



Hastings Br  
13  
Club Calls  
**ZL2AS**  
**ZL2QS**

Napier Br 25  
Club Calls  
**ZL2GT**  
**ZL2G**

**IRLP**  
Node  
6793  
147.250

**Branch's**  
**13/25**  
**Net**  
9.00 AM  
Sunday  
Morning  
670  
Repeater

**Editor**  
John Newson  
ZL2VAF



*Eric ZL2TSU's antenna tuner project – see page 4*

<http://www.zl2gt.nz/>

<http://www.zl2as.org.nz/>

**Emergency Call-in Frequencies: 3615khz and 670 repeater**



<https://arec.nz/join-arec/>

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## **NAPIER BRANCH 25**

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**Committee Meetings:** 7:30 pm, 3rd Tuesday of January, March, May, July, September, November

**Club Calls:** ZL2GT, ZL2G

**Club Web Site:** <http://www.zl2gt.nz/>

**Club Nights:** First Wednesday each month (except January) 7.30pm at the Club Rooms: 123 Latham Street Napier

## **Napier Amateur Radio Club Branch 25 NZART**

Time rolls on, it is now a year since we have moved into our retirement village, we are enjoying it more and more as time goes by.

The weather is currently Sunny as I write this, but one wonders if the rains will return, or if we can expect some "drying out" of the sodden ground.

I have enjoyed some DX on the bands that I have an antenna for, with some nice long path contacts into the mediteranean, and a smattering of JA, VK and W stations at the times I have available to operate my equipment.

There has been some interest in generating a new "Club Project", with a RF field strength meter, a satellite 2M / 70cm crossed yagi, a dual AF frequency audio generator (for ssb tx checking) and a DF aerial for fox hunting being suggested. You may have a better or different idea which you can bring to the next meeting. My intention with this project, once we have a direction to head into, is to form a team to develop the project with an emphasis on self construction of the actual and final device.

A weekend working bee, will be announced shortly to complete the antenna work around the Clubhouse, all welcome to attend/ help out/ learn.

The recent committee meeting recommended that the vertical antenna that was removed to make way for the tuner/longwire shack antenna be repaired and reinstalled as a spare. We need a handy man to repair the obvious missing stubs etc. and check the whole thing out. Any volunteers??

Napier Branch has its next meeting on August the 2nd and after the usual Club business, and some discussion on the above, it is "Show and Tell", where you bring anything that will be of interest to the group, this can be anything, even a paper or magazine clipping, or a You Tube clip. No contest! just for interest sake.... and join us for some chat and cuppa. This meeting will be held at the Latham Street Club rooms at 7:30pm. All Welcome!

That's all for this month, see you at the meeting

73 Dave ZL2MQ.

## HASTINGS BRANCH 13

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<b>Club Call:</b>	<b>ZL2AS and ZL2QS</b>		
<b>Net Controllers (Sunday '670 repeater, 9am)</b>	<b>ZL3TT/ZL2DW</b>		
<b>Club Nights:</b>	<b>Fourth Wednesday each month (except December) at 7.30 pm Pakowhai Hall, Pakowhai Road</b>		
<b>Club Fees</b>	<b>\$20 per year payable to Branch 13 a/c # 03 0642 0733310 00 (use your call sign as a reference).</b>		

## From the top table

Well hello one and all, here we are in July and it is the month for the famous branch 13 donated junk sale. Don't forget we are still at Branch 25 club rooms in Latham Street and maybe some members of Branch 25 might like to come along to see what fun we have on this night, you never know you could end up going home with some good stuff. I wonder how much junk that was sold last year will turn back up for resale.

At long last all the renovations that I have had done here at home have finished and now it is my turn to get stuck in and start painting, doing the little things that still need doing. The worst of the work is done and no more contractors coming in and out and leaving dirty foot marks on the floor.

Well not much more to report for this month and this must have something to do with it being winter and a little colder. I can report that 20 meters is working quite nicely in the afternoon and so guys have been talking on other bands as well when they are open, but like all things you have to be there at the right time to work the bands.

