FAI Sporting Code

Section 9 – Rotorcraft

Guidance to Risk Assessment and Risk Register

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Fédération Aéronautique Internationale

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The CIG Guide to Helicopter Championship Organisation Edition 1/20.

To be read in conjunction with "FAI Guidelines - In the event of a casualty or serious accident at FAI Air Sports document, 2012 Edition.

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***This document should be read in conjunction with National airspace rules. This is a guide and does not overrule any National requirement*.**

1.1 Site Assessment

Where the competition is held at a licensed or protected aerodrome, the aerodrome licensee remains responsible for ensuring that the conditions of the aerodrome licence are not infringed.

While many competitions are held at licensed or protected aerodromes and can take advantage of facilities already available, many are staged at other sites. In assessing any proposed site the following aspects should take into consideration:

a) The suitability of surfaces used by aircraft for take-off, landing and taxiing.

b) Obstructions in the vicinity with regard to the aircraft types which are expected to take part.

c) The proximity of congested areas, particularly if they include schools or hospitals.

d) The proximity of any sensitive, restricted or danger areas (nuclear power stations or hospitals etc).

e) The presence of livestock or wildlife conservation areas.

f) The proximity of controlled airspace, aerodromes, heliports, helipads, airstrips, microlight sites, ballooning sites, parachuting, hang gliding, gliding, ridge soaring, paragliding sites, model aircraft flying sites and visual reference points.

g) The availability of clear entry and exit routes for on and /or off site emergency service vehicles appropriate to the scale of the event.

1.2 Spectator enclosures, car parks and public address systems

Sites for spectator enclosures and car parks require careful selection. Any area to which the public has access must never be located closer than the appropriate Separation Distance to the Competition area.

Normally, spectator enclosures and car parks should be confined to one side of the site thus allowing aircraft maximum freedom of movement on the other side.

Spectators should not be allowed closer than 15 metres to any fixed refuelling area, nor closer than 15 metres radially from any fuelling or venting point on an aircraft or bowser whilst refuelling is being carried out.

Where the public is present, a public address system is essential. Such a system, when installed, must be audible throughout the whole area to which spectators have access.

The commentator should be in a position where important messages or emergency information can be given to him for rapid broadcast to the public. The commentator should have pre-prepared messages to broadcast in the event of an emergency.

Gas-filled toy balloons and the likes when released are a potential hazard to aircraft and the sale of such is not to be permitted in public enclosures.

The use of UAV's (drones) by general public at competitions poses a possible risk to aircraft and are not permitted.

1.3 Parking and manoeuvring of aircraft to and from competition field

Aircraft taking part in the competition should be segregated from visiting. Appropriate security should be in place to guard against interference with aircraft. Pilots should be advised to ensure that starting systems etc. are isolated. Fire extinguishers should be readily available and aircraft should be parked so that fire vehicles can achieve easy access and move freely amongst them. Parking areas must be out of bounds to spectators when aircraft engines are running.

Effective barriers and marshalling arrangements are required to keep spectators clear of aircraft manoeuvring areas. Areas in which spectators are not permitted must be properly enclosed at all times. Marshals must be detailed to control the movement of spectators throughout the event.

In the interests of safety, smoking must not be permitted in competition areas and aircraft parking areas.

1.4 Competition area

It is important that the competition area intended to be used is considered and decided on early in the planning stage. A competition area restricted in size by its surroundings may ultimately dictate the suitability and practicality of the competition.

The competition area is the ground area footprint of the airspace within which competition aircraft manoeuvre.

1.5 Freestyle considerations

The following considerations should be considered by the organiser for the Freestyle.

Complexity:	Organisers should consider the following when making the judgement on whether an event is High or Low complexity.
Airspace:	Consider the complexity of the airspace surrounding the competition venue, including proximity to controlled airspace or areas with specific limitations that may affect the type of aircraft competing.
Geography:	Consider the difficulty of the terrain in addition to crowd and event layout.

Built Up Areas:	Consider the proximity, density and size of adjacent built up and congested areas
Spectators:	Consider the likelihood and controllability of spectators and any effect the freestyle may have on uninvolved third party members of the public. Consider the proximity of major roads, railway lines and local infrastructure and how busy they are.

1.6 Risk Assessment

Risk Assessment is an essential element of the production of any safety plan.

