

DIRIGIBLE

THE JOURNAL OF THE AIRSHIP MUSEUM

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NEWS BRIEF

DIRIGIBLE is the journal of the Airship Museum and is published by Friends of Cardington Airship Station. It is published quarterly and distributed free to all members and associate members of FOCAS and, through our close associations, to the Friends of the British Balloon Museum and Library.

■ The objects of FOCAS are to foster and promote the study of the history of airships in every aspect, and to present the results of such study to the public, and to stimulate public interest in the role of Cardington as an airship base and in the conservation of the principal buildings thereof, and in particular to promote and assist in the formation and operation of a museum and study centre devoted to the airship.

Full Membership of FOCAS is limited to persons who, having a particular interest in or knowledge of airships, are approved by the Governing Council, the Trustees, who are elected by members from among their number. There is also provision for Associate Membership, which is open to the public generally. Further information and application forms can be obtained from:

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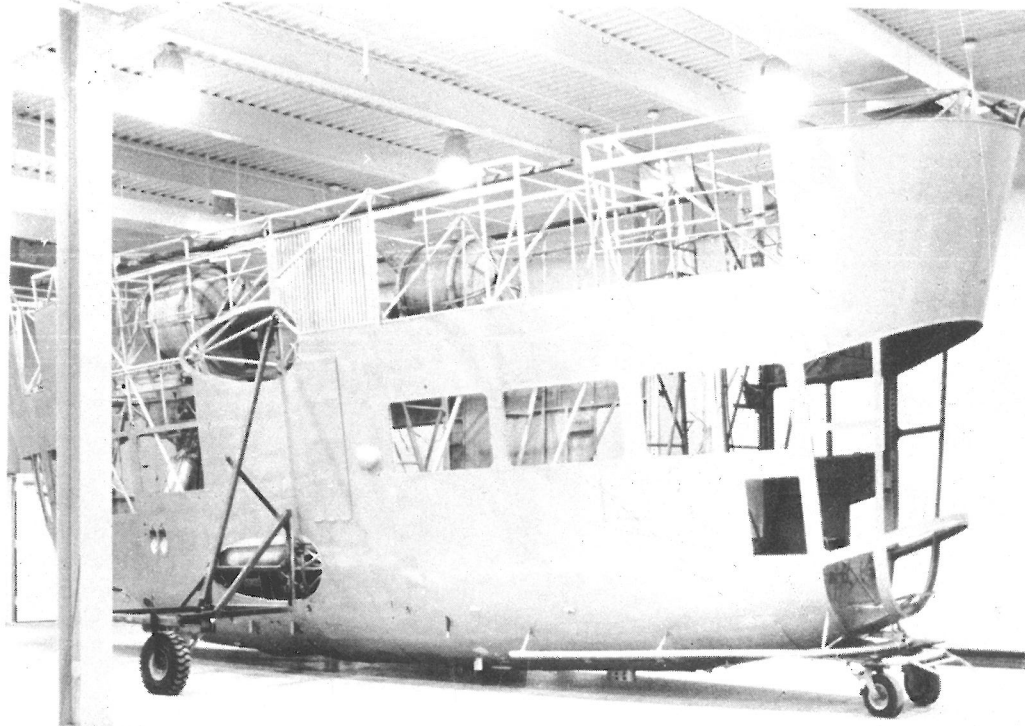
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K Type Gondola

FOCAS has just acquired, from the National Museum of Naval Aviation at Pensacola, Florida the Gondola from the American World War II K Type airship K88. Although in need of extensive renovation, the gondola, which is 40 feet long and 13 feet high comes with engine mounts and cowlings. It is hoped we will be able to obtain engines and propellers at a future date. Once restored, the gondola will become a very important exhibit for the Museum. The cost of shipping the gondola from the USA will be considerable and a leaflet appealing for members support is enclosed with this edition. **Please give generously.**



The partially restored K ship gondola belonging to the National Museum of Naval Aviation. The gondola donated to FOCAS will require a considerable amount of restoration work just to reach this condition.

The Dream of Glory

This was the title of a very successful production of the R101 story by the Bedfordshire Youth Theatre. All seven performances, given in a specially built theatre inside No. 1 Shed, were completely sold out. Throughout the week FOCAS members manned an extensive display of R101 photographs and artifacts which attracted many members of the audience. Albert Hunt saw himself played as a small boy; both he and Don Beattie acted as technical advisers to BYT for the show.

Maiden Flight of R100

At their last meeting, the FOCAS Council had the pleasure of viewing a video recording of the maiden flight of Nigel Well's splendid model of R100. Radio controlled, the ship handled in prototype fashion so well that, for a moment, some of the older members thought that we had come across some archive colour film!

