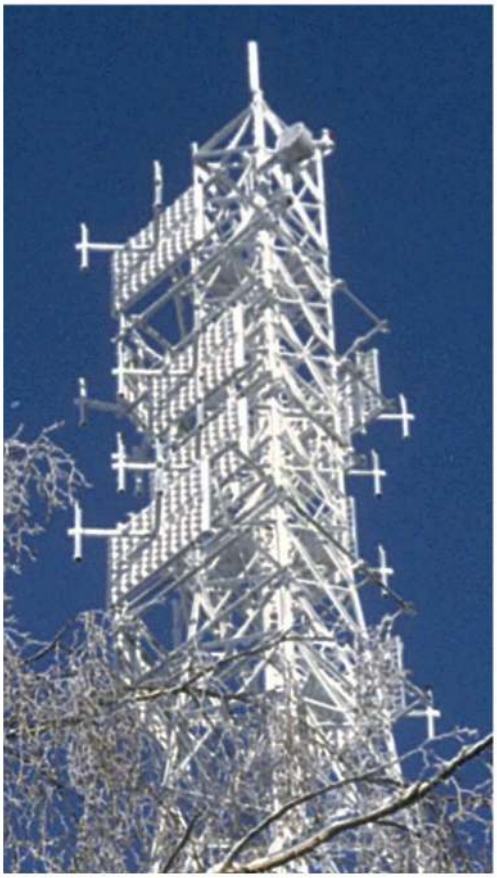
Alan Dick Broadcast Antennas are designed for all Environments

Alan Dick Broadcast VHF Panel Antennas



Alan Dick Broadcast engineers have over 30 years of experience in designing antennas or use in all parts of the world from the arctic to the tropics. Since our aim is to supply antennas that have a 25 year life we have to pay particular attention to the many design details that will ensure ADB products withstanding all environmental conditions. This is because in the end it is mechanical integrity, rather than electrical performance, that generally determines the life of an antenna. To date we have many systems that are still operating in excess of 25 years.

With so much experience behind us we have the advantage of a considerable amount of feedback. When problems have arisen in the past with a particular product or in an unusual environment, we have been able to learn from them and to apply the experience to improvements. In our opinion there is no substitute for this type of knowledge. Whilst environmental simulation chambers have many uses and go some way, they are not the same as real practise. As a result our customers are today able to benefit from over 30 years genuine experience.

The antennas proposed have been fully developed for a number of years now and incorporate many features necessary to provide long reliable service. We have listed below what experience tells us are the key climatic conditions for many environments which our antenna systems are designed to withstand.

Electrical Storms

Damage resulting from lightning is minimised by making all exposed parts of antenna panels D.C. grounded. Their inner conductors are also D.C. grounded via the short circuit stubs within the dipoles, and by the dipole feed point straps.

As a result of the dipole design all distribution feeders, power dividers and main feeders also have their inner conductors grounded. Their outer conductors are directly grounded by means of D.C. connections to the supporting structure. At the lower end of the main feeder a direct D.C. bond is made between the feeder outer and the tower base.

High humidity

High humidity on its own does not present any problem, it is only the fact that it makes condensation more likely that requires antenna designs to take account of it. Naturally the area most sensitive to condensation is the inside of transmission lines and power dividers. Generally all R.F. components are sealed against the ingress of humid air. Where this is not the case very conservative air gaps between inner and outer conductors are maintained. Also insulators are of such a design that in critical positions they have tracking paths well in excess of the direct distance between inner and outer conductors. Furthermore the materials used for the insulators make it very difficult to wet their surfaces.
In the majority of cases complete sealing of the distribution feeder system is provided and furthermore it is maintained under a small positive internal pressure, via the main feeders, by means of a suitable dehydrator unit.

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High temperatures
High ambient temperatures have the effect of reducing the R.F. power rating of components due to the limited safe operating temperature of dielectric materials. We have designed the antenna systems in accordance with the maximum ambient temperatures likely to be experienced by the installed antennas, plus appropriate factors of safety.

Variations in Ambient Temperature
This can be a problem in unpressurised antenna systems if they are not carefully designed. If components are not sufficiently airtight then they will 'breath' and over a period of time will allow the ingress of water. As a result we pay particular attention to either completely sealing components (power dividers for example) by using double 'O' rings etc., or by deliberately allowing components to 'breathe' (dipoles themselves). Therefore in either case large variations in temperature should not cause a problem.

Ultra Violet Radiation
All exposed non metallic materials have minimum sensitivity to ultra violet
radiation. We have in the past carried out exhaustive tests to satisfy ourselves in this respect.

High wind speeds
Our antenna systems are designed to withstand wind speed well in excess of any likely to be encountered. An antenna of ours recently withstood the ravages of the August 1992 Florida Hurricane! Typical minimum basic wind speed is 126km/hr, and this may be increased due to customer specification or specific local knowledge. Where details of the proposed supporting structures are available, our offer will include mounting brackets for the panels and feed system components. It is obviously important that all fixings are adequately designed to withstand the loads that are imposed upon them. Sufficient rugged cable clamps will be supplied to ensure that cables are suitably protected against vibration due to high wind speeds.

Insects
The ingress of insects within the sealed components is obviously not possible so in this respect they cannot affect the electrical performance of the antennas. Items that are allowed to breath do so via a very small hole which based on our longstanding experience throughout the world, precludes infestation by insects.
Non metallic materials such as the cable jacketing is unattractive to insects in our experience.

Ice
Where applicable our antenna systems are designed to handle icing conditions more commonly found in the sub arctic environment. The dipoles are physically very rugged so that they are unlikely to be damaged by ice normally falling from higher up. From an electrical point of view wet snow is generally more damaging than ice so the sensitive area of the actual dipole feed point is protected by a GRP pod.

Corrosion
The dipoles and their screening frames are manufactured from mild steel, all of which is hot dipped galvanized to British Standard BS 729. Rigid distribution feeder components are manufactured in copper alloys, which are inherently very corrosion resistant. Nuts and bolts that are 10mm diameter or less are rust resisting stainless steel. Larger Nuts and bolts are galvanized. Corrosion can be a particular problem when dissimilar metals are in contact with each other. Because of this we keep the number of such joints down to an absolute minimum. Where they do occur we plate one of the surfaces with a material that is electrically more acceptable to its mating surface. Furthermore we put a corrosion inhibiting paste between all metal surfaces within the distribution feeder and dipole assemblies whether they are dissimilar or not. Salt laden atmosphere is a well known hazard, enabling corrosion. However, because of the materials we propose to use, i.e. galvanizing (zinc) and copper alloys they should not normally present a problem. The same applies to other forms of airborne pollution.

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Vibration
It is not uncommon for towers and masts to vibrate when exposed to certain critical wind speeds. This can lead to antennas resonating which in the long term may result in failure due to fatigue or joints being shaken loose if care is not taken when designing the antenna. We do not use any material that is prone to fatigue failure in sensitive positions
We also use single coil lock washers (spring washers) on all external screw joints. For inner conductor joints where this would not be acceptable electrically we use 'Loctite' which is a thread locking compound.

Reliability
All components have conservative factors of safety with regard to both the mechanical and electrical stresses imposed upon them. We also minimise the number of joints within a system. Statistically the greater the number of joints in a system then the greater the probability of a long term joint failure - this applies to any system. A common cause of joint failure is split spring connectors at inner conductor joints. We fit inserts to all spring fingers to ensure they are properly aligned during installation