TECHNICAL NOTES

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

No. 175

# TESTS ON A MODEL OF THE D AIRPLANE T 39 OF THE "DEUTSCHE FLUGZEUG WERKE" (GERMAN AIRPLANE WORKS).

By Wilhelm Molthan.

From Technische Berichte, Volume III, No.7.

January, 1924.

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# TESTS ON A MODEL OF THE D AIRPLANE T 39 OF THE "DEUTSCHE FLUGZEUG WERKE" (GERMAN AIRPLANE WORKS).*

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Experiments similar to those carried out with the A.E.G. (Allgemeine Elektrizitats-Gesellschaft) DI airplane** were made in the small wind tunnel of the Göttingen laboratory on a model of the D.F.W. airplane T.29.

The model, which is shown in Figure 1, was built on the same plan as that of the A.E.G. DI model, except that the steel rod forming the front wing spar was, of necessity, somewhat lighter. This was, however, offset by the introduction of a rear spar, also made of steel, so that sufficient strength was obtained when the spaces between the sheet metal ribs were filled in. The scale of the model was 1/17, in order to correspond to the dimensions of the wind tunnel.

Three series of tests were carried out on the model with a velocity head (or dynamic pressure) of 5 kg/m² (1.02 lb/ft²), during which one of the movable surfaces was deflected at various angles, while both the others were retained in their central positions.

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* From Technische Berichte, Vol. III, No.7, pp. 253-260. (23d report of the Göttingen Aerodynamical Institute.)
** See Technische Berichte, Vol. III, No.2, p.30.

The horizontal stabilizer was set, in all these tests, at a positive angle of 1.5° to the engine crankshaft axis.

The forces and moments are indicated by their coefficients, as in the case of the A.E.G. model, and the portion cut out of the lower plane by the fuselage (60 $cm^2$ - 9.3 $in^2$), has been restored to the main supporting surface. The area of the main supporting surface is 1515 $cm^2$ (234.83 $in^2$). The moments are referred to this surface and to the maximum chord (10.3 cm - 4.06 in) of the upper wing. The following three axes, at right angles to one another through the center of gravity, have been chosen as axes for the moments, in the same manner as in previous tests.*

The axis of the pitching moment is at right angles to the plane of symmetry and is positive to the left. The axis of the rolling moment is parallel to the engine crankshaft and is positive rearward. The axis of the yawing moment is at right angles to the two above and is positive in an upward direction. The moments are reckoned as positive when the direction of turning is clockwise, as viewed in the direction of the positive axis. A positive pitching moment therefore tends to raise the tail of the airplane and a positive rolling moment tends to raise the right wing, while a positive yawing moment tends to force the tail to the right. The center of gravity, in accordance with the dimensions shown in Figure 1, is in the plane of

* This information is not given in the report on the A.E.G. model, since it was given in another report that should have preceded it, but which has not yet been published.

symmetry of the model, 0.3 cm (.118 in) above the axis of the engine crankshaft and 12.3 cm (4.84 in) behind the nose of the fuselage.

The forces and moments are shown in exactly the same way as for the A.E.G. model in Figures 2 to 7. The angular deflections of the elevator and rudder are reckoned from the mean plane of the corresponding fixed surfaces and that of the ailerons from the direction of the chord of the upper wing.

Of special interest among the results of the tests is the different run of the elevating moments. The curves for the A.E.G. model, rising to the right, denote stability with the elevator locked, while the slight inclination to the left with the D.F.W. model denotes a slight instability. For the maximum $C_L$ values, the stability of the A.E.G. model continues to increase and the instability of the D.F.W. model is converted into stability. The rolling moments shown when the angular deflection of the ailerons is $0^o$, are due in both series of tests, to the unequal distribution of the air velocity over the cross-section of the wind tunnel, rather than to lack of symmetry in the model.

Table 1. Elevator Deflection.

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_m$ |
|---|---|---|---|---|---|
| Elevator $0^o$ | | Rudder $0^o$ | | Aileron $0^o$ | |
| $-9^o$ | -86 | 65.0 | -11.3 | 8.60 | -2.0 |
| -6 | 116 | 48.3 | 15.3 | 6.38 | -2.7 |
| -4.5 | 201 | 44.9 | 26.5 | 5.92 | -3.0 |
| -3 | 290 | 43.9 | 38.2 | 5.79 | -3.8 |
| -1.5 | 366 | 46.0 | 48.4 | 6.07 | -4.2 |
| 0 | 452 | 51.8 | 59.6 | 6.82 | -4.8 |
| 1.5 | 522 | 58.5 | 68.9 | 7.71 | -5.4 |
| 3 | 606 | 68.4 | 79.9 | 9.02 | -5.8 |
| 4.5 | 677 | 79.2 | 89.1 | 10.4 | -6.2 |
| 6 | 752 | 92.6 | 99.2 | 12.2 | -6.6 |
| 9 | 872 | 124.4 | 115.0 | 16.4 | -4.7 |
| 12 | 911 | 179.2 | 120.2 | 23.6 | 0.3 |
| Elevator $5^o$ | | Rudder $0^o$ | | Aileron $0^o$ | |
| $-9^o$ | -76 | 64.7 | -10.0 | 8.55 | 0.0 |
| -6 | 122 | 47.5 | 16.1 | 6.26 | -1.0 |
| -4.5 | 211 | 43.8 | 28.8 | 5.78 | -0.3 |
| -3 | 299 | 44.0 | 39.5 | 5.80 | -1.5 |
| -1.5 | 374 | 46.2 | 49.3 | 6.07 | -2.8 |
| 0 | 456 | 51.1 | 60.0 | 6.73 | -2.9 |
| 1.5 | 530 | 58.9 | 70.0 | 7.76 | -2.5 |
| 3 | 612 | 69.6 | 80.7 | 9.17 | -3.6 |
| 4.5 | 690 | 80.4 | 91.0 | 10.6 | -3.5 |
| 6 | 764 | 93.8 | 101.0 | 12.4 | -3.2 |
| 9 | 880 | 126.4 | 116.5 | 16.7 | -0.8 |
| 12 | 916 | 185.0 | 121.0 | 24.3 | 8.7 |

Table 1. Elevator Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_m$ |
|---|---|---|---|---|---|
| Elevator 10° | | Rudder 0° | | Aileron 0° | |
| -9° | -72 | 64.1 | -9.4 | 8.47 | 3.7 |
| -6 | 135 | 47.0 | 17.8 | 6.21 | 4.2 |
| -4.5 | 214 | 43.5 | 28.2 | 5.75 | 2.6 |
| -3 | 308 | 44.2 | 40.7 | 5.83 | 1.8 |
| -1.5 | 382 | 47.8 | 50.6 | 6.32 | 2.1 |
| 0 | 470 | 53.3 | 62.1 | 7.05 | 1.8 |
| 1.5 | 541 | 60.2 | 71.5 | 7.95 | 1.3 |
| 3 | 628 | 70.5 | 82.9 | 9.31 | 0.9 |
| 4.5 | 700 | 83.2 | 92.5 | 11.0 | 1.7 |
| 6 | 770 | 96.6 | 102.0 | 12.8 | -0.2 |
| 9 | 883 | 129.6 | 116.7 | 17.1 | 1.1 |
| 12 | 933 | 191.7 | 123.4 | 25.3 | 6.1 |
| Elevator 15° | | Rudder 0° | | Aileron 0° | |
| -9° | -62 | 62.9 | -8.3 | 8.30 | 5.1 |
| -6 | 138 | 47.1 | 18.2 | 6.25 | 4.7 |
| -4.5 | 218 | 44.8 | 28.9 | 5.91 | 4.0 |
| -3 | 310 | 44.4 | 41.0 | 5.87 | 3.9 |
| -1.5 | 384 | 47.7 | 50.7 | 6.30 | 3.2 |
| 0 | 473 | 54.2 | 62.4 | 7.17 | 2.8 |
| 1.5 | 544 | 61.9 | 72.0 | 8.18 | 2.7 |
| 3 | 626 | 71.5 | 82.7 | 9.43 | 2.0 |
| 4.5 | 704 | 83.5 | 93.1 | 11.0 | 2.6 |
| 6 | 776 | 98.2 | 102.3 | 13.0 | 1.8 |
| 9 | 888 | 122.7 | 117.0 | 16.2 | 4.9 |
| 12 | 930 | 190.6 | 122.6 | 25.2 | 5.3 |
| Elevator 20° | | Rudder 0° | | Aileron 0° | |
| -9° | -48 | 64.4 | -6.4 | 8.49 | 9.4 |
| -6 | 154 | 50.0 | 20.4 | 6.60 | 8.6 |
| -4.5 | 236 | 49.4 | 31.1 | 6.50 | 7.9 |
| -3 | 331 | 48.6 | 43.6 | 6.40 | 8.1 |
| -1.5 | 406 | 51.9 | 53.6 | 6.85 | 7.3 |
| 0 | 490 | 57.9 | 65.4 | 7.63 | 6.7 |
| 1.5 | 560 | 65.8 | 73.7 | 8.66 | 6.2 |
| 3 | 650 | 77.6 | 85.6 | 10.2 | 6.8 |
| 4.5 | 716 | 89.1 | 94.5 | 11.8 | 5.4 |
| 6 | 796 | 104.8 | 105.0 | 13.8 | 6.3 |
| 9 | 912 | 138.2 | 120.0 | 18.2 | 7.5 |