OK guys, that's it for this month not much more so look forward to Wednesday night and please if you have some junk that you wish to get rid of bring it along and we will send you back home with some to replace what you came with.

Cheers to one and all.

Blue ZL3TT President Branch 13 HBARC

President Branch 13 HBARC



*Branch 13/HBARC, Hastings, office bearers,  
David Walker ZL2DW (Secretary),  
Blue Smith ZL3TT (President),  
Peter ZL2HM (Treasurer).*



## Antenna tuner unit

When you have a long wire aerial system or any aerial that you want to use off from the resonant frequency, that it tuned to, you need to use an antenna tuner unit to get it into resonance for your transmitter. If you have the latest and greatest transceiver it may have auto tune for best Standing Wave Ratio and not be needed. In the good old days (ie valve) this was not a problem, The large amount of voltage coming back to your transmitter from the aerial did not damage the RF output valve. But with transistor or FET transmitter output, this now becomes a problem.

In my pile of stuff that I have purchased at the famous Hastings Club auction is a selection of tuning gangs and an Inductor coil on a ceramic core. I thought well, I could make an antenna tuner with this. I chose an old pi vision antenna tuner circuit. There are more modern ones, may be better, but in the back of my mind, I needed to make certain that I could drain off any rain static that was on the aerial system. I don't like leaving the aerial on my receiver when there is thunder and lightning or rain around, the FET inputs don't like it.

Although this one won't do it by itself I will be building up a separate filter unit to bleed off static voltage. This can be done with a large inductance to earth or a high ohmic resistor to earth. Neither of these will help in a lightning strike.

I also need a FM radio filter to stop inter-modulation for my SDR radio, but that's a different project.

My long wire has a Balun on it to help with this problem, but the centre fed 40 meter dipole I am building will need help. I will use them as a means to have a DC path from the aerial to earth.

The variable Capacitors have big spaces between the plates, this is voltage over kill but they are a matched pair that will be just in case I happen to put a high power transmitter on to the ATU.

You never know what happens in the future. The switch unit to switch the inductance taps out arrived from another years sale at the Hastings Club now all I needed is a box to fit it in. At the scra yard one day came one of those small uninterruptible power supplies for a computer system. The metal box is what I wanted, and the boss wanted the battery, electronics and the opper wire out of the inside.

And so deal was made, I was stripping out all the parts the boss can sell and bringing them back to work. I was able to keep the metal case.

The first problem was, I wanted to use the side of the case not the small end. The lid is a slide on one, and I have 3 control shafts that need to stick through the front. Sliding on won't work for this case.



So with the use of an angle grinder with a cutting blade, I cut the back off, just down 10 mil's from the top, and that allows me to clip the front on and then slide it along and then screw the back on as a separate piece. A coat of paint to pretty it all up. Put some little rubber feet on and it should do the job.

Now I mounted the aerial sockets on the front because, when it's sitting on the shelf pushed up against the back wall I don't want to have to be pulling it in and out all the time to change aerial leads around, as I swap it from set to set.

I was going to make a front instrument panel for it with a computer program and printer. But the learning curve to get it to do what you want is pretty steep. So I'm going to give that away, and I went down to the local book shop and bought some protractors, clear plastic ones. They are graduated for 180° that's all I need for setting the variable capacitors.

I still have some work to do on the Inductance switch position, but I need something smaller of that.

We'll call it working.

So I'm off inside for a coffee and a bikkie.

Eric ZL2TSU



## **Aerial / antenna wire available for free.**

For the past 25 years I've enjoyed experimenting with wire aerials, but the cyclone seems to have put an end to that!

I've got a couple of bins of cable and wire which may be of use to someone. No charge. Pickup Havelock North

50M of almost new 50 Ohm coax, a small drum of 300 Ohm TV feedline, a small drum of 8-way heavy-ribbon cable (1mm wire?), an 80M offset dipole, coax cable, UTP cable and various lengths of 1mm and 2.5mm wire.

David, ZL2WT, 022 500 2182.