The Raising and Lengthening of the Cardington Airship Shed

Ted Greenstreet provides us with some facts and figures about Shed No. 1, one of Cardingtons principal buildings

The British government decided in 1924 to proceed with the construction of the two great airships R100 & R101, each of 5,000,000 cubic feet capacity. R101 to be built at Cardington and R100 at Howden.

In order to carry out this operation it became necessary to increase the length and height of the existing shed at Cardington which had been sufficiently large enough to house the R33 and R36. The existing shed was 700 feet long with a minimum clear height at the centre of 110 feet and a clear interior width of 181 feet 6 inches extending to an overall exterior width of 254 feet. The capacity above floor level was 17,100,000 cubic feet.

The framing was covered with painted ungalvanised corrugated sheeting, with the exception of the walls to the annexes which were "hybrid" being covered with cement mortar. Both ends of the building were fitted with sliding doors covering the entire height and width of the main transient.

In order to accommodate the new airship it was necessary to increase the length of the shed by four bays, each 33 feet long and increase the height by 35 feet. It was considered in the light of past experience that it was not necessary for doors to be fitted at both ends. The corrugated sheeting was in such bad condition that it would be entirely replaced during the enlargement.

Some job! Tenders were invited for both the design and engineering work. The Cleveland Bridge and Engineering Co Ltd of Darlington put forward the winning bid at a total cost of £105,000.

The major problem was how to increase the height of the shed. Many ways presented themselves including the raising of the shed bodily by a system of hydraulic jacks. This scheme was not adopted in view of the considerable increase in height of 35 feet; moreover the existing building was an entirely bolted structure and lent itself to easy dismantling. This method was adopted and the vertical columns strengthened and increased in height, the roof structure remaining unaltered. Extra stability was provided by new raking struts running down to concrete blocks laid outside the existing foundations. The new raking struts were braced to the existing framework to give them lateral strength and further diagonal and horizontal bracings girders were introduced between the main transverse ribs of the building in its longitudinal plane to supply the additional rigidity necessitated by the increased height.

The original shed had a comparatively flat top to the main door openings, having been designed to accomodate two airships of the R33 type. In order to give greater height in the centre it was decided to remove the wind girder which supported the end sheeting over the doorway and to support this sheeting by smaller framing. This gave an additional headway at the centre of about 11 feet, which, when added to the 35 feet gained by raising the shed



Above: Workmen ascend one of the new 'A' frames.

gave a total increase at the centre of the doorway of 46 feet. This therefore was the effective increase in height of the new buildings over the old.

Naturally the increased height meant greater loads, and the foundations under the existing inside columns were therefore increased from 7 feet 6 inches by 7 feet 6 inches to 11 feet 6 inches square. The foundations at the south west end are embedded in gravel but towards the north east end clay rises to within a foot or two of the surface and most foundations are therefore in clay, the depths averaging about 6 feet.

The lengthening of the shed was a simpler matter than the raising of it, as it was possible to adopt a design distinct from the existing shed. The arch rib with one or two improvements is identical with those in the original structure, but the new "A" frames are naturally of a less complicated form than those formed of new and old work.

