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WATTS

06-2013

Year 83 + 6m

Monthly newsletter of the Pretoria Amateur Radio Club
 Maandelikse nuusbrieff van die Pretoria Amateur Radio Klub.

✉ PARC, PO Box 73696, Lynnwood Ridge 0040, RSA

web <http://www.parc.org.za> mail: zs6pta@zs6pta.org.za

Bulletins: 145,725 MHz 08:45 Sundays/Sondae
 Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
 Activated frequencies are announced prior to bulletins

Swapshop: 2m and 7.066 MHz Live on-air after bulletins
 Bulletin repeats Mondays | herhalings : Maandae 2m 19:45



Club history: Bill ZS6KO (SK) shack 1947. more detail on page 2



In this issue

- Member news and activities Lede-nuus en Aktiwiteite
- Technical

10 years of electronic WATTS	Tegnies
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- Page eight -- Bladsy agt

In hierdie uitgawe

Next club events

Fleamarkets at PMC

Sat 10 Aug Sat 7 Dec

Club social at U.P.
 Thursday 6 June 7pm
Club committee meeting
 Thursday 20 June 7pm

PARC Management team / Bestuurspan Aug. 2012 – Aug. 2013

Committee members

Chairman, Contests	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Vice Chairman, SARL liason	Fritz Sutherland	ZS6SF	fritz@icon.co.za	012-811-3875	083-304-0028
Secretary, Clubs, Strategy	Jean de Villiers	ZS6ARA	zs6ara@webmail.co.za	012-663-6554	083-627-2506
Treasurer, SARS	Andre van Tonder	ZS6BRC	andreh.vtonder@absamail.co.za	361-3292	082-467-0287
Rallies, Social	Johan de Bruyn	ZS6JHB	zs6jhb@gmail.com	012-803-7385	079-333-4107
Webmaster	Graham Reid	ZR6GJR	greid@wol.co.za		083-701-0511
RAE, Bulletin co-ordinator	Vincent Harrison	ZS6BTY	zs6bty@telkomsa.net	012-998-8165	083-754-0115
Repeaters, Technical	Craig Symington	ZS6RH	zs6rh@hotmail.co.za		081-334-6817
Technical, Kits, PR, youth	Rudi van Dyk	ZS6RVD	vdykr@telkomsa.net		082-962-4141

Co-opted/Geko-opteer:

Auditor	Tony Crowder	ZS6CRO	tcrowder@telkomsa.net	011-672-3311	
WATTS newsletter/Kits	Hans Kappetjin	ZS6KR	zs6kr@wbs.co.za	012-333-2612	072-204-3991
Clubhouse	Pieter Fourie	ZS6CN	pieter2@vodamail.co.za	012-804-7417	083-573-7048
Fleamarket	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za		083-938-8955
Historian, Archives, Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	

Happy Birthday to Electronic WATTS

By this month electronic WATTS is 10 years old. Your editor used his newly aquired MS Office for Small Business and left literal copy and paste behind for electronic copy and paste and spent quite some time to discover and learn the more subtle operations in MSWord.

Picture processing was also mastered and the aim to keep WATTS below 1mB was realized with most issues as many members still had slow and expensive dial-up internet. They made up about half our membership and WATTS was printed and posted to the remaining members.

WATTS content was aimed to be as much as possible about the club and its members and their activities as well as technical content that could be understood by non-technical members so as to enhance their experience of the hobby.

I have recently made a title listing of all technical knowledge and project articles with reference to the relevant WATTS issue over the last 10 years and can be sent as a .pdf to any one requesting it.

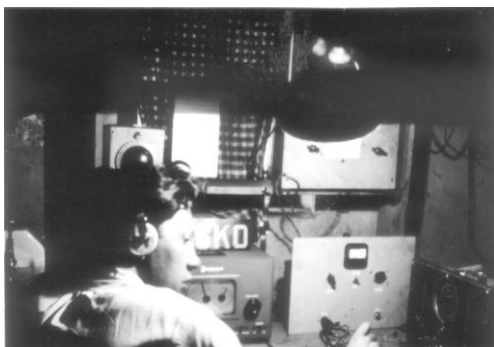
All electronic WATTS issues are on our website and the non-technical content accurately reflects our club's- and member's trials, tribulations and elations month by month so that none of the history be forgotten.

