



Introduction to the World of Helicopters

Introduction

Since the first mass produced helicopter appeared in 1946, this revolutionary mode of transport has progressed at a rate even eclipsing that of fixed-wing aviation. In comparison to their rather agricultural beginnings, helicopters on the market nowadays are smooth, reliable, comfortable and quiet machines, which owe only their basic principle of flight to the pioneering aircraft of earlier years.

Modern corporate helicopters can carry between three and fourteen passengers in a comfortable environment at speeds approaching 200 mph. They can be especially useful at shrinking distances here in the United Kingdom, to the point where users can usually fit two or three appointments anywhere on the mainland into a single working day. Many destinations on the continent are also within range - London to Paris takes about an hour and a half. Smaller private models offer similar levels of mobility.

If you are considering using a helicopter, either on a charter basis or purchasing your own, this page is designed to answer some of the questions you will certainly have.

To start with, how can I benefit from operating a helicopter?

- The most obvious advantage is simply to reduce your travelling time from point to point, enabling you to run your business more efficiently and leave more time to spend with family and friends.
- Reaction time to opportunities and critical situations is thus greatly reduced. A helicopter can land in the company car park or at the nearest airport (often with much shorter notice than that required for aeroplanes), and connect with them for longer journeys.
- It is a prestigious form of transport with which to meet your clients and visitors, fly them to a meeting and do business.
- It provides management with a very flexible tool, which can help to increase areas of control and responsibility. You could consider expanding your Company's sphere of influence with the increased mobility it provides.
- It frequently abolishes the cost and inconvenience of overnight stops, improving your quality of life.
- It can carry high value goods and documents from point-to-point at high speed and with high security.
- If you intend flying yourself it is a new, demanding and very rewarding skill to master.

Of course, if you are thinking about acquiring a helicopter you will have thought through many of these advantages. You will have your own personal requirements however, which makes it all the more important to get expert advice at the outset. Many factors need to be considered to help you realise the full potential of this remarkable machine.

What kind of helicopter?

It all depends on your priorities. A single piston engined two seater will not do the same job as a twin jet engined all-weather capable 200mph helicopter, but you may find it will do exactly what you need for a fraction of the cost. Every helicopter type is a compromise of size, capacity, costs (both initial and running), comfort, speed and versatility.



For example, the Robinson R22 or Schweizer 300 are excellent low cost introductions to helicopter flying, which will enable you to fly yourself and a companion around the country in fairly basic comfort, taking advantage of all the time-saving capabilities of the helicopter. They should not, however, be compared with say...

The Jet Ranger or Squirrel, five place single turbine-engined helicopters which are popular choices for charter flying and filming work in the UK. They are fast, nimble and comfortable, but restricted to fair weather flying, unlike the Aerospatiale Dauphin 2 or Sikorsky S76, for instance. These fully instrument capable machines can fly up to 14 people in twin-engined safety and comfort at speeds approaching 200mph.

Each of these helicopters has its competitors, and you may find that an Enstrom Shark, a McDonnell-Douglas 500E, an Agusta 109A or a Twin Squirrel has a better combination of advantages for your circumstances. Salesmen will obviously try and convince you that their product is best, but in the end you must decide for yourself.

Having said that, helicopters do fit into certain classifications, which can give you some idea of which group you should start with.

- **Light Piston-engined Types** - Helicopters such as the Enstrom, Schweizer 300 and Robinson fall into this category having 2 or 3 seats, low initial costs and an 80-110mph speed range. Perhaps surprisingly, the fuel they use for their piston engines is more expensive than the kerosene based product in turbine engines, but they do use less of it. It is the restricted seating capacity which often leads to their being outgrown by the private flyer, and they are less viable as corporate and charter machines. However they remain very popular for training and private use, and are excellent introductions to the world of helicopter travel.
- **Light turbine helicopters** - Aircraft such as the Aerospatiale Squirrel, McDonnell Douglas 500E and the Bell (or Agusta-Bell) Jet Ranger are widely flown in the United Kingdom. The Jet Ranger continues to be the most popular light turbine helicopter in the world, but the Squirrel has sold very well in the last few years, and both are suitable for charter. The MD500E on the other hand has found a firm niche with private owners who like its sporty looks and nippy performance.
- **Twin Engined Helicopters** - When you move into the world of twin engines (modern designs are all turbine driven these days), you enter a different market and price bracket. For the extra you get a faster, safer machine (in the event of one engine failing the other can cope in most circumstances), which can fly to places forbidden to its smaller brothers.

