



# THE PROPAGATOR

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MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY  
VOLUME - 86 , NUMBER : 11  
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MEETINGS ARE HELD ON THE SECOND TUESDAY OF EACH MONTH ,  
(EXCEPT-JANUARY) AT 7.30.PM.AT THE STATE EMERGENCY SERVICES,  
BUILDING , IN MONTAGUE STREET , NORTH WOLLONGONG.

VOSITORS ARE MOST WELCOME TO ATTEND THE MEETING.

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MERRY  
CHRISTMAS  
&  
A HAPPY  
NEW YEAR



# ANNUAL AUCTION

The Illawarra Amateur Radio Society held its annual Auction-Sale last Month in the S.E.S. Building.

Although the attendance was not up to previous years standard, all present enjoyed the occasion.

President Keith VK2OB took over the duties of auctioneer for the night, as the usual auctioneer Dennis VK2DMR is still over in the U.S. of A.

There was a reasonable amount of goodies brought in by members to go under the Hammer, and most of them found their way into other shacks.

Auctioneer Keith had a hard time getting the bidding going, but after a few jovial remarks (no one made a bid on these) things started to swing with the bids going into double figures.

From then on in bidding for items were fast and furious, keeping Keiths

helpers Tony VK2ENX, Bill VK2DYU, Jim VK2EJH and Dave VK2YKQ/VAV busy for the rest of the evening.

After the auction members adjourned to the canteen for a well earned "CUPPA" and "CHINWAG" before loading up their vehicles with their purchases.

And so another successful Club Annual Auction came to and end until next year.

Thanks must go to members who make this its usual successful occasion to members and business houses who supply and donate goods for the Clubs financial benefit. And to members who come on the night (Buyers or non buyers) and members who bring items for auction, these are the people that make our clubs yearly auction, an enjoyable (if not expensive night).

## SO THE STORY GOES

A young man took a young Lady driving in the country in an open top sports car, when miles from the nearest town a bad storm came up, so the couple seeked shelter for the night at a farmhouse.

When the farmer came to the door they asked him if he could put them both up for the night and if he had seperate bed rooms, (as they were not married).

The farmer said that he only had 1 room that was spare with only a double bed in it, and suggested the only way out of the predicament was to put two large pillows down the centre of the double size bed thus in theory making two singles.

The young couple agreed to this as it was raining very hard outside.

Next morning with the storm having gone, they said their thanks & farewells to the farmer and took off in the open sports car.

After driving for about ten minutes the young mans CAP blew off and disappeared over the fence.

He slammed the brakes on and started to get out of the car when the young Lady asked him what he was going to do.

The young man replied, "I am going to jump over that fence and get my CAP back". The young Lady replied, "jump over that fence, you have to be joking you couldn't jump over two bloody pillows last night".

WHICHEVER WAY YOU LOOK AT IT  
YOU CANT GO PAST

**MARINA GARAGE**

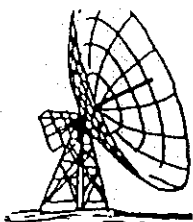
FOR SERVICE CALL IN AND SEE  
**PETER CHIECO**

For Your :-

- \* Electronic tune up \* Wheel balancing
- \* Front end alignment \* Brakes
- \* And also Rego Checks.

146 PRINCES HIGHWAY. CORRIMAL

PHONE: 84 5650



# SATELLITE NOTES BY LYLE VK2ALU

Satellite Notes - December 1986.

(prepared 26/11/86)

As I have been away from home over the past few weeks I have not yet caught up with the latest satellite news.

Oscar 10's condition should become more clear over the next month or so.

According to info received from a VK7 satellite operator while I was in Launceston, FO12's digital transponder is either on or close to being usable.

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# EME REPORT BY LYLE VK2ALU

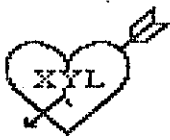
Moonbounce Report -December 1986.

Dr Dick Turrin's latest letter has provided sufficient ideas to keep an experimenter going for many months! In essence it boils down to working through the fundamentals of a low noise UHF/microwave receiving system as well as trying to obtain optimum antenna feed polarisation, not only for our echoes, but also for signals from other stations which may start out not necessarily exactly circularly polarised in the correct direction and then propagated through a more complex medium than is generally recognised.

Up till now I have considered that the mean path loss for a "circularly polarised" EME signal could be calculated with known accuracy, but right now I'm not so sure! -Fascinating!!

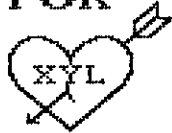
As Tony VK2ENX, had other commitments on Sunday 23/11 and no one else contacted me with regard to the proposed EME operation on that day, it was decided to operate on the morning of Monday 24/11 (local time) instead as an extra hour of moon window would be available and European 1296MHz signals are more likely to be about on their Sunday than on their Saturday. Unfortunately it was raining at my QTH when it was time to leave home on 24/11. A solo effort under such conditions is, at present, undesirable - so VK2AMW did not appear on EME this month.

