



FEEDBACK

The Official Newsletter of the
Georgian Bay Amateur Radio Club

April 2017

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Message from the President

To all GBARC members,

The time of year has come when we start to prepare for a series of interesting upcoming events that will take us through the summer. The biggest one on the immediate horizon is the Annual Field Day June 24th and 25th that we will host again on the Bayshore grounds in Owen Sound. We have some interesting plans to be able to demonstrate to the public ham radio digital capabilities as well as the ease with which to communicate on phone, near and far. We will even deploy an NVIS antenna like the one we demonstrated and talked about at our last meeting that all appeared to find very interesting. This is an opportunity if you do not have access to a HF radio to just get on the air. I have found these events to be educational as well as getting hands on experience with contesting. Yes Field Day is a contest for most groups and I would say that we do not approach it as a contest we must win. We are there for the experience and social aspect the event brings while enjoying the many aspects of the hobby. There is some preparation work that we will need to cover over the next 2 months to get ready. Some of it is educational to get folks familiar with what goes on to set up an emergency radio station, to software that is used to log contact and the procedures that are followed to hunt and peck for contacts or find a static frequency to get others to contact you. Each has its own challenges and joys you will find enlightening if you have not been to Field Day before or return as a regular.

You are all welcome to join in at any phase of the weekend event to get experience that you are looking for. In order to have an idea on numbers of folks looking to experience set-up a station from scratch, manning the radios and teardown at the end, just register on the GBARC site when you have a moment letting us know what phase and times you would be available. This way we will be able to ensure you get the experience or hands on radio time you are looking for. I can assure you from my personal experience, you will enjoy the time spent at Field Day and may find yourself struggling to leave with many interesting things going on. Come out and see if you are the one this year that makes the prestigious contact with a US Navy ship, LAX Airport or one of the many others. Look forward to seeing you there.

Cheers and 73's for now.

Frank Gufler

VA3-GUF / VE0-GUF / VE0-VET

Announcements

Join the Fun Net control stations are needed for the Wednesday 2 meter net on VE3OSR. Please consider volunteering an hour of your time once a month performing net control duties. If you are an ARES member it is good experience conducting the net as it gives you practice with procedures and allows those who have not done this before to gain some confidence speaking on the air. There are suggested net control guidelines for you to use. <https://www.gbarc.ca/netcontrol.php> For more information contact Rick VE3US either at this email address ve3typ@gmail.com or by replying to this mailing or by posting a message on the forum.

Huron Shores Ragchew Sunday at 7:00 PM or 19:00 hours on frequency 3.775. All amateurs are welcomed. The gift of gab will continue for as long as any one has nothing else to say. This is not a formal net but a ragchew. The moderator will be VE3US. Join us.

Emergency Preparedness Week May 7 to 13, 2017

Emergency Preparedness Week (EP Week) is an annual event that takes place each year during the first full week of May. This national event is coordinated by Public Safety Canada, in close collaboration with the provinces and territories and partners.

This year, the theme is Plan. Prepare. Be Aware. It is meant to help Canadians take action to protect themselves and their families during emergencies. [\[Read More\]](#)

VE3OST Repeater 146.895- Is on the air at the QTH of Bernie VE3BQM. The repeater is under test while various issues are taken care of. This is in preparation in moving it to Woodford at the QTH of Tom VA3TVA.

Estate Sale of Gerry VA3BWZ – Check out the forums for listings of equipment from Gerry's estate, more will be added as time proceeds. There is a free tower, spider beam and rotor. ***Bobby VE3PAV is looking for some help in taking down a tri-band beam and second tower.***

NEW Vice-President – Tom VA3TVA has volunteered to be our VP for our current term. Many thanks and welcome aboard.

