The SEALAND

an economical amphibian

foreword . . .

THE "Sealand" is a twin engine all-metal amphibian aircraft designed for charter and feeder line services, or as an ideal machine for the private owner.

The advantages of the "Sealand" over a normal land-plane are manifold. Possibly the greatest is its ability to land on small stretches of water in localities where airfields are few and far between, and where the expense of building a suitable landing ground involves the operator in a high initial outlay of capital. At the same time where airfields are available the "Sealand" can be flown in for major overhauls.

We specially recommend this aircraft for countries with long coastlines where a service can be run using the small bays and inlets for landing areas, or for countries with large towns on the coasts where the local airfield is within easy distance from the centre of the town.

The private owner will find the "Sealand" an ideal aircraft for use at weekends, cutting out tiring journeys by other forms of transport.

The business man can have the cabins of his "Sealand" specially converted for use as an office with accommodation for secretary and staff.

The charter companies who specialize in freight carrying can have a "Sealand" fitted out for transporting freight only, or a combination of freight and passengers. The entrance hatch has been specially designed so that large crates can be loaded. Stretcher cases may also be conveniently carried, being put aboard through the adjustable-width door.

Shorts

SHORT BROTHERS & HARLAND LTD., BELFAST, NORTHERN IRELAND
Please address inquiries to 17 Grosvenor Street, London, W.1

THE FIRST MANUFACTURERS OF AIRCRAFT IN THE WORLD • ESTABLISHED 1908

amphibian or flying-boat. . .

The "Sealand" is primarily designed as an amphibian but the landing chassis, both main and tail, is readily removable if it is desired to operate from water only. The weight advantage in so doing amounts to 624 lbs. which permits the payload to be increased by that amount.

This operation is simple and only involves the removal of two bolts on each leg and the breaking of the electrical and pneumatic connections. The complete unit can then be lifted out and metal cover plates fitted in place of the wheels to preserve the smooth exterior shape of the aircraft. When this has been done the "Sealand" can still be beached. A simple cradle is fitted under the hull enabling the aircraft to be brought ashore on a slipway or suitable ramp.

The "Sealand" can also be supplied as a flying-boat pure and simple, that is, without any undercarriage structure. This permits the payload to be increased by 1,000 lbs. when operating with full tanks.

A scheme for replacing the wheels with skis is being investigated for operating in conditions of snow and ice.

As an extra the "Sealand" can be fitted with the Sperry "Pilot Aid" which removes the need for dual control. Dual control can, however, be retained if it is desired to use the "Sealand" as a trainer for flying-boat pilots.

passenger comfort . . .

The standard layout includes five passenger seats, three in the forward cabin and two in the after cabin. Each seat is well sprung, and provided with a head rest. There is ample leg room for each passenger.

Very large windows and the absence of a low wing gives each passenger unrestricted views of the country over which the aircraft is flying. There is no need to lean forward to look out of the window ; the passenger can relax and see everything of interest below.

The cabins are upholstered in washable leather-fabric the forward cabin being soundproofed. The colour scheme can be varied to suit individual requirements.

The temperatures are controlled by the pilot but within easy reach of each passenger is an adjustable cold-air louvre.

The cabins themselves are large enough for the passengers to stand up and stretch their legs without pushing past other occupants or falling over outstretched feet. Small hand-luggage can be safely stowed in luggage racks above the seats and ash trays are provided, smoking being permitted in both cabins.

Extra seats can be installed up to a maximum of eight and where desired, a toilet can be fitted in place of the rear seat on the starboard side, or as an addition in the five seat version. This toilet is surrounded by a wooden partition and door, and can, if necessary, be made a permanent feature of the "Sealand." The complete toilet can be installed or removed in a few minutes.

Abaft of the cabin is a large baggage compartment access to which is through a door in the rear cabin. This compartment also contains the aircraft accumulators and the ground supply socket as well as other items.

cockpit . . .

THE COCKPIT

The cockpit has been designed so that every instrument and control is within easy sight and reach of the pilot and at the same time his view is unobstructed. How far the designers have achieved their object can be judged from the illustration.

