# QSX-PE

## January 2008

This Newsletter is published by the Port Elizabeth Amateur Radio Society
P.O. Box 10402, LINTON GRANGE. 6015

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QSX-PE - A Newsletter for the discerning Radio Ham

**Download QSX from www.zs2pe.co.za**

# PEARS Monthly Meeting

The year end meeting of the Port Elizabeth Amateur Radio Society, will be held on Tuesday, January 15th, 7pm, at the Londt Park Sports Club, Ralston Road, Fernglen.

# WRINKLY RAVERS

On Thursday 3rd January the venerable Ravers started off the new year at The Hedges in Main Road, Walmer. It was a nice surprise to have Neels ZS2ND and XYL attending, swelling the numbers to ten. All agreed that the food, service and prices were very acceptable indeed, so the February get-together on the 7th February, will again be at The Hedges.

Come and enjoy the company of the "wrinkled ravers" who gather at this popular venue to have a good chat as well as enjoy some good food.

**See you there!**

# from the editor

**Hi All,**

**Well, I hope that you enjoyed the festivities of the past year, and New Year, as well as having your families with you.**

**I note with sadness the passing of Ken Tremeer, ZS2BWB, and take this opportunity to pass on Janet's and my condolences to Judy and family.**

**Once again, I am faced with a dilemma of not having enough articles for this edition of QSX. I have appealed to hams over the past number of months for articles for QSX, and would take this opportunity to thank those who responded. However, to put out QSX month after month, needs a special effort on the part of all for articles to be published. In future what I receive is what will go into QSX.**

**I have removed my email address from QSX because of spam, so please call or SMS me on 0823726696 for my email address.**

73

ASHLEY ZS2AG

# Hamnet / ECARES News

We have had several aircraft disasters of late and the mountain club search and rescue members have been involved with attempts to find these aircraft and their passengers. Use was made of the repeater network for these operations.

Apparently there have been rumblings of discontent among some hams about this, so I feel there is a need to draw attention to a few facts regarding this. Governments are not benevolent societies, indeed it is their duty to see that countries function as efficiently as possible. This includes the allocation of radio frequency spectrum's for which there is a great demand. Yet they allocate something like ten percent of spectrum's to radio amateurs.

The reason for this is that radio amateurs represent self-trained technicians and operators with self-bought equipment and one of the advantages of this is having them provide communications during major disasters. Not only do we benefit from the use of these radio frequency allocations, but we pay a relatively small license fee and there are other benefits too which allow us to build communication systems like our repeater network. Most of the time we can communicate to our hearts content on the ham bands, but when there is a disaster where these communications systems are utilized then we should justify our existence by assisting or at least keep these channels clear. Instead of complaining under these circumstances, and if you must communicate, set yourself up on channels or bands where there is no emergency traffic in progress.

73,

Al Akers

Director

Are you keen to build some amateur radio equipment, but feel you need some guidance to do so, why not contact the Elmer sub-committee.

Feel free to listen in or join in the discussion on Monday nights, just after the re-broadcast of the PEARS weekly bulletin.

**The sub-committee consists of**

Bill ZS2ABZ, phone 041-5812580;

Viv ZS2VM, phone 041-3681340 and

Al ZS2U, phone 041-360-2983.


Dear fellow Radio Amateurs and PEARS members,

Well with Xmas and new years behind us it is important for us to look at what we as a club want to achieve this year. I want all of us to contemplate this so that we can come up with some workable ideas to discuss it at the January meeting. According to NASA the solar Cycle that we have all been waiting for seems to have started albeit very weakly, hopefully this will mean increased HF activity. So look forward to seeing all of you at the monthly meetings and continue to support your club and encourage non members to join. Our strength lies in our numbers.

Amateur Radio is alive and well in PEARS. So come on SAY HELLO!

73

Donovan ZS2DL

Chairman PEARS

Contd. from Dec. Edition of QSX

# --Fuses--

2) Fuse Markings

A sample of the many markings that can be found on a fuse.

