



PW-5 "SMYK"

Sailplane Flight Manual

4.5.2 TAKE-OFF

A) AEROTOWING

Before take-off put the trimming device handle into 1-2 position for the light pilot and up to 5-6 position for the heavy pilot.

Roll on the main wheel.

The controlling behaviours in towed flight are the typical ones.

The sailplane can be trimmed in the whole airspeed range in towed flight.

The flying under the towing airplane downwash is not recommended since the towing cable rubs the fuselage front part.

Recommended aerotowing airspeeds:

- at climbing 110 km/h
- at cross-country towing 150 km/h

55 kts
75 kts

B) WINCH-LAUNCHING

Before take-off put the trimming device handle into position 1 for the light pilot up to 5-6 position for the heavy pilot.

Due to the hook location it is recommended the launching cable position at the left-hand side of the sailplane.

If however the cable is situated clearly at the right-hand side of the sailplane it should not be positioned on the left side of the front wheel.

- 01 | During the ground run the stick should not be pulled excessively to avoid the tail skid impact onto the ground. Roll on the main wheel.

During the steep climb the stick forces are of small value.

The best launching airspeed is 90-100 km/h.

46-51 kts

RELEASING

The sailplane is equipped with the self-releasing hook.

Two releasing techniques exist:

- 1) before the intended releasing release the stick to lower the cable tension then pull the releasing handle in the cockpit.
- 2) before the intended releasing hold the stick in position till the self-releasing occurs. After releasing recover immediately the glide and check the cable releasing pulling the control handle.



4.5.3 FLIGHT

CIRCLING

The circling airspeed, depending on the bank angle and sailplane weight ranges 80 - 85 km/h.

The bank reversal $45^\circ/45^\circ$ requires 3.5 seconds.

SIDE SLIP

The sideslip should be performed at the airspeed of 90 km/h or higher. Up to 20° bank the sailplane allows to retain the heading. For the greater bank the sailplane turns. With air brake retracted as well as with extended the sideslip is a typical one. The airspeed indicator records in sideslip are not valid.

AIR BRAKE OPERATION

- 01 | For the airbrake full extended the sailplane ratio in approach is 6.5. The diving at 45° in respect to the horizon with air brake full extended does not exceed 225 km/h airspeed. The extending or retracting of the air brake creates no pitch. The air brake may be extended in the whole airspeed range. The retraction requires the airspeed of below 150 km/h.

121 k/h

75 k/h

NOTE:

When extending the airbrake at the airspeed above 170 km/h the considerable negative vertical acceleration appears. Therefore the air brake should be extended gently. The pilot should be tightened with the belts.

90 k/h

4.5.4 APPROACH

Recommended approach airspeed is 95 km/h.

51 k/h

The approach angle should be adjusted by means of air brake.

4.5.5 LANDING

Touch ground with the main wheel. Avoid the tail skid ground impact. Ground run should employ the front wheel to allow for direction retaining and efficient braking.



4.5.6 FLIGHT IN RAIN

No abnormal control characteristics when flying in rain appear. No significant increase of stalling speed observed.

4.5.7 AEROBATICS

Before the initiation of the manoeuvres the sailplane should be trimmed for about 70 kts airspeed. Check the air brake to be locked and check the absence of moveable items in the cockpit.

Manoeuvres are performed in the typical way.

The recommended entry (recovery) speeds and load factors gained are listed below:

Manoeuvre	entry speed (IAS) kts	load factors
looping	92 to 97	3.4 g
stall turn	97	3.2 g
spinning	81 (recovery)	4.0 g
spiral	65	3.5 - 4.0 g

SAILPLANE BEHAVIOURS IN SPINNING

pilot with parachute	light 55 - 70 kg	mean 70 - 90 kg	heavy above 90 kg
aileron deflection	arbitrary	neutral or towards rotation	only towards rotation
longitudinal oscillations	exist considerable	exist	not exist
angle in respect to the horizon	40 - 50 deg.	50 deg.	60 - 70 deg.
delay in recovery	no more than 3/4 of turn	no more than 1/4 of turn	without delay

The recovery is typical one (see item 3.5).



4.6 PROCEDURES AFTER FLIGHTS

- switch-off the electrical devices,
- drain, if necessary, the ducts of total and static pressure installations (acc. to MAINTENANCE MANUAL),
- clean the pilot's cockpit and the whole sailplane,
- perform the inspection same as the pre-flight one.



