

The Journal of

THE HELICOPTER ASSOCIATION OF GREAT BRITAIN

CONTENTS include

Vibration Problems associated with the Helicopter
O L L Fitzwilliams

All Weather Operation of Helicopters

(Part I) Engineering Aspects by P A Hearne

(Part II) Piloting Aspects by J W Reid

LONDON

4, THE SANCTUARY,
WESTMINSTER, S W 1

Vol 11 No 3 JUNE, 1957



*Photograph by courtesy of
Helicopter Services Ltd*

HELICOPTER ROTOR BLADES...

*and materials for blade manufacture
produced to B C A R. by*

HORDERN RICHMOND LTD

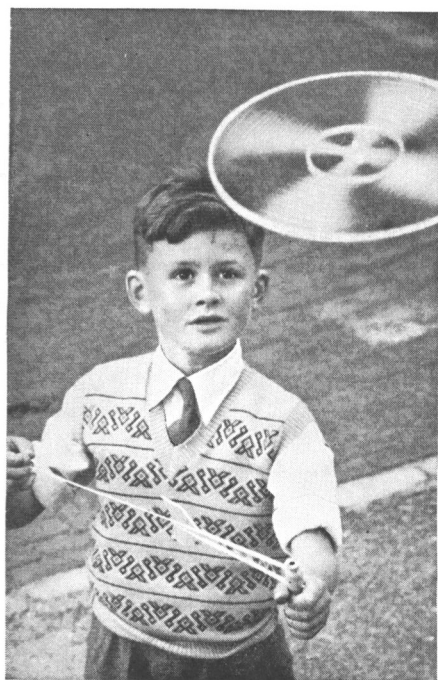
Haddenham, Bucks Tel Haddenham 444/446

- Makers of tail rotor blades for Bristol and Westland Helicopters
- Suppliers of Hy-du-lignum for main rotor blades of Bristol Sycamore and 173 helicopters and for tail rotors of the Saunders Roe Skeeter
- AGENTS FOR BELL and AGUSTA-BELL helicopters in the U K and Republic of Ireland



BELL & HILLER BLADES TO B C A R

A complete type-testing programme using the company's Bell 47G helicopter has been satisfactorily concluded, securing A R B approval for Bell and Hiller rotor blades manufactured by the company under licence from the Bell Helicopter Corporation U S A



Since the earliest days...

Not only the imagination of schoolboys has been captured by the possibilities of vertical flight. Since the earliest days Palmer have enthusiastically worked in close collaboration with Helicopter designers—pioneering the development of many special components.

The Helicopter removable polythene floor tray, for example, is a component pioneered by Palmer in this country—as is the pneumatic bag for the smooth engagement and release of the rotor clutch.

It is because Palmer Tyres, Wheels and Brakes, as well as other Helicopter components, possess *special* features that they are now fitted on most British-designed Helicopters for civil and service use.

There's a wealth of Palmer experience in the development and production of aircraft components at your disposal—experience which can be invaluable when an idea is at the "can it be done?" stage.

Palmer

components are on

WESTLAND TYPE S.51

BRISTOL 'SYCAMORE'

BRISTOL TYPE 192

SAUNDERS-ROE 'SKEETER'

FAIREY 'ROTODYNE'



The Palmer Tyre Limited PENFOLD ST EDGWARE RD LONDON N.W.8

AERO COMPONENTS RAMS VALVES SILVOFLEX HOSE X-RAY INSPECTION SERVICE

S1272



MADE FOR THE JOB

IT WAS part of nature's plan to design a long neck for the giraffe so that it might eat food hanging high above the reach of other beasts. Similar careful thought has been given to every aspect of the Skeeter designed and built by Saunders-Roe to give the finest performance in the many roles which a light helicopter has to fill. The Skeeter is ideal for training, light liaison and A.O.P. duties and is now in production for the British Army, the Royal Air Force and the armed forces of West Germany.

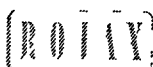
SAUNDERS-ROE LTD

HELICOPTER DIVISION EASTLEIGH SOUTHAMPTON
HEAD OFFICE OSBORNE EAST COWES
ISLE OF WIGHT

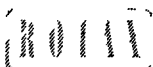
Something to depend on...



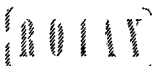
You can depend on it—



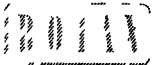
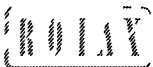
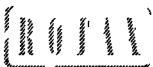
most British aircraft do depend on
Rotax Electrical & Starting Systems



You can depend on it—



the reason is the magnitude and
scope of Rotax research, design
development and manufacturing facilities,
and their unrivalled servicing and
technical information



In fact, you can depend on



**Complete Electrical and Starting
Systems for Aircraft.**

ROTAX LTD Willesden Junction London, NW 10
LUCAS ROTAX (AUSTRALIA) PTY LTD Melbourne and Sydney Australia
LUCAS-ROTAX LTD Toronto, and Montreal, Canada



Powered by two Gazelles

The twin rotor Bristol 192 is powered by two 1 300 s h p N Ga 2 free turbine GAZELLES mounted vertically and with an emergency rating (applicable to single engine operation) of 1 650 s h p. The GAZELLE can be installed in any position between vertical and horizontal.

