

Marine HF SSB Antenna

Almost any thing will work to some extent. Just like you or your Dad using a coat hanger and foil for your TV antenna, but an antenna that works well should have these properties:

1. It should present an impedance that is compatible with your antenna tuner at the desired frequencies.
2. It should have minimal Resistance loss.
3. It should have good insulation to avoid arcing to supporting or other structures near the antenna.
4. It should have the desired radiation pattern.

Impedance: Although this parameter is measured in ohms it is not the same ohms that most are familiar with. It is a complex function of voltage current and their relative phases. The main factors that set the impedance are frequency, length, and proximity to other conductors. As you may remember when following installation instructions, an antenna length that is a multiple of the half wave length of any desired frequency should be avoided. The reason for this is that in theory, a half wave antenna has a very high impedance at the feed point and it may not be possible for your tuner to correct it.

Resistance loss. Small gauge wire should be avoided as there are significant currents flowing in an antenna. When current flows through a resistance it will generate heat. This heat is a loss in energy that would have better been spent radiated as radio waves out of your antenna. Likewise when receiving, energy in the antenna is best sent to the receiver than spent as heat in the antenna. Note that connections can be a significant point for resistance.

Arcing: This issue is most significant while transmitting as voltages along the antenna can be very high. This is the main reason GTO wire is recommended as the conductor between the tuner and the main antenna. I used the term “main antenna” to remind you that this conductor is part of the antenna. The insulation on GTO wire has a very high voltage rating where standard wire is rated at about 600 volts.

Radiation pattern: Antennas transmit and receive more energy in some directions than in others. On a vessel the desired direction is upward about 45 degrees and 360 degrees around the vessel. This pattern would resemble a dough nut with the boat located in the hole. It does little good to radiate or receive from straight up or down towards the water. Determining the radiation pattern is complex and a function of the antenna length, height, orientation, proximity to other conductors.

Considering all of this, what makes a good antenna installation:

1. Avoid antenna length that is a multiple of the half wave length for frequencies you want to use. Remember that the conductor from the tuner to the base of the main antenna is included in this length. Over length should be at least 20 feet especially if you expect to operate on the 2000kHz band.
2. If not using existing standing wire, use at least 14g wire. Make sure connections are good and will resist corrosion.
3. Use good insulators and high voltage wire for any segment that is near another conductors including wood or damp fiberglass.
4. Select a space for the antenna that is free of nearby conductors like standing rigging and mast. On my boat I had a wire rope topping lift that would swing while sailing and I found that it would react with my back stay antenna changing the impedance as it would swing.