

General Weight & Balance Information

for

Grob 103 Twin II and Twin II Acro gliders

N4446Y, N228BG

and for

Twin Astir gliders

N8485W, N80PX

in the form of

“Individually Tailored Loading Graphs”

First Constructed 3 June 2007

Updated 10 May 2018

by

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Weight & Balance considerations for the GROB 103 and Twin Astir 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 operations are prohibited for other reasons, as follow:

1. The POHs impose a 242 lb. maximum weight limitation in either seat, which (at least for the Twin II), 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 Twin II 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 Twin II *derived* operating Gross Weight just beyond it's 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.)

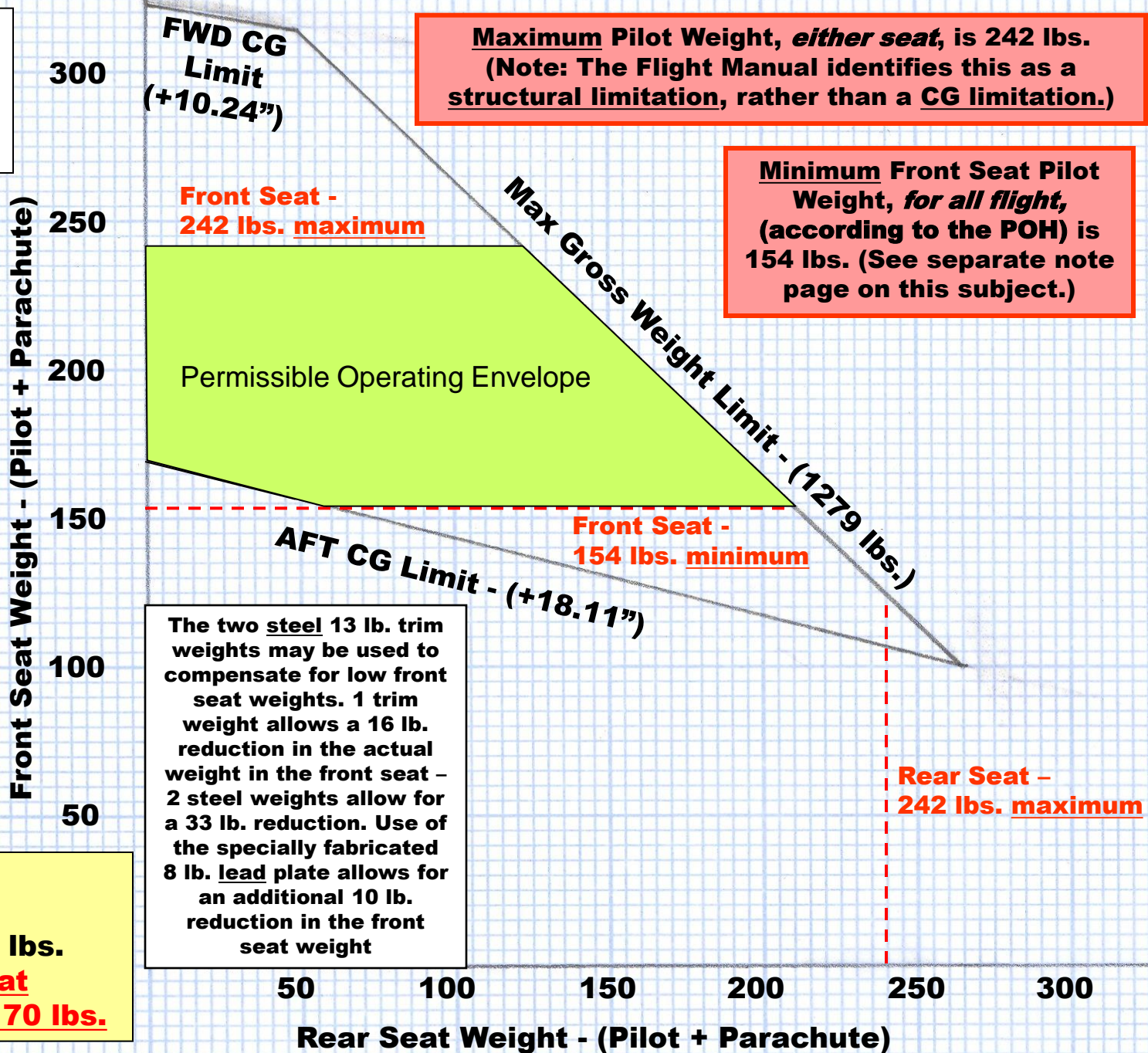
Next – A couple of examples
(utilizing the loading graph for 8BG)
that may help clarify proper use of
the loading graphs - - -

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
10 April 2010

E.W. = 916.0 lbs.
EWCG = +29.85
Useful Load = 363 lbs.
Minimum Front seat
weight for solo - 170 lbs.