Twins such as the Agusta 109, the Sikorsky S76 or the Aerospatiale Twin Squirrel and Dauphin are chiefly used as corporate and charter machines, although one or two are privately owned. They can fly in bad weather (see All-Weather Capability, down the page), join the airways with the big boys (if suitably equipped), fly over city centres and even use roof-top helipads in specific cases. If we eventually gain a second Heliport for London, it will be certainly restricted to certain types of twin engined helicopter. They are obviously more expensive: expect to pay over a million pounds for a new one.

Your own circumstances and requirements will usually dictate the type of helicopter you require. After that it is down to advice from fellow users and other pilots, your personal preferences and the salesman.



What is this All Weather Capability I hear about?

Normally referred to as IFR (Instrument Flight Rules) capability, it basically means the upgrading of the aircraft cockpit with instrumentation necessary for flight without external visual reference.

In fact the first thing to remember is it is not strictly 'all-weather'. You can let down through cloud to an airport equipped with the appropriate aids, but you need specialist equipment to enable you to make a safe approach to a company car-park or a back garden in poor conditions - and you must be able to see something on final approach.

This apparent restriction is because most cockpit instrumentation merely allows you to interpret ground based signals; those which are approved by the CAA (Civil Aviation Authority) to provide information to aircraft. If the specific location has no aids, then no signals, so no go. There are weather limitations to these navigation aids as well. Some airliners can land at some airports in zero visibility, but in general - although instruments can provide accurate navigation to overhead a specific location - such feats are beyond helicopters at present. New avionics equipment based on GPS (Global Positioning System) or MLS (Microwave Landing System) may allow greater flexibility of operations.

Icing is another factor which can limit helicopter operations. The temperature need not be freezing at surface level for there to be a real risk of icing at height. This is routinely forecast, but if the weather is cold and there is cloud along the route, icing may be a problem.

In the UK, IFR is not permitted by single engined helicopters. It is a legal requirement that all IFR helicopters are twin engined.

So what are the advantages that all this extra expense brings?

Firstly, it is safer to fly under IFR in bad weather than it is to struggle along in marginal VFR (Visual Flight Rules) conditions underneath. Every helicopter pilot has had the experience of fumbling his way along at low level, his eyes peeled for power lines, factory chimneys, rising ground etc., in an attempt to get to his destination. Airborne weather forecasts are sometimes wrong too. The situation is full of traps for the unwary or unprofessional.

IFR capability gives the pilot an escape route out of this situation. He can fly up into the cloud and call for assistance. A classic example can occur when crossing water when the cloud base or freezing level lowers, visibility worsens and the pilot suddenly finds himself in a goldfish bowl of murk at very low altitude, unable to distinguish the water surface. In this situation the IFR helicopter is able to take the safe way out - up. The single can also go up of course, but he may be jumping from the frying pan into the fire.

IFR qualifications are difficult and expensive to gain. Pilots who have such ratings generally know their aircraft better, and therefore tend to be more competent.

IFR capability allows a considerably higher utilisation of the helicopter, and therefore makes it more cost-effective.

A twin engined/IFR capable helicopter has far more freedom, especially when it comes to flying over congested areas.



A single engined machine must always fly over a route where it may land safely in the event of an engine failure. A twin can normally continue safely with its remaining engine.

