

SIXTH EUROPEAN ROTORCRAFT AND POWERED LIFT AIRCRAFT FORUM

Paper No. 2

THE FUTURE ROLE OF HELICOPTERS IN PUBLIC TRANSPORT

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SEPTEMBER 16-19, 1980

BRISTOL, ENGLAND

THE UNIVERSITY, BRISTOL, BS8 1HR, ENGLAND

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Captain Cameron, Managing Director of British Airways Helicopters, explains the role in public transport of the most versatile type of aircraft man has ever devised. But it has yet to accomplish its greatest success, that is its acceptance as a means of operating passenger services. All attempts so far to operate economically viable services have failed but one, and that is operated by British Airways Helicopters.

Captain Cameron will explain the background to his success story and assess the prospects for the future as he prepares to launch a new technology helicopter, the 44 seat Chinook, into service.

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It is only 37 years since the first successfully designed production helicopter flew some 40 years ago after the Wright brothers historic flight in 1903. Today the development of the helicopter is still 40 years behind that of the fixed wing aircraft. The technological progress of the rotorcraft has more or less followed in the shadow of the aeroplane. Even so, the helicopter has firmly established itself as the most versatile type of aircraft man has ever devised.

There is no doubt that the rotorcraft has been just as demanding, or more so, on technical skills as its counterpart and over the years we have seen the designer, the aerodynamasist and the mechanical engineer being welded together in a way never before experienced in aviation.

The number of tasks it has performed is too numerous to list, but they range from life saving (and the helicopter has saved thousands of lives), through offshore oil support activities, to aerial crane operations and police patrol work.

But despite these many achievements, the helicopter has yet to accomplish its greatest success - its universal acceptance as a means of operating passenger services.

These have been tried with a variety of helicopters in the past, and all have failed bar one - the service between Penzance and the Isles of Scilly.

And as the person responsible for the planning and operation of the service - and not suffering from that well known affliction known as Scottish modesty - I can give you the four main reasons for the success of this service.

They are:

- 1 The right aircraft - which in 1964, when we launched the service, was the Sikorsky S61.
- 2 The right staff - each was as determined as myself to make it a success both commercially and operationally without a standby aircraft.
- 3 The right heliport - we owned and operated our own at Penzance.
- 4 The right organisation - we did not tolerate any bureaucratic interference and, at the same time, kept fixed wing expertise at a respectable distance.

It would be wrong to assume that our success was due to lack of competition. There are two other means of communication between the Island and the Mainland: one is by ship and the other by STOL aircraft operating out of Newquay Airport.

Last year, our sixteenth on the route, we carried 88,500 passengers. Regularity of over 97 per cent was maintained throughout. Why then, with such an impressive record are there not many more S61s being used, not only by ourselves, but by other operators on other routes? The answer is simple - there are few routes across stormy waters of about 33 nautical miles with dense tourist traffic for six months of the year, giving the high load factors needed to make the service commercially viable.

It does, however, prove one very important point, that a high seat mile cost helicopter can make good profits over short sectors. This, as we all know, is the difficult area for modern fixed wing jets with their high airport and landing charges and interminable taxiing and holding costs.

Enough of the past and the present, now for the future. British Airways Helicopters will be putting into offshore service six long range Boeing Vertol 'Chinook' helicopters next year. Each will be capable of flying some 600 nautical miles with full payload and 44 passengers.

This version of the Chinook is an enormous step forward in the development of civil helicopters, for not only will it enable larger numbers of people to be carried farther in greater comfort, it will directly lead to a helicopter that will be capable of operating short range international services that will be commercially viable.

This stretched version of the Chinook, with a ten foot plug in the fuselage, will be capable of carrying 68 passengers on routes from London to Paris, to Brussels, to Amsterdam, to Rotterdam and to the Channel Islands.

The stretched Chinook will have the General Electric T65, a new technology engine, with improved specifics. This aircraft should appear, certainly by 1984, and its impact on short range inter-city travel will have world wide implications. No longer will the travelling public have to fight their way through overcrowded and congested airports to reach destinations less than 200 miles distant.