## **Available FREE 2v cells**

<https://www.cyb.com.au/content/industrial/telecommunications/batteries/uxl-specs/uxl330-2.pdf>

Contact Jeff (ZL2HT, Hastings 022 6198891



## **Branch 13/HBARC, Hastings, next meeting**

Wednesday 26 July, 7-30pm, at the NAPIER Branch 25 Club Rooms

- General Meeting.
- "Donated Junk Auction".

Bring along your donated electronic/radio goodies and we will auction them off for Club funds.....and give you a fun night.

## LONG TIME....NO ANSWER.

In about 1978 a group of us from the then "HB VHF Group" visited David Lamont at his Taradale home to see his CW decoder.

He had just learnt CW to gain the call sign ZL2AMD.

He had built a wonderful electronic CW decoding machine ..... for nothing. He found out that it decoded CW just fine when it was generated by machine but despite his best efforts he could never make it successfully decode hand generated CW.

Jump now to July 2023, QST, P52, where a person in the "Ask Dave" column (on the RHS of P53) talks about this and Dave's reply ..... no one has made a successful hand generated CW decoder ..... and here we are 45 years later after ZL2AMD's attempt.

This must annoy a few CW contesters hi hi . Nothing like the human brain to do the job huh.

73, David ZL2DW



*A bit of EME tonight do you think ? (location unknown)*

# SWR

## —What it means in practice

*When amateurs get together, and the talk turns to antennas, it is not long before the magic phrase, "SWR", is heard. But just what is SWR and how important is it in practice? This article looks at the subject in practical terms, at a level which everybody should understand.*

by PHILIP WATSON VK2ZPW

It is an unfortunate fact that SWR, along with antenna and transmission line theory in general, is one of the most misunderstood subjects in the whole of amateur radio. It boasts as many myths and old wives tales as does pregnancy and childbirth, some of them perpetuated by supposedly reputable text books.

In trying to get a mental picture of what is, admittedly, an extremely complex subject it is often a help to start with a theoretically perfect situation, against which we can compare the usually imperfect practical situation.

### The antenna

Let's start with the antenna. In any transmitter installation, this has to satisfy two basic requirements. One is to radiate the RF energy fed to it by the transmitter in the most efficient manner possible. The other is to present the transmitter with the correct load in order that the transmitter may deliver the level of RF power which the designer intended.

While both are important, the second requirement is, in many ways, the more important one. Suppose we have a typical commercial transmitter designed to deliver 10W into a 50Ω load. If we connect a pure (ie, non-reactive) 50Ω

resistor directly across the antenna terminals or socket at the set, and energise the transmitter, it will deliver 10W to the resistor, which will appear as heat.

If we were to substitute some other value of resistor a number of things could happen. The most likely one is that the transmitter would no longer deliver its 10W. By how much it would fall short would depend on the error in the load value and the design and tolerance of the particular transmitter output stage.

Another possibility, again depending on the output stage design, is that it would try to deliver more than its rated power, but run into overload in the process, and destroy itself and other sections as a result. Fortunately, most commercially designed transmitters are well protected in this regard, but there is no point in taking unnecessary risks.

But, this risk aside, we should make every endeavour to present the correct load to the transmitter simply to ensure that it delivers the maximum power for which it was designed. On the other hand, there is little to be gained by simply feeding this energy into a resistor; it will radiate very little of the RF energy and waste virtually all of it as heat.

So we replace the resistor with an antenna and, fairly obviously, this antenna should look (to the transmitter)

like a 50Ω resistor if it is to deliver maximum power. Assuming the antenna is resonant at the transmitter frequency, and fed at the right point, it will look like a resistor. If it is not resonant it will exhibit either a capacitive or inductive component, according to which way it is off resonance.

Assuming that it is resonant, the next question concerns the value of resistance it presents to the transmitter. And this is where the going gets tough because, in other than a very few clearly defined cases, this is very largely an unknown or, at best, "guesstimated" value.

We can, for example, nominate the resistance at the centre of a half wave dipole as being in the region of 72Ω, while a folded version of the half-wave dipole will have four times this impedance, or 288Ω (often mentally rounded off to 300Ω). A number of factors can cause minor variations to these values, such as the diameter of the elements, relative to their length, space between folded dipole elements, etc.