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PLEASE BRING  
YOUR X.Y.L.  
TO THE NEXT MEETING

A PLATE WOULD BE  
MOST WELCOME FOR  
THIS OCCASSION



## NEWTEK- ELECTRONICS

WE STOCK:  
ALARMS - ANTENNAS  
BOOKS - BOXES  
COMPONENTS-COMPUTERS  
HARDWARE - KITS - TOOLS  
WIRE AND A LARGE RANGE  
OF SEMICONDUCTORS FOR  
THE PROFESSIONAL AND  
HOBBYIST : 116 CORRIMAL  
STREET . WOLLONGONG.  
(JUST FROM HARP-HOTEL)  
PHONE : 27 1620.

lately still air, the only forces acting on the tower are due to the weight of the antenna and its own weight. These are transferred down through the structure and end up as a simple vertical load. When a wind blows on the tower and antenna, the stays are called upon to resist this force. Ideally, stays should come out horizontally from the tower, and in such a situation the wind force would be resisted by the stays, and the only forces transferred down through the tower would be the original vertical load.

In practice however, we have to bring the stays down to anchorages at ground level so we get involved in calculations of a triangle of forces, since a stay inclined at an angle below the horizontal introduces additional vertical loads in the tower. If we assume that the stay is inclined at an angle  $A^\circ$  to the vertical, then:

$$\sin A = \frac{\text{wind force}}{\text{stay force}}$$

$$\tan A = \frac{\text{wind force}}{\text{tower load}}$$

If for example we installed a stay an angle  $A = 45^\circ$ , and if the wind force was 100kg then:

$$\sin 45^\circ = \frac{1}{2} = \frac{100}{\text{stay force}}$$

$$\text{Stay Force} = 100 \times 2 = 141\text{kg}$$

$$\tan 45^\circ = 1 = \frac{100}{\text{tower load}}$$

$$\text{Tower load} = 100\text{kg.}$$

If the stay was at an angle of  $30^\circ$  to the vertical then  $\sin A = 0.5$  and  $\tan A =$

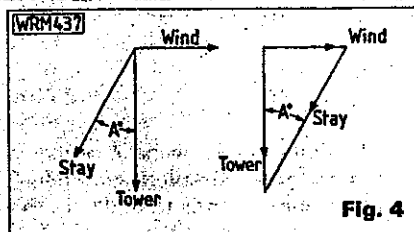


Fig. 4

0.58. Thus for a wind force of 100kg the stay force would be 200kg and the tower load would be 172kg.

So we see that a horizontal stay takes a pull equal to the wind force and exerts no additional load on the tower, a  $45^\circ$  stay takes 1.41 times the wind force and imposes a tower load equal to the wind force, and a  $30^\circ$  stay takes twice the wind force and imposes a tower load 1.72 times the wind force.

If we refer back to the first example we see that the 160km wind load on a 6-element beam is 61kg. If we assume a wind load of 30kg acting on the top section of the tower body itself, we have a total wind load of 91kg.

With  $45^\circ$  stays, the corresponding stay force would be 128kg, and the tower load would be 91kg.

With  $30^\circ$  stays, the corresponding stay force would be 182kg, and the tower load would be 157kg.

From a practical point of view, we should try to have the highest stay on a tower at  $45^\circ$  inclination, if possible. In cases of space restriction we could reduce this to  $30^\circ$ , but doing so introduces quite severe loads in the stay and in the tower.

To determine the size of wire necessary for a given installation, the wind forces acting on the antenna and tower can be calculated as before and a

suitable wire selected from the makers data for safe loadings. It is important that staywires are terminated on suitable galvanised steel or plastics thimbles available from builders providers and ships chandlers to ensure that excessive bends are not made which would weaken the wire. Turnbuckles are recommended for adjusting the tension in the stays. They should not be over-tightened, merely made secure enough to resist the wind forces without pre-stressing.

In regard to the foundation, a massive block of concrete of 1 cubic metre (such as was called for in the case of the free-standing tower) is not necessary. For a typical installation, say two 6m lengths of triangular TV antenna tower, assuming that the ground is solid, not boggy or waterlogged, a pad of concrete 0.6m square by 0.25m thick on a base of gravel would be ample. A few bolts may be embedded in the concrete to provide an anchorage for the tower which simply sits on the concrete, the bolts serving merely to resist any tendency for the tower to skid sideways. The nuts on these bolts need only be hand-tight. Large commercial towers, such as for TV broadcast stations, very often have the tower coming to a point at the bottom, with provision for a large ball-bearing on which the tower rests (Fig. 3).

Three stays are sufficient at any one level; do not attempt to install four or more stays since it can be very difficult to tension them equally. In the case of the 12m tower mentioned, stays would be required at the 6m and 12m levels. If short sections were used, such as 3m sections, it would be advisable to install stays at each joint.

