

BULLETIN

WIRELESS INSTITUTE OF AUSTRALIA

TASMANIA DIVISION

APRIL 1975

President: R. Emmett VK7KK

Secretary: J. Gelston VK7ZGJ, G.P.O. Box 1010, Launceston. 7250

Treasurer: W. Carter VK7AK

Editor: B. Yeoman VK7ZBY, c/- Department of Transport
Launceston Airport, Tas. 7250 Ph. 918218

NOTICE OF MEETINGS

May: 3rd Council Meeting, QTH of VK7ZBY Launceston Airport, 2.00 p.m.
7th Southern Branch, special General Meeting, QTH of Tom Allen,
VK7AL, 8 p.m.
9th Northern Branch, Civil Defence Building, Bourke Street,
Launceston, 8 p.m.
13th North-West Branch, Lakins Hall Ulverstone, 8 p.m.

EDITORIAL

Well Gentlemen, another Annual General Meeting and Dinner has come and gone. It cannot be said that members attended both these functions in force, in fact the total number of members that even bothered to fill in their ballot papers, was to say the least, disappointing. I don't know what the reasons are for this apparent lack of interest in Divisional matters, but it can do nothing but create dissatisfaction amongst the members who are trying to do their best to keep this Division a vibrant and viable one.

I call on all members of this Division to back their Branches and Divisional Council in all matters to ensure that this year, will be the year when the VK7 Division becomes a united and active one.

73, Brian VK7ZBY

SIXTH INTELSAT IV NOW IN ORBIT.

Another Intelsat IV communications satellite - the sixth in the series, and the second to be placed over the Pacific - has been launched from Cape Canaveral, Florida.

The satellite, designed and built by Hughes Aircraft Company of California, was launched by N.A.S.A. for the International Telecommunications Satellite Organisation. An Atlas Centaur booster was used to place the satellite in synchronous orbit 35,300 km. above the equator, and one degree from the International Dateline.

The new Intelsat IV will provide added capacity and back-up assurance for the primary Pacific satellite, launched in January 1972. It will become part of a "neck-lace" of Intelsat IV's orbiting the globe. Three of these are over the Atlantic Ocean, whilst another is over the Indian Ocean.

REPORT ON 1975 ANNUAL GENERAL MEETING

On Saturday the 5th of April the VK7 A.G.M. was held at the A.E.B. Rooms, High Street, Launceston, with 34 members and one visitor present, the visitor being Bill VK3ZLK.

The meeting opened on time with Reg Emmett VK7KK in the chair, and Steve VK7OA, as secretary. After the reports from both the President and Treasurer were presented, (a copy of the Treasurer's statement appears at the end of this report) the matter of electing Divisional Councillors for the ensuing year was carried out in the form of a ballot. The result of that ballot is as follows:

- | | | | | | |
|----|--------|-------------|----|--------|--------------|
| 1. | VK7AK | Bill Carter | 5. | VK7FB | Mike Jermer |
| 2. | VK7KK | Reg Emmett | 6. | VK7ZAQ | Graeme Rand |
| 3. | VK7PF | Peter Frith | 7. | VK7ZBY | Brian Yeoman |
| 4. | VK7ZGJ | Joe Gelston | | | |

The election of other office-bearers then took place, and they are:

- | | | |
|------------------------------|--|-----------------|
| Patron: | VK7AG | J. Milne |
| QSL Manager: | VK7CH | C. Harrison |
| Legal Officer: | VK7RR | B. Morgan |
| Bulletin Editor: | VK7ZBY | B. Yeoman |
| Key Section Co-Ordinator: | VK7RH | R. Harwood |
| Intruder Watch Co-Ordinator: | VK7MX | H. Ivos |
| Y.R.C.S. Supervisor: | VK7KK | R. Emmett |
| Historical Officer: | Council to take care of this in the ensuing year, and to establish a permanent location. | |
| VHF Representative: | VK7ZGJ | J. Gelston |
| Auditor: | Council to handle | |
| Oscar Co-Ordinator: | VK7PF | P. Frith |
| Membership Secretary: | VK7ZMK | M. Knott |
| WICEN Representative: | VK7JV | J. Van Staveren |

After these positions were filled, the meeting moved into the two motions on the agenda, as per the March Bulletin. The results of these motions were:

1. The motion concerning constitutional amendments was passed with no amendment.
2. The motion concerning the VK7 Merit Award was passed with one (1) amendment, that being that wherever the word "member" occurs, it should be changed to "person".

With the passing of these two motions the 1975 A.G.M. closed at 1600 hrs.

General Meeting

A General Meeting of the VK7 Division followed the A.G.M., and started at 1610, with the following resolutions made with regard to the laid down agenda.

1. On the subject of books and magazines at present held by the Southern Branch; they are to be retained by the VK7 Division and Council will assume care and control of the said books and magazines.

3.

A.G.M. REPORT (Contd.)

2. On the subject of equipment held by Branches - the Division is to retain the 7MHz transmitter and associated equipment for broadcast purposes, and that the remainder of the equipment in the Southern Branch become Southern Branch property with one amendment - that should the Southern Branch wish to dispose of this equipment, that it be advertised as a Tender in the Divisional Bulletin.
3. The next item discussed was that of Branch A.G.M. uniformity. It was resolved that if Council recommends it, all Branch A.G.M.s will be in March.
4. In the area of discussion instigated by Branch Presidents, it appeared that all Branches were quite happy with the present relationships between them and the Division.
5. The Bulletin Editor gave a brief rundown on the Bulletin costing, and stated that providing things remained as they are, the yearly cost of the Bulletin should be around \$100. The Editor also asked for comments from the members on the present Bulletin format, bi-monthly posting, etc. as it is difficult to know what the members are looking for in their Bulletin without feedback from them.
6. On the subject of broadcasts, members present at this meeting gave a reassurance that they were quite happy with the system as it stands at present, and asked that the people concerned with the Sunday morning broadcasts whether originating or re-broadcasting be thanked for their efforts in the past and the future.
7. There being no other business, the General Meeting closed at 1700 hours.