A more controversial value is that for the popular quarter-wave ground plane. For years it has been stated, in many popular amateur textbooks, that this is approximately half the value of the simple dipole, or 36Ω (in fact, various values have been quoted between 30 and 36Ω). This figure appears to have been based on a theoretically calculated value for a quarter-wave radiator working against an infinitely large, perfectly conducting ground plane.

Some of these text books even went so far as to describe matching devices ("Q" sections, etc) which would match this value to the popular 50Ω coax cable and transmitter load requirements. As anyone who has tried to make one of these matching systems work, or who has attempted to confirm this figure with an impedance bridge will testify, the real-



life ground plane, using four quarter-wave radials, is a vastly different device.

Strangely enough, the true situation has been known for many years. At least as early as 1962, and possibly earlier, the R.S.G.B. Handbook (page 365) stated: "The radiation resistance of a ground quarter wave aerial is  $35\Omega$ , but that of a ground-plane is less than  $20\Omega$ ." More recently other authorities have been emphasising this same point but, unfortunately, old ideas die hard, and the point needs to be emphasised a good deal more strongly if the error is to be corrected.

One of the most recent articles on the subject, and one of the most detailed, is that by Guy Fletcher, VK2BBF, which appeared in the August 1984 issue of "Amateur Radio", the official journal of the Wireless Institute of Australia. This, and two articles which follow in subsequent issues, are recommended to anyone wishing to get a more detailed picture of the antenna scene generally.

But this is a separate argument. The point we set out to make is that, apart from these few simple designs, it is exceedingly difficult to nominate the feed point impedance of an antenna. We do know the general effect of many design factors; that, for example, the addition of director or reflector elements to a dipole will lower the impedance. But by how much is another matter.

So we are faced with the situation that the impedance of all but the simplest antenna systems is largely an unknown quantity. With experience we can make a rough estimation that it will be between this and that figure, or below some other figure, but beyond that we must resort to some form of measurement or "suck-it-and-see" approach.

### SWR meters

One such approach involves the use of a standing wave ratio meter, or SWR meter. But it would be premature to go into details at this stage. We need to talk about SWR in some detail first.

So far we have considered only those situations where a resistor or an antenna — which looked like the same resistor — was connected directly across the transmitter output terminals. Apart from a few special cases, feeding an antenna in this manner is not very practical. We need to locate the antenna as high as possible and clear of objects which might shield it, while we need to put the transmitter in a convenient indoor working location, some distance away.

And, to couple the two together, we need a special kind of cable; one that will convey the transmitter output to the

antenna with minimum loss and which, in itself, will not radiate any significant amount of this energy into a shielded environment, where much of it would be wasted.

There are two types of cable commonly used by amateurs, the open wire line and the coaxial cable. The open wire line can be homemade, has very low losses, and can be made to have any impedance characteristic over a wide range. On the other hand it can be awkward to install and is much less popular than it once was.

Coaxial cable is a commercial product, with somewhat higher losses, and is commonly available in two popular impedance values:  $50\Omega$  and  $72\Omega$ . It is reasonably flexible and relatively easy to install. For most of our discussion we will assume the use of coaxial cable, although most of the points would be just as valid for open wire lines.

### Characteristic impedance

Undoubtedly the most important single characteristic of a coaxial cable, for the beginner to understand, is its characteristic impedance, typically  $50\Omega$  or  $72\Omega$ , as already mentioned. This is not an easy concept to grasp and the beginner

may have to content himself with accepting some basic statements at their face value, at least initially.

Coaxial cable consists of two conductors, one within the other, and insulated from each other. A common form uses solid or stranded wire as the central conductor, copper braid as the outer conductor, and a polythene insulating material between them.

The characteristic impedance is a factor of the inductance of the two conductors, relative to the capacitance between them, per unit length. These factors, in turn, are determined by the physical characteristics of the components; the inductance by the cross sectional area of the conductors, and the capacitance by their area relative to each other, the distance between them, and the dielectric constant of the insulating material. The length of the line is not a factor.