# Treasurers Report

December 1986

Subscription to the lotto scheme has recently dropped off a little. Although this drop is not significant, if the trend continues... Members should remember that the lotto has replaced our older fund raising activities (raffles, etc.) which brought in less money, and cost more time from the 'hard core' club workers (that SMALL group of members that actually DO the work). I have made mention in past reports of the club's bright financial future - these predictions were made under the assumption that members would support the club's fund raising. It is true that our club's future is promising - but only with your support - remember, the club has a \$3200 debt to pay off, and considerable expenditure on VK2RAW may be needed in the immediate future.

Current membership:	Life	.....	3
	Pensioner	....	16
	Normal	.....	90
	Overseas	.....	2
		---	
	Total		111

Monthly transactions for November 1986:

Income	\$	515.20
Expenditure		318.94
Book Balance	\$	4177.71

Budgeted expenditure to the end of this financial year (March 1987):

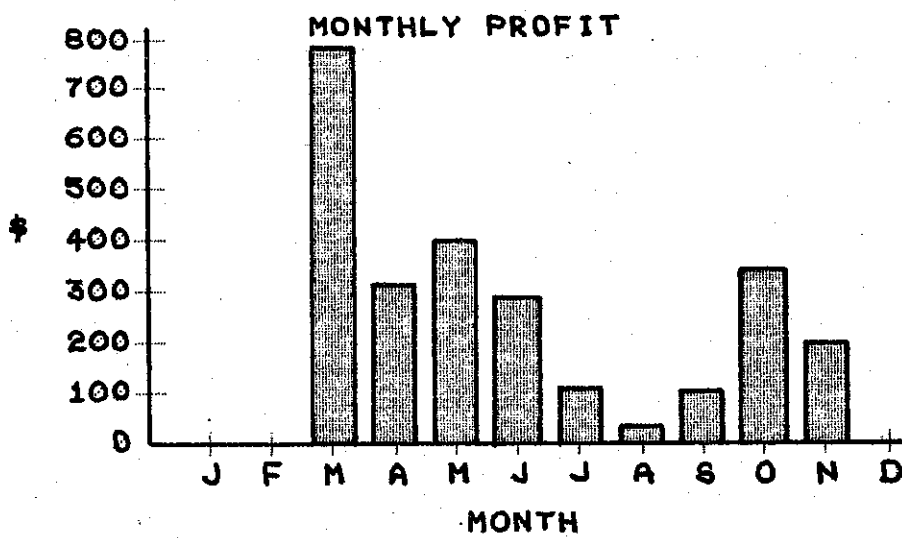
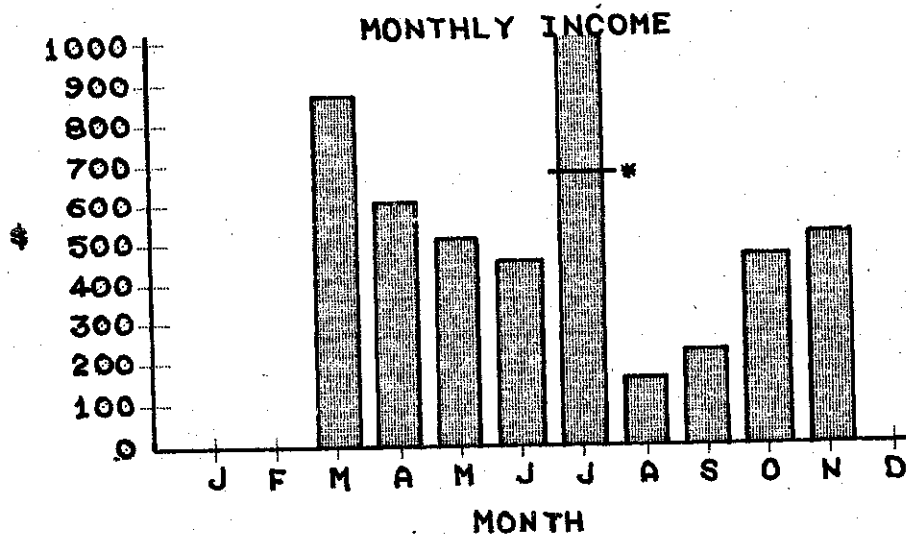
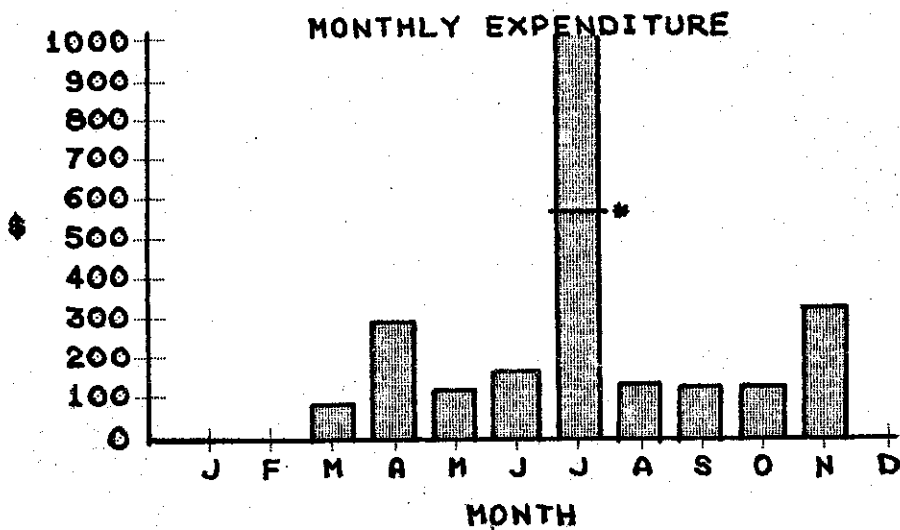
Propagator costs	\$	90.00
Refreshments		20.00
Lotto2 payouts		150.00
Lotto2 coupons		2.30