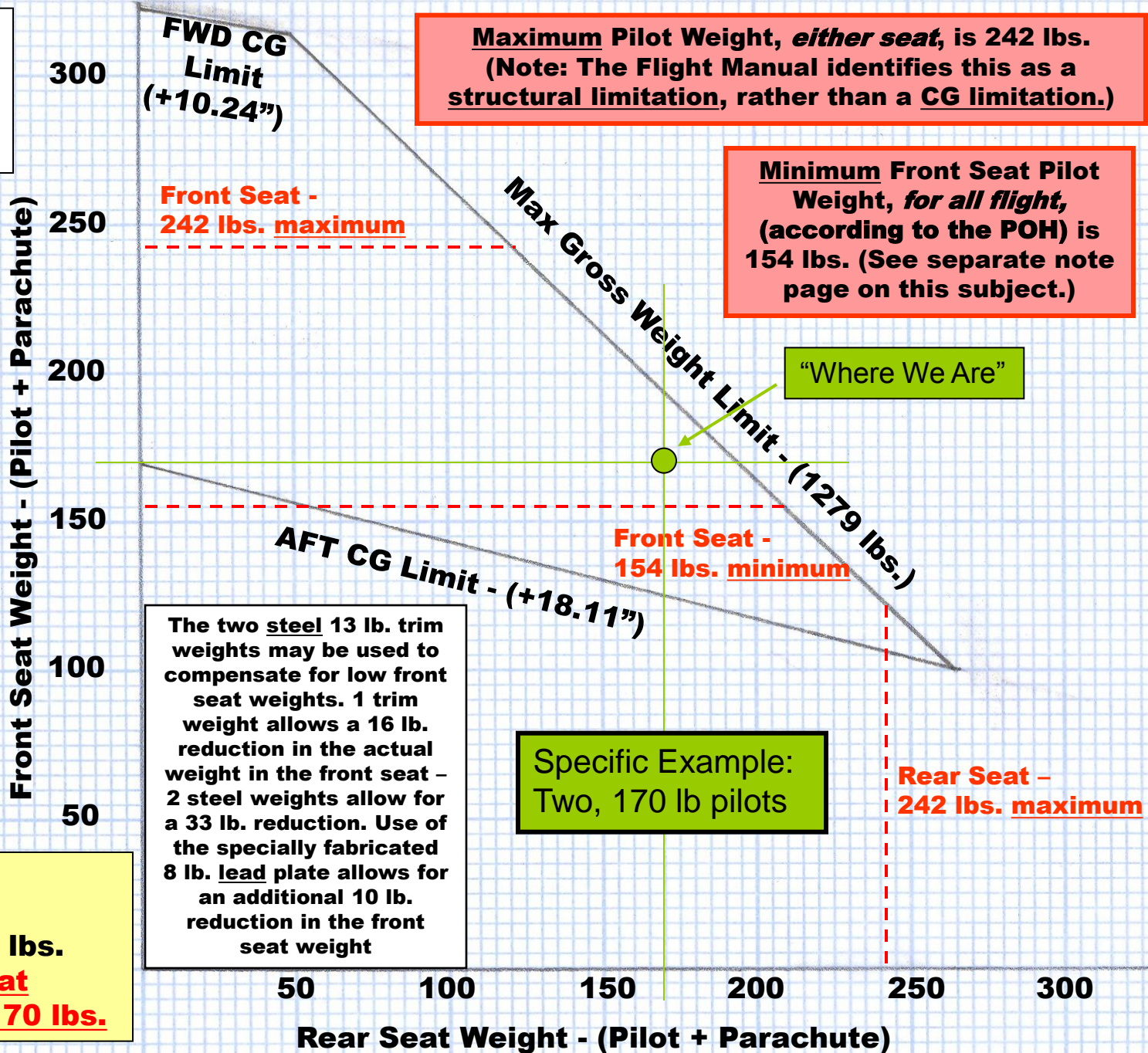


8BG

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
10 April 2010

E.W. = 916.0 lbs.
EWCG = +29.85
Useful Load = 363 lbs.
Minimum Front seat
weight for solo - 170 lbs.