All the flying instruments are in front of the pilot and the engine controls are within easy reach either in front of the dashboard or on a panel in the roof.

The Marconi wireless is fitted in the starboard side of the dashboard and can be remotely controlled from the port side of the cockpit. If a radio operator is carried, a folding seat can be fitted beside the pilot.

The pilot's seat is adjustable in flight and the rudder pedals can also be moved fore and aft to suit individual pilots.

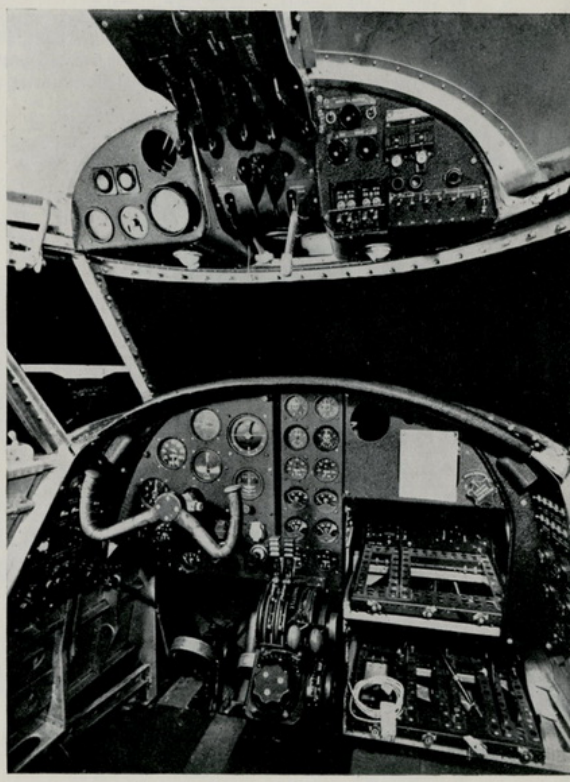
The windscreen has a direct vision panel and the windows on either side of the cockpit slide back, both for additional ventilation and, combined with small folding hatches, for ease of mooring. A windscreen wiper and glycol spray can also be fitted to the direct vision panel.

Heating and ventilation points similar to those in the passenger cabins are provided for the pilot.

Full blind-flying equipment is fitted and illumination of the instruments is by ultra-violet and red lighting.

MOORING

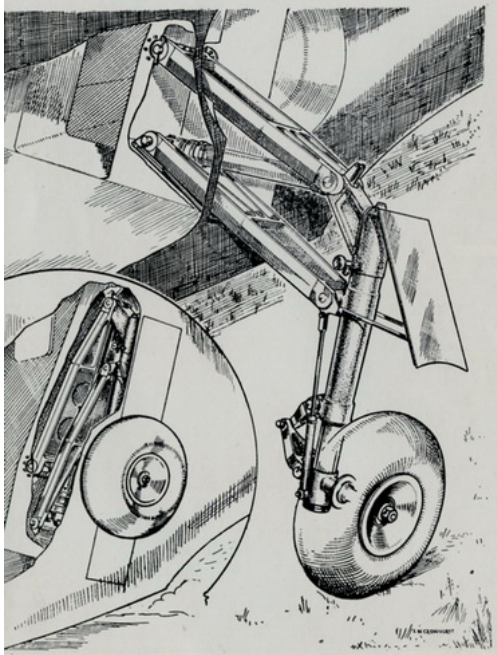
Mooring the "Sealand" is a simple operation. The aircraft is taxied so that the buoy passes close beside the cockpit on the port side; a manœuvre simplified by the reversible-pitch propellers. The pilot using a short boat hook-fitted with a grabbit hook engages the strop on the buoy. He then releases the boat-hook which is attached to a cleat inside the cockpit by a short length of rope. The pilot then slides back the window on the starboard side, opens the folding hatch, and steps out on to a step just above the waterline. From that position he opens the nose hatch and standing inside makes the aircraft fast to the mooring bollard. For take-off purposes, the operation is reversed.



experience in design . . .

