

British Model Flying Association

Members' Handbook

2010 Edition

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Member's Handbook
2010 Issue

Welcome to the 2010 issue of the BMFA Member's Handbook.

The BMFA is constantly reviewing it's advice to model flyers and it regularly advises the Civil Aviation Authority (CAA) on model flying matters. Extracts from the latest CAA issue of CAP 658 (2007) are incorporated into this book for your information.

All text new to the Handbook since the 2007 issue is highlighted by sidebars,

like this.

The Member's Handbook is an active document that is constantly kept under review and we are very happy to receive input from anyone concerned about model flying matters.

In fact, we know that many of you will recognise new sections or paragraphs or alterations to existing paragraphs that cover matters that you have brought to our attention over the past few years.

We would encourage anyone with comments on the Handbook or with ideas for new or changed items to contact the Technical Secretary via the BMFA Leicester office.

Words of masculine gender should be taken to include the feminine gender unless the context indicates otherwise.

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AN INTRODUCTION TO THE BRITISH MODEL FLYING ASSOCIATION

Welcome to the British Model Flying Association (BMFA) which, as the Society of Model Aeronautical Engineers (SMAE), was established in 1922 as the national body for model flying.

In its eighty nine years, the Association has built up a fund of knowledge, experience and has accumulated benefits for its members which add up to an unbeatable membership package for you.

The BMFA is a non-profit making association of model flying clubs and individuals who agree to join together and pool resources for the benefit of all.

It is controlled by its Annual General Meeting and it is administered by a Council of Management elected from its members.

Model flying in the UK is under increasing pressure from legislative and environmental bodies and the BMFA, the world's oldest model flying body, is involved in ever increasing fields of activity to protect model flying on your behalf.

Much of the BMFA's time and resources are taken up in working with government bodies, local authorities and other organisations in order to safeguard your model flying interests. As well as these efforts at national and local level, the BMFA also spends much time promoting and encouraging all facets of model flying.

The Chief Executive, Development Officer, Membership Secretary and other BMFA staff work from the permanent office in Leicester and are there to further the running of the Association. They can answer most of your queries or put you in touch directly with BMFA officers when necessary.

Both staff and voluntary officers are always pleased to hear from members and to help where they can.

Please read this booklet carefully and familiarise yourself with its contents as it will help you gain the maximum benefits from your membership of the Association.

THE SOCIETY OF MODEL AERONAUTICAL ENGINEERS

The SMAE was originally set up in 1922 and its recognition by the Royal Aero Club dates from then but its roots can be traced back to 1909.

In that year the Kite Flying Association was formed and, shortly after an exhibition at Olympia where model aircraft were shown, its name was changed to the Kite and Model Aircraft Association. In 1921 this association was replaced by the London Aeromodellers Association which, a year later, changed its name to the Society of Model Aeronautical Engineers.

Many British aviation pioneers have been SMAE members including Sir Frank Whittle, Sir Thomas Sopwith and Sir Alliot Verdon Roe, founder of Avro.

Since 1948 the Society of Model Aeronautical Engineers has been a Company Limited by Guarantee, as are most governing bodies of sport in the UK.

The SMAE and BMFA

In 1987 the Annual General Meeting of the Society of Model Aeronautical Engineers (SMAE) voted to adopt a working title, the **BRITISH MODEL FLYING ASSOCIATION.**

The SMAE still exists as the parent body and its title is still used on all legal documents and for many functions of the Society controlled by the Articles of Association.

Throughout this handbook both titles will be used where appropriate, BMFA in most cases but SMAE where a reference has implications as noted above.

The title BMFA should be used by any member club or individual.

We know that you will find the use of the BMFA title extremely useful when dealing with outside bodies and people who are not model flyers. Having a title that says exactly who you are and what you do means that you have far more time to explain to them what you really want before they lose interest.

BMFA Affiliated Clubs are encouraged to use the BMFA logo and the words 'Affiliated to the BMFA' (or similar) on letterheads and other club stationery.

The colours of the SMAE are Silver and Blue.

The colours of the BMFA are Red, White and Blue.

The Association's Objectives

It would be appropriate to list a few items from the SMAE's original 1948 Memorandum of Association (see Directory of Publications), which still applies to the BMFA and which explains its aims.

The main objectives are;

The promotion, protection, organisation and encouragement of model aircraft building, flying and development, in all its aspects in the United Kingdom, through the medium of clubs and individual members; assistance and guidance to model aircraft clubs or individuals; collaboration between members of the Society; and co-operation on behalf of members of the Society with the Civil Aviation Authority or other government departments and any other bodies and organisations in the United Kingdom and overseas.

To produce, collect and distribute information in connection with model aircraft or the model aircraft movement on such terms as Council shall think fit.

To encourage and support research in model aircraft design, theory and construction.

To control and record model aircraft performance within the areas under the jurisdiction of the Royal Aero Club.

To act as promoters of National and International model aircraft meetings, contests and exhibitions; as publishers, stationers and booksellers, general traders, dealers agents and manufacturers, both wholesale and retail, of any articles of any description which may assist the development of model aviation.

To establish and support, financially or otherwise, or aid in the establishment and support of any educational scheme or establishment with benefit to the model aircraft movement.

Our motto is

"UNITED WE ACHIEVE"

It's Your Association

Every single member of the Association counts and has the full back-up of the organisation.

However, to gain the full benefit from your BMFA membership it is recommended that you belong to a BMFA affiliated club because, as a club member, you can have your opinion made known at any of the many regional meetings that are held regularly by the BMFA Areas.

As a member of an affiliated club your vote can also be used by your club delegate to influence decisions taken at General Meetings of the Society on such subjects as policy and finance.

BMFA Areas

The country is divided into thirteen geographic Areas plus the Royal Air Force Model Aircraft Association (RAFMAA) who also act as an Area. Every club in an Area is automatically a member of their Area Committee and the officers of the Area Committee are elected from the club delegates who attend the Area meetings.

At any Area meeting your representative can hear the viewpoint of those elected Area officers and the representatives of other clubs as well as expressing your own club's opinion.

The Area Committee can be a powerful influence for the benefit of model flying, both locally and nationally particularly as one member of each of the fourteen Area Committees has a seat on BMFA Council. These Delegates also attend their own Area's meetings, of course, and are the link between the Area and Council through which information can flow; yet another reason for your club to send a representative to attend Area meetings.

In addition, two delegates from your Area (usually the Area Chairman and the Council Delegate) will represent you at Areas Council, a powerful sub-committee of the BMFA Council of Management. Area Council has direct responsibility for many vital aspects of BMFA operations including all the Achievement Schemes.

If your club is not making its presence felt at Area level, why don't you consider becoming its representative? Details of Area meetings are sent out to each club by the Area or information can be obtained from the Association's Leicester Office. It's your Association and any member can influence its actions and attitudes through the Area structure.

BMFA Back-up

Whatever your particular model flying interest you will find that the BMFA has been working on your behalf for many years.

If you fly radio controlled aircraft the Association has already been of help to you, possibly even before you knew it existed. The BMFA, for example, played a large part in obtaining the frequencies you currently fly on and it is still working actively to protect and extend them.

Successes in recent years have been increased allocations of model flying frequencies in the UK and the BMFA led EEC directive setting up a pan-European 35 MHz band of 23 channels (60 to 82) devoted to model flying, making Europe one of the largest world markets for model flying R/C equipment. Both of these very significant events for UK model flyers would not have happened without dedicated work by BMFA officers.

Perhaps more importantly, BMFA has taken a robust and positive lead in the successful negotiations that have allowed the 2.4 GHz band to be available to model flyers in the UK and across Europe.

Wherever and whatever you fly, BMFA expertise can help you liaise and negotiate with local councils, government agencies and other public and private landowners so that you can have the best and safest possible model flying facilities.

To protect your interests the BMFA has adopted a robust attitude towards those who act unreasonably to restrict the facilities we all need for safe model flying. To this end the BMFA is an active and vocal member of the Central Council for Physical Recreation (CCPR) and many Areas and clubs have representatives involved with regional and local sports organisations.

As the membership of the BMFA grows its influence with such bodies increases. However, the national voice of model flying would be much stronger if all model flyers joined the BMFA instead of trying to solve their problems in isolation. As a member, you can help by encouraging fellow flyers to join the Association. There is no question that, when BMFA is in negotiations on your behalf, numbers are extremely important.

BMFA is especially useful to the ninety percent of the membership who don't take part in our sport as competitors. The major part of the BMFA's work consists of keeping you and your clubs in touch with model flying locally and nationally and, most importantly, being there with help and unbiased advice whatever model flying problems arise.

The full time staff of the BMFA make a very significant contribution to the work done by the BMFA at both area and national level but, in addition, a great deal is done entirely voluntarily by model flyers like you. This applies whether the work is of general benefit (publicity, local and national government liaison etc.) or more specialised (such as the various Technical Committees).

Responsible Flying and Relations with the General Public

It is important to remember that although our chosen sport is one of the larger of the minority sporting activities, we are still vulnerable to the negative aspects of public opinion.

The BMFA spends considerable time and effort creating the best possible public impression of model flying but all this work can easily be wasted if you fly in a thoughtless manner.

Your enjoyment of model flying, now and in the future, depends on developing and displaying a highly conscious 'safety first' attitude towards your equipment and the flying site you use. The best publicity the sport can receive is through your actions and your responsible and safe attitude to flying at all times.

There is no place in model flying for those who do not consider other people's safety; nor is there a place for those who are inconsiderate about noise.

One person's thoughtless actions can jeopardise the enjoyment and pleasure of those many others who adopt a responsible approach. Considerate and careful model flying must always be our aim.

Clubs and members enjoy the benefits of flying from many varied sites throughout the UK. Everyone should remember that it is a common courtesy to make sure that they have the landowner's permission before flying on any site.

The Contest Scene

The BMFA organises numerous contests at venues all over Britain, covering all aspects of the sport from indoor flying to large radio controlled scale models. Details of forthcoming competitions and events are published in the BMFA's own publications and website and in the commercial model flying magazines.

Newcomers to contests are always welcome and should not be afraid to participate, for there is no doubt that competition will improve your skills and even the experts can be beaten. Taking part in competitive events can add a great deal of enjoyment to model flying and it will also give you the opportunity to see some of the country's best models and flyers in action.

Selection trials are held each year to pick teams to represent the UK at World and European Championships for many of the International classes of competition model flying.

Contest organisation is the responsibility of the Technical sub-committees of the BMFA and up-to-date rules for the various classes of flying are published annually. See the index of contest rule books at the end of this handbook for more details.

National and International Status

The BMFA is the body delegated by the Royal Aero Club to be responsible for all aspects of model flying in the UK, and is in an identical situation to, for example, the Microlight Aircraft Association or the British Gliding Association.

It is recognised as the sole representative organisation for the sport in the UK by the Federation Aeronautique Internationale (FAI), the world governing body for all forms of sporting aviation, including model flying.

The FAI has numerous international committees relating to its various interests, such as gliding, aerobatics, space and model flying and the Commission Internationale d'Aeromodelisme (CIAM) is the committee responsible for our sport. The BMFA's reputation and contribution to the work of CIAM has been, and is, second to none.

BMFA is represented each year at the annual plenary meeting of CIAM by a small team of specialists who are delegated to speak for the UK.

The SMAE pioneered the present world programme of model flying and has provided many of the officers of the FAI over the years and BMFA members still hold many important FAI posts.

The Society is the holder of an Honorary Group Diploma of the FAI, which is an honour given to those who have greatly contributed to the progress of aviation or astronautics.

The benefits of our FAI and Royal Aero Club memberships are two-way, since we can learn much from the way the problems of model flyers are tackled by other countries, as well as giving them the benefit of our own experience.

FAI Licences

The BMFA is empowered by the FAI to issue international sporting licences to individuals and this document is essential for anyone competing abroad or in any FAI international event. They are available at reasonable cost on request from the BMFA office.

An FAI Licence could be of great help to anyone flying model abroad, not just competitors, as it is a document that is recognised world wide. It may be of help when dealing with airlines over the carriage of models and radios and it could help if you seek to fly with a foreign club or have to deal with local authorities abroad over model flying matters. If you are planning on model flying abroad then, for the small cost involved, it would be well worth considering obtaining your own FAI licence.

Sports Council Recognition

Model flying is recognised by UK Sport as an official sport. Although not recorded as a separate entity in the UK Sport composite list of sports, model flying is one of the three categories of air sports encompassed under the single heading 'Flying'.

As a consequence of official policy being to support only 'Olympic' sports, we do not currently receive any financial assistance from UK Sport. This is a situation that is unlikely to change in the near future.

The Education Initiative

The BMFA is extremely concerned about the increasing lack of exposure of school children to model flying. Increasing competition from other activities and the lure of the computer game has led to a situation where very few children have had the opportunity to fly a model.

The long term future of model flying in the UK may well depend on positive action being taken to counter this trend.

The BMFA has produced a package that has been designed to integrate into National Curriculum Craft, Design and Technology (CDT) courses and which enables any teacher or youth leader of nine to thirteen year olds to make use of a structured course as an introduction to aviation subjects.

The practical side of this course uses the BMFA Dart and other easy-to-build model aircraft as demonstration tools and, with the help of the scheme, many thousands of children have gained 'hands on' model flying experience in the past few years. It is expected that the scheme will expand considerably in the future.

The scheme is not aimed at recruiting junior members but rather to give children who may never have even held a model aircraft the thrill of that first successful flight that we all remember.

The BMFA Education Working Group co-ordinates the efforts of all who wish to be involved in this vital work. If you think you can help or you would like details of the package for your school, please contact the BMFA's Leicester office for details.

For those schools with existing model aircraft clubs or those who are considering setting up such an activity, the BMFA Youth Group Scheme will be found to be invaluable; see the section on BMFA Membership for details.

Recommended Codes Of Practice and Achievement Schemes

It is the duty of the BMFA, as the national body for model flying, to act responsibly in giving the best advice it can to all model flyers and other interested parties. This advice covers not only specific flying matters but other legal responsibilities that flyers and clubs might encounter.

The BMFA has gathered a great deal of experience in such matters and this knowledge and experience is freely available to anyone who requires it.

In some cases BMFA has published specific Codes of Practice on certain subjects and details of these Codes are included throughout this handbook.

For instance, as a practical means of improving radio control model flying standards, achievement schemes for radio control power fixed wing, helicopter, silent flight thermal soaring, silent flight slope soaring and electric flight have been introduced and you will find full details later in this handbook.

General Regulations and Contest Rules

The General Regulations (Part 1) which appear later in this handbook are, in effect, Section 1 of the Contest Rule Books. They affect all contest flyers and their models and are printed in this handbook because of their general application.

The more complex and detailed individual contest rules are published separately and can be obtained from the Leicester office or the BMFA website (see BMFA Contest Rule Books).

Model Flying Records

The BMFA is responsible for documenting and overseeing all model flying records set in the UK, whether they are National or World Records.

There are over 80 categories of FAI World records plus many more categories in which a British record can be achieved, both contest and non-contest.

Two Records booklets are available free of charge from the BMFA's Leicester office or as downloads from www.bmfa.org. The first is Records Section 2A, which is the rule book, and the second is Records Section 2B, which is a full list of the current British records and record holders. A list of the current World records is also available.

Records Section 2A is required reading for anyone thinking about record attempts and you should not consider making an attempt without obtaining a copy.

Further advice to anyone contemplating an attempt on a model flying record of any type is available from the BMFA's Records Officer who can also be contacted via the Leicester office.

If you are serious about wanting to set and claim records then a chat with the BMFA Records Officer is essential.

TYPE AND CONDITIONS OF MEMBERSHIP

(1) **BMFA MEMBERSHIP** is available to all applicants. Those over 18 years of age on the 1st January of the year of membership are Senior members, those younger than this are Juniors (but have full membership status.

Note: In exceptional circumstances, BMFA Council reserve the right to refuse membership applications.

(2) **COUNTRY MEMBERS**. Individual members not belonging to a BMFA Affiliated club are known as Country Members.

(3) **FAMILY MEMBERSHIP** is available to families living at the same address. To qualify for family membership, one senior member must register as 'Head of Family'; a spouse/partner and all children under 18 years old can then register as family members at a reduced fee. Family membership is open to both club and country members. All family members have full membership status but only the 'Head of Family' receives a copy of BMFA News.

(4) **FELLOWSHIP** and **HONORARY MEMBERSHIP** are two different classes of membership which are awarded to a few people in cases of special merit. Fellowship is, in fact, the highest honour awarded by the Association and is awarded for meritorious work within the BMFA to a maximum of two people each year by the Annual General Meeting.

(5) **MEMBERSHIP PERIOD.** The normal period of membership is from 1st January to 31st December in each year. Applications for membership part way through the year may be subject to a reduced membership fee as decided from time to time by BMFA Council. In any case those applications which are received after 1st September in any year will have a part of the paid fee credited to the following year. The membership fees are agreed each year at the Annual General Meeting of the Society.

(6) **COMPETITION ENTRY**. Full members of the BMFA may enter the contests and events organised by BMFA on payment of the entry fee. Evidence of membership must be shown to an authorised BMFA official if requested.

(7) **FEES AND BENEFITS**. The categories, term and benefits of membership are occasionally modified as the Association develops. When in doubt about the current fees or benefits, please contact the BMFA's Leicester office where the staff will be pleased to provide you with all the information you or your club require about joining the Association.

BMFA AFFILIATED CLUBS

(1) **AFFILIATED CLUB MEMBERSHIP** of the BMFA is open to clubs and model flying groups consisting of not less than five persons. All current club members who fly and/or who are involved in any organising function within the club whatsoever must be registered with the BMFA as fully paid up individual members and at least one of them must be a senior member.

(2) **SCHOOLS AND YOUTH GROUP MEMBERSHIP** is open to bona-fide school model flying clubs and clubs organised by recognised youth organisations such as the ATC, the Young Engineers or the Scouts etc. The minimum number of club members is one individual senior and four juniors. The juniors need not be named and their membership fee will be one third of the current junior fee, rounded to the nearest pound.

This gives the club full affiliated membership of the BMFA and at General meetings such clubs carry one vote for the senior member and one vote for every three reduced rate juniors, subject to a minimum of five votes.

Any reduced rate junior may become a full member of BMFA by paying the balance of the full junior membership fee. Any such full junior member is not disqualified from membership of his youth group. See also the section on insurance.

VOTING

(1) **VOTING RIGHTS AT GENERAL MEETINGS**. Fellows of the SMAE and all clubs affiliated to the BMFA have the right to vote at general meetings of the SMAE. Each shall have one vote, the affiliated club's being cast by its duly authorised representative. If a poll vote is called, an affiliated club shall have one vote for each registered full member and a Fellow shall have five votes.

Note: General meetings of the SMAE consist of the Annual General Meeting of the Society plus any Extraordinary General Meetings which may be called from time to time.

Council of Management meetings do not come into this category and have their own voting system (see the section 'BMFA Council of Management' near the end of this handbook).

(2) **VOTING RIGHTS IN POSTAL BALLOTS** are decided by BMFA Council each year. Depending on circumstances, all BMFA members may be eligible to vote in the postal ballot and voting forms will be distributed as required.

MEMBER'S INSURANCE

The primary insurance cover provided by the BMFA for its members is Third Party Civil Liability.

This covers you, the flyer, against any civil liabilities you may incur during your model flying activities. Note that, as with any other third party insurance, this is NOT an automatic cover for the 'injured party'. The person insured is the flyer.

In addition, a 'no fault' personal accident insurance covering permanent disablement is included.

Title

It covers the BMFA, its employed, elected and co-opted officers, their committees and all registered clubs and individual members of the BMFA.

Activities

It covers the normal and lawful pursuits of the Association and its registered members.

Notes:

(I) Any form of flying for trade or commercial enterprises, whether paid or unpaid, is not covered by the basic policy (See 'Exclusions' and the section on 'Model Traders Insurance').

Indemnity Limits for the Third Party Public and Products Liability

£10,000,000 for any one claim, (in the aggregate in respect of Products Liability).

Note that claims relating to property damage are subject to a £50 excess.

Territorial Limits

(1) The whole of the UK and

(2) Elsewhere in the world in respect of the Association's officers and registered members temporarily abroad.

Note - Although the BMFA insurance cover is fully valid in the USA and Canada, you are required to inform the BMFA office if you intend to fly in those countries on your BMFA insurance.

Models Covered

(a) All classes of model aircraft of whatever size, weight or engine capacity (subject to compliance with CAA regulations) except as noted in 'Exclusions'.

(b) Model boats and cars.

(c) Models powered by legal rocket propulsion systems up to and including 'M' size motors.

(d) Steam powered models except when used for passenger carrying purposes for hire or reward.

(e) Kites (subject to compliance with CAA regulations).

(f) First Person View RC flying provided it is carried out in accordance with CAA/BMFA regulations/ recommendations.

Exclusions

(a) Any form of commercial or trade activities including professional, semi-professional or sponsored display teams.

(b) Pulse jet powered models except as specified in the BMFA General Rules, Section 1.2.3.1, Reaction Motors, parts (1) and (2) as noted later in this handbook.

(c) Deliberately staged mid-air collisions at airshows and public displays.

Notes:

(i) Money paid to clubs by organisers of fetes, shows, etc, where the club is giving a demonstration does not constitute 'professional use'.

(ii) The carrying of Company or Organisation names or logos on models does not constitute a 'form of commercial or trade activity'.

Extensions

(a) **Member-to-member** liability is covered including damage to property belonging to fellow members.

(b) Indemnity is automatically extended to any Principals (**Landowners**, Schools, Local Authorities, Government Departments etc.) whose land or premises is used by any BMFA affiliated club or registered member.

(c) The Indemnity is extended to the **Committee Members** of any affiliated club and **all lawful club activities** are also indemnified.

(d) The reduced rate insurance cover available to juniors under the **Schools and Youth Groups** membership scheme only applies when such juniors are flying under the supervision of their group leader(s). To obtain the full unlimited BMFA insurance cover, any such junior must become a full junior member of the BMFA.

(e) Indemnity is provided for **paid flying instruction** provided the conditions laid down by the Association are complied with (see 'Flying Training Cover' section).

(f) In the BMFA **Airside Cover** special provision, indemnity is provided for members operating their private motor vehicle 'airside' on an airfield or aerodrome, in pursuit of any activity associated with model flying where the members own private motor vehicle policy makes a specific exclusion in this respect. A higher excess is applicable to any claim made under this special provision.

(g) Club indemnity is extended to cover first time visitors to a club who have no previous experience but are seeking to try out model flying prior to joining the BMFA and the Club. Indemnity under this **First Time Inexperienced Flyer** provision will only be in place when flights are being totally organised and supervised by a suitable club member approved by the Club Committee. The limit of this indemnity is 3 separate day visits for any single inexperienced flyer.

(h) Club indemnity is extended to enable clubs to welcome **Model Flyers from Overseas Countries** to fly at their club sites during short visits to the UK. In the interest of promoting good international relations the BMFA will absorb the cost of providing this indemnity for a period not exceeding 30 consecutive days for any one overseas visitor in any single membership year. Club Secretaries are required to notify the BMFA, in advance, if this provision is required.

(i) Employer's Liability Cover with a £10 million level of indemnity is provided to all affiliated clubs. This covers legal liabilities for damages and legal costs arising from death or injuries caused to employees in the course of their 'employment'

The definition of 'employee' in this context includes labour only sub-contractors and volunteers working within the club.

Conditions

(a) When dealing with the injured/third party **you must not, under any circumstances**, admit liability or make or agree any financial settlement with respect to any incident which might give rise to a claim under the policy.

However, when dealing with the BMFA and its insurer, you should provide a full and honest account of events, especially when filling in an incident report form.

(b) It is the duty of the insured to exercise reasonable care to see that their models are sound and in proper order and that all reasonable safeguards and precautions against accidents are provided and used.

Incident Reporting Procedure

(a) Prompt notification of all incidents / accidents that may result in a claim on the policy is essential. Initial telephone contact with the BMFA's Leicester Office should be within 24 hours of the incident. Reports out of office hours will be recorded on the office answerphone.

(b) The Leicester office will supply you with an incident report form which will become the basis of an initial report of an incident to the Insurer if required. The office staff will give you any specific advice you need to help you complete this form.

(c) Regardless of how serious an incident may be, the reporting procedure outlined above will nearly always be adequate.

(d) It is important advice that, in the event of any incident that may have insurance implications, you should never admit any liability to any third party involved in the incident.

However, when completing the incident report form supplied by the BMFA office, **it is essential** that you provide a truthful account of events leading to the incident. If you believe that you have any responsibility or liability for the incident then you should declare this on the reporting form. Any declaration you make on the BMFA incident report form will NOT result in you being penalised in any way.

(e) The CAA has set out procedures for reporting more serious incidents in CAP 658 and these are set out later in this handbook together with more advice from the BMFA on the subject.

Operative Dates

The liability cover is effective from the date of joining until the end of the current membership year. Note that 'date of joining' means, for members of affiliated clubs, the date that payment is made to the club's BMFA contact and, for all others, the date payment is received at the Leicester office.

Certificates

Individual insurance certificates will be provided to all registered members of the Association from the Leicester office with their membership card.

To maintain continuous cover it is vital that your membership renewal each year is prompt.

Any changes to the personal information detailed on your certificate should be notified to the BMFA.

Personal Accident Scheme

Members of the BMFA between the ages of 3 and 85 are covered by a standard personal accident policy whilst participating in Association activities which include the building and flying of model aircraft for sport and recreational purposes as well as travel to and from the flying site.

The benefits payable under this policy are £5000 in respect of accidental death and up to £25000 for permanent disability (current as at 1st January 2010); however, the level of benefits payable may change from time to time. Reduced benefits are paid to members over the age of 70.

Personal Accident Cover is extended to cover first time visitors to a club who have no previous experience but who are seeking to try out model flying prior to joining the club and BMFA. Indemnity under this **First Time Inexperienced Flyer** provision will only be in place when flights are being totally organised and supervised by a suitable club member approved by the Club Committee. The limit of this indemnity is 3 separate day visits for any single inexperienced flyer.

Product Liability

In any incident it is quite possible for blame to be attributed to a component or equipment failure which could well not be the responsibility of the flyer. The supplier of the component or equipment, who could possibly be a fellow member, could be held ultimately responsible and that could be you. Hence, product liability insurance is essential and it is a key element of the BMFA insurance protection.

Flying Training Cover

The BMFA insurance policy contains indemnity cover for any member who accepts a fee for the teaching of R/C flying. This cover is only available for instruction carried out in the environment of a BMFA affiliated club and not in a commercial organisation.

In all cases, other than those covered by the First Time Inexperienced Flyer provisions, both the instructor and the pupil must be BMFA members.

Ministry Of Defence Indemnity And Flying On MoD Property

An exclusive feature of the BMFA insurance is the vital Crown Indemnity cover given to clubs and members flying on land owned by the Ministry of Defence (e.g. RAF airfields).

In order to fly on Ministry of Defence property you will require three things:

(1) Third party insurance, as provided by the BMFA for its members.

(2) Crown indemnity insurance which is a special cover provided by the Association and which is invoked as in 3) below.

(3) A licence issued by Defence Estates (DE) which must be submitted to the BMFA for countersignature to the effect that the applicant is a BMFA affiliated club or member, thus invoking the special BMFA Crown Indemnity insurance cover.

Only BMFA members will be permitted to fly on the site and, since random military security checks operate, model flyers using MoD land must carry their card identifying them as BMFA members.

The formal procedures for obtaining access to MoD lands are contained in Defence Council Instructions and will be referred to by the Commanding Officer or the Defence Estate office concerned.

The BMFA's Leicester office is very familiar with the procedure and will provide help and the necessary documents when needed. BMFA Area officials may also be able to help and advise you on this subject.

Model Trader's Insurance

The Association has made available a special insurance to indemnify model traders flying at displays, shows etc. The following conditions apply:

(1) The model trader flyer must be registered with the BMFA via the Leicester Office.

(2) All persons flying for the model trader must be a current member of the BMFA and must hold a BMFA 'B' Certificate.

Optional Insurance Schemes

Additional Insurance schemes are available directly from the BMFA's Insurance Broker. These include:

(1) House and Contents insurance, which includes cover for model equipment whilst at home, in transit or whilst left unattended in a secured vehicle.

(2) Club Equipment Cover, which provides fire and theft cover for items such as grass cutting equipment.

(3) Commercial Flyers Insurance which provides cover for aspects of commercial model flying such as aerial photography, survey work or flying training undertaken on a commercial basis.

ADVICE TO CLUBS

Flying Site Negotiations

To help your club in negotiations with local government authorities and other landowners the BMFA has, over many years, built up a unique depth of experience and expertise which is available to you.

The BMFA Flying Site Advisor

The BMFA has the services of a full time planning advisor whose brief is to assist all BMFA affiliated clubs with planning and site problems.

Before your club enters into any form of dialogue with Local Authorities or anyone else on the subject of model flying it is essential, for your own benefit, that you discuss your problems or proposals with the BMFA Flying Site Advisor.

Very early involvement is crucial in any negotiations.

Your initial contact with BMFA should be as soon as you suspect that you may be involved in negotiations or planning applications. This will enable the BMFA Flying Site Advisor to build an information file on your circumstances which will be invaluable if you run into problems. All information will, of course, be confidential.

BMFA is aware that independent action by clubs has, at times, led to the complete withdrawal of flying facilities for everyone using a site so the facts are clear - to give your club the best chance of success you should use the experience and expertise available through the BMFA. It is only a telephone call away.

Help and advice from BMFA has been instrumental in obtaining and retaining the use of many flying fields so call the BMFA's Leicester office for details of how to contact the Flying Site Advisor.

Club Assets and Grant Applications

If you are making grant applications (for instance, to Local Authorities) you may find that the award will depend on your Club Constitution clearly stating what will happen to assets in the event of the club winding up.

The usual requirement is that your members may not benefit directly and your Constitution may need to state that the Club assets would be transferred to, for instance, a charity or possibly to BMFA.

The BMFA operates a Trust scheme to help clubs in these circumstances. All assets are held in trust for a period of ten years and will be administered by a Board of Trustees. The money may be used to assist the re-forming of the Club or the formation of a new Club in the immediate area.

For more details, contact the BMFA Leicester office.

THE CARE AND PROTECTION OF CHILDREN AND VULNERABLE ADULTS

Model flying clubs and groups have legal responsibilities to consider the care and welfare of children and vulnerable adults. BMFA has sought the best advice possible for its clubs and members on this matter so that junior and vulnerable adult members can continue to take part in club activities.

There are also insurance implications in this matter and Royal & Sun Alliance (the BMFA insurers) have indicated that, to ensure continued insurance cover for this aspect of Club activities, all Clubs that have or may have junior or vulnerable adult members should set up a policy for their care and protection.

The BMFA has produced a comprehensive document that is available to all clubs and which covers most circumstances that you will find at club level. However, it is important that any policy which you implement within your club is one that suits your particular needs and circumstances. There is no 'one size fits all' policy. Copies of the document are available free of charge from the BMFA Leicester office or as a download from the BMFA website at www.bmfa.org.

Implementing a policy within a model flying club is a relatively simple process, the main requirement being a large degree of common sense. At all times the objective is to do what is 'reasonable'.

At its most basic level a policy should reflect your club's commitment to the care and welfare of junior members and vulnerable adults and define the way in which these individuals are cared for within the club environment. In most cases you will find that this is just a matter of formalising what you already do on a day-to-day basis.

CRB Checks

One of the options you have when setting up a policy at club level is the voluntary Criminal Records Bureau (CRB) checking of those who directly work with or take responsibility for junior members on a regular basis. This can be seen as a measure of protection for both the club and the volunteer concerned. The BMFA can initiate the Enhanced Disclosure Check on behalf of members.

It should be noted that CRB checks are free of charge to volunteers and all information is handled and stored in the strictest of confidence. The certificate is valid for three years and two copies are issued - one to the applicant and one to the BMFA. A letter is then generated for the applicant stating whether or not they are cleared to work with juniors, which is all that a club requires.

You may be wondering why your Club should bother with these matters but the point is well made by the BMFA Insurance Brokers, Perkins Slade, that, in

relation to child protection matters, model flying is a low risk sport, not a no risk one.

For further advice on Child Protection or CRB matters, please contact the Development Officer or the Chief Executive at the BMFA Leicester office.

Guidance on Caring for Junior Club Members

(a) In setting out its Child Protection Policy, a Club should have clearly defined who takes responsibility for junior club members. Depending on what has been decided, this may be the parents/guardians of the juniors, it may be club members or it may be a shared responsibility. Whatever the situation is within the Club, it should be well publicised to ensure that all are aware of any division of responsibilities. Club rules should carry this information and a copy of the rules must be given to parents/guardians and their attention drawn to them.

(b) Junior members must be supervised at all times by a responsible adult, as defined by the Club's Policy. The level of supervision is to be commensurate with the junior member's age, maturity, capabilities and levels of experience.

(c) No senior member is to be expected to assume full responsibility for a junior member unless they have been clearly requested to do so by the junior member's parent/guardian and if the action is in line with the Club's policy regarding Junior members.

(d) Should a member discover a junior member is unsupervised he must assume responsibility for the junior member's safety in the first instance. The situation should then be rectified as soon as possible by seeking out the junior member's parent/guardian or nominated supervisor. Any instance of such an occurrence is to be reported to the Club Committee as soon as possible as it is likely that the Club's Child Protection policy has been compromised and action may need to be taken to prevent this in the future.

(e) A junior member is usually defined as being under 18 years of age but particular care must be taken with the supervision of those juniors under the age of 14 years.

(f) Whilst supervising junior members, senior members should avoid placing themselves in a position that could be open to misinterpretation or question.

(g) It should be noted that any disclaimer concerning the care of any member, particularly junior members, is not acceptable in law.

(h) Any model flyers who find themselves dealing with a matter connected with Child Welfare or Protection should remember that they are not expected to do anything other than act in a reasonable manner.

Vulnerable Adults

(i) A vulnerable adult is defined as a person of 18 years of age or over who requires a higher level of supervision and care than that normally commensurate with an adult member. This could range from a person who requires permanent supervision whilst on the flying field to a usually able bodied member who is suffering a temporary illness. It can include, for instance, members with heart problems and asthmatics who might function normally in nearly all circumstances but who would benefit from a little more care from other members at times.

(j) In most cases, no more is required from members than they act in a reasonable manner, probably just as they have always done.

Disability Guidelines for Model Flying Clubs

The BMFA encourages and supports model aircraft flying and related modelling activities at all levels and within all social groups.

The Disability Discrimination Act (DDA) of 2005 extended previous legislation to make it illegal for private clubs with 25 or more members to discriminate against a member or potential member on the grounds of their disability.

This places a requirement on private clubs to consider reasonable measures to improve access to their facilities.

Knowledge of the disability legislation and how it effects clubs and individuals is important and we recommend that everyone involved in organised model flying should be aware of their legal obligations towards disabled members.

As such the BMFA has produced a comprehensive set of Guidelines for Model Flying Clubs, which are available free of charge on request or via the BMFA website at www.bmfa.org.

Meeting a disabled person's needs is largely a matter of common sense and clear communication at the outset can often prevent problems arising at a later date. For further advice, please contact the Chief Executive Officer or the Development Officer at the BMFA Leicester Headquarters.

LEGAL CONTROLS OVER MODEL FLYING

The sport of model flying is subject to various legal controls which should be carefully considered at all times. You are personally responsible for any flights you make and knowledge of your legal responsibilities is important.

(1) The Air Navigation Order (ANO)

The ANO is the legal framework which covers all flying activity in the UK. It is administered by the Civil Aviation Authority (CAA) and has been ratified by Act of Parliament. This means that the ANO is part of the body of law of the UK and, if you break it, you are liable to criminal prosecution.

However, model flying has been exempted from most of the clauses of the ANO. The main ones that still apply are Articles 138, 137, 166 and 167. These are ;-

Article 138;

"A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property"

Article137;

'A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft'

THESE APPLY TO ALL MODEL AIRCRAFT AT ALL TIMES, WHATEVER THEIR WEIGHT OR SIZE.

Article 166, (Small Unmanned Aircraft)

(1) A person shall not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a small unmanned aircraft so as to endanger persons or property

(2) The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.

