N121M Performance Test. 5/16/2021
Jim Hudson, PIC. Gordon Hall C0-Pilot, Logan Schwisow - pax

The objective of the test was to see how she flies, and performs in stalls, take-offs and landings and how the numbers compare to the Robertson STOL-STC where applicable.

Conditions: We were within 15# of gross weight and almost neutral CG (see attached W&B sheet). I was PIC, Gordon co-pilot, and Logan riding in the back.
Surface Conditions Wind Calm, Temp 16 deg C, Press 29.92 (for real) near standard conditions.
I used the CloudAhoy app to get the take-off/landing distances.
https://www.cloudahoy.com/debrief/?key=V9XpbgSPHLe24Np446po&startAt=1621177635418.02

1st – take-off and pattern at normal C182 numbers – as per the checklist.
0 Flaps, Rotate at ~ 50, climb out at Vy 75 and 775 '/min.
Rotation at 972' Clr 50' 1960'
Standard C182Q take off table says 880 / 1705 for short field take-off with 20 deg flaps. The above was not short field.

Pattern
Downwind 85Kts 15" MP 0 Flaps level flight
Initial descent 80 kts 12" MP 10° flaps – 500'/min
Base 70 kts 13" MP 20° flaps – 500'/min
Final 60 kts 13" MP 40° flaps – 500'/min, 55kts on short final

Touch and go – rotate at 55 climb out 80kts = 600 '/min.
Went out to the practice area to do stall tests.

Slow Flight – MCA/Stall 6000' 29.92 Press OAT= 58° F Aircraft Weight: 2900#
Slow Flight/Stall Test: Determine the power to maintain MCA (Minimum Control Airspeed) in level flight. – Stall Horn Just Starting to sound. Reduce Power while maintain altitude until Stall. Record IAS for each configuration.
Slow Flight / Stall

Flaps	IAS @ MCA	IAS @ Vs	MCA-Vs	PWR MP/RPM	STC Stall Speeds	POH Stall Speeds	Notes
0	55	40	15	15 /2350			
20	45	30	15	16 /2350			
40	45	30	15	16 /2350			
0	57	53	4	Pwr Off	44	45	0° bank
20	48	45	3	Pwr Off	37	43	0° bank
40	46	38	8	Pwr Off	36	42	0° bank
0	60	55	5	Pwr Off	50		20° bank
0	73	65	8	Pwr Off	64	54	45° bank
20	50	48	2	Pwr Off	40		20° bank
20	55	55	0	Pwr Off	51	50	45° bank

The result of this test is that the stall speeds we achieved in the test were quite a bit higher that the POH, except at 40° Flaps, no bank, No flaps 45° bank 0. The STC does not indicate the altitude at which the stall tests were performed, nor does the POH. The STC gives numbers for 40 deg bank angle instead of 45 deg as the POH. The POH states that KIAS values are approximate.
This is why it's best to go out and test the actual plane. Lori MacNichol has all of her students do this, because each plane is different, even the same model. To be more statistically correct, we should perform this test several times.

We did some power on Stalls but did not record the numbers. I do recall the stall speed being below the minimum indicted speed of 40 on the stall speed indicator – I estimate lower than 30kts.

Best Glide POH says 70, STC says 69. We tested at 70 and 65.
70 Kt = -750'/min
65 Kt = -700'/min with prop out 650'/min.
Seems like 70 is a good number.

Back for landings.

1st landing T&G about the same as above.
2nd Short field landing – estimated landed in 700' CloudAhoy says 642'.
Short Field take/off 20° Flaps as per stc – rotated at 45kts. I don't recall the take-off roll, I think less than 1,000'. We started at the 1,000' mark. One thing I noticed is when retracting the flaps, there was significantly more drop than in our regular C182's. Something to be aware of with the R-STOL.
The stalls seemed a little milder than a regular C182. I did the falling leaf without power and it did break and recover similar to a normal C182s, but possibly a bit milder. Gordon and I both feel that 55 Kts on final is about as low as one should go to not have the bottom drop out. 60 Kts on final felt very stable. There was no wind to really test the lack of crosswind authority with the R-STOL.