Table 1. Elevator Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_m$ |
|---|---|---|---|---|---|
| Elevator 25°. | | Rudder 0° | | Aileron 0° | |
| -9° | -33 | 67.3 | -4.4 | 8.88 | 11.8 |
| -6 | 160 | 51.1 | 21.1 | 6.75 | 11.5 |
| -4.5 | 245 | 49.3 | 32.4 | 6.50 | 10.6 |
| -3 | 335 | 50.8 | 44.3 | 6.71 | 10.2 |
| -1.5 | 412 | 54.2 | 54.5 | 7.15 | 9.9 |
| 0 | 498 | 61.1 | 66.0 | 8.06 | 9.4 |
| 1.5 | 570 | 69.8 | 75.0 | 9.21 | 8.9 |
| 3 | 652 | 81.6 | 86.2 | 10.8 | 9.4 |
| 4.5 | 726 | 94.0 | 96.0 | 12.4 | 8.5 |
| 6 | 799 | 103.8 | 106.0 | 14.4 | 8.1 |
| 9 | 910 | 142.2 | 120.0 | 18.8 | 7.6 |
| Elevator 30°. | | Rudder 0° | | Aileron 0° | |
| -9° | -33 | 69.1 | -4.4 | 9.12 | 13.8 |
| -6 | 169 | 55.1 | 22.3 | 7.28 | 14.0 |
| -4.5 | 254 | 53.7 | 33.6 | 7.09 | 12.8 |
| -3 | 340 | 55.4 | 45.0 | 7.31 | 13.1 |
| -1.5 | 423 | 60.0 | 55.8 | 7.93 | 12.5 |
| 0 | 511 | 67.4 | 67.5 | 8.90 | 12.6 |
| 1.5 | 580 | 76.3 | 76.5 | 10.1 | 12.9 |
| 3 | 658 | 88.8 | 87.0 | 11.7 | 11.1 |
| 4.5 | 730 | 101.5 | 96.4 | 13.4 | 10.1 |
| 6 | 799 | 114.0 | 105.6 | 15.1 | 7.9 |
| 9 | 902 | 145.0 | 119.1 | 19.2 | 6.6 |
| Elevator -5° | | Rudder 0° | | Aileron 0° | |
| -9° | -96 | 68.3 | -12.5 | 9.01 | -5.8 |
| -6 | 104 | 50.2 | 13.8 | 6.62 | -6.1 |
| -4.5 | 189 | 47.0 | 24.9 | 6.20 | -7.5 |
| -3 | 278 | 46.1 | 36.6 | 6.07 | -7.7 |
| -1.5 | 352 | 48.2 | 46.4 | 6.36 | -8.5 |
| 0 | 438 | 52.8 | 57.7 | 6.96 | -8.9 |
| 1.5 | 514 | 59.5 | 67.7 | 7.84 | -9.0 |
| 3 | 594 | 69.4 | 78.2 | 9.15 | -10.0 |
| 4.5 | 668 | 80.2 | 87.8 | 10.6 | -9.2 |
| 6 | 744 | 93.7 | 98.0 | 12.3 | -9.3 |
| 9 | 860 | 125.1 | 113.0 | 16.5 | -9.9 |
| 12 | 904 | 182.5 | 119.0 | 24.1 | -3.2 |

Table 1. Elevator Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_m$ |
|---|---|---|---|---|---|
| Elevator -10° | | Rudder 0° | | Aileron 0° | |
| -9° | -103 | 71.2 | -13.6 | 9.40 | -7.0 |
| -6 | 100 | 51.7 | 13.2 | 6.82 | -8.0 |
| -4.5 | 184 | 48.4 | 24.4 | 6.39 | -3.4 |
| -3 | 274 | 47.3 | 36.1 | 6.23 | -9.1 |
| -1.5 | 346 | 48.6 | 45.8 | 6.42 | -9.7 |
| 0 | 435 | 53.4 | 57.5 | 7.05 | -10.2 |
| 1.5 | 507 | 59.8 | 67.0 | 7.90 | -11.2 |
| 3 | 590 | 69.3 | 78.0 | 9.35 | -11.6 |
| 4.5 | 664 | 79.7 | 88.0 | 10.5 | -11.8 |
| 6 | 741 | 92.4 | 98.0 | 12.2 | -11.2 |
| 9 | 857 | 134.0 | 113.0 | 16.4 | -11.6 |
| 12 | 900 | 182.9 | 119.0 | 24.1 | -5.0 |
| Elevator -15° | | Rudder 0° | | Aileron 0° | |
| -9° | -112 | 74.8 | -14.9 | 9.90 | -11.0 |
| -6 | 86 | 56.7 | 11.4 | 7.50 | -12.6 |
| -4.5 | 170 | 52.1 | 22.5 | 6.80 | -13.2 |
| -3 | 258 | 50.4 | 34.1 | 6.68 | -15.4 |
| -1.5 | 332 | 51.7 | 43.9 | 6.82 | -15.0 |
| 0 | 420 | 56.1 | 55.6 | 7.42 | -14.5 |
| 1.5 | 497 | 63.0 | 65.8 | 8.33 | -14.8 |
| 3 | 578 | 71.5 | 76.3 | 9.48 | -15.7 |
| 4.5 | 649 | 81.1 | 85.8 | 10.7 | -15.8 |
| 6 | 725 | 93.6 | 96.0 | 12.4 | -15.6 |
| 9 | 844 | 123.6 | 111.9 | 16.4 | -14.1 |
| 12 | 894 | 179.8 | 118.2 | 23.7 | -7.5 |
| Elevator -20° | | Rudder 0° | | Aileron 0° | |
| -9° | -117 | 81.4 | -15.5 | 10.9 | -14.2 |
| -6 | 72 | 62.8 | 9.6 | 8.30 | -15.0 |
| -4.5 | 158 | 58.2 | 20.0 | 7.70 | -16.2 |
| -3 | 244 | 56.5 | 32.1 | 7.48 | -16.8 |
| -1.5 | 321 | 57.7 | 42.5 | 7.61 | -17.7 |
| 0 | 404 | 60.5 | 53.2 | 8.00 | -17.8 |
| 1.5 | 473 | 65.8 | 62.4 | 8.69 | -18.2 |
| 3 | 556 | 75.0 | 73.4 | 9.91 | -19.6 |
| 4.5 | 630 | 83.9 | 83.2 | 11.1 | -19.5 |
| 6 | 705 | 95.6 | 93.1 | 12.6 | -21.4 |
| 9 | 824 | 123.7 | 108.8 | 16.4 | -19.9 |
| 12 | 888 | 176.5 | 117.2 | 23.4 | -8.1 |