WATTS content is enerally garnered using the grapevine, bulletins, repeater chat etc. Only very few members contribute useful material that reflects what they are doing in the hobby. More member co-operation will be appreciated with photos and news. WATTS is first and foremost a club newsletter – and secondly a source of technical information relevant to the hobby.

Let us keep that balance 50-50 sothat readers are always inspired to experiment, make improvements, create or join interest groups to further their hobby and its capabilities. Your contributions no matter how small make our newsletter more enjoyable for every one else and conveys the message that we are not static.

ZS6KO (SK) shack 1946-1947

OK Bill took various photos of his equipment and antennas over the years. (should we do this too?) Front page photo is annotated: "June 1947 40m-20m. Rig 6L6 Xtl osc. 807 doubler, 803 final, abt 400V plate.



Some of the photos were very very small.

Left: A youthful Bill. "Dec 1946. 1st rig. 6L6 osc. 807 final antenna (drawing) 33' each leg fed with ladder line and balanced matcher.

Right: "1944-1946 Regen RX



Birthdays Verjaarsdae

June



Junie

Anniversaries Herdenkings

- 02 Elma, sw van Chris ZS6LOG
- 06 Simon ZS6AST
- 07 Chantel, dogter van Martie en "JB" ZR6YV
- 08 Ronel, sw van Pieter ZR6PSR
- 11 Nadia, daughter of Pat ZR6AVC and Frank ZS6GE
- 12 Erna, lv van Whitey ZS6JJJ
- 14 Hilary, daughter of Molly ZR6MOL and Richard ZS6UK
- 17 Lynette, dogter van Elize en Pieter ZS6PA

24 Marieta en roy ZS6MI (42)

- 20 Malcolm ZR6OLM, son of Retha and Roy ZS6XN
- 22 Richard ZS6UK
- 26 Pieter ZR6PSR
- 27 Selma, sw of Joe ZS6TB

Lief en Leed | Joys and Sorrows

Jean ZS6ARA en sy ma is ongedeerd na 'n nagtelike huisinbraak danksy 'n middelhek tussen die slaapkamers en sitkamer.
Andre ZS6GCA was hospitalized on 21 May. **Eddie ZR6RAS** sterk tuis aan. **Pieter ZS6PWV** is ook terug vanaf die hospitaal.

Diary | Dagboek (UTC times)

June

- 01-02 SEANET Contest 12:00-12:00
- 08-09 Portugal Day Contest 12:00-11:59
- 15-16 All Asian DX CW Contest 00:00-24:00
- 16 SARL Youth day Sprint 07:00-11:00 ?
- 22-23 His Majesty of Spain Contest SSB 12:00-12:00
- 22-23 Ukranian DX Digi Contest 12:00-12:00
- 22-23 Marconi Memorial HF Contest 14:00-14:00

Be an early bird!

PARC SUBS / LEDEGELD 30-06-2011

Please remit your subs in
time to our treasurer or
by transfer to:

Betaal asb. u ledegeld
betyds aan ons tesourier
of per oorplasing aan:

Bank : FNB Ordinary members/ gewone lede R150
Branch : 25 20 45 Spouses, pensioners R50
Account : 546 000 426 73

Your call sign must appear as statement text! !

Snippets | Brokkies

SARL awards were received by our members:
Silent Keys Memorial Trophy for aggregate 2012 HF
contest scores: **ZS6KR** for SSB, **ZS6RJ** for CW.
Jack Twine Trophy for unselfish dedication to the hobby:
Pierre **ZS6PJH**

Fritz **ZS6SF** was re-elected to SARL Council for 2013-14

Harry ex ZR6HRD has now settled in the UK and
received a new callsign **MOHRB**

Announcement: C9 – Mozambique.

A multi-national group will activate C9 in
mid October.