SECTION 5

PERFORMANCE

5.1 INTRODUCTION

5.2 APPROVED DATA

5.2.1 AIRSPEED INDICATOR SYSTEM CALIBRATION

5.2.2 STALL SPEED (IAS)

5.3 NON-APPROVED FURTHER INFORMATION

5.3.1 DEMONSTRATED CROSSWIND PERFORMANCE

5.3.2 FLIGHT POLAR



5.1 INTRODUCTION

Section 5 provides approved data for airspeed calibration, stall speeds and additional non-approved information.

The data are calculated on the base of actual flight test results gained on the glider of good condition and using the average controlling techniques.

5.2 APPROVED DATA

5.2.1 AIRSPEED INDICATOR SYSTEM CALIBRATION

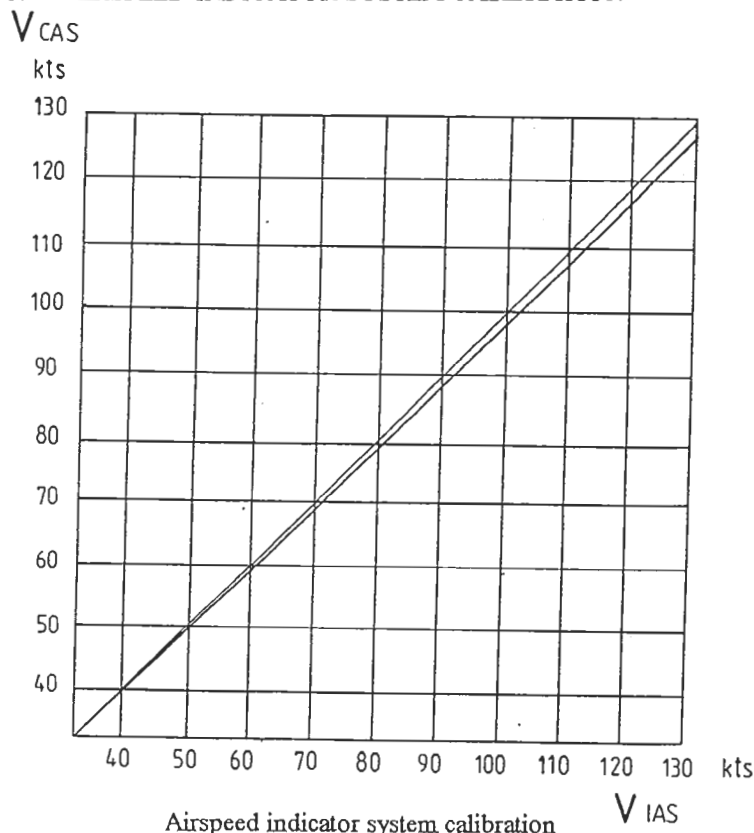


Fig. 5 - 1



5.2.2 STALL SPEEDS (IAS)

SAILPLANE WITH HEAVY PILOT

The sailplane with heavy pilot (above 90 kg) does not stall in straight flight with air brake extended as well as retracted.

The flight with the stick pulled full is possible with the minimum airspeed of about 65 - 73 km/h. With the air brake extended the minimum airspeed ranges about 70 - 78 km/h.

When circling with 45° bank the sailplane does not stall either. The minimum airspeed ranges about 74-78 km/h. With the air brake extended the minimum airspeed ranges about 79-83 km/h

SAILPLANE WITH MEAN OR LIGHT PILOT

The sailplane with mean or light pilot (55-90 kg) stalls in straight flight gently and it is possible to retain the lateral balance.

The stall warning is mild. When stalled the sailplane drops down very gently and symmetrically. When pulling the stick more no tendency to wing dropping appears. The stalling speed ranges about 58 - 67 km/h. With the air brake extended the stalling speed ranges about 65-75 km/h.

When circling with 45° bank as the critical airspeed is gained the sailplane automatically recovers the wings to level position or gently banks towards the turn. The slight releasing of the stick or the aileron deflection associated with the stick releasing results the transition to the normal flight without the tendency to spinning.

The stalling speed ranges about 64-75 km/h. With the air brake extended the stalling speed ranges about 74-80 km/h.

The altitude loss during recovery is not more than 30 m.