At approx. 1930 hours the Annual Dinner of the VK7 Division got under way at the Village Motel Launceston with 44 persons attending. A very enjoyable dinner, which was washed down with a selection of excellent dinner wines, was very suitably disposed of, and judging by the reactions and antics of some members, and their wives present, the 1975 Annual Dinner was a rip-roaring success. The only comments I have to make is to thank the organisers for their efforts in ensuring that the whole show, including the A.G.M. progressed smoothly; those who did not attend this marvellous dinner were the ones who missed out.

73, Brian VK7ZBY

AMATEUR RADIO EXHIBITION

The dates for the Amateur Radio Exhibition at the Northern Regional Library in Launceston have been finalised. The exhibition is to be held from June 9th to June 21st inclusive.

Norm VK7NR, who is organising this display would appreciate any equipment that you feel would be suitable for this exhibition.

As the exhibition is to be set up on Saturday the 7th June, the deadline for the equipment will be the last week in May to give Norm and his helpers time to see how the display is going to fit together. For further details see your October Bulletin on this subject.

EDITOR

4.

W.I.A. TASMANIAN DIVISION : GENERAL ACCOUNT : FEBRUARY 1975

Receipts

Balance Brought Forward	\$ 336-63
General Account Interest	15-36
Term Deposit Interest	78-00
Donations Life Members	44-00
Subscription Collections	66-00
Refunds Federal Executive	<u>773-74</u>
	<u>1313-73</u>

Expenditure

Petty Cash Sec.	\$ 5-00
Wreath	10-00
Convention Expenses '73	98-52
A.R. Inserts and Advertisements	24-44
A.R. Losses to VK3	116-00
Bulletin Expenses	102-28
7 W.I. Licences	12-00
Stamp Duty Constitution	2-00
Refund Interest Southern Branch	234-00
Travelling Expenses S. Fraser	18-75
Share Surplus Funds N.W. Branch	38-00
Subscriptions to E.D.P. Rep.	66-00
Unpresented Cheques as at 22/2/75	543-80
<u>Surplus for Year</u>	<u>42-94</u>
	<u>1313-73</u>

Treasurer: S.W. Carter
Auditor: D.H. Fisher

Auditor's Note: Monies from Federal Executive not readily reconcileable with documents received, and have taken these as presented.

Equipment Account stands at \$28-00 and is to be transferred to the General Account.

MEETING NOTESCouncil : February/March

The February Council meeting was held on Saturday the 15th, at the QTH of Peter, VK7PF. Apologies were received from Messrs. Yeoman and Rand. After the minutes of the previous meeting were read and confirmed, the subject of Divisional equipment held by the Southern Branch was discussed. The Southern Branch will be approached with the view of asking that Branch to do a stocktake on Divisional equipment, at present residing in that Branch.

Included in the correspondence was a Nomination Form for Federal Councillor from Peter VK7PF. As this was the only nomination received, Peter was elected Federal Councillor for the ensuing year 1975. Also tabled in correspondence was the report on the 17th J.O.A.

The Council discussed the subject of the Merit Award and resolved that it be included as a Notice of Motion for the 1975 A.G.M.

The March Council meeting was held on Saturday the 15th at the new QTH of Reg VK7KK. Present were Messrs. Frith, van Staveren, Fraser, Rand, Carter, Yeoman, and Emmett. After the minutes of the previous meeting were read and confirmed, Council nominations were received from VK7s AK, JV, FB, ZAQ, ZBY, KK, PF, and ZGJ.

Six applications for membership were received from the following:
 Stephen Russell, of Ulverstone, for student membership
 Stanley Burtt, of Devonport, for associate membership
 Alan Holmes, of Launceston, for associate membership
 James Davis, of Latrobe, for associate membership
 Bernard Turner, of Burnie, for associate membership
 John Wicks, of Ulverstone, for associate membership

After due consideration, all of the above were passed for membership. The Council welcomes you all to the VK7 Division.

As this is the last Council meeting for the year, the Council would like to thank the Branches for all their co-operation during the year and hopes that the incoming Council will receive the same co-operation. See you all at the A.G.M.

73, Brian VK7ZBY

Northern Branch : February/March

The February meeting of the Northern Branch was held as per usual in the A.E.B. Rooms, High Street, Launceston, with thirty members present, an improvement on the January meeting.

The meeting was informed by Ed, VK7HE, that discussions with the Launceston City Council on the subject of Clubrooms were still in progress. Further details will be made known when available.

The meeting was then informed by Peter, VK7PF, that in line with the Department of Transport's 80 per cent cost-recovery programme, power charges will now be made for the Mt. Barrow ~~repeater~~ VK7RAA. After discussion, the meeting agreed to pay the \$32 per year for power, and the \$35 per year for the facility of having the repeater on standby emergency power.

MEETING NOTES (Contd.)

The Editor of the Northern Branch's Bulletin (QRM), John VK7JV, indicated that he would be resigning from this position and that a new Editor would have to be found to fill the position. I know I speak for all of the Northern Branch, John, when I say thank you for a job well done.