Minutes of GBARC Meeting

28th March 2017

Meeting called to order by Frank VA3GUF at 19:00hrs

Attendees (Executive)

Frank VA3GUF, Bernie VE3BQM, Tom VA3TS, Doug VE3WRF, Christine VA3CAO, Scott VA3EXO, Bobby VE3PAV, Philip VE3QVC, Adam VE3IZS, Paul VE3EFQ, Tom VA3TVA & Beth, Ian VE3MUD, Greg VE3NXB, Leigh VA3GFO, Carson VA3OSO, Maureen VE3MIO, Greg VE3RQY, Natasha and Maryam

Do we have a Quorum-YES

A QUORUM SHALL CONSIST OF AT LEAST THREE FULL MEMBERS IN GOOD STANDING WHO ARE NOT MEMBERS OF THE EXECUTIVE COMMITTEE, PLUS AT LEAST THREE MEMBERS OF THE EXECUTIVE COMMITTEE. NO MOTIONS SHALL BE CONSIDERED OR VOTED ON AT A GENERAL MEETING UNLESS A QUORUM IS PRESENT.

Presentation An informative presentation on NVIS antennas was given by Carson and Frank. The history, antenna types and propagation expected was discussed. Carson also presented our newest members Natasha and Maryam with a radio receiver as a gift so they would have something to listen on.

Minutes of Last Meeting

Minutes of last meeting - included in the February newsletter

Motion to accept Tom VA3TVA 2nd Doug VE3WRF. Carried

Treasurer's Report *Bernie VE3BQM*

As of Feb 28, 2017 balance is \$xxxx.xx Actual dollar amounts are only disclosed at meetings

Motion to accept – Doug VE3WRF 2nd Philip VE3QVC. Carried

Old business

Dave VE3WI has resigned as Vice President due to family issues. Frank called for volunteers to fill in for Dave from the group attending explaining the 4th executive member would allow any one executive member to be absent and still have a quorum. There were no interested parties.

The CANWARN training course scheduled for the 5th of April has been 100% booked.

GBARC Challenge - Scott and Christine gave an update on the challenge activity which by all accounts is successful.

GBARC Course - Doug VE3WRF gave an update on the course which is scheduled to commence on March 29th in Meaford. Details are on the GBARC website

New business

Frank gave a rundown of upcoming events and encouraged the members present to consider signing up to participate on the website event signup page. Activities include the Ontario QSO Party, Field Day, the Bruce Peninsula Multisport race, Cabot Head and the summer BBQ. The Dayton Hamvention was also discussed outlining their new venue.

VE3OSR Repeater – thanks to Bobby VE3PAV and Philip VE3QVC who were the only ones to sign up to help out with repeater issues. More members for this committee are needed.

The Amateur's Code - Frank made a motion to adopt these words as part of our new GBARC operating manual. A lengthy and lively discussion followed identifying issues with the use of some words in the text. Motion to accept Tom VA3TVA 2nd Maureen VE3MIO. Carried with 12 for and 1 opposing the motion, 4 abstaining.

Net Controllers – Carson suggested that there be more net controllers for the Wednesday evening 2 meter net on VE3OSR. This will allow more members to improve their on-the-air skills with net procedures. To this end the webmaster will create a new topic on the forum where interested members can discuss this and come up with a net controller schedule.

Projects – Bobby VE3PAV discussed some small electronic projects to encourage young people to become interested in kit building or electronics. Examples were LED's and flashers, raspberry pi among others. Bobby would like some assistance with this from other members.

Carson offered some RTL-SDR sticks to the members at a very good price.

Close

- 21:10hrs Motion by Doug VE3WRF, 2nd Maureen VE3MIO – Carried

Tech Topic

Next Meeting

April 25th, 2017 at 1900hrs at the Owen Sound Professional Building, 3rd Ave E, Owen Sound.

Minutes taken by Tom VA3TS Secretary

Upcoming Events

The Community Club Fair sponsored by the Owen Sound public library is **NOT** planned for 2017.
RAC/ARRL FieldDay June 24th and 25th, to download the Field Day Packet click [HERE](#)

Feedback

We would be happy to receive announcements of your radio activities or messages of any kind to be included here. Please send your submissions to Tom VA3TS contact@gbarc.ca .
The deadline is 1 week before the scheduled club meeting or the 3rd Tuesday of each month.