Plans are to have radios operational on
160, 80 and 40 simultaneously during all
hours of propagation for eight days
starting in mid October.

The emphasis will be on the low bands and
other bands, 10 - 30 operational at all
other times.

The operation is led by Tom N4XP and Don
N1DG serving as co leaders with Tjerk
ZS6P, Chris ZS6EZ, Chris ZS6RI, Dave
WB4JTT, Franz DJ9ZB, Rusty W6OAT, Max
I8NHJ, Mike N6MZ and Jose CT1EEB
completing the team.

A web site will be operational in the near
future. OQRS, LoTW and club log will be
utilized with log updating on a daily basis.

Roger ZS6RJ has revamped his shack.

It now sports two TS-590 rigs.

Gone is the IC-7600.

Built simply for speed with a focus on dx-chasing and contesting. The heart of the station is focused on SO2R, consisting of two new connected Kenwood TS-590's and 2 remote linears (Expert 2K-FA and Icom PW-1)



Fleamarket 1 May had a great turnout



How's this for great service!

1997 (ZS6GCA praised)

André Coetzee, a technician at the Silverton Client Care Services recently received a job card to install a telephone in a block of flats in Silverton. The customer was not at home, so André returned that evening and, not finding the customer there, called on him again the next day and a few days thereafter.

He managed to find a contact number. The person who answered said the customer was in Antarctica. Not perturbed, André managed to get hold of the telephone number for Antarctica, which was an out-

door extension (satellite link) of a PABX of a firm in Pretoria. He discovered that a call would cost the same as a normal local.

André went home for lunch and dialled straight through to the Sinai Base in Antarctica, only to be told that he had reached another new base which is presently under construction. He was, however, linked up by means of a two-way radio, and was at last in contact with his customer.

The customer was delighted to hear from Telkom in this way. His

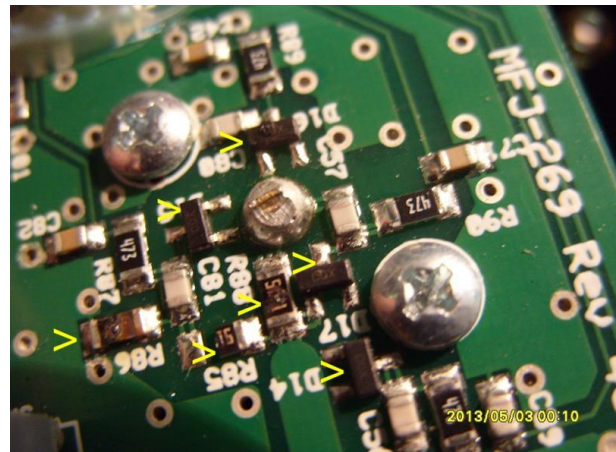
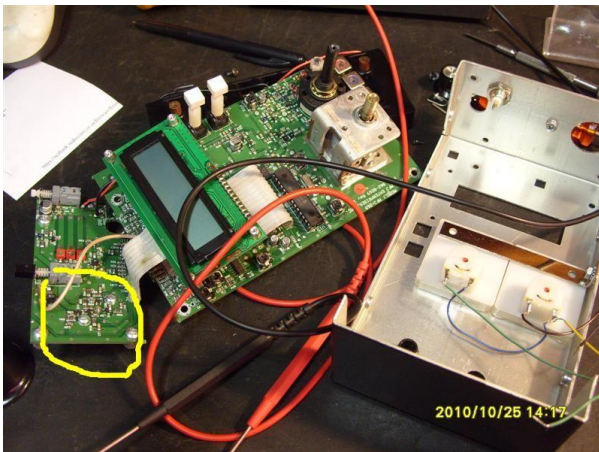
sister had a key to his flat, and André was given her number. The customer discussed the weather, saying they were experiencing a 24-hour summer's day in Antarctica, and that he was walking around in short-sleeves in the sub-zero temperatures as the sun was reflecting warmly on the snow and ice!

After this, André was able to install his customer's phone, which was ready for him when he returned home in March. Needless to say, he is a satisfied customer.