5.3 NON-APPROVED FURTHER INFORMATION

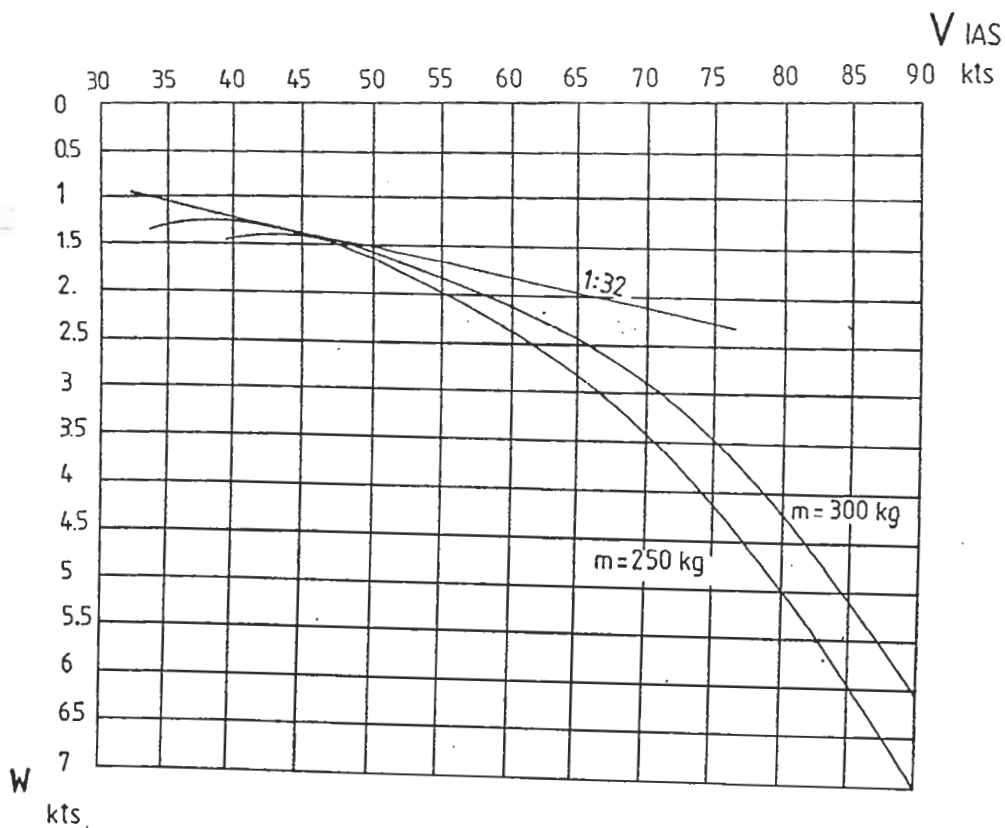
5.3.1 DEMONSTRATED CROSSWIND PERFORMANCE

The demonstrated crosswind component at take - off and landing is 6 m/s.

During the take-off or landing ground run on two wheels the sailplane is practically non-sensitive to the crosswind action.



5.3.2 FLIGHT POLAR

Flight polar
Fig. 5 - 2



PW-5 "SMYK"
Sailplane Flight Manual

SECTION 6

WEIGHT AND BALANCE

- 6.1 INTRODUCTION
- 6.2 PERMITTED PAYLOAD RANGE AND WEIGHT AND
BALANCE RECORD



PW-5 "SMYK"
Sailplane Flight Manual

6.1 INTRODUCTION

This Section contains the payload range within which the sailplane may be safely operated.

The weighing and C.G. location calculation procedure as well as the range of weight and C.G. locations of empty sailplane are contained in MAINTENANCE MANUAL.

Comprehensive list of all equipment available for this sailplane and the installed equipment during the weighting of the sailplane is contained in MAINTENANCE MANUAL.

6.2 PERMITTED PAYLOAD RANGE AND WEIGHT AND BALANCE RECORD

PERMITTED PAYLOAD RANGE

Maximum cockpit load (pilot + parachute + luggage).....110 kg

Minimum pilot's weight with parachute.....55 kg

CAUTION:

**PILOTS OF THE BODY+PARACHUTE WEIGHT BELOW
60 KG MUST HAVE THE BACK-REST LOCATED IN
LIMIT FRONT POSITION**



PW-5 "SMYK"
Sailplane Flight Manual

SECTION 7

*SAILPLANE AND SYSTEMS
DESCRIPTION*

- 7.1 INTRODUCTION
- 7.2 COCKPIT DEVICES
- 7.3 LUGGAGE COMPARTMENT
- 7.4 INFORMATION PLACARDS IN COCKPIT



7.1 INTRODUCTION

This Section provides description and operation of the cockpit devices. The particular data on the additional or other than standard devices are contained in Section 9 of this Manual.

The detailed description of the sailplane and its systems is contained in MAINTENANCE MANUAL.