Surface Mount Fuses on 8 mm tape: Each fuse measures 1.6 mm x 0.79 mm and hasn't markings. Most fuses are marked on the body, or end caps to markings show their ratings. Surface mount technology "chip type" fuses feature little or no markings making identification very difficult.When replacing a fuse, it is important to interpret these markings correctly as fuses that may look the same, could be designed for very different applications. Fuse markings will generally convey the following information:

* Ampere rating of the fuse
* Voltage rating of the fuse
* Time-current characteristic ie. element speed
* Approvals

* Manufacturer / Part Number / Series

Breaking capacity

2.1) Fuse approvals

The majority of fuse manufacturers build products that comply with a

set of guidelines and standards, based upon the application of the fuse. These requirements are devised by many different Government agencies and certification authorities[3]. Once a fuse has been tested and proven to meet the required standard, it may then carry the approval marking of the certifying agency.

#) Fuse terminologies

Rated Current IN This is the maximum current that the fuse can continuously pass without interruption to the circuit, or harmful effects on its surroundings.

#) The Iýt: This value is a direct measure of the energy required to blow the fuse element and is an important characteristic of the fuse. It determines the energy to which the object to be protected by the fuse will be subjected, before the fuse blows.

#) Voltage Drop: the values of the voltage drop across a fuse are usually given by the manufacturer. A fuse may become hot due to the energy dissipation in the fuse wire at rated current conditions. The voltage drop should be taken into account particularly when using a fuse in low-voltage applications.

#) Breaking Capacity The breaking capacity is the maximum current that can safely be interrupted by the fuse. The maximum short-circuit current that could occur under fault conditions should not exceed the rated breaking capacity of the fuse. Some fuses are designated High Rupture Capacity (HRC) and are usually filled with sand or a similar material.

#) Voltage Rating The voltage rating of a fuse should always be greater than or equal to the circuit voltage. Fuses can be used without detriment at voltages less than their rating, though the fuses' own resistance should be taken into account at very low voltages.

4) Fuse Packages

Fuses come in a vast array of sizes & styles[4] to cater for the immense number of applications in which they are used. While many are manufactured in standardised package layouts to make them easily interchangeable, a large number of new styles are released into the marketplace every year. In terms of fuse body construction, ceramic is the most commonly used material. Glass & plastic are also used in lower voltage applications.

* Cartridge (ferrule) fuses have a cylindrical body terminated with metal end caps. While many cartridge fuses are symmetrical, some cartridge fuses are manufactured with differing body proportions to reduce the possibility of inserting an incorrect fuse into the holder (circuit). An example of such a fuse range is the 'bottle fuse', which in appearance resembles the shape of a bottle.

* Fuses designed for soldering to a printed circuit board have radial or axial wire leads, however surface mount fuses have a smaller fuse body size, and have solder pads instead of leads.

* Fuses used in higher voltage/ampere circuits as required by industrial applications, commonly feature metal tags or blades located on each end of the fuse. Tags allow the fuse to be bolted into the fuse holder while blades slot into metal pressure clamps located on the fuse holder. Blade type fuses often require the use of a special purpose extractor tool to remove them from the fuse holder.

4.1) Glass vs. Ceramic Construction

While glass fuses have the advantage of a visible fuse element for inspection purposes, they have a low breaking capacity which generally restricts them to applications of 15 A or less at 250 VAC. Ceramic fuses have the advantage of a higher breaking capacity facilitating their use in higher voltage/ampere circuits. Filling a fuse body with sand provides additional protection against arcing in an overcurrent situation.

4.2) Measurements

Cartridge fuses are generally measured as the overall length and diameter of the fuse. Due to the large variety of cartridge fuses available, fuse identification relies on accurate measurements as fuses can differ by only a few millimeters between types. 'Bottle style'

cartridge fuses also require the measurement of the cap diameter as this varies between ampere ratings.

Other fuse packages can require a variety of measurements such as;

body (width x height x depth)

blade or tag (width x height x depth)

overall length of the fuse (when the fuse features blades or tags)

overall width of the fuse (when the fuse features 2 bodies)

width of the mounting holes (when the fuse features tags)

distance between blades (when radially configured)

fixing centre (when the fuse features tags - see below)

Fuses fitted with tags require the fixing centre measurement. This measurement is the distance between the tag mounting holes on either end of the fuse as measured from the centre of each mounting hole.

