PRETORIA
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Logo by ZR6FD

WATTS

12-2014
Year 84 + 12m

Monthly Newsletter of the Pretoria Amateur Radio Club
Maandelikse Nuusbrief van die Pretoria Amateur Radio Klub

PARC, PO Box 73696, Lynnwood Ridge 0040, RSA
http://www.parc.org.za @ zs6pta@zs6pta.org.za

Bulletins : 145.725 MHz on Sundays / Sondae at 08:45
Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
Activated frequencies are announced prior to bulletins
Swopshop : 2m and 7.066 MHz live on-air after bulletins
Bulletin repeats on Mondays / herhalings op Maandae : 2m 19:45

PARC Club Meeting 6th November 2014

In this Issue / In hierdie Uitgawe

Next Events

Club social at SAM's
Thursday 4 December 7:00PM

Club Committee Meeting : No Meeting in December

Merry Christmas

PARC Committee Members / Komiteelede : 2014 – 2015

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Contests	Jaco Cronje	ZR6CMG	jaco.cronje@mobaxgroup.com		076-319-1057

Birthdays – December / Verjaarsdae - Desember

01 Pieter Fourie ZS6CN
08 Hans Kappetijn ZS6KR
15 Louis Du Pisani ZS6LDP
27 Pierre Britz ZR6ADZ
28 Allan De Souza ZS6AVC
31 Henk Stuivenberg ZS6CS

Spouse's Birthdays (Dec)

06 Sylvia, Spouse of Tjerk Lammers ZS6P
12 Elsa, Spouse of Fritz Sutherland ZS6SF
23 Dienkie, Spouse of Pierre Britz, ZR6ADZ

Anniversaries / Herdenkings (Dec)

04 Henk and Ria Stuivenberg ZS6CS
08 Theo ZS6TVB and Avida Bresler ZS6AVB
29 Richard ZS6UK and Molly Peer ZR6MOL

Lief en Leed / Joys and Sorrows

Jaco Cronje ZR6CMG was admitted to hospital with a heart attack. He underwent surgery, which was successful. Recently, Jaco was discharged and is recovering at home. The Committee and Members of PARC wish Jaco all the best and a speedy recovery.
Johan de Bryun's ZS6JHB laptop was stolen recently.

Diary of Events – December / Dagboek van Gebeure - Desember

01-31	Youth on the Air with ZS9YOTA
01	Closing date for updating SARL unmanned devices database
05-07	ARRL 160m Contest : 22h00 – 16h00
06	South African Radio League digital contest
13-14	ARRL 10 meter contest : 00h00 – 24h00
15	Input to the SARL on the national ICT policy discussion document
20	OK DX RTTY Contest : 00h00 – 24h00
20-21	Croatian CW Contest : 14h00 – 14h00
27-28	World Wide Iron Ham Contest : 12h00 – 11h59

Dates for 2015 Flea Markets : 28 March ; 2 May ; 25 July ; 31 October
Please contact Almero Dupisani ZS6LDP for any enquiries

PARC SUBS / LEDEGELD FROM / VAN 30-06-2014

Bank	First National Bank	Ordinary Members / Gewone Lede : R150 Spouses / Pensioners : R50	**Your call sign must appear as statement text!**
Branch Code	25 20 45		
Account No	546 000 426 73		

Please remit your subs in time to our Treasurer, or pay per transfer into the PARC account
Betaal asb. u ledegelde betyds aan ons Tesourier, of betaal per oorplasing in die PARC rekening

PARC Club Meeting 6th November 2014

The Club Meeting held at SAM's on the 6th of November turned out to be an enjoyable event with a fair number of Club members attending. Enjoying liquid refreshments and juicy boerewors and buns from the braai, new and experienced members shared lots of conversations on numerous topics on amateur radio varying from the attributes of various transcievers to construction of antennas.

If all Club Meetings are as enjoyable as this one, we really appeal to all members of PARC to join us every first Thursday of the month at SAM in Silverton, and experience the wonderful spirit of the greatest hobby in the world, Amateur Radio!

Whitey ZS6JJJ, Kenny ZS6KMM, Fritz ZS6SF and Sarel ZS6EK

Johan ZS6JHB and Andre ZS6BRC

Pierre ZS6PJH, Ettiene ZS6EFN, Andries ZS6SCH and Pieter ZS6PA

Craig ZS6RH and Theo ZS6TVB with Ettiene and Andries

Editorial

Time has not metaphorically flown at the speed of light, but at least at the speed of time, however relatively fast that may be! It seems that for every individual, time moves at a different pace. In the beginning of anything, the seeds of it's end is already sown, and the end of the year 2014 is rapidly approaching.