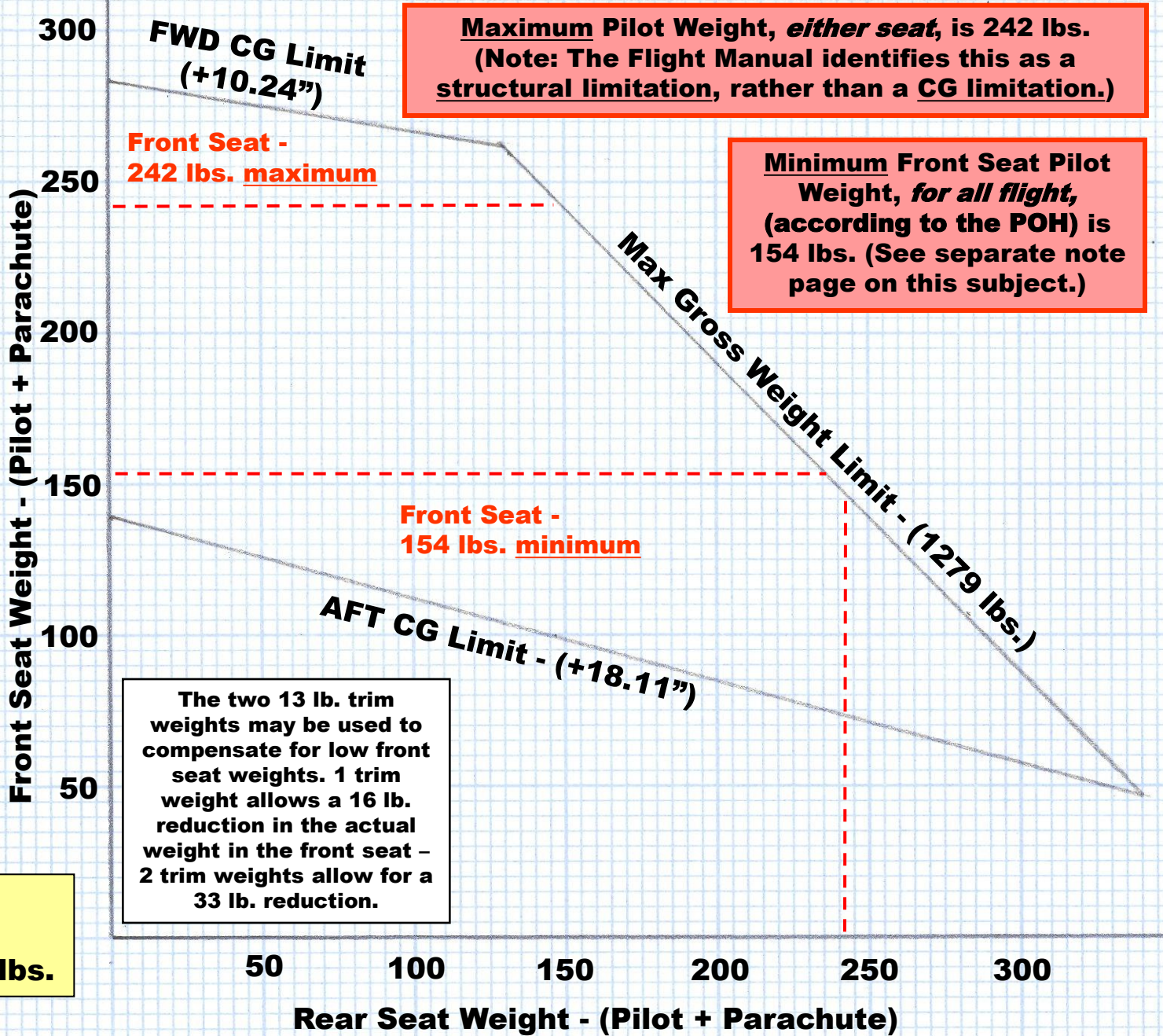
Now, on to current, individually
tailored loading graphs

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.



