The most common question we get asked about our Hammo-Cans™ is “How long will I be able to operate,” or put another way, “What size battery do I need?”

By size, in this case we mostly mean its capacity in Amp-Hours. To oversimplify, a fully charged 12 Amp-Hour battery should be able to power a 1 amp load for 12 hours until it reaches its “terminal voltage” — often defined as 10.5 Volts.

Estimating the required capacity in Amp-Hours is not too difficult. You'll need to know your radio's current draw in both transmit and receive; the percentage of time in transmit vs. receive you expect; and what modes you plan to operate. Let's work through a few examples.

As a rule of thumb, a typical 100 Watt HF radio draws 20 Amps of current at full power on transmit, and 2 Amps on receive. Similarly, a 50 Watt FM mobile radio might draw 15A on transmit, 2A on receive. We'll use these figures -- but check your radio's manual for the specs on your particular model. Note that by lowering the power output, you'll draw less current on transmit. However, it's not a direct correlation. Cutting the power in half might mean a 15A draw instead of 20. Still, your battery will last longer. And after all, we're supposed to use the minimum power necessary in any case.

What percentage of the time do you expect to be transmitting? I'm sure you understand that your radio draws maximum current only while you're transmitting. If you're running stations in a contest, or serving as a very busy net control, you might approach 50% transmit time. If you're making some casual DX contacts and tuning around in between them, it may be 10%. If you've been assigned a post along a road race, or at an emergency shelter, you may just need to check in once or twice an hour with a brief status report. That's probably 5% or less transmit time.

Your operating mode can have a big impact on battery life, too. FM voice (and most digital modes) are "full carrier" -- that is, when the radio is in transmit it puts out full power regardless of whether you are speaking into the mic. SSB, on the other hand, only pushes the radio to full power out on very hard voice peaks. You can watch the needle bouncing up and down as you speak! A conservative estimate would be 50% of full power as an average. Similarly, CW is a full carrier mode. But by nature of its on-off keying, you can assume 50% average power here too.

So let's take our typical HF radio on a casual DXing afternoon in a local park. We'll leave it set at full power -- 100W -- use sideband, and assume transmitting 10% of the time.

On TX: 10% of 20A = 2A. But remember that since the SSB duty cycle is maybe 50%, our average current draw on transmit is about 1A.
On RX: 90% of 2A = 1.8A, and there's no duty cycle correction on receive.
So our overall average draw = 2.8A.

Here's a second case: You'll be acting as a moderately busy net control for a charity bike-a-thon. Let's assume 20% transmit time with your 50W FM mobile rig.

On TX: 20% of 15A = 3A. FM is full carrier, so no duty cycle correction.
On RX: 80% of 2A = 1.6A.
Overall average draw = 4.6A

The above examples might lead you to conclude that with a 35 Amp-Hour battery, you could chase DX for about 12 hours, or run your net for about 7 hours. But there's one other factor you need to consider. Many, if not most, radios are specified to operate properly at 13.8 Volts, plus/minus 15%. On the low end, that's 11.73V. But that 35AHr rating assumes taking the battery down to about 10.5V. Many radios become quite unhappy once the voltage gets below 12V or so. Others will work fine, particularly with reduced power output, at lower voltages. You'll need to take that into account when selecting your battery. In fact, if battery/portable operation is an important part of your planned Ham Radio activities, you may want to consider this before purchasing a new radio.