7.2 COCKPIT DEVICES

Description for Fig. 7 - 1:

- 1) instrument panel,
- 2) towing cable releasing hand-grip (yellow) - pull to release,
- 3) pedal adjusting hand grip (brown on the instrument panel pedestal) - to adjust the pedals:
 - unlock the pedals pulling the hand-grip,
 - locate the pedals into the required position by pushing or pulling the feet,
 - release the hand-grip,
 - check the locking by pushing the pedals with feet.
- 4) canopy emergency jettisoning hand-grip (red) - pull to jettison the canopy,
- 5) air brake control lever (blue)- operation of air brake control:
 - extension - backwards,
 - retraction - forwards,
 - locking of the air brake in retracted position - press the lever forwards till clearly perceptible locking click appears,
 - unlocking of the air brake - pull the control lever backwards till the clearly perceptible unlocking click appears.
- 6) wheel brake lever -
to brake the wheel press the wheel brake lever to the air brake lever,



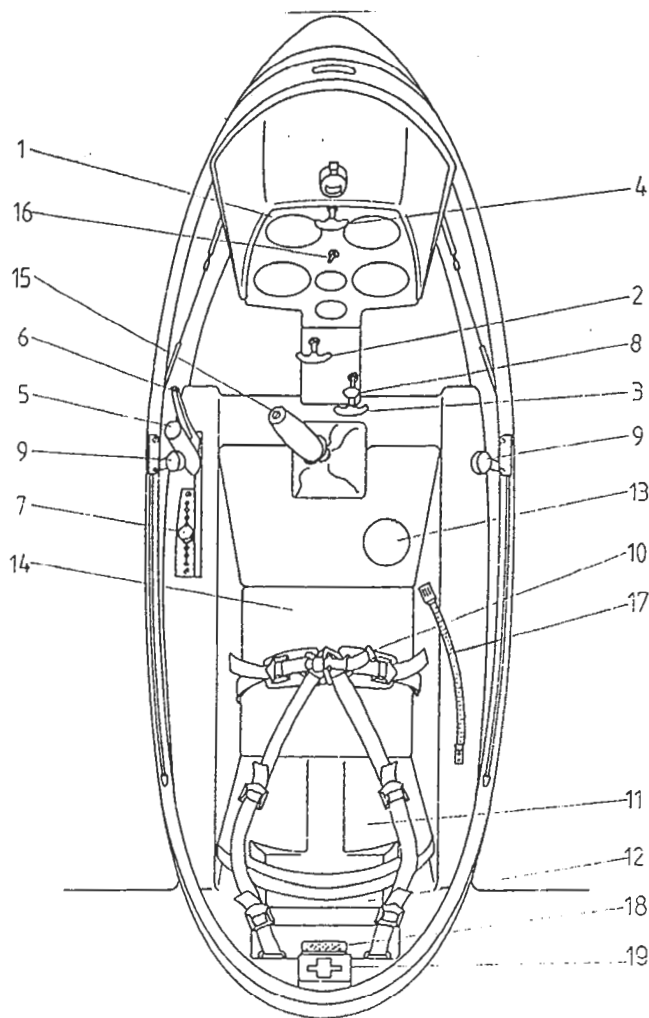
- 7) trimming device ball-grip (green) - sailplane trimming:
 - unlock the device pressing down the ball-grip,
 - locate the ball in one of 11 locations (moved forward - the airspeed increases, moved backward - the airspeed decreases),
 - lock the device by means of releasing the pressing on the ball,
 - check the locking by moving the ball forwards or backwards,
- 8) ventilation hand -grip - pull the hand-grip to open the air intake,
- 9) canopy locks hand-grips (white)- operation :
 - forwards - canopy opened,
 - backwards till to perceptible lock - canopy locked,
- 10) pilot's belts,
- 11) pilot's back-rest - the back-rest is adjusted by means of:
 - location of back-rest lower fitting in one of 5 openings in the seat plan,
 - inserting under the back-rest the suitable amount of adjusting inserts (item 12),
- 12) pilot's back rest adjusting inserts,
- 13) sanitary equipment cover,
- 14) seat pillow,
- 15) push-to-talk button,
- 16) turn indicator switch, - positions: I - on , O - off,
- 17) microphone,
- 18) loudspeaker,
- 19) container for First Aid Kit.

7.3 LUGGAGE COMPARTMENT

- 01 The luggage compartment is located behind the pilot's back-rest. It is provided for barograph or other items. Inside the compartment 4 fixing points are provided for strips fastening the luggage. Maximum luggage weight is 5 kg.