(3) The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.

(4) The person in charge of a small unmanned aircraft which has a mass of more than 7 kg excluding its fuel but including any articles or equipment installed or attached to the aircraft at the commencement of its flight, must not fly the aircraft .

(a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained.

(effectively in any controlled airspace down to ground level - Ed)

(b) within an aerodrome traffic zone during the notified hours of watch of the air traffic control unit (if any) at that aerodrome unless the permission of any such air traffic control unit has been obtained; or

(c) at a height of more than 400 ft above the surface unless it is flying in airspace described in sub-paras (a) or (b) and in accordance with the requirements for that airspace.

(i.e. in any uncontrolled airspace. A further point is that 'above the surface' means 'above the point of launch from the ground' and this has been clarified with the CAA on several occasions - Ed).

(5) The person in charge of a small unmanned aircraft must not fly the aircraft for the purposes of aerial work except in accordance with a permission granted by the CAA.

(Section 5 doesn't affect you unless you are flying your model commercially for 'valuable consideration' - Ed).

Article 167, (Small unmanned surveillance aircraft)

(1) The person in charge of a small unmanned surveillance aircraft must not fly the aircraft in any of the circumstances described in paragraph (2) except in accordance with a permission issued by the CAA.

(2) The circumstances referred to in paragraph (1) are :-

(a) over or within 150 metres of any congested area;

(b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;

(c) within 50 metres of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft; or

(d) subject to paragraphs (3) and (4), within 50 metres of any person.

(3) Subject to paragraph (4), during take-off or landing, a small unmanned surveillance aircraft must not be flown within 30 metres of any person.

(4) Paragraphs (2)(d) and (3) do not apply to the person in charge of the small unmanned surveillance aircraft or a person under the control of the person in charge of the aircraft.

(5) In this article 'a small unmanned surveillance aircraft' means a small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.

BMFA Notes.

BMFA has had clarification from the CAA that 'surveillance or data acquisition' equipment does NOT include such items as dataloggers, variometers etc. that are clearly used to monitor the performance of the model carrying them. They are only concerned with models equipped with cameras,

video equipment etc. that have the potential to be used for surveillance purposes, either visual or electronic.

It should also be noted that the above legislation (articles 166 and 167) does NOT prohibit you from flying a camera or video equipped model for recreational purposes. The person in charge of the model must retain direct visual contact with the model (Article 166) and there are some restrictions as to where you can fly (Article 167).

Probably the most important of these restrictions are the limits of not flying within 50 metres of any person or 30 metres from any person during take off and landing and these are exactly the same as for any model over 7 kg. Most clubs cope with these restrictions quite easily.

(2) Models Over 20 kg

These are considered by the CAA to be aircraft, not model aircraft and, as such, they are treated in a different manner to models under 20 kg.

They are subject to airframe inspection, pilot and airworthiness testing before an exemption certificate can be issued to allow them to be flown.

The exemption certificate does exactly that, it exempts the model from most of the clauses of the ANO but the model is then subject to whatever conditions the CAA might apply to the model and these are detailed on the certificate itself.

Most of the conditions are usually based on those for models between 7 and 20 kg, set out in Article 167 of the ANO above, but the CAA reserves the right to include other conditions if it thinks fit.

It should be noted that breaking any of the terms set out in the exemption certificate, for instance during a flight, will invalidate the certificate at that point in time and make the model and its pilot subject to the whole of the ANO.

(3) Mandatory Model Flying Insurance

It is a legal requirement in the UK that all models over 20 kg maximum take off mass (MOTM) must carry at least £750,000 third party public liability insurance.

This obviously applies to all models over 20kg dry, which are covered by CAA exemption certificates. However, it also applies to those models under 20kg which do not need an exemption certificate but which are taken over 20kg when fuelled for flight.

(4) Planning Permission Considerations

Use of a site for model flying may in some circumstances require specific planning permission. In granting a planning consent a local planning authority may impose conditions designed to reduce the risk of disturbance by noise and any such conditions should be observed at all times.

If your Local Authority requests that you obtain planning permission, you may find it very much to your advantage to contact the BMFA Flying Site Advisor, via the BMFA office. The success rate for planning applications is good but there is no doubt that early contact with BMFA will help you avoid the errors that can severely damage your case for permission. See the section on ‘Advice to Clubs’.

(5) Byelaws

Local authorities may make bylaws, subject to approval by the Secretary of State, prohibiting or restricting model flying on certain municipally owned land or on land subject to certain provisions of the National Parks and Access to the Countryside Act, the Countryside Act, and the Countryside (Scotland) Act . Similar provisions apply in Northern Ireland.

(6) Noise

Under the Environmental Protection Act (EPA) 1990, local authorities or individuals may apply to a Magistrate's court for a noise abatement notice which may restrict or prohibit model flying at a particular site if the noise caused by the activity is judged to amount to a statutory nuisance.

In Northern Ireland similar action may be taken by local authorities and magistrate's courts under articles 38 and 39 of the Pollution Control and Local Government (Northern Ireland) Order.

(7) The Department of the Environment Noise Code

(4), (5) and (6) above would normally entail the relevant authorities (Planning Authorities or Magistrates) consulting the Department of the Environment Code of Practice for the Restriction of Noise from Model Aircraft which follows this section.

The Code of Practice is not the law and, in fact, there are no direct legally enforceable noise level requirements for model aircraft.

What IS legally enforceable, however, is a Noise Nuisance Notice which could be issued by a Magistrate against model flyers whom they consider are creating a statutory nuisance and which would stop any flying on the site immediately and permanently.

When a Magistrate is deciding if model flyers are creating a statutory noise nuisance, the document most likely to be referred to is the DoE Code of Practice which is set out in full later in this handbook.

THE BMFA GUIDELINES AND SAFETY CODES FOR MODEL FLYING

Article 138 of the Air Navigation Order states,

'A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property'.

Article137 of the Air Navigation Order states,

'A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft'.

These laws cover ALL model flying. The codes of practice contained in this handbook have been developed over many years in response to the implications of Articles 138 and 137 and, whenever model flying takes place, the BMFA strongly recommends that these codes are used

CAP 658

During 1996 some changes were made to the Air Navigation Order which re-defined model aircraft as 'small aircraft' and which are covered in detail in the section 'Legal Controls Over Model Flying'.

At the same time the Civil Aviation Authority (CAA) issued Civil Aviation Publication 658 (CAP 658), Small (Model) Aircraft: A Guide to Safe Flying.

This document gives advice for all model flyers, much of which is based on the existing BMFA Safety Codes. CAP 658 will be referred to throughout this handbook whenever it adds to the existing BMFA safety codes.

Extracts from the latest version of CAP 658 (April 2007) are included in this handbook where appropriate.

Whilst the recommendations in CAP 658 are not regarded as legal requirements, one of the reasons why it is issued by the CAA is to provide a guide to what would be considered 'reasonable practice' in the event of a model flyer being prosecuted by them under the Air Navigation Order.

This makes CAP 658 an important document for all model flyers and, although all relevant clauses in it are covered in this handbook, it is recommended that all model flying clubs at least should obtain their own copy of the document from the CAA. With the recent change to web based distribution, every model flyer can now obtain a copy very easily.

Go to www.caa.co.uk and type CAP 658 in the search box for the download or look in the address directory if you require a hard copy.

INTRODUCTION to the SAFETY CODES

Accident statistics and the low insurance rates that BMFA Member's enjoy show that model flying is not a dangerous sport but, as with other sporting activities, hazards can arise if common sense rules are not applied. It is important that we all follow safe model flying practice and the BMFA Safety Codes are designed to help everyone achieve this.

The BMFA Safety Codes presented here are available to all model flyers and show you ways to fly your models safely, based on over half a century of experience.

There are sections covering all model flying activities, including displays and competitions.

At some flying sites, circumstances may dictate that additional safety measures beyond those indicated in this handbook might have to be taken. Examples could be limiting the number of spectators or the number of models being flown at any one time.

With the advent of small electric models that can be flown from small sites, such as football pitches, you may also have to think carefully about the size and type of aircraft that you can safely fly from such sites.

As the pilot it is ultimately your decision as to what and where you fly but the range of types and sizes of model currently and easily available to you means that you may have to give the subject of suiting your model to your flying site much more thought than it needed in the past.

These Codes are not intended in any way to lessen the responsibility that model flyers have for introducing additional safety factors. The Association wishes to encourage any safety initiatives wherever they may be thought necessary by the users of any site and, indeed, any suggestions about the contents of the Safety Codes and the Handbook in general will be welcomed.

Finally - remember that your attitude to safety can affect the whole image of model flying.

Model flying must not only BE safe - it must be SEEN to be safe.

RESPECT THE ENVIRONMENT

Much model flying takes place in countryside locations and many clubs and individuals fly in places of natural beauty or Sites of Special Scientific Interest (SSSI). Wherever you fly you should take steps to minimise the impact on your surroundings.

Our aim as model flyers should be to leave any flying site in the same condition that we found it. Clearly, leaving litter or damaging property are not acceptable.

Model flyers should be familiar with the basic provisions of the Countryside Code which is compiled by Natural England and applies to all of the countryside in England and Wales. Most of it is just good commonsense as it is designed to help us all to respect, protect and enjoy our countryside.

'MIXED' SITES

Model flying does (and can continue to) take place safely on sites where other airspace users are operating at the same time close by.

Because, in all such cases, the other users always involve 'people carrying' aviation e.g. gliding, hang-gliding, parachuting, light aviation etc. the model flyer is always going to have to accept that his needs are going to be secondary to the safety of the other user. Indeed, this point is specifically covered by those few articles of the Air Navigation Order which apply to all model flying.

Having made this point, it is clear that 'mixed' sites can operate perfectly safely provided that there is good preparation beforehand, involving all the user groups. The most usual practice is for arrangements to be made whereby, before each day's flying, the user groups representatives meet to determine their respective locations, take-off/landing paths etc. and to agree methods of attracting attention should changes be needed during the day or further liaison be necessary.

As a general rule, once the day's model flying location and flying area limits have been determined, the knowledge (and the confidence that the model flyers will adhere to the agreed limits) is sufficient to enable the other users to operate freely and safely within their own limits.

In essence, therefore, 'mixed' sites generally do not share airspace - instead, in consultation between users, segregated airspace is fixed by agreement and, usually, controlled by the wind direction.

It cannot be stressed too highly that a means of quick alert is needed in case of difficulties or required changes. Mobile 'phones are probably the most effective contact method so make sure that contact numbers are available to those regularly involved. However, perfectly good arrangements are known to exist by simply running a flag up a prominent flagpole as a signal to 'stop flying - come and talk'.

On any shared site, it is extremely important that the model flying group have a robust and reasonable set of rules that are agreed by all users of the site and are rigidly applied. Anything less than this could lead to compromised safety.

These rules should always include the provision to set up a permanent lookout whenever model flying is taking place, either by individuals or by everyone present. Any airfield may be used by aircraft in emergencies or as waypoints for overflights, even when it is officially inactive.

Remember also that on such a site, there will always be a person on the full size side who will be in ultimate charge of airfield safety. This may be Air Traffic Control, the Chief Flying Instructor or even a Senior Instructor. In any disputed circumstances, their instructions must be followed

In the particular case of hang-gliding on slope sites, shared airspace is sometimes involved and the Association has a separate Code, agreed jointly with the British Hang and Paragliding Association (BHPA), which covers such situations and which is available on request from the Leicester office.

MILITARY LOW FLYING

Military aircraft may conduct low flying exercises over much of the UK on any weekday and the sudden appearance of a low flying military aircraft is difficult to anticipate. However it is vital to be aware of the problem and to remember that one aircraft may be the first in a stream of three or four.

In areas known to be used for low flying a dedicated lookout should be considered essential.

On **WEEKDAYS** only, on flying sites where low level flying by military aircraft is **KNOWN** to take place and where a club is planning to operate **FIVE or MORE** models at any one time, the CANP reporting procedures outlined in CAP 658 can be used. If possible call the day before the activity. A minimum of four hours notice is required to allow full circulation of the information.

Telephone Freephone on 0800 515544 or Fax on 0500 300120 and give the following information;

Civil low flying - recreational activity

Model aircraft flying

Location (ordnance survey grid reference or position in relation to the nearest town)

Operating area (e.g. 500 metres radius)

Date and start/finish in local time

Operating heights (lower and upper limits above ground level)

Number and type of models (e.g. 3 gliders and 3 aeroplanes)(sic)

Contact telephone number

Operator or club name and telephone number if different to above.

For more details of this service, clubs are advised to contact the BMFA's Leicester office.

YOUR FITNESS TO FLY.

Many factors can affect your day-to-day ability not only to pilot a model aircraft, but also to participate in other flying related activities (a good example of this would be the retrieving of free flight models).

Careful consideration should be given before flying to ensure that you are not compromising your own safety and welfare or that of those around you. Be aware that you might occasionally be 'unfit to fly'.

When at the flying field take good care of yourself and make sure that you are equipped with any medication that you are taking. If you use an inhaler, make sure that you have a charged one with you at all times. In hot weather consider taking sun-block, a hat and fluids - the effects of de-hydration can be serious. In cold weather make sure that you are equipped with suitable clothing.

Some medications may render you unfit to fly and the effects of alcohol should not be ignored. As a guide, if you are fit to drive a motor vehicle then you are probably fit to fly an R/C aircraft. If you are in any doubt then do not fly solo.

If you wear prescription glasses or contact lenses ensure that these are used along with appropriate eye protection for the prevailing conditions. Good quality sunglasses will help protect your eyes from harmful UV radiation at any time of the year.

As always, however, the responsibility for the final decision on whether to fly rests with you, the pilot.

HAZARDOUS MATERIALS

(a) We come into contact with hazardous materials every day but there are some that we use in and around our models that you should be particularly careful about.

(b) Carbon (and sometimes boron) fibre is regularly used as strengthening and structural material in models. These fibres, when stressed or fractured give off clouds of ultrafine microscopic fibres which are immune to your lungs' natural cleansing mechanism. Long term exposure may have very serious consequences. 'Stressed or fractured' carbon fibre could be found when you are repairing a model but it must also include cutting and sanding of new material. Whenever working with such material, always wear an appropriate mask.

(c) Kevlar fibres may also give long term problems so equal care should be taken if using the material.

(d) If any model aircraft is built or repaired using composite materials or parts then it is essential to be particularly diligent in picking up any debris after a crash or mid-air collision. Composite shards do not degrade quickly and can be a dangerous hazard in and on the ground for many years

(e) Cyanoacrylate glues (superglues) are well known for causing severe allergic reactions in some people and it seems that such a reaction can build up over time. Work in a well ventilated area, avoid breathing superglue fumes and, if necessary, wear a fume proof mask.

Superglue 'kicker' is also known to cause adverse reactions on occasions so care should be taken when using that too.

(f) Epoxy and polyester resins are also known to build up allergic reaction in some people over time. It is likely that the main culprit is the fumes given off by the products as they cure so it is important that you heed the advice to work in a well ventilated area.

(g) Methanol is fairly safe to store in a cool place and out of sunlight. However, it is a poison and the ingestion of even small quantities can be dangerous. Don't let it stay on your skin if you spill any.

(h) Petrol is an increasingly used fuel and the ease with which its vapour ignites makes it one to be very careful with. A small spark can lead to a big explosion. Don't store it or try to transfer it between containers indoors. This is one where working outdoors is very good advice.

(i) Smoke Systems

Some of the oils used in model aircraft smoke systems are known to be carcinogenic when burnt and all of them are irritants to varying degrees, even the purer types.

Smoke should only be used when the wind is blowing away or at least along the pits / flightline area and there is no possibility of the smoke cloud being blown over pilots or spectators.

THE BMFA GUIDES TO THE SAFE OPERATION OF MODEL AIRCRAFT

General Club Information

(a) Clubs or groups of flyers should draw up carefully considered safety rules for specific sites. It is recommended that the Codes in this Handbook are used as a basis for these rules but additions to cover local circumstances should always be considered too. These 'flying field' rules, should cover the club or group's normal operating procedures and safety measures.

(b) Clubs should take care to keep their flying field rules separate from their Club Constitution. This will enable them to regularly review their operating procedures to ensure that, if any additional safety measures are needed, they are recognised and implemented.

(c) Where byelaws restrict model flying to specific areas and times, model flyers should encourage local authorities to erect notices indicating the restrictions.

(d) On public sites, or sites where casual visits by the public are likely, always try to use the same take-off areas. Other regular users will then expect to see model aircraft operating from a particular place.

(e) On private sites with public access, suitable notices warning of model flying should be erected if possible and where appropriate. The signs should say **'Please Be Aware. Model Flying Takes Place Beyond This Point'.**

The Safety Marshal

(f) On any site with public access, and especially on sites where model flying activity and the public interact regularly, it is strongly recommended that a **SAFETY MARSHAL** be appointed at any flying sessions. His duties should include warning both the public and flyers of flight patterns, take-off areas and safety procedures and advising spectators of the safest area from which to watch.

Note that the person appointed will usually be appointed on the day and it may not be the same person all day. Many clubs operate the system successfully by having a rota system so that no one individual is expected to do too much.

It may even be that every member on the field is tasked with acting as a Safety Marshall as part of their flying field responsibilities.

The most important point is that all flyers are aware that care must be taken and that steps have to be taken to ensure public safety.

The Club Safety Officer

(g) If it is considered to be appropriate, a Club should appoint a competent Club **SAFETY OFFICER** whose duties would be to ensure that both the BMFA and the Club Safety Codes are followed.

However, a Safety Officer acting alone has an almost impossible task and some form of infrastructure should be set up within the club to help the designated officer.

The most successful way to do this is to make the task of Assistant Safety Officer part of the duties of every Committee member. These Assistants then report to the designated Safety Officer when required. This will keep the Safety Group to a manageable size but will ensure that there is a recognised safety presence at most flying sessions.

If it is felt that this might not be enough, you can appoint other responsible club members as Assistants too. Examiners, Instructors or senior club members might all be candidates.

It is not recommended that you appoint 'all club members' as their own safety officers. Such an approach loses the focus of a smaller group and can become ineffective.

(h) Clubs should educate and encourage their members, particularly new or junior members, to conform to Club safety requirements and should have no hesitation in disciplining persistent offenders.

Using Your Flying Site

(i) All flyers must ensure that the site they intend to use is entirely suitable for the type and size of model they wish to fly before attempting to use it. You are personally responsible for the flights you make and the consequences of flying at an inappropriate site could be serious.

(j) All flyers must ensure that the site is left free of any foreign objects or debris. This is particularly important where the use of active airfields is concerned or when livestock is likely to have access to the site at any time.

(k) CAP 658 says,

For any model aircraft flying, first choose an unobstructed site and at all times keep a safe distance from persons, vessels vehicles and structures.

Then only fly in suitable weather, with regard for any other conditions such as local bylaws and with due consideration for other people and property.

(l) If light conditions or visibility are such that you might lose sight of your model then do not fly.

(m) Take great care if you fly near any overhead cables. Telephone wires are dangerous and electricity cables can and have killed. Even the low level electricity lines on wooden posts carry lethal voltages. **KEEP CLEAR**.

(n) Do not leave fuel, adhesives etc. where children or other spectators may get hold of them.

(o) Flying alone should be avoided if at all possible. There are many cases on record where model flyers have been injured or incapacitated on the flying field and have only been saved from permanent injury or worse by the prompt actions of fellow flyers.

If you do fly alone, take a mobile 'phone with you. There are risks of interference with a mobile but the safety factor of being able to summon help if you are injured is more important.

(q) It is extremely unwise to let children wander on a flying site. If children are there make sure that they are under supervision and safe.

(r) Dogs and model aircraft do not mix. If you take your dog to the flying field it should be on a lead and restrained at all times.

R/C FLYING SITE LOCATION

Inter-club interference

(a) Inter club interference is possible when 35 MHz is in use as a model control frequency. However, if a club is set up to use 2.4 GHz equipment only then the following section is not relevant and lesser safety distances will apply.

If your club is using 2.4 GHz only, the organisation must be very careful to police the rule rigorously and, in the case that there are nearby clubs, it would be good practice to inform them of the club's location and the fact that only 2.4 GHz will be used.

(b) As a general rule, when 35 MHz is in use as a club frequency in both clubs, they should not operate closer together than 2 miles unless an agreement has been negotiated between them giving an equitable and workable frequency sharing plan. The 'block' frequency sharing arrangement is the safest and most common method. The use of odds/evens split by power and glider clubs flying close together is another, lesser used example (see the section 'Frequency Allocation at Club Sites').

(c) Both parties are bound by the implications of radio transmission law and the Air Navigation Order to take action.

(d) Please take note that negotiation in such circumstances (i.e. where interference is possible) is not optional.

(e) The use of our 35 MHz frequency bands and channels is legally granted to all of us but no one group or individual has the 'right' to reserve the use of any of our frequencies, no matter how long they have been using them on a particular site, and whoever turns on a transmitter first in any given situation is the legal user of that frequency until they turn the transmitter off.

(f) It is recommended that each negotiating club or group appoints a named person as a point of contact, possibly from its existing Committee members. Good communication is important in these circumstances to avoid misunderstandings occurring and rumour spreading and to make sure that your flying is as safe as possible.

(g) It must always be borne in mind that continuing to operate in these circumstances, (i.e. using 35 MHz as a model control frequency) without reaching a practical frequency sharing agreement may have serious legal consequences under the terms of the Air Navigation Order and may also have insurance implications for both the pilots and clubs concerned.

Model Flying Heights and Interaction with Full Size Aviation

(a) At flying sites very close to airports and aerodromes, liaison should be maintained with the airport authorities to agree any special precautions needed. For instance, in certain cases, safe model flying heights might need to be arranged.

(b) Models under 7 kg are not subject to any specific legal restrictions in this respect but you must always remember that Articles 138 and 137 of the Air Navigation Order (which cover endangering) apply at all times to all models and possible conflict with full size aircraft MUST be avoided.

(c) You do, however, have rights as model flyers and the operators of airports and aerodromes may not simply say that you cannot fly without giving very good reasons. In any situations where they will not listen to your case or where a reasonable compromise cannot be reached you should contact the BMFA office as soon as possible for assistance.

R/C POWER FLYING SITE LAYOUT AND FLIGHT PATTERNS

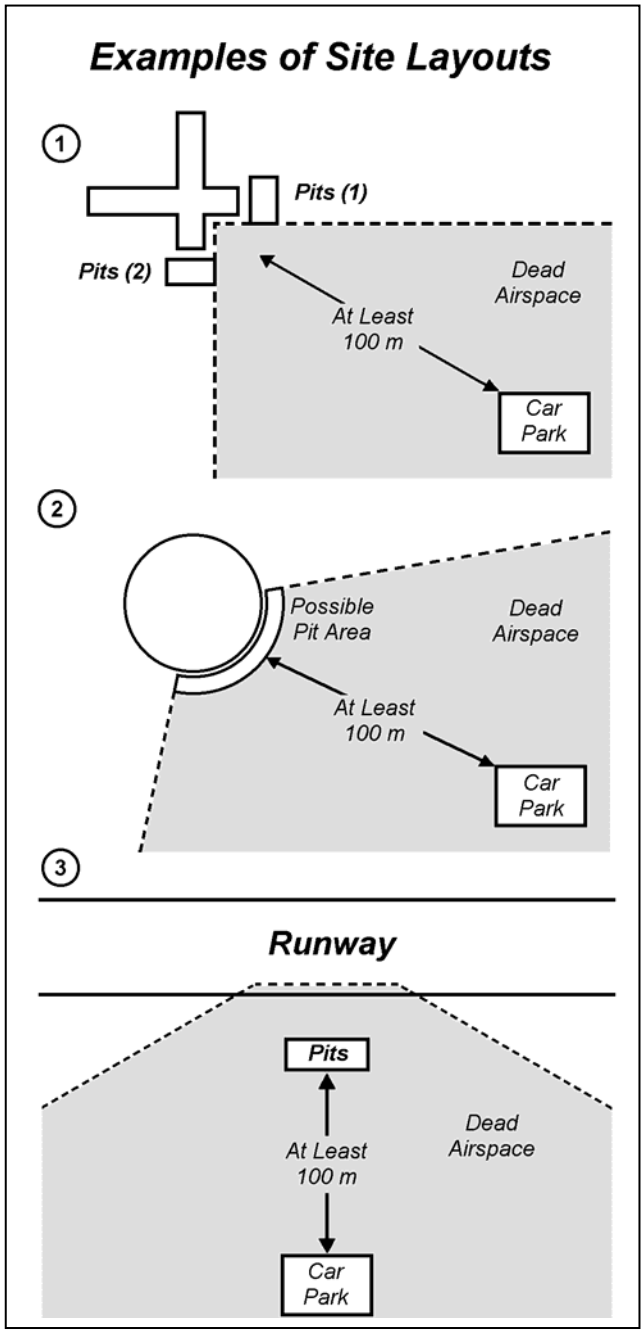
A study of the incident reports received by the BMFA shows that many accidents are either caused or made worse by poor flying site layout, lack of thought about flight patterns or general lack of flying discipline.

The following section seeks to set out the lessons learned in general terms and it gives a framework in which the general safety code can work to its best advantage.

These guidelines are advisory as every flying site has its own particular circumstances.

It is strongly recommended, however, that all R/C power oriented clubs, both fixed wing and helicopter, study this section and see how their sites

and practices compare with the guidelines, especially with respect to the provision of 'dead airspace'.



(a) Set up a car park separate from the pits area and, if possible, arrange for it to be at least 100 metres from the take-off/landing area, ideally crosswind from the prevailing wind. Some sites do not allow the car park to be positioned this far away from the flying area but you should make an effort to position it as far away as practicable. If your site allows you will find it useful to position your car park near some obstacle to flying such as trees or a high hedge.

(b) Enforce a strict ruling of no cars in the pits area. An exception could be made for any of your disabled members but only for loading and unloading.

(c) Have at least two recognised pits areas available so that the pits can be set up crosswind from the active runway whatever the wind direction and, if possible, at least 30 metres crosswind from the take-off/landing path. Under no circumstances allow models to take-off from or land over or towards the active pits area.

(d) Do not allow flying all around the field 'control line' fashion. Lay out an area of dead airspace that takes in the pits area, the car park, the approach to the field and any noise or safety sensitive areas which you need to avoid. The dead airspace area will usually be a segment of at least 90^{o} and could be up to 180^{o} i.e. all flying takes place one side of a line through the strip with the pits, car park etc. on the other side. It is vital to set up this area of dead airspace, even if your field is totally unobstructed all around.

Some field layouts may mean that your approach road cannot be included in the dead airspace you define. In these cases you must take extra care to have a laid-down method of driving on to the field and you should make sure that all your members are carefully briefed and aware of the safety situation.

(e) Enforce a strict rule that NO-ONE flies in the 'dead airspace' at ANY height.

(f) Specify that any flying actually over the take-off/landing area must be into wind only, i.e. in the designated landing direction. This avoids conflicting flight patterns over the active runway but does not prohibit other styles of flying away from it.

Notes

Sections (d), (e) and (f) above have certain implications, the main one being that the circuit flown at any time will depend on the wind direction. For instance, if the prevailing wind is westerly and this gives you a left hand circuit on your field, a change in the wind to easterly means that you must fly a right hand circuit.

Because of this your members will have to become proficient in both left and right hand circuits and will have to be able to land either from their left or their right. None of this should bother most reasonably competent club flyers or any newcomer trained to fly like that from the start but a few flyers, even some quite experienced ones, may need encouragement and help to break old habits and begin flying in a slightly more disciplined style.

Once settled into this more disciplined style, your members may find that it is easier to fly this way.

Please note that this section refers to club flying sites only. Model flying displays have their own site safety code recommendations in a later section.

LEARNING TO FLY RADIO CONTROL

CAP 658 says

If at all possible contact and join a local model flying club. There is no doubt that this is the best way to learn to fly. Details of your local clubs can be obtained from the BMFA or your local model shop.

Most of the many hundreds of model flying clubs in the UK offer training in R/C flying to beginners.

It is not impossible to learn to fly without being a member of a club but it can be very difficult. If you are not able to join a club then try to get help from an experienced model flyer who will be able to guide your first efforts.

Some organisations offer commercial model flying training. Details can usually be found in the model flying magazines.

Simulators

Flight simulators are becoming increasingly popular as a tool to help you learn to fly R/C models and there's no doubt that they also help develop and hone flying skills when you can't get out to fly.

Look out for depth perception problems when you move back to real models as there are differences.

Simulator Leads

Be aware that the constant plugging and unplugging of simulator or training leads can lead to poor connections or damage to the host circuit board on some transmitters

RADIO CONTROL AND YOU

This section gives advice and guidance on the operation of your radio equipment which may not be covered in the manufacturers literature.

Aerials

(a) The aerial on your transmitter is an integral part of the set that is certified/tested by the manufacturer in order to qualify for the CE mark. If you are replacing a whip aerial on a 35 MHz set you should try to obtain the manufacturer's spare part. If you can't do this then the aerial you fit should be of the same specification (length, screw fixing etc) as the original.

If you wish to fit a base loaded or 'rubber duck' aerial, you should be aware that you may only use one of these aerials if the manufacturer has cleared your particular transmitter for such an aerial. If this is the case, then you should be able to buy the manufacturer's authorised spare.

If your particular 35 MHz transmitter is cleared to use such an aerial by the manufacturer but you can't get the original manufacturer's spare then any replacement aerial you buy must meet the same specification as the manufacturer's item. Note that, with this type of aerial, the specifications are more complex than simply matching the length.

You should be aware that fitting an aerial that does not meet the transmitter manufacturer's specifications will result in you being considered to have introduced into use a new variant of the transmitter which will not be covered by the manufacturer's testing/certification and CE mark.

If you wish to fit an aftermarket aerial you should first contact the manufacturer/importer of your transmitter for further information. You might also find information on the Ofcom website at www.ofcom.co.uk

(b) A dirty or oily telescopic transmitter aerial will degrade the range of your transmitter, sometimes quite severely, and may even affect the output frequency. Clean it every two or three months with methylated spirit or similar and never lubricate it.

(c) Take care to route your receiver aerial well away from any carbon fibre in your aircraft. Carbon fibre is electrically conductive and is a good aerial itself. Large quantities of it can blanket your receiver aerial completely and even a few strands used for strength can cause glitching in flight if they are close to the aerial and can affect the signal reaching it.

It has also been reported that some metallic covering films and certainly some metal clad airframes have also been seen to suffer from degraded range and glitching and the siting of receiver aerials in these types of model can be quite critical.

(d) A point that is often overlooked, even by experienced flyers, is that the placement of 2.4 GHz receiver aerials is much more critical than for 35 MHz equipment. You must read the manufacturers installation instructions very carefully and take note of the information they give you. If you don't take care to do this you may find yourself flying equipment that is low on airborne range simply because the aerial configuration you have set up is inefficient.

If you do not have the original instructions, visit the manufacturer's website and download the information from there.

Batteries

(a) Dry cell batteries do have their uses in some transmitters but care should be taken to monitor pack voltage at all times.

(b) The use of dry cell batteries in airborne battery packs is strongly discouraged and they must never be used in the airborne pack if you have four or more servos operating.

(c) Subject to the advice given below, It is recommended that you only use rechargeable batteries in your radio control equipment. However, when fitting Nickel Cadmium (Ni-Cd) or Nickel Metal Hydride (Ni-Mh) rechargeable batteries to equipment designed and sold to take dry batteries, always ensure that the cells are soldered or welded into packs and that the packs are either hard wired or wired through a plug and socket into your transmitter and receiver systems. Do not rely on the spring type battery contacts in battery boxes.

(d) There are, however, exceptions to this advice. Some modern transmitters have very low current drain and are supplied as dry battery sets with battery boxes that are not removable. In these cases dry cells give an acceptably long operational life and may be used safely.

If you do use individual re-chargeable cells in these transmitters, make sure that the cells are removed at least monthly. While the cells are out of the transmitter, carefully clean the spring battery contacts and the ends of the cells before replacing them. You should also carry out this procedure if the transmitter has been standing idle for any length of time.

If you don't take these precautions, your transmitter might suffer from the same symptom as many TV remotes when they stop working until you have disturbed the batteries.

(e) Lithium Polymer batteries (Li-Po) are being used increasingly in radio control transmitters and many flyers are retro-fitting Li-Pos in place of Ni-Cd or Ni-Mh battery packs. If you are considering this, it is essential that you contact your Tx manufacturer / importer for information on whether this is allowable in your transmitter. This is because there are significant issues with voltage differences between the different types of battery pack and the ability of any specific transmitter to cope with them.

If you are not given clearance to make this change but you still go ahead then you will run the risk of damaging your Tx and, in addition, any warranty you have will be invalid, you may not be able to have the equipment serviced and the CE mark on the transmitter will also be invalid. The legal responsibility that you then take on yourself is considerable and must not be underrated.

(f) The regular use of a receiver battery checker is a good idea and there are many cheap reliable units available, either hand held or on-board. The peace of mind in knowing that the last flight of the day will not be the last flight of the model is well worth having.

There is a selection of battery checkers available to cover most battery types so no matter what type of cells you are using you can buy a checker to suit.

(g) The Electroflight section later in this handbook. gives more information on the use of batteries and associated equipment.

Nickel Cadmium (Ni-Cd) Batteries

(a) Ni-Cd cells will self discharge at a rate of around 20% of their capacity each month and if a stored pack discharges below approximately 1 volt per cell, there is a danger that one of the cells in the pack may be irreversibly damaged. The lower the voltage reached the more risk there is that this will happen. It is therefore recommended that all Ni-Cd packs be charged regularly, at least every few months, and that any pack not in regular use be initially stored fully charged.

(b) Ni-Cd cells are very resilient when trickle charged at around 1/10C (i.e. 50mA for a 500mA battery). Most chargers supplied with radio equipment are designed to work in this range and there is little risk involved if packs are inadvertently left on charge when using them. Even if you regularly fast charge your cells, it is good practice to trickle charge them occasionally.

(c) Overcharging Ni-Cds at high currents (fast charging) can ruin your cells and has been known to cause battery packs to explode violently. Most fast chargers have a 'delta peak' voltage controlled cut-off and are generally very reliable. If you don't have such a charger and wish to fast charge your cells then, as a minimum, you should use a charger with a timer or temperature controlled cut-off.

(d) If you have a charger capable of both discharging and charging your battery packs then you should fairly regularly cycle the packs as this will help to keep them in optimum condition. However, it is also good practice to occasionally trickle charge any packs that are regularly fast charged whether they have been cycled or not. Just make sure that the pack has been well used or discharged before you start (no lower than 1 volt per cell though).

Nickel Metal Hydride (Ni-Mh) Batteries

(a) Ni-Mh cells can self discharge at a rate of up to 40% of their capacity each month and the danger of a stored pack discharging below 1 volt per cell and possibly causing irreversible cell damage is therefore considerably greater than with Ni-Cd cells simply because it will occur sooner. It is therefore recommended that all Ni-Mh packs be charged more regularly than Ni-Cds, at least every two or three months, and that any pack not in regular use be initially stored fully charged.

(b) Ni-Mh cells may be trickle charged at around 1/10C (i.e. 50mA for a 500mA battery) and most chargers supplied with radio equipment are designed to work in this range.

However, Ni-Mh cells are more fragile than Ni-Cds and are susceptible to damage by overcharging even at normal trickle charge rates and should never be left connected to the charger longer than is necessary. The 'safe' constant trickle charge rate is very much less that that provided by the standard

type of charger supplied with most radio equipment so the possibility of overcharge damage when using these trickle chargers must always be borne in mind.

(c) Ni-Mh packs can be charged at high currents (fast charging) but overcharging can quickly ruin the cells. Most fast chargers have a 'delta peak' voltage controlled cut-off and are generally very reliable but you must ensure that the one you are using is specifically designed for Ni-Mh batteries.

(d) Ni-Mh packs may be cycled, as with Ni-Cds, and you should consider doing this fairly regularly. However, it is also good practice to occasionally trickle charge any packs that are regularly fast charged whether they have been cycled or nor. Just make sure that the pack has been well used or discharged before you start (no lower than 1 volt per cell though) and note the advice in (b) above.