4.3) Special Features

Glass cartridge and plug fuses allow direct inspection of the fusible element.

Other fuses have other indication methods including:

*) Indicating pin or striker pin: extends out of the fuse cap when the element is blown.

*) Indicating disc: a coloured disc (flush mounted in the end cap of the fuse) falls out when the element is blown.

*) Element window: a small window built into the fuse body to provide visual indication of a blown element.

*) Flag: an external sprung arm that is released to an extended position once the element is blown.

*) External trip indicator: similar function to striker pin, but can be externally attached (using clips) to a compatible fuse.

*) Some fuses allow a special purpose microswitch[7] or relay unit to be fixed to the fuse body. When the fuse element blows, the indicating pin extends to activate the micro switch or relay which in turn triggers an event.

5) Automotive fuses

Plug-in type fuses come in three physical sizes: mini, ATO and maxi.

Automotive fuses protect the wiring and electrical equipment for vehicles. They are generally rated for circuits no higher than 24 volts direct current.

5.1) Blade type

Plug-in fuses (also called blade or spade fuses), with a plastic body and two prongs that fit into sockets, are used in automobiles. These types of fuses come in three different physical dimensions: mini (or minifuse), ATO® (or ATC) and maxi (or maxifuse).

The physical dimensions, including the connector, of the fuses are as follows (LxWxH) (ampere ratings in the parenthesis):

mini: 10.9x3.6x16.3 mm (2A, 3A, 4A, 5A, 7.5A, 10A, 15A, 20A, 25A, 30A)

ATO: 19.1x5.1x18.5 mm (1A, 2A, 3A, 4A, 5A, 7.5A, 10A, 15A, 20A, 25A, 30A, 40A)

maxi: 29.2x8.5x34.3 mm (20A, 30A, 40A, 50A, 60A, 70A, 80A)

It is possible to replace an ATO-type plug-in fuse with a circuit breaker that has been designed to fit in the socket of a ATO-sized fuse holder. These circuit protectors are more expensive than a regular fuse.

5.2) Bosch type

Bosch type fuses are used in old (often European) automobiles. The physical dimension of this type of fuse is 6x25 mm with conical ends. Bosch type fuses usually use the same color coding for the rated current. The DIN standard is 72581/1

6) High voltage fuses

Fuses are used on power systems up to 115,000 volts AC. High-voltage fuses are used to protect instrument transformers used for electricity metering, or for small power transformers where the expense of a circuit breaker is not warranted. For example, in distribution systems, a power fuse may be used to protect a transformer serving 1-3 houses. A circuit breaker at 115 kV may cost up to five times as much as a set of power fuses, so the resulting saving can be tens of thousands of dollars.

Large power fuses use fusible elements made of silver, copper or tin to provide stable and predictable performance. High voltage expulsion fuses surround the fusible link with gas-evolving substances, such as boric acid. When the fuse blows, heat from the arc causes the boric acid to evolve large volumes of gases. The associated high pressure (often greater than 100 atmospheres) and cooling gases rapidly extinguish (quench) the resulting arc. The hot gases are then explosively expelled out of the end(s) of the fuse.

Other special High Rupturing Capacity (HRC) fuses surround one or more parallel connected fusible links with an energy absorbing material, typically silicon dioxide sand. When the fusible link blows, the sand absorbs energy from the arc, rapidly quenching it, creating an artificial fulgurite in the process.

7) Fuses compared with circuit breakers

Fuses have the advantages of often being less costly and simpler than a circuit breaker for similar ratings. The blown fuse must be replaced with a new device which is less convenient than simply resetting a breaker and therefore likely to discourage people from ignoring faults. On the other hand replacing a fuse without isolating the circuit first (most building wiring designs do not provide individual isolation switches for each fuse) can be dangerous in itself, particularly if the fault is a short circuit.

High rupturing capacity fuses can be rated to safely interrupt up to 300,000 amperes at 600 V AC. Special current-limiting fuses are applied ahead of some molded-case breakers to protect the breakers in low-voltage power circuits with high short-circuit levels.