Full marks to André.

Be kind to your MFJ.

Never apply power to the antenna socket. The yellow outline and arrows show damage caused !



Similar damage can be caused if you do not short out your antenna system before connecting to the analyzer as static build-up on the antenna can reach high voltages and so also kill some of the same components shown.

Grounding Systems in the Ham Shack - Paradigms, Facts and Fallacies

Content provided by: Jose I. Calderon, DU1ANV - Makiling Amateur Radio Society. Member: Philippine Amateur Radio Association (PARA). First part only. Abridged by ZS6KR. Full article at <http://kc.flexradio.com/KnowledgebaseArticle50426.aspx>

Most new hams who operate mostly in the VHF and UHF band enjoy their operating until later when they upgrade to the HF bands, and problems immediately crop up. The first time they press the PTT and start talking into the microphone, all active equipment in the shack go haywire. Panel meters go crazy, the power supply volt meter jumps up and down, and if unlucky, get a microphone bite if the base microphone case is metallic.

Organizing an effective grounding system in the ham shack requires the ham radio operator to address the two major aspects of grounding. They are:

- First** - Compliance with electrical safety guidelines (electrical grounding system), and
- Second** - Dealing with RFI in the shack (RF grounding system).

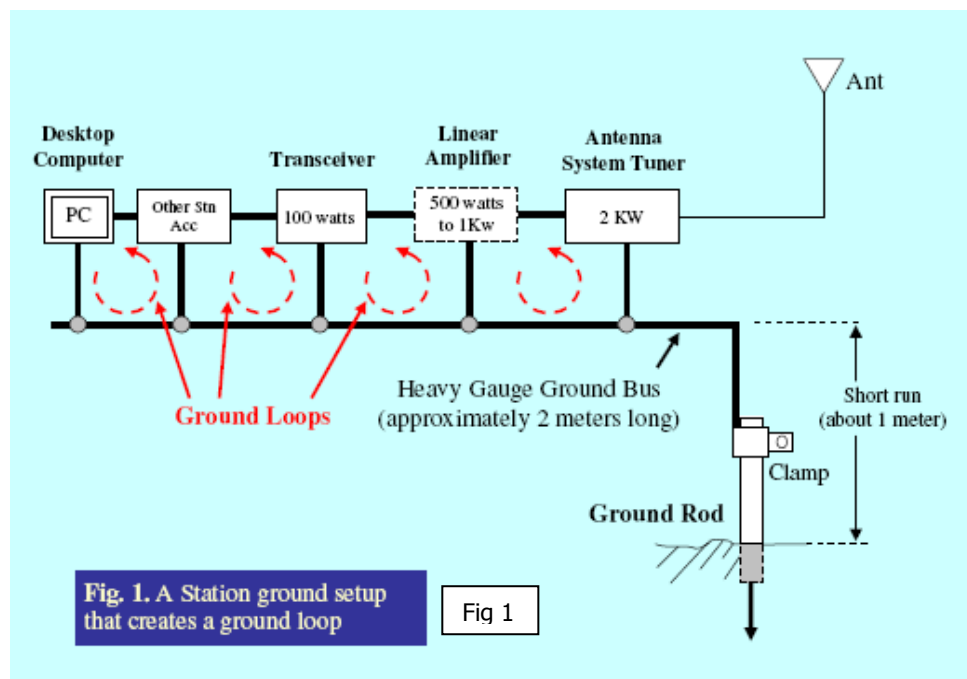
In general, most newcomers to Ham Radio do comply with the first aspect in the context of electrical safety but often neglect the aspect of reducing the excessive presence of RF energy within the shack. Many believe that complying with good electrical safety guidelines is enough to dispel other operating problems. Though seemingly true, this notion is in fact a fallacy. Some of the problematic signs and symptoms of poor RF grounding in the shack that degrade the quality and satisfaction of operating ham radio equipment are enumerated below:

- Microphone bites (nasty RF shock!)
- Gritty and or fuzzy audio modulation (Distortion)
- Malfunction of electronic keyer (sending wrong characters)
- RF shock when touching metallic objects within the shack
- Power supply jitters (the regulated power supply becomes un-regulated!)
- Crazy SWR meter readings
- Desktop computer going crazy
- PC Desktop monitor jitters
- Fluorescent lamp flicker
- Active TTL switch circuit going crazy (Turning ON-OFF-ON by itself)
- Inactive panel meters of separate equipment moving on their own
- When transmitting, a distorted audio is heard over the amplified speaker of the PC desktop.
- Severe Radio Frequency Interference (RFI) to home appliances and alarms within the vicinity of the Ham shack.

All of the above are the major signs and symptoms of the presence of high RF voltages within the immediate vicinity of the ham shack when the transmitter is active.

And these are all attributed to poor RF grounding. All conducting objects will absorb RF energy through coupling and will re-radiate the same.

Let us analyze some scenarios of grounding systems typically complying with good electrical safety but which are poor RF grounding systems. An anthology of a simple case scenario and a worst case are presented and the possible problems that may arise at the instance the transmitter becomes active.



Scenario 1 (Simple case paradigm) This ham operator was a neat fellow. One day, he finally convinced the xyl to let him setup his own radio shack, and so built his own radio room on the ground floor of the home QTH. He built a good electrical ground system by laying out a heavy copper wire about 3 meters long just behind the neatly lined up station equipment. Each equipment ground lug accommodated a short flexible grounding wire to reach the ground bus. He did this to all of the station equipment with a very neat connection. The remaining length of the ground bus was led outside to an effectively driven ground rod, near the wall of the dio room.

This grounding setup looked like the one shown in Fig. 1.

When everything was in order, he fired the 100 watt transceiver and begun transmitting in J3E mode by calling another station at 7.035 MHz. To his surprise, the station operator at the other end responded to tell him that his signal was S9 but the audio was garbled, gritty and fuzzy. Further adjustment and tweaking the ALC and mic gain controls did not solve the problem. He further observed that by reducing the RF power to 50 watts PEP, the problem disappeared. But when he switched on his linear amplifier to give 250 watts PEP output, the problem returned and became even worse. The two stations spent almost two hours of adjusting "this" and "that" but alas, to no avail. Just as our good and neat fellow ham was about to retire after a frustrating day, a third ham who has been monitoring the exercise came on frequency, and then politely said "You may be suffering from a "POOR GROUND".... The problematic ham answered "What? I have a perfect ground system". He then described his new and neatly connected grounding setup".... "Hmmm...." said the third ham "You may have GROUND LOOPS!" Then he proceeded to explain why. During the long QSO exchange, the problematic ham learned the following:

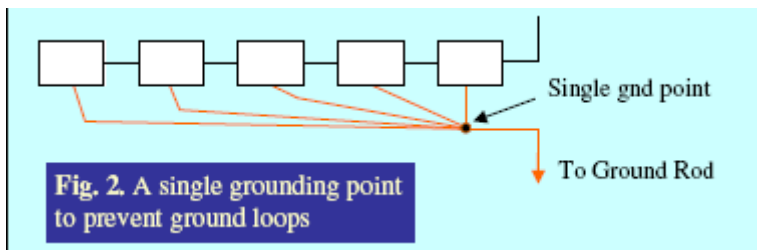
Ground loops are formed when the individual ground wires of each equipment are:

1. Ground loops are formed when the individual ground wires of each equipment are connected to the main ground bus at a point that is distant from each other (see Fig. 1)
2. The individual station equipments already have their own ground reference but when they are interconnected, grounding each equipment to the main ground bus as shown in Fig.1 creates GROUND LOOPS. Each time a ground loop is created, a small inductive coil is formed (the ground wire completes the loop).
3. When the ground loops are in the near field of RF energy (During transmit mode), these loops will couple to the RF energy (called RF coupling). As the RF energy is coupled to each loop, a fluctuating voltage is induced in unison with the burst of audio modulation of the RF energy. This energy will flow within the system and will seek the least resistance by following the associated circuits and eventually creeping into other internal circuits.
4. Once the RF is inside these circuits, it will interfere with the normal operating parameters of sensitive circuits thereby creating havoc. RF bleed-over escaping from long interconnecting coaxial cables may also flow within each loop, bathing the whole shack with RF energy.
5. His new ham shack has an excellent DC electrical ground system but has a VERY POOR RF GROUND SYSTEM!

