

Schaufele Annotations

Chapter 9 Baseline 3-View Layout Drawing

Note that most of this chapter is specific to a four-turboprop regional transport. You must differentiate between the specific information and information that is generic to a three-view drawing. The general layout is quite similar to the YC-15, but with a swept wing and turboprop propulsion.

Three-view drawing

Schaufele Fig. 9-1 shows a fairly standard three-view drawing of a configuration. The bottom right hand corner has a title block that may take various forms, and an example is shown in Fig. 9.3 below.

<i>Drawing Title</i>	
<i>Configuration Number</i>	<i>Drawing Number</i>
Drawn By:	Approved:
Scale:	Revision No:
Date:	Revision Date:
<i>Company Name</i>	

Fig. 9.3 Example of drawing title block

In addition, a three-view usually has a summary of the leading geometric characteristic in a block in the top left hand side of the figure, as illustrated in Fig. 9.4.

Characteristic	Wing	Horiz. Tail	Vert. Tail
Area (sq ft)			
Aspect Ratio			
Span (ft)			
Root Chord (ft)			
Tip Chord (ft)			
Taper Ratio			
M.A.C. (ft)			
Λ @ $\frac{1}{4}$ chord ($^{\circ}$)			
t/c root			
t/c tip			
Dihedral ($^{\circ}$)			

Design Takeoff Gross Weight (lb):

Engine Type:

Installed Takeoff Thrust SLS Std Day (lb):

Fig. 9.4 Characteristics Block

The plan view of the drawing should show the m.a.c. and the x-value of the leading edge of the m.a.c., (marked as LEMAC). Sometimes a three-view will also show a scrap view indicating the lateral tip-over angle, as described in the annotations to Chapter 7.

Fuselage Shaping and Length

Schaufele refers to "corner post noise", which is the noise that often occurs when flight decks have flat panel windshields. Older designs (such as the B-737 and DC-9) have flat panels which at the time of their design were the only type available to meet bird-strike requirements.

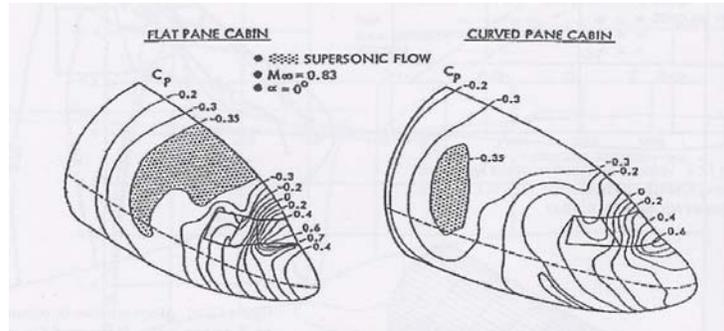


Fig 9.1 Potential flow comparison between flat panel and curved panel windshields (source: AGARD LS-67 Paper 4)

Fig. 9.1 shows a potential flow evaluation of the pressure coefficients on the forebody of a narrow-body commercial transport.

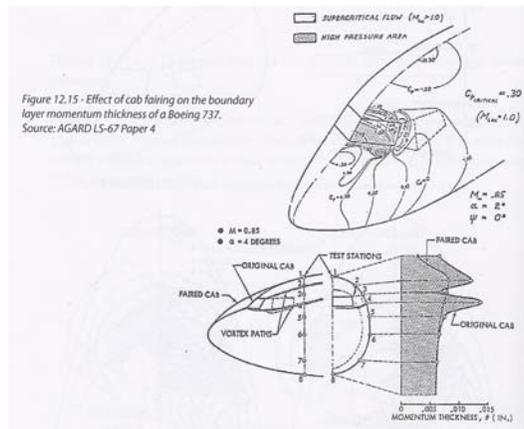


Fig 9.1 Momentum thickness and vortices in the region of a B-737 nose

Vortices from the corner post on the 737 windshield can be seen. They are indicated by an increase in boundary layer momentum thickness, and result in increased drag and flight deck noise. Modern windshields are either flat-wrap (simple curvature) or compound curvature.

Propulsion System

The integrated propulsion and high-lift system is similar to that of the YC-15. This concept was eventually used on the C-17.

Empennage

Schaufele implies that a high-wing configuration should have a T-tail. This is usually the case, but not universal, as exemplified by the Antonov An-125 or An-225. Although not stated in this chapter, the aircraft is probably designed for a 2000 ft take-off field length, and a large vertical stabilizer is required in order to meet the relatively low speed engine-out requirement.