The procedure detailed at Appendix 1 should be completed.

The Event Organiser is responsible for the event Risk Assessment as a whole and this must be completed prior to the competition commencing.

At many events, particularly at airfield sites, the congregation of Spectators outside of the Airfield Boundary, on the 'live-side', may give organisers cause for concern. Neither the police nor the local authority has the power to remove such people. The Event Organiser should endeavour to anticipate this during the planning process and take necessary steps to reduce it where possible. Blocking the view from obvious vantage points is one method.

Event Organisers should be aware of the increasing use of hazardous materials such as carbon fibre in modern aircraft construction. Information on such hazards should be included in the Risk Assessment. Military Participants can advise on specific hazards in relation to their individual aircraft. Civilian Participants can advise with regard to hazardous materials specific to their particular aircraft.

It is recommended that the Event Organiser actively engages the local authorities concerning any local emergency planning.

1.7 Risk assessment form

The risk assessment form.

Hazard = A condition, event or circumstance that has the potential to cause harm to people or damage to aircraft, equipment or structures. You may name a number of initiating events for the same hazard.
Risk = The potential outcome from the hazard in terms of the likelihood of the harm occurring and the severity if it does.
L =Likelihood of Risk Occurring ; **S** = Severity of Risk ; **R** = Risk Rating (where R=L*S)
Mitigation measures - Risk control measures additional to Country Regulatory Aviation Authority requirements to lower the risk to as low as reasonably practical (ALARP).
Remarks - Any other information relevant to the competition risk management process which has not been captured elsewhere. E.g. clarity or explanation to a risk assessment calculation or mitigation measure.

Competition Name :	**Competition Dates :**
Risk Assessment Team (i.e. Names (if applicable)) :	**Date RA Conducted:**

Hazard description	**Risk (including location, where appropriate)**	**Initial rating**			**Mitigation measures (if applicable)**	**Final rating**			**Remarks (if applicable)**
		L	**S**	**R**		**L**	**S**	**R**	

Add additional rows as required.

I confirm that this Risk Assessment is suitable and sufficient to manage the risks associated with the competition.

Safety Officer Sign Off	**Name:**	**Signature:**	**Date:**

Event Organiser countersignature (where applicable)	**Name:**	**Signature:**	**Date:**

APPENDIX 1

Competition Risk Management

At any competition there are hazards that may cause harm to people. Event Organisers are accountable for ensuring that their events are managed safely and this includes managing the risks created by any flying that forms part of their event.

Competition risk management need not be complicated and the procedure that follows should suit the needs of most competition and flying events.

The risk management process

The risk management process starts with identifying the hazards created by the competition and then assessing the risks associated with those hazards in terms of likelihood (what is the likelihood of the hazard happening?) and severity (if the hazard occurs how bad will it be?). Once the level of risk is identified, appropriate remedial action or mitigation measures can be implemented to reduce the level of risk to as low as reasonably practicable (ALARP). The implemented mitigation measures should then be monitored to ensure that they have had the desired effect.

It is important to include people with the relevant expertise and experience in the risk management process to ensure its robustness. All Risk Assessments are reliant on the quality of the information used to make the assessment, and the knowledge of the people conducting the assessment.

Therefore, the risk management process must be undertaken by people who are aware of the risks associated with the activity being assessed, knowledge of the range of mitigations available to reduce any risk and who will use sound judgement in the preparation of the assessment. The assessor(s) should also be aware that, in the event of a subsequent accident or incident, the Risk Assessment process might be challenged.

The risk management process is illustrated below:

Hazard Identification

A hazard is defined as a condition, event or circumstance that has the potential to cause harm to people or damage to aircraft, equipment or structures.

A risk is defined as the potential outcome from the hazard and is usually defined in terms of the likelihood of the harm occurring and the severity of the outcome if it does.

For example, bird activity in or around an aerodrome is a hazard to aircraft operations. One risk associated with this hazard is that a bird strike causes an aircraft engine to fail resulting in the aircraft crashing, harming the pilot and/or the public.

In general, a hazard exists in the present whereas the risk associated with it is a potential outcome in the future.