SWR Seminar

by Terry Darling VE3CAB circa 1975

INTRODUCTION

The purpose of this seminar is to educate us on that vague term S.W.R its use and more prevalent misuses by most of us involved in Amateur Radio, Transmission lines will be studied very briefly in order that a few basic concepts be understood about electromagnetic wave propagation through a line from the generators (transmitter) to the load (antenna).

Most of the material for this seminar was taken from QST articles entitled REFLECTIONS by Walter Maxwell J2DU, Parts 1-6 as listed in the Bibliography, The basic concepts were taken from a Communications course ELT405 of Ryerson Poly-technical institute.

I would strongly suggest that the Amateurs interesting in thoroughly understanding SWR read the QST articles as listed in the Bibliography.

TRANSMISSION LINES

Any set of conductors which is used to carry electromagnetic energy from one place to another is deemed a transmission line* At high frequencies such as we use in Amateur work the signal changes so rapidly at all points on the line that the time needed for the signal to move down the line becomes great compared to the frequency of the signal voltage.

A Balanced Transmission Line?????

A Balanced line is one in which both conductors are the same and situated a like distance above ground, actually meaning they are both un-grounded. The use for this type of line is between an un-grounded source and load. Eg: Tv and folded dipole

The balanced transmission line looks to the source 3 (Transmitter) as shown below in Diagram 1. It exhibits series inductance, L series resistance, R, and shunt capacitance between the wires, C, as well as shunt admittance G (Admittance = fancy name for a resistor in parallel)

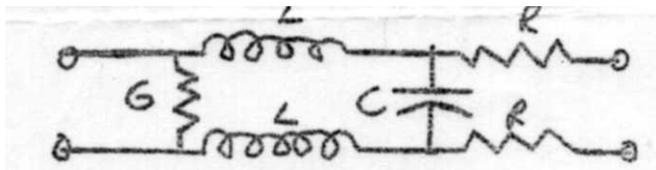


Diagram 1

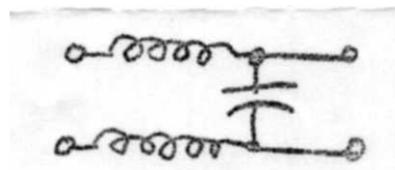
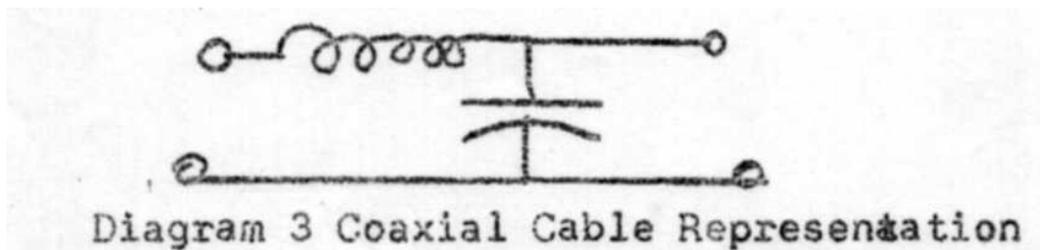


Diagram 2

Generally for high frequency work the series R and shunt G can be eliminated to give the more general representation of a Balanced Transmission line as shown In Diagram 2

An Unbalanced Transmission Line

The best example of this type of line is the very familiar Coaxial Cable we all use. Unbalanced means that both wires are different in dimensions, and that one is grounded while the other is at a potential.

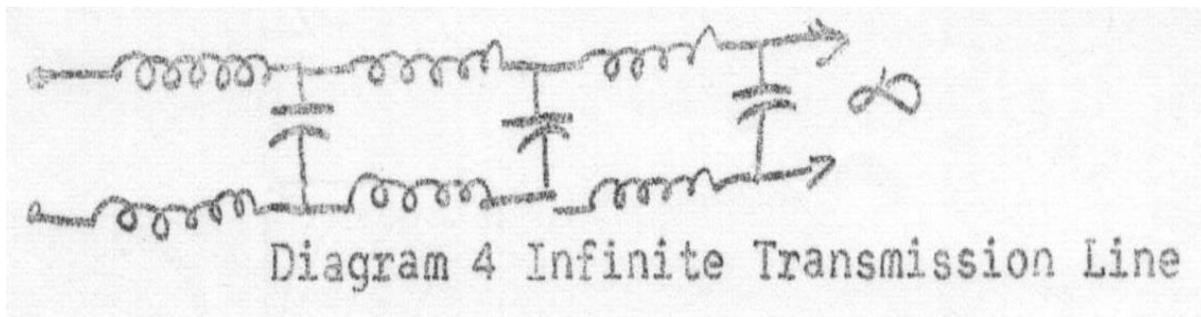


In the unbalanced line, it is generally represented as assuming all the resistance occurs in one of the wires.