(e) A noticeable feature of Ni-Mh technology has been the increasing capacity of the cells for any given cell size. For instance, the early AA pencells were rated at around 700 mAH but you now see capacities of around 2000 mAH for the same cell size.

The only way this extra capacity can be achieved is by increasing the surface area of the active components within the cell and, for a given size of casing, this can only be done by making these components thinner. The problems that this will give you are increased internal resistance (the cell won't give it's energy up as easily and may get hot) and increased fragility of the cell. Thinner materials can be damaged more easily, both electrically when charging or discharging and mechanically, for instance, due to overheating when soldering or being over-stressed in a crash.

These problems may not be apparent in your transmitter pack but you should think carefully about using very high capacity Ni-Mh cells in airborne packs where the demand on the batteries will fluctuate and can be much higher than in a transmitter. You can easily get into a situation where a high capacity pack is unable to supply the voltage required by some hard working servos simply because the internal resistance of the cells will not let the energy stored in them be released quickly enough.

Low Self Discharge (LSD) Ni-Mh Batteries

Originally developed by Sanyo under the trade name 'Eneloop', This type of cell is now produced by several other manufacturers.

These cells have such a low self discharge rate that you can treat them very much as you would a Li-Po and charge them when you come in from flying rather than the day before you go out.

They are robust and can be charged with a standard Ni-Mh battery charger. They are a little more expensive than standard Ni-Mh cells but their very slightly higher operating voltage gives good energy storage levels and the claimed number of possible charge cycles is greater than the standard cells. The technology is new but they are certainly worth considering as an alternative and very useable battery, especially in Transmitter applications or in airborne packs that cannot be readily removed from the airframe for charging..

Lithium-Polymer (Li-Po) Batteries

Li-Po batteries are now used by a very significant number of model flyers and they must be treated differently to the more conventional rechargeable batteries.

One of the most useful aspects of their operation is the very low self discharge rate, which can be as low as one or two percent per month. This gives them the extremely useful property of being able to be charged when you come in from flying and still be fresh and ready to use even several weeks later. Anyone who has forgotten to put their batteries on charge the night before a flying session will appreciate that.

However, they are different to conventional cells and probably the most important aspects of these batteries from a safety point of view are the consequences of over charging, over discharging and crash damage.

The individual Li-Po cells are nominally 3.6 volts with a maximum fully charged rating of 4.2 volts and a minimum safe discharged rating of 3 volts.

If you over-discharge the battery to much below 3 volts per cell you will almost certainly damage it permanently and it will not then accept a re-charge. NEVER leave a Li-Po battery connected to something that will allow even the slightest discharge as the battery will be effectively destroyed in a few hours.

If you charge your battery beyond the 4.2 volt per cell limit, you risk damaging the battery and also have the possibility of a thermal runaway, resulting in a battery fire. You MUST use a dedicated Li-Po charger and, if your charger is not automatic, you MUST make sure that the voltage control on the charger is set correctly for the number of cells in the battery you are charging.

Most Li-Po cells and chargers have a cell balancing facility and the use of this will help keep the cells working efficiently and safely. In fact, we would not recommend the purchase of a Li-Po charger that didn't have this facility available.

You must also use a speed controller (ESC) that is designed for use with Li-Pos and will not allow them to over-discharge.

Other precautions should also be taken when charging.

Never charge batteries in a model, always remove them from the airframe.

Charge on a fireproof surface in a position where a battery flare cannot ignite other items. A Li-Po burn only lasts a few seconds so it is not a long term fire source but it is extremely hot and will easily ignite other flammable items that are in close proximity. Dedicated 'charging bags' are also available that will contain any Li-Po flare if used correctly.

Damaged cells are usually very easy to spot as they 'balloon' out.

The cells are generally 'softer' than the traditional Ni-Cd types and are much more susceptible to crash damage. Any visible damage to the cell should be treated with suspicion.

Any cell that is 'ballooned' by charge/discharge problems or by crash damage should be discarded.

Any cells you wish to discard must be made safe. The commonest recommended method of doing this with a damaged cell is to discharged the cell electrically and then submerge it in strong salt water for at least twelve hours. After this the cell is inert and may be disposed of with your household refuse. For more guidance on this subject you should search the internet for the latest information on cell disposal.

Always read the manufacturers information on the cells you are using as this will give you information on maximum charge and discharge rates.

Other Lithium Based Batteries

Battery technology moves rapidly and there are several types of lithium based batteries now available to model flyers, including Lithium Phosphate and Lithium Manganese. These are only two of a growing selection and you can expect many more developments in the near future that will give you more capable and safer on-board power sources.

The cells now available generally have a slightly lower energy density than Li-Pos but they are more robust and not susceptible to the potential thermal runaway problems that Li-Pos may experience.

In very general terms these packs are treated in much the same fashion as Li-Pos but it must be stressed that you should follow the manufacturers/suppliers guidelines carefully.

For more information on these newer cell technologies, keep watching the commercial magazine electric flight columns and you should also be prepared to surf the net as there is a great deal of information out there.

Li-Po Basics

If you have not used Li-Pos before or do not have access to manufacturers data, the following might be of use to you.

The terminology applied to Li-Po batteries can be confusing but it is actually quite simple. There are three different things to look for.

Cell configuration

You will see a battery referred to, for example, as 3s1p or 2s1p. The first two characters are simply the number of cells in the pack; 3s = 3 cells = 10.8 volts nominal, 12.6 volts fully charged. The second two characters tell you how many packs are connected to make the battery. 1p = one pack of cells. Therefore 3s1p is a single pack of 3 individual cells. 4s2p is two packs of four cells each, connected in parallel as one big battery.

Capacity

This is familiar to any rechargeable battery user and will usually be in milliamp hours (mAH), i.e. 700 mAH, 2000 mAH etc.

The 'C' Rating

This can be thought of as a measure of the ability of the battery to carry a discharge load. In conjunction with the Capacity, it will help you decide how quickly it can be safely discharged. Most batteries have their 'C' rating marked on them by the manufacturer but if you do not have this information it is always wise to consider the battery to be 10C.

Charging Rate

The generally accepted level of charge of a Li-Po battery is 1C. Therefore, the maximum charge rate of a battery will be found by dividing the capacity of the battery by 1 hour. In other words, you simply note the capacity of the battery in mAH, remove the 'H' and you will have the maximum charge rate in mA.

A 700 mAH battery will be 700 mA (0.7 amps) maximum charge rate.

A 1500 mAH battery will be 1500 mA (1.5 amps) maximum charge rate.

A 2200 mAH battery will be 2200 mA (2.2 amps) maximum charge rate.

Note that this is only a guide and that many dedicated Li-Po chargers (which you MUST be using) will only allow you to select the number of cells to be charged (and hence the charging voltage). The charging current will then be regulated automatically.

However, if you can set the charge current then, for longer battery life, you can always charge at less than the maximum allowed but do not go higher. If the battery comes off the charger anything other than slightly warm, you are charging at too high a rate.

Discharge Rate

The safe maximum continuous discharge rate of the battery is the full 'C' rating multiplied by the capacity.

A 10C x 700 mAH battery will have a maximum safe discharge rate of 7 amps.

A 20C x 1500 mAH battery will have a maximum safe discharge rate of 20 x 1500 mA = 30 amps.

These are reasonable figures to use as a basis for your power decisions. If you find that your model is landing with the batteries more than reasonably warm, you are discharging at too high a rate and battery life will shortened. Much too high a discharge rate and you risk the same thermal runaway situation as with overcharging.

It is highly recommended that you invest in a good multimeter or powermeter so that you can monitor the current drain on the batteries in operation. Even a minor change in propeller selection can make the difference between safe and unsafe battery operation but you won't know unless you can monitor current levels.

Battery Isolator Switches

One of the most dangerous points in the flight preparation of electric models is when the flight battery is plugged into the model. A freshly charged battery has a lot of power locked up in it and many models are very awkward when it comes to connecting the battery pack, especially as you usually need both hands to do the job.

Consequently, if the pilot fails to set throttle to the correct setting or the onboard electronics in the ESC fail, it's very easy to have a propeller or rotor come to life when you least expect it to, with possible serious consequences.

Ideally, there should be an isolating switch between the battery connections and the ESC that would enable you to plug the flight battery in but still leave the model 'dead' until you were able to switch on the power with the model held safely.

Some quite substantial isolating switches are available through the trade but it is very likely that many other types will soon be on the market, some of which should be at quite attractive prices.

We recommend that you seriously consider the fitting of an isolator switch to any model that uses powerful batteries. In addition, the trade situation should be monitored and, if smaller, cheaper switches do become available, they should almost be considered to be an essential safety fitting for most electric models.

Becs / Ubecs / Receiver Batteries

Virtually all Electronic Speed Controllers (ESC) have a built in battery eliminator circuit (BEC) and the use of the BEC to run the airborne radio package of electric models is very popular.

However, there are factors that you should bear in mind when using or considering the use of the BEC.

All BECs are limited in the amount of current they can supply. The cheaper BECs can usually supply current that is adequate for most sport models with three or four servos but if you are using more servos than this or are using digital, large or special servos, you should check the specifications of the BEC you are using to see if the current it can supply is adequate.

Remember that digital servos may require more current supply that you might expect and, no matter what type of servo you use, any binding or stalled servos or high aerodynamic loads will also pull significant current. Helicopters can be particularly demanding.

If you have any concerns, there are three ways to improve the situation and give your airborne system the ability to supply the current that the receiver and servos require.

1) Fit a higher specification ESC that has a BEC capable of supplying sufficient current.

2) Fit a UBEC. This is the equivalent of the BEC circuit in the standard ESC but it is a stand-alone unit that is not reliant on the ESC circuitry. These units are usually quite cheap and you can check the current capabilities of the units before you buy.

3) Fit a separate receiver battery of an appropriate capacity.

All of these solutions are potentially valid but you should think carefully about the model and flight requirements before making your choice.

For instance, if you have a model that requires nose weight, it would make sense to fit a separate receiver battery and use this as part of the weight required. An electric powered glider might also be a good candidate for a separate battery as you may reach a situation where you have exhausted the propulsion battery but may still have significant flight time to come, especially if you are thermalling.

There is one other point that you must bear in mind and that is that the current capabilities of most BECs are designed to match the specification of the ESCs of which they are a part.

The ESC will have limits to the voltage (number of cells) and to the output current in amps. The BEC output will be specified in amps at the standard

voltage (4.8 to 5.2 volts) but the BEC has to handle the total voltage of the supply pack (e.g. 12 volts for a 3S Li-Po). The higher this voltage the greater is the power dissipated in heat which might require a reduction in the output current demanded of the BEC to avoid overheating and possible damage and failure.

With many electric packages now running at higher voltages, for instance four or five Li-Po cells in series, it may be that, in these circumstances, the BEC in many ESCs will not be able to safely supply the current needed by the airborne RC pack.

If the specification of the ESC or UBEC that you are using confirms that this is the case then a separate receiver battery will almost be essential.

Black Wire Corrosion

(a) Systems fitted with rechargeable batteries can suffer from **black wire corrosion**. When this happens the surface of the copper strands in the core of the negative (black) wire in a circuit receive a coating of black material which works inwards until all of the copper in the wire has corroded. This black corrosion has a high electrical resistance so as it gets deeper into the wire it lets less current through until eventually your radio stops working.

(b) The wires which are most affected by this corrosion are the negative wires from the battery to the switch in both transmitter and receiver wiring but in severe cases the corrosion can go much further than this and in extreme cases has even been seen in servo leads.

(c) The causes of the corrosion are too complex to go into here but it seems worse on batteries in storage or which have been allowed to go flat or, possibly, have been kept in a damp atmosphere. Well used and maintained batteries certainly suffer much less but they are not immune to the problem.

(d) Unfortunately, there is only one practical way to find out if your wiring is suffering from black wire corrosion and that is a visual inspection of the core of the wire. If you are competent to do this, inspect the wire leading from the negative terminal of the battery. Stripping back a very short length of outer will show if you have the problem. Be aware that the corrosion is highly resistant to solder so if you have unsoldered the wire and it looks clear but you can't solder it back on to the battery easily then the wire has almost certainly started to corrode.

(e) There is no cure for black wire corrosion other than removing the affected wire and replacing it with new.

(f) If you find the black coating on the battery lead but the wire still looks sound then you should be able to clear the problem simply by replacing that lead. If you find bad corrosion, however, it will almost certainly have gone further into the wiring harness and you must investigate and eliminate all traces even if this means discarding an entire switch harness for instance.

(g) If you are unsure of any of this advice, it will be well worth sending your rechargeable batteries and switch harness back with your radio equipment when you have it serviced with a specific request for black wire corrosion checking. Several companies specialise in supplying batteries and they might also be able to help. Another source of advice could be your local model shop but failing all this you should ask an experienced modeller for assistance.

Buddy Box and Simulator Leads

Be aware that the constant plugging and unplugging of simulator or training leads can lead to poor connections or damage to the host circuit board on some transmitters

Crystals

(a) It is essential that you use the correct specification crystals in any non-2.4 GHz transmitter or receiver you are using. Not all crystals are the same and you should **NEVER** use one manufacturer's crystal in another's Tx or Rx. The only exceptions are many of the aftermarket receivers and their manufacturers actually specify which crystals are compatible.

(b) When buying crystals, always take care to specify in which individual piece of equipment they are to be used. Original manufacturer's crystals are always the best choice.

(c) Receiver crystals are a fragile point in any airborne R/C system and they are susceptible to crash damage. If you have any concerns about your Rx crystal after an incident then you should replace it with a new one. This could be a very good investment if you consider the implications of crystal failing in the air a few flights later.

Failsafes

(a) CAP 658 says:

For All Model Aircraft

Any powered model aircraft fitted with a receiver capable of operating in failsafe mode (i.e. PCM receivers, Digital Signal Processing (DSP) receivers or 2.4 GHz equipment) should have the failsafe set, as a minimum, to reduce the engine(s) speed to idle on loss or corruption of signal.

For Models Weighing 7 to 20 kg

A serviceable 'fail-safe' mechanism should be incorporated to operate on loss of signal or detection of an interfering signal. For example on a power driven model this should operate, as a minimum, to reduce the engine(s) speed to idle.

For All Gas Turbines

All gas turbine models should be fitted with a failsafe. This must bring the engine to idle in the event of radio interference or failure. The fuel system must be capable of manual shut off via a fuel valve or fuel pump switch.

Note: The current CAP 658 does not mention that 2.4 GHz equipment has failsafe modes built in but it would not be sensible to have this section in the Handbook without making reference to the fact.

(b) This means that you will have to carefully consider what type of receiver you are using in ANY i/c or electric powered model, even the smallest.

All PCM sets, most DSP 35 MHz receivers and all 2.4 GHz equipment have settable failsafe modes and if you are using any one of these then you should take care to set the failsafe to at least engine idle.

For over 7 kg, you should ONLY use failsafe settable equipment and, again, set to engine idle as a minimum.

(c) As a reminder, nearly all PCM and DSP receivers and all 2.4 GHz equipment defaults to 'hold last position' out of the box so if you don't set the failsafe, then that's what it will do. This means that, for even the smallest model, interference or loss of signal will mean throttle and control lock-on and a potential flyaway or high throttle, high energy impact.

(d) Users of any failsafe capable radio equipment (PCM, DSP or 2.4 GHz) should check fail-safe operation before each flight. With the model restrained, switch off the transmitter and ensure that all relevant controls on the model move to their pre-set fail-safe positions. Switch the transmitter on again and make sure that normal control operation returns within a few seconds. If the fail-safe does not re-set quickly there may be a fault so **DO NOT FLY.**

To be safe, You must take the positive step of specifying what your failsafe should do instead of leaving it set at default. Read your radio manual carefully for details of settings.

If you don't initially understand the instructions for setting the failsafe on your equipment then you MUST take steps to find out how to do it. This is one thing you cannot ignore and ignorance of the procedure is not an excuse that can be accepted.

Note: If you have PPM equipment and don't have a DSP receiver but are using an add-on failsafe, it too should be set as a minimum to low throttle.

Glider Failsafes for Models Weighing 7 to 20 kg

The requirement in CAP 658 to use and set failsafes applies to these silent flight models too, although obviously the 'setting of throttle' does not apply. You should remember that the reason that the CAA requires failsafes is to prevent flyaways, not to deliberately crash the model, and you should set the controls of your model with this in mind. Application of spoilers, 'crow' brakes or even rudder and elevator to spin the model might be appropriate.

Frequency Identification

Users of 2.4 GHz will not have or need any method of frequency identification but for users of 35 MHz there will be many occasions when others might need to quickly identify the frequency you are operating on and your transmitter should carry an easily visible channel identification pennant;

For 35 MHz, an orange flag with one inch black or white numerals should be used

Mix-and-Match Tx and Rx

Using different makes of transmitter and receiver is common practice when using 35 MHz equipment, especially with the large range of aftermarket receivers available. There is a point you must be aware of, however, concerning manufacturers guarantees. A matched Tx and Rx will be warranted by their manufacturer both as individual items and to work together as a pair. If you 'mix and match', the individual warranties still apply but you have no guarantee that the pair will work together. In this case you take upon yourself the legal responsibility of making sure that your equipment operates correctly.

Mobile Phones

(a) Although mobile telephones operate on frequencies far removed from our model control frequency bands they are a major addition to the increasing background radio 'noise' that our equipment has to filter out. In addition, there is some evidence that there may sometimes be an interaction between mobile 'phones and microprocessor controlled transmitters.

(b) Many mobile 'phones transmit powerful signals regularly even when on standby and BMFA recommends that they are not taken into the pits area and especially not on to the flying area. Many 'phones also emit a powerful signal pulse when switching off, which is also something you may have to consider. Your radio equipment has a hard job to do filtering out background RF radiation and you could make it much worse with your mobile 'phone.

Module Equipped Transmitters

(a) Plug-in transmitter modules sometimes suffer from corrosion of the connecting pins, especially if the transmitter has been operated in a damp or

humid atmosphere. Unplug it regularly and check for dirty connections. Carefully clean the pins with methylated spirit or similar (check that the solvent doesn't affect the plastic before you use it).

(b) Broken fixing lugs on the plug-in module is another problem that may affect a module equipped transmitter. Never rely only on the connector pins to hold the module in. Modules in this state have been known to fall out of the transmitter without warning, sometimes with a model in flight.

Neckstraps

There have been several cases of transmitter neckstrap users accidentally knocking the throttle stick open when getting ready to fly. This can have very serious consequences so take great care with your pre-flight preparations if you use a neckstrap.

Pacemakers

The use of radio control equipment by heart pacemaker users has been investigated but no direct interaction problem has been identified. If you are a pacemaker user, however, and you require more information you are strongly recommended to speak to the Consultant who fitted your pacemaker. He should have all the technical specifications of the particular unit you use and should be able to identify any problems you may have.

It should be noted that modern pacemakers, fitted since around 2006, are very much more resistant to interference that the older models and should give very little cause for concern.

Servos

(a) Do not use standard inexpensive servos in any situation where flight loads are likely to be very high, i.e. virtually any flight control on a large or fast model. Standard servos have many uses and are usually very reliable and good value but they simply do not have the torque, precision and power of a servo designed to cope with very high loads. There is an enormous range of servos available so think about what you expect of the servo and choose carefully. If your model is large or likely to be fast then don't automatically fit the cheapest you can get or those that simply come to hand in your workshop.

(b) Many larger models feature long servo and battery leads and the trend towards separate aileron servos in each wing means that even quite small models might have extended servo leads fitted. If you are using 35 MHz equipment, these long leads make excellent aerials, feeding signals back into the receiver and possibly causing interference. Any extended lead should be de-coupled either by a using a commercial opto-electronic de-coupler or by looping the lead several times through a small ferrite ring which may be obtained from your local model shop.

It should be noted that this should not be a problem with 2.4 GHz radios.

(c) High power, high torque and digital servos may have a high power drain and you should carefully consider the capabilities of the batteries you use with them. Multiple battery systems may be required in some cases. This is especially so if you expect your servos to work hard in your model. The more work you expect them to do, the more current they will take to do it.

Switches and Wiring

(a) The standard airborne wiring harness and switch sets supplied with most new radio equipment, and also many of those available as aftermarket spares, are usually rated at approximately 3 amps. You can recognise this quite easily as the three core flat cable and plugs used are similar or identical to normal servo connector leads.

This type of standard setup is fine for most applications when four or five standard servos are in use but when multiple digital or high torque servo installations are used, the 3 amp limit can very easily be exceeded, sometimes by a large margin.

If you are using a demanding servo setup (and, for instance, most 3D capable fixed wing and Heli models or larger or faster models will be) then you should think very carefully about the capability of your wiring harness and switch.

You should fit a higher rated switch and wiring harness if you have any doubts about the standard setup.

Transmitter and Receiver Issues

(a) With a new or repaired radio control equipment, a ground range check is essential, preferably in a model and with the model's engine running if possible. Check the manufacturer's literature or website for guidance on your transmitter or, if this is not possible, look for a minimum range of between 30 and 50 metres with the transmitter aerial down.

2.4 GHz equipment usually has a 'range check' button that enables a ground range check to be done, even though the aerial cannot be altered. It is recommended that you make use of this facility regularly so that you can monitor the performance of your radio.

(b) It is good practice to carry out a routine range check on your equipment at regular intervals, at least every month or so, and a check is advisable if you have not flown for a few weeks. You should also be prepared to do a range check if you feel that you have a problem with your radio equipment or if

you have removed and replaced crystals or a transmitter module.

(c) If you use aftermarket 35 MHz receivers be aware that many are designed for indoor use, especially the very lightweight models. The range and ability to filter out interference of such receivers may not be suitable for outdoor use and you should take care that you are aware of the limitations of the equipment you are using.

When selecting which receiver to buy and use you should consider carefully where you will be flying and remember that to a great extent you get what you pay for. Single conversion receivers are usually the cheapest and work well in most circumstances but the more expensive high specification or dual conversion receivers are generally more capable, especially with outside interference rejection.

(d) If you are operating in a busy radio environment (such as at a busy club site or on a site known to be subject to outside interference) then you should seriously consider only using higher specification or dual conversion receivers or moving to 2.4 GHz equipment.

The radio spectrum gets busier by the day and your transmitter signal has to be filtered out by your receiver from every other signal out there. This situation will only get worse and there are already some sites where only high specification, dual conversion or 2.4 GHz equipment is safe to use.

RADIO CONTROL AND YOUR CLUB

(a) Before starting to use a flying site every effort should be made to determine if there is any 35 MHz radio interference present. Particular attention should be paid to other major users of the radio spectrum in the area, such as other model clubs or hospitals, factories etc. (who might be using paging systems or other high power radio frequency transmissions).

(b) All radio control clubs should have access to some means of frequency checking or monitoring. There are several 35 MHz monitors on the market which retail from around £50 to £400. These are all good value and offer a range of facilities ranging from a basic scanner up to a combined scanner/pegboard.

BMFA has several frequency monitors which are available to clubs on loan. Contact the Leicester office for details.

An alternative is a ham radio type scanning monitor which will cover all the bands we use. These are about £400 to buy new but a second-hand unit in good condition could be a good investment.

Hand held **frequency checkers** are also available at reasonable cost and are a purchase that is highly recommended to any R/C club that has significant numbers of 35 MHz transmitters in use. They will enable a Club to keep a regular comparative check on its members' individual transmitters and are invaluable for spotting such things as faulty crystals, wrong frequency flags etc. One model even allows the checking of receiver crystals.

Cellphone Masts and Microwaves

(a) It has been shown that Cellphone transmitter masts may cause short range interactions with the radio equipment we use. To be safe, do not allow models to fly within 100 metres of such masts. If there is a mast near your field, you should arrange your flying area so that the pilots have their backs to the mast and it is in ‘dead airspace’ if possible.

(b) The UK is crossed by many low level microwave communication beams and the number of these has increased dramatically since most cellphone masts have been converted from landline feeds to microwave interconnection.

If one crosses your field it may cause problems with interference and glitching, particularly with 35 MHz radios. If your club member’s suffer from such interference regularly (usually in the same place on the field) then it may be a microwave problem.

You can guard against it completely by simply wrapping 35 MHz receivers in a layer of aluminium cooking foil, making sure to tightly crimp the foil for about 5cm out along both the receiver aerial and the bundle of servo leads. The interference affects the components of the receiver directly and doesn’t work through the aerial.

Note that some receivers already have a conductive coating of carbon sprayed on the inside of their plastic case which has the same effect as the external foil wrap.

35 MHz Transmitter Interaction Problems

Any model using 35 MHz can suffer severe interference if it flies closer to an operating 35 MHz transmitter other than the one that is controlling it. To avoid the chance of this happening Clubs should:

(a) Ensure that all pilots stand reasonably close together when flying. The concept of a ‘pilot’s box’ is useful, even though it will not usually be marked out.

(b) Ensure that operating transmitters are not overflown. Care should be taken by the club to ensure that flying field procedures make this very clear.

(e) Take action to prevent operating transmitters being taken out on to an active flying area when, for example, models are being retrieved. Transmitters should be handed to a helper on the flightline and should remain switched on until the model has been retrieved and switched off.

(f) Ensure that all inactive transmitters in the pits area have their aerials retracted if possible. The extension of the aerial should be one of the last actions taken when moving out to the pilot's box to fly and retracting the aerial should be one of the first actions when moving back into the pits area with your model and transmitter switched off.

Frequency Control at Club Sites

(a) All clubs should operate some form of frequency control system on the flying site, such as a peg-board

(b) At larger flying sessions the use of a transmitter pound should be considered in addition to the frequency control system.

(c) All transmitters, except 2.4 GHz sets, should carry an easily visible channel identification pennant;

For 27 MHz, a correctly coloured ribbon and/or a white flag, approximately three inches by two inches with one inch minimum height black numerals.

For 35 MHz, an orange flag, approximately three inches by two inches with one inch minimum height black or white numerals.

For 2.4 GHz, there is no need for an identifier.

(d) All clubs operating a mix of 35 MHz and 2.4 GHz transmitters should institute very robust pre-flight checks, especially if individual members fly a mix of frequencies.

Several incidents have occurred where a flyer has not appreciated that the 35 MHz set they have in their hand is not the 2.4 GHz set they are used to using and have neglected to extend the aerial. Constant vigilance is required.

PEGBOARD RECOMMENDATIONS

It is highly recommended that all club pegboards are clearly marked with the GPS co-ordinates or map reference of the flying field. This will enable emergency services to find your location easily in the event of a serious incident, even in isolated areas.

2.4 GHz

2.4 GHz radios do not need a pegboard system to be set up to control radio frequency safety.

However, there is one circumstance where a 2.4 GHz pegboard might be extremely useful to a club and that is when there is a limit to the number of models allowed to be flown at any one time.

Many clubs in these circumstances use the number of pegs 'on the board' to help control the number of active models and the ability to monitor the number of 2.4 GHz sets actually in use at any one time could be important.

The 35 MHz Peg-Off System

The pegboard displays all useable channel number/colours each with an appropriately numbered peg or marker clipped to it. To reserve a channel the flyer must take the correct peg off the board and, usually, clip it to his transmitter aerial.

Pegs must be returned to the board at the end of each flight or there can be confusion as to who has the right to fly. Flyers can easily forget this and it can then be difficult to find out who actually has the peg for a specific channel, especially at larger flying sessions.

Flyers sometimes take the peg home with them and the 'missing peg' can lead to a new peg being made. The problems when both pegs then turn up at the field can be imagined.

Even worse is the situation where it is assumed that a missing peg has been taken off-site and a new temporary peg is made for the rest of the day. You can very easily have two people both thinking that they have use of a frequency.

This system is useful for fixed base operations when the board and its pegs can be left on site without being subject to vandalism.

The 35 MHz Peg-on or Reversed Peg System

The pegboard is marked out with the channel numbers/colours as before but with no pegs. Each flyer carries his own named peg and to reserve a channel the peg is clipped on to the board before a transmitter is switched on. It is essential that pegs are removed from the board when a flight is finished and pegs must always carry the pilot's name. Under no circumstances may pegs be shared by pilots or blank pegs used. You must be able to identify whose peg is clipped to the board.

If a pilot goes to the pegboard to reserve a frequency and it is in use, he can easily see who is using it and can arrange to reserve it later.

Under no circumstances should anyone simply remove a peg that is reserving a frequency.

If, however, you suspect that a peg has been left on the board in error (the flyer may have gone home) then you should check with senior flyers on the field and the peg may then only be removed after stringent checks that it is no longer in use. The name on the peg helps again here and is yet another reason to make sure that all pegs are named.

This system is useful for sites where vandalism might be a problem as the pegboards can be made small enough to carry easily and each member of a

club can have his own, only one being used at any flying session of course.

The 35 MHz Double Peg System

The pegboard used is exactly the same as for the peg-off system, complete with a full set of numbered pegs. The pilot, however, also has a named peg that he carries with him as in the peg-on system.

In use, to reserve a frequency, the pilot takes the numbered peg off the pegboard and replaces it with his own named peg.

This system still has to be used carefully but it is recognised as probably the most reliable system as it avoids several of the potential problems with the two other peg systems. It can still be wrongly applied, however, and all the comments in the peg-off and peg-on systems should be noted and applied.

The Individual Marker System

A further popular system is where each club member has his own small individual frequency marker board with his name and channel number marked on it. These are stuck side by side in the ground by the flyers as they arrive on the site making, in effect, one large pegboard. Flyers on the same frequency place their markers one behind the other and use a peg or similar to reserve the channel between them.

This system has been known to be effective on beach and hill sites as the marker boards can carry 'permit to fly this year' details as well as name and frequency information.

This system may also have uses with 2.4 GHz equipment, not as a frequency control system but to enable the flyers to see who is actually on the field or slope and this may have significant safety implications if anyone is injured or taken ill.

There are other variations and clubs should select the system which they feel is most appropriate to their flying field situation and, whichever system is chosen, should ensure that the operation of frequency control is well understood by all their members and visiting flyers.

Pegboard Problems

(a) Switching on without 'getting the peg' is the cardinal sin and can have very serious consequences so Clubs should make very sure that their flyers do not slip into such bad habits. This is especially important as many flyers are now using both 35 MHz and 2.4 GHz sets and not using the 35 MHz pegboard because they have become used to using a 2.4 GHz set is becoming a common problem. It cannot be emphasised enough that all Clubs should insist on high standards of training in the use of their frequency control system. The move to the pegboard before even thinking about switching on a 35 MHz set should be second nature to all R/C flyers.

(b) Changing 35 MHz crystals, either on the field or at home, can also have very serious consequences if the flyer forgets that he has done it. It is very easy to then take his 'usual' peg and reserve a completely different frequency to that which he is actually using. The dangers are obvious.

(c) If 35 MHz channels are changed, it is essential that channel flags are used and changed with the crystals. Pilots must discipline themselves to act correctly in these circumstances as it is very easy to make a mistake with the pegboard after a change has been made.

35 MHz Synthesised Frequency Transmitter Control

Synthesised frequency transmitters are legal to use in the UK, as long as they have been tested and carry the familiar CE mark.

Synthesised transmitters do not have a higher risk factor than crystal controlled sets but the possible problems that may arise are slightly different because of the ease with which channels may be changed.

To help control this situation, all UK available synthesised frequency sets either have a two stage switch-on sequence where the frequency to be transmitted is clearly shown on initial switch-on or a permanent display of the set frequency that is shown even when the transmitter is switched off.

This ensures that the user always knows what frequency will be transmitted before the 'live' switch-on when the set can actually transmit.

This is virtually the same procedure that the user of a crystal controlled transmitter goes through and it gives the users of both type of set the opportunity to go to the frequency control system and reserve their frequency ('get the peg').

From the club's point of view, no changes to the normal 35 MHz frequency control will have to be made but we strongly recommend that you emphasise the correct use of the pegboard to all your 35 MHz using members at regular intervals. A regular check on the flying field will also be useful to make sure that flyers are all following the correct pegboard procedures.

Whatever type of 35 MHz transmitter your members are using, the biggest risk will always be the flyer who switches on without thinking and without 'getting the peg' and it makes no difference if their transmitter is a synthesised one or not.

35 MHz Frequency Allocations at Club Sites

The 35 MHz frequency band is by far the most used by club flyers but, because almost every club operates in unique circumstances, it is not possible to recommend a fixed band plan for the regulation of those frequencies on every site.

There are, however, several different types of frequency allocation already in operation at club level, as laid out below, and all clubs should consider very carefully which method of frequency allocation they should use.

(1) Use of all frequencies at 10 kHz spacing

This is the most used system and it is operated successfully by most clubs. Modern equipment gives very few problems at 10 kHz spacing, especially when common sense precautions against self generated radio interactions are taken.

As one safeguard, it is important that flyers regularly operating together on adjacent channels should perform an adjacent channel check every two or three months.

Use of all the frequencies at 10 kHz spacing, combined with the Club's general safety precautions and the Adjacent Channel Check is probably the safest way to operate. Modern equipment is quite capable of operating to this standard and when faults do develop (usually faulty crystals) they can usually be spotted before they cause any trouble.

THE 35 MHz ADJACENT CHANNEL CHECK

The check is quick and easy to do. Flyer A switches on transmitter (with aerial down), then switches on his receiver and stands about 4 metres from his model. Flyer B, on an adjacent channel, switches on transmitter (aerial up) and stands alongside flyer A. No interference should be noted on A's model and it should be under the full control of A's transmitter. The test is then repeated using B's model and with his transmitter aerial down and A's extended.

Note that 'interference' will range from 'glitching' with older sets to failsafe operation with DSP receivers or PCM sets.

Any interference noted indicates possible tuning or crystal problems and must be investigated further. The test may save your model as it will give early warning of problems beginning in your radio equipment, usually well before they become bad enough to cause control problems in the air.

(2) Use of the Contest Band Plan / 20 kHz spacing

The original contest band plan, dating from the first allocation of 35 MHz frequencies, is as follows:

R/C power . . . . . all odd frequencies

R/C silent flight . . . all even frequencies

The original allocation of competition channels was the responsibility of the BMFA Technical Committees but it was also used by most clubs as their standard 35 MHz frequency band plan.

It gives an automatic 20 kHz split between frequencies in use on a site and this was important in the early days of 35 MHz, when the equipment available was not as reliable as it is today.

However, Increased demand for frequencies and better standards of radio equipment has led to this system becoming used much less, both at club level and in competitions.

This system may still be useful for some 'silent flight' clubs and for some power clubs with sites near to known slope or thermal soaring sites. Its use has, however, been overtaken by frequency requirements and availability and the 'block frequency allocation' is now more appropriate in many cases.

(3) Use of a Block Frequency Allocation

Where a club has a large site and is able to set up two or more flight lines, or where two clubs operate closely together then the block frequency allocation should be used.

For example, if a power club, using all frequencies at 10 kHz spacing, has room to set up a separate helicopter flight line, the frequency allocations could be:

Main flight line channels 55 to 79

Second flight line channels 81 to 90

leaving channel 80 unused as a safeguard although, depending on site considerations, this may not be necessary.

Each flightline then has its own pegboard, allowing only the agreed allocated frequencies to be used.

Similarly, two clubs operating in close proximity could arrange that one uses 55 to 71 and the other uses 73 to 90, leaving 72 unused as a buffer.

Again, each group would have their own pegboard showing only those frequencies that they had agreed to use.

Many combinations can be worked out to suit individual needs and the increased number of channels made available in recent years has made this type of frequency sharing much easier. The ability to have targeted pegboards on each flightline or site is very important in avoiding frequency clashes.

(4) Lone Flyers

Lone flyers, or people who fly in small groups of two or three, must take the greatest care that they are

not operating in situations where they can cause interference to a local club or flying group. As a general rule, you should not fly within two miles of a recognised club flying site unless you have some arrangement with the club who fly there.

This is for the benefit of both parties as interference works both ways and could result in the loss of aircraft on either site.

Lone Flyers, in fact, are far safer when operating on 2.4 GHz as there are no interference implications and the radios can be used anywhere that the flyer wishes.

If you wish to fly alone and are still using 35 MHz radio but are not sure if there are clubs sites local to you, contact your local model shop or the BMFA's Leicester office for information. You will usually be able to get into contact with clubs quite easily through these sources and it is essential that you do so to ensure safe flying for all concerned.