Hazard identification is fundamental to effective Competition risk management and there are benefits to approaching the task formally. There are many ways of identifying hazards and depending on the size of your event and the organisation surrounding it, the following methods may be useful:

- Brainstorming; when your safety committee, Flying Control Committee and others involved in the organisation of your competition meet to identify possible hazards. Simulation and table top exercises of possible scenarios can be an effective part of the brainstorming process. It should be noted that brainstorming sessions need not

be limited to Safety Committee and FCC members and can include any interested parties or person thought worthy of inclusion
- Reviewing data from previous accidents and incidents
- Mandatory/voluntary incident reporting schemes (internal and external)
- Internally or externally conducted safety assessments/audits
- Safety information from external sources; e.g. similar organisations, aviation authorities, media, etc
- Generic hazard checklists

When defining hazards you should consider and list all of the initiating events that may precede it. This will allow you to avoid mistakes in risk rating and help in identifying potential mitigations.

It is advisable that you record the process used to identify your competition hazards, along with a list of hazards identified but deemed not applicable.

Examples of features at competitions that need to be considered as part of a hazard identification process include hazardous material carried by aircraft, congested areas in and outside the competition area, electricity pylons, competition and non-competition aircraft, human factor influences, sources of visual confusion etc.

Competition Risk Assessments should include consideration of risks related to competition location, including occupied properties and concentrations of people, both inside and outside of the competition location, that are put at increased risk by the aerial activity, and any specific risks arising from participating aircraft.

Risk Evaluation

A risk evaluation process starts with defining the risk(s) associated with the hazards you have previously identified. There may be more than one risk associated with a particular hazard and a Risk Assessment may need to be conducted for each risk.

Your Risk Assessment should cover all the people associated with the competition, including the pilots, staff and volunteers, as well as members of the public both inside and outside of the event. In general, the purpose of the Risk Assessment is to determine the risk posed to people, and how to mitigate that risk. It is not primarily concerned with the impact that an incident will have on the operational aspects of a competition or event.

The next step is to assess the risk in terms of likelihood and severity. Note that your initial Risk Assessment should assume that all legal requirements and good practice guidelines are met.

Once you have assessed the risk in terms of likelihood and severity, you can decide on what mitigation is necessary to reduce the risk to an acceptable level (ALARP). Mitigation measures should be implemented to reduce the likelihood of the risk occurring or reduce the severity of the outcome if it does, or both.

Risk Likelihood (L)

In order to assess initial risk likelihood you should take into account any mitigation measures that are currently in place to reduce the likelihood.

To help assess the likelihood you should ask the following questions:

- Is there a history of similar occurrences (either at your competition or at others) to the one under consideration, or would this be an isolated occurrence?
- What impact do the types of aircraft and items have on the likelihood of incidents occurring at my competition?
- How many people are involved and how likely is it that they would be harmed?

A guide to assessing likelihood is in the table below:

Likelihood of Occurrence (L)	
Description	**Meaning**
Probable (5)	Anticipated to occur i.e. likely to occur
Occasional (4)	Foreseeable to occur
Remote (3)	Unlikely to occur
Extremely Remote (2)	Not anticipated to occur
Extremely Improbable (1)	So unlikely that it is not anticipated to occur

Risk Severity (S)

In order to assess the severity you should take into account any mitigation measures that are already in place to reduce the severity.

To help assess the severity you should ask the following questions:

- What harm would be caused?
- Would lives be lost?
- Who would be affected (pilots, Spectators, by-standers, volunteers, workers)?
- What are the likely commercial implications or media interest?
- Would there be a loss of reputation?

A guide to assessing severity is in the table below:

Severity of Consequences (S)	
Classification	**Meaning**
Catastrophic (5)	Multiple deaths, usually with loss of aircraft
Hazardous (4)	Large reduction in safety margins leading to serious or fatal injury to small number of people
Major (3)	Significant reduction in safety margins leading to serious incident or injury
Minor (2)	Minor injury
Negligible (1)	Any event which is considered to be less than severe

Risk tolerability

Once the likelihood (L) and severity (S) have been defined, a risk tolerability matrix such as the one below can be used to assess how tolerable the risk is.