Amateur Radio is not only about radios, which the uninformed may not realise. There is a great deal more to Amateur Radio than the eye may behold. Integrating the fields of physics, mathematics and chemistry, radio is an intreagingly mysterious world where phenomena may sometimes seem incredible. In addition to the scientific component, various other aspects such as radio contests, rallies, reaching out to the youth, and making lots of new friends add to the enjoyment of Amateur Radio.

The Committee of the Pretoria Amateur Radio Club hereby thanks all Members sincerely for all their hard work and participation in the various activities which makes PARC the great Club it is known to be. May all have a blessed Christmas holiday, and may the year 2015 promise to be a very prosperous one. May PARC continue with their great traditions and enjoyable activities which make Amateur Radio such a great hobby.

PARC Committee Chairman and Members

SARL Field Day Contest 15 -16th November 2014

Saturday morning the 15th started off with a tremendous thunderstorm which made the erection of antennas quite difficult and dangerous initially. However, the rain subsided somewhat, providing a window to set up a 160m dipole. For the remainder of the weekend the conditions were quite favourable for a contest.

Theo ZS6TVB operating on 40m and Whitey ZS6JJJ on 80m claimed 61 452 points for the contacts they managed to achieve. Contacts were also made by Pierre ZS6PJH on VHF and UHF, while Hans ZR6HVG and Pieter ZS6PA worked the 6m and 1.3 GHz bands.

Even though a tremendous effort was done by these gentlemen, it was clearly evident that more operators are needed to help PARC in our competitions efforts. We also need ham operators to work more bands and more modes during these competitions. We therefore appeal to all club members to become more involved. Please do contact Pierre ZS6PJH, Theo ZS6TVB and Jaco ZR6CMG if you wish to become more involved.

Oliver Hart ZR6DD, Andries ZS6SCH, Whitey ZS6JJJ and Pieter ZS6CN erecting a 160m dipole

Theo ZS6TVB working HF

Pierre ZS6PJH working VHF and UHF

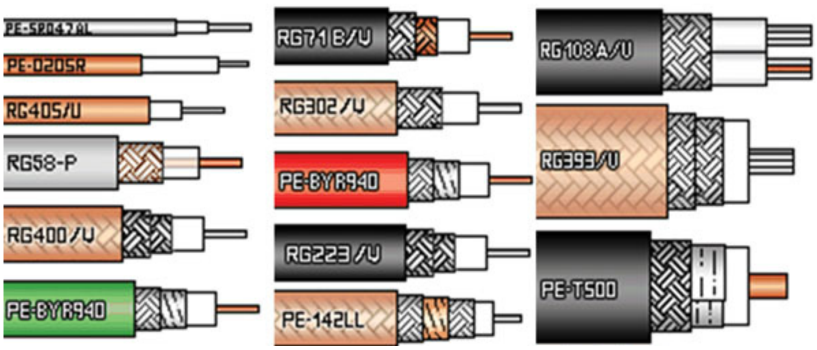
Hans ZR6HVG and Pieter ZS6PA erecting portable 6m and 2m yagis as well as a 1.3 GHz helical

What's in Your Coaxial cable?

Published Sep 11, 2014 Jean-Jacques DeLisle | Microwaves and RF   (Retrieved from RFcafé.com and abridged)

Coaxial cables are a standby of the RF/microwave industries, as they connect vital components ranging from smartphones and laptops for everyday life to radar and GPS for military and aerospace. For almost every application, it is challenging to transfer signals from one component to another while maintaining adequate signal integrity. One solution to this problem was proposed by the renowned engineer and mathematician Oliver Heaviside. He patented a design for a shielded telegraph transmission line in 1880.

In 1929, to overcome the limitations in Heaviside's design, Bell Labs' Lloyd Espenschied and Herman Affel developed the broadband coaxial cable with an air-like dielectric spacer. Since this invention, coaxial-cable technologies have advanced in both materials and performance, providing solutions for a wide range of RF interconnection problems.



The most basic form is a cylinder-within-a-cylinder conductor geometry allowing electromagnetic (EM) signals below a maximum cutoff frequency to create a transverse-electromagnetic (TEM) wave (or an EM wave with perpendicular magnetic and electric components) within the separation space between the conductors.