The meeting was then presented with an excellent talk by Ed Bovis, VK7ED, on Early Sea-faring Radio, in the days when spark transmitters and sailing ships were all the rage. Ed went into the problems that an operator of a spark transmitter had to contend with, such as, after every transmission a new spot had to be found on the Crystal Detector in the Receiver, because it had been burnt out by the transmitter. The approximate power output from these transmitters was 1.5 kw. As technology improved, the range was increased, and with better receivers and transmitters, break-in operation was possible. After hearing your talk on early sea-faring radio, and the problems encountered, I think we can all appreciate the advancements made in the field of communications. From all those present, many thanks Ed, for a most informative talk on a most fascinating subject.

The meeting closed at approximately 2230 hrs. for the usual refreshments and eyeball QSOs.

73, Brian VK7ZBY

March saw the A.G.M. for the Northern Branch once more and this enticement produced a roll up of 36 members.

Prior to the election of Office Bearers, several items were brought up. As John, VK7JV, was relinquishing his post as Editor of QRM, a general vote of thanks was passed by the meeting for his tremendous effort in the past. We wish the new Editor, Graham, VK7ZGG, the best of luck with his new venture.

A point raised by Ed VK7ED, was whether all technical articles published in QRM and Bulletin should be forwarded for publication in A.R. Of several ideas put forward, it seems that the greater percentage are not of sufficient technical standard and/or there is such a delay in the articles being published in A.R. that duplication would not really matter anyway.

The President Reg, VK7KK, then tabled his Annual Report, followed by Kevin VK7ZAH, who presented his trading account for the equipment store.

The election of office bearers for 1975 then followed. These are:

President:	Brian VK7ZBY	Lecture Officer:	Wally VK7ZWX
Vice-Pres. 1:	Lindsay VK7ZLD	QSL Officer:	Col VK7LZ
Vice-Pres. 2:	Reg VK7KK	Branch	
Secretary:	Ed VK7HE	Correspondent:	Bob VK7ZRF
Treasurer/		Refreshment	
Equip. Store:	Kevin VK7ZAH	Officer:	Reg VK7KK
QRM Editor:	Graham VK7ZGG	Auditor:	Carl Waldon

The Annual General Meeting closed at 2015, to be reopened at 2025 for a General Meeting by the new Office Bearers.

7.

MEETING NOTES (Contd.)

Alan Holmes was welcomed as a member to the Northern Branch.

Ed VK7HE, reported no new developments on the Clubroom investigation. He also requested that people intending to attend the Divisional A.G.M. and Dinner on the 5th April please let him or Kevin VK7ZAH, know before the deadline, the 1st April.

Finally, Mr. John Hodson, an engineer with the P.M.G. gave the meeting an informative and at times amusing lecture on the transition from black and white to colour of the National Television Transmitters, in particular the Mount Wellington station.

It appears that amateurs are not the only ones that emit spurious radiation from their transmitters, even if it is 60db down - on 20k or 200kw E.R.P.

73, Bob VK7ZRF

Southern Branch : April

At the April meeting of the Southern Branch, held at the QTH of Tom Allen VK7AL, only nine members were present, and although this did constitute a quorum, it was decided not to proceed with the main business, the election of office-bearers for the coming year. The reasons behind this decision were several. Firstly, not enough nominations (or volunteers) were received for the vacant positions. Secondly, in view of the seeming lack of interest, it was questioned as to whether the Branch should be continued, so it was decided to attempt to canvas the opinions of as many members in the South as possible, before anything further is done. Until then, we still have last year's office-bearers.

In order to determine the feelings of members, and amateur non-members, a special General Meeting is to be held at Tom Allen's QTH, 22 Karoola Road, Lindisfarne, on Wednesday May 7th, at 8 p.m. As stated, all members interested are asked to come along, and as many amateurs who are not members will be notified - the Branch has funds and equipment, and only a small group of those who are aware of it seem interested in using them. Perhaps there are others who could use them also, possibly much more effectively. As a background to the special General Meeting, the following is a brief summary of discussion heard at the April meeting, and of the state of the Branch at present.

It was generally acknowledged that interest in the W.I.A. in the South has been declining, as had the interest in radio generally; both HF and VHF operators seem to be less active (on the air, at least). Many people expressed opinions as to the reasons for the decline; these included the fact that W.I.A. meetings held no interest for members; they had no interest in procedural matters and they found nothing else at meetings. Some lectures and social activities were organised, but the lack of support was disheartening to the organisers, giving them no incentive to go on. A lack of interest and support was also the reason for the lagging activity in group projects, mainly the new repeater.

A suggestion was made that the Branch should hibernate for twelve months or so, but such a decision could not be made with so few members present.

8.

MEETING NOTES (Contd.)

The state of the branch is probably reasonably well known to most members, and the following is just a brief summary. There are several projects and activities which are being carried on mainly by a few interested members, on their own, and with little interest, encouragement or support. These include the Saturday morning Y.R.C.S. classes, which are going extremely well although the interest is about half a dozen members and a couple of interested non- members. The Divisional broadcasts once every three weeks, and the re-broadcasts every week - again a few interested people keep it going, but their efforts are hardly rewarded by the numbers checking in on the callbacks, especially on VHF. The last project is the construction of the repeater - to date only about four people have shown much interest, and they have done all the work so far, although several new faces have expressed a great deal of interest lately. This group is working under its own impetus.

Finally, the state of the Branch finances: we are running an equipment store which has been very poorly supported in recent times, even though prices on the range of items stocked have been very good. The equipment store has been financing the repeater project to date, although with miserable turnover, is making quite a hole in the funds. The clubhouse funds stand at about \$3700, mainly in fixed term deposits, all of which will mature by August 1975. We have had several offers of land on which to build a clubhouse, one of which would be more than suitable in all respects, if the offer is still open. Assuming then, that we do not have to buy any land, the clubhouse funds at present will go a long way towards providing material for a building.