Having said that, the twin engined helicopter is still something of a novelty to Air Traffic Control (ATC) services. Different operating heights and speeds, turning circles, angles of approach and climb all call for revised ATC procedures. At the moment helicopters have to fit in with all the other airspace users, which often means that they are allotted the time and space for a manoeuvre appropriate to a much larger aircraft, perhaps even a Boeing 747. Times are changing slowly, but we have a long way to go before we reach the level of freedom enjoyed by helicopters in countries such as the USA.

Where Can I Fly From?

Your Own Land

If the land is within the curtilage of your own property, ie, your garden, you do not need planning permission to fly your helicopter from it. This is so when the machine is kept purely for your personal or business use, and you do not carry out any development in connection with its operation (like build a hangar for instance). You should be aware, however, that some homes may have had their 'permitted development rights' removed before construction as part of the planning consent by the local planning office, though this would probably only occur with more modern properties.

It would be very unwise, however, to start flying a helicopter from your back garden or company car-park without consulting your neighbours first. Recent experience has shown that those who neglect this public relations aspect invariably attract unwelcome publicity, which is in itself likely to make local councils take an interest.

Involve your neighbours; show them how responsible you will be, discuss alternative flight paths to avoid flying over their property, offer them an aerial photograph of their homes, promise not to take off at 6 o'clock on a Sunday morning, etc. etc. There is so much you can do to make your life easier, and to indirectly help the helicopter community as a whole. Remember that most people are fascinated by helicopters to start with: it is over-familiarity which breeds contempt.

Over 250 helicopters operate from private land here in the United Kingdom, and most of them do so without causing any hardship at all. That is because most of them fly with consideration to others.

Other Peoples' Land

Commonly called 'ad hoc' sites; these can be used with the owner's permission as long as they are suitable. In this case the site is regarded as 'temporary', and under current legislation - provided it is not used for more than 28 days in a year - planning permission is not required.

Landing sites which are located in built up areas may in addition require special permission from the CAA because of safety regulations. They may well be restricted to twin engined types for the same reason.



Build Your Own Helipad

You should take expert advice on the location and construction of a helipad, which should take into account items such as obstructions and the prevailing wind. In general terms however, you will need:-

a level piece of well drained ground, either good grass or solid surface, but not one which will create dust or gravel when dry. Loose material can be picked up by the down-wash from a helicopter's rotor, and cause damage to the helicopter or nearby buildings, cars or people. Even a solid surface such as concrete should be regularly swept or watered to keep the FOD (Foreign Object Damage) risk as small as possible.

Ideally the area should be about 35 metres in diameter, although 20 metres will be enough for most small, single-engined machines. As many approach paths as possible to the site need to be free of obstructions such as buildings, power lines or tall trees. Use an imaginary line taken from the centre of the landing area, inclined at 8 degrees from the ground out to a distance of at least 200 metres as a guide.

If there is an airfield close to your site, you should check with local air traffic control to see if there is likely to be any conflict.

- Mark it out - with a white 'H' painted in the middle. The legs should be 3m long and 40cm wide, and the crossbar 40cm wide as well. The crossbar should separate the legs so as to give an overall width of the 'H' of 1.8m. The whole should be surrounded by a yellow circle (line width 30cm) with a radius of at least half the overall length of the helicopter. A windsock on a 3m pole should be positioned adjacent to the landing area but clear of it.
- Tell Neighbours About it - and the police. The rules are that if the public has access the local police must be informed. They need not necessarily attend and are certainly not required to give permission for you to go ahead.
- Night Flying - If you are thinking about night operations (more PR required here) consider the appropriate lighting. There are several ways of lighting your pad, but it should ideally have point lighting set into the ground surrounding the pad, and floods to illuminate the immediate surroundings.
- Permanent fire cover - is not required at unlicensed helipads, but it is certainly sensible to provide some facilities. Foam or powder extinguishers should be the minimum: hoses and rescue equipment are worth considering. Ask your local fire service.

How Much Does it Cost?

First of all you pay to have it; then you pay to run it.