The lotto costs will be offset by the \$262 still to be collected for FRL2.

The accompanying bar charts show the club's financial activity for the past year. The income and expenditure for July are inflated by the cheques drawn and deposited when we moved accounts from Westpac to the IMB. I have shown the values excluding these items with asterisk (\*) on the chart.

73

David Henderson (VK2YKQ / VK2VAV)  
Treasurer.



# SMOKEY & THE BANDIT

Fiction

Paul Malkinson

I'm a junkie: that is to say I eat junk food and all that stuff.

I enjoy it; I love the taste of junk food.

I am also addicted to tobacco. Now that I don't enjoy. Not one little bit. I don't enjoy waking up in the morning to de-coke my long-suffering lungs with spasms of coughing severe enough to produce a hernia.

I don't like being told by my wife that I smell. That my clothes smell, and that everything around me smells.

I hate it when someone says to me "Doesn't that smell nice?" because how the hell would I know it smells nice. Or whether it has any smell at all.

"Can you believe that incredible flavor, the subtle blend of herbs and spices?" asks one of my acquaintances. I could strangle him. Unless there's enough chilli in my food to start a campfire, I can't taste a damn thing.

Add to that the burn holes on the furniture where I forgot I'd left a cigarette, the overflowing ash-trays and the brown stains of tar finely coating the surfaces of everything surrounding my little office, the frantic dash down to the store when I realise my supply is in imminent danger of running out, the bitten fingernails when I didn't make the store before it closed.

(Excuse the ash on this page, damn stuff gets everywhere)

I stare horrified at the 'NO SMOKING SIGN' in the cab; how can I make it across town in a taxi without my drug? I ask you. It could take fifteen minutes or even more.

I daren't go into a department store these days without staying close to an exit; if the urge comes on I want to be able to get out there quick! Life's hell, isn't it?

I even have to feel guilty when I light up in a non-smoking friend's house; everyone stares at those wonderful blue plumes of fragrant smoke.

"Stop smoking" says my wife. "If others can do it, so can you". Smug little so-and-so, she never started.

"All it takes is will-power", she adds.

She knows damn well I don't have any will-power; I'm a weakling. All I want is another cigarette.

"You'll save money". To hell with the money, give me a smoke. "You're ruining your health". Sure, sure. Give me a cigarette.

Read any of those articles about heroin addicts? Terrible business. All that suffering and anguish; dreadful.

But what about me?! You just try taking my drug away from me and see what happens.

Thing is, my drug's legal. Apart from that, it makes me more manly. Says so, right there in the adverts. Hell, some cigarettes enables me to go out and rope a wicked looking steer from horseback, others make me into a better cameraman, or a sailboat skipper winning races like they were going out of fashion. If it takes my fancy I can appreciate music with a never before heard of clarity, with the aid of a certain brand of tobacco. If I want to catch fish with a little cast net and enjoy a little freshness and coolness, there's a brand available which demonstrates how easy and pleasant it all is,

There seems to be no limit to the abilities offered to me, a whole new world opens up if I choose one or the other brand of cigarette. They do however, appear to be quite selective. The one which promises a life as a cowboy offers no guarantee, nor even a whisper, that I may benefit in the field of Grand Prix motor racing, using the same brand. Presumably, in order to be equally proficient in horse riding, racing, fishing, or just being cool and refreshed, one must carry and use several different brands. Personally, as I have no aspirations to better myself by diverse accomplishments, I'll stick to the brand which seems to be preferred by that curious animal with a hump on its back. I've already got the right temperament.

See how it gets to you? There I was, ready to launch into a serious and impassioned piece about the evils of the humble cigarette, and I got completely carried away.

Tell you what I'm going to do: I'm going to make up a heap of paper strips with words on them and I'm going to sabotage the advert poster. Where it says "Enjoy the fresh cool flavor of...", I'm going to stick the paper over it reading AIR.

When I've done that my next target is going to be "Your international passport to (choking) pleasure". Then, I think I'll have a crack at two together, with a cowboy mounted on a camel, roping in a half-smoked cigarette with a length of fishing line.

That is, after I've rolled myself a smoke from that brand of tobacco which is produced explicitly for MEN.