These then, briefly, are some of the items which will be brought forward: should we maintain the Southern Branch, and support the various groups and projects already struggling along? Should we start on something new, which will have the support of more than just a few? Or should we let the Southern Branch die a natural death, in the hope that perhaps, at a more fertile period in the future, it may rise again? Interest in radio and electronics is still strong, on an individual basis - people are still sitting for their A.O.C.P., and the Y.R.C.S. has many keen young members; perhaps, if the W.I.A. in this area can re-align itself to promote radio and electronics, for individuals and groups, then we may be able to do far more good and interest more people, than we have in the past. It is hoped that the meeting on Wednesday May 7th will discuss and hopefully resolve many of these points, and conclude with a concrete plan of action for the future.

If anyone is unable to attend this meeting, for any reason, and has some ideas or opinions, these will be well received by either Phil Thompson VK7SS, or Andrew Boor VK7AW, verbally or in writing, prior to the meeting. But everyone who has any interest at all, no matter how slight, in the W.I.A. and radio, is urged to make an effort to come along to Tom's place.

Signed: Andrew Boor VK7AW
 Phil Thompson VK7SS

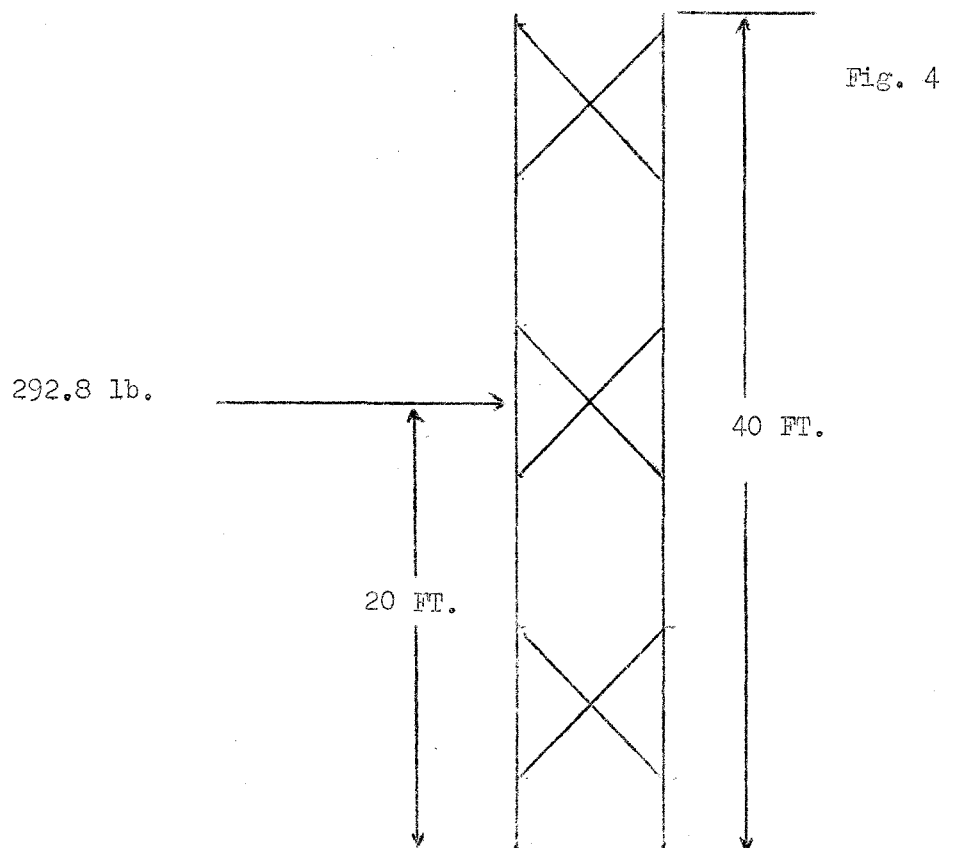
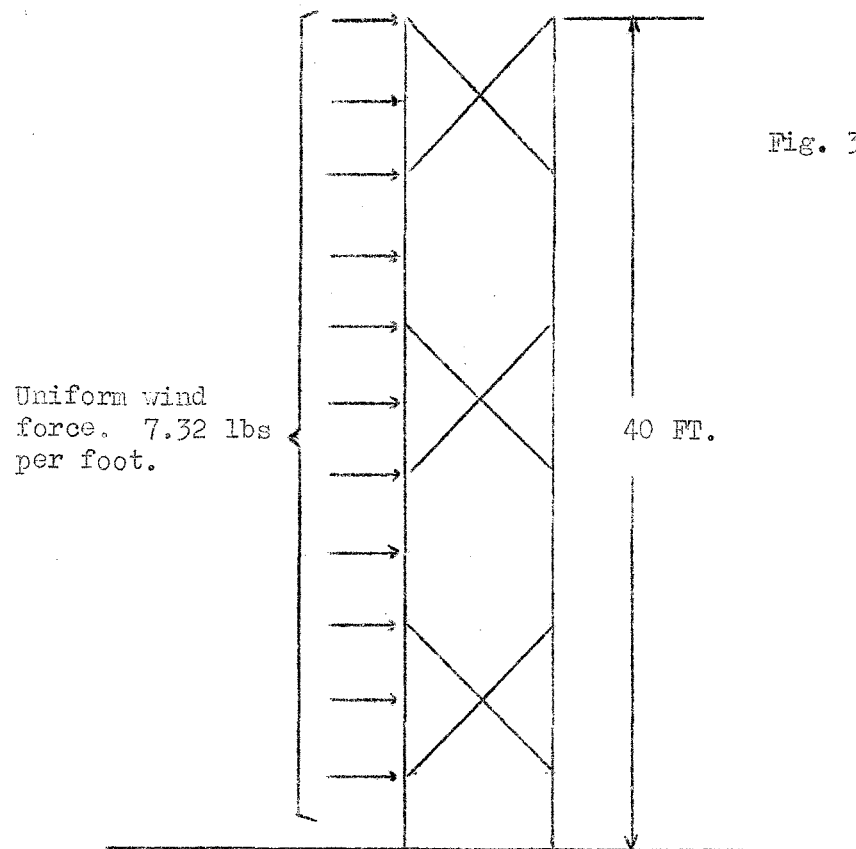
REQUEST FOR A MISSING DOSSIER

From Mike Jenner VK7FB comes a request for the dossier that was compiled and written by the late Lon Jensen VK7LJ, on the VK7 Division since its inception. Anyone having this dossier, or knowing of its whereabouts, please contact Mike on one of the following phone numbers.
Work: 441611
Home: 478729

9.