For signals beyond the cutoff frequency, the size of the wavelengths are small enough to generate non-perpendicular transverse-electric (TE) and transverse-magnetic (TM) waveguide modes. These additional modes reduce signal integrity and performance. Generally, the larger the diameter of the coaxial cable, the lower the cutoff frequency will be. Power-handling capability also increases with size.

Due to the sensitivity of the TEM mode wave within the coaxial cable, all of the cable's geometric components must be consistent throughout the transmission line. Otherwise, the signal will suffer from a variety of degrading reflections and phase variations. The voltage standing wave ratio (VSWR), insertion loss, phase length, and other performance characteristics are all very critical.

The materials used to construct coaxial cable may vary, electrically, as a function of vibration, temperature, moisture, current, flexure, and strain. Such variations affect the cable's performance. Additionally, there is the skin effect—a physical phenomenon that describes the increased distribution of electrons traveling near the surface of a conductor as the frequency of the signal is increased. The skin effect makes the signal traveling along a coaxial cable susceptible to imperfections in conductor surface finish.

The dielectric spacer within a coaxial cable is critical, as it maintains the coaxial geometries of the two conductors with the added challenge of behaving as much like air as possible. Being air-like involves having close to the same magnetic permeability μ/μ_0 and electric permittivity $\varepsilon/\varepsilon_0$ of air (or a ε and μ of approximately 1, which are both components of the loss tangent δ of the material).

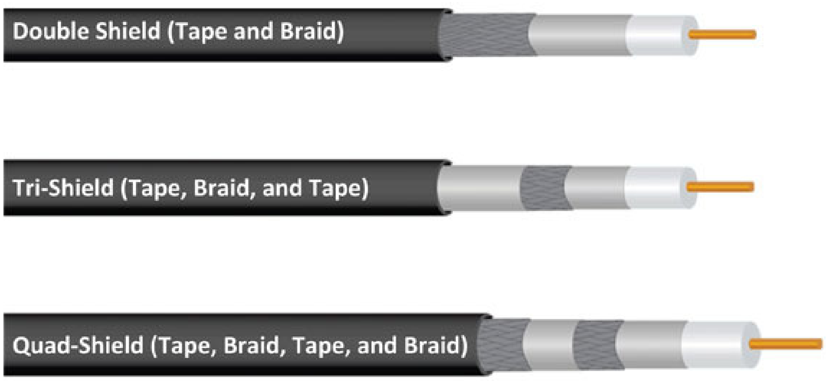
Because very few materials have the same electric and magnetic properties as air, techniques that reduce the amount of disturbing dielectric material used are common. Such techniques include the use of expanded plastic foams with high air content; spiraled dielectric spacers; dielectric ribbons that trap air; and materials designed to be more like air.

To maintain the air-like mechanical and thermal properties of a dielectric, much investment has focused on the chemical material development of plastics. Originally, solid tubes of Teflon were used for the coaxial dielectric, as Teflon is highly electrically stable. It also has high chemical and thermal resistance at low cost. Unfortunately, however, Teflon flows at room temperature. As a result, it has been mostly replaced in low-cost applications by polytetrafluoroethylene (PTFE) foams or nylon materials. Other materials, such as extruded fluoropolymer resin, offer enhanced performance over PTFE in terms of phase stability and velocity of propagation (VOP). Teflon and nylon dielectrics typically have a phase velocity in the 70% range.

In contrast, PTFE-expanded air dielectrics can reach the low-to-mid-80% range, while fluoropolymer resins have been developed with phase velocity in the upper 80% ranges.

The center conductors of a coaxial cable can be made from many conducting materials in various styles, depending on the application. The traditional center conductor is a simple solid copper wire that extends throughout the coaxial cable. To increase the flexibility of the cable by trading off high-frequency performance, a braided or stranded center conductor can be used. Plating metals—like aluminum, steel, silver, or tin—may be used with copper to reduce the weight and cost of the center conductor. This approach also ensures that good electrical performance is maintained at higher frequencies, as the surface conductor is primarily copper. In some applications, a hollow metal center conductor can be used to decrease weight and cost while increasing flexibility. Yet this solution is specific to high-frequency applications that do not need to channel high power at low frequencies.