## WOLLONGONG ALUMINIUM CENTRE

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- \* Round Hollows.
- \* Square Hollows.
- \* Flat Bars.
- \* Channels.

\* Cutting Service Available \*

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## COAST-WIDE COMMUNICATIONS

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CB AERIALS - COAX CABLE  
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SALES AND SERVICE

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SHELL - GARAGE  
PHONE: 67 2134.

VK2KWN WAYNE NEWPORT

# REPEATER REPORT - GRAEME - VK2CAG

IARS REPEATER REPORT

DECEMBER 1986

6850 Mt. Murray.

The access track to the repeater, which has become more difficult to negotiate recently, has been repaired by a small group of workers. On Sunday 23/11/86 Rob VK2MT and XYL, Peter VK2JAM and XYL, and Fred VK2KFW were on site covering the slippery sections of the track with road base material and moving rocks and filling in holes. With most of the work completed, there remains some more filling to be laid to finish the job. This should be done next weekend if the weather holds. I am told that the XYLs did more than their fair share of the work!

This work is a very necessary part of repeater maintenance which adds to the reliability of the repeater. There is no reason now for the repeater to be off the air for long periods in the event of a breakdown, because it is now accessible by any member of the repeater committee who has a car, rather than have to wait for the availability of a 4WD.

There have been many instances in the past when I have had reason to pass within a few kilometres of the repeater, and would have called in to do a routine maintenance check, but have given it a miss because of the possibility of getting stuck or stranded on the track.

Thanks guys for the time and effort you have put in, not to forget Morry who organised the day leaving me time to work on 7275 at Sublime Point.

Mt. Murray packet repeater.

The last news on the proposed packet repeater destined for Mt. Murray was that we had shelved the project indefinitely. Well, due to changed circumstances I am happy to be able to say that we are proceeding again with the project. The main reasons for abandoning it were that we had problems supplying enough power to 6850 from solar panels, and another repeater at the same site, no matter how economical on energy it might be, would worsen the problem. Also, at that time there was talk of another Sydney based packet radio group using a site on the Southern Highlands for a packet repeater. If this went ahead, there would be no need for one at Mt. Murray, but no-one appears to have made a move to date, so it looks as if we will be the ones to take the initiative. Our application for the licence is still being processed, and the delay appears to be due to recent changes in DOC policy (in our favour) relating to packet radio operation and repeaters.

The extra solar panel installed last July has indeed solved the energy problem. We are selling the wind generator, and will purchase another solar panel with the proceeds. The packet repeater, due to its lower power and short transmit/receive duty cycle, will draw far less power than 6850, and one additional panel will be more than adequate to supply the energy needed. Most of the equipment is already available, either donated or on permanent loan to the IARS, so the cost will be minimal. No extra licence fee is payable when more than one repeater share a common




**THE ILLAWARRA AMATEUR RADIO SOCIETY**
  
**P.O.BOX. 1838. WOLLONGONG. 2500. N.S.W.**

**MEETINGS:** Are held every 2nd Tuesday of the Month except January, at 7.30.p.m. in the S.E.S. Headquarters, Montague street, North Wollongong.

**REPEATERS:**  
 VK2RAW - 146.850. - (VOICE) VHF Mt Murry.  
 VK2RIL - 147.275. - (VOICE & R.T.T.Y) VHF Sublime Point.  
 VK2RUW - 438.225. - (VOICE) UHF Hill 60 Port Kembla.  
 VK2RIL - 438.725. - (VOICE & R.T.T.Y) UHF Sublime Point.

**BROADCAST:** On Sunday evening prior to the club meeting, at 7.00.p.m. R.T.T.Y. Mode, and at 7.15.p.m. on voice. Transmitted on 147.275.VHF, and relay on 3.562.Mhz. Callbacks will be taken after the voice broadcast.

**W.I.A. RELAY:** On 146.850. at 11.00.am. and at 7.30.p.m. each Sunday.

**CLUB - NETS:** On 3.562.Mhz. SSB on Sunday at 8.00.p.m. and a slow morse net on 28.440.Mhz. on Thursday evenings at 8.00.p.m.

**NEWSLETTER:** "THE PROPAGATOR", published monthly to reach FINANCIAL-MEMBERS in the week preceeding the club meeting. All articles, adds etc, to the editor must be in, or try, by the 3rd Tuesday each month.

**MEMBERSHIP:** The Secretary, I.A.R.S., P.O.Box.1838. Wollongong. 2500. Full membership is \$10 per annum; students & pensioners concessional members \$5 per annum.

**AWARDS:** The award of the Illawarra Amateur Radio Society is the LAWRENCE-HARGRAVE-AWARD. VK stations require 10 contacts with I.A.R.S. members. Overseas stations require 5 contacts with I.A.R.S. members. A contact with VK2AMW is sufficient for the award. Band-details, date, frequency, station worked and \$2 or 4 I.R.C.'s. to THE AWARD-MANAGER, I.A.R.S., P.O.Box. 1838. WOLLONGONG. 2500. No QSL-CARD is required.