There is no doubt that the acquisition and annual operating costs of a helicopter will be more than any other form of transport of similar capacity.

Only the owner can make the judgment as to the viability of his helicopter operation, and this can be arrived at by comparing the actual cost with the service it provides and the time it saves.



The components of the total costs are described below, but the real expenditure will be determined by certain fiscal advantages whereby depreciation and operating charges are legitimate expenses to be claimed for taxation purposes. This is notwithstanding the fact that the value of the machine is likely to increase over the years.

What will you get for your money?

Capital Outlay

There are several ways of acquiring a helicopter. You can buy it outright, lease it over a specific period or buy it with a lease back arrangement to an operating company. In the latter case the owner of the machine leases it back to a company - often the one which sold the machine in the first place - which can hire it out when the owner does not require it. In this way the owner is able to recoup some of the fixed costs.

For current prices, check advertisements in the trade press such as 'Flight International', 'Helicopter World' or 'Helicopter International'. The BHA will be able to provide contacts of member companies who deal in new and used machines.

Calculating Operating Costs

The best way of doing this is to convert all costs into a proportion related to each hour of flight, which can in turn be calculated as a cost per mile. Such a formula can readily be adapted to local conditions, considering skills, maintenance practices, prices and accounting methods.

There are two basic costs directly related to all aircraft: fixed and hourly costs. It is important when comparing such costs to make like-with-like comparisons. For example, some operators apportion crew costs as direct hourly rather than fixed costs; others will ignore unscheduled maintenance on a new machine, bearing in mind the warranty cover and good first year serviceability. Some company accountants prefer not to include overhaul reserves, on the assumption that the aircraft will be sold before reaching those hours.

- **Fixed Costs** - These are usually calculated as annual costs, and are irrespective of the number of hours flown. They include items such as depreciation, insurance, taxes, crew costs, overheads, interest and capital equipment. This last figure will include facility, tooling, equipment and major components. The final figure will naturally vary with the type of helicopter and method of operation.
- **Hourly Costs** - These are the costs that vary directly with the number of hours flown, and are considered under the following headings:
 - Fuel and Oil
 - Scheduled Maintenance Labour
 - Unscheduled Maintenance Labour
 - Engine Overhaul
 - Airframe Overhaul
 - Airframe Lifer Items

Once you have calculated your fixed costs, the total cost per flight hour can be determined by combining them with hourly direct costs. This in turn may be converted into a cost per mile, which incidentally has been compared - using a pre-owned single turbine helicopter - to about the same as that charged by a London black cab.



From the above you can see that total operating costs reduce as flying hours increase; that the fixed costs on a new machine are a large part of total costs (but may be reduced by using the lower capital cost of a used machine), and that direct costs for fuel play a large part. This is particularly true if a piston engined helicopter is envisaged - fuel is more than double that used in jet engines due to the tax that is levied on AVGAS only.

Company Ownership

Although part of the capital cost of a helicopter - together with a percentage of the operating costs - is tax deductible, the main justification for investing in one will be how much use you make of it. This is very much an individual decision, but if a relatively low usage is envisaged you may consider a lease back arrangement with an approved helicopter air taxi operator.

Under this arrangement an operator will agree to utilise your machine when you do not require it. The company will naturally pay you for this facility, but this revenue should be regarded as a contribution to operating costs rather than as a profit.

Ad Hoc Charter

Where full-time availability of a helicopter cannot be justified, an air taxi helicopter can be hired from a wide variety of operators situated around the country. Typical examples of charter rates are given below. They cover the hire of the helicopter and pilot(s) for flying costs per hour, inclusive of fuel. Extra to these are expenses such as landing fees.

- Jet Ranger (4 Passengers) - £400-£500
- Twin Squirrel (4/5 Passengers) - £700-£800
- Sikorsky S76 (8-12 Passengers) - around £1600

Details on these (and other similar) helicopter types may be found in the [BHA Handbook](#).