Table 1. Elevator Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_m$ |
|---|---|---|---|---|---|
| Elevator-25° | | Rudder 0° | | Aileron 0° | |
| -9° | -125 | 83.3 | -16.5 | 11.0 | -13.7 |
| -6 | 74 | 63.3 | 9.8 | 8.35 | -14.3 |
| -4.5 | 156 | 59.0 | 20.5 | 7.79 | -15.9 |
| -3 | 243 | 57.7 | 32.1 | 7.63 | -16.8 |
| -1.5 | 314 | 58.6 | 41.5 | 7.74 | -17.6 |
| 0 | 396 | 62.2 | 52.3 | 8.22 | -19.6 |
| 1.5 | 472 | 68.4 | 62.4 | 9.03 | -19.0 |
| 3 | 552 | 76.6 | 72.9 | 10.1 | -21.0 |
| 4.5 | 624 | 86.0 | 82.4 | 11.4 | -21.1 |
| 6 | 700 | 96.0 | 92.3 | 12.7 | -21.2 |
| 9 | 815 | 125.6 | 107.5 | 16.6 | -21.5 |
| 12 | 876 | 173.9 | 115.6 | 23.0 | -14.2 |
| Elevator-30° | | Rudder 0° | | Aileron 0° | |
| -9° | -126 | 88.6 | -16.7 | 11.7 | -13.7 |
| -6 | 68 | 66.9 | 9.0 | 8.82 | -14.7 |
| -4.5 | 157 | 62.0 | 20.7 | 8.19 | -15.1 |
| -3 | 245 | 60.0 | 32.4 | 7.92 | -16.1 |
| -1.5 | 320 | 60.3 | 42.1 | 7.95 | -17.0 |
| 0 | 405 | 64.4 | 53.5 | 8.50 | -17.7 |
| 1.5 | 472 | 69.4 | 62.3 | 9.15 | -19.2 |
| 3 | 554 | 79.4 | 73.1 | 10.4 | -19.0 |
| 4.5 | 626 | 88.3 | 82.6 | 11.7 | -20.7 |
| 6 | 699 | 100.9 | 92.2 | 13.3 | -21.2 |
| 9 | 808 | 128.7 | 107.0 | 16.9 | -23.6 |
| 12 | 866 | 178.0 | 114.0 | 23.5 | -16.0 |

Table 2. Rudder Deflection.

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_n$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 5° | | Aileron 0° | |
| $-12°$ | -264 | 93.6 | -34.7 | 12.4 | 2.05 | -6.5 |
| - 9 | - 78 | 59.8 | -10.3 | 7.87 | 1.51 | -2.5 |
| - 6 | 120 | 44.2 | 15.7 | 5.83 | 1.79 | -3.0 |
| - 4.5 | 206 | 41.0 | 27.2 | 5.42 | 1.67 | -3.6 |
| - 3 | 291 | 41.7 | 38.3 | 5.50 | 1.60 | -4.1 |
| - 1.5 | 368 | 42.5 | 48.6 | 5.60 | 1.38 | -4.2 |
| 0 | 450 | 45.5 | 60.0 | 6.00 | 1.08 | -4.0 |
| 1.5 | 520 | 52.6 | 68.6 | 6.94 | 1.17 | -4.5 |
| 3 | 609 | 61.0 | 80.5 | 8.05 | 0.92 | -4.6 |
| 4.5 | 675 | 70.7 | 89.1 | 8.33 | 1.14 | -3.6 |
| 6 | 746 | 82.3 | 98.5 | 10.9 | 0.71 | -4.6 |
| 9 | 866 | 112.3 | 114.0 | 14.8 | 0.26 | -3.5 |
| 12 | 904 | 156.2 | 119.0 | 20.6 | 0.92 | +1.9 |
| 15 | 924 | 277.6 | 122.0 | 36.6 | -4.86 | +7.7 |
| Elevator 0° | | | Rudder 10° | | Aileron 0° | |
| $-12°$ | -264 | 94.5 | -34.8 | 12.5 | 2.69 | -6.9 |
| - 9 | - 77 | 61.1 | -10.2 | 8.10 | 2.06 | -2.7 |
| - 6 | 118 | 45.0 | 15.6 | 5.94 | 2.31 | -3.1 |
| - 4.5 | 205 | 41.5 | 27.1 | 5.50 | 2.33 | -3.5 |
| - 3 | 288 | 40.9 | 38.0 | 5.40 | 2.01 | -3.9 |
| - 1.5 | 364 | 42.3 | 48.1 | 5.60 | 1.66 | -4.2 |
| 0 | 445 | 47.2 | 58.8 | 6.22 | 1.72 | -4.6 |
| 1.5 | 520 | 52.8 | 68.7 | 7.00 | 1.25 | -4.3 |
| 3 | 600 | 62.4 | 79.2 | 8.25 | 1.44 | -5.0 |
| 4.5 | 676 | 73.5 | 89.1 | 9.70 | 1.00 | -4.9 |
| 6 | 748 | 85.6 | 98.8 | 11.3 | 0.91 | -5.0 |
| 9 | 859 | 112.9 | 113.6 | 14.9 | 0.22 | -3.6 |
| 12 | 904 | 169.6 | 120.0 | 22.4 | -0.83 | +0.9 |
| 15 | 882 | 268.8 | 116.3 | 35.5 | -3.02 | +7.1 |

Table 2. Rudder Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_n$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 15° | | Aileron 0° | |
| $-12^{\circ}$ | -263 | 96.2 | -34.8 | 12.6 | 3.64 | -7.5 |
| - 9 | - 82 | 62.8 | -10.8 | 8.30 | 3.01 | -3.2 |
| - 6 | 119 | 45.6 | 15.7 | 6.02 | 3.02 | -2.0 |
| - 4.5 | 204 | 41.9 | 26.9 | 5.53 | 2.90 | -3.7 |
| - 3 | 288 | 42.4 | 38.0 | 5.60 | 2.95 | -4.2 |
| - 1.5 | 362 | 44.1 | 47.9 | 5.83 | 2.87 | -4.6 |
| 0 | 446 | 47.9 | 58.9 | 6.32 | 2.53 | -4.7 |
| 1.5 | 517 | 54.5 | 68.2 | 7.21 | 2.31 | -4.7 |
| 3 | 597 | 62.6 | 78.8 | 8.27 | 1.90 | -5.0 |
| 4.5 | 666 | 72.6 | 88.0 | 9.60 | 1.97 | -5.5 |
| 6 | 738 | 83.9 | 97.3 | 11.1 | 1.94 | -5.1 |
| 9 | 858 | 115.6 | 113.4 | 15.2 | 1.18 | -4.2 |
| 12 | 900 | 166.4 | 119.0 | 22.0 | -0.32 | 2.0 |
| 15 | 880 | 272.8 | 116.2 | 36.1 | -2.01 | 6.5 |
| Elevator 0° | | | Rudder 20° | | Aileron 0° | |
| $-12^{\circ}$ | -267 | 96.7 | -35.2 | 12.8 | 4.35 | -7.7 |
| - 9 | - 80 | 64.2 | -10.5 | 8.47 | 3.65 | -3.6 |
| - 6 | 113 | 46.6 | 14.9 | 6.15 | 3.42 | -3.8 |
| - 4.5 | 204 | 43.3 | 27.0 | 5.72 | 3.45 | -3.8 |
| - 3 | 284 | 42.8 | 37.6 | 5.65 | 3.26 | -4.6 |
| - 1.5 | 366 | 43.8 | 48.4 | 5.79 | 3.18 | -4.7 |
| 0 | 446 | 49.7 | 58.9 | 6.55 | 3.02 | -5.5 |
| 1.5 | 516 | 56.8 | 68.1 | 7.49 | 3.03 | -5.4 |
| 3 | 604 | 65.5 | 79.8 | 8.61 | 2.86 | -5.7 |
| 4.5 | 666 | 75.5 | 88.0 | 9.94 | 2.86 | -5.2 |
| 6 | 744 | 87.6 | 98.2 | 11.6 | 2.57 | -5.8 |
| 9 | 861 | 117.9 | 114.0 | 15.5 | 1.88 | -4.7 |
| 12 | 901 | 170.7 | 119.0 | 22.6 | 0.76 | 0.5 |
| 15 | 686 | 274.5 | 117.0 | 36.1 | -2.28 | 6.8 |