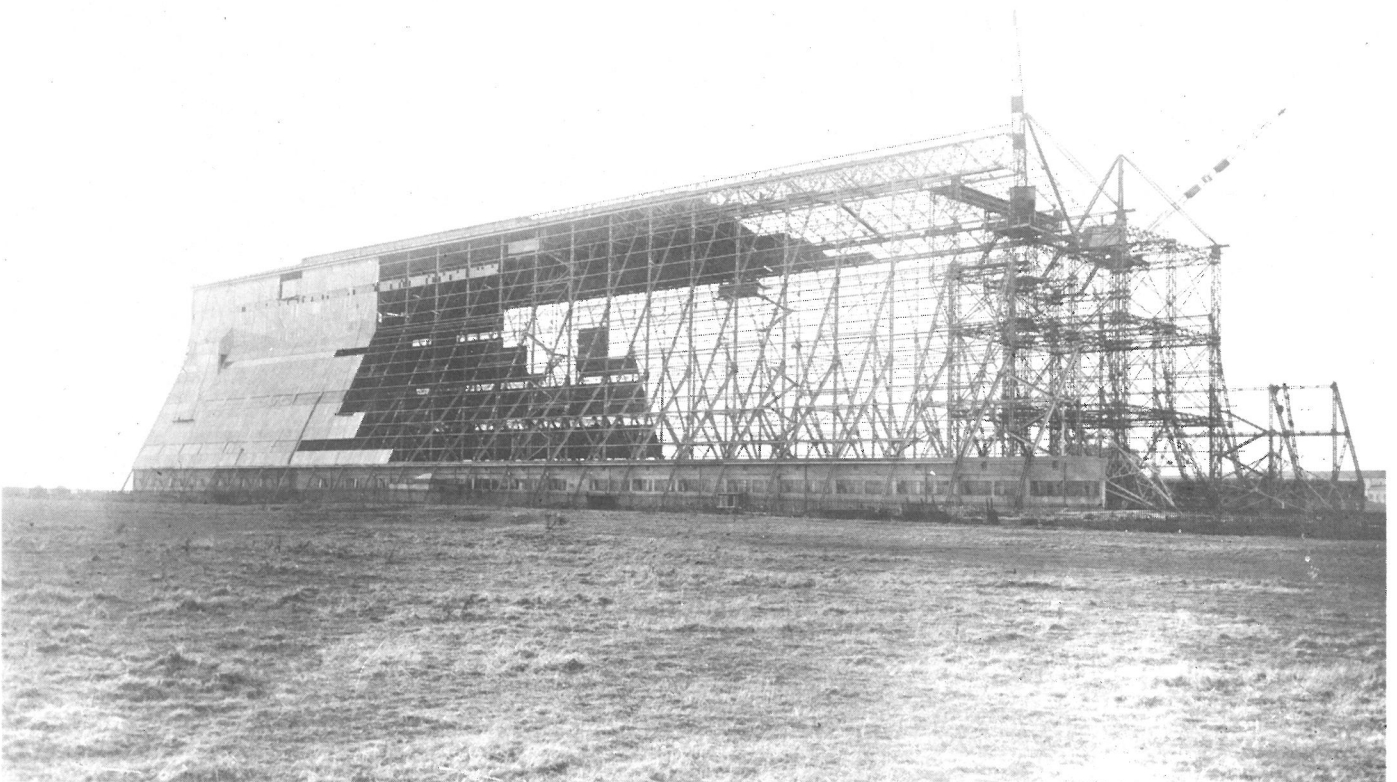
Work commenced at the north east end of the shed following extension of the railway sidings. A Butters steam crane was erected with a 140 feet jib on a 40 feet steel staging. This crane was in turn used to erect a great steel travelling stage "inside" the shed which measured 100 feet wide, 80 feet deep and 120 feet high. It contained 230 tons of steel. This stage was built on a double set of tracks, 90 feet apart, and was

moved forward by means of wire ropes operated by winches secured to the longitudinal sleeper tracks. Two 10 ton Morgan steam cranes with 110 feet jibs were mounted on the top of the staging.

The first task was to remove and disassemble the doors at the North East end. They were then transported to Darlington where much of the framework was adapted to form the frames for the new permanent end, doors for the new shed only being at the South West end. The doors at the south west end were also removed, dismantled and forwarded to Darlington for modification. The whole process of re-erecting to the new specifications was then carried out in reverse using electrically operated drills and pneumatic rivet guns.

Some facts and figures about the doors are of considerable interest. Originally the doors were of the self supporting or ballasted type and this feature was retained for the enlarged design. Constructed in four leaves they were opened and closed by means of a capstan on each leaf and required a large number of men about half an hour to open. The load per wheel amounted to about 33 tons under favourable conditions but rose to as much as 60 tons under worse conditions (wind force of 30lb per sq ft). To carry the extra load of the enlarged doors the gauge of the running track was increased to 3 feet

Below: The travelling stage with its' two steam cranes at the north east end of the shed during the enlargement.



6 inches. The wheels themselves are cast steel and have a diameter of 2 feet 6 inches. They are double flanged at the rim and have roller bearings at the centre in gun metal cages. Each half door weighs 470 tons including about 248 tons of concrete ballast, thus giving a total of 940 tons for the whole door.

The completed shed has a floor area of $4\frac{3}{4}$ acres and a capacity of 26,000,000 cubic feet. The clear width is 180 feet up to a height of 98 feet, the maximum clear height at the centre being 156 feet 8 inches and the total height overall 179 feet 6 inches—in fact high enough to house Nelsons Column! The total length inside the shed is some 812 feet deep. The floor is of concrete, fitted with mooring rings and trenches for carrying pipes for gassing and fuelling of the ship. The sides of the shed were sheeted with 20 gauge galvanised corrugated sheeting, the roofing with 22 gauge 3.5 inch pitch Robertsons protected metal.

The roof is drained into pressed steel gutters at eaves level, and from there into six mild steel tanks situated in the roof, each capable of holding 7000 gallons. These are joined up to service pipes,

connected to eight fire hydrants.

The total amount of steelwork in the framework of the completed shed amounts to about 3,720 tons, exclusive of foundation steelwork. The work was commenced in October 1924 and completed in May 1926 and although the work had been carried out in all weathers, no serious accidents were recorded.