(Be careful: The word assume is made of 2 words, **ASS** and **MULE**)

CHARACTERISTIC IMPEDANCE

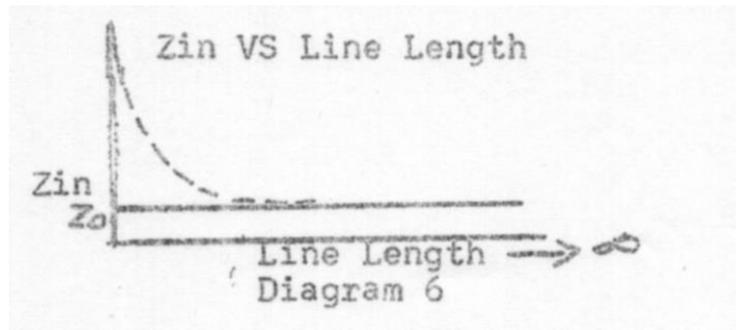
If we "Cascade" a number of these sections together as shown in diagram 4, then we would have the true representation of an "Infinite transmission line".



If we could apply and measure an input current and voltage to the terminals of the input then we could calculate the input impedance from the relationship that $Z_{in} = \text{Input voltage}/\text{current}$. This measurement would

give us the characteristic impedance of the particular line we were measuring which includes the series L, R, and shunt C.

We would find that as we added many of these sections on the effect on the input impedance would be much smaller than the previous section. Obviously then, the input impedance is approaching a finite X value, as the length of the line approaches Infinity. The limit that this line approaches is called The Characteristic Impedance of the line.

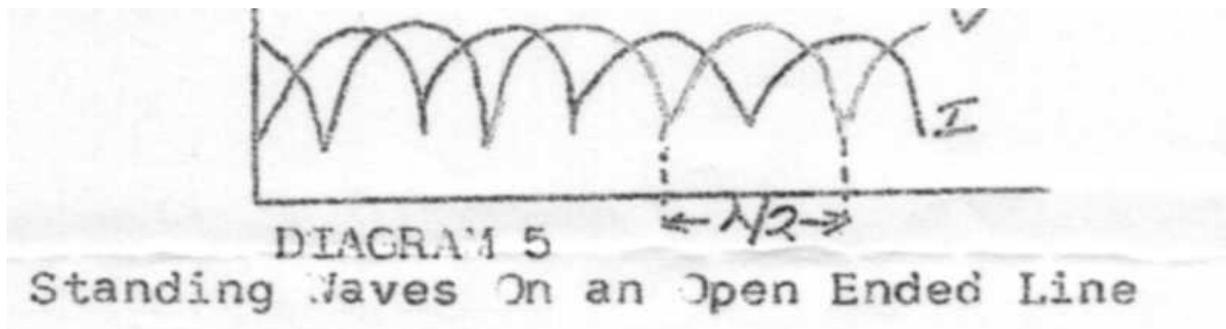


The characteristic impedance of a coaxial cable (Z_0) can be pre-determined by a formula which uses the diameters of the inside and outside conductor diameters.

TERMINATION OF LINE BY $R=Z_0$

Wave motion and energy conditions can be examined on any section of line terminated by $R=Z_0$. As in the case of an infinite line, energy travels down the line, but now, except for the small amount of energy that is attenuated in the resistance of the line, all the energy is delivered to, and dissipated by the load* maximum energy is transferred from the source to the load. In this case there is NO reflection of energy. As far as the source is concerned the line appears infinite because it sends out energy and does not see it again. In summary, any line terminated by a resistive load equal to the characteristic impedance acts as an infinite line:

- a) Input impedance- Z_0 and is resistive
- b) No reflections occur on the line
- c) Current and voltage are in phase
- d) Maximum energy transfer from source to load



The Standing waves are stationary on the line as the name standing implies. If we could measure the voltage or current on the line we would

find that the max, and minimum would occur a half wavelength apart as shown in the above diagram 5.