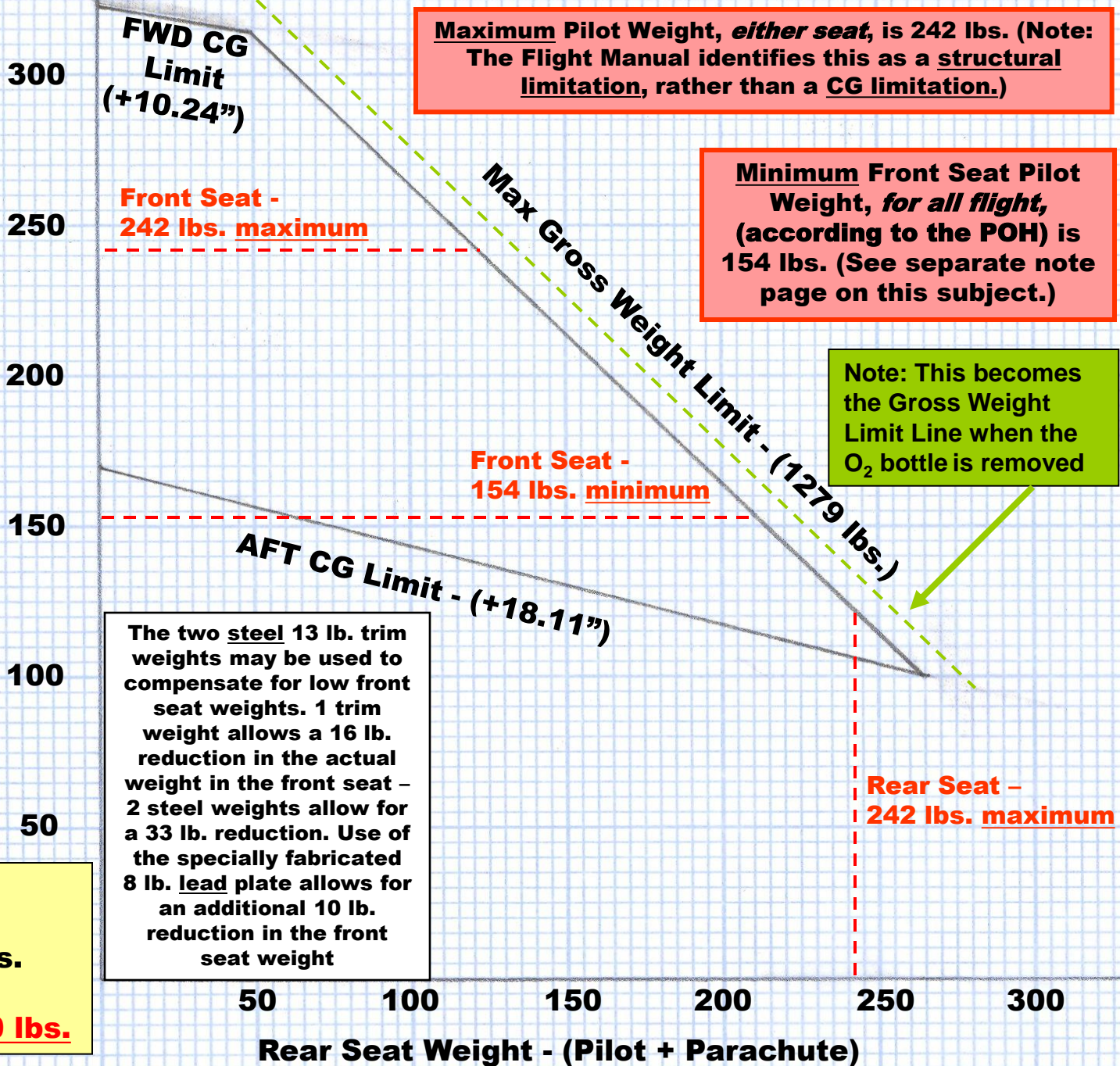
8BG

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
10 April 2010

E.W. = 916.0 lbs.
EWCG = +29.85
Useful Load = 363 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.