This naturally brings up the question of heliports in, or convenient to, city centres. In London we have a site three miles from the City in the West India Dock. This site has, or will have, excellent road and underground communications. It is large enough to cope with the expected demand between the mid-80s and the end of the century.

Such a scheme will assuredly bring prosperity to an area which at present is in great depression. This heliport could cope with up to eight million passengers per year. It is interesting to note that not one acre of agricultural land would be used, or should I say lost.

We as an island race just cannot afford the vast wastage of agricultural land necessary for the construction of more fixed wing airports. And before leaving the subject of heliports, I firmly believe that heliports of the future should be owned and operated by ourselves, the helicopter operators. First hand experience at Penzance has effectively demonstrated the wisdom of this.

I have referred to the shorthaul Continental routes as possibilities for the stretched Chinook. But, of course, the opportunities are much greater. There are other areas in the United Kingdom where these 68 seat helicopters could be used to great advantage. One that immediately comes to mind is that of the Highlands and Islands of Scotland. The closing down and the cost savings of at least six airports, part of which could be credited to the helicopter operator.

The closure to passenger service of three antiquated and extremely expensive (in Government subsidy) rail routes - namely - The West Highland line (Glasgow to Fort William and Mallaig), the Glasgow to Oban line and the Inverness to Dyle of Lochalsh would eventually be necessary. I do not underestimate the public outcry there would be, but we in the helicopter business went through the same situation when we closed St. Just airport at Lands End and retired fixed wing aircraft in 1964. As a result the Government are saving £150,000 per year. This is just a drop in the ocean compared to what British Rail, and thus the British Government, could save in the Highlands and Islands - but most important of all, the public would get a much more efficient service.

I realise that there are those who will dispute my views on the development of passenger services operated by large helicopters.

Their arguments will no doubt be:

- 1 To date no helicopter yet produced has been granted a full Category A Certificate of Airworthiness.
- 2 External noise generated by large machines would be unacceptable operating in city centres.
- 3 The higher seat mile costs of such machines over modern jet aircraft.
- 4 The air traffic control of such operations on an already congested airways system.

Each argument can be answered convincingly.

As regards the C of A, the helicopter, although some 40 years behind in fixed wing design and technology, is making sure progress with failsafe structures just as our fixed wing colleagues have done.

The helicopter, dependent on one main gearbox to sustain flight, must ensure that this vital part (which cannot be duplicated) will in future be internally monitored giving advance warning of any malfunction. Even with helicopters such as the Sikorsky S61 designed some 25 years ago, British Airways Helicopters has an enviable record on air safety and our incident rate compares even better than that of fixed wing scheduled passenger operations.

However, I recognise that such machines in the hands of inexperienced or avaricious operators are a menace to the future of an extremely promising industry.

On the noise issue, the future of the civil passenger transport helicopter depends on its ability to penetrate safely into city centres and as such it must meet stringent noise requirements. Heliports should, therefore, be sited in areas of high ambient noise levels. The West India Dock, which I mentioned earlier, is a good example of this, because very heavy road traffic circles the site.

In order to keep noise footprints to a minimum I believe vertical take offs will be essential. This must be taken note of by designers, who must eliminate the height/velocity restriction curve from flight manuals.

A Category A Certificate of Airworthiness may mean producing over-powered machines and increasing operating costs, but operators will accept these costs in order to reach the tremendous potential provided by city centre operations.

The argument over seat mile costs is totally unrealistic. It would be inconceivable to expect a VTOL aircraft such as a helicopter to operate with the same seat mile costs as a modern fixed wing jet. One either invests in miles of concrete for the aeroplane or put the costs into the helicopter.

What we have proved over the 16 years of helicopter scheduled service operation is that total costs over short sectors are in the helicopter's favour.