Table 2. Rudder Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_n$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 25° | | Aileron 0° | |
| -12° | -266 | 99.6 | -35.1 | 13.2 | 5.30 | -8.2 |
| - 9 | - 82 | 65.8 | -10.8 | 8.70 | 4.65 | -4.1 |
| - 6 | 112 | 48.7 | 14.8 | 6.43 | 4.30 | -4.2 |
| - 4.5 | 197 | 45.1 | 26.0 | 5.96 | 4.42 | -4.6 |
| - 3 | 284 | 44.6 | 37.5 | 5.90 | 4.38 | -5.4 |
| - 1.5 | 364 | 46.2 | 48.0 | 6.10 | 4.19 | -5.4 |
| 0 | 444 | 50.9 | 58.6 | 6.71 | 4.03 | -5.8 |
| 1.5 | 517 | 56.5 | 68.2 | 7.46 | 3.59 | -5.8 |
| 3 | 593 | 66.3 | 78.4 | 8.75 | 3.56 | -5.6 |
| 4.5 | 662 | 75.4 | 87.5 | 9.95 | 3.48 | -5.8 |
| 6 | 738 | 87.9 | 97.5 | 11.6 | 3.39 | -5.9 |
| 9 | 852 | 116.6 | 112.5 | 15.4 | 2.75 | -4.8 |
| 12 | 895 | 169.1 | 118.0 | 22.4 | 1.24 | -0.6 |
| 15 | 879 | 274.1 | 116.0 | 36.2 | -0.18 | 6.0 |
| Elevator 0° | | | Rudder -5° | | Aileron 0° | |
| -12° | -258 | 91.4 | -34.0 | 12.1 | -1.41 | -7.0 |
| - 9 | - 78 | 58.7 | -10.4 | 7.73 | -1.77 | -2.4 |
| - 6 | 122 | 43.2 | 16.0 | 5.70 | -1.34 | -2.9 |
| - 4.5 | 206 | 40.6 | 27.1 | 5.37 | -1.23 | -3.0 |
| - 3 | 288 | 39.8 | 38.1 | 5.25 | -1.16 | -3.5 |
| - 1.5 | 362 | 40.0 | 47.9 | 5.29 | -1.24 | -3.7 |
| 0 | 453 | 45.3 | 59.9 | 5.99 | -1.90 | -4.2 |
| 1.5 | 514 | 50.4 | 68.0 | 6.66 | -2.25 | -4.1 |
| 3 | 398 | 59.4 | 79.0 | 7.85 | -2.21 | -4.8 |
| 4.5 | 660 | 69.0 | 87.3 | 9.11 | -2.63 | -4.5 |
| 6 | 734 | 81.9 | 97.0 | 10.8 | -2.30 | -4.9 |
| 9 | 852 | 112.2 | 112.5 | 14.8 | -3.04 | -3.6 |
| 12 | 892 | 174.7 | 117.9 | 23.1 | -6.61 | -0.3 |
| 15 | 874 | 252.0 | 115.4 | 33.4 | -2.67 | +8.7 |

Table 2. Rudder Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_n$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder -10° | | Aileron 0° | |
| -12° | -262 | 93.3 | -34.6 | 12.3 | -1.93 | -6.7 |
| - 9 | - 78 | 62.1 | -10.3 | 8.20 | -1.81 | -3.2 |
| - 6 | 113 | 46.7 | 14.9 | 6.16 | -1.73 | -3.2 |
| - 4.5 | 206 | 42.4 | 27.2 | 5.60 | -2.07 | -3.4 |
| - 3 | 286 | 41.8 | 37.8 | 5.51 | -2.30 | -4.1 |
| - 1.5 | 355 | 43.5 | 46.8 | 5.74 | -2.37 | -4.6 |
| 0 | 440 | 48.0 | 58.2 | 6.33 | -2.66 | -4.5 |
| 1.5 | 516 | 54.2 | 68.0 | 7.15 | -2.90 | -4.5 |
| 3 | 596 | 62.5 | 78.6 | 8.25 | -2.76 | -4.6 |
| 4.5 | 666 | 72.2 | 88.0 | 9.53 | -3.34 | -4.8 |
| 6 | 742 | 85.5 | 98.0 | 11.3 | -3.66 | -5.2 |
| 9 | 852 | 111.9 | 112.4 | 14.8 | -4.15 | -3.6 |
| 12 | 893 | 165.7 | 118.0 | 21.8 | -5.58 | -1.5 |
| 15 | 883 | 269.3 | 116.5 | 35.5 | -7.62 | 6.8 |
| Elevator 0° | | | Rudder -15° | | Aileron 0° | |
| -12° | -262 | 91.8 | -34.6 | 12.1 | -2.98 | -6.7 |
| - 9 | - 76 | 62.4 | -10.0 | 8.24 | -2.73 | -3.0 |
| - 6 | 116 | 46.3 | 15.2 | 6.11 | -2.64 | -2.4 |
| - 4.5 | 200 | 40.9 | 26.4 | 5.40 | -3.02 | -3.7 |
| - 3 | 283 | 41.6 | 37.4 | 5.49 | -3.22 | -4.1 |
| - 1.5 | 356 | 43.2 | 47.0 | 5.70 | -3.18 | -4.3 |
| 0 | 438 | 47.5 | 57.9 | 6.26 | -3.29 | -4.8 |
| 1.5 | 508 | 53.1 | 67.1 | 7.00 | -3.42 | -4.6 |
| 3 | 584 | 62.1 | 77.0 | 8.20 | -3.83 | -5.0 |
| 4.5 | 664 | 72.1 | 87.5 | 9.51 | -4.20 | -4.9 |
| 6 | 731 | 84.5 | 96.5 | 11.1 | -4.04 | -5.0 |
| 9 | 844 | 112.7 | 111.2 | 14.9 | -4.66 | -3.6 |
| 12 | 888 | 164.8 | 117.1 | 21.7 | -5.79 | +0.8 |
| 15 | 867 | 267.1 | 114.3 | 35.2 | -7.93 | 7.4 |

Table 2. Rudder Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_n$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder -20° | | Aileron 0° | |
| -12° | -260 | 94.7 | -34.4 | 12.5 | -3.88 | -7.4 |
| - 9 | - 80 | 63.2 | -10.6 | 8.33 | -4.21 | -3.6 |
| - 6 | 114 | 47.7 | 15.0 | 6.30 | -3.79 | -3.7 |
| - 4.5 | 197 | 44.1 | 26.0 | 5.82 | -4.08 | -3.9 |
| - 3 | 280 | 43.5 | 37.0 | 5.73 | -4.56 | -4.7 |
| - 1.5 | 352 | 44.3 | 46.5 | 5.84 | -4.81 | -4.6 |
| 0 | 440 | 48.9 | 58.0 | 6.44 | -4.70 | -5.0 |
| 1.5 | 506 | 54.7 | 66.9 | 7.20 | -5.03 | -5.0 |
| 3 | 590 | 65.0 | 78.0 | 8.58 | -5.27 | -5.5 |
| 4.5 | 659 | 73.2 | 87.0 | 9.67 | -5.29 | -5.4 |
| 6 | 734 | 85.9 | 96.9 | 11.3 | -5.47 | -5.4 |
| 9 | 845 | 113.6 | 111.4 | 15.0 | -5.79 | -4.2 |
| 12 | 892 | 166.2 | 117.9 | 22.0 | -6.73 | 0.3 |
| 15 | 872 | 270.0 | 115.2 | 35.6 | -11.9 | 6.9 |
| Elevator 0° | | | Rudder -25° | | Aileron 0° | |
| -12° | -260 | 98.9 | -34.4 | 13.0 | -3.85 | -8.2 |
| - 9 | - 82 | 66.9 | -10.8 | 8.84 | -4.44 | -2.9 |
| - 6 | 114 | 50.1 | 15.1 | 6.62 | -4.32 | -4.5 |
| - 4.5 | 198 | 47.5 | 26.2 | 6.26 | -4.13 | -4.8 |
| - 3 | 278 | 46.6 | 36.8 | 6.15 | -4.41 | -5.6 |
| - 1.5 | 356 | 48.0 | 47.0 | 6.35 | -4.56 | -5.6 |
| 0 | 436 | 51.4 | 57.5 | 6.79 | -5.08 | -5.9 |
| 1.5 | 508 | 57.8 | 67.2 | 7.65 | -5.81 | -5.9 |
| 3 | 585 | 65.9 | 77.2 | 8.70 | -5.82 | -5.8 |
| 4.5 | 662 | 76.0 | 87.2 | 10.0 | -5.95 | -6.5 |
| 6 | 730 | 85.9 | 96.5 | 11.3 | -5.97 | -5.8 |
| 9 | 844 | 114.1 | 111.5 | 15.0 | -6.74 | -4.7 |
| 12 | 890 | 169.2 | 117.5 | 22.4 | -7.52 | +0.1 |
| 15 | 865 | 270.5 | 114.3 | 35.8 | -10.0 | +6.1 |

Table 3. Aileron Deflection.