**STORE:** The club store operates at each club meeting. by COMMITTEE-MEMBERS.

**COMMITTEE:**

PRESIDENT	VK2OB - KEITH CURLE. 24 . Beach Drv, Woonona.
VICE-PRESIDENT	VK2DYU- BILL CHADBURN. 45. Beltana Ave, Dapto.
SECRETARY	VK2EJH- JIM HAYES. 1 Kathleen Cres, Woonona.
TREASURER	VK2VAV-YKQ-DAVE HENDERSON. 8. Gladstone st. Bellambi.
AUDITOR	VK2ZHU- GEOFF CUTHBERT. 1 Nioka Ave, Kieraville.

**GENERAL-COMMITTEE:** VK2EXN- IAN CALLCOTT. VK2ENX- TONY MOWBRAY. VK2MT- ROB McKNIGHT.  
 VK2ALK- LES KIRCHMAJER. VK2DWR- DAVE ROUTLEDGE. VK2JAM- PETER WOODS.  
 VK2OE- WOJCIECH TOMCZYK. VK2BMH- MARTIN HUTCHINGS.

**REPEATER - CHAIRMAN:** VK2CAG - GRAEME DOWSE.

**REPEATER - COMMITTEE:** VK2EXN - IAN CALLCOTT. VK2EMV - MORRY. v. d. VORSTENBOSCH.

VK2DFK- MIKE KEECH. VK2MT- ROB McKNIGHT. VK2JAM- PETER WOODS. VK2EZY- DAVE COLLESS.

**QSL-CARD'S OUT :** VK2EXN - IAN CALLCOTT.

**QSL-CARD'S IN :** VK2DWR - DAVE ROUTLEDGE.

**E.M.E. CO-ORDINATOR:** VK2ALU - LYLE PATISON.

**PUBLICITY - OFFICER:** VK2VAV/YKQ - DAVE HENDERSON

**BROADCAST - OFFICER:** VK2ENX - TONY MOWBRAY.

**CARTOONIST :** VK2AXI - BRIAN WADE.

**PROPAGATOR-EDITORS :** VK2PZY - DAVE CAPON. VK2EMV- MORRY. v. d. VORSTENBOSCH.

**PRINTERS :** VK2DFK - MIKE KEECH. AND POSTED BY VK2EJH- JIM HAYES.

**LIFE - MEMBERS :** VK2CAG- GRAEME DOWSE. VK2OB- KEITH CURLE. VK2ALU- LYLE PATISON

**SUNDAY - EVENING - CLUB-NET - ROSTER:**

1<sup>st</sup> SUNDAY OF THE MONTH : VK2MT - ROB McKNIGHT.

2<sup>nd</sup> SUNDAY OF THE MONTH : VK2ENX- TONY MOWBRAY.

3<sup>rd</sup> SUNDAY OF THE MONTH : VK2PZY- DAVE CAPON.

4<sup>th</sup> SUNDAY OF THE MONTH : VK2DWR- DAVE ROUTLEDGE.

5<sup>th</sup> SUNDAY OF THE MONTH : VK2EBI- KEVIN MURPHY.

# ON THE NET

23rd November 1986.

## F. R. L. 2. WINNERS

- Week No: 3. S. HARJU  
 Week No: 4. C. VAUGHAN  
 Week No: 5. M. KEECH  
 Week No: 6. C. VAUGHAN

2nd November 1986.

VK2EMV-Morry. Co-ordinator.  
 VK2KFW-Fred. VK2PZY-Dave.

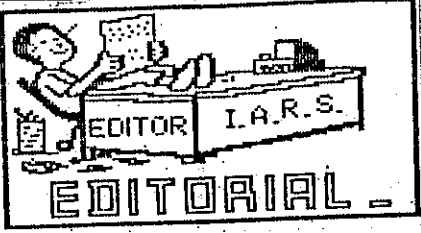
VK2PZY-Dave. Co-ordinator.  
 VK2EBI-Kevin, VK2MT-Rob,  
 VK2KFW-Fred, VK2DFL-Dave,  
 VK2EMV-Morry, VK200-Ray,  
 VK2JAM-Peter, VK2ENX-Tony.

9th November 1986.

VK2ENX-Tony. Co-ordinator.  
 VK2MT-Rob, VK2QU/3-JIM,  
 VK2PZY-Dave, VK2AXI-Briane,  
 VK2EMV-Morry, VK2JAM-Peter,  
 VK2PHD/5-Ray, VK2KFR-Fred,  
 VKPTL-Phil.

16th November 1986.

VK2MT-Rob. Co-ordinator.  
 VK2EBI-Kevin, VK2KFW-Fred,  
 VK2PZY-Dave.



Well its that time of year again, the time when all Good Amateurs get ready to hang up their pillow cases hoping that Mrs Santa will put a new A.T.U. unit or 2.M. rig or just a plain down to earth yagi in it.

It is also the last get together, Before the NEW-YEAR of 1987, my how time flies.