Another important factor is the helicopter's ability to maintain high block speeds, taxiing and runway delays which show up so markedly on short range jet aircraft are eliminated. We can expect great improvements in helicopter seat mile costs as they become larger and faster.

I am sure that the product produced by the rotorcraft will find favour with the travelling public, who, after all, will be the sole arbiters in the helicopter's fight to carve a niche in the short range civil transport market.

The fourth argument I mentioned referred to air traffic control. Studies have shown that the bottom of our airways system - by this I mean from 3,000 to 8,000 feet - is rarely used, and this is the airspace we would require. Unlike fixed wing aeroplanes, whose efficiency improves with altitude, the reverse is true of helicopters.

This means flying in the weather instead of above it; however, turbulence is mitigated to a large extent through the rotor system. Our experience of flying helicopters in stormy weather over the North Sea in our oil/gas operations is that few of our passengers suffer from air sickness.

Looking even further ahead to the end of the decade, there is the prospect of even larger helicopters appearing on the civil scene, provided that the military and civilian operators get together to define operational requirements. The Boeing Vertol heavy lift helicopter would give us a three engined, 230 seat machine capable of 160 knot cruise speed. Its low seat mile costs over short stages would ensure it a permanent place on what is a vast untapped civil market.

Other developments in the VTO field are exciting. I refer to the tilt rotor Bell x V5, which will cruise at 300 knots. This will be a small 30/36 seat machine and will be available for commercial use by the end of the decade. It won't compete with the large short range helicopter but will extend the VTOL range to 600 nautical miles.

The Sikorsky ABC (advanced blade concept) is also under test. Again, this is a rotorcraft and as the title suggests has contra-rotating rotors and as such eliminates blade stall. It also cruises at 300 knots.

To helicopter designers and manufacturers I would say that the days are long past when operators will buy underpowered multi-engined helicopters. We must accept that future multi-engined machines can achieve true vertical take offs.

This means that no longer can they hide behind height/velocity restrictions in their flight manual

By so doing three very important features will emerge. First we shall see vertical take offs and a great reduction in the reject take off distances presently required to cater for underpowered helicopters. Secondly, and just as important, it would result in greatly reduced noise footprints, and thirdly, the elimination of present day high helicopter approach speeds under IFR conditions. This latter feature is a must, but it can only be accomplished by the complete removal of present day height/velocity restrictions.

It is true to say that helicopter approaches under IFR conditions can be equalled by STOL aeroplanes; this is a nonsense and is an area in which our industry must make progress. We must be able to steepen approach paths at speeds no greater than 25 knots.

You will notice I have specifically not mentioned vertical landings; these, I believe, can only be made once the ground cushion effect has been established. Any helicopter on a 6 to 8 degree descent to a heliport should not cause noise problems, because unlike modern fixed wing jets, they retain powerful slow speed control down to the hover.

Without these features the future of city centre operations must remain restricted.

Helicopter operations into and out of airports should, in my opinion, be avoided unless for the specific purpose of connecting the airports concerned, as for instance the successful Gatwick/Heathrow link. Using any other method would have had to be at the expense of runway movements, which in the case of the London airports, would have been totally unacceptable to the BAA. There is no doubt, however, that helicopter support systems to our major airports will develop, but I believe that such services will have to be accommodated outside the airports, and in the case of Heathrow the heliport should be sited at Sipson.

If, however, airport authorities provide rooftop landing facilities, and when helicopter manufacturers give us VTO capability without height/velocity restrictions, then I believe it will be possible to fly passengers direct to the airport terminals.

To conclude, as one who has been closely connected with the development of rotorcraft for the past 35 years, I still never cease to marvel at the fact that machines can be developed capable of lifting three times their own weight vertically into the skies.

I consider we are all privileged to be part of this industry and I am sure the 1980s will prove to be as exciting and progressive as the advent of the jet aeroplane into fixed wing service at the end of the 1950s. I am certainly proud to have played a small part in the development of the civil transport helicopter - how I wish I was 30 years younger to enjoy the fruits of my labour.