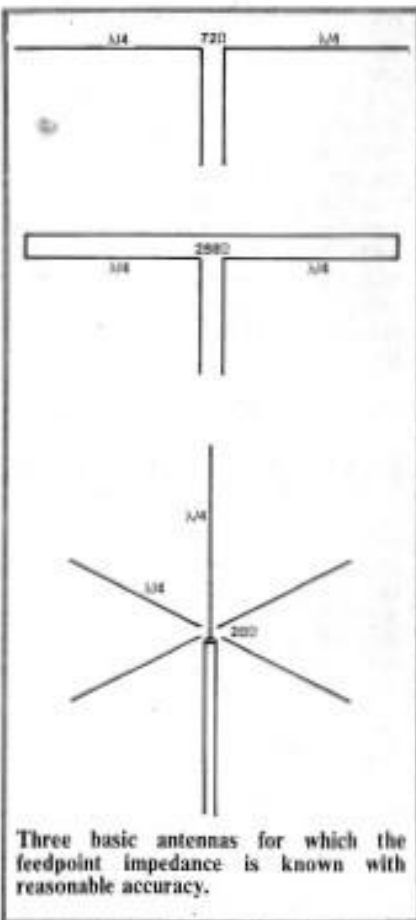
The effect of this inductance/capacitance relationship is to establish an equally firm relationship between the voltage and current of RF energy travelling up the line. This relationship is exactly the same as would have occurred across and through a pure resistor having the same value (say  $50\Omega$ ) as the characteristic impedance of the cable.

It may help to grasp this concept if one is to visualise a very short burst of RF energy transmitted up the line; so short that its trailing edge has left the transmitter long before its leading edge has reached the load at the far end. Thus, something in the manner of a fired projectile, or even a thrown tennis ball, it is in a kind of limbo; while influenced initially by the manner of its launch its subsequent movement is largely a factor of its environment. And it knows nothing about what lies in store for it at the end of its journey.

We can carry the analogy a little further. If the tennis ball ultimately hits a brick wall it will bounce off (or be reflected) simply because the brick wall represents a gross mismatch to the manner in which energy is stored in the moving ball. A softer object, such as a bale of hay, may well have absorbed all the energy with no bounce (or reflection).

The same applies to our burst of RF energy. When it reaches the end of the cable it will need to meet exactly the right load if all its energy is to be dissipated in that load. And it doesn't take much imagination to conclude that the load should look like (in this case) a  $50\Omega$  resistor.

If it encounters any other value then only part of the energy will be absorbed





# SWR — What it means in practice

by the load, and the remainder will be reflected down the line in the direction of the transmitter. And this is what creates what are called "standing waves" on the transmission line.

## Standing waves

In greater detail, the standing waves are actually peaks of voltage between the conductors, or peaks of current through the conductors, which occur at regular intervals along the line. They occur at those points where (say) the voltage of the outgoing energy encounters voltage of reflected energy which is exactly in phase with it. Similarly for the current peaks.

The position of each peak is fixed and will always be one half wavelength away from its neighbour. Exactly between each peak, ie, one quarter wavelength away, will be a dip or voltage minimum, and it is the ratio between these two voltages which constitutes our "standing wave ratio" or SWR. (Note: wavelengths in coaxial cable will be physically shorter than in free space, according to the characteristics of the insulating material. A factor of 0.66 is typical, commonly referred to as the "velocity factor".)

In the theoretically perfect situation, where the cable is correctly terminated, all the energy is absorbed by the load, there will be no reflected wave, and the voltage and current values will remain essentially constant along the length of the line. Such a situation is said to constitute a "flat" line.

By now the reason for our interest in the SWR should be apparent. Because it occurs only if there is a mismatch, and its value is directly related to the degree of mismatch, its measurement provides a very useful "suck-it-and-see" approach to ensuring that the transmitter is presented with its correct load.

In greater detail, an SWR of (say) 2 to 1 will mean that the load is in error, relative to the cable impedance, by this ratio. But it cannot indicate in which direction the error lies. Assuming a 50Ω cable the 2 to 1 error could mean that the load is half (25Ω) or twice (100Ω) the correct value. Note, however, that this relationship is true only when the load is purely resistive.