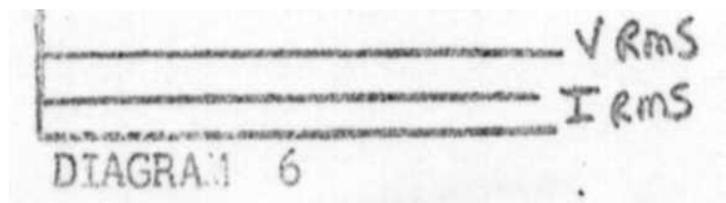
2. REFLECTIONS ON A SHORT CIRCUITED LINE

Since a short circuit is a condition of zero resistance, the current at the end of the line has a value maximum. Even though the voltage will have a minimum value, reflection will occur because none of the energy of the incident wave is absorbed by the short circuit. Voltage and current are 90 electrical degrees out of phase with each other as in the previous case but the current is maximum at the load end while the voltage is a minimum.

3. REFLECTIONS ON A LINE TERMINATED OTHER THAN BY AN OPEN OR SHORT CCT

When a transmission line is terminated other than by #1 or #2 conditions the situation will be somewhere between the two. There will be incident and reflected waves on the line resulting in standing waves of voltage and current, unless of course the termination satisfies the condition $R_{Load} = Z_0$. Diagram 6 shows the RMS voltages and currents on a transmission line on which there are no standing waves.

THE STANDING WAVE RATIO



The optimum condition for transmission line and load combinations is one in which the maximum values of voltage and current along the line are equal to the minimum values. No reflections present) A figure of merit which indicates how close we are to the optimum condition is defined as the standing wave ratio which is simply the ratio of maximum voltage to minimum voltage or maximum current to minimum current. Note on diagram 5 that the minimum of both the voltage and current will not = 0. Note from diagram 6 that the ratio of maximum to minimum voltage or current is the same, or 1:1, the ideal case, ideal ONLY meaning that standing waves are not present, or in other words the line has been terminated by $R_{load} = Z_0$.

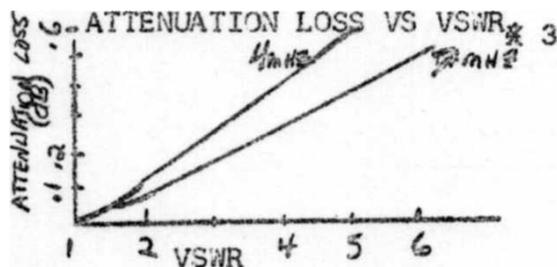
WHAT HAPPENS TO REFLECTED POWER???

The amount of reflected power lost is not dependent on the SWR alone. The attenuation factor for the specific feedline must also be included. Note this very important point: The ONLY reflected power lost is the amount dissipated in the line because of the attenuation, the remainder returns to the load. That is to say it is re-reflected back to the load from the transmitter. As the SWR increases the amount of reflected power increases but ALL of it returns back to the load anyway EXCEPT for the little which is attenuated in the line as it goes back and forth between the transmitter and antenna many times depending on the degree of mismatch. The higher the SWR the more times re-reflections occur.

From the viewpoint of amateur communications, it can be shown mathematically and easily verified in practice that the difference in power transferred through any coaxial line with an SWR of 2:1 is imperceptible compared to having a perfectly matched 1:1 termination, no matter what the length or attenuation of the line, and that many typical feedlines (coaxial) that we use in the HF bands with an SWR of 3 or 4 and often as high as 5 to 1 have an equally imperceptible difference.

What is being said, then, is that the lower the feedline attenuation the higher the values of SWR that can be permitted as far as not losing much power is concerned. ONCE again "All reflected power reaching the source is returned to the load as part of the incident wave. The only power lost is because of the line attenuation, during its return to the source and once again during its return to the load (antenna).