This is also the time of year when we (-INVITE-) the LADIES in our lives (God bless them) to join us at our last get together of the year.

So come on Fellas, coax your Wives Girl Friends etc to come to the December meeting, and if they could, bring a plate of goodies with them it would be appreciated.

To the Ladies in our lives we cordially invite you to come and meet the other XYL'S and hope you have an enjoyable evening on this festive occassion.

Dont make expensive mistakes by buying blind  
 What should you expect as a minimum when  
 purchasing an IBM compatible?

- \* Dual speed 4.77MHz & 8MHz
- \* 8088-2 Processor
- \* Fully socketed Mother Board
- \* Socket provided for 8087 arithmetic chip
- \* Eight Expansion slots (2 should only be occupied)
- \* Extra sockets for ROM's
- \* Minimum 640K on Mother Board
- \* 135w Power Continue output
- \* Built in cooling fan
- \* Centronic parallel printer port
- \* 2 RS-232 serial Communication port ( you will probably end up with a Modem & Mouse or A/D card etc )
- \* Joystick Port
- \* Dual floppy Controller
- \* Battery backed clock/calendar
- \* Legal Bios eg. ERSO
- \* 2 Quality Floppy Japanese Disk Drives as used in Sperry, IBM, Olivetti etc .
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# Antenna Tower Calculations

*This article, written by Sean Linehan EI7CV, was first published in the IRTS Newsletter. It is intended as a guide to anyone who may contemplate installing a tower in a concrete base or a stayed tower.*

Some of the figures may be taken as constants, the others such as tower height, width and weight will depend on the individual's own case, but the method of calculation remains the same, and the precise values of the variables may be substituted.

A typical example could be as follows:

- Tower height—10m
- Width at top—0.3m
- Width at bottom—0.6m
- Width of corner members—35mm
- Width of diagonals—25mm
- Weight of tower plus antenna—200kg
- Wind speed—160km.p.h.
- Weight of concrete—2400kg per cubic metre
- Weight of earth—1600kg per cubic metre

The loads to be catered for in the design are:

- (a) Wind on the antenna
- (b) Wind on the tower
- (c) Weight of the tower

A wind of 160km.p.h. will exert a pressure of 61kg per square metre on exposed surfaces. A typical 6-element beam has a surface area of 0.75 square metres. If we take an area of 0.836 square metres this will cater for the antenna, rotator and pipe.

Thus the wind load on these:  
 $= 61 \times 0.836 = 51\text{kg}$

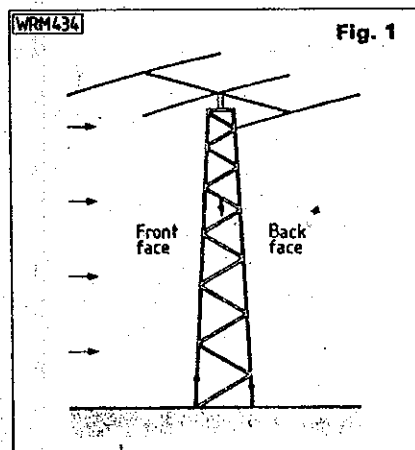
The moment at ground level:  
 $= 51 \times 10 = 510\text{kgm}$

Next an estimate of the tower surface area must be made. The corners first:

$$2 \times 10 \times 0.035 = 0.7\text{sq m}$$

For the diagonals we shall assume 10 of average length 1m:

$$10 \times 1 \times 0.025 = 0.25\text{sq m}$$



The total surface area of the front face is:

$$0.7 + 0.25 = 0.95\text{sq m}$$

We then have to take into account half the area of the back face, since this is partially shielded by the front face. So this is 0.475sq m.

Total area:

$$0.95 + 0.475 = 1.425\text{sq m}$$

Thus the wind load on the tower is:

$$61 \times 1.425 = 87\text{kg}$$

This acts uniformly along the whole height, but to find its moment at ground level we take:

$$27\text{kg acting at 8m over ground} = 216\text{kgm}$$

$$20\text{kg acting at 6m over ground} = 120\text{kgm}$$

$$20\text{kg acting at 4m over ground} = 80\text{kgm}$$

$$20\text{kg acting at 2m over ground} = 40\text{kgm}$$

$$\text{Total} = 456\text{kgm}$$

Therefore the total overturning moment is:

$$510 + 456 = 966\text{kgm}$$

The moment load per leg is:

$$\frac{966}{2 \times 0.6} = 805\text{kg}$$

That is with 2 legs per face at a width of 0.6m.