PW-5 "SMYK"
Sailplane Flight Manual



Cockpit devices
Fig. 7 - 1



7.4 INFORMATION PLACARDS IN COCKPIT

The operation limitations placards are described in Section 2. Rigging and de-rigging placards and location of the placards are described in MAINTENANCE MANUAL.



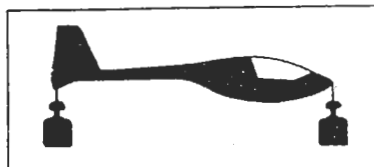
air brake



wheel brake



back-rest adjustment



trimming device



cable releasing



pedal adjustment

location of trimming device



canopy locks



cockpit ventilation



canopy jettison

Information placards in cockpit
Fig. 7 - 2



PW-5 "SMYK"
Sailplane Flight Manual

SECTION 8

SAILPLANE HANDLING, CARE AND
MAINTENANCE

- 8.1 INTRODUCTION
- 8.2 SAILPLANE INSPECTION PERIODS
- 01 | 8.3 SAILPLANE ALTERATIONS OR REPAIRS
- 8.4 GROUND HANDLING, ROAD TRANSPORTATION
- 8.5 CLEANING AND STORING



8.1 INTRODUCTION

This Section contains manufacturer's recommended procedures for proper ground handling of the sailplane. It also identifies the inspection and ground handling requirements, which must be followed to retain the performance and condition of new sailplane.

8.2 SAILPLANE INSPECTION PERIODS

The sailplane inspection periods and range are contained in MAINTENANCE MANUAL.

01 | 8.3 SAILPLANE ALTERATIONS OR REPAIRS

It is essential that the responsible airworthiness Authority be contacted prior to any alternation on the sailplane to ensure that the airworthiness of the sailplane is not compromised.

For repairs refer to MAINTENANCE MANUAL.

01 | The sailplane external surfaces should have the white, not getting yellow, Lacquer covering.
On the upper surfaces of wings, tailplane and fuselage no colour markings are allowed (it does not consider the colour markings of the wing tips).
On the control surfaces no markings are allowed to be painted, except producer marks on the rudder which are considered in the mass balance of the rudder.

8.4 GROUND HANDLING, ROAD TRANSPORTATION

TAXIING

The sailplane may be taxied by means of motored vehicle or other device using the front hook. The maximum allowed taxiing speed is 6 km/h. The general transportation rules should be observed. During the taxiing the canopy should be locked, and the control stick fastened with the pilot's belts.

NOTE:

Pushing the sailplane on the wing tips or tailplane tips as well as the control surfaces is prohibited.



PARKING ON AIRFIELD

When parking on the airfield the canopy should be locked and protected with a cover.

NOTE:

The non-anchored sailplane cannot be left without the supervision.

ANCHORING

- put the sailplane in such a position that the wind blows from back-side direction,
- put the wing against the wind,
- anchor the sailplane on wing tip, front hook and end of fuselage,
- immobilise the stick by means of pilot's belts.

ROAD TRANSPORTATION

To prepare the sailplane for a transportation:

- check the sailplane to be complete,
- empty the cockpit,
- immobilise the control stick by means of pilot's belts,
- lock the canopy and close the window,
- put the cover on the canopy,
- secure the control systems ends protruding out of the wings to avoid the damages,
- immobilise the ailerons and rudder by means of fixators,
- fix the sailplane components on the trailer on the way that the possibility of damage is excluded (see - storing, the tailplane may be located horizontally).

NOTE:

When the opened trailer is used secure the sailplane with covers.



8.5 CLEANING AND STORING

CLEANING

The sailplane should be washed with water mixed with the normal detergents using the sponge or soft rag. After washing the perviousness of drainage holes should be checked and, if necessary, the structure inside dried (this concerns especially the air brake boxes). For washing the textile elements the special cleaning agents should be used acc. to the recommendation of their producers.

The cockpit should be regularly cleaned with the vacuum cleaner.

NOTE:

Do not use the organic solvents (gasoline, nitro etc.) for canopy perspex cleaning.

STORING

The sailplane should be stored in dry and ventilated room. In case of prolonged storage it is necessary to protect the fittings against a corrosion (e.g. with a grease).

