

# General Weight & Balance Information

for

Grob 103 Twin II and 103 Twin II Acro gliders

along with

specific data for N54554, N4446Y, and N228BG

in the form of

“Individually tailored Loading Graphs”

First Constructed 3 June 2007

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by

**Stanley E. McGrew - A&P1240495**

Weight & Balance considerations for the GROB 103 can get a bit confusing, largely (I believe) because of the “method of presentation” to be found in the Flight Manual (a.k.a., Pilots Operating Handbook or “POH”). This package has been put together as an attempt to identify and clarify certain GROB Weight and Balance issues. First, the following peculiarity:

***There are areas that fall well within the fore and aft CG and maximum gross weight operating limits, within which areas operations are prohibited for other reasons, as follow:***

1. The POH imposes a 242 lb. maximum weight limitation in either seat, which is identified as a structural, rather than a CG limitation.
2. The POH also specifies a 154 lb. minimum weight in the front seat for all flight operations. This should not be confused with “minimum front seat weight for solo operation” (which may be more than 154 lbs., but can thus never be less than 154 lbs). The POH offers no explanation for this, but I conjecture that GROB has misapplied a specific JAR-22 Certification Requirement as a Required Operational Condition. This view is based on the observation that, *whenever the rear seat is also occupied*, the front seat weight may be some value less than 154 lbs., without shifting the loaded Center of Gravity position outside of the permissible operating envelope of +10.24 to +18.11 inches.

3. *Pilots will have to make their own judgment call on this issue!*

Because the trim weights are installed at a location that is somewhat forward of the front seat, both their actual weights as well as their front seat effective weight change effects must sometimes be taken separately into account. (Neither does the POH identify the station where these weights are to be installed. The math associated with this issue reveals this station to be approximately 57.5 inches forward of the datum.)

The effective front seat weight change upon installation of a single weight is 16 lbs., and the effective front seat weight change when both weights are installed is 33 lbs. If the effective front seat weight change is used in conjunction with the loading graphs that are a part of this presentation, the results will always be conservatively safe. However, it must be remembered that the effective weights so used are greater than the actual weights added to the glider (16 and 33 lbs., versus 13 and 26 lbs., respectively). Not a lot of difference, but perhaps just enough to sometimes push the *derived* operating Gross Weight just beyond its limit of 1,279 lbs. Taking into proper account the actual weight added, as opposed to the front seat effective weight change figure, may sometimes serve to get the operating Gross Weight figure back within limits.

Still a bit confusing? I shouldn't wonder! (But hey, I didn't put all these "ifs, ands and buts" into the POH. I am just attempting to give a little bit better insight into some things I believe the POH covers rather poorly.)

Next – A couple of examples  
(utilizing the loading graph for 8BG)  
that may help clarify proper use of  
the loading graphs