CALCULATIONS OF WIND LOADING ON TOWER AND ANTENNA STRUCTURE PART 2.

Reprinted extracts from Ham Radio, August, 1974



10.

477.6 lbs.

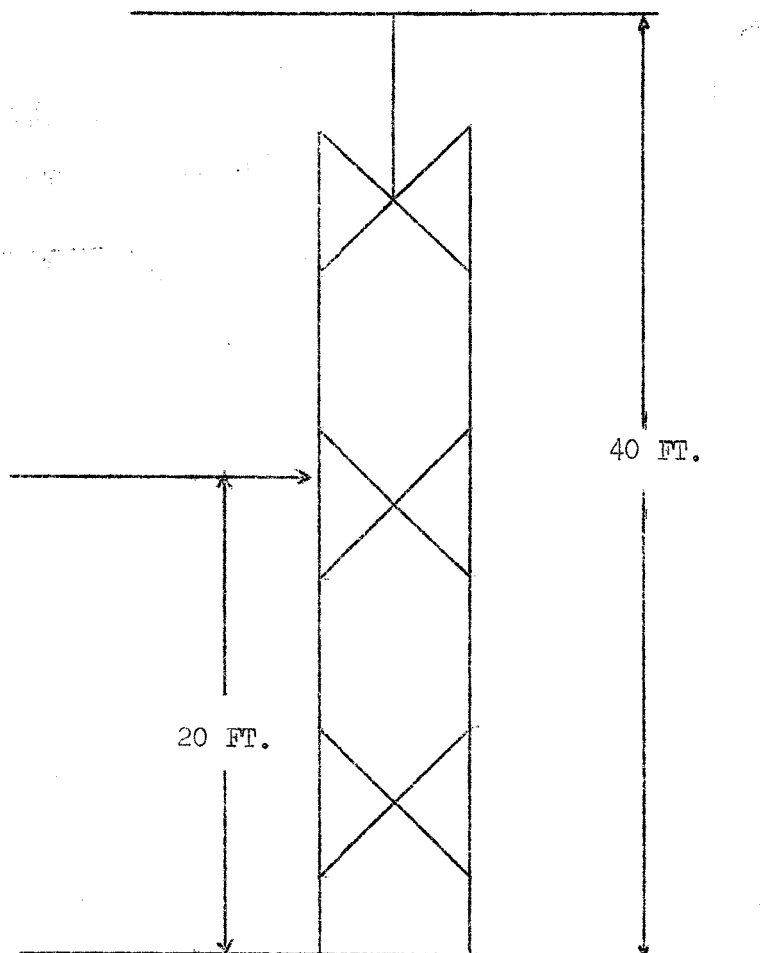


Fig. 5A

238.8 lbs.