Considering all the foregoing, and with the benefit of hindsight, one wonders whether the term "SWR", to some extent, might be misleading; and that some other term, like "mismatch ratio", might not have been a better choice.

But it is essential to keep one very

important point in mind at this stage of the discussion. The existence of standing waves, in itself, is only a secondary problem. It is a useful measurement only because it tells us whether the transmitter is being correctly loaded or not and that our efforts should be directed to correcting this aspect of the problem. Whether we correct the SWR in the process may not even matter. Let us consider a practical example.

Suppose an SWR reading indicates quite clearly that there is a serious mismatch between antenna and cable. We have two options: either fit some kind of matching device between the antenna and the cable so that the antenna now looks like the correct value, or fit a matching device between the transmitter and the cable so that the transmitter sees a correct load.

In theory the first option is the preferred one, since we not only present the transmitter with its optimum load, but we eliminate the standing waves at the same time. In practice, however, the second option may well be very much more practical and convenient. It will have achieved the same primary objective of loading the transmitter correctly and in many cases the SWR can be ignored.

But what happens to the RF energy reflected by an antenna which does not match the cable? If it is sent back down the line, is it not wasted? No, it isn't. The practical situation is that the transmitter presents a gross mismatch to the line, and deliberately so. Its (source) impedance is kept as low as possible in order that as little as possible of the RF energy it generates is wasted as heat in the final stage.

So the reflected RF energy encounters this gross mismatch and is promptly reflected up the line again to the antenna, where the major proportion of it is radiated and a minor proportion reflected. After a couple of such journeys virtually all of the energy will have been radiated. (In typical audio transmission systems the time delays involved are not important. In a TV transmission system they can be significant, and more careful design is necessary to avoid transmitting "ghosts".)

## Cable losses

In fact, there is a flaw in that argument. We can only assume that no energy is wasted if we ignore the inherent losses in the cable. All cables have some losses, and these increase with frequency. For example, a popular foam

filled coax, RG8U, has a loss of 0.9dB/30m at 30MHz which rises to 3.5dB/30m at 400MHz. The presence of such losses means that any signal which has to traverse the line more than once will suffer additional losses on each excursion.

So we have to concede that, in practice, standing waves do create some loss. But how much, and how important is it? If we assume a 3dB loss in a cable system which is correctly terminated, ie, no standing waves, then an SWR of 3 to 1 will add a further 1dB loss. The accompanying graph indicates the additional loss for a wide range of basic cable losses and SWR values.

At 450MHz, using RG8U cable, with a run approaching 30m, a loss of 3dB could be expected and, if it had to be tolerated, then anything which would minimise further losses would be worth considering. This is a case where, all else being equal, correction at the antenna might be preferable to that at the transmitter.

At lower frequencies losses become less important. At 150MHz, RG8U wastes only 2dB/30m (an additional 0.8dB for a 3:1 SWR), and at 30MHz 0.9dB (plus 0.48dB for 3:1 SWR).

So, hopefully, that should put the SWR problem into some kind of perspective. But there are other misconceptions which we might perhaps comment upon. One is that the reflected energy finds its way back into the final stage and overheats it. Wrong!

It is true that a transmitter working into a transmission line with a high SWR may show signs of distress. But the distress is not due to the SWR; rather it is due to the incorrect load at the antenna into which the transmitter is trying to work.

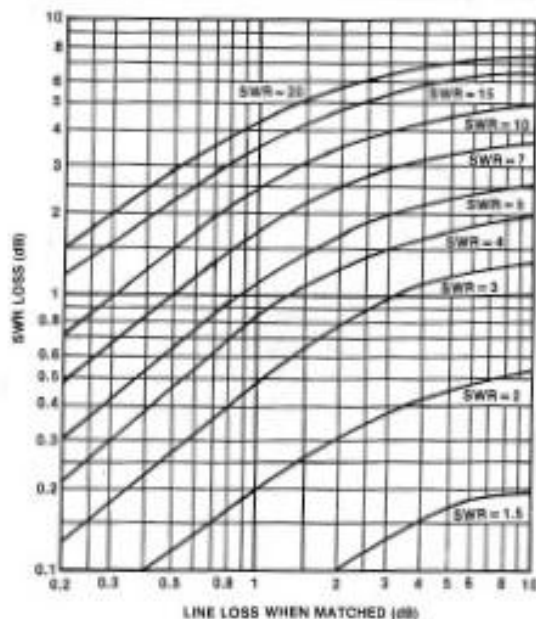
## Cable length?