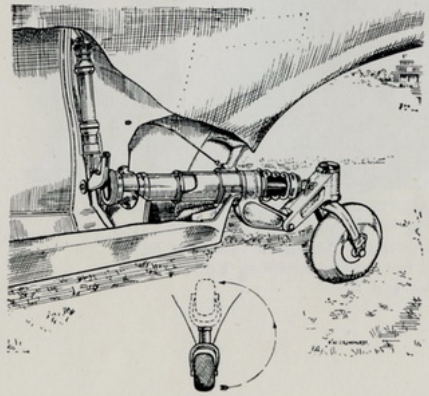
Behind the "Sealand" lies forty years of experience in the manufacturing of aircraft. This unequalled record is brought home to the advantage of the operator in many ways. Shorts' designers know from experience the small snags which mean trouble, delay and expense, and so, forewarned, can give detailed attention to ensuring regular and profitable operation. As examples we show here three points where this careful thought is carried into practice.

Special care is taken to avoid salt-water corrosion in both the main and tail undercarriage units, and an elaborate protective treatment is used. No bronze parts are in contact with light alloy; while special precautions are taken to seal the jack and oleo leg of the main undercarriage, and the compression rubbers of the tail undercarriage. It may be noted also that the wheels have cast light alloy hubs in place of more customary but highly corrodible magnesium alloy castings.



During retraction, the jack extends, and the main undercarriage swings upwards and inwards, the wheel coming to rest in a recess in the side of the hull, a little below the wing. The radius links swing between two parallel frames in the hull which are about one foot apart and have a pronounced forward rake.

In an aircraft of such varied utility as the "Sealand," besides passengers, all shapes and sizes of freight can be carried. The entrance then, is adaptable to these conditions and yet retains a neat appearance.



Retraction consists of rotating the complete undercarriage, in its two horizontal bearings, through 180°. This brings the wheel to rest just under the up-swept portion of the hull.

assembly abroad . . .

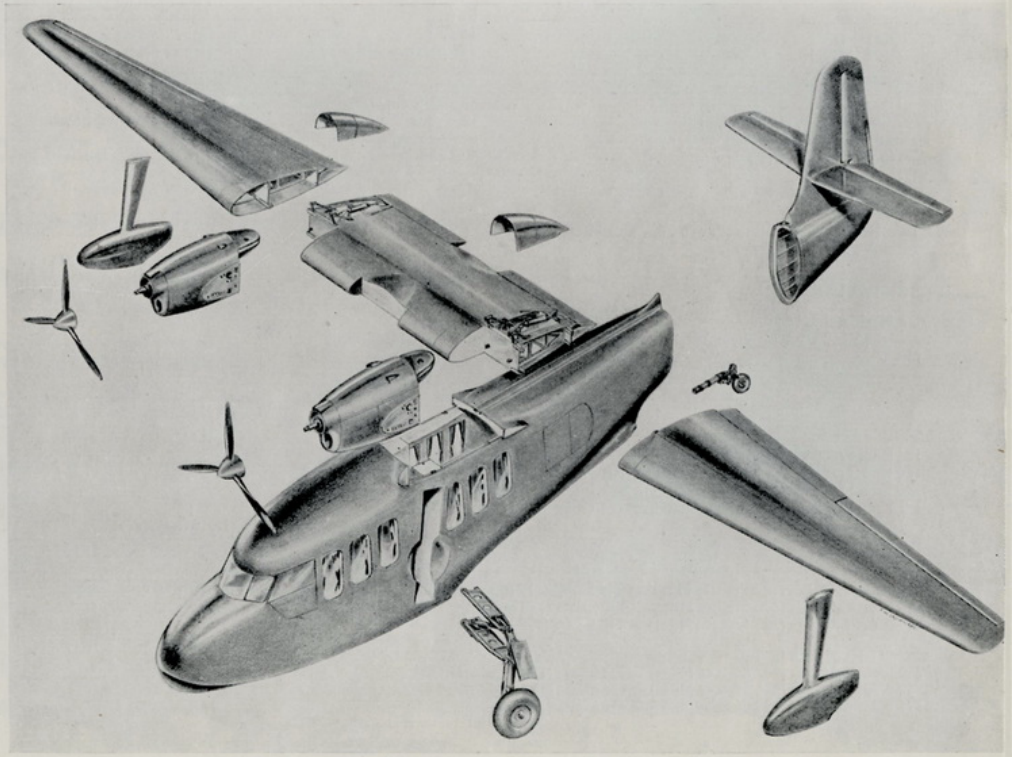
For shipping purposes where it is found that it would be more economical to crate the "Sealand" rather than fly it to its destination, carefully planned production permits of a breakdown as shown here. The value of this system will also be quickly realized in the matter of repairs.