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_l$ | $C_n$ | $C_m$ |
|---|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 0° | | | Aileron 0° | |
| -12° | -263 | 87.4 | -34.7 | 11.5 | -1.10 | 0.04 | -5.1 |
| - 9 | - 58 | 56.7 | - 7.7 | 7.48 | -3.66 | 0.22 | -2.1 |
| - 6 | 126 | 42.9 | 16.6 | 5.66 | -2.65 | 0.02 | -2.5 |
| - 4.5 | 216 | 38.6 | 28.5 | 5.10 | -3.56 | -0.23 | -3.1 |
| - 3 | 296 | 37.9 | 39.1 | 5.00 | -4.23 | -0.52 | -3.6 |
| - 1.5 | 374 | 41.0 | 49.4 | 5.41 | -4.99 | -0.33 | -3.8 |
| 0 | 454 | 45.6 | 60.0 | 6.01 | -5.77 | -0.47 | -4.3 |
| 1.5 | 528 | 53.6 | 69.7 | 7.07 | -5.71 | -0.62 | -4.8 |
| 3 | 608 | 62.7 | 80.1 | 8.27 | -6.36 | -0.63 | -5.3 |
| 4.5 | 678 | 71.1 | 89.3 | 9.39 | -6.69 | -0.78 | -4.4 |
| 6 | 748 | 81.1 | 98.7 | 10.7 | -7.11 | -1.38 | -4.7 |
| 9 | 864 | 113.6 | 114.0 | 15.0 | -8.90 | -0.98 | -3.5 |
| 12 | 902 | 168.1 | 119.2 | 22.2 | -10.2 | -2.40 | -3.1 |
| 15 | 808 | 271.3 | 106.5 | 35.8 | -12.0 | -3.37 | -17.5 |
| Elevator 0° | | | Rudder 0° | | | Aileron 5° | |
| -12° | -262 | 92.7 | -34.6 | 12.2 | 0.41 | | -6.6 |
| - 9 | - 76 | 62.2 | -10.1 | 8.21 | 1.66 | | -2.8 |
| - 6 | 122 | 43.0 | +16.2 | 5.68 | 2.12 | | -2.7 |
| - 4.5 | 206 | 39.6 | 27.3 | 5.23 | 1.45 | | -2.9 |
| - 3 | 292 | 39.3 | 38.5 | 5.19 | 2.46 | | -3.5 |
| - 1.5 | 364 | 40.4 | 48.1 | 5.33 | 2.44 | | -3.8 |
| 0 | 448 | 44.4 | 59.1 | 5.87 | 2.13 | | -4.1 |
| 1.5 | 516 | 50.3 | 68.1 | 6.65 | 2.22 | | -4.4 |
| 3 | 603 | 59.9 | 79.9 | 7.90 | 2.30 | | -4.6 |
| 4.5 | 668 | 69.3 | 88.1 | 9.17 | 1.58 | | -4.7 |
| 6 | 745 | 80.8 | 98.3 | 10.7 | 0.65 | | -4.6 |
| 9 | 856 | 110.4 | 113.0 | 14.6 | -1.46 | | -3.5 |
| 12 | 898 | 163.4 | 118.5 | 21.6 | -2.50 | | 1.5 |
| 15 | 877 | 264.7 | 115.9 | 35.0 | -4.95 | | 7.8 |

Table 3. Aileron Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_l$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 0° | | Aileron 10° | |
| $-12°$ | -264 | 96.7 | -34.9 | 12.7 | 9.03 | -6.3 |
| - 9 | - 84 | 61.5 | -11.1 | 8.15 | 10.4 | -1.5 |
| - 6 | 115 | 45.6 | 15.1 | 6.05 | 10.3 | -3.9 |
| - 4.5 | 195 | 40.7 | 25.8 | 5.38 | 9.77 | -3.1 |
| - 3 | 287 | 41.5 | 37.9 | 5.50 | 9.87 | -3.9 |
| - 1.5 | 361 | 43.6 | 47.6 | 5.78 | 9.55 | -3.1 |
| 0 | 439 | 46.8 | 58.0 | 6.20 | 10.2 | -4.4 |
| 1.5 | 513 | 53.5 | 67.7 | 7.10 | 9.54 | -4.4 |
| 3 | 597 | 62.1 | 78.7 | 8.21 | 9.00 | -4.6 |
| 4.5 | 671 | 71.9 | 88.5 | 9.54 | 9.64 | -4.2 |
| 6 | 746 | 84.8 | 98.6 | 11.2 | 9.11 | -4.6 |
| 9 | 857 | 114.5 | 113.0 | 15.2 | 7.13 | -3.7 |
| 12 | 893 | 166.2 | 123.0 | 22.1 | 5.88 | -1.1 |
| 15 | 865 | 267.4 | 114.0 | 35.5 | 3.88 | 7.5 |
| Elevator 0° | | | Rudder 0° | | Aileron 15° | |
| $-12°$ | -276 | 96.3 | -36.2 | 12.6 | 13.3 | -10.3 |
| - 9 | - 88 | 64.6 | -11.6 | 8.50 | 15.0 | - 2.6 |
| - 6 | 109 | 47.8 | 14.4 | 6.30 | 14.8 | - 2.9 |
| - 4.5 | 193 | 44.0 | 25.5 | 5.81 | 15.3 | - 3.2 |
| - 3 | 278 | 42.6 | 36.7 | 5.63 | 15.0 | - 3.8 |
| - 1.5 | 352 | 44.7 | 46.5 | 5.90 | 15.5 | - 4.8 |
| 0 | 439 | 49.3 | 58.0 | 6.52 | 15.5 | - 4.8 |
| 1.5 | 510 | 55.9 | 67.3 | 7.40 | 16.3 | - 4.5 |
| 3 | 594 | 65.4 | 78.3 | 8.67 | 15.9 | - 5.3 |
| 4.5 | 660 | 74.3 | 87.1 | 9.85 | 16.3 | - 5.3 |
| 6 | 734 | 86.3 | 97.0 | 11.4 | 15.7 | - 5.6 |
| 9 | 846 | 113.4 | 111.0 | 15.0 | 14.7 | - 3.9 |
| 12 | 881 | 164.5 | 117.0 | 21.7 | 11.1 | +0.1 |
| 15 | 855 | 264.4 | 113.0 | 35.0 | 8.5 | 9.4 |