Finally, the Elmer suggested to him to try the following:

1. Dismantle the present ground wire configuration.
2. Remove the long ground bus and terminate all ground wires from each equipment into a single point near your ground rod.

The problematic ham scribbled quickly in a piece of paper and came up with a final wiring that looked like the circuit shown in Fig. 2. They both agreed on the modifications and promised to contact each other at the same time the following day and then signed off.



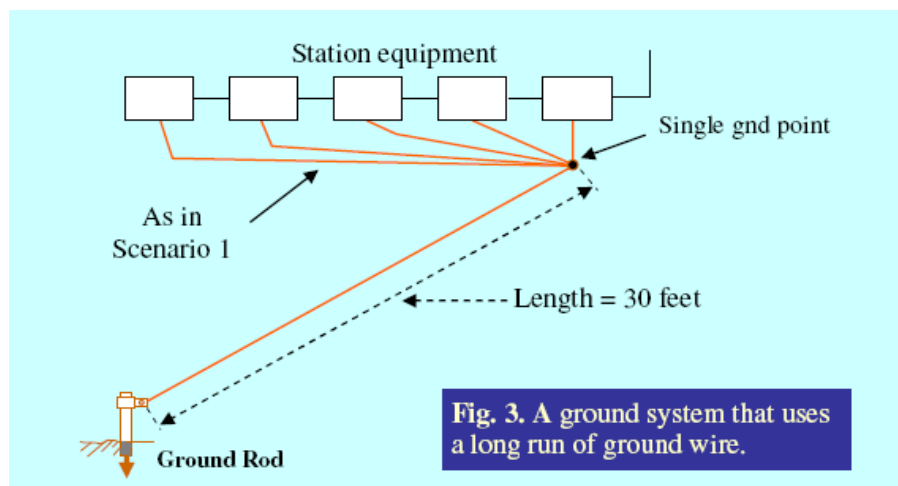
Came the following days contact, the audio problem was solved and he was happy ever after.

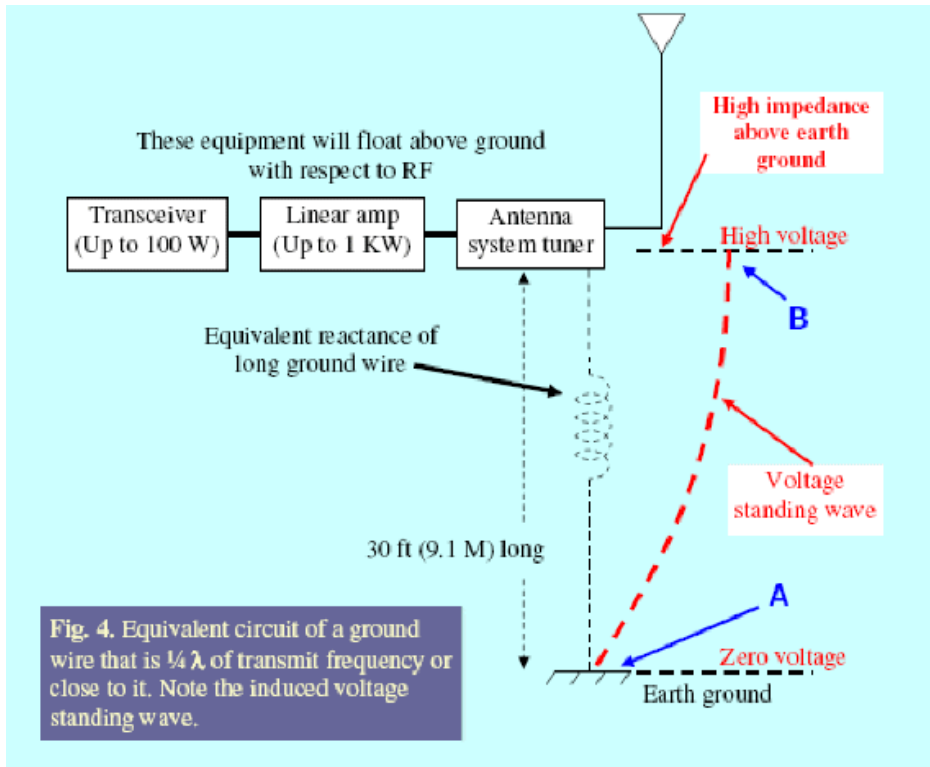
Scenario 2 (Worst case paradigm) - The Un-grounded Ground