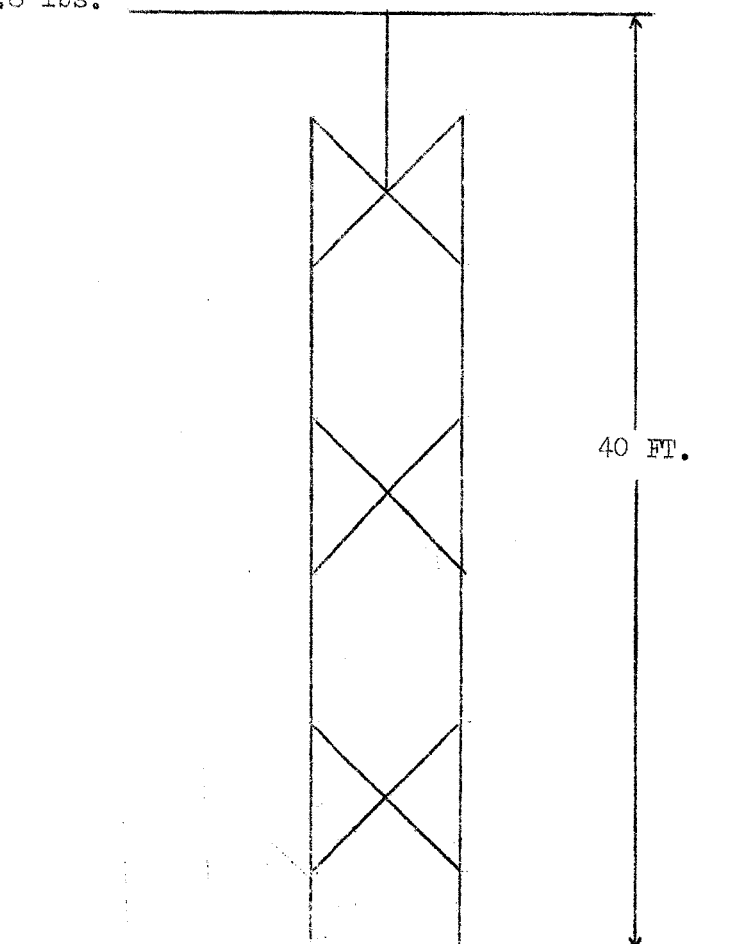


Fig. 5B

Guying of Towers

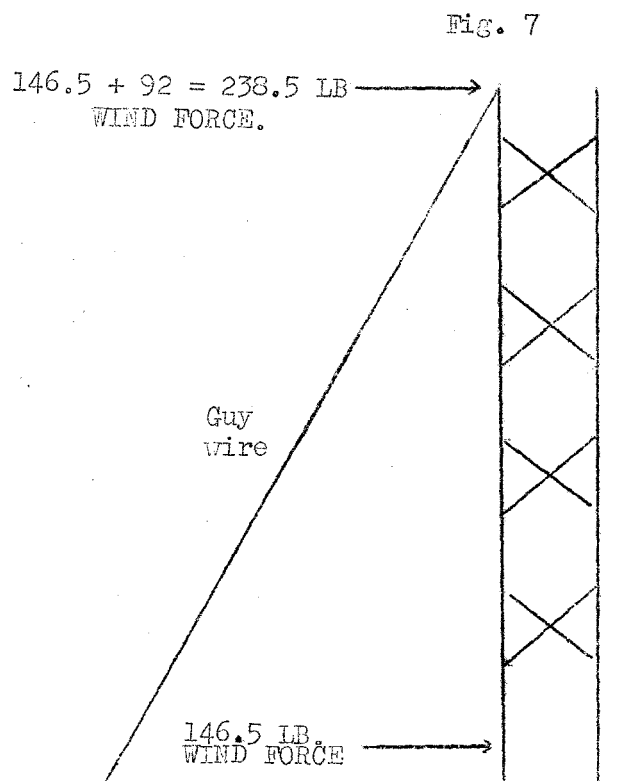
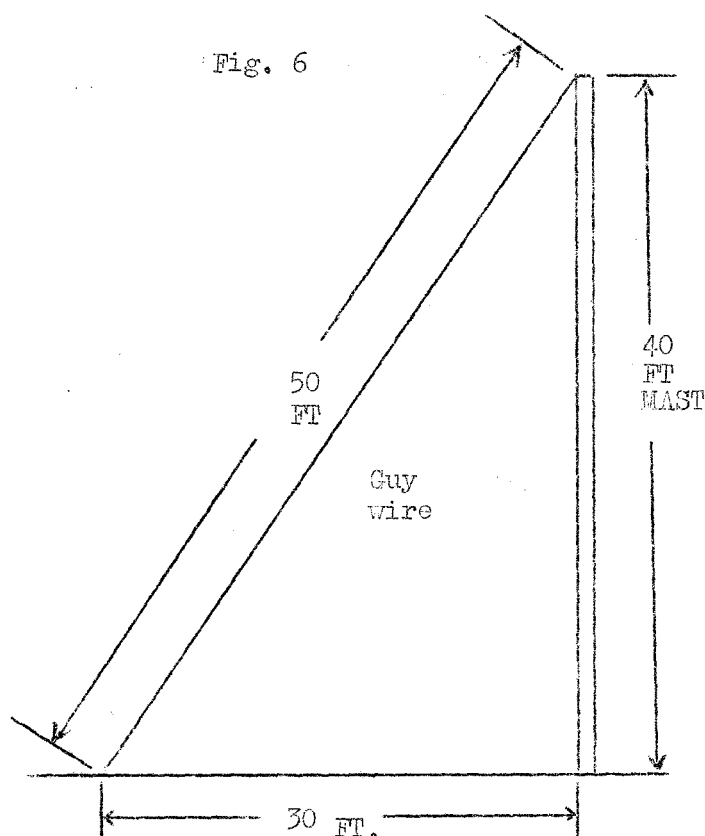
Guyed towers have the advantage of requiring much less structural material than self-supporting towers. As an example, a self-supporting 700-foot (213.4 meters) steel tower of conventional design, will weigh about 460,000 lbs. (208,651 kg.). A comparable guy tower will weigh about 200,000 lbs. (90,718 kg.) including the weight of the guys. It should be remembered that a guyed tower must also be capable of supporting the guy-wires. While very few amateurs are so fortunate, or unfortunate, as to have a 700-foot tower, the savings in material of a guyed tower is obvious.

Assume now the same 40-foot tower and antenna array as previously described has a set of guy wires 30 feet (9.1 meters) from the base of the tower, as shown in Fig. 6. From the Pythagorean theorem the length of the guy wire is : $\sqrt{40^2 + 30^2} = 50$ feet (15.2 meters). The angle with respect to ground is:

$$\theta = \tan^{-1} \frac{40}{30} = 53.1 \text{ degrees}$$

For the sake of simplicity, we will consider only one guy wire. This is actually the case when the wind is blowing toward the tower from the direction in which the guy wire under consideration is anchored.

It is not generally appreciated, but a guy wire converts an overturning moment into increased downward stress on the tower. As previously noted, the total horizontal force in this example is 293 lbs. (132.9 kg.) on the tower plus 92 lbs. (42 kg.) on the antenna. Since the top of the tower is now constrained by the guy wires, the overturning moment is zero. For this reason the structural requirements on the tower and foundation are greatly reduced because these items need not support the weight of the assembly and the additional load imposed by tension in the guy wires.



12.

Because the horizontal force on the tower - 293 lbs.(132.9 kg.) - is uniformly distributed over the length of the tower, we will assume that one-half the constraining force - 146.5 lbs. (66.5 kg.) - is located at the top of the tower and one-half at the bottom. The horizontal force on the antenna - 92 lbs. (41.7 kg.) - will be assumed to be located entirely at the top of the tower. This is shown in Fig.