"Current-limiting" fuses operate so quickly that they limit the total "let-through" energy that passes into the circuit, helping to protect downstream equipment from damage. These fuses clear the fault in less than one cycle of the AC power frequency. Circuit breakers cannot offer similar rapid protection.

Circuit breakers which have interrupted a severe fault should be removed from service and inspected and replaced if damaged.

Circuit Breakers must be maintained on a regular basis to ensure their mechanical operation during an interruption. This is not the case with fuses, in which no mechanical operation is required for the fuse to operate under fault conditions.

| Colour | Ampere |
|---|---|
| Yellow | 5A |
| White | 8A |
| Red | 16A |
| Blue | 25A |

In a multi-phase power circuit, if only one fuse opens, the remaining phases will have higher than normal currents, and unbalanced voltages, with possible damage to motors. Fuses only sense overcurrent, or to a degree, over-temperature, and can't usually be used independently with protective relaying to provide more advanced protective functions, for example, ground fault detection.

Some manufacturers of medium-voltage distribution fuses combine the overcurrent protection characteristics of the fusible element with the flexibility of relay protection by adding a pyrotechnic device to the fuse operated by external protection relays.

8) Fuse boxes

Fuse boxhold electrical consumer units (also called fuse boxes) were fitted with fuse wire that could be replaced from a supply of spare wire that was wound on a piece of cardboard. Modern consumer units contain magnetic circuit breakers instead of fuses. Cartridge fuses were also used in consumer units and sometimes still are, as miniature circuit breakers (MCBs) are rather prone to nuisance tripping.

n North America, fuse wire was never used in this way, although so-called "renewable" fuses were made that allowed replacement of the fuse link. It was impossible to prevent putting a higher-rated or double links into the holder ("overfusing") and so this type must be replaced.

The "Wylex standard" was very popular in the United Kingdom up until recently when the wiring regulations started demanding Residual-Current Devices (RCDs) for sockets that could

feasibly supply equipment outside the equipotential zone. The design doesn't allow for fitting of RCDs (there were a few wylex standard models made with an RCD instead of the main switch but that isn't generally considered acceptable nowadays either because it means you lose lighting in the event of almost any fault) or residual-current circuit breakers with overload (RCBOs) (an RCBO is the combination of an RCD and an MCB in a single unit). The one pictured is fitted with rewirable fuses

but they can also be fitted with cartridge fuses and MCBs. There are two styles of fuse base that can be screwed into these units one designed for the rewirable fusewire carriers and one designed for cartridge fuse carriers.

Over the years MCBs have been made for both styles of base. With both styles of base higher rated carriers had wider pins so a carrier couldn't be changed for a higher rated one without also changing the base. Of course with rewirable carriers a user could just fit fatter fusewire or even a totally different type of wire object (hairpins, paper clips, nails etc.) to the existing carrier.

In North America, fuse boxes were also often used, especially in homes wired before about 1950. Fuses for these panels were screw-in "plug" type (not to be confused with what the British call plug fuses), in screw-thread holders similar to Edison-base incandescent lamps, with ratings of 5, 10, 15, 20, 25, and 30 amperes. To prevent installation of fuses with too high a current rating for the circuit, later fuse boxes included rejection features in the fuseholder socket. Some installations have resettable miniature thermal circuit breakers which screw into the fuse socket. One form of abuse of the fuse box was to put a penny in the socket, which defeated the overcurrent protection function and resulted in a dangerous condition. Plug fuses are no longer used for branch circuit protection in new residential or industrial construction.

9) British plug fuse

20 mm 200 mA glass cartridge fuse used inside equipment and 1 inch 13 A ceramic British plug fuse.The BS 1363 13 A plug has a BS 1362 cartridge fuse inside. This allows the use of 30 A/32 A (30 A was the original size; 32 A is the closest European harmonised size) socket circuits safely. In order to keep cable sizes manageable these are usually wired in ring mains. It also provides better protection for small appliances with thin flex as a variety of fuse ratings (1 A, 2 A, 3 A, 5 A, 7 A, 10 A 13 A with 3, 5 and 13 being the most common) are available and a suitable fuse should be fitted to allow the normal operating current while protecting the appliance and its cord as well as possible. With some loads it is normal to use a slightly higher rated fuse than the normal operating current. For example on 500 W halogen floodlights it is normal to use a 5 A fuse even though a 3 A would carry the normal operating current. This is because halogen lights draw a significant surge of current at switch on as their cold resistance is far lower than their resistance at operating temperature.

