

FAR 23 LOADS LOAD CALCULATIONS



FAR 23 LOADS provides a procedure to calculate the loads on an airplane according to the Code of Federal Regulations, Title 14 - Aeronautics and Space, Chapter I - Federal Aviation Administration, Subchapter C - Aircraft, Part 23 - Airworthiness Standards, Normal, Utility, Acrobatic and Commuter Category Airplanes, Subpart C - Structures. This is referred to as 14 CFR Part 23. Most of the detailed flight loads are developed from the flight envelopes specified in 14 CFR sections 23.333 and 23.345.

Loads

At every point specified in the flight envelope, the airplane is balanced by a tail load reacting to the specified linear normal acceleration and the aerodynamic lift, drag and moment about the center of gravity. The data needed to make these balancing calculations consists of weight and center of gravity, aerodynamic surface geometry, structural speeds and aerodynamic coefficients. Modules in the FAR 23 LOADS program develop these data. After these balancing loads data are developed, the critical structural loads are determined for each component. For the critical conditions, the air loads, inertia loads and net loads are calculated. Aileron, flap, tab, engine mount, landing and one engine out loads are also calculated.

CASE	ANGLE	CL	V KEAS	CONFIG	CG ALT	COND	FAR
22	PHAA	1.413	121.39	CRUISE	2 00000	STALL +M	23.333(b)
145	PLAA	0.470	212.40	CRUISE	2 12000	MAN D	23.333(b)
150	PMAA	0.202	170.00	CRUISE	2 12000	GUST +C	23.333(b) or (c)
193	NAA	0.131	170.00	CRUISE	4 12000	GUST -C	23.333(b)
240	ACRL	1.180	122.76	CRUISE	2 18000	AC ROLL	23.349(a) (2)
138	TORS	0.470	170.00	CRUISE	1 12000	ST ROL C	23.349(b)

Critical Wing Load

AIRPLANE WEIGHT AND INERTIA								
ITEM	COMPONENT	WEIGHT	X	Y	Z	ITX	IYY	IZZ
1	WING, OUTBOARD	330.000	97.870	0.000	87.730	4444110	133485	4444110
2	HORIZ TAIL	42.000	270.360	0.000	111.000	0	0	0
3	VERT TAIL	23.000	276.930	0.000	137.760	0	0	0
4	MAIN GEAR WHEEL	45.000	97.000	0.000	49.000	0	0	0
5	MAIN GEAR STRUT	110.000	97.000	0.000	78.000	0	0	0
6	NOSE GEAR WHEEL	9.000	1.000	0.000	52.000	0	0	0
7	NOSE GEAR STRUT	40.000	1.000	0.000	45.000	0	0	0
8	FLIGHT CONTROL	57.000	123.000	0.000	105.000	0	0	0
9	NACELLE	62.000	21.000	0.000	92.000	0	0	0
10	ENGINE INSTALL	505.000	22.000	0.000	92.000	52604	81473	81473
11	PROPELLER	74.000	-10.000	0.000	100.000	0	0	0
12	SYSTEMS	88.000	60.000	0.000	100.000	0	0	0
13	FURNISHINGS	175.000	105.000	0.000	100.000	0	0	0
14	UNUSABLE FUEL	12.000	73.000	0.000	80.000	0	0	0
15	FUSELAGE STRUCT	250.000	99.000	0.000	80.000	0	1131020	1131020
END OF EMPTY WEIGHT ITEMS								
51	PILOT	170.000	75.000	0.000	100.000	28730	24480	4250
52	30 MIN FUEL	71.000	70.000	0.000	92.000	86975	0	86975
END OF MINIMUM WEIGHT ITEMS								
61	COPILOT	170.000	75.000	0.000	100.000	28730	24480	4250
62	3RD PERSON	170.000	111.000	0.000	100.000	28730	24480	4250
63	4TH PERSON	170.000	111.000	0.000	100.000	28730	24480	4250
64	5TH PERSON	170.000	150.000	0.000	100.000	28730	24480	4250
65	6TH PERSON	170.000	150.000	0.000	100.000	28730	24480	4250
67	FUEL TO GR WT	409.000	70.000	0.000	87.000	501025	0	501025
68	BALLAST	78.000	103.700	0.000	90.000	0	0	0
END OF DISCRETIONARY WEIGHT ITEMS								