Another popular furbly claims that the length of the cable is critical; that it must be an exact multiple of a half wavelength long if the transmitter is to be properly loaded — and the standing waves eliminated — even when the antenna is presenting a proper load.

The truth is that, if the load is correct, then this value will be "seen" at the other end of the cable regardless of its length. If the load is incorrect, then this value will be seen at half wavelength intervals along the cable. But since it is wrong anyway there seems little point in trying to reproduce it.

In fact, in such circumstances, the length of the line can be critical for a





This graph clearly indicates the amount of additional loss, due to SWR, which occurs for various values of pure cable loss i.e. loss when correctly terminated.

quite different reason. Between the half wavelength points the cable will exhibit a range of impedances, one of which may match the transmitter. So, by adjusting its length the cable may be made to act as a matching transformer, and load the transmitter correctly.

But don't try to do it using the SWR meter because altering the line length will have no effect on the SWR. If this trick is to be employed other measurements must be used, such as that from a field strength meter at a fixed distance from the antenna.

So, after all that, what is the role of the SWR meter? Well, it obviously isn't the universal answer to all antenna/transmission line problems. On the other hand, if it is the only instrument available it can be quite useful. An important point to realise is that, while it can indicate that there is something wrong with a particular set-up, it cannot indicate what is wrong.

Thus an antenna may present the wrong load for a number of reasons. It may not be resonant, the design may be wrong or may have been misinterpreted by the constructor, or the matching device, if one is used, may be incorrect. Alternatively, the cable impedance may be other than that claimed. (There is the story, well authenticated, about the Sydney disposals dealer who could supply either 50Ω or 75Ω cable at a very attractive price, both off the same reel!)

In other words, when the SWR meter indicates that there is something wrong, the important thing is to make a systematic approach to finding out what it is. For example, terminating the cable

in a good dummy load having the same resistance will quickly indicate whether or not the cable is at fault. If it is not, the antenna is the next obvious suspect.

Exactly what needs to be done, or can be done, to change the antenna's impedance will, of course, depend on the particular type of antenna and what is physically convenient or practical. But, whatever the approach, the SWR meter can be used to monitor the effect of the changes or adjustments.

Finally, one more controversial point. Just where should the SWR meter be connected in the line: at the transmitter end or the antenna end? Some authorities are adamant that it should be at the antenna end, while others are

equally emphatic that this precaution isn't necessary.

While, in theory, it can be shown that the antenna is the right place to make this measurement, the practical situation is that this is seldom a very convenient, or even feasible, arrangement. So, in practice, most people tend to make it at the transmitter end. (Where an antenna tuning unit, or other matching device is used at the transmitter, fitting the meter between the two is a perfectly legitimate way of determining when the tuning unit is presenting the correct load to the transmitter.)

The main objection to measurements made at the transmitter end is that the cable losses will mask the true ratio, the forward signal having been attenuated before it was reflected, and the reflected signal attenuated again on the way back. Depending on the severity of the losses, the user may obtain a reading below what he has set as an acceptable maximum when, in fact, the true value is appreciably higher.

Unfortunately, cable losses become worse as the frequency increases and, in the 420-450MHz (70cm) band this problem could be very real. So, be prepared to work at the antenna unless the coax line can be kept short. In cases like this it is sometimes better to move the transmitter close to the antenna, and use a much shorter line.

And so to sum up: The most important characteristic of an antenna system is to present the transmitter with its optimum load. An SWR measurement can indicate whether this is happening and, if not, the degree of error. It is valuable primarily for this reason, the standing waves in themselves being relatively unimportant.

So let's keep things in perspective. ☺

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