

Predicted Service Life of Wideband Mobile Radios in BC.
Results of a telephone survey of BC radio shops

Craig Evans RFT

Allan Bradley RPF, PEng

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Introduction and Background

In 2012, during the testing of the RR radio communications protocol in two areas of British Columbia, the BC Radio Communications Working Group became aware of potential radio communication problems that could be caused by the use of pre-1997 wideband mobile radios on radio-assisted resource roads. The communication problems included degraded reception with a narrowband radio (e.g., static or reduced volume) when it receives calls from wideband radios.

Pre-1997 wideband radios are only capable of transmitting and receiving a **wideband** radio signal¹ (hereafter the report refers to these radios as wideband radios). Narrowband radios (that is, radios capable of transmitting and receiving both **wideband** and **narrowband** radio signals) were introduced in 1997 and became the standard technology for Canadian mobile radios in 2004. Since 2004, wideband mobile radios have been considered non-standard and, therefore, are neither specified in regulations nor distributed by radio companies. However, they are still legal for use in Canada but may have a potential to interfere with narrowband radios using the RR radio channels.

It is expected that after the RR radio communications protocol has been implemented (starting in June 2013), there will be still be a number of users of radio-assisted resource roads who have not upgraded to narrowband compatible radio equipment. This could compromise the safety of those who are compliant with regulations and are operating in narrowband. In June 2012, the BC Ministry of Forests, Lands and Natural Resources (FLNRO) directed FPInnovations to assess the potential size of the issue by quantifying the number of in-service wideband mobile radios on BC resource roads and their expected remaining service life. It is anticipated that the number of wideband mobile radios will decrease with time due to equipment breakdowns, limited parts availability, and high repair costs.

Study Method

In the summer/fall of 2012, FPInnovations conducted a telephone survey of select radio shops (radio suppliers) located throughout BC. The radio shops were recommended for the survey by spectrum managers in Industry Canada's three BC regional offices. These radio shops were recommended on the basis of them having good rapport with Industry Canada and being deemed to be reliable sources of information. A telephone survey questionnaire about wideband radio models, in-service population, and service life formed the basis for discussions. The questionnaire comprised the following questions:

1. How many wideband-only mobile radios are used in the area on vehicles known to use resource roads? (That is, how many wideband mobile radios are actively being serviced for use on resource roads?)
2. Which wideband-only radio makes and models are serviced in your shop?

¹ Wideband radio frequencies occupy 15 KHz of radio spectrum and narrowband radio frequencies occupy 11 KHz of radio spectrum.

3. What is the expected service life of each model (that is, how long can you keep these radios working)?
4. Are parts that are critical to the radios' operation still available? (If yes, which parts?)

Results & Discussion

FPIInnovations surveyed 21 radio shops in BC, representing an estimated 18% of the Provincial total. Shop owners and service technicians were questioned specifically about wideband mobile radios belonging to resource industry companies (e.g., forestry, oil & gas, and mining) because these industries were judged to be the most likely to use resource roads.

Numbers of wideband mobiles

A large number of wideband mobile radios are estimated to be in service on resource roads in BC. The radio shops surveyed in seven BC regions (not including various remote locations and the Okanagan region) estimated a total of 18650 wideband radios were in use by resource industries. The shops in the Lower Mainland estimated only 20 wideband mobile radios are currently used by local resource industry companies. In comparison, radio shops in the Peace River area estimate the local population of wideband mobile radios at 170, Kootenay area shops estimate 210 units are in-service, and Fraser Valley shops estimate 600 units. Other areas in BC estimate there are much larger populations of wideband mobile radios currently used by resource industries. The Northern Interior shops estimate 7550 wideband radios are in use, Vancouver Island shops estimate 6600 units in-service, and Cariboo area shops estimate 3500 wideband radios are in use by resource companies (Table 1). The amount of resource activity happening in each area (especially forestry dependent regions), had an impact on the number of wideband mobiles that have not yet been upgraded. The Peace River area, not surprisingly, had low numbers of wideband radios because of local compliance with the RR radio communication pilot. Similarly, Vancouver Island has high numbers of wideband mobile radios in use in areas not included in the RR radio communication pilot in the BCTS's Strait of Georgia Business Area.