Check Out Requirements.
Ground check-out that reviews inspection of the VG's, operation of the Electric Tach, and Engine monitor, operation of Robertson STOL, review of the STC, and general familiarization with the plane.
Flight Check-out – Stalls in various configurations and several take-off and landings at normal and short field configurations.
Attached is the data sheet Gordon and I used and pdf's.
Cheers,
Jim

Basic Information					
Aircraft Ident: N121M	Aircraft Type: C-182Q	Departure Date:		Departure Time: 9:00	Arrival Time 12:00

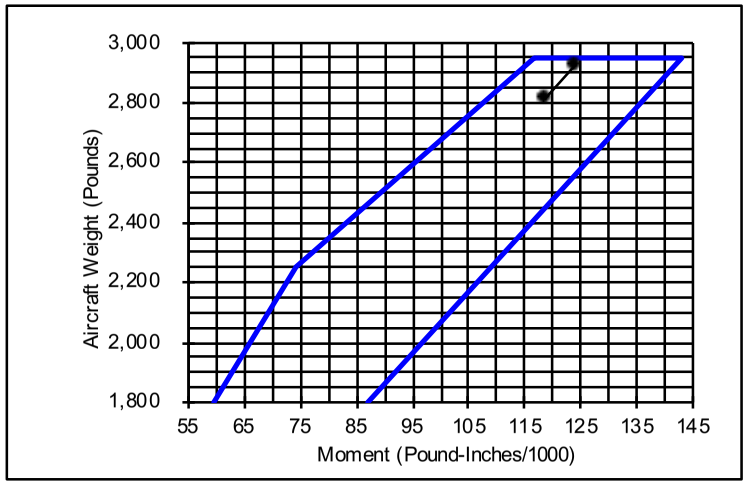
Fuel - 75 Gallons MAX Useable	75.0	
Planned Trip Time	1.5	Hrs.
Payload (Pax & Baggage)	655.0	
* Range @ 74% Pwr =12.7 GPH	5.8	Hrs.
Fuel Reserve Time	4.3	Hrs.

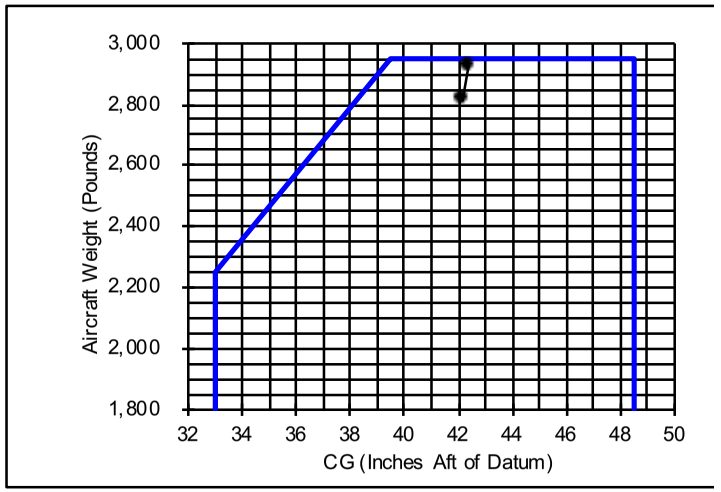
Enter data in highlighted blocks			
Max Gross Weight	2950		
Take-Off Weight	2928	99%	of Gross
Over/Under weight	**22**		

* Range based on POH Fuel Burn @ 74% power, 8,000' Std Conditions - may be more or less depending on leaning, DA, other factors.

Weight and Balance at Departure					
Loads		Weight (Pounds)		Arm (Inches)	Moment /1000
Empty Aircraft:		1831.8		37.26	68.26
Front Passengers:		200.0	195.0	37.0	14.6
Rear Passengers:		225.0	15.0	74.0	17.8
Area 1 Baggage 120# Max:				97.0	
Area 2 Baggage 80# Max:		20.0		115.0	2.3
Departing Fuel :	73.5	441.0		47.9	21.1
Grnd Ops (Gal):	1.5				
Totals:		2927.8		42.4	124.1
CG = Total Moment / Total Weight:					42.4

Weight and Balance at Arrival				
Loads		Weight (Pounds)	Arm (Inches)	Moment /1000
Empty Aircraft:		1831.8	37.26	68.26
Front Passengers:		395.0	37.0	14.6
Rear Passengers:		240.0	74.0	17.8
Baggage (Area 1):			97.0	
Baggage (Area 2):		20.0	115.0	2.3
Arrival Fuel (Gal)	54.5	326.7	47.9	15.7
Totals:		2813.5	42.2	118.6
CG = Total Moment / Total Weight:				42.2