In most other wiring practices the wires in a flexible cord are considered to be protected by the branch circuit overcurrent device, usually rated at around 15 amperes, so a plug-mounted fuse is not used. Small

electronic apparatus often includes a fuseholder on or in the equipment, to

protect internal components only.

10) Other fuse types

So-called "self-resetting" fuses use a thermoplastic conductive element known as a Polymeric Positive Temperature Coefficient (or PPTC) thermistor that impedes the circuit during an overcurrent condition (through increasing the device resistance). The PPTC thermistor is self-resetting in that when the overcurrent condition is removed, the device will revert back to low resistance, allowing the circuit to operate normally again. These devices are often used in aerospace/nuclear applications where replacement is difficult.

A "thermal fuse" is often found in consumer equipment such as coffee

# CONGRATULATIONS . . .

## on your birthdays

### January

20 Barry Murrell ZS2EZ

21 Margaret France ZS2HM

22 Judy Tremeer, XYL of Late Ken, ZS2BWB

22 Bill Atteridge ZS6GHJ

24 Anthony Bruyns ZS2BA

27 Gary Anderson ZR2G

### February

02 Paul Galpin ZS2PG

02 Ginny Pullinger ZS2GIN

02 Shirley Winter, XYL of Gus, ZS2MC

03 Tom Davies, ZSL037

04 Ivan Newman, ZS2ILN

07 Joan Bowles, ZR2ABA

10 Mark Hugo ZS2MH

10 Lynne Crothall ZS2MM

11 Dirk Ligthelm ZS2D

12 Anne Prior, XYL of Brian, ZS2AU

12 Peter Lunow ZR2PEL

14 Arno du Preez, ZS2ABT

16 Mike Hanslow ZS1RMS

## on your anniversaries

### January

22 Renette and André van Deventer ZS2BK

23 Natasha, ZS2QT, and Anthony Bruyns ZS2BA

29 Margaret and Ken Victor ZS2OC

### February

01 Lizette and Nicolas Oelofse ZS2N

15 Vanessa ZS2VS and Chris Scarr ZS2AAW

## --Fuses--

contd.

makers or hair dryers. They contain a fusible, temperature-sensitive alloy which holds a spring contact mechanism normally closed. When the surrounding temperature gets too high, the alloy melts and allows the spring contact mechanism to break the circuit. The device can be used to prevent a fire in a hair dryer for example, by cutting off the power supply to the heater elements when the air flow is interrupted (e.g. the blower motor stops or the air intake becomes accidentally blocked). Thermal fuses are a 'one shot', non-resettable device which must be replaced once they have been activated.

## SILENT KEY

**Our friend and fellow Ham: Ken Tremeer ZS2BWB on 22nd December, 2007**

Will be missed by all at P.E.A.R.S.

# Sunday Bulletins

PEARS bulletins are transmitted on Sundays immediately after the SARL English transmission, i.e. at about 08:45 on 7098 kHz as well as the 2 metre linked network that provides from Butterworth to George and up to the Free State and their environs. PEARS 7098 or 3640 kHz transceive facilities are also remotely linked as needed. In addition, the SARL's 40m operations on 7082 or 7066 kHz or Hamnet's 7070 kHz can be remotely patched to the 2m network in receive only mode or with full transceive capability for interactive events.