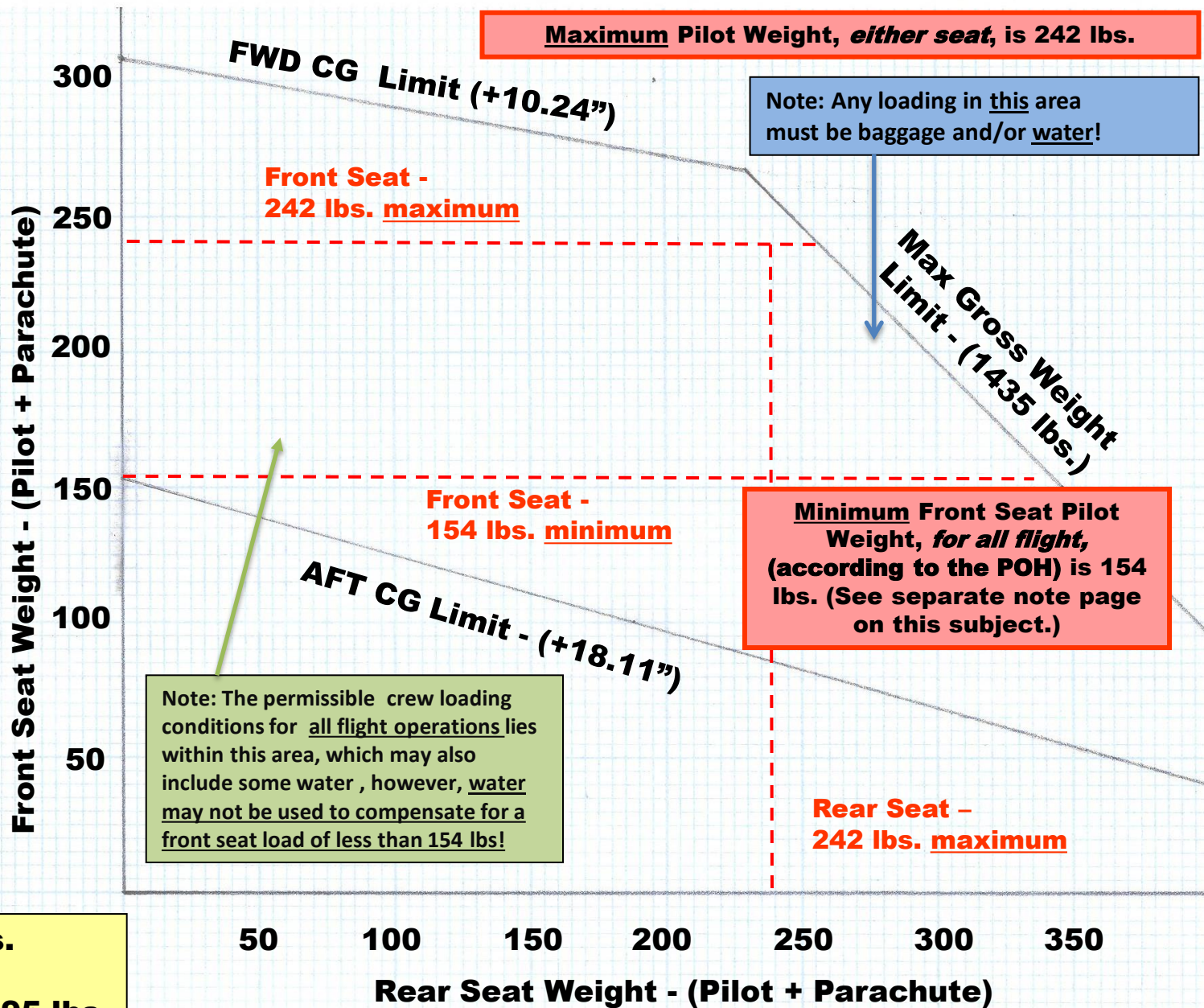
To assist in dealing with this difficulty, an additional 8 lb. lead trim weight was fabricated, which when installed on the same posts as the steel weights, will enable an additional 10 lb. reduction in the actual weight of a solo pilot. With all three weight used, the allowable reduction in actual solo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

85W

GROB
Twin Astir
N8485W
Serial No.
3290

This graph is based on the Weight & Balance Revision performed on 17 Oct 2013

E.W. = 940.0 lbs.
EWCG = +28.26
Useful Load = 495 lbs.