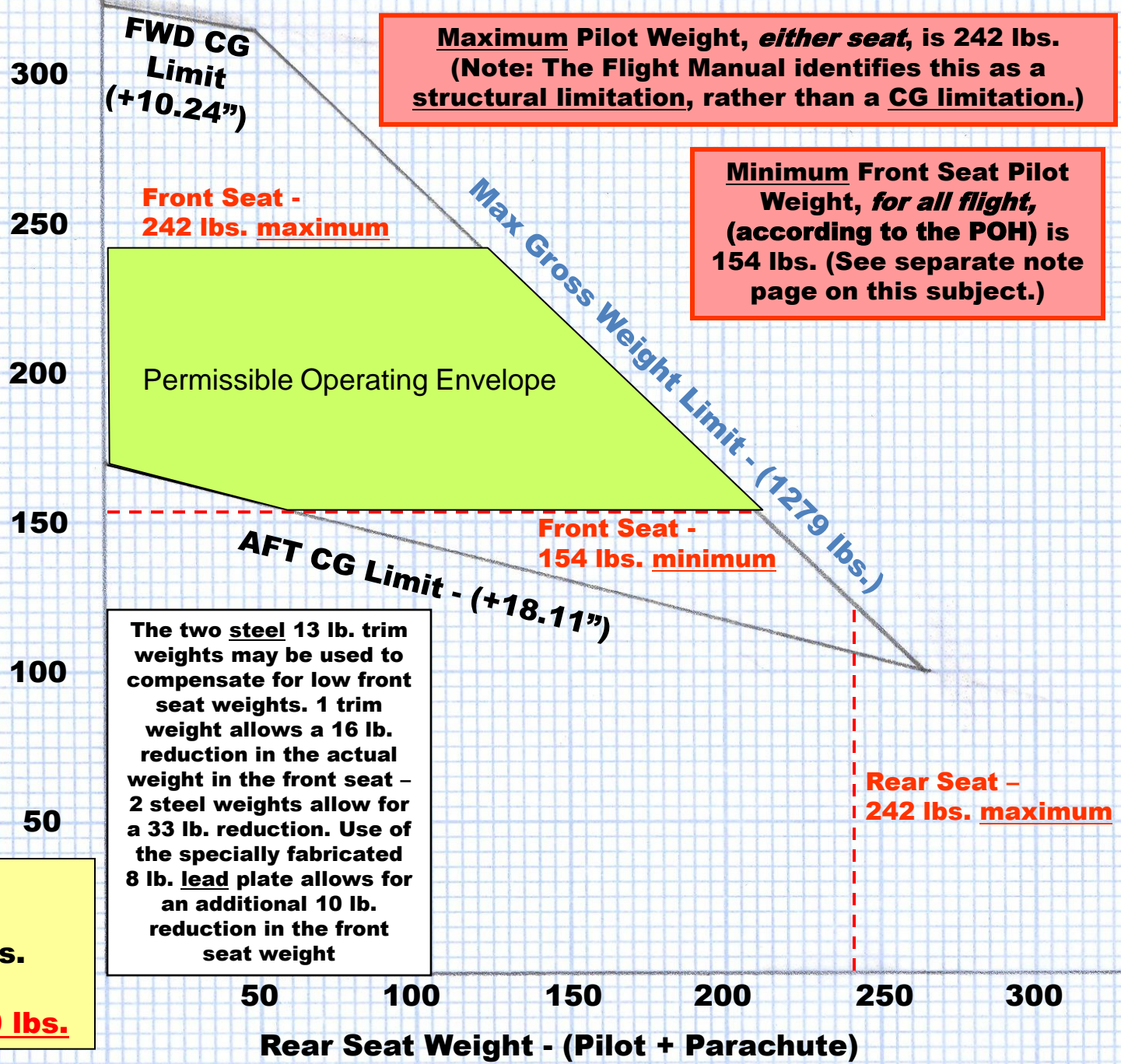
# 8BG

**GROB G 103A  
Twin II Acro  
N228BG  
Serial No.  
33995-K-228**

**This graph is  
Based on the  
weighing,  
and the  
Weight &  
Balance  
calculations  
performed on  
30 June 2011**

**E.W. = 915.0 lbs.  
EWCG = +29.85  
Useful Load = 364 lbs.  
Minimum Front seat  
weight for solo - 170 lbs.**

**Front Seat Weight - (Pilot + Parachute)**



**Maximum Pilot Weight, *either seat*, is 242 lbs.  
(Note: The Flight Manual identifies this as a  
structural limitation, rather than a CG limitation.)**

**Minimum Front Seat Pilot  
Weight, for all flight,  
(according to the POH) is  
154 lbs. (See separate note  
page on this subject.)**

The two steel 13 lb. trim weights may be used to compensate for low front seat weights. 1 trim weight allows a 16 lb. reduction in the actual weight in the front seat - 2 steel weights allow for a 33 lb. reduction. Use of the specially fabricated 8 lb. lead plate allows for an additional 10 lb. reduction in the front seat weight