INTERFERENCE

Individual Cases

(a) It is a great temptation to claim interference whenever a model crashes but the plain fact is that outside radio interference is rare and causes very little trouble.

(b) If you have crashed a model and think you have been affected then run through this checklist first. These are the main causes of model crashes.

(c) Pilot error – this includes stall/spin incidents on final turns, tip stall incidents everywhere, not 'keeping up' with the model so that it doesn't seem to be doing what you tell it, disorientation, lack of awareness of where the model is in relation to ground features, flying over operating transmitters, the inappropriate use of low specification radio equipment and very many more.

(d) Airborne power failure – including receiver battery failure or lack of capacity, wiring, plug and switch failures, black wire corrosion etc.

(e) Airborne hardware failure – including individual servos and receivers, crystal failures, aerials breaking or being masked, linkage failures, airframe failures etc.

(f) Ground failures - transmitter battery failure or low capacity, transmitter crystal failure, module pins corroding, dirty, faulty or loose transmitter aerial, dirt and oil in transmitter electronics etc.

(g) 35 MHz Club interference – other members switching on without frequency clearance, other transmitters faulty, people wandering over the field with operating transmitters etc.

(h) The list is by no means exhaustive and you can add to it if you give it some thought but these are the things that you should think about very carefully. If you can honestly say that you can eliminate all of these then you MAY have suffered from interference.

(i) If so then you should report the matter to your club committee, setting down all the relevant facts, and your club will then be in a position to file a report with BMFA if necessary.

Club Cases

(j) If your members are reporting regular cases of what seems to be interference then it is almost certain to be on 35 MHz and your first step is to conduct what on-field investigations you can.

(k) Look very carefully at the individual incidents to see if you can eliminate any. Try to collate the incidents you have to see if there is any pattern. Use your club scanner to see if you can pick up any specific interference.

(l) Investigate the equipment used by anyone suspected of suffering from interference. It may be that your site requires the use of high specification receivers and you can spot this quite easily if those affected are all using single conversion but no high specification receivers are affected. Read the section 'Radio Control and You' for more information. A new club site rule may be all that is required to solve the problem.

(m) When you are reasonably sure that you are suffering from 35 MHz interference then contact BMFA Leicester office and ask for an interference reporting form. When you have completed and returned this form, it will be cross-referenced with the BMFA interference database and appropriate action will be taken, usually in conjunction with the UK Radio Control Council - UKRCC (which was the JRCUC), of which BMFA is an active member.

(n) The action taken may range from setting up an independent on-field investigation with specialised tracking equipment to gain more information to directly reporting your problems to Ofcom for immediate action.

GENERAL MODEL SAFETY

(a) Models should be built to a standard such that they will not fail under normal circumstances, giving particular attention to control surfaces and connections.

(b) Models should be thoroughly checked prior to each flying session and after any abnormally hard landing.

(c) It is recommended that rounded spinners or safety propeller nuts of the domed type are fitted to internal combustion and electric powered models and that gliders and pusher powered aircraft noses should also be rounded (no needle noses)

(d) Care should be taken by the operator that propellers are of suitable size and construction for their engine or motor's operating speed. All propellers should be carefully balanced. Cheap and efficient propeller balancers are available from you local model shop and you should ask an experienced modeller for help if you are unsure how to use them.

(e) Do not use propellers on i/c engines that are designed for use on electric motors.

(f) On internal combustion engines and electric motors, damaged propellers must not be used. Inspect your propellers regularly and replace any that are not in good condition

(g) On internal combustion engines and electric motors, metal propellers must not be used.

(h) The use of locking prop nuts is recommended, especially for users of 4-stroke engines. A backfire or 'kick' can loosen a prop nut and locking nuts will prevent the propeller flying off.

The safety factor of locking prop nuts on four-stroke engines is more important than the recommendation to use 'domed' safety nuts so, if you have to choose, go for the locking nuts.

(i) Heavy ballast, or any other heavy part, subject to jettisoning in flight is prohibited. Jettisonable ballast must be of a safe nature e.g. water.

(j) All R/C models are subject to in-flight vibration, landing knocks, transport damage etc. Be sure that receivers and batteries are well protected, servos are fixed securely, control linkages (pushrods, snakes, closed loop etc.) are robust enough for their purpose, are properly supported where necessary and are as slop free as possible and that all control surface hinges and horns are fitted correctly. Pushrod clevises should fit control horns cleanly with no sideways strain and they should be fitted with a plastic or silicon tube 'keeper' as a secondary closure.

(k) When starting an engine make sure that the model is restrained and cannot move forward. Although this may not always be practical, restraint is best done by either a helper or by some mechanical means.

(l) Never put yourself in a position where your face is in line with a turning propeller. A broken propeller will fly out and forward so make all engine adjustments from the rear if possible. A broken propeller will also be a danger to anyone standing nearby so take care that no-one is in line with it when starting your engine.

A SAFER FLYING FIELD AND YOU

When you arrive at a flying field and before you start flying, we recommend that you take a few moments to consider the surroundings and the flights you will be making.

Think **S.W.E.E.T.S.**

S - Sun

W - Wind

E - Eventualities

E - Emergencies

T - Transmitter Control

S - Site Rules

Sun – Where is the sun in relation to where you will be flying? Will it affect your flight patterns? What actions will you take if you accidentally fly 'through' the sun? Should you be wearing sunglasses? Remember that low sun in winter can be a particular problem.

Wind – Consider the wind strength and direction. How will this affect your flights? Will you have to modify your normal take-off and, especially, your landing patterns? From your local knowledge, will there be any turbulence with 'this' wind direction and strength? And how bad might it be?

Eventualities – What will you do if you hear or see a full size aircraft or helicopter flying at low level near the field? What if the landing area is suddenly obstructed when you are on finals to land? What will you do if a nearby footpath or bridle path suddenly has walkers or horses on it?

Emergencies – You may have an engine cut at any part of a flight so consider where your deadstick landings might be safely made and which ground areas you should definitely avoid. How will you warn other field users if you have an emergency?

Transmitter Control – Is the site pegboard in operation? If not, why not? Where has the pegboard been placed? Are you familiar with the system and understand how it works?

Site Rules – Are there any specific site rules you should be aware of? Most importantly, where are the no-fly zones or dead airspace areas on the site?

The answers to most of these questions are contained within these Safety Codes and your local Club rules but you will be making the final decisions as to whether flights can be made safely. If conditions are poor or a site is unsuitable remember that a decision not to fly can be both valid and sensible.

We would also recommend that you review the sections on the sun and wind throughout the day as they obviously change over time and this may affect some of the decisions you will be making.

RADIO CONTROL FLYING SAFETY

(a) Before you do anything else, make sure that you understand and are complying with the field frequency control system. NEVER switch on until

you are sure it is safe. ALWAYS check the pegboard – on EVERY flight.

(b) Before every flight, check that transmitter trims, rate switches etc. are in their correct positions and that each control surface on the model moves freely and in the correct sense.

(c) Immediately before take-off, flight controls must be checked for full, free and correct movement under full power if applicable. If there are any doubts as to their operation, **DO NOT FLY**.

(d) Flyers wishing to use adjacent frequency channels should first perform an interaction check. Flyers regularly operating together on adjacent channels should perform the check every two or three months.

See the previous section on Radio Control and Your Club for details of the simple check you should perform.

(e) Inexperienced R/C flyers should never fly without an experienced helper.

(f) Unless positive controls are in force, all flyers should use the same take-off area at any particular flying session.

(g) Do not taxi in or out of the pits area. Wheel or carry your model well clear of the pits before commencing taxying and stop the model well clear when taxying back after landing. Do not put other flyers at risk.

(h) Before take-off, check that both ground and sky are clear and never take off or land towards other pilots, spectators or the pits area.

(i) Always make the initial turn after take-off away from spectators and parking areas. Diving manoeuvres should always be pointed away from spectators, parking areas and other people.

(j) Always maintain a clear view of the model and allow plenty of room between the flight path and spectators, other flyers or model pit areas.

(k) **DO NOT OVERFLY** houses, domestic gardens, car parks, traffic, railways, organised games or spectators. You may not be able to control people walking by at a reasonable distance from the take off/landing area but you should take care not to overfly them at low level.

(l) At any sign of malfunction or an unexpected jettisoning of model parts, land as soon as it is safe to do so.

(m) Do not distract pilots, particularly when they are controlling models taking off or landing.

(n) Clubs should exercise strict control over the take-off/landing area used. Pilots about to take off should inform people already flying. Pilots landing should have priority but must call out their intentions 'loud and clear' and must **NEVER** assume that they have been heard. A pilot going out to take off may not hear a call over the noise of his model's engine.

(o) **NEVER** assume that the landing area is clear even if you have called landing. In emergency situations call for help from your fellow flyers and always be prepared to land in a safe place off the landing area if necessary. In **ALL** cases, the safety of people is paramount.

(p) Care must be taken at all times to avoid overflying operating transmitters. Pilots should stand together and should not be allowed to wander over the flying area when operating transmitters. Clubs should take action to prevent operating transmitters being taken out on to an active flying area when, for example, models are being retrieved (see the section on 'Radio Control at your Club').

There are exceptions to this particularly in some silent flight operations, and extreme care should be taken not to overfly transmitters in these cases.

(q) Under no circumstances whatsoever should you move to the far side of the flying area so that you can land your model between yourself and the pits area.

(r) Under no circumstances whatsoever should you fly between yourself and the pits area.

(s) Take extra care when flying in adverse weather conditions. It is easy to lose sight of your model in fog or low cloud. Strong winds and turbulence can be a stimulating challenge but can catch out the unwary. Flying in rain can give serious radio problems if water gets inside your transmitter.

(t) The staging of deliberate mid-air collisions at airshows and public displays is banned and they are not covered by the Association's insurance.

PRE FLYING SESSION MODEL CHECKS

On arrival at the flying site:

(1) Check airframe for any transit damage.

(2) Check that servos and linkages are secure.

(3) Check undercarriage for secure fixing and correct alignment.

(4) Check propeller for damage and secure fixing.

(5) Check receiver aerial for damage and secure fixing and, with 2.4 GHz equipment, that the aerial orientation is correct.

Checks Before Each Flight

(1) Obtain frequency clearance. Exactly what you do will depend on the rules of the site but be sure you understand exactly what you are doing and do not forget this step.

(2) Switch transmitter ON then receiver ON.

(3) Check that all controls operate freely and do not bind or stick at any point in their movement.

(4) Check that all controls move in the correct sense. For conventional models, stand behind the model and look for;

Elevator stick back – Elevator comes up.

Aileron stick right – Right hand aileron comes up.

Rudder stick right – Rudder moves to the right.

(5) Check that all control surfaces are in their correct positions with the transmitter trims at neutral.

(6) Look for any minor radio malfunctions such as slow or 'jittery' servos, glitches etc. If in doubt, **DO NOT FLY.**

(7) With i/c models, after starting the engine and allowing it to warm up, check that the pick-up from idle to full power is satisfactory. Hold the model with its nose pointing upwards at a steep climbing angle for ten or fifteen seconds and check engine operation at full power. If the engine falters or cuts it is usually set too lean and must be re-tuned. Repeat the test until the engine runs correctly in the nose-up attitude.

(8) Just before you go out to fly, **DOUBLE CHECK** that all transmitter trims, rate switches, mixers etc. are in their correct positions and that the transmitter meter is 'in the green' or that you have the correct model selected and that your aerial is extended.

(9) Finally, with the aircraft held securely (usually on the ground for i/c models), open up to full power and re-check all flying controls again for full and free movement, also noting any glitches, hesitations or odd vibrations. If **ANYTHING** seems odd, **DO NOT FLY**

Be S.M.A.R.T. with your transmitter.

S... Switch on

M... Model selected is correct / **Meter** in the Green

A... Aerial secure / extended

R... Rate switches all in correct positions

T... Transmitter voltage good and **Trims** all in correct positions

Checks After Each Flight

(1) Receiver OFF then transmitter OFF.

(2) Clear the frequency control system.

(3) Clean the aircraft down

(4) Check propeller, airframe, undercarriage, wing fixing etc. for security of fastening and for possible flight or landing damage.

REMEMBER - Never fly with a damaged aircraft or propeller, or with any possible radio problem.

ALMOST READY TO FLY MODELS

(a) ARTFs are very popular and usually offer very good value for money but you should be aware that some airframes you may buy could have manufacturing or design defects. Close scrutiny of even a pre-covered airframe may pay big dividends if you can prevent a future failure.

(b) All visible glue joints within the fuselage should be checked, especially the engine bulkhead, fuselage bulkheads, wing mounting plates or wing dowels, undercarriage mountings and servo mountings. If you have any concerns then the reinforcement of many of these joints using scrap balsa stripwood will significantly increase the strength and durability of the airframe for very little weight increase.

(c) Take particular care when gluing wing panels together. Follow the manufacturers instructions and when adding such things as dihedral braces make sure that the whole joint is wetted out by the glue.

(d) Check pre-fitted pushrods, snakes and clevises for suitability. Most will be fine but some have been seen that were inadequate for the job expected of them, either being to thin or too weak. The rule of thumb should be 'if I was fitting this, would I fit this'.

(e) Always check flying surfaces for warps - don't assume that a wing will be straight because it was built for you. Minor warps can sometimes be removed by gently heating the covering, twisting the surface in opposition to the warp and holding until cool. Major warps are a reason for returning to where you bought the model.

(f) The ONLY acceptable (and beneficial) warp on an R/C model is matched wash-out. That is, looking from the rear the trailing edge at each wingtip is twisted upwards a little compared to the root of the wing. If this is present then it MUST be even on both wings or it's just another warp.

(g) On i/c powered models, have a good look at the fuel proofing around the engine and fuel tank bay. If you are looking towards something more than a throw away airframe then an extra coat of fuel proofer in and around the nose will certainly be worth while.

ULTRALIGHT R/C MODELS

(a) There are numerous electric powered 'Slow Fly' or 'Park Fly' models on the market that may be classed as 'Ultralight' and this is encouraging the flying of R/C models in places that have never seen model flying or which have been out of bounds to flying for many years.

(b) Although virtually all of these models are lightly loaded and may seen innocuous, great care must be taken when flying them as you can be led into situations that you would not face on a club field.

(c) Read the Safety Codes contained in this handbook carefully as virtually all of them still apply to this type of flying, especially those concerned directly with radio control.

(d) Be very careful to avoid flying near to existing model flying sites if you are using 35 MHz equipment. Find out where models are being flow in you area and check on a local map that your chosen flying area is far enough away to be safe.

(e) Take special care to avoid putting members of the public at risk. Your activities, with quiet slow models will almost certainly draw the attention of passers by and they could appear from anywhere.

(f) Park flyers have the possibility of introducing model flying to great numbers of the general public who may never have seen our sport close up before. Your behaviour and safety awareness could result in there being many new model flyers in the future.

(g) Be aware that some Local Authorities have by-laws banning the flying of powered models from their open spaces. Check carefully to avoid trouble.

You may, however, find yourself in a situation where you are flying sensibly, safely and not causing a nuisance and are approached by someone who says he represents the Local Authority or some other official body and who tells you that you are not allowed to fly. You are within your legal rights to ask to see a copy of the by-law that bans flying on the area you are using.

If you still have trouble and you consider that your rights as an individual and a model flyer are being overridden, then you should contact the BMFA office for help and advice as soon as possible.

HELICOPTERS

It cannot be stressed enough that a model helicopter must have a higher degree of safety built into it than perhaps any other flying model. Because the Association feels so strongly about this the following comprehensive guide is set out below. This is in addition to the regular R/C safety code.

It is VITAL that you never fly or run up your helicopter in or near the pits area or near spectators. When starting the model in the pits, hold the rotor head firmly. When the engine is running carry the model a sensible distance from other people before running up or flying.

Electric Helicopters should be carried out from the pits area with the flight battery disconnected and it should be only be connected in a safe area. the model MUST be considered to be live as soon as this is done and great care is needed during this procedure.

Do not release the rotor of the model until you are sure that it is safe to do so and NEVER FORGET the amount of energy there is in a spinning rotor.

Never hold the model overhead to run up the engine or run the engine with no rotor blades fitted.

Rotor blades must always be carefully balanced and you should always remember that vibration in helicopters can be very destructive.

A MODEL HELICOPTER MUST NEVER, UNDER ANY CIRCUMSTANCES, BE FLOWN OR RUN UP:

(a) **IN OR NEAR** the pits area or close to any spectators.

(b) Directly towards the pits area or any spectators.

(c) With metal rotor blades.

(d) With knife sharp leading edges on main or tail rotors.

(e) With damaged or out of balance rotor blades. Note that blades, especially wooden ones, should be reinforced at the root with hardwood, glass-fibre or some other suitable material.

(f) With radio equipment unproofed against shock and vibration.

(g) In the presence of spectators or at a competition or fly-in until properly tested and proved airworthy.

(h) Until thorough maintenance checks are carried out as set out in (A) and (B) below.

(i) Note that all helicopters weighing more than 7 kg without fuel are subject to the ANO regulations concerning models over this weight and must comply with those conditions when flown. In particular, you must have permission to fly from the appropriate Air Traffic Control Unit if you are flying in controlled airspace. If you don't have such permission, your flight is illegal.

(A) CHECKS BEFORE DAILY FLYING SESSION

(1) Check all ball links for slop and change as necessary.

(2) Check that all rotor blades are in good condition with no damage apart from minor tip damage.

(3) Check for loose or missing nuts and bolts.

(4) Check that there is no backlash in the drive system apart from gear backlash which should not be excessive.

(5) Check that servos are secure and free from oil.

(6) Check that the fuel tank and all piping is secure.

(7) Check that the receiver aerial is secure and in good condition with no chafing or damage.

(B) CHECKS BEFORE EACH FLIGHT

(1) If a helicopter suffers damage or a heavy landing, recheck all of (A) above.

(2) Check all controls before starting especially for binding links or slowing of servos.

(3) Re-check controls at high rotor rpm just before lift-off.

(4) Check for vibration and eliminate before flight.

(5) Check main rotor blades for true tracking in hovering flight.

(6) Check that the receiver aerial cannot become entangled with any moving or rotating part.

(7) Double check that all switches on the transmitter are in their correct positions before **EVERY** flight.

For more information on the British R/C Helicopter Association, contact the BMFA's Leicester office.

Helicopter Rotor Blade Safety

Rotor blade failures have five basic causes, (1) design and manufacture faults, (2) incorrect assembly, (3) incorrect repairs, (4) unnoticed accident damage and (5) ageing and weathering.

(1) Most design and manufacturing faults seen are centred around the rotor fixing hole. Typical faults are the hole being drilled on the junction between two wood laminations and incorrect wood selection leading to the hole being drilled in a soft lamination.

Blades with this type of fault should not be used. Even root reinforcement may not stop a failure.

(2) Incorrect user assembly is commonly found in root reinforcements and in blades which have to have tip weight of some description added. In all cases you should take the greatest care that any components added are fitted correctly and with suitable adhesive. Incorrect glue joints and badly applied reinforcing components are probably the biggest single cause of blade failure so it is very important that you take the greatest care with any assembly work you have to carry out.

(3) Do not be tempted to undertake major repairs to rotor blades unless you know exactly what you are doing. Minor repairs to blade edges are permissible but you should always re-balance after completion.

(4) Any ground strike or boom strike will almost certainly cause damage to rotor blades and in many cases this may go unnoticed under the blade covering. If in doubt, have no hesitation in stripping off the covering for inspection. Re-covering and re-balancing the blades is a small price to pay for peace of mind.

(5) Ageing of glue joints in wooden structures is common and the high stresses inherent in rotor blade operation mean that you should keep a close eye open for delamination in wooden blades.

A problem sometimes seen in composite blades is heat damage. Blades left in a car on a hot day can suffer from softening of the resin and this, combined with an expansion of the foam filler, can make the blades unsafe.

To summarise, keep a close eye on your rotor blades and do not hesitate to discard them if you are at all concerned over their condition.

SILENT FLIGHT

(THERMAL / SLOPE / ELECTROFLIGHT)

(a) R/C silent flight models generally operate with low wing loading and low drag. Consequently, landing approaches may cover a lot of ground at low level. Check your landing approach path before you launch. Check again before you enter the landing circuit. Remember that people will not hear your model coming so take no chances.

(b) When strong thermal or slope lift is encountered, beware of flying too high. At altitude, lift is often very strong and turbulent. Models fitted with spoilers or ‘crow’ brakes should have little trouble leaving such lift but do not try to dive out of strong lift if these are not fitted. Fly away from the lift and try to find sinking air. If emergency action is required, full up elevator and full rudder may give the safest descent.

(c) Design considerations mean that many silent flight models are built light. Be sure that the design, construction and materials are adequate for the job.

(d) Silent flight models are often flown at considerable distances from their pilots and a high visibility colour scheme can be a great safety factor. Be extra careful when flying at distance and/or height and beware of flying across the sun.

THERMAL SOARING

(a) When using a towline, bungee or power winch, locate yourself and your equipment well away from car parking areas and ensure that there is no possibility of launching lines falling on buildings, persons, roads or where they might distress wild, domestic or farm animals.

(b) Launch stresses can be severe. Be sure that wing joiners/attachments are strong enough to cope with the high loads imposed. The use of a ‘weak link’ of known breaking strain in launch lines is a measure that may safeguard model wing structures and should be considered.

(c) Bungee (Hi-Start) anchorages must be very secure. Use a screw-in type of fixing and do NOT peg the end down with devices such as old screwdrivers. Consider using guy lines on the stake

for extra security and always do so if the stake is in soft earth.

(d) Electric winches should have an obvious, clearly marked master on/off switch accessible to anyone in an emergency. Shrouded plugs and sockets should always be used and the motor switching should be indirect, i.e. by relay.

(e) Turn-round pulleys must be very securely staked and braced with guy lines. Remember that the load at the pulley is double that on the line and pulley carrier geometry may produce even more load at the stakes.

(f) Whether you use winch, bungee or hand tow, make sure that spectators cannot be endangered if the model veers to one side on launch.

(g) Soaring pilots may tend not to stand together when flying. If this happens on your site then avoid overflying other transmitters at any distance from your own. It is your model that will suffer from interference and it could easily be damaged.

SLOPE SOARING

(a) Slope sites are often used by many people other than model flyers. Always ensure that flying is permitted on your selected site. Note that an increasing number of slope sites are being used on an exclusive basis by clubs who may be paying considerable fees for the privilege. Keep away from paths used by ramblers and climbers and make sure that you do not frighten or disturb any animals.

(b) If the site is regularly used or overflown by full size gliders or hang gliders, then you should attempt to contact them and arrange shared use of airspace and land. We all have airsports participation in common and discussion is better than confrontation. Advice is available from the Association's Leicester office along with details of an agreed code of practice for shared sites.

(c) If a frequency control system is operating on the site, you MUST use it. If no control is operating you must not switch on your radio until you have checked that it is safe to do so.

(d) To avoid possible interference, pilots should attempt to keep reasonably close together. If this is not possible (i.e. if a pilot does a cross-country flight) then everyone on the slope should be made aware of the fact.

(e) Be aware of the turbulence immediately behind the apex of the slope. With high wind conditions and/or steep slopes this can be severe. If necessary, land either slightly down-slope or well back in the lee of the hill.

(f) Specific guidelines for the flying of slope combat, covering models, flying sites and legal requirements, are available from the BMFA Leicester office. These contain important advice and information for the slope combat flyer and should be considered essential reading if you fly this type of model. Be aware, though, that this is a legal activity if carried out on suitable sites and with care taken to avoid the endangering of other people on the slope.

ELECTROFLIGHT

(a) The first and most important principle of electric flight ground safety is to understand that the instant you start to plug in the flight battery, the model you are holding may transform itself from a dead airframe into one with its motor running at full revs and all controls moving. No matter how good your other safety checks, you must be prepared for this to happen every single time you start to connect the flight battery.

(b) Since plugging the flight battery in is nearly always a two handed job you must give serious thought to how your model will be restrained BEFORE it does something you don't expect. When plugging in the flight battery, positive restraint, either by a helper holding the model or by some other method, and staying completely clear of the propeller must always be part of your regular routine.

(c) Electric motors have very different power and torque characteristics to normal i/c model engines. You must take very great care when setting up their control systems and handling them as an accident, such as the propeller hitting your hand, which would stall a glow engine might just make an electric motor turn harder.

(d) Developing technology has made it much more acceptable to use battery eliminator systems (BECs) to save the weight of a receiver battery, especially in lightweight installations using two or three small servos.

You should not use BEC in an installation where servo battery drain may be high or prolonged, for instance with four or more servos or with standard servos in a thermalling electric glider. Also, many older BEC systems are not as reliable as the modern equipment and in all these cases the use of a separate battery is still considered to be the safer choice.

The decision is yours but if you have any doubts then you should use a separate battery. It should be noted that the use of BECs will not invalidate your insurance.

(e) Always check that motor operation does not interfere with the R/C equipment in the model. Range checks with the motor off and with it on will highlight any problems. Suppression of a brushed motor is a simple task and you should seek the advice of an experienced flyer on the subject.

(f) All connectors and cables should be robust enough to carry safely the current for the motor/s used. Wiring used for small motors will reduce the power of larger motors and may run dangerously

hot. If you change a motor, check that the wiring is adequate for the new one.

(g) Batteries

Ni-Cd or Ni-Mh fast charge cells and larger Li-Po packs can be discharged at very high currents (up to 100 amps and more). Short circuits, faulty wire insulation or loose contacts can result in very considerable heat generation and may cause fires.

(h) The standard two pin polarised connectors supplied with many 'buggy' type battery packs are only suitable for small to medium current draw as they can offer significant resistance at times and have been known to overheat badly. There are other specialist connectors, especially the readily available 2mm and 4mm gold plated 'bullet' connectors, which are much better as they offer very low resistance and are designed to carry high currents.

(i) Always ensure that flight batteries are securely fixed and that they cannot move in flight.

(j) Many speed controllers have a specific 'arming' sequence, which is a pre-programmed sequence of actions that have to be followed before the motor will respond to throttle stick movements. For instance, after switching on the transmitter and receiver and then plugging in the main flight battery, one type of controller requires that you move the throttle stick from low to full throttle and then back to low before the motor is 'armed' and ready for flight. You must be fully familiar with the system fitted to your model.

(k) You must pay particular attention to the 'throttle to low - transmitter on - receiver on' sequence and be aware that the model you are holding will be 'live' as soon as you start to plug in the flight battery, no matter what controller arming sequence you may then have to go through.

(l) The BMFA has an Electric Flight Safety Committee who are able to give advice on any technical aspect of electric flight. They can be contacted via the BMFA's Leicester office.

CONTROL LINE

(a) Always use steel lines of sufficient strength for the type of model you are flying. Where possible, stranded lines should be used when flying over grass or when the model is going to be manoeuvred.

(b) If swivels are used between the control handle and the lines they must be of substantial construction. Do not use the thin bent wire type.

(c) Before each flying session and after any heavy landing, the model should be subjected to a pull test of at least 10 times the model's weight.

(d) Before every flight check the lines and linkages thoroughly. If any damage is found, **DO NOT FLY** until it has been rectified and re-tested to your satisfaction.

(e) Ensure that there are no spectators near to the circle before you release the model.

(f) Do not fly near **ANY** overhead cables. Even the low level distribution cables on wooden posts carry lethal voltages which can 'jump' many metres to your control lines. **KEEP WELL AWAY**.

(g) Control lines make good lightning conductors. Do not fly in thundery weather.

(h) Whenever high pulls are expected, use a safety strap connecting the handle to your wrist.

(i) Never release the control handle when the model is flying.

(j) Encourage spectators to stand upwind of the circle.

(k) Always mark a centre spot for your circle, ensuring that adjacent circles are not too close to each other.

(l) Always stay on the centre spot when flying.

(m) If someone strays into the circle whilst you are flying, fly high to avoid them and stay high until the circle has been cleared.

(n) Always 'ditch' your model rather than hitting someone.

FREE FLIGHT

(a) A model should not normally be launched from an area such that it would overfly houses, major roads, railways or similar hazards in its expected flight pattern.

(b) Always launch models, particularly powered ones, well away from and downwind of any spectators or vehicles.

(c) When a fuse type dethermaliser is used, always use a snuffer tube.

(d) Check flying surface alignment and, if your model employs them, the dethermaliser and any automatic systems fitted thoroughly before launching.

(e) All glider launches should be undertaken with the towline detached from the hand winch.

INDOOR FREE FLIGHT

(a) Take care when launching that no one is standing in the flight path of the model.

(b) If your model hangs up at height, take great care when retrieving. If you have to climb to get the model, use ladders and get someone to hold them steady. Do not over-reach, take foolish risks or take on tasks that are beyond your ability.

If you are flying in the larger sites such as the Cardington airship sheds, professional help is usually available and should be used.

INDOOR RADIO CONTROL

(a) Most of the precautions for outdoor R/C club flying will apply to indoor events.

(b) It is not advisable, except under exceptional circumstances, to have free flight and radio control flying at the same time.

(c) Active transmitter control should be in operation throughout the meeting and at larger events a transmitter pound should be used.

(d) You should take note that some indoor specification receivers may not have the performance of standard receivers and should be prepared to limit the available frequencies to 20 kHz spacing for some sets.

(e) The pits area should usually be situated along the shorter wall next to the door and you should, if possible, use netting to isolate the pits area from the flying. Pilots should stand together in front of the nets.

(f) A 'duty pilot' should always be on duty to act a flight marshal. This may not be the same person for the whole event but, whoever it is, they must have the authority to ground any persistently unsafe pilots.

(g) The duty pilot should decide on the number of aircraft to have safely in the air and which direction the circuit to be flown should be.

(h) A written event briefing sheet should be given to all pilots if staggered arrivals make a pilots briefing impractical.

(i) The size of the venue will limit the size of model allowed to fly but as a general rule for a larger hall you might consider a maximum weight of 200 grams and a maximum wing loading of 10 grams per square decimetre (just over 7 ounces and 3 ounces per square foot).

(j) A Guide to Safe Indoor R/C Flying is available from the BMFA Leicester office on request.

MODELS BETWEEN 7kg AND 20kg

(a) Any model aircraft **(that is, either power fixed-wing, glider or helicopter)** weighing between 7 kg and 20 kg without fuel is subject to regulation by the Air Navigation Order, over and above Articles138 and 137. Full details are included in the section 'Legal Controls over Model Flying.

Pilots of models between 7 and 20 kg should take great care to comply with these regulations as their wilful or negligent breaking could result in their flights being illegal under the terms of the ANO and they may be liable to criminal prosecution.

The address of the CAA is listed at the back of this handbook and you can contact them or obtain a copy of CAP 658 from www.caa.co.uk for details of current regulations. In addition, BMFA will supply news of all the latest CAA conditions on request. Contact the Leicester office for more details.

One of the most important clauses in the ANO regulations for these larger models is Article 166 (2) which says 'The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.'

This puts a legal requirement on the pilot to consider all aspects of safety before a flight is made. Pilots should take great care not to underestimate the importance of this clause.

(b) Large models may not be flown in any full-size air traffic control zone or special rules zone without the specific permission of the appropriate ATC authority. For information on such zones, contact your nearest airfield or airport air traffic control. They will be able to give you the permission you require if your flying site falls within such an area. If you have any problems with this process you should contact the Leicester office for advice.

(c) Pilots of large radio control models should be aware that such models may have different operating characteristics to smaller models, several of which may not be initially apparent.

The greater mass and inertia of the large model, its generally more robust (less compliant) structure and the differences in aerodynamic efficiency of larger flight surfaces can mean handling characteristics nearer to full size aircraft than to models. You may be caught out if you are not aware of this.

You may also have visual perception problems caused by the size of the model. This usually takes the form of the aircraft being much further away than you think and can cause positioning problems in flight and danger on landing due to the large 'swept' area on the approach. Be aware of this problem, especially when flying at low level.

(d) When constructing the model ensure that all parts have adequate strength for the task they perform. Pay special attention to the way in which wing load stresses are transferred between the wing structure and the fuselage. Tailplane members, if detachable, should have a positive lock to their mounting so that they cannot be shed in flight.

(e) Never use long unsupported control rods to the control surfaces or plastic clevis connectors as control forces will be high. Wherever possible each aileron should have its own servo and the elevator should preferably have two independent servos with either (a) mechanical interconnection so that either can drive the control surface (with reduced movement) should the other fail or (b) each servo

should drive one half of the elevator through separate pushrods.

(f) Pay particular attention to the state of the battery and the switch harness. Ensure that the batteries in both the model and the transmitter have adequate capacity for the flight to be undertaken and are fully charged for each flying session. Don't expect a standard receiver battery pack to cope with the demands of high power servos and large control forces. Loss of battery power is the most frequent cause of system failure. There are commercial battery back-up systems available and circuits have been published for similar systems. These should be seriously considered if overall servo current drain is likely to be very high.

(g) As required by the CAA, a radio fail-safe device must be fitted and operational to all models over 7 kg. Remember that the purpose of the device is not to land the model but to prevent it from flying away in the event of radio failure. You should test it regularly as part of your pre-flight checks.

(h) It is recommended that all 'large model' pilots should hold the BMFA 'B' certificate or its equivalent (e.g. SAA Silver Wings, LMA Certificate of Competence), and should ensure that both adequate third party insurance is operational and that all flights made comply with CAA regulations.

(i) Do not operate large models at a site which allows public access to the take-off or landing area unless that access can be marshalled during the duration of the flight. Although you may be aware of the potential dangers, the general public, especially children, will not know these of hazards.

(j) Above all always fly sensibly and safely.

Power Fixed Wing

(a) The fail-safe device fitted must, as a minimum, bring the engine to idle speed.

(b) Pay particular attention to vibration proofing the airframe. Larger engines may produce high amplitude low frequency vibration unlike that normally associated with model aircraft engines. Ground test the airframe under full power until you are satisfied that nothing will loosen in flight.

(c) Take No Chances With a Running Engine. The greatest care should be taken when running the engine of a large model. Full-size aviation standards of safety and awareness must be exercised whenever you start, run and adjust the settings of the engine.

Helicopters

(a) The fail-safe device fitted must, as a minimum, bring the engine to idle speed.

(b) The greatest attention must be paid to the effects of vibration on the airframe and radio installation. Linkages must be regularly checked and any that are suspect must be renewed.

(c) Because of the high airframe density and lifting power of modern helicopters, it is very easy to be operating a model weighing over 7 kg without being aware of the fact. Pilots are recommended to weigh all helicopters powered by '40' sized engines and above and to make certain that you are complying with any current CAA regulations if necessary.

Gliders - Slope And Thermal

(a) Considering that the purpose of the fail-safe device fitted is to avoid a flyaway, it is recommended that it should be set with that in mind. Activation of spoilers, crow brakes or even the elevator to full up and the rudder to full left (or right) would be appropriate.

(b) Many large gliders have scale 'bolt on' wing fixings. Pay strict attention to how the wing load stresses are passed from the wing skins and spars through any such fixings to the fuselage structure.

(c) When flying from the slope be sure that you give audible warning to spectators, assistants and other pilots when about to launch or land. Agree a flight pattern to be used along the slope with other pilots or follow local rules. Always turn away from the hill at the end of each pass.

(d) Do not operate large gliders in the same airspace as other users, e.g. full-size gliders, aircraft, hang gliders etc. (see the earlier section on 'mixed sites').

(e) Always perform aerobatics well away (not less than 50 metres) from people or property and never, under any circumstances, overhead.

Flying Sites For Models Between 7 Kg And 20 Kg

Models between 7 kg and 20 kg are directly regulated by the Air Navigation Order and two of the main legal requirements are that they are not flown in controlled airspace or in aerodrome traffic zones (ATZ) without Air Traffic Control (ATC) permission and that they are not flown at more than 400 ft agl without the permission of the relevant authority.

Within controlled airspace this is the appropriate ATC unit and outside controlled airspace it is the CAA itself.

CAP 658 says;

Models between 7 and 20 kg must not be flown above 400 ft agl unless with ATC permission (if in controlled airspace – Ed) and should be flown well clear of any congested area of city, town or settlement; 150 metres is suggested. (note that the CAA definition of 'congested area' includes playing

fields that are actually in use, i.e. if a football match is in progress - Ed).