We assumed the weight of the tower to be 200kg, or 50kg per leg, which acts downwards. Thus on the compression side we get:

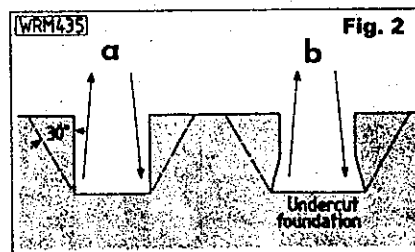
$$805 + 50 = 855\text{kg total downward load.}$$

On the tension (uplift) side we get:

$$805 - 50 = 755\text{kg total upward load.}$$

If the tower is placed in solid ground there is no need to make special provision for the downward load, so we now need to cater for an uplift of 755kg per leg. For a tower of this size, it would not be practicable to have separate foundations for each leg, so we consider a single block of concrete to enclose the four legs. Of this block, half can be considered as resisting uplift, thus we have to design for a block to resist an uplift of:

$$2 \times 755\text{kg} = 1510\text{kg (2 legs)}$$



A suitable size of concrete to enclose a tower of width 0.6m will be 1m square—which is about the size of the best hole a man can dig without getting stuck on a pickaxe! If we dig a hole 1m deep and fill it with concrete, we will have 0.5 cubic m resisting uplift. In addition, an inverted half-pyramid of earth will help to resist uplift, its shape being determined by a 30° angle from the vertical at the bottom of the concrete block (Fig. 2(a)).

An approximation for this volume of earth is:

$$1 \times \frac{1}{2} \times \frac{1}{2} \times 1 \times 2 = 0.33\text{ cubic m}$$

This amount of earth weighs 528kg. As stated previously, we have 0.5 cubic m of concrete resisting uplift, and this amount of concrete weighs 1200kg. So the total weight resisting uplift is:

$$1200 + 528 = 1728\text{kg}$$

This is greater than the uplift load of 1510kg calculated previously, so this foundation would be adequate.

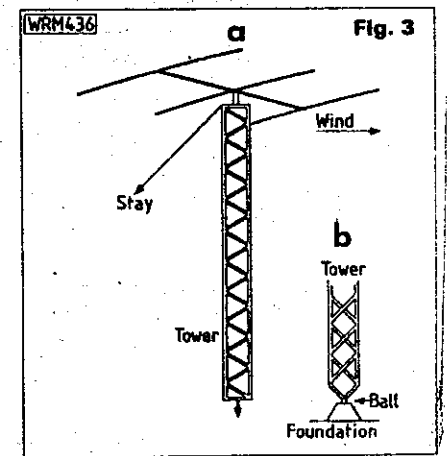
If we are placing the tower in solid ground, not prone to cave-in during digging, for any given size of excavation the strength of the foundation can be increased by undercutting the hole at the bottom by say 0.15m in the last 0.3m of depth, since the volume of earth resisting uplift will thereby be increased considerably. This undercutting should not be done until just before placing of concrete, to avoid danger of collapse (Fig. 2(b)).

To summarise, a free-standing tower has no outside assistance in the form of stay-wires, and must be capable of resisting within its own structure, all the forces exerted upon it. The design is such that all the forces are transferred downwards and into the foundation, ending up as uplift forces and downward forces. These forces combine in trying to overturn the tower, and so the foundation is designed to resist all these forces without yielding.

## A Stayed Tower

A stayed tower relies on the stays for its stability and is by comparison with a free-standing tower, a relatively flimsy and flexible structure.

Under conditions of no wind, abso-



# 12 MONTHS GONE

Well it is 12 months since moving North to the good country. My radio & computer equipment setup is slowly progressing.

It was quite a pleasure to participate in J.O.T.A. at the 1st. Rathmines Scout Hall this year without being washed out as in the past.

I worked in company with Phil, VK2BPC, both running our gear with home brew antenna consisting of a 20mtr 1/4 wave vertical & a multi band dipole with tuned feeders. All the antenna's were set up by the

local scout group which showed to be quite enthusiastic.

Stations worked on the Sunday included H44 Solomons 3D2 Fiji, ZL & P29 plus the various VK stations in all states.

In general, DXing has been very interesting during the past week or so. Stations worked include YI0BIF, HZ1TA, Y78SL, A4XJW, 4X6TT & UQ1GWC :- All QRP ( 5 watts or less ) & 200 mtr long Wire Ant, at app. 6 mtrs above ground.

All contacts were on 20

mtrs around 1200 to 1400 Zulu. And speaking of DX, an extremely rare copy on 70cm from Arcadia Vale to VK2EXN at Mt Warrigal and later in the week 2mtr hand held contact to the same station.

A 5 minute visit from VK2CAG, XYL & Harmonic in October was a pleasant surprise, which after a BBQ tea and a 2 hour Ragchew catching up on the Southern news, Graeme & Family left for home.

In closing, if any of the club members are travelling North, then don't fail to give me a call on 7100 or 6900 most times. I am usually not far away & would be pleased to see some old faces. Location is Western side of Lake Macquarrie just South of Toronto.

73 for now.  
Dave VK2DFL.

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# FIRST PRIZE

A young man won first prize in LOTTO of \$1,000,000 Dollars. His Father asked him, "SON what are you going to do with all that money".

His Son replied, "well Dad I am going to buy a new car, a posh house and take a World cruise. But before I do that I am going to give you \$1 for yourself".

The young mans Father was speechless and when his Son asked him what he was going to do with his Dollar, the Father looked his Son straight in the eye and said, "I am going to marry your Mother".