
**Things to Consider
Before Your First Flight
in the SZD-51-1 Junior
by Paul E. Remde**

Introduction

This document was created for pilots preparing for their first flight in the SZD-51-1 Junior. The Junior is reputed to be very easy to fly, but there are several factors which make it unique from the other club aircraft and could lead to problems if they are not anticipated. Below are summaries of the impressions and suggestions of two MSC instructors: Stephen Nesser and Jon Mattsson. After their thoughts are a few suggestions I have received from various instructors over the years in regard to flying singles-seat taildraggers. Also included is a review of the Junior by noted British instructor Derek Piggott. At the end of the document are a few tables and placards of specifications and speeds to fly, etc.

Impressions of the SZD-51-1 Junior
From Stephen Nesser, CFIG
As told to Paul Remde

Overall Impressions

Stephen said that the Junior flies very nicely. He said it is a delightful ship which penetrates very well. He did warn, however, that it is a very clean ship which picks up airspeed very quickly.

Pitch Sensitivity

Stephen said that the pitch sensitivity of the Junior is not bad. He said it was similar to the Owl in this respect.

Ground Loops and Taildraggers

Stephen did mention that since the Junior is a taildragger, it will be a bit more difficult to handle in a crosswind. Some care must be taken to avoid ground loops.

Spin Characteristics

Stephen said that the glider does spin very aggressively with a very nose down attitude. He also said that he had to force it to spin. It had a very benign stall with full aft stick in a shallow turn.

Airbrakes

Stephen noted that the airbrakes are very effective.

Slipping Characteristics

Stephen said, "Don't slip the ship with the airbrakes out". He said that when he tried a slip with the airbrakes out there was "significant buffeting and rapid degradation of elevator effectiveness".

Landing

Stephen recommended that, during landing, you should "fly it on rather than holding it off fully".

Recommendations

The Junior is very clean ship which accelerates quickly. Therefore airspeed management in the pattern is very important.

Impressions of the SZD-51-1 Junior
From John Mattsson, CFIG
As told to Paul Remde

Overall Impressions

Jon said that the Junior is very easy to fly for anyone who has flown a ship of equal or better performance. The only thing he didn't particularly like was the way the trim mechanism. It is not very easy to use. He liked the wide range of acceptable pilot weights in the glider. He also said he didn't think the glider would pose any problems for the people he thought would be interested in flying it.

Pitch Sensitivity

Jon said that the Junior was not particularly pitch sensitive.

Ground Loops and Taildragers

Jon said that although the Junior is a taildragger, he considered it a "club" taildragger due to the placement of the wheel. He said that the tail comes up quickly and that he did not think the glider was as prone to ground loops as most taildraggers. He considers the Junior a good transition ship between the ASK-21 and a "full taildragger".

Spin Characteristics

Jon said that the Junior will spin. He said it does not stall quite as aggressively as the Owl, but close.

Airbrakes

Jon said that the airbrakes were very effective.

Slipping Characteristics

The Junior slips beautifully with the airbrakes closed. Jon didn't try slipping with the airbrakes open.

Landing

Land the Junior the same as the ASK-21 or any Schleicher glider. Get it close to the ground and then hold it off until it comes down.

Recommendations

On your first flight it would be a very good idea to stall it at altitude to determine what the stall speed is with you in the glider.

In most ships Jon puts the trim well forward. In the Junior the tail came up very quickly and he says that for the Junior he would recommend putting the trim closer to the middle.

Remember that this is a taildragger, unlike all the other ships in the club. See the section below on Ground Loops and Taildraggers. Jon contributed much of the information found in that section.

My 2 Cents on Flying Single-seat Taildraggers

By Paul Remde

Introduction

Below are a few suggestions I have received from various instructors over the years in regard to single-seat taildraggers. I am not an instructor and have not flown a Junior. I certainly hope I don't come off as trying to sound like a know it all. However, some club members may find a good tidbit or two of knowledge in the text below.