Arranging to fly on a site already cleared for model flying could save you some problems.

Long term permission can be arranged for sites within controlled airspace and ATZs and you should liaise with your local ATC to arrange this. Such permission should be in writing and will probably be for one year.

This type of long term permission is endorsed by the CAA and BMFA and if your local ATC is not willing to give it in what you consider to be reasonable circumstances then you should contact the BMFA Leicester office. An arbitration procedure has been agreed with the CAA and the matter will be taken further on your behalf by the BMFA.

Flying Sites For Models Over 20 Kg.

Such models are subject to the issue of a CAA exemption certificate before they may be flown. The certificate will set out any conditions required but you can certainly expect any restrictions to be at least based on those noted above for models between 7 and 20 kg and it is extremely unlikely that they will be less strict.

Models Over 20 Kg

Models over 20 kg are subject to the issue of a CAA 'Permission to Test' exemption certificate before they may be flown. This certificate lasts for twelve months.

The CAA will not issue such a certificate unless the construction of the model has been monitored and 'signed off'. A UK wide building inspection system which is available to all who need it has been set up and details can be obtained from the BMFA office.

A full exemption certificate will then only be issued by the CAA on the completion of a witnessed test flight schedule. Only pilots named on the exemption certificate may fly the aircraft in public and each named pilot is required to complete the flight test schedule on the aircraft separately.

It is extremely important that anyone building or thinking of building a model that may exceed 20 kg should use the inspection service and test flight monitoring service.

If you don't then an exemption certificate will not be issued by the CAA. Flying the model will then be illegal (in the strict definition of the word) and you will be liable to prosecution if you do fly it.

SPACE MODELS

Sports Rockets Up To 'G' Motors

(a) Model rockets must be constructed of lightweight materials, with no metal structural parts.

(b) Models may only be powered by legal rocket propulsion systems.

(c) All models must have a reliable recovery system (parachute/streamer) or suitable aerodynamic surfaces so that a safe return to ground is made on each flight.

(d) Models must be launched from a stable platform equipped as a minimum with a launch rod for initial guidance and must not be launched at an angle of more than 30o from the vertical.

(e) Motors must be ignited electrically, with the operator and any spectators being at least 5 metres from the model. A clearly audible countdown of at least 5 seconds must be given by the launch supervisor. In the event of a misfire, do not approach the model until it is certain that ignition will not occur.

(f) Flying sites must be clear and open and models should only be flown in conditions of good visibility.

(g) Where spectators are present, a Range Safety Officer should be appointed to take responsibility for all flying activity.

(h) For more information plus a detailed set of safety rules, contact the Association's Leicester Office.

Large Scale Rockets, 'H' To 'M' Motors

(a) Details of the operating and safety procedures for large scale high powered rockets are naturally more extensive and involved than for the lower powered ones.

A comprehensive safety code has been written by UKRA to cover such operations and is published by the BMFA. It is required reading if you are interested in large scale rocketry.

Space Modelling Specialist Bodies

The BMFA Specialist Bodies covering space models are Federation Aeronautique Internationale Rocketry (FAIR) and the United Kingdom Rocketry Association (UKRA). These bodies can be contacted via the BMFA's Leicester office.

GAS TURBINES

This section includes all the Gas Turbine guidance in the current version of CAP 658.

General

(a) The operation of gas turbines requires special care and the manufacturer's operating instructions must be understood and closely followed. All pilots and helpers must be fully briefed on the operation of the engine before any starts are attempted.

(b) Never run an engine in excess of the manufacturer's recommended power rating. Always follow the manufacturer's recommendations on pipework and fittings, especially with regard to periodic renewal.

(c) Take extra care during the engine's initial operating period. Until the unit is proven, do not operate it near people.

(d) Pressurised gas fuels, such as Propane, require care in handling; spill dispersal rates can be slow and the gas can 'pool' in hollows or in void areas in fuselages. The liquid can also cause frostbite, if allowed to come into contact with skin.

(e) Ensure that all fuel is stored in labelled containers fit for the purpose. These containers should be no larger than necessary.

(f) Model jet turbine installations may produce significant amounts of RF interference. In particular, fuel pumps, if they use brushed motors, and the turbines themselves, which have been known to produce significant static interference, especially if ceramic bearings have been incorporated. Make sure that you do not install receivers or servos or run aerials near to the engine installation.

(g) All gas turbine models are required by the CAA to be fitted with a failsafe. This must, as a minimum, bring the engine to idle in the event of radio interference or failure. The fuel system must be capable of manual shut off via a fuel valve or fuel pump switch.

Before Starting

(h) Smoking or naked flames must not be allowed near the engine and the fuelling area.

(i) A suitable fire extinguisher (CO_2 or dry powder but not water) should always be present at Start Up and for any period during which the engine is running.

(j) The Start Up area should be kept clean and free from any loose items that may get sucked into the fan or turbine.

(k) Ideally the Start Up area should be on a paved surface, but if this is not possible the grass should be short and clear of all loose material.

(l) Check the integrity of any compressed air hoses, clips etc, prior to turning on the air. Manufacturer's instructions should always be followed, particularly those relating to safety.

(m) Gas fuelled models must never be left in the pits area fuelled up. Once fuelled up they should be moved directly to the designated start-up area.

(n) If the engine is home-built or of a new design you should take extra care during its initial operating period. Until the unit is proven, do not operate it with large crowds of spectators present or in pit areas.

(o) The use of plywood or composite impellers is not recommended unless the builder has detailed and specific knowledge of the use of such materials.

Starting

(p) The engine should normally be started facing into wind but make sure that it is not pointed at people or the pits area. The effect of the jet blast must always be kept to the absolute minimum.

(q) Beware of 'wet' starts with liquid fuels.

(r) After starting the engine always check the oil flow to the bearings. It is also advisable to check the exhaust gas temperature each day and you should keep a constant watch for any new noises or vibration. Any deviation from normal could indicate trouble. Do not run the engine if you are not sure.

(s) Whenever possible a reliable helper should assist with the start. The helper should be close by and fully briefed on the operation of the engine. The helper should ensure that you are not distracted during the start sequence.

(t) Models must be physically restrained during start up. The use of wheel brakes alone is not sufficient.

Shutdown

(u) After every flight ensure that the engine is fully shut down, the fuel shut-off has been operated and that any hatches are opened to assist engine cooling.

Turbine Model Flight Safety Information:

(v) Adverse runway conditions can have an adverse effect on the aircraft's performance on take-off. e.g. wet or long grass will significantly increase take-off distance.

(x) The rate of climb at take-off weight may be significantly less than that of a propeller driven model aircraft. Care must be exercised to ensure safe clearance of any obstacles immediately after take-off.

(y) The lack of “prop wash” over the control surfaces of a jet propelled model aircraft will result in less control surface effect particularly at low speed.

Turbines and BMFA

(z) There is a detailed guidance booklet covering the safe operation of model gas turbines which is available from the BMFA Leicester office. This booklet is a joint GTBA / BMFA production and study of it cannot be recommended too highly for any gas turbine operator.

(az) The BMFA Specialist Bodies covering gas turbines are the Gas Turbine Builders Association and the Jet Modellers Association. These bodies can be contacted via the BMFA’s Leicester office.

First Person View R/C Flying

FPV RC is a legitimate activity but there are limitations that you must observe to be both legal and insured.

ANO Article 166 (3) says The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.

This is a strict legal requirement

The implication for FPV RC is that the pilot ‘under the hood’ cannot, by definition, be the pilot in charge of the model and that there must be a separate ‘pilot in charge’ at all times.

After discussions with the insurers and the CAA, BMFA has been able to arrange insurance for the activity but ONLY if the following regulation is followed.

(a) When flying FPV RC, the pilots MUST use a buddy box system with the pilot in charge using the master transmitter.

In addition, the model is equipped with a video camera and video link to the ground and will automatically be classed by the CAA as a small aircraft equipped for surveillance.

Consequently, all of ANO Article 167, (Small unmanned surveillance aircraft) will apply to any flights made.

This can be read in full in the section ‘Legal Controls over Model Flying’.

Again, these are strict legal requirements.

THE BMFA SAFETY CODE FOR MODEL FLYING DISPLAYS

This code is issued for guidance only. The Association takes no responsibility for arrangements at particular events outside the Association's direct control.

General

This code has been prepared to give guidance to organisers of, and participants in, public displays which include model flying as part of a demonstration or entertainment. The Code will assist the organisers in meeting their direct responsibility for the safety of spectators and nearby persons and property.

The recommendations contained herein are not intended to apply to

(a) competitive model flying events where spectators attend in the knowledge that model aircraft will be taking part in contest flying; for these events specific safety rules are included in the appropriate competition rules; or

(b) general model flying, the safety requirements for which are covered in the BMFA Safety Code for General Flying.

Article 138 of the UK Air Navigation Order which states that: **‘A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property’**.

Article 137 of the UK ANO states that **‘A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft.**’

These apply to ALL aircraft flown in the United Kingdom, including unmanned ones. This, of course, includes all model aircraft, whether above or below 7 kg. Model aircraft of over 7 kg must also comply with other CAA regulations whenever they are flown including Article 166 of the ANO which contains an additional requirement to fly safely.

Clubs organising displays at which large models will be flown must take careful note of the CAA regulations in order that they do not lead the pilots of such models into breaking the conditions laid down by the CAA.

The following minima for sites, distances maintained from spectators and proficiency standards required from flyers of model aircraft at displays are recommended as a result of many years experience by the BMFA. As there are several different types of model aircraft they each require different facilities and site conditions for safe and effective displays. The different types will therefore be treated separately below.

The BMFA is available to give advice to display organisers, insurance companies, local authorities, etc., in specific cases.

Organisation

One person, the **DISPLAY ORGANISER**, should assume overall responsibility for the event; he will make arrangements for:

(a) Site assessment

(b) Spectator control or, in the case of an event at which model flying is part of a large function, the siting of the model flying area with respect to spectator enclosures, car parks etc..

(c) Verification of flyers' competence. The BMFA and other organisations have voluntary achievement schemes for R/C flyers and organisers should consider these as they are all guides to the proficiency of flyers wishing to take part in the display or event. Details of the BMFA Achievement Scheme are included in this handbook.

(d) In the case of R/C flying, establishing effective transmitter control and frequency monitoring.

(e) Airworthiness and safety checking of all model aircraft and equipment to be used in the display.

(f) Verification of third party insurance validity, covering individual flyers, the model flying club carrying out the flying and the display organisers.

The appointment of a **FLYING DISPLAY DIRECTOR** who will be responsible for the safe conduct of the flying display and who will assume overall responsibility for the planning, organisation and subsequent running of the event.

(g) The appointment of a **FLIGHT LINE DIRECTOR** who will assist in the planning of the flying, the briefing of pilots and who will take full control of the model flying area (in modelling terms, a Contest Director or CD).

The appointment of a **FLIGHT LINE MARSHAL** who is responsible to the Flight Line Director and who will directly control the active model flying.

A POLICE AND EMERGENCY SERVICES LIAISON OFFICER who is responsible for all contact with police and emergency services both before and during the display.

His duties will be to liaise with police and local authorities or, in the case of model flying as part of a wider function e.g. fetes, traction engine rallies etc, to notify the function organisers, in writing, of any special requirements.

The Flying Display Director and Flight Line Director's posts can be held the same person but the Flight Line Marshal must be a separate post and it would be sensible if the Emergency Services Liaison Officer was a separate person too.

(I) The Flight Line Marshal must exercise authority over all flying matters as he is directly responsible for the flying safety of the display. He must not hesitate to discipline pilots if necessary and it cannot be stressed too strongly that his is the final say on all matters on the airside of the flightline.

This places a great deal of responsibility on the Flight Line Marshal and it almost defines his job. A very pro-active approach must be taken so that these responsibilities are fulfilled and all display organisers are urged to consider very carefully the quality of the person appointed to this task.

SITE ASSESSMENT

The BMFA Site Assessment Service

The BMFA offers a free voluntary site assessment service to all display organisers and you should contact the Leicester office for details. The use of this service is very highly recommended to you although the conclusions reached during the site assessment are not binding.

However, you may be very surprised at what a fresh pair of eyes can see in your plans and you should lose no opportunity to make sure that what you are going to do is as safe as possible; which is what the CAA expects of you as a display organiser.

Control Line Aircraft

The flying area shall be substantially flat. The aircraft are tethered and fly in a circular path; the minimum radius of the area required is the maximum control-line length to be used during the display, plus 13 metres.

A three metre diameter circle should be marked in the centre of the flying area (emulsion paint is recommended for this purpose), and pilots should ensure that they do not leave this circle while flying.

Under no circumstances should the boundary of the flying area be less than 50 metres from ANY overhead cables or masts supporting such cables.

Radio Controlled Aircraft

A minimum area for take-off and landing of 100 x 40 metres, with the 100 metre direction substantially parallel to the wind direction, shall be available, with a tarmac or mown grass surface.

To the upwind and downwind sides of this area there should be no spectators, parked or moving vehicles, or other obstructions within a minimum 150 metres of the boundaries of the take-off and landing area. Specific attention shall be paid to the possibility of turbulence caused by nearby tall buildings, trees, marquees, etc..

It is essential that the site be positioned so that all flying can take place without car parks and spectator areas being overflown.

It is recommended that no radio-controlled flying displays should take place within 5 km of any airfield without prior consultation with the chief air traffic control officer of the airfield concerned. This

consultation should be sought at least 30 days before the display is due to take place.

Clubs wishing to organise or participate in displays away from their normal flying site must take great care not to interfere with the legitimate flying of other clubs or groups near the display site.

Enquiries should be made (with the BMFA, with local club contacts and local model shops) and if any club or group is flying within 2 miles of the display site, the display should only take place with their agreement and co-operation.

Control and Siting of Spectator and Car Parking Areas

Control Line Aircraft

Spectators should be behind stout rope barriers or similar restraints surrounding the flying area. Sufficient marshals should be available to ensure that spectators are adequately controlled and organised.

Radio Controlled Aircraft

Spectators should be behind a stout rope or other barrier located parallel to the take-off and landing direction. They should thus be on only one side of the flying area for radio-controlled aircraft. In NO circumstances should take-off or landing be performed towards or over spectator or car park areas. Sufficient marshals should be appointed to ensure that spectators are appropriately controlled and supervised.

PLANNING AND CONDUCT OF MODEL FLYING DISPLAYS

The organiser should himself preferably be an experienced flyer of the type(s) of model aircraft being used at the display, but in any case must be thoroughly familiar with the operating characteristics of the aircraft taking part. He is responsible for the postponing or cancelling of all or part of the display in case of adverse circumstances likely to cause a hazard to safety. It is also his responsibility to ensure that minimum nuisance is caused, and that no unauthorised flying takes place. All flyers should have had experience with the aircraft they are to fly and the types of manoeuvres to be performed. In the case of radio-controlled flying;

(a) It is recommended that all flyers should be BMFA 'B' Certificate holders or equivalent.

(b) All helpers should be familiar with the Safety Codes within this handbook.

Control Line Flying

Model, control-lines, handle and safety straps shall be subjected to the pull test specified for the type of aircraft in the contest rule book before each flight, and visually examined for damage. Safety wrist straps shall be used at all times. All helpers in the control-line flying area shall wear safety helmets and should be familiar with the safety codes within this handbook. All control lines shall be of steel.

Radio Controlled Flying

All display pilots should have a helper/caller with them when they are flying.

All ground helpers should be familiar with the safety codes in this handbook.

All flyers should hold the BMFA 'B' Certificate or its equivalent (SAA Silver Wings or LMA Certificate of Competence).

When using the LMA Certificate of Competence in place of the BMFA 'B' Certificate, the following conditions must be complied with.

(a) The pilot must be a paid up member of both the BMFA and the LMA.

(b) The pilot may only fly the type of model for which he is certified.

(c) All CAA regulations regarding model flying must be complied with.

(d) The pilot's helper/caller should be either a 'B' certificate or LMA Certificate holder.

It is strongly recommended that a frequency monitor shall be operated throughout the display and for half an hour before flying commences.

The number of frequencies in use should be kept to a minimum. At the planning stage enquiries should be made to ascertain whether any hospitals, factories, military or public service establishments in the vicinity may use radio equipment or any other electronic or electromechanical devices likely to cause interference on the radio frequencies to be used during the display.

If there is felt to be any risk of such interference, then no flying must take place. If any radio interference is suspected during flying all models should be landed immediately and no further flying may take place until the interference source is identified and eliminated.

Strict control of transmitters **MUST** be enforced. A transmitter pound, together with a pegboard, and the use of a frequency checker on all transmitters is highly desirable.

All control functions of each aircraft shall be checked before each flight (1) when the radio is switched on and (2) with the engine at full throttle before take-off. All power-driven aircraft flown at displays should have throttle control.

Particular attention should be paid to the state of both transmitter and receiver batteries - dry batteries must not be used and rechargeable battery

packs should be fully charged at the start of the display.

No flying should take place if the surface wind speed exceeds 25 knots, or if the visibility is less than 500 metres.

27 MHz radio control equipment must not be used for public displays owing to the danger of interference from other legitimate model users, industrial or medical installations.

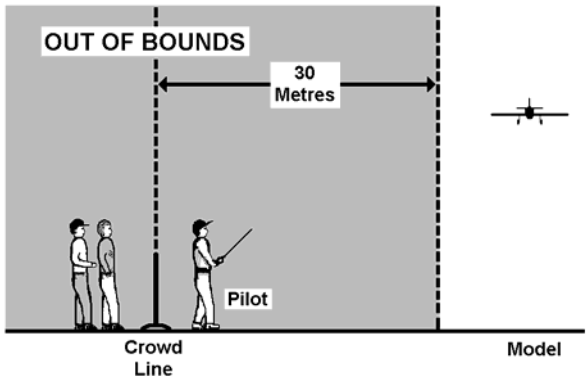
No turn should terminate with the aircraft on a heading towards the spectator enclosure.

No aircraft may be flown within 30 metres of spectators. For models over 7 kg and all gas turbine powered models this distance should be 50 metres. This may be reduced to 30 metres for take off and landing only.

The organisers, especially the Flight Line Marshal, should also consider the need to add additional separation distance for models of exceptional dimensions, weight or performance.

The Flight Line Marshal must position the pilots so that they are between the spectators and the flying models.

Note that the distance of 30 metres shown must be 50 metres when models over 7 kg or gas turbine powered models are flown.



Toffee Bombers

Models dropping toffees should not weigh in excess of 7 kg. The toffee bomber should fly alone. All other models should remain on the ground during the toffee drop and all transmitters should be switched off and in the care of Tx control. An area within the public enclosure should be provided for those children wishing to take part.

The toffee bomber should make its drop from as high an altitude as is practical. It should then circle at height upwind and should not fly over the area where the toffees have landed. If this is not possible without flying over car parks, houses, roads etc, no toffee drop should be included in the programme.

Children should be controlled by officials and/or the PA system and prevented from leaving the enclosure until the toffees have been dropped and the model is away from the area. The field should then be cleared as soon as possible after the drop. All children must be safely back in the spectator's enclosure before the pilot is permitted to bring the model back for its landing.

Young Pilots

Whenever a young pilot takes part in a display, it is very strongly recommended that a suitable person is tasked to stand with them as a safety pilot. The legal responsibilities and possible liabilities of young people under the age of 15 are not clearly delineated and the organisation should take great care that no young pilot is allowed to fly unless accompanied by a person known to the organisers as being a proficient safety pilot.

Smoke Systems

Some of the oils used in model aircraft smoke systems are known to be carcinogenic when burnt and all of them are irritants to varying degrees, even the purer types.

Smoke should only be used when the wind is blowing away or at least along the pits / flightline area and there is no possibility of the smoke cloud being blown over pilots or spectators.

General

It is important that a written description of arrangements for the model flying programme be circulated in advance to all people participating in the display. This should be reinforced and, if necessary, updated by a further oral briefing on the day of the display.

The Club Fly-In, Small Display or Open Day

The BMFA Safety Code for Model Flying Displays was written to cover the larger type of display and questions are often asked about what to do in the case of the smaller display or club fly-in.

The answer lies, as it so often does, in the organisers acting in what may be seen to be a reasonable manner.

As an organiser, you should read the Display Code very carefully and pick out the parts that you feel apply to your event and apply them carefully.

There's no doubt that a Display Organiser to take overall control of the event and a Flight Line Marshall to take responsibility for all the flying would be required posts no matter how big or small the event is.

However, you may feel that you do not need the full range of other personnel required at a larger display and, although most of the jobs are valid, they could be amalgamated into far fewer people.

The requirement for pilots to hold a 'B' certificate is also sensible for a large display but at a smaller event it could be appropriate to accept a lesser qualification and take care that the flying is carefully monitored.

Checking pilot's insurance details is essential. However, and should always be done.

The Display Code will give you the guidance you need and you should try to operate within the spirit of the document. You should also remember that, if there is an incident, your actions will be judged on the basis of 'did you act reasonably?', and the Code will give you the help you need to make the decisions you have to make.

THE BMFA DISPLAY PILOT'S LOGBOOK

To assist display organisers in their task of assuring themselves of pilot competence as required by the CAA in CAP 658, the BMFA has introduced a Display Pilot's Logbook scheme.

The logbooks are free from the BMFA Leicester office and are also available from various show organisers. The only qualification needed to obtain a logbook is that you must hold a 'B' Certificate.

The logbook has spaces for pilots to fill in their show-by-show flying experience and for organisers to sign off each entry.

If you are a display organiser or flight line marshal and a pilot hands in his logbook, you will have a direct view of his experience (or lack of it) on the 'show circuit'. You will be able to see the types of aircraft he has flown and you should be able to come to a better informed conclusion about his competence than you could before.

If you are a regular or occasional display pilot and you haven't already done so then please think about getting your logbook started. Anything that might reduce the workload and responsibility of a display organiser has to be of benefit and a good logbook record is very impressive - It's your show flying CV already laid out for you.

MANDATORY OCCURRENCE REPORTING

CAP 658 Says:-

1 Definitions

An **ACCIDENT** is where a person suffers a fatal or serious injury as a result of contact with any part of any model including parts that have become detached from the model.

A **SERIOUS INCIDENT** means an incident involving circumstances indicating that an accident nearly occurred.

An **INCIDENT** is an occurrence that has the potential for an accident or serious incident to occur.

2 General Flying

In the event of an accident involving a model aircraft which causes injury to a third party, the pilot must inform their own National Association as soon as is reasonably practicable.

3 Public Events (Displays or Competitions)

The Organiser of a display is responsible for ensuring that any Accidents involving injuries to members of the public are reported to the CAA as soon as is reasonably practicable. Note this includes injuries caused by ground special effects.

The Organiser of a display or competition is also responsible for reporting any accidents or serious incidents to their respective Association with information to the BMFA.

Incidents occurring near or behind the crowd line or in any area to which the public has access must also be reported to the respective Association as soon as is reasonably practicable.

The Flying Display Director shall be responsible for the initial determination of the seriousness of any incident occurring at the display. The Display Organiser shall be responsible for initiating the reporting procedure outlined above.

At a display or competition, the Display Organiser must appoint a Police and Emergency Services Liaison Officer to act as the point of contact for liaison with the police and emergency services in the event of an accident or serious incident.

4 Contact Details

The respective Associations are to maintain a list of contacts who are authorised to act on behalf of their Association on notification of an accident or serious incident occurring.

Accident reporting to the CAA (Out of Office Hours) is on 07808 900329

BMFA ADVICE ON MANDATORY OCCURRENCE REPORTING

1. General

First of all, you should bear in mind that any reportable incident might well trigger a CAA inquiry, run by the Air Accident Investigation Board (AAIB).

The possibility of a future inquiry will usually depend on the severity or potential severity of the incident and your actions regarding collection of evidence, etc. should be with this in mind.

A fatal accident is certain to result in such an inquiry.

Almost all these inquiries are conducted for the AAIB by the BMFA so there is an assurance that an experienced modeller will be involved and not someone who is unfamiliar with model operations.

2. General Flying

Whilst not being required to report accidents (defined as involving fatal or serious injury) directly to the CAA, any serious incident may well trigger an AAIB inquiry.

With this in mind, those present on the flying field will have to decide very quickly on their course of action.

In the case of a fatal incident there is no doubt that the first course of action will be to alert the emergency services, e.g. ambulance and police.

The model, radio equipment and any other items involved should not be moved or even touched, if that is possible. If any transmitters operating during the incident are switched off later this should be noted.

All other transmitters, the pegboard and the pits area should be left untouched until full details have been recorded.

Photographs of the area will be extremely useful and, if a camera is not available, mobile phone pictures will do; as many as possible.

Names and addresses should be taken of all those present and no one should be allowed to leave the field until a police presence has been established.

If there are no Committee members on the field then, at some point, Committee officers must be contacted. This should obviously be done as soon as possible but Club members on the field should not wait for a Committee presence to take care of the steps outlined above, many of which need to be done quickly.

For any incident that has not resulted in a fatality but is still serious, a police presence will probably not be required and the level of evidence collection may be reduced but you should always remember that an inquiry might be held into the incident.

Plenty of photographs of the scene, possibly impounding the model and radio equipment, names and addresses of witnesses and notes taken at the time will all be extremely helpful if you consider that you may be involved in an inquiry

It will also help in any insurance related queries that might arise.

3. Public Events (Displays or Competitions)

Who is Responsible for What

CAP 658 specifies three people within a display organisation, all with specific jobs to do if an incident occurs.

If there is an accident, serious incident or incident, it is clear that the Flying Display Director (that is, the flightline CD) is responsible for deciding how serious the incident is and then reporting this to the Display Organiser.

The Display Organiser is then directly responsible for following any of the reporting paths outlined in the regulations.

He is also responsible for the initial appointment of the Police and Emergency Services Liaison Officer.

The Liaison Officer must be kept informed by both the CD and the Display Organiser of the current situation regarding any incident as his job will be to act as a point of contact for all the emergency services. He must be a person who is able to be aware of the overall situation as, when emergency services arrive at an incident and have no single person to deal with, serious confusion can arise

It is quite possible that, at a smaller display or competition, these three posts may be held by one or two people. For instance, in many cases the Display Organiser is also the Flightline CD.

The Emergency Services Liaison Officer should, if possible, be a separate person who can step in if needed.

Note that the Flightline Marshal is not mentioned here. This is because that job requires constant vigilance and the person doing it should not be distracted.

Accidents and Serious Incidents

In the case of accidents and serious incidents (as defined in CAP 658) and for organisers of displays, fly-ins and competitions, almost all of the above comments apply.

The exception will be the taking of names and addresses if there are many people present. You should focus on those directly involved and anyone who might be a witness to events.

One thing in particular that might help considerably is the collection of video evidence and, at a larger event, this might be available. A request from the organisers over the PA should be made and details of anyone offering such evidence should be taken.

Do not be complacent about these details. Any incident, serious or potentially serious, that occurs in front of the public will almost certainly be reported to the press, probably before the dust has settled, and the press will almost certainly contact either the CAA or the BMFA for comment.

Consider the consequences of a telephone call from the press to the CAA on a Monday morning asking for details of the 'model aeroplane crash' that turns out to be a serious one and neither the CAA nor the BMFA has any knowledge of it.

Incidents

An incident (defined by CAP 658) may still require the organisers to collect and retain some evidence.

Careful noting of circumstances, taking names and addresses of those involved, a careful check of frequency control arrangement, whatever statements from officials that can be arranged and photographs of the scene if possible are all important.

You will have to report the incident to your local association and they may come back to you for more details than you gave them initially, so be prepared to take the time to collect any evidence.

Again insurance matters may also be involved so you need to gather whatever information you consider necessary, depending on the potential severity of the incident, remembering always that members of the public might see the incident in a different light to you and that most of them have mobile 'phones to contact the press.

THE RADIO CONTROL ACHIEVEMENT SCHEMES

General

The main aim of the R/C Achievement Schemes is to encourage model flyers to reach a given standard of flying ability and safety and to prove that standard to an Examiner. There are two grades;

(a) The 'A' Certificate which may be equated to a 'safe solo' standard of flying.

(b) The 'B' Certificate which is designed to recognise a more advanced pilot's increased ability and knowledge and a demonstrated high level of safety.

In addition, there are endorsements available to the 'B' Certificate in various disciplines for those flyers who wish to take their personal flying standards and achievements further. At the time of writing, these are,

The 'C' Certificate, Aerobatics.

The Gold, Diamond and Diamond Star Silent Flight Thermal Certificates (run by BARCS).

The Gold, Diamond and Diamond Star Silent Flight Slope Certificates (run by BARCS).

The Achievement Scheme is run by the BMFA as a National Scheme and it is open to all model flyers. However, non-members of the BMFA must produce evidence of Third Party insurance in the sum of not less than £5,000,000.

The scheme may also be used by any model flying group or club, whether it is BMFA affiliated or not and all applications from clubs who wish to participate in the scheme are welcome.

National Standards and Advice to Area Chief Examiners, Club Examiners and Candidates.

The Achievement Scheme Standards Leaflets

Leaflets are available to Club Examiners setting out the nationally agreed standards for the testing of candidates taking all of the available 'A' and 'B' certificates and 'C' Aerobatics.

These leaflets are also available to test candidates, either from your club examiner or on request from the Leicester office, on receipt of a SAE. They are available for download from the BMFA website.

Candidates are very strongly advised to make every effort to obtain a copy of the relevant standards leaflet as it explains every aspect of the test they will be taking in great depth.

Testing of Club Examiner Candidates

Area Chief Examiners are supplied with a leaflet detailing the nationally agreed standards that they should employ in testing candidates for Club Examiner. This leaflet is also available to examiner candidates and may be obtained from your Area Chief Examiner or from the Leicester office.

How the Achievement Scheme is Run and Administered

The Scheme Controllers

The Achievement Schemes are administered by a national Power Scheme Controller and a national Silent Flight Scheme Controller acting for the Areas Council .

Contact details for The addresses of the Power and the Silent Flight Scheme Controllers may be found in the address directory at the back of this handbook. Contact details for Area Co-ordinators may be obtained from the BMFA Leicester office by telephone or e-mail.

The Area Achievement Scheme Co-Ordinators

Each of the fourteen BMFA Areas has appointed an Achievement Scheme Co-ordinator whose job is to oversee the running of the schemes in their Area and to liaise with their local Area Chief Examiners and Club Examiners as well as with the overall Scheme Controllers.

If your club does not have any Registered Examiners, does not have enough Examiners or has any problems with co-ordinating the work of your existing Examiners, then it is essential that your club committee contacts the local Area Achievement Scheme Co-ordinator who will be able to help.

Contact your Area Secretary or the BMFA Leicester office for more details.

Area Chief Examiners

(Fixed Wing, Helicopter and Silent Flight)

The Achievement Scheme is run at Area level by Area Chief Examiners who are persons nominated by Area Committees and ratified by Areas Council as Area Chief Examiners.

A sufficient number of Area Chief Examiners should be maintained by each Area to ensure good geographic coverage for their clubs.

The principal duty of an Area Chief Examiner is to test applicants for the post of Examiner and to promote and maintain the standards of the R/C Achievement Schemes by example and by visiting clubs that require their services.

They are also non-voting officers of their Area Committee and are required to liaise with their Area Scheme Co-ordinator and to submit an annual report to the Area AGM.

It is important to note that Area Chief Examiner status is an appointment, not a qualification and is subject to annual re-ratification.

Area Chief Examiner Eligibility

Area Chief Examiners must be senior members of the BMFA and may be appointed for fixed-wing, helicopter, silent flight or any combination of the three and all Area Chief Examiner ratings will be shown on the individual's BMFA membership card.

They must have long term knowledge and experience of any discipline for which they are appointed for and must also have full knowledge of the BMFA Safety Codes

All Area Chief Examiner candidates must have held an Examiner rating in the discipline for which they are to be appointed for at least two years.

The initial Areas Council ratification ends on December 31st of that year. After that, Area Chief Examiner appointments are for a period of one year only, from January 1st to December 31st. The appointment may be renewed by the appropriate Scheme Controller annually at the request of the appropriate Area Committee.

How an Area Appoints an Area Chief Examiner

The first step is for the Area to decide that an Area Chief Examiner is needed and then to decide on a suitable candidate.

Before the presentation of a potential candidate to an Area meeting for ratification, a consultation with the appropriate Scheme Controller is required by the Area Achievement Scheme Co-ordinator so that the candidate's experience within the Achievement Scheme can be properly appraised by the Area.

The vote to put the candidate forward is then taken at an Area meeting and, for the candidate to be successful, the voting **MUST** show at least two thirds of those present and eligible to vote to be in favour of the candidate. The Area should note that there is a requirement that the candidate provide a CV to go with the proposal.

The proposal form raised by the Area is then passed to the BMFA office, usually by an Area Achievement Scheme Co-ordinator.

Immediately on receipt, the BMFA Office will check the proposal form to see that the Area voting was correct, that the required CV is present, that the candidate has been an Examiner in the requested discipline for the required length of time and that the

required consultation with the Scheme Controller has taken place.

If all is correct, the proposal will be added to the agenda of the next available Areas Council meeting and a copy will be sent to the appropriate National Controller.

The National Controller will pass to the BMFA Leicester Office for inclusion with the proposal any comments about the candidate's record of activity within the Scheme and any recommendations to Council on the suitability of the candidate that he feels are necessary. This must be done by the National Controller as soon as possible after receiving his copy of the proposal.

At the Areas Council the proposal is voted on and, if successful, the candidate becomes a full Chief Examiner for his Area.

Retaining Area Chief Examiner Status

There are two conditions for remaining an Area Chief Examiner which must be fulfilled each year.

One of these is that you are a current BMFA member.

The other is that you are ratified by your Area each year at the Area's AGM and then confirmed by the appropriate National Scheme Controller.

If either of these is not done then you will lose your Chief Examiner appointment and your status on the membership database will be changed.

If your membership lapsed then you will be credited a 'B' certificate.

If you are not ratified by your Area then your status will depend on whether you are accepted by a club as an Examiner. If so then you will be credited with an 'E'. If not then you will be credited with a 'B'.

Regaining Chief Examiner status on re-joining or being re-ratified by your Area is not automatic and will be subject to the normal process of ratification by Areas Council.

Area Chief Examiner's Area Of Operation

Chief Examiners operate within the Area for which they are ratified.

If a Chief Examiner is

(a) requested to operate in another Area as a Chief Examiner for any reason or

(b) asked to test Examiner candidates from a club in another Area

He **must** obtain prior agreement from that Area's Achievement Scheme Co-ordinator before taking any further action.

However, an Area Chief Examiner may operate without permission outside of their own area at any time but only with Club Examiner status (e.g. they operate by invitation and they may take 'A' Certificates or stand as one of the two Examiners for a 'B'. They cannot take a 'B' test on their own).

Club Examiners

(Fixed Wing, Helicopter and Silent Flight)

The Achievement Schemes are run at local level by Club Examiners who will be tested and appointed by an Area Chief Examiner, arranged by their local Area Achievement Scheme Co-ordinator.

The principal duty of a Club Examiner is to test applicants for 'A' and 'B' Certificates and to maintain the standards of the Achievement Scheme, both in their club environment and further afield.

Examiners are appointed specifically to clubs and may not operate unless initially appointed by a club and then ratified annually by at least one club.

It is important to note that Club Examiner status is an appointment, not a qualification and is subject to annual re-ratification.

A Club has the sole right to specify which Examiners may test their members on their own flying fields. The Examiners may be those ratified annually by the Club or they may be Examiners who are invited by the Club Committee to visit the Club to test members.

This does not restrict the right of model flyers to be tested at a venue and with an Examiner of their choice but it should be noted that any Club may insist on satisfying themselves regarding the flying proficiency of any member or visitor who has been tested away from the Club and not by their own Examiners.

Club Examiner Eligibility

Club Examiners will be categorised as 'Fixed-wing', 'Helicopter', 'Silent Flight' or any combination of the three. Separate certificates will be issued for Fixed-Wing, Helicopter and Silent Flight Examiners and all Examiner ratings will be shown on the individual's BMFA membership card.