Risk Likelihood (L)	**Risk severity (S)**				
	Catastrophic (5)	Hazardous (4)	Major (3)	Minor (2)	Negligible (1)
Probable (5)	**Unacceptable**	**Unacceptable**	**Unacceptable**	**Review**	**Acceptable**
Occasional (4)	**Unacceptable**	**Unacceptable**	**Review**	**Review**	**Acceptable**
Remote (3)	**Unacceptable**	**Review**	**Review**	**Acceptable**	**Acceptable**
Extremely remote (2)	**Unacceptable**	**Review**	**Review**	**Acceptable**	**Acceptable**
Extremely improbable (1)	**Review**	**Acceptable**	**Acceptable**	**Acceptable**	**Acceptable**

Using a risk tolerability matrix, the risk can then be classified as either acceptable, to be reviewed or unacceptable, allowing a suitable risk mitigation strategy to be developed if required.

Risk Rating Categories

Unacceptable: If the risk is unacceptable, either the competition or event should not proceed or major mitigation will be necessary to reduce the severity of the risk from the hazard, or reduce the likelihood of the hazard occurring, or both, such that the risk can be controlled to a lower level. Normally, it is the likelihood of the occurrence that can be reduced rather than the severity.

Review: If the risk falls into the review category, the likelihood or severity of occurrence is of concern; measures to mitigate the risk to as low as reasonably practicable should be sought. Where the risk is still in the review category after this action has been taken, it may be that the cost in terms of money, time and resources needed to implement the actions required to reduce the risk further are too prohibitive. The risk may be accepted, provided that the risk is understood and has the endorsement of the Event Organiser.

Acceptable: If the risk falls into the acceptable category, the risk may be considered to be low (the chance of the hazard occurring is sufficiently unlikely and/or the consequence is not overly severe). However, consideration should still be given to reducing the risk further.

Risk mitigation

If the level of risk falls into the unacceptable or review categories, additional mitigation measures will be required to reduce the risk to a level as low as reasonably practicable.

Unacceptable risks should always be mitigated to at least the review level to become tolerable. Mitigation action should be taken whenever possible to reduce risk ratings even when the risk is in the acceptable category. However, risks from your competition or event do not need to be reduced to the acceptable level and can remain at the review level, provided that you are able to demonstrate that the risks are being effectively managed.

Mitigation measures are actions or changes, such as changes to operating procedures, equipment or infrastructure, to reduce either/both the severity and/or the likelihood.

As with hazard identification, defining appropriate mitigations will benefit from a formal approach and you can use similar methods to do it.

Generally risk mitigation strategies fall into three categories:

- **Avoidance**: The operation or activity is cancelled or avoided because the safety risk exceeds the benefits of continuing the activity, thereby eliminating the risk entirely.
- **Reduction**: The frequency of the operation or activity is reduced or action is taken to reduce the magnitude of the consequences of the risk.
- **Segregation**: Action is taken to isolate the effects of the consequences of the risk or build in redundancy to protect against them.

Mitigating risks to third parties not involved in the competition itself poses particular challenges for Event Organisers because it is more difficult to control where they are located. When seeking to mitigate these risks organisers should be aware of the range of options open to them which include:

- Engagement with local authority Safety Advisory Groups, highways authorities and rail network operators where appropriate
- Application for road closures and/or Temporary Traffic Orders for the duration of the competition
- Providing alternative routes for members of the general public who wish to avoid passing directly by the competition location
- Ensuring that there is adequate information provided to the general public, both in advance of and during the competition
- Engaging with the owners or controllers of land near a competition site where the general public may or are known to gather and informing them of the competition
- Informing the public that the safest viewing point is always within designated Spectator areas provided by the Event Organiser
- Preventing overflight of areas where people have been known to congregate if they cannot be prevented from doing so
- The Risk Assessment process concludes with a reassessment of the risk rating if planned mitigations are put in place. You should record the reasons why the mitigating actions you put in place affect the final severity and likelihood scores in your assessment
- The Risk Register is ongoing monitoring and reviewing the hazards that you identify, Risk Assessments and subsequent follow up
- The register should include each identified hazard, the associated risk(s), and results of the initial Risk Assessment taking into account any current mitigation measures in

place, additional risk mitigation measures if required and a re-assessment of the risk once the additional mitigation measures have been implemented.

- The risk register is a working document and should be reviewed regularly, especially during any Safety and Flying Control Committee meetings. You should ensure that the risk register is available to all people involved in its effective management and that they familiarise themselves with any parts of it pertinent to their role.
- The register should be reviewed after the event to determine what was managed well and to identify areas where improvements could be made. You should record these findings in a way that is accessible for future events.