Pitch Sensitivity

The Junior is reputed to not be overly pitch sensitive. However, most single-seat aircraft are more pitch sensitive than most two-seat aircraft. This is caused by several factors. One is that shorter tail and lighter construction lead to a lower rotary inertia around the pitch axis. This means that the tail will accelerate up and down more easily and quickly than in a larger, longer and heavier two-seat glider.

How to avoid overcontrolling

Rest your hand or wrist on your leg and control the stick with your finger tips. This gives a ground point for the hand and makes it more difficult to over control. The opposite approach (not recommended) would be to grab the stick like a baseball bat and move it like you're stirring a kettle.

The sensitivity of the elevator can create a problem during landing when using the airbrakes. Many people tend to twist their shoulders to the left while pulling back on the airbrake handle with their left hand. This shoulder twist can cause a person's right hand to move forward slightly. If the stick moves more easily than the airbrake handle moves, the shoulder twist may cause the stick to move forward farther than the airbrake handle is pulled back. If this happens in a pitch sensitive glider a pilot induced oscillation (P.I.O.) is likely to be the result. As mentioned above this effect can be reduced or eliminated by resting your right hand or wrist on your leg and controlling the stick with your fingertips.

What to do if a pilot induced oscillation (P.I.O.) is encountered

P.I.O.s are often encountered by new single-seat pilots on take-off and/or landing. Since a P.I.O. is caused by the pilot getting behind the aircraft, the best solution is to stop chasing the pitch oscillations. If you hold the stick steady for a second or two the oscillation will stop. Then resume control with a gentle touch – making only small, smooth motions with your finger tips on the stick.

Towhook Location

The Junior has both a nosehook and a C.G. hook. Always use the nosehook for aerotows as it will tend to straighten the glider out behind the towplane both on the ground and in the air.

Ground Loops and Taildraggers

The Junior is a tail-dragger. All the other sailplanes in the MSC are nose-draggers. Taildraggers must be handled differently than nose-draggers during takeoff and landing. Since the C.G. of a taildragger is behind the main wheel the tail will always try to pass the main wheel if the glider is

not kept straight. Crosswinds can make this more of a problem. For example: If, during the landing roll you kick hard on the rudder (to clear the runway) the C.G. will try to pass the main wheel and swing the tail around. This tendency will be enhanced if the brake is applied while turning. In an extreme ground loop the outside wing will lift off the ground and slam back down when the rotation stops. One way to avoid ground loops is keep the glider tracking straight during the landing roll. Slow gradual turns are OK. If a strong crosswind exists, keep the upwind wing low. If the crosswind blows the downwind wing into the ground a ground loop can happen very quickly. If the tail starts to swing around apply opposite rudder and try to keep the wings level.

Jon Mattsson added the following comments on ground loops and taildraggers:
Gliders will ground loop into the wind more easily than away from the wind. This is due to the tendency of the glider to weather-cock as the tail is blown downwind. This gets worse as you slow down and lose rudder authority.

During the takeoff run there is poor rudder authority at low speed. You must be ready to release if the glider starts to head off toward the side of the runway. Start the takeoff run with full downwind rudder and reduce it as you gain directional control.

To aid in directional control at low speed in a taildragger, use full back stick to keep the tail down on the tailwheel. Ease the back pressure as the rudder becomes effective.

Review of SZD-51-1 Junior
by Derek Piggott
From his book “Gliding Safety”

The Junior is perhaps the least known of all the ‘club’ gliders, but it has many excellent features and has much the same best gliding angle as the ASK-23 and Grob 102, although this is at a lower flying speed.

Perhaps the most striking and advantageous feature is the huge main wheel fitted with a disc brake. It reduces landing shocks and prevents damage when landing in rough fields. With a claimed glider ratio of 35:1 at 43 knots, the Junior is nearly 10 mph slower than other machines and this makes it particularly suited to thermalling in small, weak thermals. The lower speed is also an advantage for winch launching on a small site and ensures a really high launch.

This machine is much closer than many other gliders to my own idea of a good club aircraft. In my opinion the lower circling speeds are a great advantage to the inexperienced pilot, and the chance of damage is always greatly reduced by lower landing speeds. This is why the K8 and the K18 were so successful and popular in the clubs.