**Rear Seat -  
242 lbs. maximum**

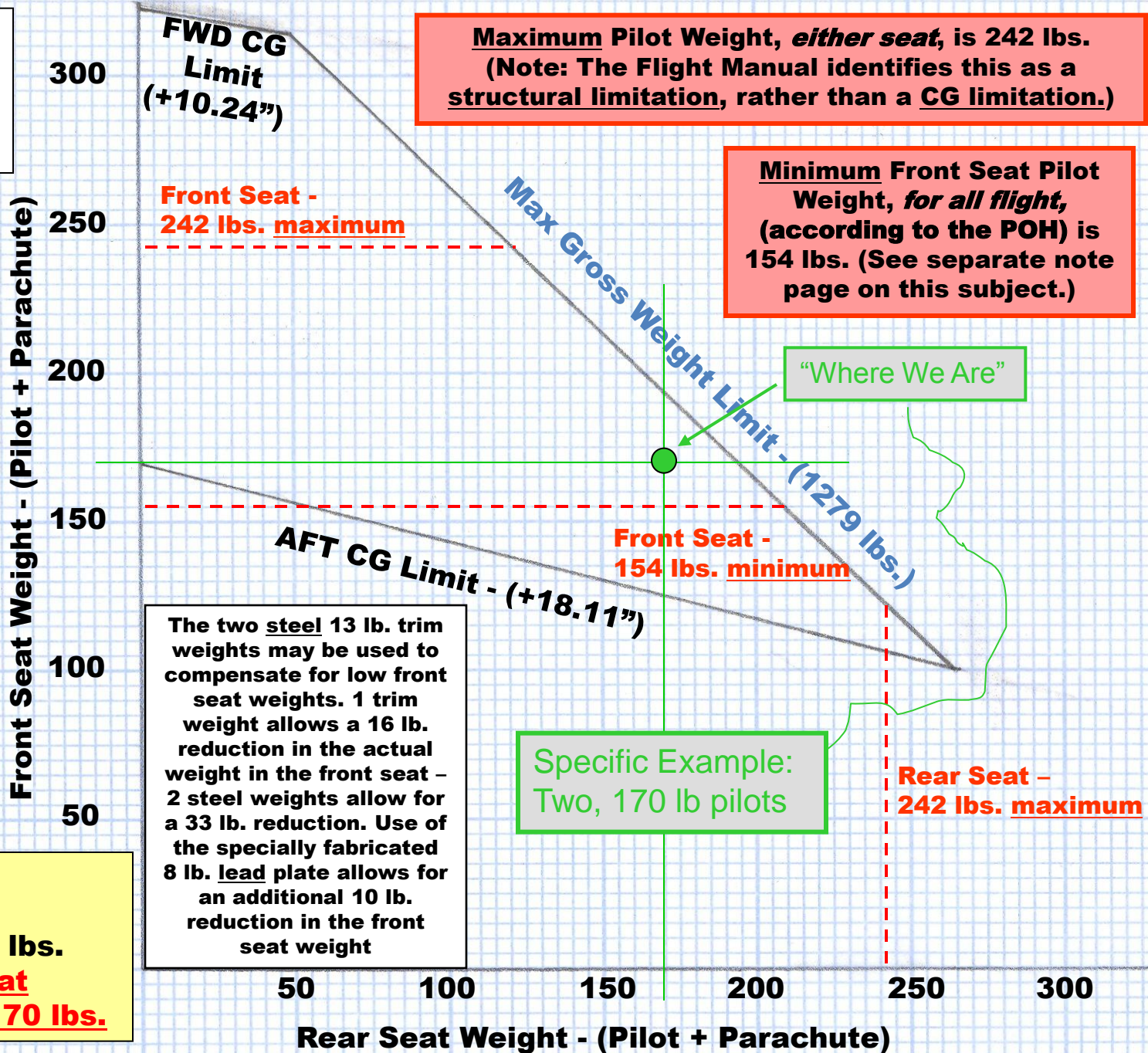
**Rear Seat Weight - (Pilot + Parachute)**

# 8BG

GROB G 103A  
Twin II Acro  
N228BG  
Serial No.  
33995-K-228

This graph is  
Based on the  
weighing,  
and the  
Weight &  
Balance  
calculations  
performed on  
30 June 2011

E.W. = 915.0 lbs.  
EWCG = +29.85  
Useful Load = 364 lbs.  
Minimum Front seat  
weight for solo - 170 lbs.