Powered by two Elands

This Fairey Rotodyne convertible helicopter is powered by two 3 500 e h p ELAND propeller turbines each with an auxiliary compressor mounted co-axially at the rear which supplies compressed air to combustion chambers at the rotor tips for vertical flight.



Powered by two Elands

The 5-blade rotor of the new Westland Westminster helicopter will be powered by two 3 500 e h p ELANDS. Because of its higher power, low cost and ease of maintenance, the ELAND offers new standards of economy for both the airline operator and the air traveller.



Powered by one Gazelle

A single 1 450 s h p N Ga 13 GAZELLE powers the single rotor Westland Wessex in production for the Royal Navy. This rugged engine is designed to work for long periods between overhauls and to withstand the heavy demands of Service operation.



NAPIER

Leads in Helicopter Gas Turbines

D NAPIER & SON LIMITED LONDON W 3

CRC 532



TRANSMISSION

The Bristol Type 171 Sycamore Helicopter uses LAYRUB as the main drive between engine and rotor.

Layrub couplings use rubber trunnion blocks as the main driving elements, giving a fully cushioned drive. As there are no metal to metal contacts, no lubrication is required, therefore little or no maintenance.

Other well-known British aircraft on which Layrub is used either as auxiliary or main drive include Bristol Type 173 Helicopter and Bristol Britannia.

A post-card will see full technical data on its way to you.

AT ITS BEST

Layrub

© R. H. Design 3

LAYCOCK ENGINEERING LTD. · MILLHOUSES · SHEFFIELD 8

World's highest rate of climb

Precise Control

Negligible Maintenance
no specialist ground crew

Assembles in minutes
survives rough handling



The **FAIREY** Ultra-Light

MILITARY HELICOPTER

One three ton truck carries the helicopter pilot, fuel and spares, and functions as a deck for landing and take off, forming an entirely self sufficient mobile unit.



THE FAIREY AVIATION COMPANY LIMITED HAYES MIDDLESEX
ENGLAND AUSTRALIA CANADA

The Journal of THE HELICOPTER ASSOCIATION OF GREAT BRITAIN

President
The Rt Hon IORD BRABAZON OF TARA C B I MC PC Hon F R A e S

Past Presidents
J C Weir C M G C B I F R A e S
I Mensforth C B L M A M I Mech E F R A e S M I P E
Marshal of the R A F Lord Douglas of Kirtleside G C B M C D F C

Vice Presidents
Norman Hill A M I Mech F A R A e S M C A I
R A C Brie A F R A e S A F I A e S

Offices 4, The Sanctuary, Westminster, S W 1 Tel Abbey 5160

VOL 11 No 3

June, 1957

PRICE 10/6

THE COUNCIL

Chairman
C S Hislop Ph D B Sc (Eng)
A R T C M I Mech E
F R A e S

B H Arkell A F R A e S
J A J Bennett D Sc Ph D
F R A e S
R A C Brie A F R A e S
A F I A e S
A E Bristow A R A e S
J A Cameron
L G Frise B Sc F R A e S
A F I A e S

W R Gellatly A F C
R Hafner F R A e S
J F Harper A F C
A McClements A R T C
M I Mech F
F T Meacock A F R A e S
M C A I
J W Richardson A F R A e S
H Roberts Ph D B Sc D I C
A F R A e S A M I Mech I
D L Hollis Williams B Sc
F R A e S

Hon Secretary
Lt Col J W Richardson
A F R A e S

Hon Treasurer
W G Leslie A C I S
Asst Secretary
Miss P Chute

Lecture Sub Committee
J A J Bennett D Sc Ph D
F R A e S (*Chairman*)
R A C Brie A F R A e S
A F I A e S
A McClements A R T C
M I Mech E
J W Richardson A F R A e S
R H Whitby D I C A R C Sc
B Sc A F R A e S
D L Hollis Williams B Sc
F R A e S

Journal Hon Editors

Administrative
B H Arkell A F R A e S

Technical
D M Davies M A A F R A e S
R H Whitby D I C A R C Sc
B Sc A F R A e S
H Roberts Ph D B Sc D I C
A F R A e S A M I Mech E

Librarian
R W L Cure

Auditors
W B Keen & Co

The opinions expressed in papers read before the Association and in the discussions also recorded in this Journal are not necessarily those of the Executive Council or of the Association as a whole

CONTENTS

	<i>Page</i>
VIBRATION PROBLEMS ASSOCIATED WITH THE HELICOPTER	
By O L L FITZWILLIAMS	110
DISCUSSION	144
ALL WEATHER OPERATION OF HELICOPTERS	
Part I Engineering Aspects	
By P A HEARNE	156
Part II Piloting Aspects	
By J W REID	170
DISCUSSION	177
NOTICES	188

OBJECTS OF THE ASSOCIATION

The objects of the Association are to collect compile and disseminate information of a technical and semi technical nature pertaining to Helicopters and all other types of Rotating Wing Aircraft The Association aims to work in close co operation with existing Aeronautical Bodies on matters affecting its objects and it may act as an Advisory Body in the promotion of legislation calculated to be of benefit to the development of Rotating Wing Aircraft

Publications Advertisement Manager
S H Pilton Effingham House Arundel Street London W C 2