For the convenience of operators studying this important feature, there follows a list of crate sizes and weights.

		L. × B. × D.
Hull (including Chassis, props. and nacelle fairings)	1 case	44′ × 10′ × 7′
Centre Wing	1 case	17′ × 3′ × 7′
Outer Wing	2 cases ea.	23′ × 2′ × 7′
Outer Flaps	1 case	11′ × 2′ × 4′
Centre Flaps	1 case	7′ × 2′ × 4′
Ailerons	1 case	13′ × 3′ × 3′
Wing Tip Floats	2 cases ea.	8′ × 4′ × 3′
Wing Tip Float Struts	1 case	6′ × 5′ × 2′
Tail Planes	1 case	9′ × 2′ × 2′
Elevators	1 case	8′ × 2′ × 3′
Fin	1 case	7′ × 5′ × 2′
Rudder	1 case	8′ × 5′ × 2′
Power Units	2 cases ea.	7′ × 2′ 8″ × 4′

Total Loaded Weight 7 tons, 7 cwts., 1 qtr.

Total Weight of Cases (Empty) 4 tons, 14 cwts., 1 qtr.



data . . .

DIMENSIONS :—

Hull

Overall length	42 ft. 2 in.
Maximum beam at chine	5.25 ft.
Maximum depth	8.5 ft.

Main Plane

Span	59 ft.
Aspect ratio	10
Area (gross)	353 sq. ft.

Control Surfaces

Flaps (area)	65 sq. ft. approx.
Ailerons (area aft of hinge)	19.4 sq. ft.
Tailplane and Elevator (gross)	54.77 sq. ft.
Fin and rudder (net)	40.77 sq. ft.

POWER UNIT :—

Two De Havilland Gipsy Queen 70. Gear Ratio :—0.711 : 1.
345 b.h.p. each at take-off.

PROPELLERS :—

De Havilland 3/1,000/2.
3 Bladed ; 8 ft. 3 in. diameter ; constant speed, fully feathering and reversible pitch.

SPEED :—

173 Knots (200 m.p.h.) at Maximum Power (Altitude 5,200 ft.)
166 Knots (191 m.p.h.) at Climb Power (Altitude 8,000 ft.)
160 Knots (185 m.p.h.) at Rich Cruising Power (Altitude 6,300 ft.)
157 Knots (181 m.p.h.) at Maximum Economic Cruising Power (Altitude 7,800 ft.)

RANGE :—

With full tanks—120 gallons and 994 lbs. of freight

510 Nautical Miles (587 Statute Miles) at 149 knots (172 m.p.h.)
590 Nautical Miles (680 Statute Miles) at 130 knots (150 m.p.h.)
665 Nautical Miles (765 Statute Miles) at 110 knots (127 m.p.h.)

With 54 gallons and 1,400 lbs. of Payload (= seven passengers and baggage)

250 Nautical Miles (287 Statute Miles) at 149 knots (172 m.p.h.)
300 Nautical Miles (346 Statute Miles) at 130 knots (150 m.p.h.)
335 Nautical Miles (385 Statute Miles) at 110 knots (127 m.p.h.)