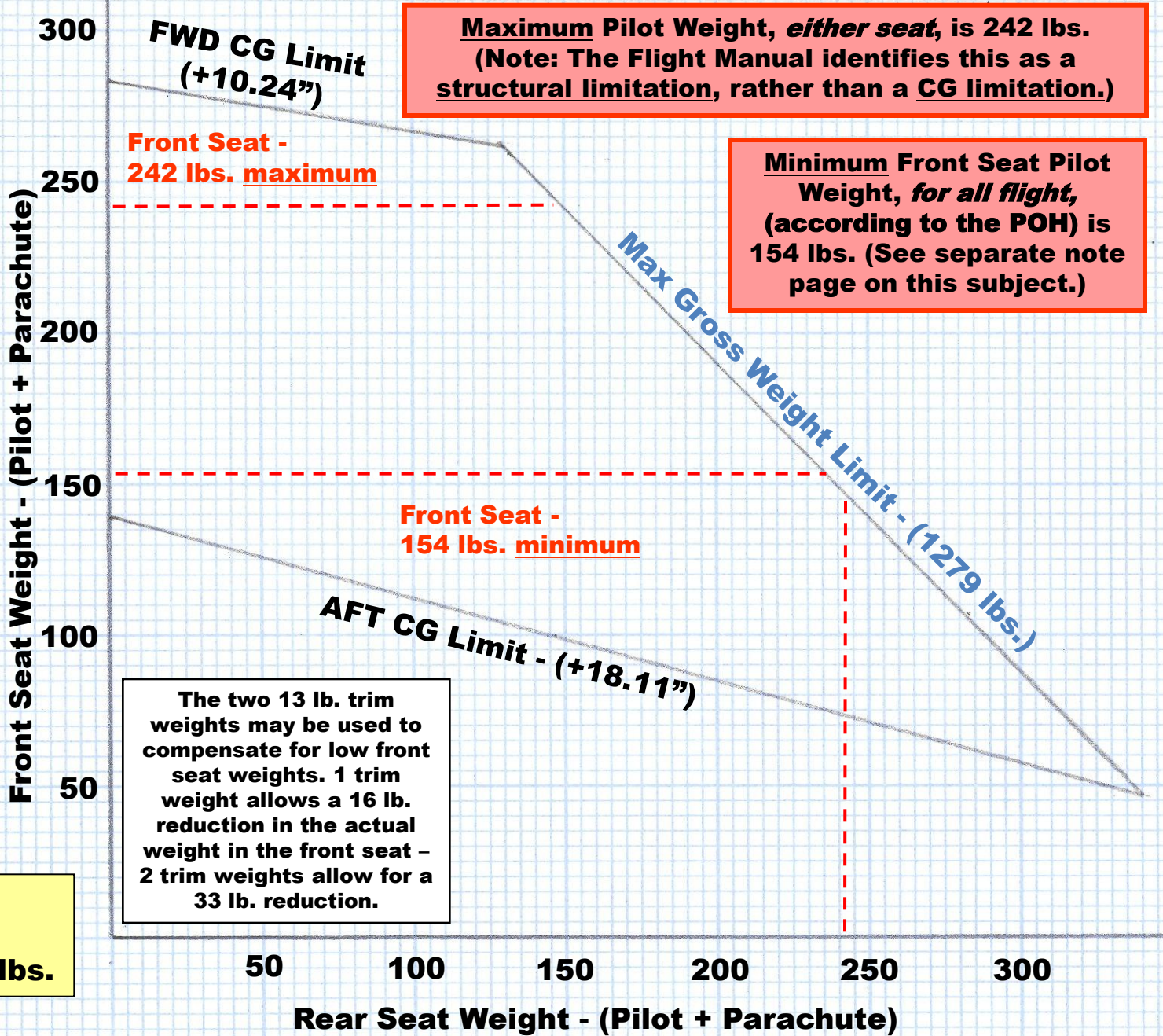
Now, on to current, individually  
tailored loading graphs

# 46Y

GROB G 103A  
Twin II  
N4446Y  
SN: 3825

This graph is based on the weight & balance calculations performed on 12 May 2011

E.W. = 888.0 lbs.  
EWCG = +28.0  
Useful Load = 391 lbs.