Techniques that are similar to those used on the center conductor are applied to the outer conductor to reduce weight and cost. Designers also strive to improve flexibility and reduce environmental strain. Because the outer conductor serves as the return path for the electrical signal, sufficient thickness must be maintained to prevent leakage/interference of the signal path in most applications. However, maintaining adequate thickness for a solid outer conductor increases weight while reducing flexibility. As a result, methods of braiding, stranding, and winding have been developed to offer adequate protection and performance.



For low-cost applications, like cable television, minimal braiding is used to reduce cost, weight, and size. Center conductors are generally silver-plated copper, though tin-plated copper is also used. Silver-plated, copper-clad aluminum is used in lightweight applications.

Coaxial shields can be a variety of materials including formed beryllium copper, silver-plated copper, and metallized polymers."

Lighter weight and smaller size may be desirable for higher-performing cables. This trend has led to the development of methods that add shielding layers that are either woven, wound, or wrapped.

Such techniques produce disadvantages when it comes to the flexure and mechanical motion performance of the cable. As a result, additional techniques are required to maintain electrical performance under stress. Using a mechanically insulating dielectric layer between the multi-layered shields helps to prevent shielding deformation and wear over time with motion. It also adds to the shielding capability of the layers. (Shielding materials include wound ribbons, woven ribbons, woven wire, and wound strips of conducting tape—often aluminum.)

Additionally, a crush layer—typically comprising wound cylindrical steel—can be used to surround the high-performance cable. It will prevent damage from high pressures and torqueing. Increasing the density of the dielectric increases its crush resistance but the performance of the coaxial cable suffers. So the most common practice is to use a stiffer jacket. For example, adding stainless-steel braid over the coaxial shield improves crush resistance while sacrificing weight and flexibility. Armored cable jackets are the most effective, but they are also very heavy and expensive."

Depending on the environment that the cable will be in, there also are several methods of jacketing a coaxial cable to protect its performance. The standard coating, polyvinyl chloride (PVC), can be made in a variety of thicknesses and colors. Although PVC is relatively chemical and temperature resistant, it cannot withstand mechanical stressors. A woven outer jacket using high-tensile synthetic materials is sometimes used to increase the mechanical performance of a coaxial cable. Such a jacket provides snug pressure in addition to a coating that is resistant to cuts, slices, and abrasions.

The reason that there are so many varieties is mechanical performance. Performance also has to do with the environment in which the cable will operate. For example, a Navy ship has cabling in a radar system running along the outside of the ship with salt fog, extreme temperatures, and vibration stresses. To account for such extremes, some companies have developed proprietary materials and cable layers to enhance the performance of the cable under various conditions. Examples can be found in the aerospace, nautical, and military industries.

Article submitted by Hans Kappetijn ZS6KR

How did 50 Ω get to be the standard RF transmission line impedance?

Submitted by Hans ZS6KR (Retrieved from RFcafé.com and abridged)

Here are a few stories:

There are probably lots of stories about how 50 ohms came to be. The one I am most familiar goes like this. In the early days of microwaves - around World War II, impedances were chosen depending on the application.
For maximum power handling, somewhere between 30 and 44 Ω was used. On the other hand, lowest attenuation for an air filled line was around 93 Ω. In those days, there were no flexible cables, at least for higher frequencies, only rigid tubes with air dielectric.
Semi-rigid cable came about in the early 50s, while real microwave flex cable was approximately 10 years later.

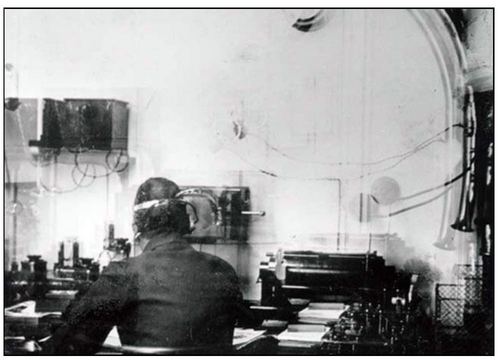
Somewhere along the way it was decided to standardize on given impedance so that economy and convenience could be brought into the equation. In the US, 50 Ω was chosen as a compromise. There was a group known as JAN, which stood for Joint Army and Navy who took on these matters. They later became DESC, for Defense Electronic Supply Center, where the MIL specs evolved.
Europe chose 60 Ω. In reality, in the U.S., since most of the "tubes" were actually existing materials consisting of standard rods and water pipes, 51.5 Ω was quite common. It was amazing to see and use adapter/converters to go from 50 to 51.5 Ω. Eventually, 50 won out, and special tubing was created (or maybe the plumbers allowed their pipes to change dimension slightly).