Table 3. Aileron Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_l$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 0° | | | Aileron 20° |
| -12° | -283 | 97.7 | -37.4 | 12.9 | 15.2 | -6.8 |
| - 9 | -102 | 65.8 | -13.4 | 8.68 | 19.1 | -2.8 |
| - 6 | 92 | 48.4 | 12.2 | 6.38 | 20.1 | -2.8 |
| - 4.5 | 178 | 47.0 | 23.5 | 6.20 | 20.3 | -3.8 |
| - 3 | 267 | 45.6 | 35.2 | 6.02 | 20.4 | -4.1 |
| - 1.5 | 342 | 48.0 | 45.1 | 6.33 | 21.0 | -4.6 |
| 0 | 421 | 52.7 | 55.6 | 6.95 | 20.9 | -4.6 |
| 1.5 | 495 | 58.1 | 65.2 | 7.70 | 20.0 | -5.0 |
| 3 | 580 | 68.8 | 76.5 | 9.10 | 22.1 | -5.6 |
| 4.5 | 650 | 76.8 | 85.8 | 10.2 | 21.4 | -5.5 |
| 6 | 724 | 88.5 | 95.8 | 11.7 | 19.6 | -5.6 |
| 9 | 833 | 115.7 | 110.0 | 15.2 | 18.6 | -4.6 |
| 12 | 874 | 162.4 | 115.5 | 21.5 | 16.8 | 0.1 |
| 15 | 804 | 261.6 | 106.0 | 34.6 | 1.4 | +5.1 |
| Elevator 0° | | | Rudder 0° | | | Aileron 25° |
| -12° | -290 | 102.9 | -38.4 | 13.6 | 19.1 | -8.4 |
| - 9 | -111 | 71.3 | -14.7 | 9.41 | 23.5 | -3.6 |
| - 6 | 85 | 55.3 | 11.2 | 7.30 | 25.7 | -3.4 |
| - 4.5 | 168 | 51.0 | 22.1 | 6.74 | 26.5 | -3.7 |
| - 3 | 256 | 51.4 | 33.8 | 6.79 | 26.4 | -4.5 |
| - 1.5 | 331 | 52.5 | 43.7 | 6.93 | 25.7 | -4.0 |
| 0 | 414 | 56.7 | 54.6 | 7.49 | 25.4 | -4.3 |
| 1.5 | 482 | 63.8 | 63.7 | 8.42 | 25.3 | -4.3 |
| 3 | 570 | 71.7 | 75.1 | 9.47 | 25.3 | -4.3 |
| 4.5 | 637 | 80.1 | 84.1 | 10.6 | 24.1 | -4.4 |
| 6 | 709 | 90.9 | 93.6 | 12.0 | 24.1 | -4.2 |
| 9 | 818 | 117.8 | 108.0 | 15.6 | 22.5 | -3.9 |
| 12 | 864 | 174.7 | 114.0 | 23.0 | 21.3 | 0.8 |
| 15 | 846 | 259.7 | 111.8 | 34.3 | 18.4 | 8.7 |

Table 3. Aileron Deflection (Cont.)

| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_l$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 0° | | Aileron -5° | |
| -12° | -251 | 91.9 | -33.0 | 12.1 | -11.0 | -6.6 |
| - 9 | - 62 | 60.5 | - 8.2 | 8.00 | -11.1 | -2.5 |
| - 6 | 127 | 44.1 | 16.8 | 5.82 | -12.2 | -2.5 |
| - 4.5 | 210 | 40.6 | 27.7 | 5.36 | -13.0 | -3.0 |
| - 3 | 296 | 40.0 | 39.0 | 5.28 | -14.4 | -3.6 |
| - 1.5 | 372 | 42.0 | 49.1 | 5.54 | -15.1 | -3.8 |
| 0 | 454 | 46.9 | 60.0 | 6.19 | -16.0 | -4.2 |
| 1.5 | 522 | 53.0 | 69.0 | 7.00 | -17.2 | -4.7 |
| 3 | 606 | 63.3 | 80.0 | 8.37 | -16.6 | -5.2 |
| 4.5 | 673 | 71.3 | 88.9 | 9.42 | -17.2 | -4.4 |
| 6 | 746 | 83.6 | 98.5 | 11.0 | -18.5 | -4.7 |
| 9 | 854 | 113.2 | 113.0 | 15.0 | -19.5 | -4.9 |
| 12 | 898 | 168.4 | 118.5 | 22.2 | -19.7 | 1.5 |
| 15 | 892 | 269.5 | 118.0 | 35.6 | -21.7 | -2.0 |
| Elevator 0° | | | Rudder 0° | | Aileron -10° | |
| -12° | -250 | 92.6 | -33.0 | 12.2 | -16.0 | -6.2 |
| - 9 | - 70 | 61.7 | - 9.3 | 8.15 | -15.2 | -2.6 |
| - 6 | +120 | 46.0 | 15.8 | 6.10 | -16.6 | -2.6 |
| - 4.5 | 210 | 42.8 | 27.8 | 5.66 | -18.7 | -3.6 |
| - 3 | 292 | 42.2 | 38.6 | 5.59 | -19.3 | -4.0 |
| - 1.5 | 369 | 45.2 | 48.8 | 5.98 | -20.7 | -4.4 |
| 0 | 456 | 49.5 | 60.3 | 6.55 | -22.9 | -4.4 |
| 1.5 | 520 | 56.4 | 68.8 | 7.45 | -22.7 | -4.5 |
| 3 | 602 | 64.5 | 79.5 | 8.52 | -23.6 | -5.5 |
| 4.5 | 666 | 73.3 | 88.0 | 9.70 | -23.6 | -5.3 |
| 6 | 747 | 86.0 | 98.8 | 11.4 | -25.6 | -5.2 |
| 9 | 864 | 115.5 | 114.0 | 15.3 | -27.3 | -4.0 |
| 12 | 894 | 172.5 | 118.3 | 22.8 | -23.7 | 0.8 |
| 15 | 872 | 271.4 | 115.5 | 35.9 | -25.7 | 7.0 |

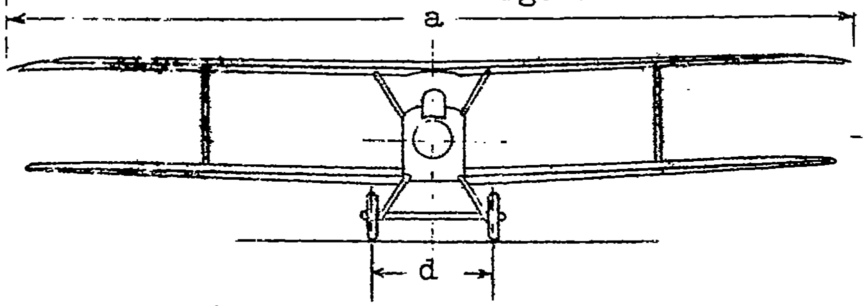
Table 3. Aileron Deflection (Cont.)

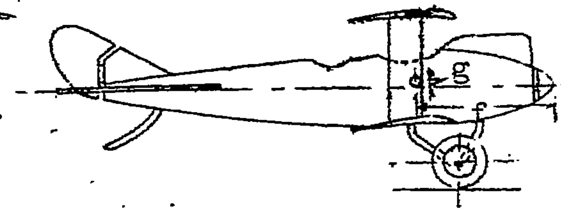
| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_l$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 0° | | | Aileron -15° |
| -12° | -264 | 95.5 | -34.8 | 12.6 | -17.2 | -6.5 |
| - 9 | - 80 | 65.6 | -10.6 | 8.66 | -18.0 | -4.8 |
| - 6 | +122 | 49.2 | 16.0 | 6.50 | -21.1 | -3.4 |
| - 4.5 | 208 | 46.6 | 27.5 | 6.15 | -22.7 | -3.9 |
| - 3 | 289 | 45.1 | 38.2 | 5.95 | -23.8 | -4.3 |
| - 1.5 | 368 | 46.7 | 48.5 | 6.15 | -25.7 | -4.7 |
| 0 | 453 | 52.0 | 59.8 | 6.87 | -27.2 | -5.0 |
| 1.5 | 521 | 57.8 | 68.7 | 7.65 | -27.8 | -5.4 |
| 3 | 587 | 64.6 | 77.5 | 8.54 | -28.1 | -5.1 |
| 4.5 | 648 | 74.6 | 85.6 | 9.85 | -27.9 | -5.5 |
| 6 | 724 | 86.0 | 95.5 | 11.4 | -28.6 | -5.5 |
| 9 | 834 | 114.8 | 111.5 | 15.2 | -30.6 | -4.2 |
| 12 | 868 | 169.4 | 114.5 | 22.4 | -29.7 | -0.2 |
| 15 | 850 | 261.5 | 112.2 | 34.6 | -28.4 | -2.6 |
| Elevator 0° | | | Rudder 0° | | | Aileron -20° |
| -12° | -278 | 101.1 | -36.6 | 13.3 | -18.8 | -7.6 |
| - 9 | - 84 | 67.4 | -11.0 | 8.90 | -21.6 | -3.0 |
| - 6 | +110 | 51.9 | 14.5 | 6.85 | -26.4 | -3.4 |
| - 4.5 | +198 | 49.7 | 26.0 | 6.58 | -27.0 | -4.4 |
| - 3 | 279 | 49.3 | 36.8 | 6.50 | -28.0 | -4.8 |
| - 1.5 | 354 | 52.0 | 46.8 | 6.85 | -29.6 | -5.0 |
| 0 | 438 | 55.5 | 57.7 | 7.32 | -30.9 | -5.7 |
| 1.5 | 508 | 61.1 | 67.1 | 8.07 | -32.1 | -5.8 |
| 3 | 590 | 72.1 | 77.7 | 9.52 | -32.4 | -6.7 |
| 4.5 | 655 | 80.8 | 85.8 | 10.7 | -33.0 | -6.5 |
| 6 | 732 | 92.8 | 96.5 | 12.2 | -33.1 | -6.6 |
| 9 | 838 | 122.0 | 111.0 | 16.1 | -34.3 | -5.8 |
| 12 | 876 | 163.6 | 115.0 | 21.6 | -31.3 | 0.7 |
| 15 | 804 | 270.0 | 106.0 | 35.6 | -28.2 | -4.6 |