7.

This allocation of reactions given may seem arbitrary, but it is difficult to visualize a mechanism by which the 92 lb. (41.7 kg.) horizontal force of the antenna can be transmitted to the base of the tower without generating a moment. Also, if there is any error, the forces in the guy wire will be overestimated and not underestimated. The tension in the guy wire may be resolved into a horizontal and a vertical component. The horizontal component must be 238.5 lbs. (108.2 kg.) since it must exactly equal the horizontal windload (146.5 + 92 lbs. or 66.5 + 41.7 kg.). The tension in the guy wire itself may be calculated by setting up a vector diagram as in fig. 8.

$$F_{gw} = \frac{238.5}{\sin 36.9^\circ} = 397.2 \text{ lbs.}$$

$$\text{Hor. wind force} = 238.5 \text{ LB.}$$

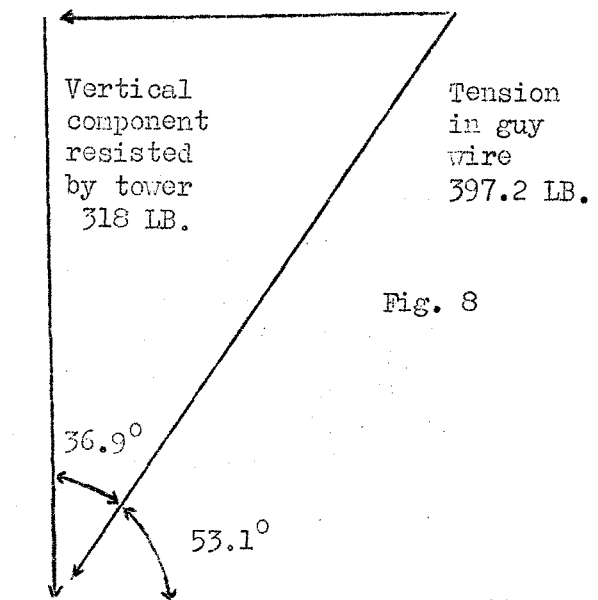
$$F_{gw} = \frac{108.7}{\sin 36.9^\circ} = 181 \text{ kg.}$$

where F_{gw} is the force on the guy wire and the additional vertical component which must be resisted by the tower is:

$$F_v = \frac{238.5}{\tan 36.9^\circ} = 318 \text{ lbs.}$$

$$F_v = \frac{108.2}{\tan 36.9^\circ} = 144.2 \text{ kg.}$$

In other words, an 86.6 mph (139.4 kph) wind will develop a tension of 397.2 lbs. (180.2 kg.) in the guy wire and an additional vertical load of 318 lbs. (144.2 kg.) on the tower.

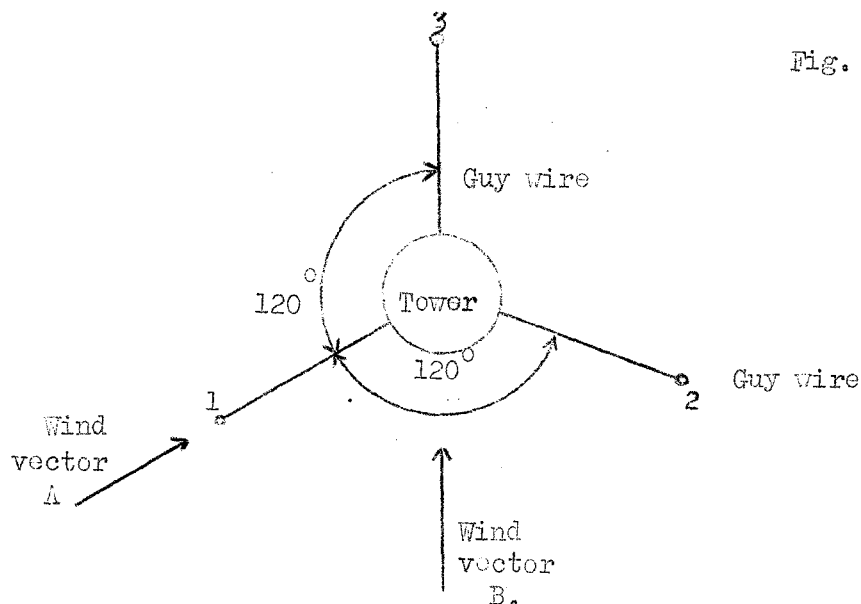


This vertical load is more than the weight of the antenna! It should also be emphasised that these loads are in addition to the vertical loads caused by the initial tension in the guy wires.

So far we have considered the involvement of just one guy wire. When considering two guy wires you might think that for the same horizontal wind load, the tension in each guy wire would be one-half the tension for one wire. Unfortunately, it does not work out that easily. Let's consider a tower held by three guy wires at 120° intervals, as shown in Fig. 9. This is a typical arrangement. If the wind blows in the direction of arrow "A", guy wire number 1 takes the wind load and the situation is as explained for one guy wire. If the wind blows as shown by arrow "B", things are slightly different, as shown by the vector diagram in Fig. 10. Using the same numbers as in the example above, the horizontal wind load of 238.5 lbs. (108.2 kg.) is shared equally by guy wires 1 and 2, so we allow 119.3 lbs. (54.1 kg.) on each. In this case the third guy wire carried none of the load. The horizontal force in the direction of each guy wire is thus :

$$F_h = \frac{119.3}{\cos 60^\circ} = 238.5 \text{ lbs.}$$

$$F_h = \frac{54.1}{\cos 60^\circ} = 108.2 \text{ kg.}$$



As in the preceding example, the tension in each guy wire is 397.2 lbs. (180.2 kg.) and the vertical component of each guy wire is 318 lbs. (144.2 kg.) - a total of 715.2 lbs. (324.4 kg.). The total is thus twice the vertical load generated by a wind blowing in the same direction as any one guy wire. It is easy to see that windloads can add up pretty quickly! The use of guy wires imposes a penalty in that the tower and foundation must be designed for greater vertical loads. The advantage of guy wires is that the tower and foundation need not be designed to resist an overturning moment.

