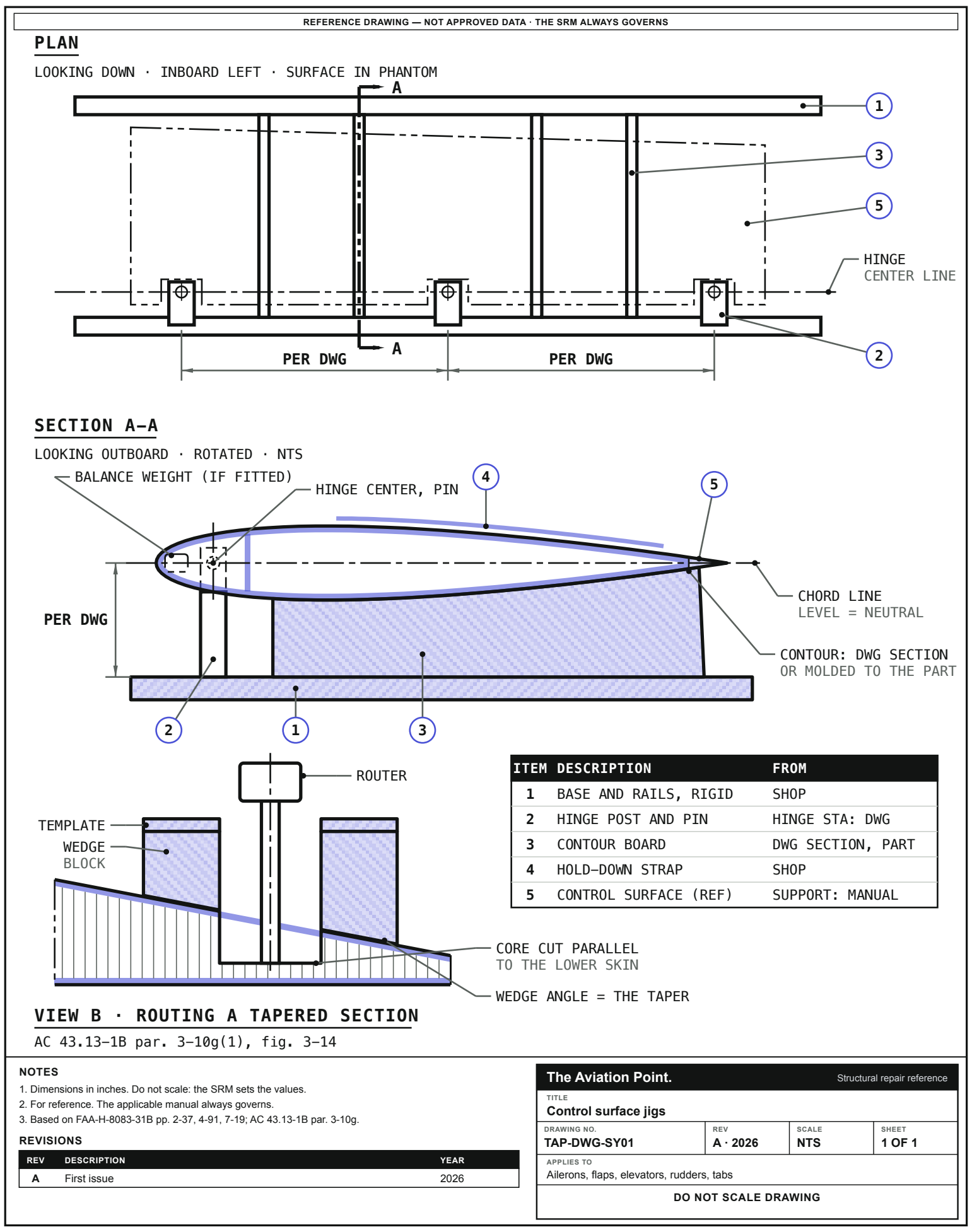
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Control Surface Jigs and Holding Fixtures: Hinge Line, Contour and Balance

Fixtures · hinge line · contour · twist · balance · tab free play

1 Identification



After FAA-H-8083-31B pp. 2-37, 4-91 and 7-19 (figs.

Fixtures and what each one does

Fixture	What it does
`Cradle`	Holds a control surface, wing panel or stabilizer while it is off the aircraft; the aircraft stays on its gear or on jacks
`Repair jig`	Holds parts in position to keep their shape and distributes the loads while an extensive repair is made
`Balancing stand, jig or fixture`	Carries the removed surface on its own hinge points, free to rotate, with the chord line level for neutral
`Rigging fixture, contour template`	Measures control surface travel; markings on it show the travel wanted
`Support tooling, mold`	Supports a bonded or composite part and keeps its contour during cure; in an oven or autoclave the part deforms without it
`Routing template with wedge block`	On a tapered section such as an aileron, lets the router cut the core parallel with the lower surface
`Welding jig or fixture`	Holds the elements to be welded rigidly enough to prevent misalignment from expansion and contraction, and positions them accurately

Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.

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2 Allowable damage

The limits the fixture has to protect

Check	Limit
Rotation on the hinge points	Free, without binding; excessive friction gives a false over- or underbalance
Neutral	Chord line horizontal, checked with a bubble protractor
Balance	Within the specified tolerances, and within the original or maximum allowable value. The values: —, the manufacturer's manual
Arm, calculation method	Hinge center line to the center of the repair, to the nearest 0.01 in [0.25 mm]
Scale, scale method	Graduated in hundredths of a pound: 0.01 lb [4.5 g]
Tab free play, tab span not over 35 % of the surface span	Total at the tab trailing edge not over 2 % of the tab chord
Tab free play, tab span 35 % or more	Not over 1 % of the distance from the tab hinge line to the trailing edge, perpendicular to the hinge line
Paint	No coats beyond what the manufacturer applied
Drainage and ventilation	Kept as built: water or ice trapped in a surface has caused flutter
Hinge-line straightness, contour and twist	—: the aircraft SRM or maintenance manual

3 Repair

1. Get the manual's data.
2. Lay out from the drawing.
3. Pick up the hinge fittings.
4. Add the contour.
5. Check the fixture.
6. Repair, balance, rig, record.

Key points

- **Own points:** the surface hangs from its hinge fittings, free to rotate.
- **Neutral:** chord line level, checked with a bubble protractor.
- **Contour:** boards to the drawing section, or a tool molded to the part.
- **Balance:** checked after the repair; weights only per the manufacturer.
- **Tab free play:** 2 % of tab chord, or 1 % hinge to TE (AC 43.13-1B 4-36d).

MAIN SOURCES · FAA-H-8083-31B, Aviation Maintenance Technician Handbook — Airframe · FAA AC 43.13-1B, Acceptable Methods, Techniques, and Practices — Aircraft Inspection and Repair · TO 1-1A-1 / NAVAIR 01-1A-1, General Manual for Structural Repair

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