Club Examiner appointments are for a period of one year only. After this time the appointment may be renewed by the BMFA Leicester office on receipt of the annual club affiliation form or a letter from the club committee.

Candidates for the post of Club Examiner must be senior members of the BMFA (i.e. over the age of 18 years) and must have held a 'B' Certificate in the relevant discipline for a minimum of 6 months (Fixed Wing 'B' for Fixed Wing Examiner, Helicopter 'B' for Helicopter Examiner and either Thermal, Slope or Electric 'B' for Silent Flight Examiner).

They will be asked to fly by the Area Chief Examiner and will be expected to demonstrate a high standard of flying and flight safety, based on the relevant 'B' Certificate test.

In their interview with the Area Chief Examiner, prospective examiners must also show a long-term knowledge of R/C flying, particularly in the discipline for which they are being tested, and a full knowledge of the BMFA Safety Codes and local club rules.

How a Club Appoints an Examiner

To request the appointment of a Club Examiner, the candidate's club must apply to their BMFA Area Achievement Scheme Co-ordinator (Area ASC) in writing, asking that the candidate be tested and giving, in advance, written acceptance of the candidate as a Registered Club Examiner should the test be successful.

If the Club is not certain who the local Area ASC is then they should contact the BMFA Leicester office who will provide contact details. Requests for Examiner tests actually sent elsewhere, such as to an Area Chief Examiner or to the BMFA office, will be forwarded to the appropriate Area ASC but this may introduce a delay.

On receipt of the written request, the Area ASC will arrange for an Area Chief Examiner to contact the candidate and make arrangements for the test to take place.

If this procedure is not followed then any Examiner test undertaken will be ruled invalid. The Area ASC must be involved in the process and an Area Chief Examiner cannot be approached directly to take tests.

If the candidate is successful, the Area Chief Examiner will report to the BMFA Leicester office where the appointment will be registered and the relevant operating paperwork will be sent to the new Examiner.

The Achievement Scheme is run by the BMFA as a National Scheme and so requests that Examiner candidates be tested will be welcomed and accepted from both BMFA affiliated and non-affiliated clubs.

Retaining Club Examiner Status

One of these is that you are a BMFA member. If your membership lapses then you will lose your Examiner status. This will be followed through near the end of the lapsed membership year when your status on the membership database will be changed and you will be credited 'B' certificate. Regaining Examiner status on re-joining is not automatic and will be subject to certification by an Area Chief Examiner.

The other condition is that you are ratified by at least one club each year and if this is not done then your status on the database will eventually be changed to show a 'B' certificate. As with lapsed membership, regaining Examiner status on being appointed or re-ratified by a Club is not automatic and will be subject to certification by an Area Chief Examiner

The two conditions for remaining a Club Examiner must be fulfilled each year.

The BMFA Achievement Schemes are intended to operate as National Schemes and not just within BMFA. Club Examiners may therefore be registered by both BMFA affiliated clubs and by non-affiliated clubs.

ACHIEVEMENT SCHEME ADMINISTRATION

Number of Registered Examiners

A register of BMFA Examiners will be maintained by the BMFA Leicester office on behalf of Council and only those whose names appear on the register are authorised to conduct examinations

The number of Examiners in a club will vary but, as an approximate guideline, a club should have at least two Examiners plus an additional Examiner for every 25 members. This will vary, of course, and some clubs will have more Examiners than this.

As an example, if a club runs the Fixed Wing, Helicopter and Silent Flight schemes, it will almost certainly need more Examiners than the guidelines suggest.

Clubs should make every effort to ratify enough Examiners for their needs and the local Area Achievement Scheme Co-ordinator will be able to help. Contact them via the BMFA office.

Examination Fees

No examination fees will be charged to either BMFA members or non-members.

Displays And Competitions

CAP 658, the Civil Aviation Authority's guide to the flying of Model Aircraft requires that all display organisers verify the competence of pilots flying in the display.

The BMFA's recommendation, as stated in the Safety Code for Model Flying Displays, is that the organisers should require that pilots produce evidence of holding a valid 'B' Certificate or equivalent qualification.

Competitors in BMFA contests for radio controlled powered model aircraft must, however, produce evidence of holding a valid `B' Certificate or equivalent as a condition of entry.

Penalties

Withdrawal of Certificates

Where an 'A' or 'B' Certificate holder or an Examiner consistently disregards the requirements of the Safety Codes or local Club rules, his Club is empowered to take the following action:

(a) In the first instance, a verbal warning to the offender by an officer of the club.

(b) In the second instance, a written warning from the club committee.

(c) Where these warnings fail to have the necessary effect, the club committee may formally request that the Areas Council withdraw the offender's Certificate or Examiner qualification.

In exceptional circumstances, a BMFA Area may formally propose to Areas Council that a certificate or qualification be withdrawn directly.

Once a certificate or qualification has been withdrawn by Areas Council, the offender will not be permitted to re-take the test for a period of 6 months from the date of withdrawal.

Note: The removal of a 'B' certificate will automatically mean that any endorsements to the 'B' will also be lost (for instance the 'C' Aerobatics). This is because you must have a 'B' certificate to take and hold a 'C'.

'A', 'B' and 'E' Certificate Re-Tests

Where a Club or Area has concerns about the standards of flying or behaviour of any individual but do not wish to take the matter to Areas Council, a re-test procedure is in place as follows:

(1) Any Club or Area may apply to their local Achievement Scheme Co-ordinator (ASC) to have any member re-tested for 'A', 'B' or 'E' certificates. Requests from a Club must be on Club headed notepaper and must be signed by at least two current Club Committee members. Requests from an Area must be on Area headed Notepaper and signed by at least two current Officers of the Area.

(2) The ASC will pass on any such requests to the appropriate National Scheme Controller who will arrange for a Chief Examiner (CE) from an a different Area to conduct the re-test by arrangement with the candidate.

(3) Any costs involved with travelling will be borne by the organisation that requests the re-test.

(4) If the candidate fails the re-test, the CE will be authorised to revoke the candidate's certificate or appointment and re-grade the candidate as required. For instance, a candidate who failed a 'B' test could be re-graded as an 'A' certificate. These actions will be ratified by the Scheme Controller after receiving the report of the CE.

(5) If the candidate for the re-test does not co-operate with the designated CE then he will be deemed to have failed the re-test.

(6) If a candidate fails a re-test and is re-graded, they will not be allowed to re-take the test for six months from the date of the failed re-test.

Note: The removal of a 'B' certificate will automatically mean that any endorsements to the 'B' will also be lost (for instance the 'C' Aerobatics). This is because you must have a 'B' certificate to take and hold a 'C'.

Equivalent Qualifications

BMFA and SAA

There is a reciprocal agreement between BMFA and the SAA to jointly recognise some of the various Achievement Scheme qualifications in the case of members moving between the Associations. This recognition will result in the automatic granting of a qualification in some cases and will work whichever way the member moves.

The equivalent qualifications agreed are:

The BMFA 'A', Fixed Wing and the SAA Bronze, Fixed Wing.

The BMFA 'A', Helicopter and the SAA Bronze, Helicopter.

The BMFA 'B', Helicopter and the SAA Silver, Helicopter.

Competition Entry

For the purposes of competition entry only:

The SAA Silver Certificate, Fixed Wing and the LMA Certificate of Proficiency are accepted as equivalent to the BMFA 'B' Certificate, Fixed Wing.

The SAA Silver Certificate Helicopter is accepted as equivalent BMFA 'B' Certificate, Helicopter.

BMFA and BARCS

The Achievement Schemes for Silent flight beyond the 'A' and 'B' Certificates, are run by BARCS. The levels achieved are recorded on the BMFA database and the BMFA membership card as endorsements to the 'B' Certificate. Therefore:

Any holder of a BMFA or BARCS Silent Flight Thermal Gold, Diamond or Diamond Star prior to 2005 will be assumed to hold a 'B' Certificate, Silent Flight Thermal.

Any holder of a BMFA or BARCS Silent Flight Slope Gold, Diamond or Diamond Star prior to 2005 will be assumed to hold a 'B' Certificate, Silent Flight Slope.

Badges

Badges in a wings design are available for all grades and disciplines of the Achievement Scheme. They may be obtained direct from the BMFA Leicester office (call the office or check the BMFA website for the latest prices). Orders must include evidence of qualification by quoting your certificate number.

BMFA Membership Cards

Details of a member's Achievement Scheme qualifications will be shown on his membership card.

THE TEST QUESTIONS

In general, most of the test questions will be based on the BMFA safety codes.

In this edition of the BMFA Member's Handbook, the BMFA General Safety Code sections run from page 17 to page 37.

Pages 38 to 47 cover specific disciplines within model flying and you should read at least those sections that apply to the test you are taking.

The section on Legal Controls over Model Flying which is on pages 15 and 16 is also worth studying as it contains considerable information on how the Air Navigation Order may affect your flying.

The Radio Control Technical section on pages 76 to 79 is also an area that you should study for general information.

For 'B' Certificate tests, some questions may be based on the BMFA Safety Code for Model Flying Displays that run from page 47 to 51.

The test for Examiner or for the 'C' Fixed Wing requires that the Chief Examiner interviews the candidate to form an impression of the person's depth of knowledge of model flying in general and, in particular, the discipline in which they are being tested.

Specific questions, as for the 'A' and 'B' tests, might not be asked but if you don't have a good knowledge of these handbook sections you are not likely to impress during the interview.

THE 'A' CERTIFICATE

(FIXED-WING)

The examination for an 'A' Certificate may be taken on application to any Registered Club Examiner or Chief Examiner. The candidate must successfully carry out the following flying test and reference to the Guidance Notes is very strongly recommended:

(a) Carry out pre-flight checks as required by the BMFA Safety Codes.

(b) Take off and complete a left (or right) hand circuit and overfly the take-off area.

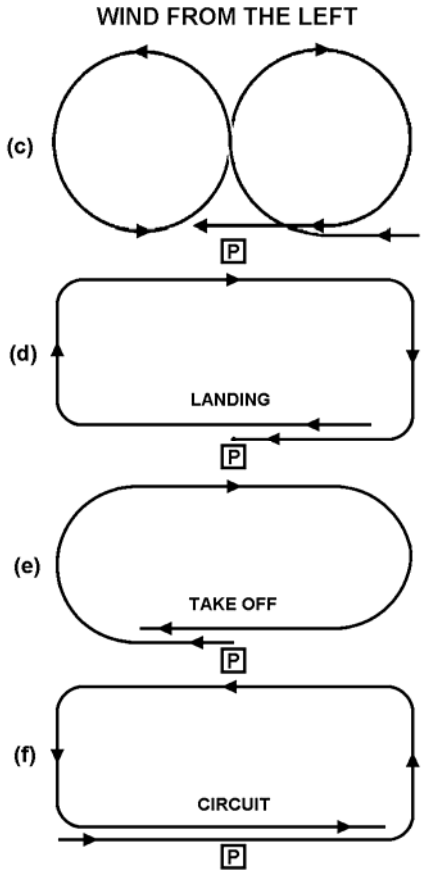
(c) Fly a 'figure of eight' course with the cross-over point in front of the pilot, height to be constant.

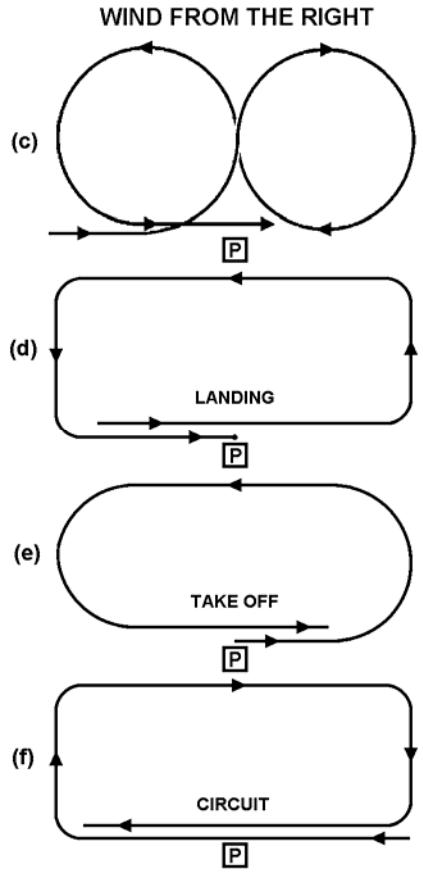
(d) Fly a rectangular circuit and approach with appropriate use of the throttle and perform a landing on the designated landing area.

If the engine stops during the landing the model may be retrieved and the engine restarted to enable the remaining parts of the test to be completed.

(e) Take off and complete a left (or right) hand circuit and overfly the take-off area

(f) Fly a rectangular circuit at a constant height in the opposite direction to the landing circuit flown in (d).





(g) Perform a simulated deadstick landing with the engine at idle, beginning at a safe height (approx. 200 ft) heading into wind over the take-off area, the landing to be made in a safe manner on the designated landing area.

(h) Remove model and equipment from take-off/landing area.

(i) Complete post-flight checks required by the BMFA Safety Codes.

All manoeuvres must be carried out in front of the pilot and, depending on the wind direction, (c), (d) and (f) may be flown as shown in the accompanying drawing.

The above schedule is treated as one test flight and must be completed in one attempt. Two attempts per examination will be allowed in any one day.

You must turn up for the test with a model that is capable of taking off on its own undercarriage or from a dolly. However, if, in the opinion of the Examiner, the surface of the flying area is such that a rolling take-off would not be possible, hand launches may be permitted.

In addition to the flying schedule, the candidate must answer correctly a minimum of five questions on safety matters, based on the BMFA Safety Codes for General Flying and local flying rules.

THE 'B' CERTIFICATE

(FIXED-WING)

The examination for a 'B' Certificate may be taken on application to a Registered Examiner. The examination may be carried out by:

(a) Two Registered Examiners (the 'lead' must be a Fixed Wing Examiner).

(b) A Fixed Wing Chief Examiner

If your club does not have any Registered Fixed Wing Examiners, you should contact your local Area Achievement Scheme Co-ordinator who will be able to help. Names and telephone numbers of Area Co-ordinators are available from the BMFA Leicester office.

The candidate must successfully complete the following flying tests and reference to the Guidance Notes is very strongly recommended:

(a) Carry out pre-flight checks as required by the BMFA Safety Codes.

(b) Take off and complete a left (or right) hand circuit and overfly the take-off area.

(c) Fly a 'figure of eight' course with the crossover point in front of the pilot, height to be constant. This manoeuvre must be flown more accurately than the similar manoeuvre in the 'A' certificate test.

(d) Fly into wind and complete one inside loop.

(e) Fly downwind and complete one outside loop downwards from the top (i.e. a bunt).

For aircraft (scale aircraft specifically) which for reasons of structural strength or control limitations cannot perform an outside loop, a Split S or Reversal (from level flight, half roll to inverted, hold, then pull through half loop to recover in level flight) may be accepted by the Examiner.

(f) Complete two consecutive rolls into wind.

(g) Complete two consecutive rolls downwind using the opposite direction of roll rotation to that used in (f) above.

(h) Complete a stall turn either left or right.

(i) Gain height and perform a three turn spin. For aircraft which will not spin, a spin attempt resulting in a spiral dive (not necessarily of three turns), will be acceptable. In each case the initial heading and the recovery heading must be into wind and the model must fall into the spin (no 'flick' spin entry).

(j) Fly a rectangular landing approach and overshoot from below 10 ft. Note that this manoeuvre is an aborted landing, not a low pass.

(k) Fly a rectangular circuit in the opposite direction to that in (j) at a constant height of not more than 40 feet.

(l) Fly a rectangular landing approach and land (wheels to touch within a pre-designated 30 metre boundary).

(m) Complete post-flight checks as required by the BMFA Safety Codes.

Parts (d),(e),(f),(g),(h) and (i) must be performed in airspace designated by the examiner prior to the test flight. The schedule must be completed in one flight.

Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either refuelling or the fitting of a freshly charged flight battery. This landing may only be made with the prior consent of the Examiners. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiners.

Two attempts per examination will be allowed in any one day.

All manoeuvres must be carried out in front of the pilot.

Depending on the wind direction, (j), (k) and (l) will be flown as EITHER left hand overshoot circuit, right hand rectangular circuit, left hand landing circuit OR right hand overshoot circuit, left hand rectangular circuit, right hand landing circuit.

In addition to the above flying schedule, the applicant must answer satisfactorily a minimum of eight questions on safety matters based on the BMFA Safety Codes for General Flying and Model Flying Displays and local flying rules.

The 'C' CERTIFICATE

(AEROBATICS)

The examination for a 'C (Aerobatics)' Certificate may be taken on application to your Area Achievement Scheme Co-ordinator. The examination will be carried out by either one Area Chief Examiner and One Club Examiner, both of whom must be Fixed Wing Qualified, or two Chief Examiners, one of whom must be Fixed Wing qualified.

To apply to take the 'C(AE)' Certificate, the candidate must already hold the 'B' Certificate (Fixed Wing).

The applicant may use any type of model capable of performing the manoeuvres set out in the following schedule. Reference to the appropriate Test Standards Booklet is very strongly recommended.

(a) Carry out pre-flight checks as required by the BMFA safety Codes, including fail-safe operation if appropriate.

(b) Take off and join the circuit in whichever direction is appropriate for the conditions.

(c) Perform a slow roll in either direction.

(d) Fly Inverted straight flight for a minimum of 5 seconds at approximately 30 feet with one roll from inverted to inverted.

(e) Perform an inverted 2½ turn spin, exit to inverted.

(f) Perform a square loop with ½ roll on both vertical legs.

(g) Stall turn with ¼ rolls on the ascent and descent, exit upright. Stall turn to be done with underside of model towards the pilot.

(h) The candidate will then select and perform seven manoeuvres from the list below. The manoeuvres and the order in which they are flown must be agreed with the examiners prior to the test.

(1) Knife-edge flight in either direction, below 30 feet, for at least 4 seconds or longer at the discretion of the examiner.

(2) Cuban 16 with half and full rolls.

(3) Hourglass with half roll in top line.

(4) Two consecutive outside square loops, from the bottom.

(5) Double stall turn, entry and exit inverted.

(6) Inverted rectangular figure of eight at a constant height of no more than 50 feet.

(7) Pull to vertical, one vertical roll up, push to vertical down, one vertical roll down, pull to upright level flight.

(8) Double avalanche. Two consecutive inside loops, each with positive snap roll at the top.

(9) Knife edge 45 degree climb with one positive snap roll from knife edge to knife edge in either direction.

(10) Rolling Circle.

(i) Perform a landing circuit appropriate to the site and conditions.

(j) Perform a landing, wheels to touch within 5 metres of a pre-designated point.

(k) Complete post flight checks as required by the BMFA Safety Codes.

(l) At least once during the test the examiner will call an emergency and this may happen at ANY time during the assessment. The candidate will be expected to respond in a way appropriate to the emergency called. Note that this may involve an intermediate landing and take-off. If the emergency is called part way through a manoeuvre, the manoeuvre must be repeated after the emergency has been dealt with.

(m) Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either re-fuelling or the fitting of a freshly charged flight battery. This landing may

only be made with the prior consent of the Examiners. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiners.

(n) Two attempts per examination will be allowed in any one day.

(o) All manoeuvres must be carried out in front of the pilot.

(p) In addition to the above flying schedule, the applicant will be interviewed by the examiners and must display a satisfactory depth of knowledge of model flying in general and, in particular, of safety matters based on the BMFA Safety Codes for General Flying and Model Flying Displays.

THE 'A' CERTIFICATE

(HELICOPTER)

The examination for a helicopter 'A' Certificate may be taken on application to any Registered Club Examiner or Chief Examiner. The candidate must successfully carry out the following flying test:

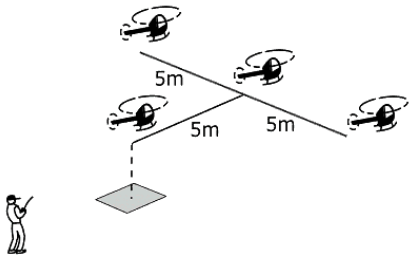
(a) Carry out pre-flight checks as required by the BMFA Safety Codes.

(b) Take off and hover tail in over the take off point, with the helicopter skids at eye level, for about twenty seconds.

(c) Hover the helicopter slowly forwards for approximately five metres, stop, and hover for about five seconds.

(d) Hover the helicopter slowly sideways for approximately five metres, stop, and hover for about five seconds.

(e) Hover the helicopter slowly sideways in the opposite direction for approximately ten metres (five metres past its original position in front of the pilot), stop, and hover for about five seconds.

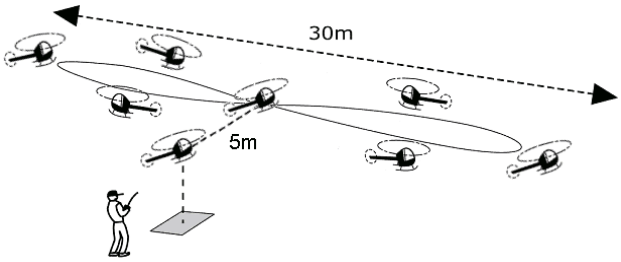


(f) Hover the helicopter slowly sideways in the first direction to bring it back to its original position in front of the pilot, stop, and hover for about five seconds.

(g) Fly slowly backwards, bringing the helicopter back to its original position over the take off point, stop, hover for about five seconds and land.

(h) Take off and fly forward for approximately 5 metres to a point over the centre marker, stop and hover for about five seconds. Turn 90 degrees either left or right and fly forward to perform two 'lazy eights', each at least 30 metres in length. Each time the helicopter passes in front of the pilot it must be sideways on to the pilot and throughout the manoeuvre the model must be flying forward, not sideways.

(i) At the conclusion of the two 'lazy eights', bring the helicopter to a halt sideways-on over the centre marker, turn the model tail-on to the pilot and hover for about five seconds. From this point fly the model to a landing on the original take off point.



(j) Complete post-flight checks as required by the BMFA Safety Codes.

The above schedule must be completed within one flight and two attempts per examination will be allowed in any one day.

The test must be taken outdoors.

The use of helicopters with coaxial contra-rotating main rotors is not allowed.

No artificial stabilisation of the helicopter is allowed other than a tail rotor gyro.

In addition to the above flying schedule, the candidate must answer correctly at least five questions from the BMFA Safety Codes for General Flying and local flying rules.

THE 'B' CERTIFICATE

(HELICOPTER)

The examination for a helicopter 'B' Certificate may be taken on application to a Registered Examiner. The examination may be carried out by:

(a) Two Registered Examiners (the 'lead' must be a Helicopter Examiner)

(b) A Helicopter Chief Examiner

If your club does not have any Registered Helicopter Examiners, you should contact your local Area Achievement Scheme Co-ordinator who will be able to help. Names and telephone numbers of Area Co-ordinators are available from the BMFA Leicester office.

The candidate must successfully complete the following flying tests.

(a) Carry out pre-flight checks as required by the BMFA Safety Codes.

(b) Perform one hovering 'bow tie'

(c) Perform one 4-point pirouette

(d) Perform one 'Top Hat'.

(e) Take off and climb to a safe altitude.

(f) Fly a left hand rectangular circuit.

(g) Fly a right hand rectangular circuit.

(h) Fly a 'figure of eight' course with the crossover point in front of the pilot, height to be constant (note that this is not a hovering manoeuvre).

(i) Perform one twenty second nose-in hover.

(j) Perform one double stall turn. Note that the stall turns must be performed with opposite rotation i.e. first one to the left, second one to the right or vice-versa.

(k) Perform an approach at 45o to the vertical, landing within a predetermined two metre square.

(l) Complete post-flight checks as required by the BMFA Safety Codes.

All manoeuvres must be carried out in airspace and orientations pre-determined by the Examiner and Candidate prior to the commencement of the test flight. The schedule must be completed in one flight.

The test must be taken outdoors.

The use of helicopters with coaxial contra-rotating main rotors is not allowed.

No artificial stabilisation of the helicopter is allowed other than a tail rotor gyro.

Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either refuelling or the fitting of a freshly charged flight battery. This landing may only be made with the prior consent of the Examiners. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiners.

Two attempts per examination will be allowed in any one day.

In addition to the above flying schedule the candidate must answer satisfactorily at least eight questions from the BMFA Safety Codes for General Flying and Model Flying Displays and local flying rules.

THE 'A' CERTIFICATE

(SILENT FLIGHT - THERMAL)

The examination for the thermal 'A' Certificate may be taken on application to any Registered Club Examiner or Chief Examiner. The candidate must successfully carry out the following test.

(a) Carry out pre-flight checks as required by the BMFA Safety Codes. Particular attention should be given to airframe, tow hook, launching aids, control linkages and surfaces.

(b) Check that any launching equipment is laid out correctly, securely and safely with respect to the field layout. Depending on the launch method, ensure that towlines are in good condition, that the bungee is securely anchored to the ground, that winches and turnaround pulleys are secure and a master on/off switch is fitted to the winch or that, if aerotow is to be used, the tug pilot is aware of the model he will be towing and that a launch plan is agreed.

(c) Check that the launch area and landing area are clear both on the ground and in the air and, after complying with the site frequency control system, prepare the model for launch. If a helper is used to launch the model they should be fully briefed as to what is required.

(d) Clearly announce "launching" and launch the model under full control, any deviation from the expected launch path must be corrected smoothly and quickly. Complete the launch by releasing the model from the launch line cleanly, if applicable, and level the model into wind without stalling.

(e) Fly the model straight and level for at least 15 seconds while pilot and Examiner clear the launch area. This does not apply to Hand Launched Gliders.

(f) At the Examiners call the model should be stalled into wind and recovered smoothly with minimum loss of height, heading into wind.

(g) Perform 3 consecutive 360 degree thermal turns to the right or left with minimum loss of height, ending on the same heading as the entry. The model must show no tendency to stall or enter a spiral dive.

(h) Perform 3 consecutive 360 degree thermal turns in the opposite direction to above with minimum loss of height, ending on the same heading as the entry. The model must show no tendency to stall or enter a spiral dive.

(i) Fly the model up wind to prepare the model for the landing phase. The model should be flown with no tendency to stall and with minimum loss of height.

(j) Call "landing" and fly a down wind leg, followed by a crosswind leg and final approach. The crosswind leg may be a continuous turn if preferred

and it may be stretched past the centre line of the landing approach to allow control of height but the model must be flown back to the centre line for the final approach. The whole approach should be flown smoothly with no stalling and the turns should have a reasonably large radii.

(k) Land the model into wind within 20 metres of a predetermined spot.

(l) Retrieve the model from the landing area, informing other pilots that the landing area is clear.

(m) Complete post-flight checks required by the BMFA Safety Codes.

(n) Repeat the above schedule twice more, giving a total of three flights.

(o) Answer at least 5 questions on safety matters from the BMFA Safety Codes.

If insufficient height is achieved at launch or very bad sink is encountered that will not allow the completion of the entire test schedule the Examiner may allow an additional flight. If in the opinion of the Examiner a poor launch height is due to pilot ability the test is failed. Note that this applies to Hand Launched Gliders too and they are not allowed multiple attempts to obtain good launches.

All manoeuvres must be carried out in airspace pre-determined by the Examiner and Candidate prior to the commencement of the test flights.

Aerotow release height will be determined by the Examiner during the launch and should be approximately the same as a bungee, towline or winch launch.

The above complete multi-flight schedule is treated as one test attempt. Two attempts per examination will be allowed in any one day.

THE 'B' CERTIFICATE

(SILENT FLIGHT - THERMAL)

The examination for a the Thermal 'B' Certificate may be taken on application to a Registered Examiner. The examination may be carried out by:

(a) Two Registered Examiners (the 'lead' must be a Silent Flight Examiner).

(b) A Silent Flight Chief Examiner

If your club does not have any Registered Silent Flight Examiners, you should contact your local Area Achievement Scheme Co-ordinator who will be able to help. Names and telephone numbers of Area Co-ordinators are available from the BMFA Leicester office.

The candidate must successfully carry out the following test.

(a) Carry out all relevant pre-flight checks as required by the BMFA Safety Codes. Particular attention should be given to airframe, tow hook, control linkages and surfaces.

(b) Check the launching equipment is laid out correctly, securely and safely with respect to the field layout. Depending on the launch method, ensure that towlines are in good condition, that the bungee is securely anchored to the ground, that winches and turnaround pulleys are secure and a master on/off switch is fitted to the winch or that, if aerotow is to be used, the tug pilot is aware of the model he will be towing and that a launch plan is agreed.

(c) Check that the launch area and landing area are clear both on the ground and in the air and, after complying with the site frequency control system, prepare the model for launch. If a helper is used to launch the model they should be fully briefed as to what is required.

(d) Clearly announce "launching" and launch the model under full control, any deviation from the expected launch path must be corrected smoothly and quickly. Complete the launch by releasing the model from the launch line cleanly and level the model into wind without stalling.

(e) Fly the model straight and level for at least 15 seconds while pilot and Examiner clear the launch area.

(f) Fly the model through either a half loop or half roll to inverted, hold straight, controlled inverted flight for a minimum of five seconds and then half loop or half roll back to level flight.

(g) Fly the model on a thermal search pattern. The model is to pass over three points, agreed with the Examiner prior to the start of the flight (e.g. corners of the field).

(h) Fly the model through consecutive 360 degree thermal turns to a position a minimum of 100m down wind of the pilot. The model should gain height if in lift or be flown with minimum loss of height if no lift is found.

(i) Fly the model a minimum of 150m up wind of the pilot with minimum loss of height.

(j) Gain speed and perform a stall turn into wind.

(k) Fly the model across wind and stall, recover with minimum loss of height, still heading across wind.

(l) Turn the model down wind and stall, recovering with minimum loss of height on the same heading down wind.

(m) Call "landing" and fly a down wind leg, followed by a crosswind leg and final approach. The crosswind leg may be a continuous turn if preferred and it may be stretched past the centre line of the landing approach to allow control of height but the model must be flown back to the centre line for the final approach. The whole approach should be flown

smoothly with no stalling and the turns should have a reasonably large radii.

(n) Land the model into wind within 10 metres of a predetermined spot.

(o) Retrieve the model from the landing area, informing other pilots that the landing area is clear.

(p) Complete post-flight checks required by the BMFA Safety Codes.

The pilot must perform three flights and all sections (f) to (l) must be completed sometime during those three flights, nominating before each launch which parts will be attempted. Sections (a) to (e) and (m) to (o) apply to each individual flight.

If the pilot has completed all tasks in 1 or 2 flights they must still perform the total of three flights. In this case the Examiner may ask for any of tasks (f) to (l) to be repeated in the third flight. The cumulative flight time for three flights is to be more than 12 minutes.

Answer at least 8 questions on safety matters from the BMFA Safety Codes.

If insufficient height is achieved at launch or very bad sink is encountered that will not allow the completion of the test schedule the Examiner may allow an additional official flight. If in the opinion of the Examiner a poor launch height is due to pilot ability the test is failed.

All manoeuvres must be carried out in airspace pre-determined by the Examiner and Candidate prior to the commencement of the test flights.

Aerotow release height will be determined by the Examiner and should be approximately the same as a bungee, towline or winch launch.

The above complete multi-flight schedule is treated as one test attempt. Two attempts per examination will be allowed in any one day.

THE 'A' CERTIFICATE

(SILENT FLIGHT - SLOPE)

The examination for the Silent Flight Slope 'A' Certificate may be taken on application to any Registered Club Examiner or Chief Examiner. The candidate must successfully carry out the following flying test:

(a) Carry out pre-flight checks as required by the BMFA Safety Codes.

(b) Launch the model and gain height.

(c) Fly for ten seconds straight and level across wind.

(d) Fly for ten seconds straight and level across wind in the opposite direction to (c).

(e) Perform one 360 degree left hand turn.

(f) Perform one 360 degree right hand turn.

(g) Perform two consecutive 360 degree 'thermal' turns, either left or right.

(h) Fly into wind and perform a straight stall and recovery.

(i) Fly a rectangular circuit in front of the slope in the opposite direction to that chosen for the landing approach.

(j) Fly a rectangular landing circuit opposite to that flown in (i) and land within 20 metres of a pre-designated spot.

(k) Remove model from landing area.

(l) Complete post-flight checks required by the BMFA Safety Codes.

All manoeuvres except the landing must be carried out in front of the slope.

The above schedule is treated as one test flight and must be completed in one attempt. Two attempts per examination will be allowed in any one day.

In addition to the flying schedule, the candidate must answer correctly a minimum of five questions on safety matters, based on the BMFA Guidelines and Safety Codes for Model Flying and local flying rules.

THE 'B' CERTIFICATE

(SILENT FLIGHT - SLOPE)

The examination for a 'B' Certificate may be taken on application to a Registered Examiner. The examination may be carried out by:

(a) Two Registered Examiners (the 'lead' must be a Silent Flight Examiner).

(b) A Silent Flight Chief Examiner

If your club does not have any Registered Silent Flight Examiners you should contact your local Area Achievement Scheme Co-ordinator who will be able to help. Names and telephone numbers of Achievement Scheme Co-ordinators are available from your Area Secretary or from the BMFA Leicester office.

The candidate must successfully carry out the following flying test:

(a) Carry out pre-flight checks as required by the BMFA Safety Codes.

(b) Launch the model, gain height and complete one horizontal circuit (either left or right hand) in front of the pilot.

(c) Fly a horizontal figure eight with the crossover point in front of the pilot

(d) Fly two consecutive loops across wind.

Fly crosswind left to right and complete a stall turn away from the slope.

Fly crosswind right to left and complete a stall turn away from the slope.

(g) Complete 10 seconds straight and level inverted flight across wind.

(h) Perform one axial roll across wind, either from the left or right.

(i) Perform one axial roll across wind in the opposite direction to (h), rotating in the opposite direction to (h).

(j) Perform a three turn spin with exit in the same direction as the entry.

(k) Fly a left hand rectangular landing approach and overshoot.

(l) Fly a right hand rectangular landing approach and overshoot.

(m) Fly a rectangular landing approach either left or right hand and land within 15 metres of a pre-determined spot

(n) Remove model from landing area.

(o) Complete post-flight checks required by the BMFA Safety Codes.

If the geography of the slope and/or safety procedures in force only allow landings and overshoots from one direction then (k) or (l) may be modified at the discretion of the Examiner and flown as a rectangular circuit out from the slope, opposite hand to the required landing circuit.

All manoeuvres except the overshoots and landing must be carried out in front of the slope.

The above schedule is treated as one test flight and must be completed in one attempt. Two attempts per examination will be allowed in any one day.

In addition to the flying schedule, the candidate must answer satisfactorily a minimum of eight questions on safety matters, based on the BMFA Guidelines and Safety Codes for Model Flying, the Safety Code for Model Flying Displays and local flying rules.

THE 'A' CERTIFICATE

(SILENT FLIGHT - ELECTRIC)

The examination for the electric ‘A’ Certificate may be taken on application to any Registered Club Examiner or Chief Examiner. The candidate must successfully carry out the following test and it is expected that you will take the test with a glider type model.

(a) Carry out pre-flight checks as required by the BMFA Safety Codes. Particular attention should be given to airframe, control linkages and surfaces.

(b) After complying with the site frequency control system, prepare the model for launch. The motor start and stop switch/speed controller sequence must be demonstrated to the examiner

(c) Check that the launch area and landing area are clear both on the ground and in the air. If a helper is used to launch the model they should be fully briefed as to what is required.

(d) Clearly announce, “launching” and launch the model under full control. Any deviation from the expected launch path must be corrected smoothly and quickly. Climb to approximately 100m. Switch off power and transition to glide without stalling.

From this point on, power must not be used.

(e) Stall the model into wind and recover smoothly with a minimum loss of height.

(f) Perform 3 consecutive 360 degree thermal turns to the right or left ending on the same heading as the entry with minimum loss of height. The turns should be under control with no tendency to stall or enter a spiral dive.

(g) Perform 3 consecutive 360 degree thermal turns in the opposite direction to above ending on the same heading as the entry with minimum loss of height. The turns should be under control with no tendency to stall or enter a spiral dive.

From this point on, power should be used as required.

(h) Fly the model up wind to prepare the model for the overshoot/landing phase. The model should be flown with no tendency to stall and with minimum loss of height.

