangerous problem the radio has for fireline use, for without constant and reliable communications on the fireline the safety of the crews is compromised. If the Racal radios are implemented for use on fires it would be a violation of our LCES standard. Communication is the backbone of all safe and effective fireline activities and must not be compromised in any way shape or form!!

Diamond Mountain Interagency Hotshot Crew

SUMMARY OF PROBLEMS ENCOUNTERED USING THE RACAL H.T.

PROBLEMS	COMMENTS
1. User Friendly Controls	Symbols on buttons and LCD are confusing to operator. Keep it simple with written descriptors.
2. Battery Life	No better than King radios.
3. No Protective Cover	Face plate cover needed to protect buttons from being inadvertently manipulated.
4. Tone Guards	Only can enter 7 need 8 for all Federal Tones.
5. External Mic	Hard to attach and detach without breaking.
6. Control Knobs	Need to be numbered in case LCD screen becomes blank. Noticeable detent for on/off indication.
7. Radio Mic	Useless when utilizing a radio chest harness. Low volume when receiving calls and when transmitting sounds like your at the bottom of a toilet.
8. Side Buttons	Are extremely easily manipulated and can be accidently activated or de-activated.
9. Antenna	One and one half rotations will remove the antenna. The antenna receiver is delicate and susceptible to breakage.
10. Clamshell	Difficult to remove (need screwdriver) to load new batteries.
11. Squelch	Difficult to control need to enter the programming mode to access and adjust for each frequency.
12. Priority Channel	Inoperative!!! Only has priority scan needs to have priority only so the priority will override all other traffic. The current priority scan caused us to miss traffic that was meant for us.
13. Scanning	Trying to listen to any lengthy conversation or message is difficult because scan sequence cuts out short segments of the message, this is definite safety concern!!!!

14. Volume	Extremely low volume on the radio speaker and the external speaker making the radio virtually useless during aircraft operations and any other high noise level activities.
15. Durability	One of the radios was accidentally dropped. Even though it only fell approximately two feet, both control knobs were broken off the top rendering the radio useless for the remainder of the shift. The knobs are much too weak and too tall.
16. General Communications	While on the fireline we worked with another crew that was also using the Racal radios and found that the range of reception and transmission was very poor, (especially when compared to the Bendix King Radios). We spent a lot of time walking over to them and yelling back and forth to each other to answer the radio. Most of the communication with these units is very garbled and difficult to understand, even when the users are close to each other.
17. Cost	Three King radios can be purchased for the cost of one Racal radio.

It is the opinion of the Diamond Mountain Hotshots that these radios are not suited for fireline use and should not be considered for replacing the current Bendix-King radios. The negative aspects of the Racal Digital Radio greatly outweigh any positive benefits this unit may offer wildland firefighters.