## Bulletin Roster

| | | |
|---|---|---|
| 20th Jan | Clive | ZS2RT |
| 27th Jan | Eric | ZS2ECH |
| 03rd Feb | Bill | ZS2ABZ |
| 10th Feb | Glen | ZS2GV |
| 17th Feb | Rory | ZS2BL |

**Advertise your swops in this space.**

**Contact Ashley ZS2AG by sending an SMS or phoning on 0823726696.**

# Your Societies Committee for 2007

| | | | |
|---|---|---|---|
| **Chairman** | Donovan van Loggerenberg ZS2DL | 082-8524885 | zs2dl@hamradio.co.za |
| **Vice Chair, Technical** | Chris Scarr ZS2AAW | 041-3681344 | cvscarr@intekom.co.za |
| **Secretary** | Beavan Gwilt ZS2RL | 041-3688810 | beavan@xsinet.co.za |
| **Treasurer / Fund Raising** | Clive Fife ZS2RT | 041-3673203 | cfife@absamail.co.za |
| **Marketing & PR.** | Anthony Bruyns ZS2BA | 041-3602060 | anthonyb@vodamail.co.za |
| **Contesting and Awards,** | | | |
| **SARL Liaison** | Barry Murrell ZS2EZ | 041-5813561 | zs2ez@zs2ez.co.za |
| **Webmaster / Youth Dev.** | Barry Murrell ZS2EZ | 041-5813561 | webmaster@zs2pe.co.za |
| **Club Social Activities/** | Glen Cummings ZS2GV | 082-4112743 | glen_vaness@telkomsa.net |
| **Guest Speakers** | Beavan Gwilt ZS2RL | 041-3688810 | beavan@xsinet.co.za |
| **RAE (co-opted for this** | Al Akers ZS2U | 041-3602983 | reucom@agnet.co.za |
| **purpose)** | Paul Galpin ZS2PG | 041-3721779 | galpinp@absamail.co.za |
| **VW Rally** | Chris Scarr ZS2AAW | 041-3681344 | cvscarr@intekom.co.za |
| | Anthony Bruyns ZS2BA | 041-3602060 | anthonyb@vodamail.co.za |
| | Beavan Gwilt ZS2RL | 041-3688810 | beavan@xsinet.co.za |
| **Catering for meetings** | Bill Hodges ZS2ABZ | 041-5812580 | whodges@absamail.co.za |
| **Other members** | Eric Hosten ZS2ECH | 041-3681505 | Eric.Hosten@nmmu.ac.za |
| **Elmer Committee** | Bill Hodges ZS2ABZ | 041-5812580 | whodges@absamail.co.za |
| Assisted by co-opted | Viv Moore ZS2VM | 041-3681340 | vivmoore@mweb.co.za |
| members | Al Akers ZS2U | 041-3602983 | reucom@agnet.co.za |

# PEARS' VHF/UHF, Packet & Other Services

**REPEATERS**

**Town VHF** # 145,050/650 **Town UHF** # 431,050/438,650 **Uitenhage** # 145,075/675
# - These repeaters form a separate sub-net in the **PE** - **Uitenhage** - **Despatch** area

**Cockscomb** 145,000/600 **Lady's Slipper** *145,100/700 **Colesberg** *431,075/438,675
**Noupoort** *431,150/438,750 **Cradock** *145,050/650

* These form the PEARS long-range 2-metre repeater system, also linked to which are **East London** 145,775 MHz, **George** 145,700, **Danabaai** 145,600, **Stilbaai** 145,750, **Butterworth** 145,725, King Williams Town 145,625 and Umtata (438,725 duplex). It is further extendable to **Cape Town** via the WCRWG system. # These can also be linked as required.

**PACKET NETWORK**

ZS0NTP-2 Packet Node - **Lady's Slipper** 7.040 300bd, 144.625 1200bd, 434.875 9600bd, 433.800 1200bd APRS, Cape Linked Network listen-only for APRS.
ZS0NTP Packet Bulletin Board - **Lady's Slipper** Access via the node, or use "VIA ZS0NTP-7"
ZS0GHT-2 Packet Node - **Governorskop** 144.675, 438.275, 434.875
ZS0CDK-2 Packet Node - **Cradock** 144.675
ZS2ABZ-4 WMR918 Weather Station on APRS 144.625

**BEACONS**

**2M Beacon** (ZS2VHF CW ID, FSK) Horizontally polarised 25W ERP 144.415

**6M Beacon** (ZS2SIX CW ID, FSK) Horizontally polarised 25W ERP 50.005

**See the PEARS web site at www.zs2pe.co.za for further details and network diagrams.**