Diagram 7 below shows the effect of S7/R on line loss at 4 and 7 Mhz for a 100 ft. section of RG8 for typical SWR values.



In a typical realistic case where the attenuation is **.5db** (175 feet of RG8 at 4Mhz or 85 feet at 14 Mhz.) if the load were perfectly matched to the line SWR = 1:1 the 100 watts delivered would be attenuated to 83.13 watts during travel to the load. But with a 3:1 mismatched load the additional one-way attenuation (due to SWR) is 0.288...83.41 watts is delivered to the load. This means that with an SWR of 3:1 we only lose 5.72 watts due to an increase from a perfectly matched load VSWR of 1:1 to one causing a mismatch 3:1. Is it really worth reducing the SWR to 1:1???

SO WHY WORRY ABOUT SWR?

Dielectric Breakdown

As far as Amateur work is concerned, we need not be concerned about dielectric breakdown with RG8u coaxial cable and the legal power limit we are confined to. That will occur in commercial work (or by using a KW with a high VSWR on RG58) with a high VSWR, is that the voltage peaks along the line will be substantially increased. As the voltage peaks increase with increasing VSWR, a point will be reached in which arcing over will occur between the center conductor and the braid. This is the same effect as applying a voltage far in excess of the rated value on an electrolytic capacitor which will break the dielectric down and destroy the capacitor. Just in passing, a general rule of thumb is that the peak voltage on a transmission line with SWR greater than 1:1 will = **sqr root of the** matched value of peak voltage at SWR = 1:1.

TRANSMITTER DAMAGE

As was previously explained, reflected power does not flow back into the transmitter and cause heating and other damage. The damage blamed on reflections is caused by improper output-coupling adjustment not by the SWR.

Tube overheating is caused by either or both of the following things:

- 1) over-coupling and
- 2) reactive loading indicative of improper tuning.

Tank-coil heating and arc overs occur because a rise in Q of the circuit is caused by under-coupling. With manipulation proper output coupling can be achieved no matter how HIGH the SWR.

The transmitter doesn't see an SWR but only an impedance resulting from it. The impedances can be matched quite well in some transmitters without concern for the SWR.

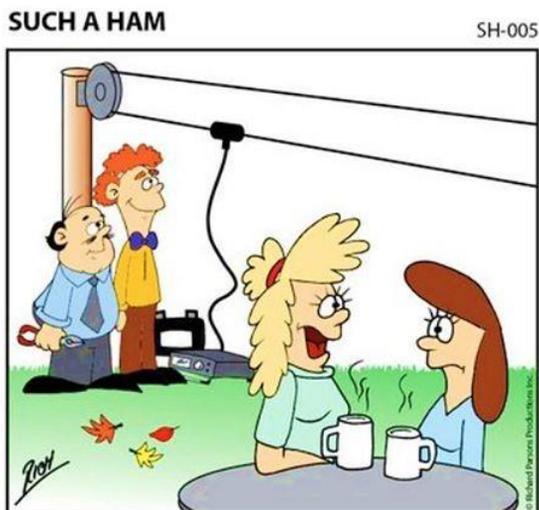
References

1973 Apr Jun Aug Oct Dec QST

Walter Maxwell April 1973 QST pp35-40

Ryerson Polytechnical ELT 405 Communication Systems

FROM the EDITOR - *When this article was written, rigs with tube finals were the only ones available. It is well known that tubes can handle variations in SWR considerably easier than solid state rigs. Solid state rigs have protection circuitry to prevent damage from high swr by reducing power output. This means that although you might be able to load the eavestrough, you won't actually know how much actual power you are transmitting without an externally connected wattmeter.*



Stan & Cliff have been working all day
on installing my clothesline, Mary.

Interesting Webpages

[List of free electronics circuit simulators](#)

[Emergency Preparedness Week](#)

May 7 to 13, 2017

[Grove Weather Pi](#)

Solar Raspberry Pi Based Weather Station

[RS-918SSB HF SDR Transceiver](#)