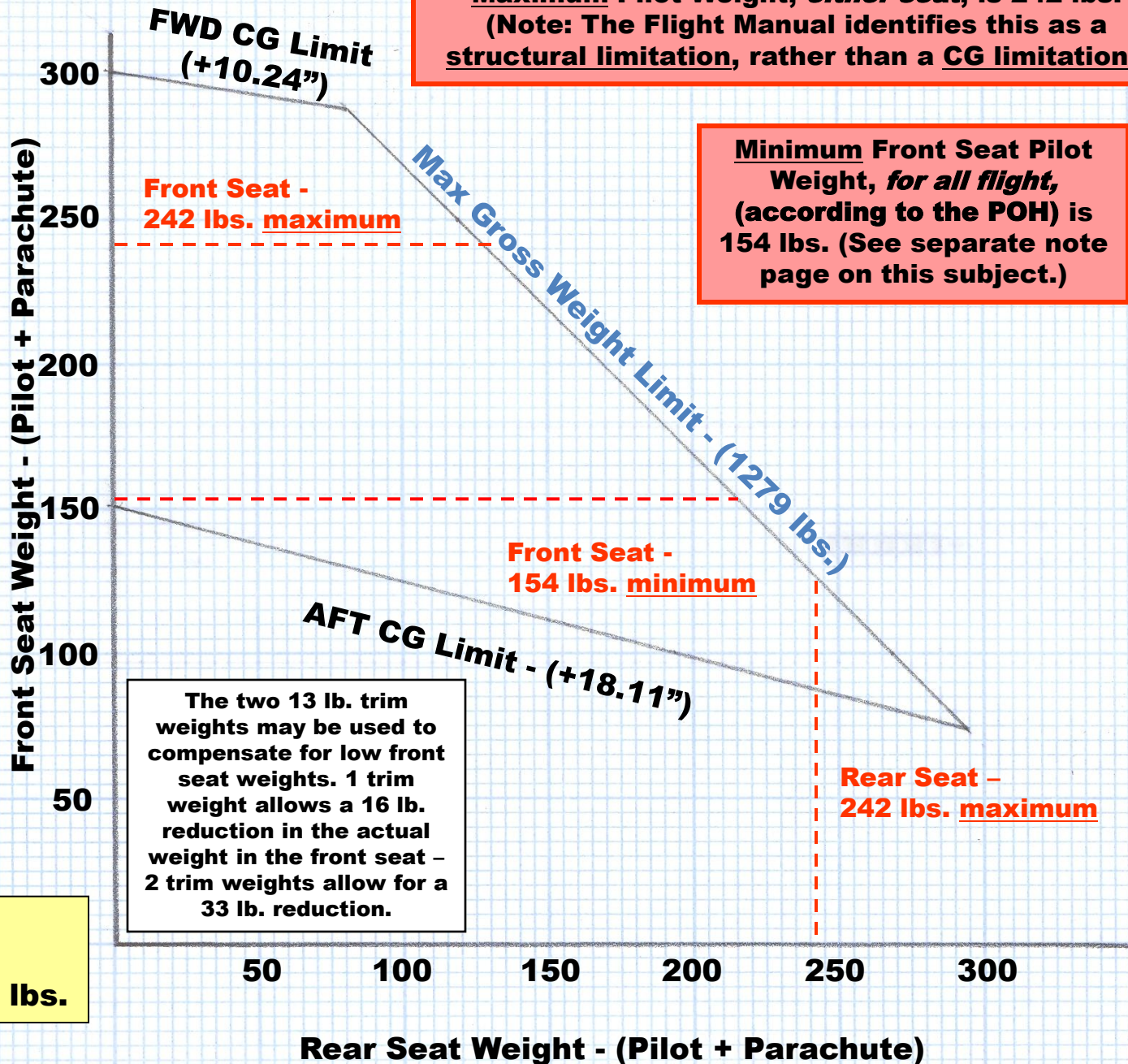


# 554

GROB G 103A  
Twin II Acro  
**N54554**  
SN: 3873-K-114

This graph is based on the weighing, and the weight & balance calculations performed on 05-03-2008

E.W. = 910.0 lbs.  
EWCG = +28.6  
Useful Load = 369 lbs.