An important factor to be considered in the installation of a guyed tower is the initial tension in the guy wires. If the guy wires are too loose, the tower will sway excessively. If the guys are pulled too tightly, an excessive vertical load may be put on the tower. In fact, in large installations it may be possible to buckle the tower with excessive initial tension. It is therefore necessary to compromise between stiffness and reasonable sized structural members in the tower.

Because of the increasing interest in 1250 khz. and above, and the easy availability of parabolic antennas with solid reflectors, it is both interesting and instructive to apply the above principles to a parabolic dish and compare these with the tower. We will assume a dish with a 10 FT. (3 meter) diameter and a 100 mile-per-hour (161 kph) wind. From equation 1, the wind pressure caused by 100 mile-per-hour wind is 40 lbs. per sq. ft. The projected area is:

$$\frac{\pi d^2}{4} = \frac{\pi (10)^2}{4} = 78.5 \text{ sq. ft.}$$

and the total horizontal wind pressure is:

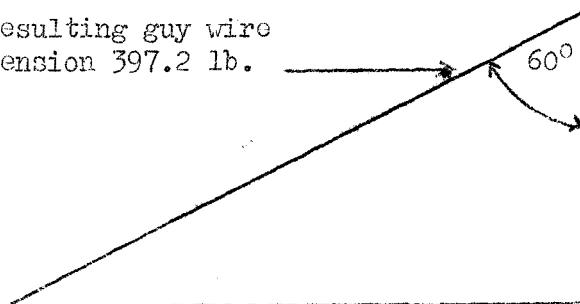
$$(78.5 \text{ ft.}^2) \times (40 \text{ lb/ft}^2) = 3140 \text{ lbs.}$$

If a 10-foot (3 meter) antenna is to look at the horizon to see a rising satellite, as shown in Fig. 11, the mounting structure must be at least 6 foot tall to provide a ground clearance. Thus, the minimum overturning moment will be :

$$(3140 \text{ lb.}) \times (6 \text{ feet}) = 18,840 \text{ lb-ft.}$$

Note that a ten-foot parabolic dish mounted on a 6-foot support has approximately twice the overturning moment as a three-element 20 meter beam, mounted on a 40-ft. tower.

Resulting guy wire
tension 397.2 lb.



One half of the
total horizontal
wind force.
 $238.5/2 = 119.3 \text{ lb.}$

side force cancelled by
guy wire No. 2 (in this example)

Unfortunately, this is not the whole story. The above calculations are for a head-on wind. Experiments have shown that the greatest wind force on a parabolic antenna occurs not for a head-on condition, but when the wind is blowing at an angle to the antenna axis, as shown in Fig. 12.

Fig. 11

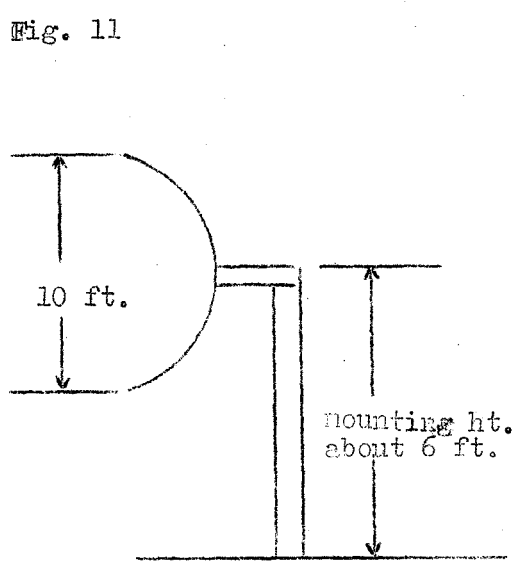
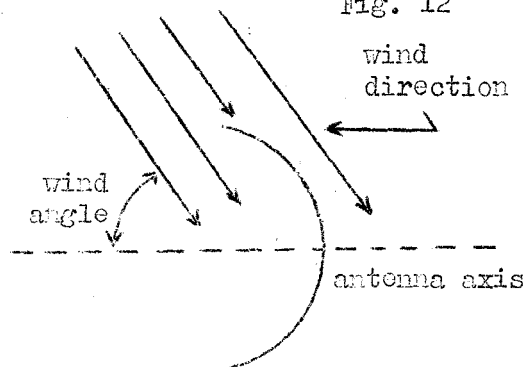


Fig. 12



For most antennas this wind angle is approximately 56° , and the maximum force is 10% higher than for a 0° wind angle. The reason for this is that at some wind angles the rear surface of the dish acts as an air foil, which develops LIFT in a similar manner to an aircraft wing, thereby increasing the horizontal force on the antenna.

Because this extra force depends on the shape of the antenna, it may not be the same for all parabolic antennas. The antenna parameter that has the greatest effect on this additional lifting force is probably the focal length of the antenna as this determines how deep the dish must be for a given diameter, and hence will affect the LIFT/DRAG co-efficient of the dish. It is not practical to give lift co-efficients or angles of maximum wind loading for all cases, but a 10% increase in wind loading due to lift at an angle of approximately 56° is probably a good approximation for most parabolic antennas.

The relatively large wind loading of a parabolic dish can be considerably reduced by perforating the dish. If the holes are small compared to the wave length of operation, the effect on antenna performance will be negligible, but the wind loading will be decreased considerably.