GENERAL :—

Volume of mooring compartment	16 cu. ft. (.453 m.³)
Volume of pilot's control cabin	58 cu. ft. (1.642 m.³)
Volume of passenger cabin (including toilet)	326 cu. ft. (9.23 m.³)
Volume of toilet compartment	26 cu. ft. (.736 m.³)
Volume of luggage compartment	77 cu. ft. (2.15 m.³)
Volume of luggage stowage (above shelf)	33 cu. ft. (.934 m.³)
Floor loading	22 lb. sq. ft. (107 kilos per m.²)
Size of passenger hatch	1 ft. 11 in. wide × 2 ft. 8 in. deep (.584 m. × .813 m.)
Size of freight hatch	3 ft. 10 in. wide × 2 ft. 8 in. deep (1.168 m. × .813 m.)
Size of mooring hatch	1 ft. 3 in. wide × 1 ft. 10 in. long (.381 m. × .559 m.)
Size of pilot's hatch	2 ft. 0 in. wide × 2 ft. 6 in. deep (.61 m. × .762 m.)
Size of windows	1 ft. 4 in. wide × 1 ft. 10 in. deep (.406 m. × .559 m.)

The two rear windows (1 port and 1 starb'd) in forward cabin are the "push-out" type.

Draught at main step	2 ft. 1 in. (.635 m.)
Freeboard at passenger hatch	1 ft. 3 in. (.381 m.)
Headroom—forward cabin	5 ft. 6 in. (1.676 m.)
Headroom—aft cabin	5 ft. 3 in. (1.60 m.)
Track	10 ft. (3.05 m.)
Ground Clearance at main step	8½ in. (.215 m.)
Ground Clearance—wing-tip floats	3 ft. 4 in. (.99 m.)

RATE OF CLIMB

The rate of climb is :—
880 ft. per minute at sea level
810 ft. per minute at 10,000 ft.
} Without overshoes for propeller de-icing.

CEILING

Service Ceiling 21,600 ft.

LANDING SPEED

Approximately 66 knots (75.9 m.p.h.)

TAKE-OFF DISTANCE

From Water 550 yds. in 26.4 secs.
From Land 430 yds.

N.B.—Above figures are for an all-up-weight of 9,100 lbs.

systems and maintenance . . .

Undercarriage

MAIN

The aircraft is fitted with a landing gear, designed by Electro-Hydraulics, Ltd., for use on land or in shallow water.

The leg comprises a steel inner cylinder (which constitutes the air chamber), a steel sliding tube which is attached directly to the axle, and a forged duralumin outer cylinder.

The outer cylinder is mounted near its upper end on two parallel radius links. These links swing during retraction about two hinges located inside the hull. Thus the cylinder and radius links form a parallelogram in front elevation. This parallelogram is braced, when the undercarriage is down, by the pneumatic retraction jack, which is internally locked. The jack forms a vital part of the undercarriage structure, the lock being subjected to high tensile loads in landing.

The undercarriage possesses a device for preventing inadvertent retraction, when the leg is fully extended.

TAIL

The rubber rings are assembled inside a duralumin cylinder, which is mounted horizontally in two bearings in the hull. Thus the shock absorber is completely enclosed in the hull, while the protruding parts of the undercarriage comprise a wheel and fork, a swivel housing and a hinge bracket.

Radio and Electrical

The electric system is single pole 24 V. The radio is an extra and the " Sealand " has been designed for the following equipments :—Receiver Type AD.108 ; Transmitter Type AD.97 ; Receiver Type AD.7092 ; V.H.F. Receiver Type STR.12 ; M.B.A. Receiver Type AD.86. In addition a radio compass can be mounted on the dashboard in a position easily read by the pilot.

The above systems cover the following radio services :—HF/MF (CW, MCW and R/T) Transmission ; Automatic D/F (MF reception, radio range, radio compass and reception) ; VHF (R/T transmission and reception).

The units are mounted on the starboard side of the dashboard as shown in the cockpit illustration, and the complete units can be removed or replaced in a few minutes for servicing purposes.