(i) Call “landing” and prepare the model for a landing with a down wind leg, followed by a base leg and final approach.

(j) Overshoot from below 10 ft and climb back to circuit height. Note that this manoeuvre is an aborted landing, not a low pass.

(k) Again, call “landing” and prepare the model for a landing with a down wind leg, followed by a base leg and final approach.

(l) Land the model into wind within 2O metres of a predetermined spot.

(m) Retrieve the model from the landing area, informing other pilots that the landing area is clear.

(n) Complete post-flight checks required by the BMFA Safety Codes.

(o) Repeat the above schedule a second time, giving a total of two flights.

In addition to the flying schedule, the candidate must answer correctly a minimum of five questions on safety matters, based on the BMFA Safety Codes for General Flying and local flying rules, at least two of which must be specific to electric flight.

All manoeuvres must be carried out in airspace pre-determined by the Examiner and Candidate prior to the commencement of the test flights.

The above complete two flight schedule is treated as one test attempt. Two attempts per examination will be allowed in any one day.

THE 'B' CERTIFICATE

(SILENT FLIGHT - ELECTRIC)

The examination for the Electric 'B' Certificate may be taken on application to a Registered Examiner. The examination may be carried out by:

(a) Two Registered Examiners (the 'lead' must be a Silent Flight Examiner).

(b) A Silent Flight Chief Examiner.

If your club does not have any Registered Silent Flight Examiners, you should contact your local Area Achievement Scheme Co-ordinator who will be able to help. Names and telephone numbers of Area Co-ordinators are available from the BMFA Leicester office.

The candidate must successfully carry out the following test and it is expected that you will take the test with a glider type model.

(a) Carry out pre-flight checks as required by the BMFA Safety Codes. Particular attention should be given to airframe, control linkages and surfaces.

(b) After complying with the site frequency control system, prepare the model for launch. The motor start and stop switch/speed controller sequence must be demonstrated to the examiner

(c) Check that the launch area and landing area are clear both on the ground and in the air. If a helper is used to launch the model they should be fully briefed as to what is required.

(d) Clearly announce, "launching" and launch the model under full control. Any deviation from the expected launch path must be corrected smoothly and quickly. Climb to approximately 100 metres. Switch off power and transition to glide without stalling.

From this point on, power must not be used.

(e) Fly the model on a thermal search pattern. The model is to pass over three points, agreed with the Examiner prior to the start of the flight (e.g. corners of the field).

(f) Fly the model through consecutive 360 degree thermal turns to a position a minimum of 100m down wind of the pilot. The model should gain height if in lift or be flown with minimum loss of height if no lift is found.

From this point on, power may be used as required

(g) Fly the model through either a half loop or half roll to inverted, hold straight, controlled inverted flight for a minimum of five seconds and then half loop or half roll back to level flight.

(h) Fly the model a minimum of 150 metres up wind of the pilot, gain speed and perform a stall turn into wind.

(i) Fly into wind and complete one inside loop.

(j) Fly the model across wind and perform an unpowered stall, recover with minimum loss of height, still heading across wind.

(k) Turn the model down wind and perform an unpowered stall, recovering with minimum loss of height on the same heading down wind.

(l) Fly the model up wind to prepare the model for the overshoot/landing phase.

(m) Call "landing" and prepare the model for a landing with a down wind leg, followed by a base leg and final approach.

(n) Overshoot from below 10 ft and climb back to circuit height. Note that this manoeuvre is an aborted landing, not a low pass.

(o) Again, call "landing" and prepare the model for a landing with a down wind leg, followed by a base leg and final approach.

(p) Land the model into wind within 10 metres of a predetermined spot.

(q) Retrieve the model from the landing area, informing other pilots that the landing area is clear.

(r) Complete post-flight checks required by the BMFA Safety Codes.

(s) Repeat the above schedule a second time, giving a total of two flights.

In addition to the flying schedule, the candidate must answer correctly a minimum of eight questions on safety matters, based on the BMFA Safety Codes for General Flying and local flying rules, at least four of which must be specific to electric flight.

All manoeuvres must be carried out in airspace pre-determined by the Examiner and Candidate prior to the commencement of the test flights.

The above complete two flight schedule is treated as one test attempt. Two attempts per examination will be allowed in any one day.

THE SILENT FLIGHT PERSONAL ACHIEVEMENT SCHEMES

The Thermal Soaring and Slope Soaring Personal Achievement Schemes are aimed at giving flyers the satisfaction of achieving set levels of proficiency beyond the 'A' and 'B' Certificates and at their own flying fields without having to take part in contests.

They are administered by BARCS in conjunction with BMFA.

The schemes are voluntary, are open to all model flyers and there will be no charge to either BMFA or BARCS members or non-members wishing to register their claims

THERMAL SOARING GLIDER

Once having passed the Silent Flight Thermal 'A' and 'B' Certificate, three further achievement levels are available and the flyer is required to attain these in sequence, from the lowest level to the highest. As of 1st January, 2002, you cannot enter for these achievement levels unless you have passed the appropriate BMFA 'B' Certificate. On passing the 'B' Certificate you will receive details of the next stage in the scheme.

Log books for the scheme are available free of charge from the Leicester office and from BARCS. And no charge is made for each claim registered.

To participate you simply have to attain the required tasks, obtain a confirming signature and send the appropriate part of the claim form together with an SAE to BARCS Achievement Co-ordinator or to the BMFA's Leicester office. Each level must be notified before the next is attempted.

General Rules

Towline length not to exceed 150 metres.

High-start 150 metres max. unstretched.

Aerotow release at approximately 150 Metres.

Flights should be made on reasonably level terrain to exclude the possibility of slope lift.

Before each launch, the pre-flight checks required by the BMFA Safety Codes should be carried out.

Precision landings must terminate with the nose of the model with 12.5 metres of a nominated target.

Each task within a level may be attempted on different days over any period of time.

Achievement Levels

Thermal Gold

One flight of 15 mins. duration, plus

One flight of 20 mins. duration, plus

One flight of 25 mins. duration, plus

Precision landings on all flights

Thermal Diamond

One flight of 45 mins. duration, plus

Five consecutive flights of 10 minutes duration in a 150 minute period

One flight of one lap over an equiangular course of 300 metres, the pilot to visit two corner points of the course, plus

Precision landings on all flights

Thermal Diamond Star

One flight of at least 60 minutes duration, plus

Five consecutive flights of 15 min duration within a 180 min period, plus

One flight of four laps over an equiangular course of 300 metres, pilot to visit two corner points of the course, plus

One goal and return flight over a 1.5km course i.e. distance covered 3km (approx. 2 miles), plus

Precision landings on all flights

SLOPE SOARING GLIDER

Once having passed the Silent Flight Slope 'A' and 'B' Certificate, Three further achievement levels are available and the flyer is required to attain these in sequence, from the lowest level to the highest. As of 1st January, 2002, you cannot enter for these achievement levels unless you have passed the appropriate BMFA 'B' Certificate. On passing the 'B' Certificate you will receive details of the next stage in the scheme.

Log books for the scheme are available free of charge from the Leicester office and from BARCS.

To participate you simply have to attain the required tasks, obtain a confirming signature and send the appropriate part of the claim form together with an SAE to the BARCS Achievement Co-ordinator or the BMFA's Leicester office. Each level must be notified before the next is attempted.

The purpose of this personal achievement scheme is to provide a varied series of tests at different levels of complexity to satisfy graded levels of slope soaring ability beyond the Silent Flight Slope 'B' certificate. Most of the tasks are to be conducted by BMFA Silent Flight Examiners although certain of the flights, as detailed on the scheme leaflet you will receive, may be witnessed by an appropriate BMFA or BARCS member.

Each task within a level may be attempted on different days over any period of time.

Achievement Levels

Slope Gold

Carry out pre-flight checks as required by BMFA Safety code on every flight

A Slope Soaring flight of 20 min maximum duration to include the following manoeuvres

3 consecutive axial rolls across wind

One double Immelman

3 consecutive outside loops

A vertical eight

A Cuban eight

Landing pattern – rectangular

3 spot landings , from a maximum of 10 consecutive attempts, within 15 metres of a pre-determined spot., measured from the model's nose

1 spot landing , from a maximum of 3 consecutive attempts, on the slope side within the slope lift area, within 20 metres of a pre-determined spot., measured from the model's nose

A flight of 1600 m , within 2 minutes, over a closed circuit course - turn points to be 80m apart

A slope duration flight of 45 minutes minimum duration

Slope Diamond

Carry out pre-flight checks as required by BMFA Safety code on every flight.

A Slope Soaring flight of 30 min maximum duration to include the following manoeuvres

Slow axial roll across wind to left immediately followed by slow axial roll to right.

3 consecutive axial rolls across wind

Four turn spin.

Four point axial roll across wind

Figure M.

Horizontal 8.

Vertical 8.

3 minutes inverted flight.

4 consecutive inside loops across wind.

4 consecutive outside loops across wind.

One double Immelman.

Landing pattern – rectangular

3 spot landings, from a maximum of 6 consecutive attempts, within 8 metres of a pre-determined spot., measured from the model's nose.

1 spot landing , from a maximum of 2 consecutive attempts, on the slope side within the slope lift area, within 15 metres of a pre-determined spot., measured from the model's nose

A flight of 1600 m within 90 secs, over a closed circuit course - turn points to be 80m apart

A slope duration flight of 60 minutes minimum duration

Slope Diamond Star

Carry out pre-flight checks as required by BMFA Safety code on every flight.

A Slope Soaring flight of 45 min maximum duration to include the following manoeuvres

One slow axial roll across wind to left in not less than 5 secs.

One slow axial roll across wind to right in not less than 5 secs.

One 4 point axial roll across wind in not less than 5 secs

4 consecutive axial rolls across wind

Six turn spin.

Figure M.

Horizontal 8.

Vertical 8.

One double Immelman.

6 consecutive inside loops across wind.

6 consecutive outside loops across wind.

3 minutes minimum duration inverted flight including one left hand and one right hand 3600 horizontal circle of minimum 50m diameter

Landing pattern – rectangular

3 spot landings , from a maximum of 5 consecutive attempts, within 5 metres of a pre-determined spot., measured from the model's nose

1 spot landing , from a maximum of 1 attempt, on the slope side within the slope lift area, within 10 metres of a pre-determined spot., measured from the model's nose

A slope duration flight of 90 minutes minimum duration

A goal and return flight of 2.5 km to goal, nominated before launch, total distance flown 5 km – landing to be within 25m of launch point.

THE RADIO CONTROL INSTRUCTOR SCHEME

The R/C instructor scheme is an important step towards safer flying in several ways:

(a) Clubs participating in the scheme will be able to offer new pilots an approved flying training course leading to `A' certificate qualification.

(b) The BMFA Approved Instructors and the BMFA Registered Club Instructors in the club will, of necessity, have to maintain a high standard of personal flying in order to retain the respect due to their status.

(c) By training new R/C pilots in a safe and professional manner right from the start of their flying.

It is to the advantage of every club to participate fully in the instructor scheme and to enable the scheme to be easily available to all who need it.

Up And Away Manuals

BMFA supplies a copy of the either the Fixed Wing or Electric Up-and-Away manual to all new members free on request. A voucher is supplied with the first membership card which simply has to be filled in and returned to the Leicester office.

The Four-Tier Scheme

The BMFA R/C Instructor Scheme is made up of four types of instructor,

(1) The BMFA Registered Club Instructor

(2) The BMFA Approved Instructor

(3) The BMFA Qualified Instructor

(4) Area Chief Instructors

BMFA Registered Club Instructors

The Registered Club Instructor (RI) is simply put forward by his club for registration with the BMFA. There is no limit on the number of instructors a club may put forward and a registration form is sent to all clubs each year.

In return the instructor will receive a 'BMFA Registered Club Instructor' sticker and the registration will be entered on his membership record at the Leicester office.

Registered Club Instructors are not tested by a Chief Instructor and will only operate within the club that puts them forward. The intention of the scheme is to give recognition to the many hundreds of dedicated club flyers who give freely of their time to instruct newcomers to model flying but who do not wish to take the step of becoming BMFA Approved Instructors.

BMFA Approved Instructors

The BMFA Approved Instructor (AI) is the second stage in the Instructor Scheme.

He must be a current member of the BMFA and initially be put forward by a club to be tested by an Area Chief Instructor, in much the same way that a Club Examiner is tested by an Area Chief Examiner.

He must also have held a relevant 'A' certificate for a period of six months.

He is free to move between clubs or to operate as country members and is expected to take the lead in maintaining the standard of instruction at club and individual level.

BMFA Qualified Instructors

Ratification as a Qualified Instructor (QI) is automatic and there is no test to take but you must comply with two conditions:

(1) You must hold an Approved Instructor rating and have held it for a minimum of one year,

And

(2) You must hold the relevant 'B' certificate and have held it for at least six months.

You will get the new rating automatically if you already meet or if you attain these criteria.

Note that the QI rating depends on your retaining both the AI rating and the 'B' Certificate. If either of these is lost, in the AI case for instance, by not renewing your membership or by not being re-ratified by a club as and when required, the QI ratification will also be lost.

Area Chief Instructors

The Scheme will be run at Area level by Chief Instructors (ACI) who are persons nominated by Area Committees and ratified by Areas Council as Area Chief Instructors.

An Area may request that the Scheme Controller appoints a Chief Instructor for a probationary period of up to six months prior to their ratification. During this period the nomination must be submitted to Areas Council as the probationary period may not be extended.

A sufficient number of Chief Instructors should be nominated by each Area to ensure good geographic coverage for their clubs.

Area Chief Instructor appointments are for a period of one year only. After this time the qualification may be renewed by the Scheme Controller at the request of the appropriate Area Committee

Area Chief Instructors must be senior members of the BMFA and will have held a 'B' Certificate and been an Approved Instructor for at least twelve months. Their principal duty is to test applicants for the post of Approved Instructor and to promote and maintain the standards of the BMFA Instructor scheme by example and by visiting clubs that require their services.

Selection of Instructors

The first step for a club wishing to participate in the BMFA Registered Club Instructor scheme is to recognise which of its members are already acting as instructors and who are willing to take part in the scheme.

The club then simply submits those persons' details to BMFA on the form provided to the club at the start of each membership year. If you don't have the form then a copy can be obtained from the BMFA's Leicester office.

If a club wishes to put forward members to become BMFA Approved Instructors, they should first select from its members those pilots who are both willing to act as Approved Instructors and who are sufficiently skilled in R/C flying.

A typical nominee will have considerable background of R/C model flying, be able to communicate flying skills, have a sound knowledge of simple aerodynamics and be highly safety conscious. He must be willing to accept the Training Manual as the syllabus he will use to train new pilots and to follow its guidelines.

To request the appointment of an Approved Instructor the candidate's club must apply to its BMFA Area Achievement Scheme Co-ordinator (Area ASC) in writing, asking that the candidate be tested.

If the club is not certain who their local Area ASC is then they should contact the BMFA Leicester office for contact details. Requests for Approved Instructor tests actually sent elsewhere, such as to an Area Chief Instructor or to the BMFA office, will be forwarded to the appropriate Area ASC but this may introduce a delay.

On receipt of the written request, the Area ASC will arrange for an Area Chief Instructor to contact the candidate and make arrangements for the test to take place.

Limits of Approved Instructor Qualification

Approved Instructors must be current members of BMFA. Lapsed members will have their Approved Instructor status removed after one year.

From time to time, Areas Council may request that a re-ratification of Approved Instructors be carried out. This will apply only to those Approved Instructors not being regularly re-ratified by their clubs.

Area Chief Instructors' Area of Operation

Area Chief Instructors operate within the Area for which they are ratified. If an Area Chief Instructor is

(a) requested to operate in another Area for any reason or

(b) asked to test Approved Instructor candidates from a club in another Area,

he must liaise with that Area's Achievement Scheme Co-ordinator before taking any further action.

Withdrawal Of Approved Instructor Qualification

It may be felt at some point, for a variety of reasons, that Approved Instructor status should be removed from an individual. This may be done by Areas Council on the recommendation of the Area Committee concerned (either on the request of a Club or on their own behalf). The affected Approved Instructor has the right of appeal to Areas Council, via the BMFA Hon. Secretary.

Once the Approved Instructor qualification has been withdrawn by Areas Council, the Instructor concerned will not be permitted to re-take the test for a period of 6 months from the date of withdrawal.

Approved Instructor Re-Tests

Where a Club or Area has concerns about the standards of flying or behaviour of any Approved Instructor but do not wish to take the matter to Areas Council, a re-test procedure is in place as follows:

(1) Any Club or Area may apply to their local Achievement Scheme Co-ordinator (ASC) to have any Approved Instructor re-tested. Requests from a Club must be on Club headed notepaper and must be signed by at least two current Club Committee members. Requests from an Area must be on Area headed Notepaper and signed by at least two current Officers of the Area.

(2) The ASC will pass on any such requests to the appropriate National Scheme Controller who will arrange for an Area Chief Instructor (ACI) from an adjoining Area to conduct the re-test by arrangement with the candidate.

(3) Any costs involved with travelling will be borne by the organisation that requests the re-test.

(4) If the candidate fails the re-test, the ACI will be authorised to revoke the candidate's qualification. This action will be ratified by the Scheme Controller after receiving the report of the ACI.

(5) If the candidate for the re-test does not co-operate with the designated ACI then he will be deemed to have failed the re-test.

(6) If a candidate fails a re-test he will not be allowed to re-take the test for six months from the date of the failed re-test.

AN INTRODUCTION TO THE DEPARTMENT OF THE ENVIRONMENT NOISE CODE

In addition to the occasional scrutiny of model flying by Magistrates referred to in the section 'Legal Controls over Model Flying', Planning Authorities are constantly making decisions on whether to allow change of use for model flying sites or whether to issue clubs with a licence to fly on Local Authority land.

When they are taking these decisions they have a statutory duty to ensure that the activities on the site are not a potential nuisance to the surrounding area. When considering possible noise nuisance, the document to which they will most likely refer is the DoE Code of Practice.

If a noise complaint is made against your flying site, the Local Authority will probably send an Environmental Health Officer (EHO) to investigate. He will arrive armed with his noise meter and a copy of the DoE Code of Practice.

The reason the DoE Code of Practice is set out in full in this handbook should now be clear;

If the noise your models make is going to be judged by anyone, then the Code of Practice is most likely to be the standard that it will be judged against.

For this reason alone, you should take careful note of the conditions laid out in this document; you never know when it may be applied to you.

Finally, the model flying knowledge of the EHO who may turn up will vary from nil to extremely good and, strange as this may seem, the same may apply to his knowledge of the Noise Code. Read and absorb the Code and it's likely that you will know as much (or more) about it as he does, which would certainly be to your advantage.

DEPARTMENT OF ENVIRONMENT CODE OF PRACTICE FOR THE MINIMISATION OF NOISE FROM MODEL AIRCRAFT

1. INTRODUCTION

1.1 The sport of flying model aircraft provides enjoyment for many. It can also create noise, some of it unavoidable, which is no part of that enjoyment and may annoy or disturb others. The purpose of this Code of Practice is to describe how such annoyance or disturbance may be minimised so that the sport may be pursued in a reasonable and considerate manner and coexist peacefully with other pursuits.

1.2 The Code of Practice does not in itself create offences or have the force of law, but it is intended to be of assistance to local authorities and magistrates courts in the exercise of their powers and functions under the provisions described in the following paragraph, and in reaching informal agreement with model flying clubs on methods of noise control. The Code of Practice cannot however override any restrictions or requirements imposed under those provisions.

METHOD OF USE OF THIS CODE OF PRACTICE

3.1 This Code of Practice contains guidelines which, if followed, should ensure that undue disturbance is avoided in most circumstances. Its terms are not

intended as hard-and-fast rules to be applied to every site; local circumstances differ, and more stringent or less stringent controls may be appropriate in individual cases or on the same site over the years.

(a) Where a site has been used for some years without causing complaint, there will normally be no need to require the pattern of use to be modified, unless external circumstances or the character of use alters significantly and disturbance is caused as a result.

(b) Where complaints have been received about existing sites, the Code is intended to guide local authorities, model flyers and others on the ways in which intensity and manner of use may be adapted to allow the use to continue, if possible, without causing further disturbance.

(c) Where the use of a new site is contemplated, the Code may be used to determine, before use starts, what constraints may be necessary to avoid a nuisance.

In both this case and that of an existing site which has caused complaints, it is recommended that the model flyers, the local authority and the near neighbours of the site should discuss, in the light of this Code, any limits which might be necessary to prevent undue disturbance being caused by noise. Since clubs can often exert very effective control over the type and manner of operation of model aircraft on a site, it is recommended that, wherever possible, those wishing to operate model aircraft should join or form a club to arrange their activities responsibly. Such clubs should then be given every encouragement to concentrate their activities on the most suitable sites.

DEFINITIONS

4.1 In this Code the following definitions apply:

(a) 'The Act'

The Environmental Protection Act 1990 S.79 (1) (g) in respect of Scotland, England and Wales. The Pollution Control and Local Government (Northern Ireland) Order 1978 in respect of Northern Ireland. Words and expressions which are defined in the Act have the same meaning in this Code unless otherwise defined in a particular context.

(b) 'Model Aircraft'

There are many types of model aircraft, and several of these are either silent or powered by rubber or electric motors, noise from which is insignificant. This Code is not concerned with them and in it the expression 'model aircraft' means only a flying machine which, owing to its size, is not capable of carrying a human being and which, being powered by an internal combustion engine, can give rise to a significant noise.

(c) 'Noise measurement' and 'dB(A)'

These refer to sound measured by means of equipment complying with BS 5969:1981 Type 1 ('Specification for sound-level meters'), using the A-weighting response, and with the noise meter set to 'slow' response. Details of the appropriate method of measurement are given later.

(d) 'Noise-sensitive premises'

Any premises, including surrounding gardens etc. used as a dwelling, hospital, or similar institution, school (in school hours in term time or at other times when in use), or place of worship (during recognised times and days of worship) or used for any other purposes likely to be affected by an increase in sound level.

(e) 'Flying site'

Any premises used for flying of model aircraft.

(f) 'Point of launch'

The position of the operator, in the case of controlled models, or the point at which the model is released for flight in the case of free-flight models.

(g) 'Free-flight model'

A model whose flight path is predetermined but which is not under the direct control of any person during its flight.

(h) 'Controlled model'

A model whose flight path is under the direct control of the operator at all times.

(j) 'Muffler'

A device which when fitted to a model aircraft engine has the effect of significantly reducing the noise emitted.

GENERAL

5.1 It is not the concern of the Code to go into detail of the various types of powered model aircraft. They may however be divided broadly into 2 types:

(a) 'Limited engine-run', where the engine runs for a short time (seldom more than 10 seconds) to raise the model into the air, the rest of the flight being silent as the model glides down. These models are normally of the free-flight type.

(b) 'Continuous engine-run', where the engine may run for the duration of the flight and the model is controlled. The method of control may be by flying the model on lines (control-line aircraft) in which case quite small premises such as small recreation grounds and playing fields will allow adequate space.

Alternatively, the control may be by radio and those models (radio-controlled aircraft) range over a greater area and are commonly flown from larger recreation grounds, parks and similar public spaces as well as airfields and private premises. They can, however, be operated from quite small areas.

5.2 Model aircraft with continuous engine runs are in general more likely to give rise to a disturbance than types with limited engine run because the engine runs for longer periods.

OPERATING GUIDELINES FOR REDUCING NOISE EMISSION

6.1 The most effective and fundamental way of avoiding disturbance is to cut down the noise at source. Like other internal combustion engines, those in model aircraft create a certain amount of unavoidable noise. It is possible, however, to reduce unnecessary noise by use of a muffler. The engines used are all basically the same and may normally be fitted with a muffler without undue reduction of operating power.

6.2 It is recommended that

(a) Model aircraft should be fitted with a muffler wherever this is practicable, except in the case of competitive flying as described in c.(i) and c.(ii) below.

(b) Except for competitive flying as described in c.(i) and c.(ii) below, no model should be operated

which gives a noise measurement at 7 metres of more than 82 dB(A).

(c) The exceptions referred to in sub-paragraphs (a) and (b) are cases where either:

(I) The operator is taking part in national or international competitions; or

(ii) the operator holds a current competition licence or permit issued by the British Model Flying Association (BMFA), the Scottish Aeromodellers Association (SAA) or any other UK body recognised by the Federation Aeronautique Internationale, and is practising for competitive purposes at times and on sites approved by the BMFA or the SAA where distance, natural or other barriers or a high ambient noise level make noise nuisance highly unlikely.

6.3 Where substantial disturbance is caused by operating unmuffled model aircraft at any site, unmuffled flying should not be permitted to continue. Provided that intolerable disturbance would not be caused, muffled flying could be allowed to continue from the site at least for an experimental period to see whether it could continue, having regard to the nature of its surroundings, without causing a nuisance.

REDUCING RECEPTION OF NOISE AROUND SENSITIVE PREMISES

7.1 Because of the technical limitations on controlling noise emitted from individual model aircraft, additional precautions may be necessary to limit the model-flying noise heard by neighbours.

The following factors are relevant:

(a) separation distance

(b) times of operation

(c) numbers of model aircraft in operation simultaneously

(d) barriers between flying site and noise-sensitive premises

It is recommended that the combination of these factors appropriate to a site should be agreed between the local authority and those representing the model flyers. Not all sites will need requirements or restrictions under all these heads. Wherever possible, local practical tests should be made by the local authority and the model flyers in order to determine reasonable limits for the overall noise from a site, these then being translated into limits on emission from each model, the number of models flown at one time, and the minimum distance from noise-sensitive premises.

7.2 If circumstances change, it may be appropriate to review and amend the terms of the agreement, for example where the emission levels of models decrease markedly, or where a new or different club assumes responsibility for model flying from a site.

Separation distance

7.3 Even when muffled, a model aircraft may still sound noisy, and should not be flown too close to

noise-sensitive premises. The minimum distance from such premises at which a model aircraft should be flown depends on the exact nature of the premises and the surroundings.

(a) Where no direct supervision (e.g. by clubs) of flying is possible, it is recommended that the following should apply:

(I) the point of launch of control-line and model aircraft with limited engine run should not normally be closer to any noise-sensitive premises than 300 metres;

(ii) the point of launch of radio controlled models with continuous engine run (which range over a greater area) should not normally be nearer to any noise-sensitive premises than 500 metres;

(iii) models should not be flown closer to any noise-sensitive premises than 200 metres.

(b) Where more detailed supervision and control may be exerted (e.g. by clubs) and other factors (e.g. noise emission levels) can be varied to compensate if necessary, separation distances may be more flexible and be related to the time of day and type of surroundings. However, model aircraft should only very exceptionally be allowed to fly closer to any noise-sensitive premises than 200 metres.

Times of Operation

7.4 The hours of flying have an important bearing on the likelihood of disturbance; the type of model is less important since it is the existence of the noise rather than its intensity, or degree of continuity, which causes disturbance, if the hours of operation are unreasonable. Generally the points of launch and closest approach of model aircraft should not be as near to noise-sensitive premises as suggested in 7.3 at the times of day and days in the week when people consider that they have a particular right to peace and quiet in and around their homes; special problems may arise at weekends when noise from model flying may conflict with other quieter pastimes.

7.5 The times of day and days of the week when any model flying noise is unacceptable will differ between areas and are a matter for local determination. In general however it is recommended that where detailed control of numbers and separation distances is not possible, or is inadequate to avoid substantial disturbance at the more sensitive times, flying should not be allowed outside the hours of 9 am 7 p.m. on weekdays and 10 am to 7 p.m. on Sundays and Bank Holidays. Longer hours may be possible in the evening if control can be exercised, e.g. by a club or site owner, and disturbance would not be caused.

7.6 If more than one site is available within reasonable distance, annoyance suffered by any individual may be minimised by alternating use between the sites; e.g. using one on Saturday and the other on Sunday. It should be borne in mind that some sites may be available to model flyers only at times when other users having higher priority do not require the land (e.g. industrial premises or airfield) and this may in itself curtail the available time for flying. To be reasonably fair, limits on flying time may in such cases need to be more flexible, if this is possible without causing disturbance.

Numbers of model aircraft in operation simultaneously

7.7 Two model aircraft each emitting the same level of noise may, if flown together, produce an overall noise level up to 3 dB(A) above that of the individual aircraft. The disturbance caused may be greater than is apparent from this simple change, owing to increased variations in sound level. If a particular type of model cannot reasonably avoid being near the limit recommended in 6.2.(b), it should be operated by itself unless the site is well protected, or remote, or its surroundings are insensitive to noise. Where the site is not so situated, more than one noisy model should be flown only if the distance from noise-sensitive premises can be increased.

Barriers between flying site and noise-sensitive premises

7.8 Topographical features such as hills can afford protection against sound, as can large buildings. Where it is possible, and on balance likely to lessen disturbance, flying sites should be chosen to take advantage of these, and less stringent minimum distances may then be practicable without risking undue disturbance. It should be noted however that belts of trees, unless dense and wide, have little attenuating effect on noise.

MODEL AIRCRAFT NOISE IN OTHER NOISE-SENSITIVE AREAS

8.1 People may be disturbed by noise from model aircraft in the countryside as well as indoors or in their own gardens, and the peace and quiet of rural areas should be respected. In addition there may be some urban open spaces, such as ornamental parks or children's play areas, where model flying would be inappropriate and should not take place at all. Nature and wildlife reserves, country parks or other countryside areas where people go to relax in quiet and peaceful surroundings, should also be avoided by model flyers.

Preferably, model flying in country areas should be confined to specified locations where suitable provisions have been or can be made with the agreement of local farmers or landowners, and where the risk of disturbance is relatively slight. Noisy pursuits will usually be out of place in National Parks. Model flyers should therefore seek the agreement of the National Park Authority before operating from any site in a National Park, however remote it may be.

8.2 Most animals, whether wild or domesticated, are probably not unduly worried by model aircraft noise; it can however be distressing to some at sensitive times, for example to mares when in foal, sheep at lambing time or birds in the nesting season. It is recommended that model flying clubs or representatives should discuss with the owners of surrounding land, or local wildlife preservation bodies, any times and places where animals are likely to be unusually sensitive and would benefit from a temporary suspension or reduction of model flying activity.

MAJOR MODEL FLYING EVENTS

9.1 From time to time major model flying events are held, which are of interest to large numbers of participants and spectators. It is likely that such an event will mean a temporary intensification of use of a site. In considering the desirable scale and frequency of such events at any site the organisers and the local authority will be able to use the provisions of paragraphs 6 to 8 of this Code of Practice as a guide, but it should be borne in mind that higher levels of noise resulting from occasional short intensification of use, may be more acceptable than the same levels of noise would be if they arose regularly and frequently. If the site is well chosen, serious disturbance need not be caused.

9.2 The organisers should ensure that unnecessary noise is kept to the minimum where disturbance is possible, and should limit ground running of engines, which can add appreciably to the overall noise level.

9.3 The organisers of any projected major model flying event should notify the local authority in advance of their intention to hold the event; they should also be expected to publicise it locally well in advance, giving a clear estimate of the date, time and expected duration of the event.

METHOD OF MEASUREMENT OF NOISE EMITTED BY A MODEL AIRCRAFT

The model, working at maximum rpm, should be held between 1 and 2 metres off the ground in a bracket or by one person standing upwind of the model. The microphone of the noise meter should, where necessary, be fitted with a windshield. It should be positioned downwind of the model, 7 metres away from it (measured horizontally), and 1.2 metres vertically from the ground. The wind speed should not be over 3 metres per second (force 2).

Measurements should be taken in the open air and away from reflecting surfaces such as buildings. The noise level emitted, for the purposes of this Code, shall be the maximum value of four readings:

(I) model pointing directly at the meter,

(ii) model pointing directly away from the meter,

(iii) model pointing 90^{o} to left of meter,

(iv) model pointing 90^{o} to right of meter.

The noise meter shall be in accordance with BS5969:1980 ('Specification of sound-level meters'), using the A-weighing response, and with the meter set to 'slow' response. The meter should be calibrated prior to use.

Note: Some local authorities may be willing to assist model flying clubs with noise measurements in order to establish the noise levels of aircraft being flown by club members.

BMFA ADVICE ON THE NOISE TEST

The noise testing procedure noted in the DoE noise code above should be followed carefully but to get the best results it is strongly recommended that you should take special note of the following.

Make sure that no noise reflecting surfaces are near the test site. This means not just buildings but cars, concrete, models, model boxes and even hard packed earth. Do the test over grass.

Do not take measurements when there is any appreciable background noise. Traffic on a nearby road, other models flying or being readied for flight and even people talking near the meter can affect the readings.

Wind blowing across the microphone has a big effect on readings. Do not test on breezy days and when you do test, use a microphone wind shield.

Make sure that the actual microphone is over the end of the seven metre tape, not your hand or the centre of the meter.

Think carefully about the four test positions of the model at the other end of the tape. As a suggestion, for the sideways-on readings put the fuselage on the seven metre mark, for the nose-on reading put the propeller over the mark and for the tail-on reading line the trailing edge of the wing up with it.

HELICOPTER NOISE TESTING

Because of the specific problems associated with performing noise tests on helicopters, it is recommended that a revised procedure be adopted.

Three markers should be laid out in a line on the flying area, one central, one seven metres to one side (crosswind) and one seven metres to the other side (crosswind). The helicopter which is being checked is held in a steady hover above the centre marker with the pilot standing downwind of it, as normal.

Noise readings are then taken with the meter positioned over each of the end markers in turn. For safety, when the meter is being carried from one end marker to the other, the checker must walk around behind the pilot flying the model.

The two readings obtained take the place of the four obtained in the fixed wing test and all other criteria are as noted in that test procedure.

Note - This method of testing is offered by the BMFA as a safe way of obtaining meaningful figures for helicopter noise levels on club sites by club flyers. It is not officially part of the DoE Noise Code.

GAS TURBINES

The advent of model gas turbines has presented an interesting problem in terms of noise levels and how they fit into the DoE Noise Code.

Although the gas turbine is, in scientific terms, an internal combustion engine, it is the BMFA's contention that the DoE Noise Code should not apply to it. The reason for this is that the noise code was written to cover the types of model i/c engines that were known at the time, i.e. piston engines, and the concept of model gas turbines was not even considered.

The fact is that model gas turbines are very quiet indeed in the air when heard from any reasonable distance, far quieter than most piston engines, and on that evidence you would expect them to be able to pass 82 (d)BA at 7 metres.

However, most of the noise they emit is very high frequency and the higher the frequency of any noise, the better it dissipates with distance. Consequently the problem is that a very quiet gas turbine in the air will not pass the DoE i/c engine noise code on the ground because the test is done at 7 metres and the high frequency noise it emits has not yet had a chance to dissipate.

BMFA is in contact with the Jet Modellers Association and the Gas Turbine Builders Group and it is expected that a modified version of the DoE noise test will eventually be put forward for gas turbines. This will probably take the form of a ground noise test at some distance greater than 7 metres with a corresponding reduction in the expected (d)BA levels.

This has not been discussed in detail yet, however, and some experimental work needs to be done before any firm recommendations can be made.

At this time therefore, BMFA advice on this matter is that the DoE noise code should not be applied to model gas turbines.

RADIO CONTROL TECHNICAL INFORMATION

The BMFA is an active member of the UK Radio Control Council (UKRCC) which used to be called the Joint Radio Control Users Committee (JRCUC). This is the body recognised by the Government Agency Ofcom as representing all modelling use of radio frequencies in the UK.

For more information check out the UKRCC website at www.ukrcc.org

Official Frequency Allocations

These and other information concerning modelling use of radio frequencies can be found in the Ofcom document OfW 311. You can view the latest copy on www.ofcom.org.uk (use the search box).

All our legal use of specific modelling frequencies stems from this document and if you have an interest in radio control then you should download a copy for yourself.

1. The 27 MHz Band

(a) Identification is by coloured ribbon attached to transmitter aerial in the colours as listed and/or a white flag with channel number in black.

(b) The channel spacing on this band is 10 kHz and all modern sets, with the CE mark, should meet this specification. However, many older specification sets are still in use and these have a minimum channel spacing of 20 kHz. This situation will remain for a number of years so if you are operating narrow band 27 MHz then be aware of the danger.

