PRESS NOTES

PRESS INSPECTION OF THE LAUNCHING OF THE SAUNDERS-ROE PRINCESS CLASS FLYING BOAT.

Saunders-Roe Ltd.

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With the Compliments of:
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With the launching of the first of the three Princess Flying Boats, designed by Saunders-Roe and ordered by the Ministry of Supply, Britain now possesses the largest passenger-carrying aircraft in the world. These giant aircraft will be able to carry over 200 troops a non-stop distance of 3,550 miles (3,000 nautical miles).

These aircraft were in the first instance intended for service by B.O.A.C., being later transferred to B.S.A.A. The design allowed for the operation of a non-stop service between London and New York, with its stage length of nearly 3,500 miles and the possibility of continuous head winds averaging up to 90 m.p.h. When plans were later made for the flying boats to be operated by B.S.A.A. it was intended that they should fly on the South American route. The original design of the aircraft incorporated plans for spacious and comfortable accommodation for the passengers, with sleeping berths, cocktail bars and every luxury possible in an aircraft.

Present plans for interior arrangement are based on the use of the aircraft as a military transport.

IN THIS CONNECTION, IT IS OF IMPORTANCE TO NOTE THAT THE THREE FLYING BOATS WHEN IN OPERATION COULD, BY VIRTUE OF THE TIME SAVED IN FLYING COMPARED WITH SEA TRAVEL, TRANSPORT IN ONE YEAR AS MANY TROOPS AS COULD BE CARRIED BY NINE ORDINARY TROOPSHIPS ON STRATEGIC TROOPING ROUTES.

The hull of each of these machines is the largest metal structure ever built for an aircraft. In cubic capacity it is equivalent to one suburban train or $3\frac{1}{2}$ Constellation aircraft and into it have gone $2\frac{1}{2}$ miles of longitudinal members, 1,469 square yards of metal plating and three million rivets.

As well as being built to resist the force of water when alighting and taxying, it is also built to withstand the intense pressure required to operate at heights of 40,000 feet.

The Princess is a high-wing ten-engined flying boat with single fin and rudder. The all-up weight is approximately 140 tons but the power weight ratio and the wing loading are such as to ensure exceptional take-off and climb characteristics.

The hull form and single step planing bottom are of advanced design, giving good water handling characteristics combined with clean aerodynamic form.

When still larger flying boats are required, the Princess will provide the foundation for their design.

THE SAUNDERS-ROE PRINCESS FLYING BOATS

Technical data for guidance of Press on the Princess fitted with Proteus III engines for which she was designed. Intermediate engines are fitted in the prototype to enable trials to commence.

Span	210' 6" Floats down 219' 6" Floats up
Length	148'
Height	55' 9"
Wing	
Wingchord at root	30'
Wingchord at tip	11'
Wing thickness at root	5.4'
Wing thickness at tip	1.3'
Aspect ratio	9.5
Wing area	5,000 sq.ft. approx.
Wing loading	63 lb/sq ft. approx.
Hull	
Height	24' 3"
Beam	16' 8"
Draught	8'
Fin & Rudder	
Height above top of hull	31' 6"
Chord at root	25' 6"
Chord at tip	11'
Area	600 sq.ft. approx.
Tail plane	
Span	77'
Chord at root	22'
Chord at tip	6' 9"
Area	1,000 sq.ft. approx.
Cruising speed	380 m.p.h. (330 knots)
Payload	The aircraft is stressed to take a payload of 40,000 lb.
All-up weight	315,000 lb. (140 ton)
Empty weight	190,000 lb. (fully equipped - i.e. less payload & fuel.)

Range 5,500 miles in still air (4,800 nautical miles) with full tanks.

Power Plants

Ten Bristol "Proteus" III propeller turbine engines arranged in four coupled pairs and two single out-board units.

Propellers

De Havilland Type 4+4/6000/6+7½ constant speed. The outer single units drive reversible pitch propellers. Each propeller is 16' 6" in diameter.

The propellers will initially be of the duralumin type but hollow steel blades will be used when these become available.

Fuel

Kerosene. 14,500 gallons of usable fuel (weighing 117,450 lb) will be carried in four integral tanks positioned between the engine units and bounded by the front and rear spars of the wing. No rivetting is used on the tank walls but nuts and bolts sealed with Bostik 606. The tanks are sub-divided by baffle plates which reduce fuel sloshing.

Anti-icing

Leading edge thermal anti-icing on all surfaces. Heat is to be taken from heat exchangers round the jet pipes of the outer engines for the main wing, and kerosene combustion burners will be used in the tail unit, the latter being self-contained units with a separate fuel supply. Air is taken through an intake in the dorsal fin, heated and then circulated through the leading edges. The heaters are ignited electrically from the cockpit.

Pressurisation

The double bubble hull is pressurised to a differential of 8 lb per sq.in. at 40,000 ft. A 60 lb. compressor is situated in each wing between the hull and inboard engines and is driven from the appropriate inboard engines. The pressurised volume is 15,000 cubic feet.

Powered flying controls

After the most careful investigation of the possibilities of aerodynamically and statically balanced controls, the conclusion was reached that manual control by the pilot does not offer a satisfactory solution to the problem of controlling an aircraft of the size and weight of the Princess. So a system of electric-hydraulic powered flying controls has been evolved whereby normal movements of the pilot's controls actuate power units which in turn transmit the desired movement to the control surfaces. All the control surfaces are of the plain flap type, thus avoiding the complications and weight of aerodynamic and static balancing.

Extensive bench and flying trials of this system have been carried out with satisfactory results.

As the pilot's controls are not directly connected to the control surfaces there is no natural load on them, and so "feel" commensurate with that of ordinary controls, is supplied artificially by a feel generator. A travelling fulcrum to vary the force required with the speed of the aircraft is incorporated.

Flaps

Electrically-operated, slotted flaps.

Floats

Retracting to form the wing tip, as originally patented by Saunders-Roe Ltd.

Beaching chassis

A main chassis is fitted on each side of the hull mid-section joint. Each main chassis has four 4 ft. diameter wheels in line athwartships. The two inner wheels will be braked.

A two wheeled bow chassis with three point attachment is fitted.

Beaching or launching can be carried out at a total weight up to 200,000 lb. and this provides an ample margin over the tare weight with all equipment on board.

The beaching chassis are buoyant.