Table 3. Aileron Deflection (Cont.)

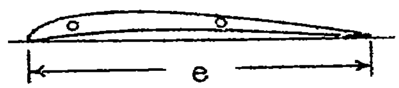
| Angle of attack | $L_g$ | $D_g$ | $C_L$ | $C_D$ | $C_l$ | $C_m$ |
|---|---|---|---|---|---|---|
| Elevator 0° | | | Rudder 0° | | Aileron -25° | |
| -12° | -283 | 105.6 | -37.4 | 14.0 | -22.2 | -8.7 |
| - 9 | - 94 | 74.2 | -12.4 | 9.80 | -25.2 | -3.7 |
| - 6 | 98 | 57.8 | 12.7 | 7.65 | -30.7 | -3.8 |
| - 4.5 | 182 | 54.0 | 24.1 | 7.13 | -31.8 | -4.4 |
| - 3 | 267 | 53.8 | 35.3 | 7.12 | -33.0 | -5.5 |
| - 1.5 | 340 | 56.0 | 44.9 | 7.40 | -33.5 | -6.0 |
| 0 | 428 | 60.0 | 56.5 | 7.93 | -34.6 | -6.0 |
| 1.5 | 500 | 66.1 | 66.2 | 8.74 | -33.8 | -6.0 |
| 3 | 584 | 74.1 | 77.2 | 9.80 | -34.2 | -6.5 |
| 4.5 | 648 | 83.4 | 85.6 | 11.0 | -33.4 | -6.6 |
| 6 | 722 | 94.1 | 95.4 | 12.4 | -35.1 | -6.4 |
| 9 | 831 | 125.5 | 109.9 | 16.6 | -34.9 | -5.4 |
| 12 | 864 | 176.7 | 114.0 | 23.3 | -34.2 | -1.5 |
| 15 | 850 | 276.9 | 112.5 | 36.7 | -33.5 | 1.5 |

Fig.1.




| | mm | in |
|---|---|---|
| a = | 781 | 30.75 |
| b = | 462 | 18.19 |
| c = | 179 | 7.05 |
| d = | 107 | 4.21 |
| e = | 103 | 4.06 |
| f = | 123 | 4.84 |
| g = | 3 | .12 |




Fuselage

| Height | | Width | | Length | |
|---|---|---|---|---|---|
| mm | in. | mm | in. | mm | in. |
| 72 | 2.83 | 53 | 2.09 | 415 | 16.34 |

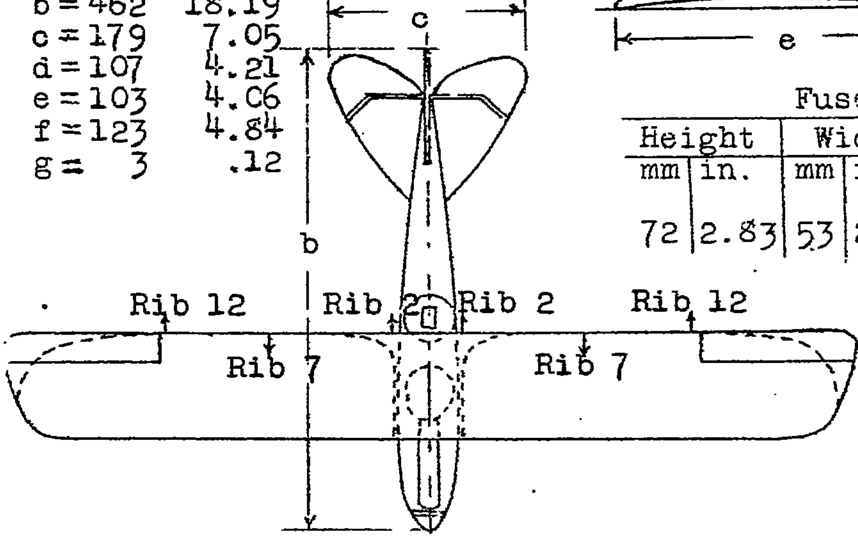



Fig.1. Model of D.F.W., T-29 airplane.

| | Maximum Span | | Maximum Chord | | Surface | | Mean gap | | Angle of incidence relative to center line crank shaft. |
|---|---|---|---|---|---|---|---|---|---|
| | mm. | in | mm | in | $cm^2$ | $in^2$ | mm | in | |
| Upper wing | 775 | 30.51 | 103 | 4.06 | 772 | 119.66 | | | Rib 2, 5° 10' |
| | | | | | | | 101 | 3.98 | Rib 12 4° 20' |
| Lower wing | 755 | 29.72 | 103 | 4.06 | 683 (+60) | 105.87 (+9.30) | | | Rib 7, 6° 20' |

| | Fin | | Control surface | | Maximum Span | | Maximum Chord | |
|---|---|---|---|---|---|---|---|---|
| | $cm^2$ | $in^2$ | $cm^2$ | $in^2$ | mm | in | mm | in |
| Elevator | 83.8 | 12.99 | 56.4 | 8.74 | 178 | 7.01 | 118 | 4.65 |
| Rudder | 14.0 | 2.17 | 25.8 | 4.00 | 66 | 2.60 | 95 | 3.74 |
| Ailerons | --- | ---- | 80.0 | 12.40 | 143 | 5.63 | 29 | 1.14 |

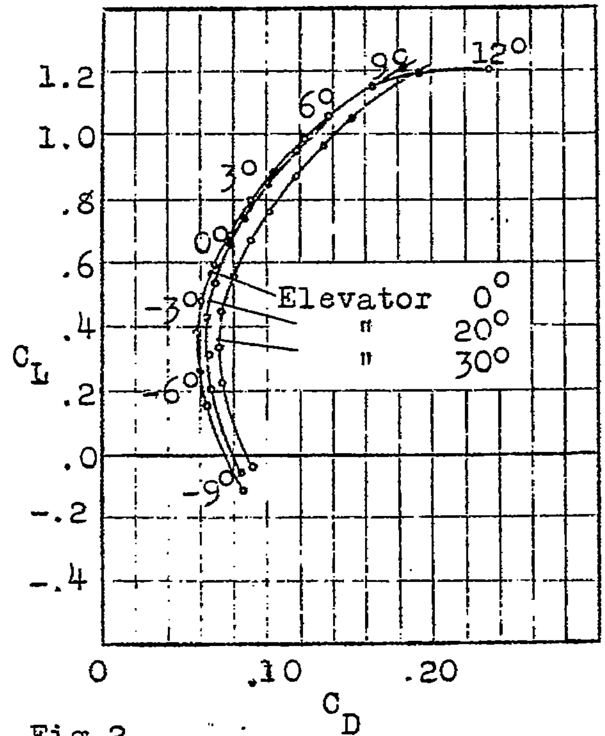



Fig.2.