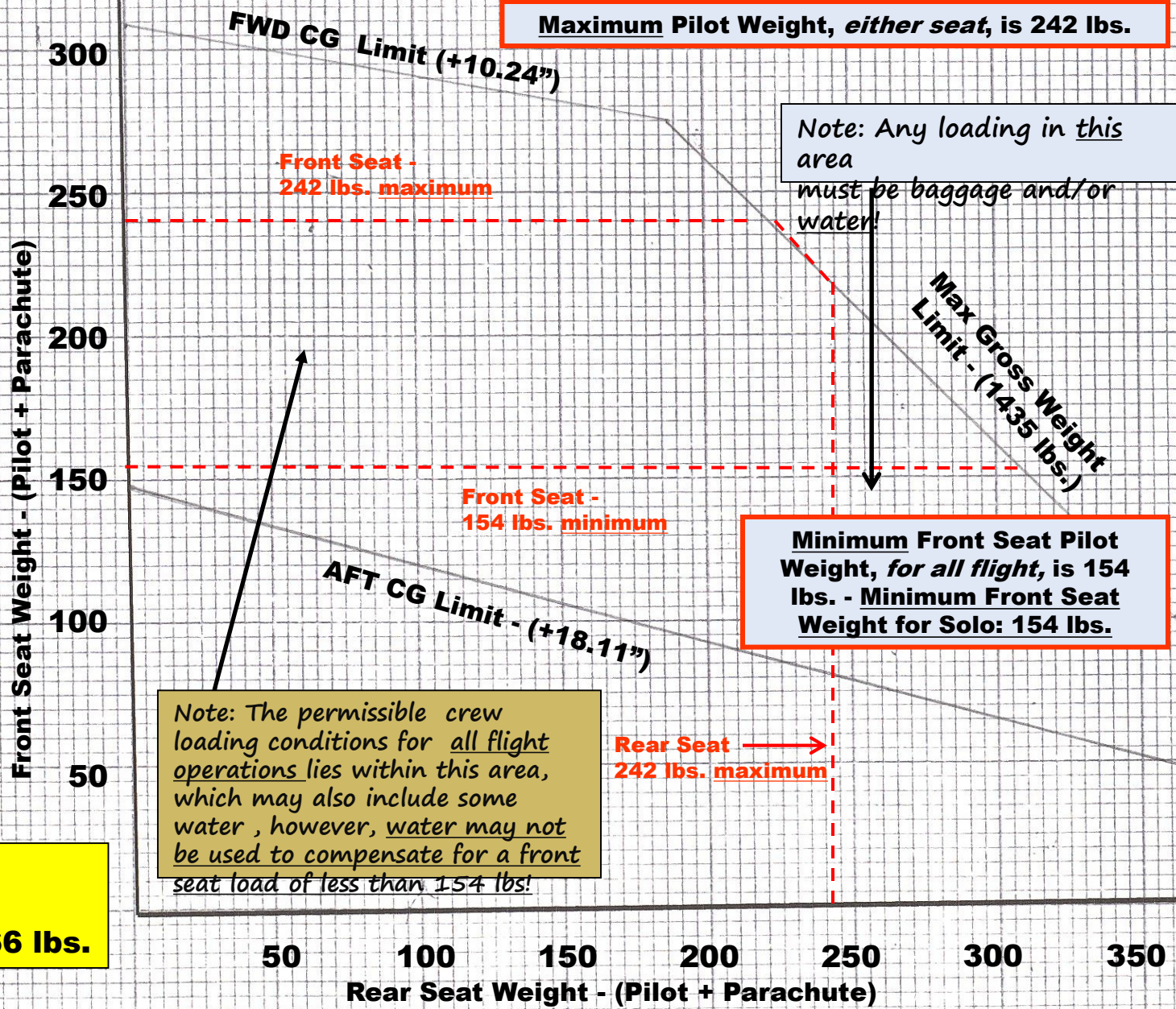


80PX

GROB
Twin Astir
N80PX
Serial No.
3285

This graph is based on the Weight & Balance Data Computed on 10 May 2018

E.W. = 969.0 lbs.
EWCG = +27.84
Useful Load = 466 lbs.



Special Weight & Balance Considerations for N8485W and N80PX

Ballast must be added in the front seat if the front seat pilot plus parachute weight is less than 154 lbs (or 157 lbs in the case of N80PX). Water ballast must not be used to compensate for a front seat load of less than 154 lbs!

Since the Empty Weight CG location for both gliders lies within the range identified on page 33 of the POH for each glider's respective empty weight (+27.44 to +28.74), the Loaded-for-Flight CG will always remain within the prescribed limits if the provisions of the Loading Graph are properly observed.

After crew and baggage weights are figured in, water ballast may be added in an amount not to exceed that required to bring the glider up to its Maximum Gross Operating Weight Limitation of 1,435 lbs.

If one remains within the loading limits of the graph, the maximum non-lifting parts load limitation of 1036 lbs. will not be exceeded .

7813

**GROB
Twin Astir
N7813
Serial No.
3178**

**This graph is
based on the
Weight &
Balance Data
Computed on
04 March 2018**

**E.W. = 958.0 lbs.
EWCG = +28.75
Useful Load = 477 lbs.**