The whole of the work was carried out under the direction of Major General Sir William Liddell, Director of Works and Buildings, Air Ministry, and H.E. Calkey Esq, Deputy Director of the same department. The Resident Engineer for the works at Cardington was Captain R. D. Thomas, R. E. Reserve and D. R. Gibbs esq, who were directly responsible for the administration and execution of the works.

During the winter of 1928-29 the No. 2 shed at Pulham was dismantled and shipped to Cardington for re-erection. Being of similar design as the original shed at Cardington it was likewise enlarged to identical interior dimensions.

Shed No. 1 has stood for almost three quarters of a century, Shed No. 2 for 60 years at Cardington. How many more years will they remain?

CARDINGTON AIRSHIP SHED.

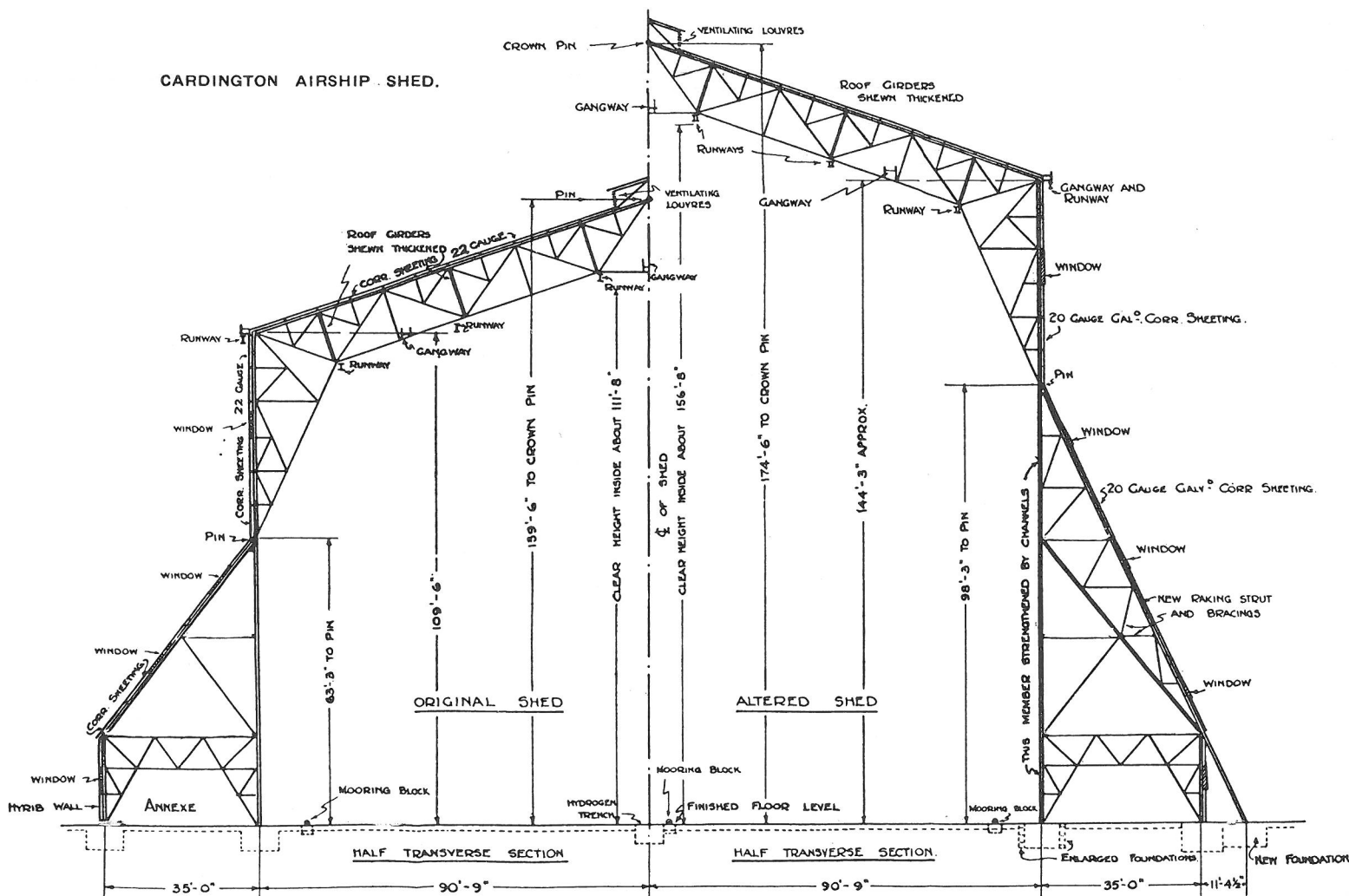


FIG. 1

FIG. 2