One day, during the next several rag-chew sessions on the same band, a third station joined the QSO. His signal was strong but the audio was also thin, fuzzy and garbled every time he raised his voice over the microphone. RF was all over the ham shack. The screen of his computer became fuzzy, and his lips were bitten with electrical shock if they touched the metallic case of the microphone. Also, he was threatened several times during the early evening QSO sessions by marble sized stones dropping and rolling down his roof top apparently thrown by close neighbors irked by the RFI to their TV, stereo and radio sets. Each time he transmitted, his Donald duck's voice was heard over their radio sets.

This ham had his shack installed on the second floor of the house. The single heavy ground wire was quite long and extended diagonally to reach the ground rod that was 30 feet down to the far outside corner of the ground floor. His grounding system looked like the setup shown:

His grounding setup is UN-GROUNDED! To understand why, please examine the drawing of its electrical equivalent circuit as shown in Fig. 4 below:





If the long ground wire is $\frac{1}{4}$ wavelength long at the transmit frequency, this wire will resonate and will act as a radiating element. If the ground wire is less than a quarter wavelength, it will appear as an inductive reactance, the value of which is "Zero" (point "A") at earth ground and "High" at the circuit ground point of the equipment (See Fig. 4, point "B"). This reactance will appear like a resistance (called impedance) to impede the flow of RF current to earth ground, bringing the ground return of all the station equipment to float above the earth ground as if the ground wire is not there.

In parallel there will be the invariable ground leakage, and if this is for instance 1000 ohms, the voltage level that the equipment will rise to is

$$(100W \times 1000\text{ohms})^{1/2} = 316.2V.$$

During a dry season this voltage can easily double and cause nasty shocks.

Table 1 lists the voltage standing waves that develop at point "B" if you use different lengths of ground wire and, if the same parameters exist in your shack. The voltage values were calculated by interpolation using the wavelength factor.

Power Output of Transmitter at the antenna terminal of the system tuner					
100 Watts at 7.035 MHz			500 Watts at 7.035 MHz (Linear amp)		
Length of ground wire	Wavelength (equivalent)	Volts rms at Point "B" (standing wave)	Length of ground wire	Wavelength (equivalent)	Volts rms at Point "B" (standing wave)
10.1 meters	$\frac{1}{4}$ (or 0.25λ)	351.3	Same	Same	785.6
9.1 meters*	0.225*	316.2*	Same	Same	707.1*
3 meters	0.074	103.9	Same	Same	232.5
1 meter	0.024	33.7	Same	Same	75.4

* Your present grounding setup

RF un-grounded danger zones

Table 1. RF voltage standing waves that are developed at point "B" (See Fig. 4) when lengths of ground wire are equal or less than $\frac{1}{4} \lambda$, at operating frequency.