Ventilating and Heating

Ventilating and heating on the " Sealand " has been the subject of considerable thought and was finally designed as three entirely separate systems :—

(1) *VENTILATION*

Fresh air enters through inlets in the leading edge of each wing and is distributed through ducts to small individually controlled louvres on the hull side above each passenger seat and in the cockpit.

(2) *COMBINED HEATING AND VENTILATION*

The heating system consists of a heater unit located on each engine exhaust manifold, through which the external air passes to a mixing valve controlled by the pilot. Grills are located near the floor in each cabin and in the cockpit so that a balanced supply of air at the desired temperature can circulate through the aircraft.

(3) *EXTRACTOR SYSTEM*

Grills to extract the waste air are provided in the central duct which runs along the top of the aircraft and which contains all the various systems, such as engine and flying controls. Two cowls are situated on top of the hull and provide the necessary suction, to draw off the waste air.

In this way the various controls are kept at an even temperature during flight.

When a lavatory is fitted a special outlet cowl provides adequate extraction from this compartment.

De-Icing Systems

De-icing systems can be fitted to the " Sealand " if required.

The T.K.S. system for the aerofoils consists of porous metal distributors located in the leading edges of the wings, tail planes and the fin. The de-icing fluid is stored in a tank in the rear baggage compartment and is fed to the aerofoils by means of an electrically operated pump.

Slinger-rings guard the propellers, drawing their fluid from the same tank, while a hand-pump sprays the windscreen from a bow tank. An automatic ice detector relay can be installed, if desired, which makes both the above systems entirely automatic. The whole system is controlled from the cockpit.

The " Sealand " can be supplied with de-icing fitted, with only the pipe line and tanks fitted or without any provision for de-icing. The operator can make his own choice as the total weight reduces the payload by 150 lb.

BILGING

This operation is quickly and easily carried out by a hand-operated pump.

Maintenance

Ease of maintenance both on the water and ashore is a feature of the " Sealand." The flying controls are in a channel along the roof of the cabins and are accessible from the outside by removable panels. There is no need to strip down any of the upholstery to service the various systems.

FUEL TANKS

There is a fuel tank in each wing with a total capacity of 120 gallons. The fuel can be fed from one tank to the other in the event of an engine failure. The engines are started entirely from the cockpit and for use in very cold conditions the Worth oil dilution and High-volatile priming systems are also fitted.