	At Gross Wt	At Take Off Wt	At Land Wt.
Va	111	111	108
V BG	70	70	68
V S0	45	45	44
VS1	48	48	47
SF Lnd @ 40 Deg Flaps	60	60	59

		At Take Off Weight				
	Sea @ GW	Sea	2,500	5,000	7,500	10,000
Vx	57	57	58	59	60	61
Vy	78	78	76	75	74	73
		At Landing Weight				
Vx	57	56	57	58	59	60
Vy	78	76	75	74	72	71

PERFORMANCE TEST

DATE 5/16/21 AIRCRAFT N 121M MODEL 182 Q PILOT Jim / Gordon / Logan

CONDITIONS: ALTITUDE 6000 PRES 29.92 OAT 58°F AIRCARFT WEIGHT 2900

Slow Flight/Stall Test: Determine the power to maintain MCA (Minimum Control Airspeed) in level flight. – Stall Horn Just Starting to sound. Reduce Power while maintain altitude until Stall. Record IAS for each configuration.

Slow Flight / Stall

Flaps	IAS @ MCA	IAS @ Vs	PWR MP/RPM	Notes
0	55	40	15" / 2350	
0	57	53	Pwr Off	
10			/	
10			Pwr Off	
20	45	30	16" / 2350	
20	48	45	Pwr Off	
30			/	
30			Pwr Off	
40	45	30	16" / 2350	
40	46	38	Pwr Off	
0	60	55	Pwr Off	20° bank
0	73	65	Pwr Off	45° bank
20	50	48	Pwr Off	20° bank
20	55	55	Pwr Off	45° bank

Power On Climb / Stall Full Power Climb at Vx/Vy pitch back until Stall Horn, then Stall. Record IAS and ROC TEMP 16°C WINDS CALM ALT 29.92 PRESS ALT 2535

Flaps	POH/STC IAS	IAS / MCA	IAS / Vs	PWR MP/RPM	ROC	
0 Vr	50 /	n/a		/	n/a	Per POH std take-off
0 Vx	58 /			/		@ 5,000' per POH
0 Vy	75 / 75			/		@ 5,000' per POH
20 Vr	50 / 44	n/a		/	n/a	Short Field t/o
20 Vx	57 / 50			/		`@ test alt
20 Vy	70 / 68			/		`@ test alt
0 Vx	58 /			/		20° bank
20 Vx	75 / 75			/		20° bank
0 Vx	57 / 50			/		45° bank
20 Vx	70 / 68			/		45° bank

700'/MIN ON TAKEOFF

20°F 60 400' 20° BANK Climb out Full Power

ROTATE 45K 22" 20°F 300' ↑ FULL PWR

CLIMB 80K FULL PWR 600' ↑ FULL PWR

Cruse / Slow Cruse / Landing
Pattern / Power Off / Landing. Power required to achieve – 500 ft/min Descent.

Flaps	POH/STC IAS/GPH	ACTUAL IAS /GPH	PWR MP/RPM	ROC	
0	143 / 13.3	/	22/2400	0	Cruse 6000' / GPH
0	129 / 10.4	/	20/2200	0	Cruse 6000' / GPH
0	116 / 8.6	/	18/2100	0	Cruse 6000' / GPH
	POH/STC IAS				
20	80	80	/	0	Slow Cruse
0	70/69		Pwr Off	-	Best Glide (cruse pitch attitude)
0	90/		/	-	Downwind
10	80/		12"/	-500	Initial descent
20	70/		13"/	-500	Base
40	~~60 70~~/ 55		14"/	-500	Final
40	60 /57		/		Final Short Field
0	70 /69		Pwr Off		Initial descent (best glide)
20	/		Pwr Off		Base
40	65/60		Pwr Off		Final

65K - BEST GLIDE -600 1653.76
70KT - " " -700 1273.9

DOWN WIND 15" = 85K 0 FT. DESCENT
2250 RPM

INITIAL DESCENT 12" = 80K 10°F 500 FT. ↓

BASE 13" = 70K 20°F 500 ↓

FINAL 14" = 55K 40°F TO TOUCHDOWN