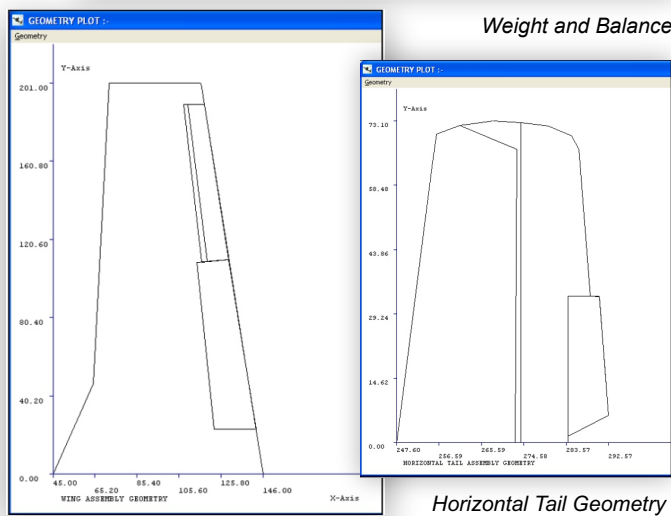
The loads on the airplane are determined by (1) the three view drawing, (2) the chosen maximum take-off weight, (3) the chosen category and load factor. The software calculates the loads using methods acceptable to the FAA and actually recommended in the previous CAR3/CAM3/CAM4 and FAR 23/FAR 25 regulations. Previous versions of this software have been used as a reference by hundreds of individuals and companies in over 40 countries. It has been licensed to the FAA.

Type Certification

FAR 23 LOADS provides the means to calculate and print a loads report, including compressibility and altitude effects, for FAA Type Certification.

Supplemental Type Certification

Strength substantiation is required for most Supplemental Type Certifications (STCs) for changes to Type Certificated airplanes. The original loads report for certification are proprietary information and not available to persons making changes to type certificated airplanes. Users of this software have received approval for STCs.

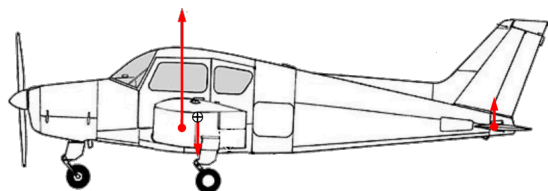
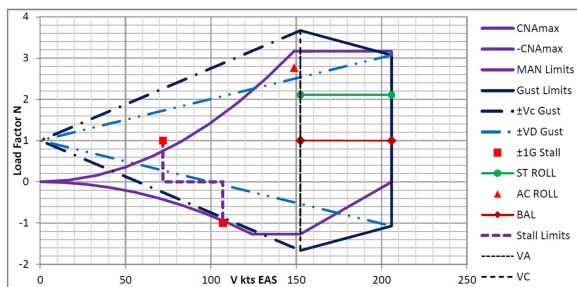
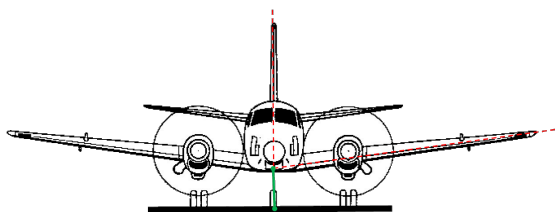


FAR 23 LOADS LOAD CALCULATIONS

Experimental or Kit Airplanes

The loads on experimental home built airplanes, kit planes or ultra light airplanes should be calculated for flight safety. Weight may be reduced with stress analysis or testing only after calculating accurate loads. Although there are no FAR certification requirements for loads and strength analysis for this category in the US, there should be great concern for flight safety in this freedom from regulation.

The computer aided engineering approach can produce a reasonably complete airplane loads report. The program is based on the Federal Aviation Regulations, text references in the industry and years of experience in the certification process of FAR 23 airplanes.

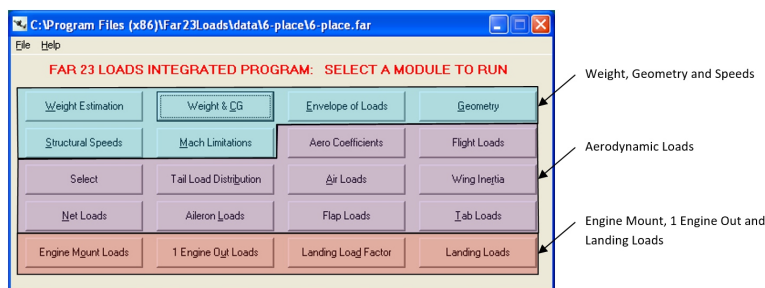


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FAR 23 LOADS Features

- Intuitive graphic user interface
- FAA-supported re-development effort
- Modules are fully integrated, single database
- Modules can also be run as stand-alone applications
- Program includes theoretical documentation and user interface guide with two airplane examples



Main Menu

FAR 23 LOADS Consists of 20 Modules

- Weight Estimation
- Weight & CG
- Envelope of Loads
- Geometry
- Structural Speeds
- Mach Limitations
- Aero Coefficients
- Flight Loads
- Select Critical Loads
- Tail Load Distribution
- Air Loads
- Wing Inertia
- Net Loads
- Aileron Loads
- Flap Loads
- Tab Loads
- Engine Mount Loads
- One Engine Out Loads
- Landing Load Factor
- Landing Loads