POWER UNITS

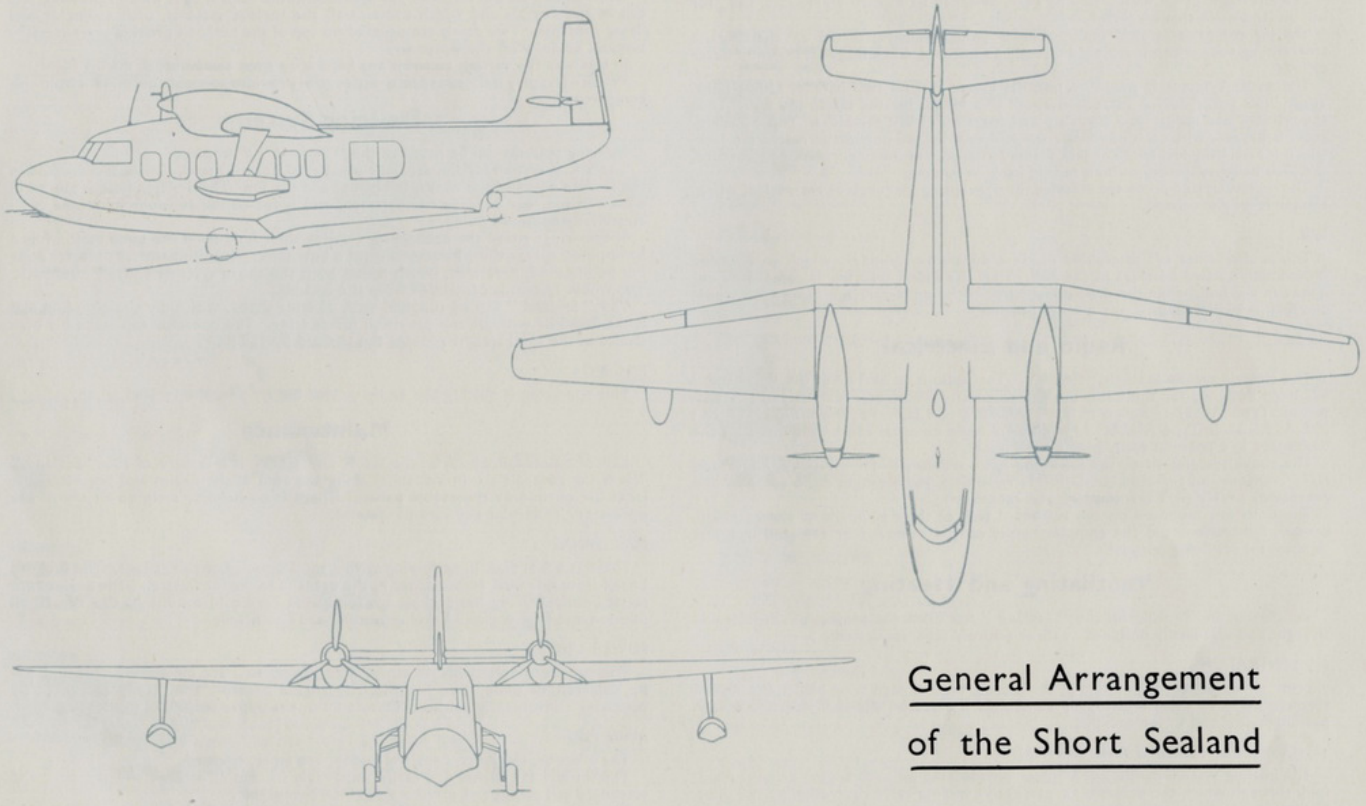
The complete units with oil tanks, accessories, etc., are interchangeable and can be replaced in under two hours. The engine controls are readily accessible by removing conveniently placed access doors in the upper surface of the leading edge.

MAIN PLANES

The ailerons, elevators, flaps and rudder are fabric covered.

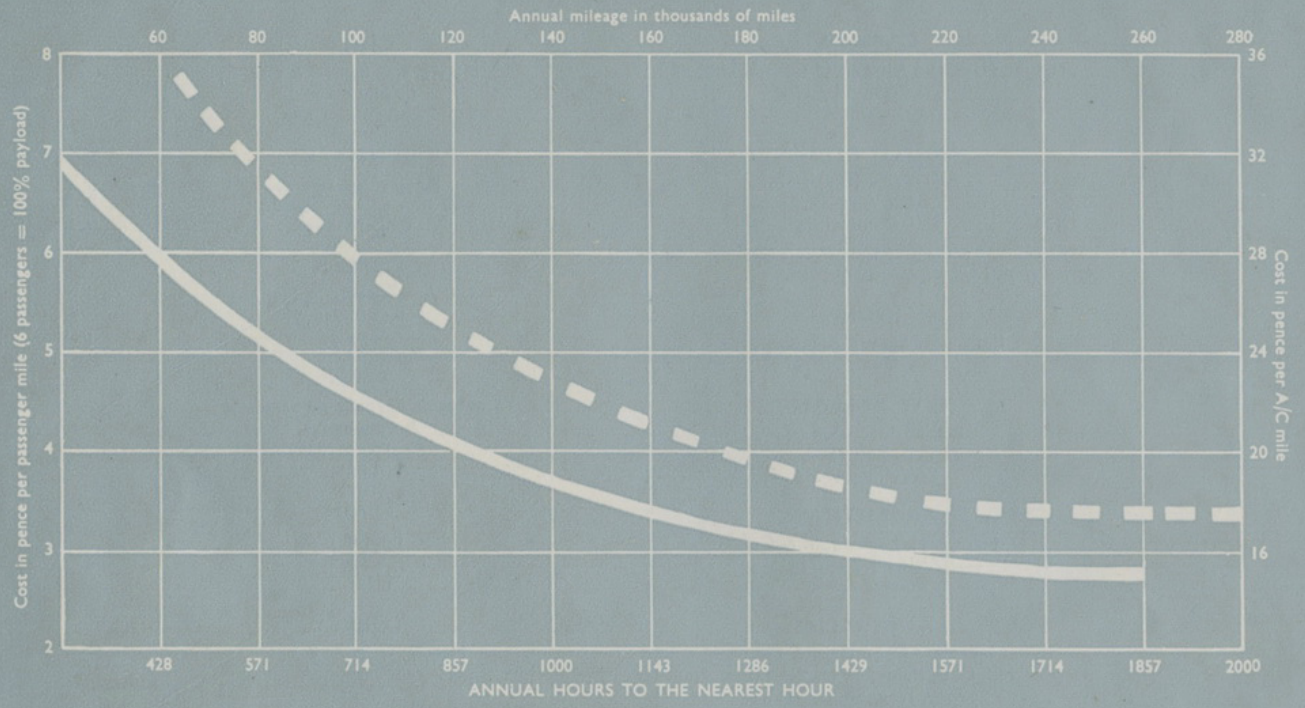
The fin and tail planes are easily removable in case of damage and the port and starboard tail planes and elevators are interchangeable.