Elevator deflection.

Pitching moment coefficient.

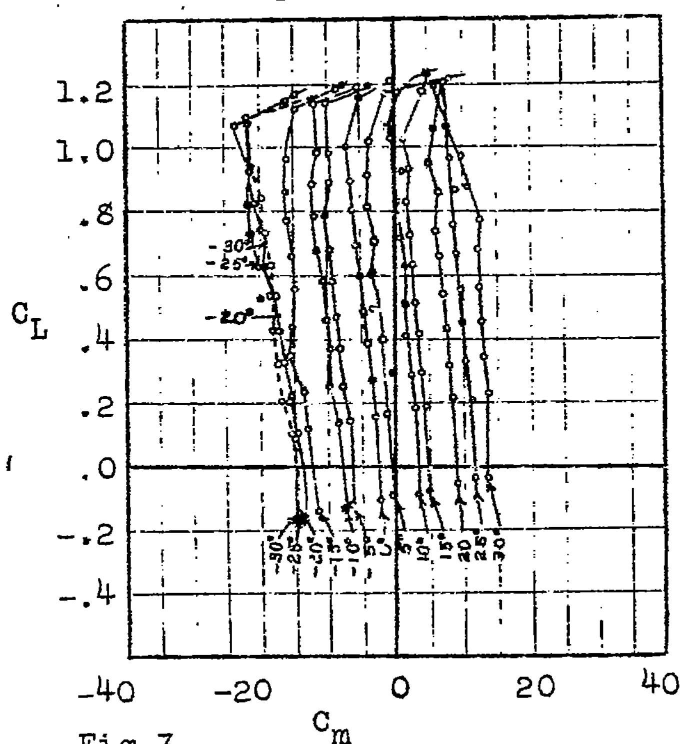
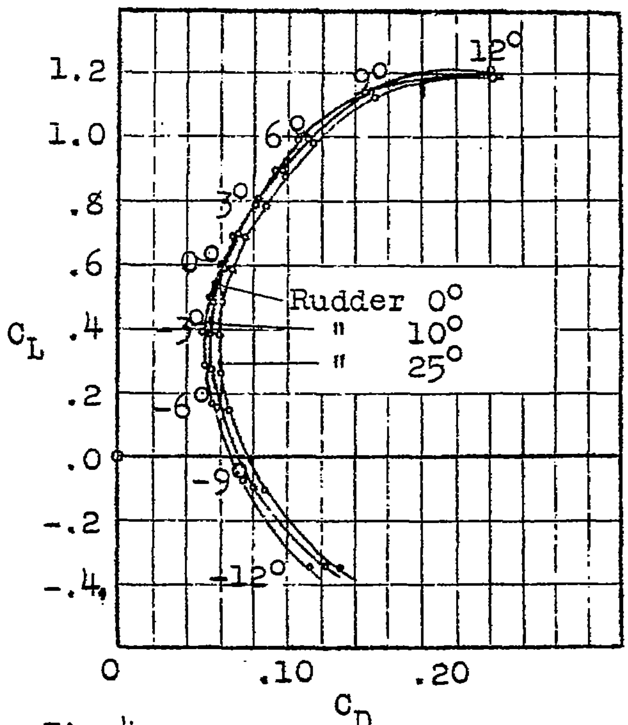



Fig.3.

Figs.4 & 5.




Rudder deflection.

Fig.4.

Yawing moment coefficient.

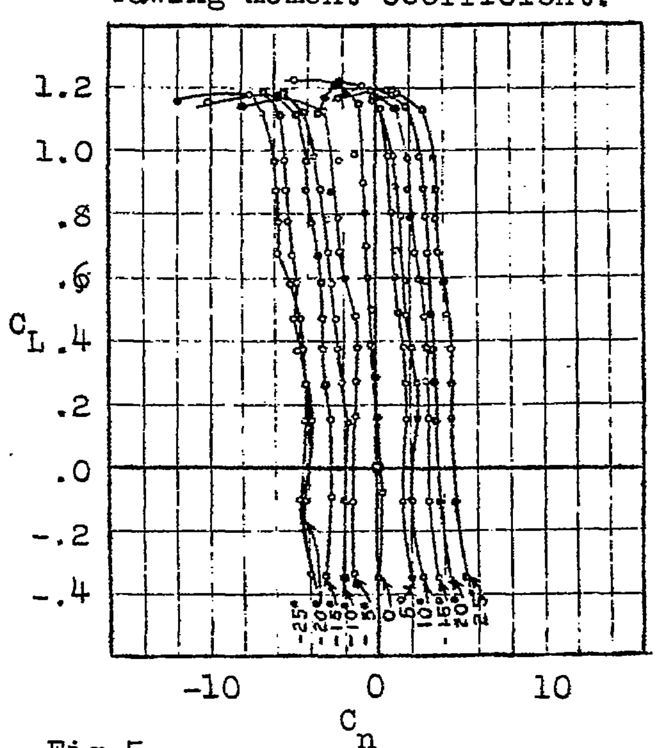



Fig.5.

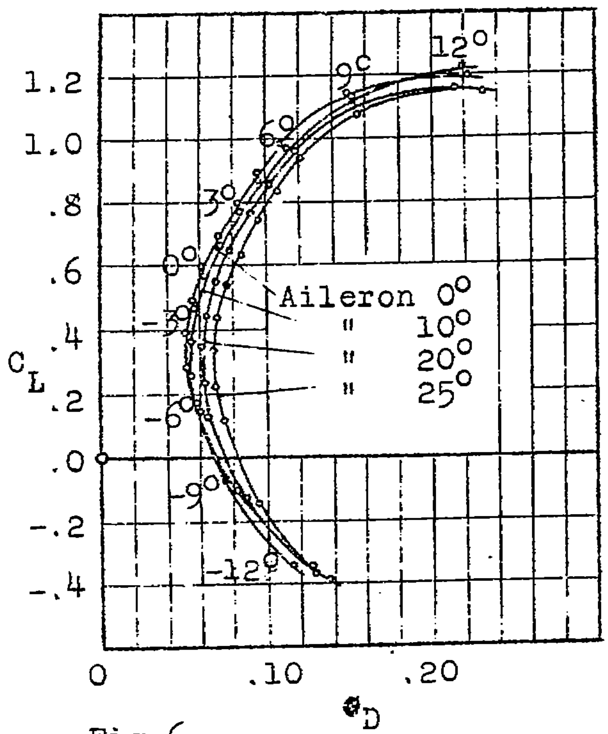



Fig.6.

Rolling moment coefficient.

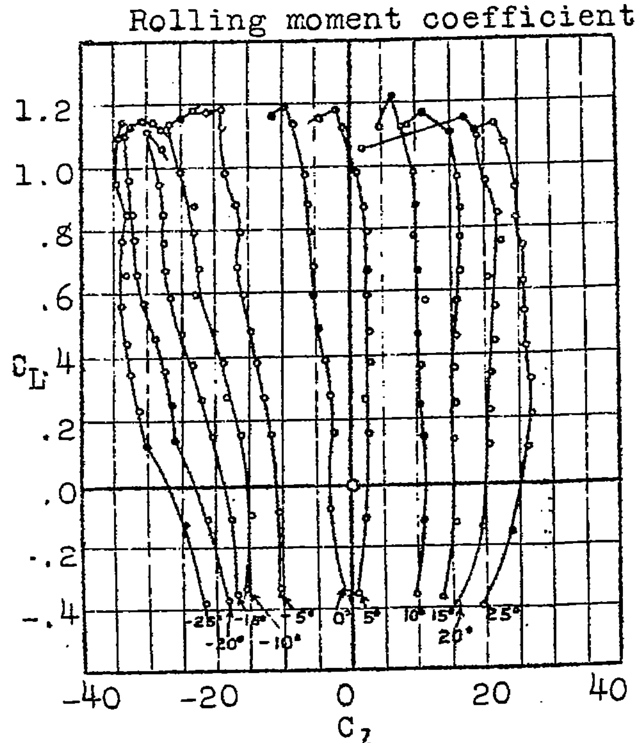



Fig.7.