SZD-51-1 Junior

Dimensions		
Wing Span	49.22 ft	15.00 m
Length	21.95 ft	6.69 m
Fuselage Height	5.15 ft	1.57 m
Wing area	134.67 ft ²	12.51 m ²
Wing loading at full-up weight	6.23 lb/ft ²	30.40 kg/m ²
Aspect ratio	18	
Dihedral of Wing	3°	

Critical Speeds (at 333 kg, 734 lbs all up weight)			
Stall Speed	32 Kts	37 mph	60 km/h
Min. Sink Rate at speed	1.13 Kts	114 fpm	0.58 m/s
	38 Kts	43 mph	70 km/h
Best Glide ratio (measured) at speed	35:1		
	43 Kts	50 mph	80 km/h
Max. Winch Launching Speed	70 Kts	81 mph	130 km/h
Max. Aerotowing Speed	81 Kts	93 mph	150 km/h
Max. Rough Air Speed	84 Kts	96 mph	155 km/h
Maneuvering Speed	84 Kts	96 mph	155 km/h
Never Exceed Speed (Vne)	119 Kts	137 mph	220 km/h
Max. Airbrake Speed in Smooth Air	119 Kts	137 mph	220 km/h
Max. Airbrake Speed Rough Air	84 Kts	96 mph	155 km/h

G-limits	
Positive	+5.3
Negative	-2.65

Sailplane Weights		
Max All-Up Weight	838 lbs	380 kg
Empty Weight (of MSC's Junior)	496 lbs	225 kg
Wing Weight	121 lbs	55 kg
C.G. Location (of MSC's Junior)		72.6 cm

Pilot Weight Ranges		
Min. Pilot Weight	121 lbs	55 kg
Max. Pilot Weight	243 lbs	110 kg
**** Back-rest must be in full forward position for pilots 126 lbs or less.		
**** Back-rest must be removed for pilots 238 lbs or more.		

Miscellaneous	
N-Number	N511SN
Serial Number	X-132
Year of Manufacture	1983
Country of Origin	Poland
Manufacturer	PZL Bielsko
Designer	Stanislaw Zientek
Airfoil (Main)	Wortmann SO2-196
Airfoil (Tips)	Wortmann SO2-158
Automatic Control Connections	Y
Adjustable rudder pedals	Y
TE probe installed	Y
Nose Hook	Y
CG Hook	Y
Airworthiness Certificate	N
Handicap (CH98)	1.025

Placards

Placards for use with instruments in knots (airspeed), feet (altimeter), and m/s (vario) are shown below:

SZD-51-1 Junior - N511SN	
Stall Speed	37 mph
Min. Sink Speed	43 mph
Best L/D Speed	50 mph
Best L/D	35:1
Max. Winch Speed	81 mph
Max. Aerotow Speed	93 mph
Maneuvering Speed	96 mph
Max. Rough Air Speed	96 mph
Max. Speed (Vne)	137 mph
Max. Airbrake Speeds:	
Rough Air	96 mph
Smooth Air	137 mph
Min. Pilot Weight	121 lb
Max. Pilot Weight	243 lb
* Seat Fwd. For Pilots ≤ 126 lbs	
* Remove Seat For Pilots ≥ 238 lbs	
Glider Empty Weight	496 lb
Max. All-Up Weight	838 lb
G Limits	+5.3 / -2.65

Speeds to Fly	
Avg. Lift m/s	Spd. to Fly mph
0.0	50
0.5	54
1.0	65
1.5	78
2.0	81
2.5	85
3.0	89
3.5	91
4.0	98
4.5	103
5.0	106

Polar Data Points

The polar plot data points below were taken from a table in the flight manual.

Polar Data Points	
Airspeed mph	Sink m/s
43	0.58
50	0.63
62	0.96
68	1.16
75	1.37
81	1.60
87	1.88
93	2.22
99	2.67
106	3.12
112	3.60