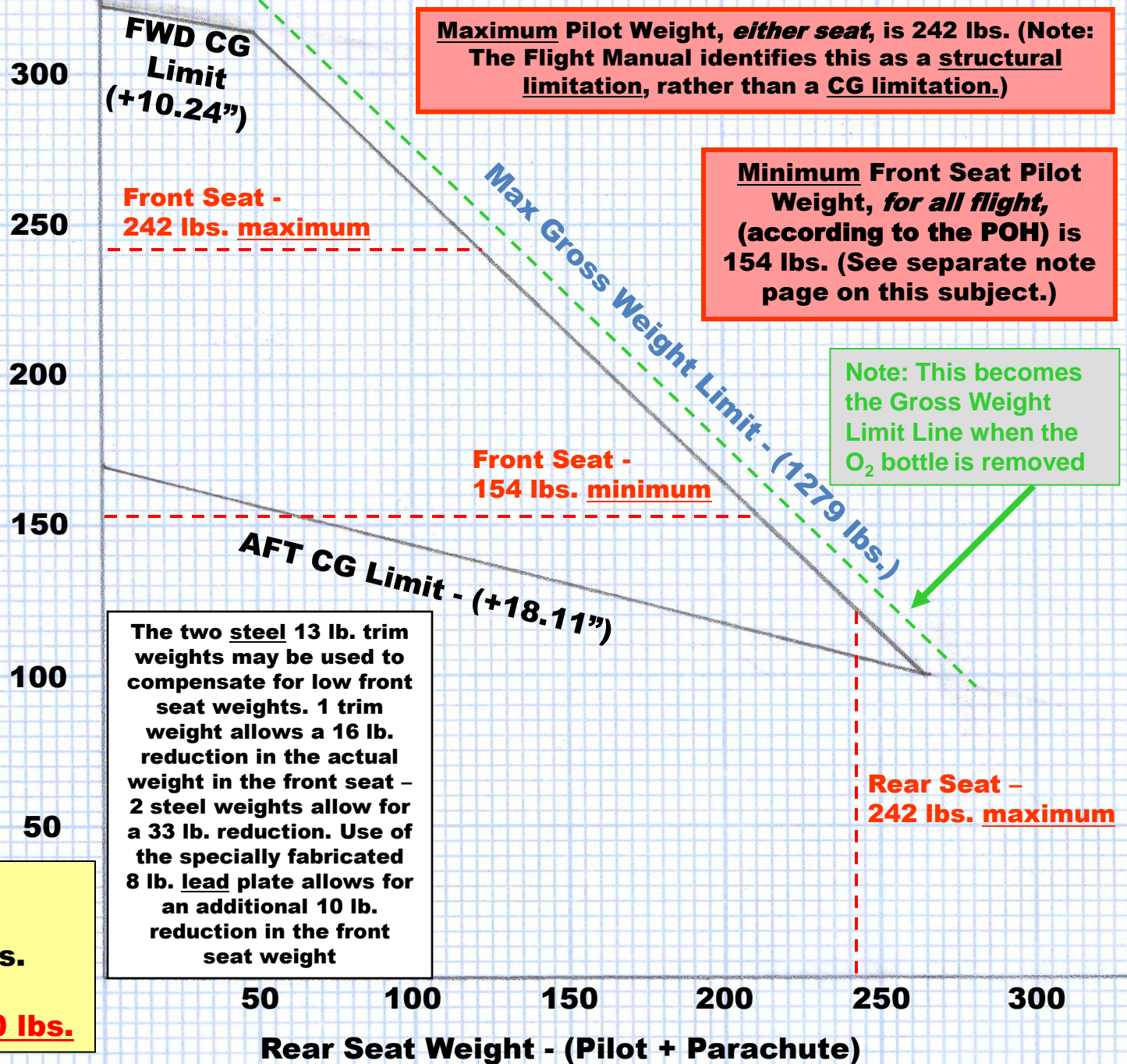
# 8BG

GROB G 103A  
Twin II Acro  
N228BG  
Serial No.  
33995-K-228

This graph is  
Based on the  
weighing,  
and the  
Weight &  
Balance  
calculations  
performed on  
30 June 2011

E.W. = 915.0 lbs.  
EWCG = +29.85  
Useful Load = 364 lbs.  
Minimum Front seat  
weight for solo = 170 lbs.

Front Seat Weight - (Pilot + Parachute)



## **Special Weight & Balance Considerations for N228BG**

During the data reduction following the weighing performed on 10 April 2010, it was discovered that the gliders' Empty Weight had increased to 916 lbs. (14.5 lbs. above the last recorded figure of 901.5 lbs). More significantly, the measured weight on the tailwheel weighing point had increased to 45 lbs. (9 lbs. more than the last recorded figure of 36 lbs). This had the effect of shifting the EWCG to the point that the glider now requires a minimum pilot weight of 170 lbs. for solo. [Why this change? Two possibilities: 1) an inaccurate previous weighing, or, 2) a gain due to the tailplane repair/refinish and wing refinish work recently performed.]

Whatever the cause, the end result is an increase in loading/operating difficulty for light-weight solo pilots. And even the use of the two existing ballast weights may not be sufficient to resolve the issue for a really light-weight solo pilot.

To assist in dealing with this difficulty, an additional 8 lb. lead trim weight was fabricated, which when installed on the same posts as the steel weights, will enable an additional 10 lb. reduction in the actual weight of a solo pilot. With all three weight used, the allowable reduction in actual solo pilot weight is 43 lbs., resulting in a minimum required actual solo pilot weight of 127 lbs. (  $170 - 43 = 127$  )

Additionally, a 10 lb., lead-filled red bag has been fabricated which may be placed and secured directly in the front seat as additional ballast if needed. Since in the seat itself, this 10 lbs. may be directly added to the weight of the front seat pilot.