Recommendations:

- Relocate the ground rod to be nearer to the shack so that the ground wire will be as short as possible and will not resonate.
- Use a short length of ground wire that will not be $\frac{1}{4}$ wavelength (or its odd multiples), or close to it, of the operating frequency. This is also the reason why your transceiver manual recommends not using this length of ground wire!
- Install the ground wire so that it will be far from telephone lines and main house wiring to prevent coupling of residual RF.
- Relocate the ground rod and drop the ground wire through another location to be as far as possible from your close neighbor.
- Match your transmission line impedance equal to the feed point impedance of the antenna or as close as possible to reduce VSWR at the tuner's output terminal (Take note: not the input terminal of the tuner! Because all tuners measure only the VSWR at the transceiver side)

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Contact Hans at 012-333-2612 or 072-204-3991

Long Term HF Propagation Prediction for June 2013

Courtesy ZS6BTY
(see also our website propagation tab)

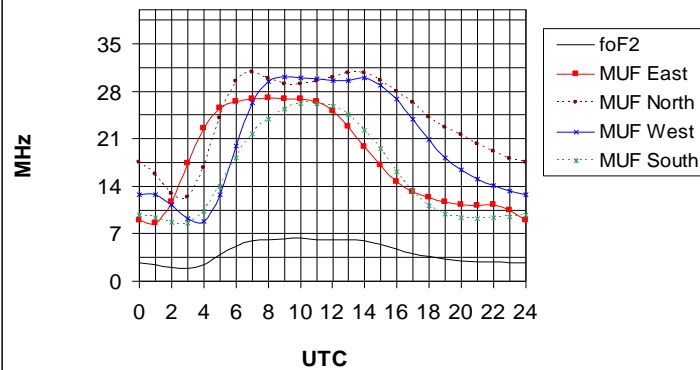
DX Operating

The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

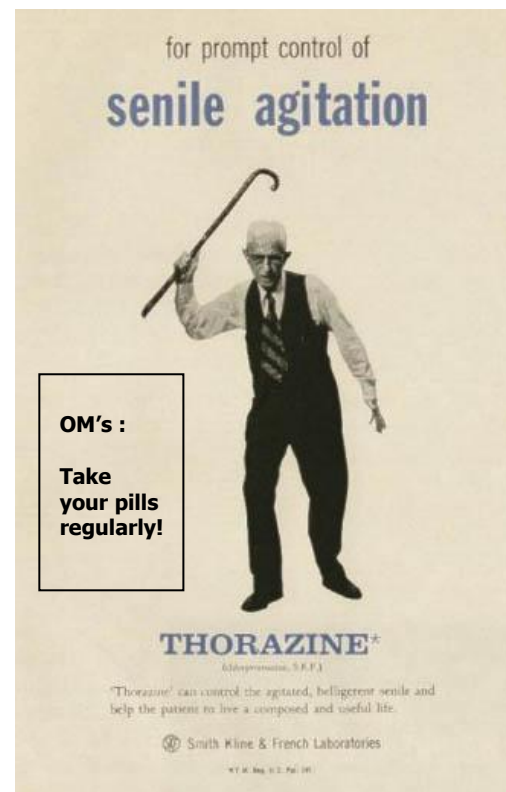
The F2 critical frequency (foF2) is the maximum frequency that will reflect when you transmit straight up. E-layer reflection is not shown.

**F2 Critical Frequency and 4000 km MUF
Pretoria - June 2013**



Edison's greatest achievement came in 1879 when he invented the electric company. Edison's design was a brilliant adaptation of the simple electrical circuit: the electric company sends electricity through a wire to a customer, **then immediately gets the electricity back through another wire**, then (this is the brilliant part) sends it right back to the customer again.

This means that an electric company can sell a customer the same batch of electricity thousands of times a day and never get caught, since very few customers take the time to examine their electricity closely. **In fact, the last year any new electricity was generated was 1937.**



Questionable callsigns

DX4U -- 6L6GC -- RG8U -- ST1NK -- SL1M -- NØQSL -- NØDX -- WØW
OZØNE -- NØQRM -- WØRK -- NØISY -- ALØHA -- RG8AU -- GHØST--
W1TCH -- SPØOK -- AL1EN -- TR1CK -- UBØZO-- UR2/WØ1RD-- WØLF--
GØRE -- GØBLN.

Real issued calls: N9CAT, K9PIG, N1HOG, W1HAM, NØEL, N6SSB, N9MOO, N6LID, KNØBS, W1RE.