(c) It is recommended that, with new equipment capable of operating on a 10kHz channel spacing, a white flag with black channel numeral be used to identify the channel you are using. If this coincides with one of the old colour frequencies then you should show that colour ribbon too.

(d) It is likely that crystals to meet the new intermediate frequencies may not be freely available but synthesised frequency sets may become available in the medium term.

(e) You must not use an old 20 kHz split crystal in a new set. Even if you wish to transmit on the same frequency, a new narrow band crystal will be required in a narrow band set.

(f) As a shared band, many of the 27 MHz frequencies are used by others but 26.995, 27.045, 27.095, 27.145 and 27.195 MHz are not shared and would seem to offer the best chance of interference free model flying operations but only on sites remote from other modelling applications (cars, boats etc.). These equate to the old 'solid' colours of brown, red, orange yellow and green.

CHANNEL	FREQUENCY	OLD COLOUR
1	26.965	
2	26.975	Black
3	26.985	
4	26.995	Brown
5	27.005	
6	27.015	
7	27.025	Brown/Red
8	27.035	
9	27.045	Red
10	27.055	
11	27.065	
12	27.075	Red/Orange
13	27.085	
14	27.095	Orange
15	27.105	
16	27.115	
17	27.125	Orange/Yellow
18	27.135	
19	27.145	Yellow
20	27.155	
21	27.165	
22	27.175	Yellow/Green
23	27.185	
24	27.195	Green
25	27.205	
26	27.215	
27	27.225	Green/Blue
28	27.235	
29	27.245	Blue
30	27.255	Blue
31	27.265	
32	27.275	White or Purple

2. The 35 MHz Band

(a) Identification is by orange flag with black or white channel numerals.

34.950	channel 55	35.130	channel 73
34.960	channel 56	35.140	channel 74
34.970	channel 57	35.150	channel 75
34.980	channel 58	35.160	channel 76

34.990	channel 59	35.170	channel 77
35.000	channel 60	35.180	channel 78
35.010	channel 61	35.190	channel 79
35.020	channel 62	35.200	channel 80
35.030	channel 63	35.210	channel 81
35.040	channel 64	35.220	channel 82
35.050	channel 65	35.230	channel 83
35.060	channel 66	35.240	channel 84
35.070	channel 67	35.250	channel 85
35.080	channel 68	35.260	channel 86
35.090	channel 69	35.270	channel 87
35.100	channel 70	35.280	channel 88
35.110	channel 71	35.290	channel 89
35.120	channel 72	35.300	channel 90

To Identify the Channel Number of an Untagged Crystal,

(1) If the crystal is marked 34.xxx you subtract 40 from the first two numbers after the decimal point of the frequency marking, (i.e. 34.960, subtract 40 from 96 giving channel 56)

(2) If the crystal is marked 35.xxx you add 60 to the first two numbers after the decimal point of the frequency marking, (i.e. 35.260, add 60 to 26 giving channel 86).

3. The 40 MHz Band.

This is for surface vehicles only and band identification is usually by green flag with white channel numeral. The band will use the last three numerals of the actual transmitted frequency as the channel identification, for instance,

40.665 MHz will be channel 665

40.825 MHz will be channel 825

4. The 459 MHz UHF Band

Identification will be by channel numeral.

458.525	channel 1	459.025	channel 21
458.550	channel 2	459.050	channel 22
458.575	channel 3	459.075	channel 23
458.600	channel 4	459.100	channel 24
458.625	channel 5	459.125	channel 25
458.650	channel 6	459.150	channel 26
458.675	channel 7	459.175	channel 27
458.700	channel 8	459.200	channel 28
458.725	channel 9	459.225	channel 29
458.750	channel 10	459.250	channel 30
458.775	channel 11	459.275	channel 31
458.800	channel 12	459.300	channel 32
458.825	channel 13	459.325	channel 33
458.850	channel 14	459.350	channel 34
458.875	channel 15	459.375	channel 35
458.900	channel 16	459.400	channel 36
458.925	channel 17	459.425	channel 37
458.950	channel 18	459.450	channel 38
458.975	channel 19	459.475	channel 39
459.000	channel 20		

Note - Many of these channels are shared with various telemetry users.

5. The 2.4 GHz Band.

This is a worldwide Industrial/Scientific/Medical (ISM) band, similar in scope to the 27 MHz band.

There are two currently available types of equipment. One uses spread spectrum technology and does not operate on a fixed frequency. There are 80 channels available and each set uses two channels during operation. They automatically set themselves to a pair of unused frequencies when switched on. Operation is constantly self monitored and the set will move to an unused frequency if any interference is detected.

The other technology in use is frequency hopping which operates in a similar manner to mobile 'phones.

All should be self regulating when it comes to selecting frequencies to use and the two different operating systems will co-exist with each other. Consequently, no direct frequency control is required for the band.

Frequency Bands Overview

The **27 MHz** band is legally shared by other users, in particular, model cars, model boats, citizens band operators and an increasing number of radio controlled toys. It may still be used for model aircraft but great care should be taken by model flyers, especially near urban areas.

Many clubs in this situation have found the need to ban this frequency band from their flying fields on the grounds of safety.

When you fly a model aircraft you are personally responsible for the safety of the flight and you should think carefully before using 27 MHz

equipment because of the many sources of potential interference in the UK.

The **35 MHz** band is SOLELY for model aircraft and under no circumstances must it be used for any other purpose, such as the control of surface vehicles.

The **40 MHz** band is SOLELY for surface vehicle use and under no circumstances must it be used for the control of model aircraft.

The **459 MHz** is shared with various telemetry operations which are used for specialised telemetry and users of these channels should be aware of the possibility of interference being present. The use of frequencies above 459.100 MHz (channel 24) is recommended.

The **2.4 GHz** band is useable for most regular R/C applications. The band is used by many computer applications such as wireless networking and Bluetooth devices but the method of operation of the R/C equipment in this band means that the possibility of interference from such devices is extremely low.

In addition to these frequency bands specifically allowed for model control in OfW 311, you may see some equipment in the **49 MHz** band in use. This is quite legal and is widely used by the toy industry for R/C use, including small indoor model aircraft. It is a low power band with a transmitter output of 10 mw maximum, one tenth of our 35 MHz transmitters.

72 MHz Equipment

Contrary to some people's belief, **72 MHz IS NOT A LEGAL FREQUENCY FOR MODEL CONTROL IN THE UK.** A manufacturer's development license is available (under very strict conditions) to bona-fide designers/manufacturers from the DTI. Anyone using 72 MHz without such a current special licence is operating illegally and may face a fine and confiscation of the equipment. This licence is for genuine development work only and does NOT give the operator the right to use the frequency for normal R/C flying.

72 MHz is very widely used in the UK for communications purposes.

R/C Equipment Type Approval

In October 1998, harmonised standards for low power radio control equipment were introduced into European Union Countries. From that date all new equipment either manufactured or imported into the UK has to comply with the requirements for the issue of a CE marking. As the legislation is not retrospective, all 35 MHz equipment which has previously been tested against the old SMAE/MHTF Type Approval standards remains legal to use.

The European standards which apply to all newly introduced R/C equipment are ETSI 300 - 200 (Type Approved testing for short range devices) and ETSI 300 - 683 (EMC testing).

It is therefore essential that any 35 MHz equipment you use carries either an SMAE/MHTF Type Approval sticker or an official CE marking. Equipment bearing either of these markings indicates that the manufacturer or importer of the equipment has submitted a sample for independent testing and that the equipment conforms to the test specification applicable at the time the tests were conducted.

The SMAE/MHTF sticker or CE marking is your only assurance that the equipment you own, or are intending to purchase, complies with the standards laid down by the Government. If your 35 MHz equipment carries neither marking, contact either the shop where it was purchased, the manufacturer or the importer for details on your particular equipment. When purchasing your next R/C equipment, make a special point of looking for the SMAE/MHTF sticker or CE marking; this is the only way you can be sure the equipment you are using is legal.

Notes:

(a) From October 1998 all newly introduced 27 MHz equipment must also carry a CE marking and be capable of operating at 10 kHz spacing. 27 MHz equipment imported into or manufactured in the UK prior to the introduction of the new standards is exempt from this legislation.

(b) Current legislation allows the CE marking to appear on the equipment itself, the instruction leaflet or on the box.

(c) From December 2006, 2.4 GHz radio equipment has been available that is suitable for general R/C use, including model aircraft. This equipment is subject to the regulations of CE marking, just the same as 35 MHz and 27 MHz sets, and you should take care that the equipment you are using carries a valid CE mark otherwise you may become personally liable for the legality of it's operation.

Synthesised Frequency Equipment

(a) Synthesised frequency equipment is legal in the UK as long as it has been tested and carries the CE mark. There is, however, a limitation to its use in the UK that has been agreed with Ofcom and also at international level by the FAI.

(b) This is that any synthesised transmitter must have a two stage switch-on process. The first switch-on stage must NOT transmit but must give a clear indication of the frequency that will eventually be transmitted. This is to enable you to select frequencies safely and, more importantly, to obtain clearance from the site frequency control system.

(c) Only after you have done this should you activate the second switch-on stage which enables transmission.

(d) Synthesised frequency equipment will give you much greater flexibility in your frequency selection but it also has many pitfalls and you should take great care if you use such equipment. Remember that most people you are flying with will not have the same facilities and your operations must fit in with what is accepted as normal operating procedures.

(e) For instance, you should be showing a frequency flag and be prepared to change it if you change frequencies. You must take extra care when using the frequency control system as your opportunities to reserve the wrong frequency will be much greater. You may find that the ability of your transmitter to select any frequency will be viewed with suspicion by some and, in the event of interference being suspected, you could find that you are the first person checked. The only way to avoid problems is to be scrupulously careful in your operations.

(f) Finally, although synthesised sets have the potential to be more reliable and cheaper to produce than plug-in crystal sets, remember that they still use a fixed crystal in the transmitter module and the receiver and that any crystal can drift over time. You will still need to have your radio equipment checked occasionally as a master crystal drifting will affect all the other frequencies synthesised from it. Curing the problem will be a job for the importer/manufacturer and will not be as simple as just plugging in a new crystal.

Grey Imports

There is a small but increasing trend, driven in many cases by the ease of internet shopping, for flyers to directly import equipment from sources outside the EU for their own use. All frequency bands are affected by this and sets on both 35 MHz and 2.4 GHz are especially involved.

Now most of us are not familiar with EU and UK law on this subject but you should consider the following very carefully.

It is a fact that the onus for making sure that the equipment meets EU standards rests not on the manufacturer but on the original importer into the EU. This applies whether the equipment carries a real or bogus CE mark or no CE mark at all.

This means, of course, that equipment bought through the normal model shop chain is warranted to be legal by the major importers who do the original importing into the EU. However, if you have imported equipment directly from outside the EU for your own use then you are personally responsible for it's legal operation within the UK.

This is extremely important to you as a user because you may inadvertently find yourself in serious trouble if you are involved in an incident.

Just to take two instances;

(1) The application of bogus CE marks to equipment manufactured and supplied from certain parts of the far east is not unknown. If you have one of these sets you have no idea whether it is legal to operate or not.

(2) The USA and Canada have higher power limits for 2.4 GHz equipment than we do and it is known that most Spectrum sets sold there have been built to take advantage of these higher powers. If you have personally imported a set from the USA then it will almost certainly be illegal to operate in the UK unless it has been re-calibrated by the official importers.

Radio Control Licence

From 1.8.1981, model control equipment is **exempt** from the requirement of a Licence under Section 1 (1) of the Wireless Telegraphy Act 1949 subject to the terms, provisions and limitations set out in parts 1 and 2 respectively of the Statutory Instrument 1980 No. 1848.

Airborne Telemetry

A frequency band that may be used to download telemetry from model aircraft has been allocated by the Radiocommunications Agency (RA).

The band is 433.05 to 434.79 MHz with a channel spacing of 25 kHz and a maximum Effective Radiated Power (ERP) of 10 mW. All equipment used must be type approved to EN 300 220-1. A list of available equipment can be obtained from the Low Power Radio Association, contact on 01422 886463.

This is an unprotected band and some of the frequencies are already used by radio amateurs so it would be wise to limit airborne use to 434.025 to 434.79 MHz.

THE BMFA COUNCIL OF MANAGEMENT

Otherwise known as FULL COUNCIL

Members of Council

The Council comprises the following members:

(A) Elected Officers:

Chairman Vice-Chairman

Honorary Secretary Honorary Treasurer

Technical Secretary Public Relations Officer

Records Officer FAI Delegate

Competition Secretary

These posts are for two years and are directly elected by postal ballot just before the AGM each year. To retain continuity, roughly half of the Elected Officers retire each year but may re-stand if they wish.

(B) Area Delegates

One accredited representative from each of the thirteen BMFA geographic Areas plus the RAFMAA, which operates as an Area. Each of these posts is elected by their individual Areas, usually at the Area AGM.

(C) Co-opted Members

Up to 9 co-opted additional members as determined by Council. The Council usually co-opts a representative from each of the Technical Committees to fill 6 of the co-options available.

Note - No elected member of Council serves for more that two years although at the end of their period of service they are eligible for re-election.

(d) A delegate nominated by the Royal Navy Model Aircraft Association.

(e) A delegate nominated by Council to represent BMFA at the Royal Aero Club.

Additionally, the Royal Aero Club is itself entitled to nominate a delegate to sit on Council. Normally, this post is filled by the same person that is sent as the BMFA delegate to them (see (e) above).

Visitors

Any BMFA affiliated club may apply to send an observer to any Council meeting. Application must be made in advance to the Chief Executive who will select two from those applying.

In addition, the Chairman of a meeting may invite whoever he wishes to attend. Standing invitations to Full Council exist for the Hon. Solicitor, the BMFA Newsletter Editor and up to two club representatives

Dates of Council Meetings

Council usually meets three times per year. Dates of the meetings along with agendas and reports of the previous meeting are carried in the Club Bulletin or they may be obtained from the Leicester office on request.

COUNCIL SUB-COMMITTEES

Some of the responsibilities of BMFA Council have been delegated to several Sub-Committees of Council, each of which has its own terms of reference.

The procedures for having items discussed by these Sub-Committees is exactly the same as for the full BMFA Council meetings and, unless the matter is urgent, proposals are allocated to the next most appropriate meeting. Voting rights at these meetings are given to those specified in the terms of reference of the meeting as laid down in the Council Handbook. The Sub-Committees are:

Areas Council

Meetings take place three times per year and are attended by all Area Delegates and Area Chairmen, plus representatives of RNMAA. The meeting is Chaired by the Honorary Secretary with the PRO as Vice-Chairman.

Its main responsibilities are all Club and Area related business and the Achievement Schemes.

The Achievement Scheme Review Committee is a sub-committee of Areas Council and it advises the Council on all matters concerned with the operation and regulation of the Achievement Schemes.

Technical Council

Meetings take place two or three times per year and are attended by delegates from all the Technical Committees. The meeting is Chaired by the Technical Secretary with the Competition Secretary as Vice-Chairman.

Its main responsibilities are all competition and safety matters.

Executive Committee

Meetings take place as necessary but at least three times per year. They are attended by the Association's Elected Officers and the Chief Executive and are Chaired by the Association's Chairman.

It's main responsibility is the running of the Association's business affairs.

Proposals to Council

A great many of the ideas discussed by Council are generated by you, the members and clubs of BMFA, and any member can affect the Association's policies.

This section sets out how you go about having your ideas put forward as proposals or discussion items to a BMFA Council. It is not a difficult process and anyone can have their say on how model flying is run in the UK.

Constitutionally, only Council Members, Area Committees or Technical Committees may place proposals before Council but there are several ways that you as a BMFA member or club can have your point of view put forward.

You can attend your local Area meeting and discuss your ideas there. If you make a good enough case the Area will make the proposal for you and it will be presented to Council by the Area Delegate. On important matters you might be invited to attend the Council meeting but in any case you can apply to be an observer at the meeting through normal channels. Dates and contacts for your Area are available from the Leicester office.

If your ideas are more in line with the work of a Technical Committee, you can approach it directly and ask it to act for you. If the Technical Committee agrees then it will put the proposal forward to Council. Technical Committee contacts are available from the office.

If these two approaches fail, and you are still convinced that your point is valid, you can approach ANY Council member for help. They each have the power as individuals to put proposals forward to Council and will do so if your ideas have merit. Again, contact addresses are available from the office.

Finally, if all else fails, a letter to the Chairman of the Association will sometimes work.

You should be aware, though, that having what you think is a good idea might not be enough to have the idea placed before Council and agreed.

If you read this section carefully you will see that there is a natural filtering process in the system and you will have to convince a number of other people of the worth of your idea before it can progress.

GENERAL REGULATIONS AND CONTEST RULES - SECTION ONE

FORMAL JURISDICTION AND GENERAL REGULATIONS

1.1.1 International Control of Competitions

The Federation Aeronautique Internationale (FAI) is the sole international authority entitled to make and enforce rules and regulations for the encouragement and control of aircraft competitions (including records) and is the final international Court of Appeal for the settlement of disputes arising therefrom.

1.1.2 National Control of Competitions

The Royal Aero Club, being a member of the FAI and the 'Recognised National Aero Club' and the National Airsports Control of the United Kingdom, having acquiesced in, and declared to be, bound by Statutes and the International Sporting Code of the FAI, now therefore declares its sole right to administer such Code and to draw up and administer rules for the control of, and to control, the sport of aviation throughout the United Kingdom and such Dominions, Colonies, Protectorates and Dependencies as are not affiliated direct to the FAI.

1.1.3 General Competition Rules

That the above powers may be exercised in a fair and equitable manner, the Royal Aero Club has drawn up its General Competition Rules, which are derived from the International Sporting Code of the FAI.

1.1.4 Delegation of Control of the Sport of Model Flying

The Royal Aero club has, subject to its power of veto, delegated its control of the sport of model flying to the Society of Model Aeronautical Engineers Limited (SMAE), now operating as the British Model Flying Association (BMFA), but retains its power of acting as a national court of appeal empowered to settle finally any dispute as to any decision pronounced by the BMFA, subject to the aforesaid right of appeal to the FAI.

1.1.5 BMFA Contest Rules

These have been prepared in accordance with the foregoing requirements: All BMFA Contests will be run in accordance with the BMFA or FAI Contest rules, as relevant. All member clubs and BMFA Areas shall conduct all their contests under the BMFA General Regulations subject to any local or specialised rules applicable to such contest set out in the special regulations published in relation thereto.

In no circumstances may rule 1.2.3.2. be varied without the consent of Council.

1.1.6 Interpretation of Rules

The interpretation of the rules contained herein or any that may hereafter be issued shall rest entirely with Council or its appointees. Council reserves the right at any time to add to, amend, or omit any of the rules they think fit at any time.

1.1.7 Final Decision

The decision of the BMFA Council must be accepted as final, subject to the aforesaid right of appeal to the Royal Aero Club.

BMFA GENERAL REGULATIONS

There are two definitions of model aircraft, one by the FAI and one by the CAA, as noted in 1.2.2.1 and 1.2.2.3 below.

Whatever the FAI definition, all flying in the UK must comply with the CAA regulations.

For R/C models over 7 kg (without fuel), wilful failure to comply with 1.2.2.3 parts (a) and (b) below will render illegal any flights under the terms of the Air Navigation Order 1976.

1.2 Applicable to Contest and non-Contest Model Aircraft.

1.2.1 Definition of Model Aircraft

Aircraft which owing to their size are not capable of carrying a human being and which are constructed purely for sporting and recreational purposes.

1.2.2 Dimensions of Model Aircraft

1.2.2.1 Model aircraft, as defined by the FAI, shall be limited to the following dimensions and weights.

(a) The total surface of the wings and the horizontal stabilising surface(s) must be less than or equal to 150 sq. decimetres (16.14 ft^2). The surface taken will be the total of the orthogonal projections of all flying surfaces onto the horizontal plane in the position of horizontal flight. In the case of wings or empennages attached to the body of the machine, the surface taken will include the complete centre of the fuselage(s), the normal contour lines of the surfaces being supposed to be extended until they

meet the plane of symmetry of the machine in plan view.

(b) The total weight of the model aircraft in flying condition must not exceed 5 kg (11.023 lb.), complete with fuel, the exceptions to this rule being for:

Single engine control line scale models 6kg

Multi engine control line scale models..... 7kg

Radio control scale models ..... 15 kg

(Electric Powered .....15 kg without batteries)

Radio control aerobatic models..... 5 kg

Radio control helicopters..... 6 kg

All these exceptions, other than R/C scale electric models, are without fuel.

(c) Nose radius on R/C gliders should be of not less than 7.5 mm radius measured tangentially to all intersecting surfaces.

NOTES - The above dimensions and weights refer specifically to competition classes and the FAI definition of a model aircraft.

They do not prohibit heavier or larger models being flown in the UK (see 1.2.2.3 and 1.2.2.4). The BMFA definition for R/C glider noses no longer specifies 7.5 mm radius.

1.2.2.2 Any contests that are flown in the UK to FAI rules and which vary from regulation 1.2.2.1 must comply with regulation 1.2.2.3 and 1.2.2.4.

1.2.2.3 Model aircraft between 7 kg and 20 kg (without fuel)

Model aircraft within these weight limits shall only be flown when their operation complies with the CAA regulations currently in force and as defined in the Air Navigation Order in conjunction with CAA publication CAP 658 (see www.caa.org);

1.2.2.4 Models over 20 kg

Models weighing over 20 kg without fuel are legally defined as small aircraft.

The Civil Aviation Authority in exercise of its powers under the Air Navigation Order 1976, as amended, may exempt from this Order any aircraft or persons or classes of aircraft or persons either absolutely or subject to such conditions as it thinks fit. Application for Exemption should be made to the Civil Aviation Authority.

This applies to models over 20 kg and it is illegal to fly such a model without a current CAA exemption certificate. The issue of such certificates is solely within the power of the CAA and new or amended certificates will not be issued unless the Authority is satisfied that the model concerned has passed through the laid down inspection procedures during building and the subsequent flight test requirements.

1.2.3 Motive Power

All types of motive power are permitted with the following limitations:

1.2.3.1 Mechanical motors.

The Code of Practice on Noise From Model Aircraft 1982, issued by the Department of Environment, must be met and all internal non-continuous combustion engines employed in model aircraft must at all times be fitted with an effective exhaust muffler with the following exceptions:

The exceptions to this rule are:

(1) Control line competition model classes:

(a) Speed (all classes)

(b) Team Racing

(c) Combat

(2) Free Flight models fitted with a device to limit the engine run to 20 seconds or less.

(3) Free Flight tailless models, with engine capacity not over 3.51 cm3 fitted with a device to limit the engine run to 30 seconds or less.

(4) Free Flight Scale models using diesel engines of less than 1.5 cm3 total capacity provided that they are fully cowled.

An effective exhaust muffler is defined as a device or devices fitted to, or built onto the engine such that it noticeably reduces the noise of operation.

Reaction motors

(1) Control Line

Control Line pulse jets may be flown under the following conditions:

(a) That the express written permission of the owner/controller of the site is obtained in advance with due regard for noise considerations.

(b) That the express written permission of any model flying club using the site is obtained in advance.

(c) That monitoring of the area surrounding the site for noise complaints is carried out on an on-going annual basis.

(2) Radio Control

Radio control pulse jets may be flown under the following conditions:

(a) That the express written permission of the owner/controller of the site is obtained in advance with due regard for noise considerations.

(b) That the express written permission of any model flying club using the site is obtained in advance.

(c) That monitoring of the area surrounding the site for noise complaints is carried out on an on-going annual basis.

(d) That all operators of such models on the site shall hold a Power Achievement Scheme Fixed Wing 'B'

(e) That CAA exemption certificates as required are obtained and the conditions on them are followed.

Any regulation specifically concerning reaction motors does not apply to small solid-fuel units of the Jetex type, nor to solid fuel rocket motors of the Rapier type or to recognised Space Model power units used in accordance with the appropriate BMFA approved codes of practice.

1.2.3.2 Propellers

(a) No model powered by mechanical motor(s) shall be operated with a propeller that has been repaired or is unsafe.

(b) The use of metal propellers is prohibited.

(c) The use of forward folding propellers of any type is prohibited.

(d) Propellers manufactured for use on electric motors shall not be used on internal combustion engines.

1.2.4 Snuffer Tubes

All models using burning fuses shall be fitted with a device designed to ensure:

(a) that the burning fuse is not at any time ejected from the model whilst in flight or on the ground;

(b) that as soon as practical after the functioning of the operation for which the fuse is fitted, the lighted end of the fuse is extinguished.

1.2.5 Radio Control Frequencies

The following frequency bands are recognised as available for model control within the UK.

(1) **General use**. 26.96 MHz to 27.28 MHz. Effective Radiated Power 100 mW.

(2) **Model aircraft use only**. 34.945 MHz to 35.305 MHz. Effective Radiated Power 100 mW

(3) **Surface vehicle use only**. 40.665 MHz to 40.995 MHz. Effective Radiated Power 100 mW

(4) **General use and telemetry**. 458.5 MHz to 459.5 MHz. Effective Radiated Power 100 mW.

(5) **General use.** 2.4 GHz. Effective Radiated Power 100 mW.

These are the only frequencies allowed for model control in the UK other than certain frequencies in the 49 MHz band are legally allowed for toy operation but the allowed effective radiated power output is restricted to 10 mW.

From 1.8.1981, model control equipment is exempt from the requirement of a Licence under Section 1 (1) of the Wireless Telegraphy Act 1949 subject to the terms, provisions and limitations set out in parts 1 and 2 respectively of the Statutory Instrument 1980 No. 1848.

The **27 MHz** band is legally shared by other users, in particular, model cars, model boats and citizens band operators. It may still be used for model aircraft but great care should be taken by model flyers, especially near urban areas. Many clubs in this situation have found the need to ban this frequency band from their flying fields on the grounds of safety.

The **35 MHz** band is **SOLELY** for model aircraft and in no circumstances must it be used for any other purpose, such as the control of surface vehicles.

The **40 MHz** band is **SOLELY** for surface vehicle use and in no circumstances must it be used for the control of model aircraft.

The **459 MHz** is shared with various telemetry operations and users of the band should be aware of the possibility of more potential interference being present.

The **2.4 GHz** band is for general model use in the UK. The equipment uses spread spectrum or frequency hopping technology and does not operate on a fixed frequency. The band is also used by many computer applications such as wireless networking and Bluetooth devices.

1.2.5.6 Airborne Telemetry

A frequency band that may be used to download telemetry from model aircraft has been allocated by Ofcom.

The band is 433.05 to 434.79 MHz with a channel spacing of 25 kHz and a maximum Effective Radiated Power (ERP) of 10 mW. All equipment used must be type approved to EN 300 220-1.

This is an unprotected band and some of the frequencies are already used by radio amateurs so it would be wise to limit airborne use to 434.025 to 434.79 MHz.

1.2.5.7 United Kingdom Radio Control Council (UKRCC)

The body that has the responsibility to liaise with OFCOM regarding model control frequencies and

general radio control matters is the UKRCC, which is a committee of user groups, manufacturers, importers and the R/C media. BMFA is a leading member of UKRCC.

The UKRCC website at www.ukrcc.org is an extremely good source of information about radio control frequencies and general R/C matters, including the international frequency bands.

1.2.6 Radio Control Failsafes

Any powered model with a radio control failsafe device must have that device set so that, as a minimum, its operation causes the engine/motor to run at its lowest speed (stopped in the case of electric powered models) and specifically not to hold the last position of the engine/motor control regardless of the other functions of the failsafe. It is the responsibility of the pilot to demonstrate this function on request.

(1) PCM Failsafes

All PCM transmitters, when used with PCM receivers, have this function enabled and users must take special care to set the failsafe as required as many default transmitter settings are 'hold last position'.

(2) Receiver Failsafes

Many modern receivers, specifically of the Digital Signal Processing (DSP) type, have built in failsafe functions even when used with non-failsafe enabled transmitters. In many cases these receiver failsafe functions cannot be turned off.

Users of this type of receiver are reminded that the setting of any available failsafe function to low throttle is a requirement on all model aircraft, not just those over 7 kg.

Note, however, that some DSP receivers are not equipped with a true failsafe but will simply 'hold last position' on signal failure or interference. Such receivers cannot be set to low throttle and MUST NOT be used in models over 7 kg.

Users of these non-failsafe 'hold last position' DSP receivers in models under 7 kg should also be aware that the receiver will 'lock on' in flight under signal failure or interference conditions.

(3) 2.4 GHz

Note that all 2.4 GHz equipment has a built in failsafe function and that this must be set to your requirements. Do not leave the equipment as it came 'out of the box' as the failsafe will almost certainly default to hold last position and not low throttle.

1.2.7 Safety

(a) Composite Materials

If any model aircraft is built or repaired using composite materials or parts then it is essential to be particularly diligent in picking up any debris after a crash or mid-air collision.

Composite shards do not degrade quickly and can be a dangerous hazard in and on the ground for many years

THE BMFA COMPETITION RULE BOOKS

(Section 1), Formal Jurisdiction And General Regulations

This section of the rule books appears in this handbook and is also re-printed in Section (2).

(Section 2) General Rules

This section is issued free with sections 3 to 8.

(Section 2a) Records Rules

This section contains detailed regulations concerning record attempts and t is available free on request.

(Section 2b) UK Records List

This section contains details of all ratified UK records including the current records and holders and it is available free on request.

(Section 3) Free Flight

Outdoor and Indoor, All Classes

(Section 4) Control Line Book 1

Speed and Aerobatics

(Section 4) Control Line Book 2

Team Racing, Combat, Carrier

(Section 5) Radio Control Power Book 1

Aerobatics

(Section 5) Radio Control Power Book 2

Pylon Racing, Helicopter, Waterplanes, SAM 35 Vintage, Fun Fly

(Section 6) Scale

All Classes

(Section 7) Radio Control Silent Flight Book 1

Gliders

(Section 7) Radio Control Silent Flight Book 2

Electroflight

(Section 8) Space Models

All Classes

All rule books are available as free-of-charge downloads on the BMFA website (See Resources/Publications/Rule Books) or they may be obtained pre-printed from the BMFA Leicester office at a cost of £3.00 per book, plus an A5 SAE.

FAI SPORTING CODE

Each section is prefaced by the full General Section of the Sporting Code and contains all the FAI rules for the discipline, including FAI Provisional rules.

Free Flight Section	£5
Control Line Section	£5
R/C Power Section	£5
Scale Section	£5
R/C Silent Flight Section	£5
Space Models Section	£5
Buy one discipline and additional discipline is	£3
FAI General Statutes	£4

DIRECTORY OF PUBLICATIONS

Available from the BMFA's Leicester office. Postage prices may vary so please enquire. Those marked * are free on request with an appropriate SAE.

GENERAL

BMFA Rule Changes Annual Booklet*

'Why Join' booklet *

Saleable Goods List *

ADVICE LEAFLETS

The Flying Site Guide*

Farmer's Guide *

Model Flying - An introduction booklet for Local Authorities etc. *

MoD Land - A guide to obtaining permission to fly *

The Promotion of Welfare and Care of Children and Vulnerable Adults in Model Flying *

The Noise Book*

Disability Guidelines for Model Flying Clubs*

Risk Assessment guide *

CONSTITUTIONAL MATTERS

The SMAE Constitution (Memorandum and Articles of Association) *

The SMAE Constitution and its Implications for BMFA Areas *

The SMAE Area Constitution *

A Guide to the SMAE Area Constitution*

Council Handbook *

Specialist, Associate and Affiliated Bodies. Guidelines for Affiliation and Association to the BMFA *

Model Club Constitution *

EDUCATION LEAFLETS

The Education Leaflet *

The Teachers Guide

Dart Facts leaflet *

SAFETY CODES

Association for Helicopter Airsports Safety Code*

British Hang and Paraglider Association/BMFA joint safety code for slope sites *

Joint Gas Turbine Builders Association/Jet Modellers Association/BMFA Safety Code*

Low Power Space Modelling Safety Code *

Slope Combat Guidelines*

UKRA Rocketry Safety Code*

ACHIEVEMENT SCHEMES

R/C Achievement Schemes booklet (extracted from the Member's Handbook)*

Guidance to Fixed Wing Chief Examiners leaflet *

Guidance to Silent Flight Chief Examiners leaflet *

Guidance to Chief Instructors leaflet *

Up And Away (R/C power instruction manual) - £2

Up and Away (Electric instruction manual) - £2

(An Up-and-Away manual is free to all new members under the special voucher scheme)

Guidance for R/C Power Instructors Booklet *

Guidance to Club Examiners and Candidates leaflets -

General *

Fixed Wing 'A' *

Fixed Wing 'B' *

Aerobatics 'C' *

Helicopter 'A' *

Helicopter 'B' *

Silent Flight Thermal 'A' *

Silent Flight Thermal 'B' *

Silent Flight Slope 'A' *

Silent Flight Slope 'B' *

Silent Flight Electric 'A' *

Silent Flight Electric 'B' *

BMFA NEWS

The BMFA News is published six times a year and is delivered direct to every full member's door. It has the highest circulation of any UK model flying publication and carries articles and photos of general interest plus news of BMFA activities.

It is also used to inform you of changes to the Achievement Schemes and many other areas of interest in addition to the official announcements that it contains. It will be to your advantage to read each issue carefully.

THE BMFA WEBSITE

If you have internet access then check out the BMFA website at www.bmfa.org.

The site is updated at least once a month and carries an ever expanding list of the latest versions of many BMFA publications plus clublists, contacts, links to clubs, other modelling organisations, commercial sites, one of the busiest 'small ads' sections on the web and the most comprehensive contest and events calendar in the UK.

New features are constantly being added to the website so check it regularly.

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Website http://www.bmfa.org

The following people can be contacted via the Association's Leicester Office

The Power Achievement Scheme Controller, Instructor Scheme Controller

The Silent Flight Achievement Scheme Controller

The Education Working Group Co-ordinator

The Flying Site Advisor

Civil Aviation Authority

Safety Regulation Group

Aviation House

Gatwick Airport South

West Sussex RH6 0YR

Tel: 01293 567171

CAP 658

CAP 658 is available on-line from www.caa.co.uk

It may also be ordered in hard copy from The Stationery Office at http://www.tso.co.uk/ at a cost of £15 plus carriage and handling

Contact addresses for the following organisations may be obtained from the Association's Leicester office.

Association for Helicopter Airsports (AHA)

British Association of Radio Controlled Soarers (BARCS)

British Miniature Pylon Racing Association (BMPRA)

British Waterplane Association (BWA)

Club 2000 Pylon Racing Association (CTA)

Combat Flyers Association (CFA)

Control Line Aerobatic Pilots Association (CLAPA)

FAI Rocketry (FAIR)

Gas Turbine Builders Association (GTBA)

Great Britain Radio Controlled Aerobatic Association (GBRCAA)

International Miniature Aerobatic Club (IMAC)

Jet Modellers Association (JMA)

Large Model Association (LMA)

Northern Ireland Association of Aeromodellers (NIAA)

Scottish Aeromodellers Association (SAA)

Society of Antique Modellers (SAM 35) (SAM 1066)

SpeedCom (Specialist Body for Control Line Speed)

Sport 40 Pylon Racing Association

Stuntcom (F2B Aerobatics Specialist Body)

United Kingdom Rocketry Association (UKRA)

Vintage Team Race Special Interest Group (VTRSIG)

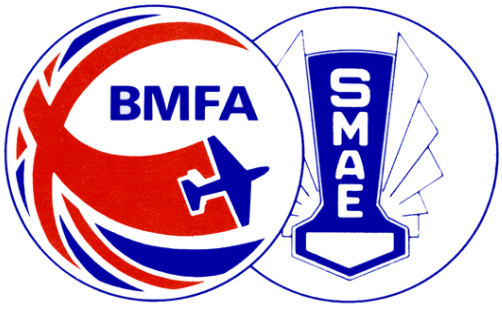
TAILPIECE

If you have any comments or suggestions for the updates or the next revision, please contact the Technical Secretary via the Leicester Office.

Chris Bromley, FSMAE,

BMFA Technical Secretary

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