Table 1. Summary of resource industry wideband mobile radios, by region

Region	Approximate number of wideband mobile radios still being used and serviced for resource work in region	Approximate % of radios serviced in regional shops that are wideband
Vancouver Island	6600	23%
Northern Interior	7550	30%
Cariboo	3500	25%
Fraser Valley	600	30%
Peace	170	2%

Kootenay	210	3%
Lower Mainland	20	0.5%

The percentage of wideband units serviced by radio shops and used by resource companies was very small in some areas (0.5%, 2% and 3% for the Lower Mainland, Peace and Kootenay, respectively) and considerable in other areas (30% for the Fraser Valley and Northern Interior, and 25% and 23% for the Cariboo and Vancouver Island regions, respectively). One Vancouver Island shop estimated that for every piece of forestry equipment in the bush, there are three wideband radios in the crew transport vehicles and shop trucks supporting it. Fraser Valley radio shops estimated only 600 wideband radios were in-service in that region, however, they serviced the highest number of wideband radios from other regions of the province.

The radio shops were asked to identify the wideband mobile radio makes and models that they were currently servicing or had serviced within the last few years, and that belonged to resource industry companies (Table 2). Respondents could readily report which radio makes they serviced, however, sometimes they were unable to recall the associated radio models. Table 2, therefore, includes radio models that the shop respondents could recall servicing and other wideband models that might have been serviced. The most common mobile radios serviced were Motorola TM100 and TM300 wideband radios, however, other common units included Midland Syn-Tech Series radios, ICOM 360 radios, TAD M8 radios, and Kenwood TK-730 and 760 radios. Vertex brand radios, of an unidentified model, were also reported.

Table 2. Wideband mobile radio types serviced by radio shops and used by resource companies

Make	Models Serviced	Other models possibly serviced
Motorola	TM100, TM300	M120, M206, M214, M216, MARATRAC, MAXTRAC, MITREK, MOSTAR, SM120, SM50, SPECTRA CONVENTIONAL, SYNTOR, or anything with tubes.
Midland	Syn-Tech Series	Generally, any Midland mobile radio with the 10-pin programming port behind a rubber plug on the RF deck.
ICOM	360	
TAD	M8	
Kenwood	TK-730, TK-760	TK-705, TK-706
Vertex	unidentified	FTL-Series, FTH-Series

In the regions with the highest number of wideband mobile radios (i.e., Northern Interior, Vancouver Island and the Cariboo), resource companies tend to work on a limited number of resource roads, never use their radios anywhere else and, therefore, require only a few radio channels. Since channel capacity is not an issue and there is no directive to upgrade their radios these resource road users tend only to upgrade their wideband radios when they can no longer be repaired. In exception to this, however, larger forestry and other resource companies operating in the Cariboo and Northern Interior regions generally have upgraded to narrowband mobile radios.

The radio shops reported that their clients are prepared to replace their wideband radios when directed to by Industry Canada. Radio shops have warned their clients for several years to plan for it and they all know the directive will eventually come.

Remaining service life of wideband mobiles

Radio shops predicted that the remaining service life of wideband mobile radios was between 5 and 10 years, with the average for all responses being 6.5 years (until 2020), with infrequently used units or Midland models expected to have longer service lives. All of the radio shops reported using spare parts to enact repairs to wideband mobile radios. Depending on the problem, some aftermarket parts were also used for repairs. Wideband radio serviceability is hampered by: the need for obsolete equipment to support the programming requirements of older units, the lack of training needed to repair and program units, and a lack of support documentation available from the radio manufacturers.

All of the radio shops indicated strong resistance to programming the RR channels into a wideband-only radio out of concern for creating interference problems and because this is prohibited by Industry Canada. The likelihood of individuals self-programming their wideband radios with the RR channels is believed to be remote. These older radios are difficult to re-program and the programming equipment and software is not easy to procure.

Most radio suppliers indicated that if the cost of a wideband radio repair exceeded 50% of the cost of a new narrowband radio, they would recommend replacing the old radio.

Wideband - narrowband compatibility

Radio shops also were asked whether there might be wideband-narrowband compatibility issues for RR channel users. In general, only two issues were anticipated:

- a wideband radio call to a narrowband radio may sound fine but the return call may sound quieter.
- depending on make, a wideband radio call to a narrowband radio may contain a lot of static. For example, one radio serviceman commented that *“Midland radios may overpower a narrowband receiving unit and cause static in the received signal. However, this problem is less likely with Motorola units because they have a more effective noise cancelling feature in the microphone circuit”*).

Conclusions

There are many wideband-only mobile radios still in use on resource roads in BC. Radio shops from seven of BC's regions estimate 18650 wideband mobile radios are in use on resource roads in their areas. The remaining service life of these wideband radios was estimated to be, on average, 6.5 years (until 2020), with infrequently used units or Midland models expected to have longer service lives.

Clients generally are prepared to replace their wideband radios when directed to by Industry Canada. Radio shops have warned their clients for several years to plan for it and they all know the directive will eventually come. All radio shops indicated strong resistance to programming the RR channels into wideband radios. The likelihood of individuals self-programming their wideband radios with the RR channels is believed to be remote.

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