Further along, the Europeans were forced to change because of the influence of companies such as Hewlett-Packard which dominated the world scene. 75 Ω is the telecommunications standard, because in a dielectric filled line, somewhere around 77 Ω gives the lowest loss. (Cable TV) 93 Ω is still used for short runs such as the connection between computers and their monitors because of low capacitance per foot which would reduce the loading on circuits and allow longer cable runs.

Volume 9 of the MIT Rad Lab Series has some greater details of this for those interested. It has been reprinted by Artech House and is available.

Gary Breed wrote in his High Frequency Electronics publication that one explanation offered via an old house-ham's tale is that, "The most common story is that 50-ohm high power coaxial lines were first made using standard sizes of copper pipe, such as 3/4 inch for the inner conductor and 2 inch for the outer conductor."

Radio Room of the RMS Titanic



Original Radio Room of the RMS Titanic

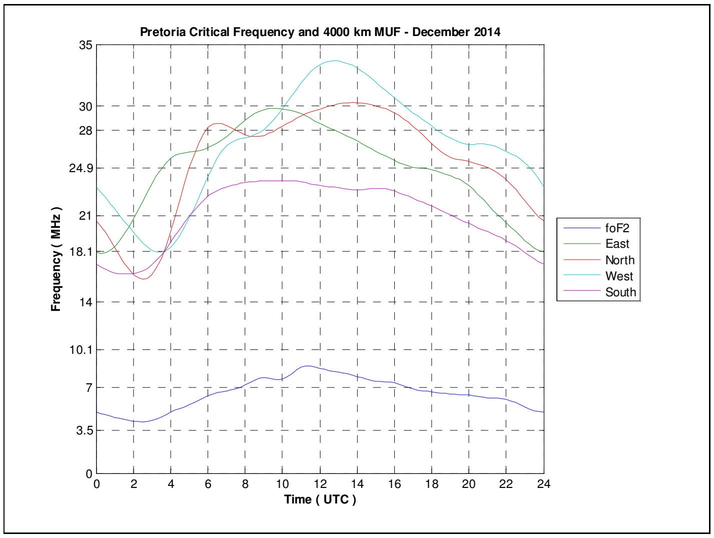
Radio Room setup for the James Cameron Movie

The *Titanic's* "wireless" equipment was the most powerful in use at the time. The main transmitter was a rotary spark design, powered by a 5 kW motor generator, fed from the ship's lighting circuit. The equipment operated into a 4 wire antenna suspended between the ship's 2 masts, some 250 feet above the sea.

The main transmitter was housed in a special room, known as the "Silent Room". This room was located next door to the operating room, and specially insulated to reduce interference to the main receiver.

There was also a battery powered emergency transmitter and a separate motor generator in the room next door. The equipment's guaranteed working range was 250 miles, but communications could be maintained for up to 400 miles during daylight and up to 2,000 miles at night.

The Titanic's call sign was MGY, and of the most famous radio messages in history was the SOS sent from the Titanic's radio room on the night to April 14-15, 1912.



Long Term HF Propagation for December 2014

DX Operating

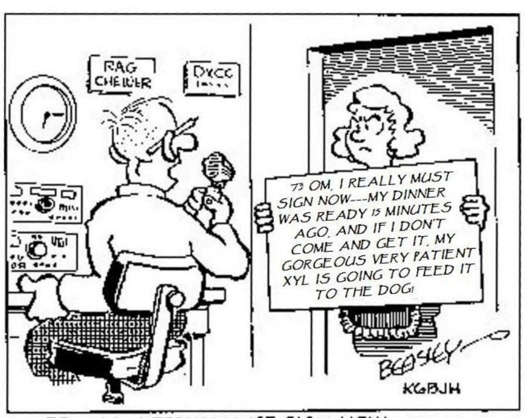
The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum F-layer frequency for short range communications.

See also the Propagation tab at http://www.parc.org.za/

Courtesy Vincent ZS6BTY



—73 O.M., I REALLY MUST SIGN NOW-------

For a hilarious sketch by Tony Hancock on the Radio Ham, follow the Youtube link below:
https://www.youtube.com/watch?v=2PzeB1nj79w

Be less curious about people and more curious about ideas : Marie Curie (1867 – 1934)