The mainplanes can be removed at a point just outboard of the engines. The wing tips can be replaced in a few minutes by the removal of two screws.



General Arrangement of the Short Sealand

operating cost . . .



While, of course, it is impossible, through the widely differing circumstances of operation which exist, to give an accurate estimate of operating costs, the curves shown are calculated on a series of assumptions based on certain facts. These facts embrace all the known factors in air operation and include Prime Cost (aircraft spares, buoys, hangars), Annual Costs (flight and ground insurance, interest on capital, depreciation, C. of A.), and actual running costs under which heading comes cost of fuel and oil (plus extra take-off allowance) engine and airframe maintenance, aircrew salaries and landing costs (including tenders, etc.). It will be seen, therefore, that they represent the most accurate estimate possible under the circumstances. Naturally we would be happy to discuss your own individual conditions and submit revised figures.

Printed in Great Britain by W. & J. Mackay and Co., Ltd., Chatham, Kent

OVERSEAS REPRESENTATIVES

CANADA
The De Havilland Aircraft of Canada Limited,
Station L,
Toronto.

SOUTH AFRICA
Airservice (Pty) Ltd.,
Rand Airport,
Germiston

(Associate Company of The Aircraft Operating Co. of Africa (Pty) Ltd., Johannesburg.)

INDIA
Indian Air Survey & Transport,
Dum-Dum, Bengal.

NEW ZEALAND
British Aircraft, Ltd.,
P.O. Box 1563,
Wellington.

ARGENTINA
Messrs. H. Hennequin & Cia.,
Alsina 902 (R.71),
Buenos Aires.

AUSTRALIA
Messrs. Allison Gray & Co.,
M.L.C. Building, 44 Martin Place,
Sydney, New South Wales.

BRAZIL
Messrs. Murray Simonsen & Cia.,
85 Avenida Rio Branco, Caixa Postal 826,
Rio de Janeiro.

CHILE
Messrs. Rac Barren & Cia.,
Casilla 4108,
Santiago de Chile.

DENMARK
Messrs. Scanagent,
27 Store Kongensgade,
Copenhagen.

GREECE
D. A. Coutroubis, Esq.,
P.O.B. 212,
Athens.

PERU
Compania Peruana de Servicios
Aeronauticas,
Apartado 1050,
Lima.

SPAIN
Snr. Ramon Escario,
Martinez Campos 53,
Madrid.

TURKEY
Messrs. G. & A. Baker,
Pperuayans Han, Tah Takale,
Istanbul.

URUGUAY
Messrs. Regusci & Voulminot,
Av. Rondeau 2027,
Montevideo.