When stored in de-rigged condition its components should be positioned in the way that excludes the possibility of permanent deformations to be got:

- wings - leading edge downwards, supported on the spar roots (near the root rib) and leading edge near the trapeze part end using the soft, fitted stillage,
- fuselage - on wheels, the support under the tail skid. It is also possible to support the fuselage near the cockpit with a soft, fitted stillage.
- tailplane - leading edge downwards; both tips supported on the soft, fitted stillages.

NOTE:

After parking the sailplane on the open air it is necessary to check for the water inside the structure, then dry, clean and ventilate the whole sailplane.



PW-5 "SMYK"
Sailplane Flight Manual

SECTION 9

SUPPLEMENTS

9.1 INTRODUCTION

9.2 LIST OF INSERTED SUPPLEMENTS




NEW ZEALAND

AIRWORTHINESS CERTIFICATE



CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

Nationality and Registration Marks	Manufacturer and Manufacturer's Designation of Aircraft	Aircraft Serial Number
ZK-GSN	WSK "PZL-SWIDNIK" S.A. PW-5 "Smyk"	17.05.015
Categories: STANDARD		
Flight Manual Ref: AIR 2519		Period of Validity: NON TERMINATING
Conditions: Private operations only		
<p>This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and the New Zealand Civil Aviation Rules in respect of the above-mentioned aircraft which is considered to be airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations.</p> <p>Date of issue: 3 NOVEMBER 2000 Signature  for Director of Civil Aviation</p>		

No entries or endorsements may be made on this Airworthiness Certificate and associated Flight Manual or other approved document except in the manner and by the persons authorised by the Director. If this Certificate is suspended or revoked as prescribed in the Civil Aviation Act 1990 or if the aircraft is deleted from the register for any cause this Certificate shall be returned to the Director.



**CIVIL AVIATION AUTHORITY
OF NEW ZEALAND**

APPROVED FLIGHT MANUAL

AIR 2519

Aircraft Manufacturer WSK "PZL-SWIDNIK" S.A.
Aircraft Designation PW-5 "SMYK"
Nationality and Registration Marks ZK-GSN
Aircraft Serial Number 17.05.015

This Flight Manual applies to the PZL-Swidnik Model PW-5 and is the Flight Manual referred to on the Airworthiness Certificate.

This Flight Manual comprises this cover page plus Sections 1 through 5 and 9 of the GILC Approved PZL-Swidnik Sailplane Flight Manual Doc. No. PW-5/IWL/II/94 issued 8 March 1994 or later GILC Approved Edition, at the latest GILC Approved Revision and Temporary Revision status, plus any applicable approved Supplements. These revised NZ pages were issued under A/L 2 to Air 2519.

A handwritten signature in dark ink, followed by a circular official seal of the Civil Aviation Authority of New Zealand. The seal contains the text 'CIVIL AVIATION AUTHORITY OF NEW ZEALAND' and the CAA logo.

for Director of Civil Aviation
Date of Approval: 2 April 1998

General Information

This Flight Manual shall be carried on board the aircraft on all flights, in accordance with CAR Part 91 §91.111. It is the responsibility of the pilot in command to be familiar with the contents of this manual and to comply with all limitations and directions contained therein relating to the operation of the aircraft, in accordance with CAR Part 91 §91.101(b) and §91.109.

Supplements

Supplements issued by the manufacturer of the aircraft are approved by the original certification Authority and are included in Section 9 of this Flight Manual.

Other Supplements may be approved on an individual basis indicated by a signature on the front page. Any such Supplements may be included in the Flight Manual if they are applicable to the PZL-Swidnik Model PW-5 and relevant to the actual aircraft configuration. These Supplements should be manually recorded in the Supplements Incorporated page supplied by the CAA and which should be inserted after this cover page at the front of the Flight Manual.

The operator must ensure all approved Supplements applicable to this particular aircraft are obtained and incorporated in the Flight Manual.

Revisions

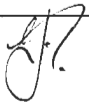
The registered owner should ensure that this manual is kept current and all revisions to the manual are incorporated on receipt. Revisions to the manufacturer's manual are no longer notified to individual owners by the CAA. It is therefore the registered owner's responsibility to ensure they are on a mailing list to receive Revisions promptly. The CAA maintains a list of the current Revision status of all Flight Manuals and confirmation of the status of any particular manual is available on the CAA website. Details of recent manufacturer's revisions received by the CAA may also be published on a regular basis in CAA newsletters.

Log of Supplements Incorporated in the Flight Manual

Details of all Approved Supplements, other than those issued by the manufacturer and listed in Appendix A, inserted in this Flight Manual should be recorded in the Log of Supplements below.

Title	Date of Issue	Incorporated
<p>Weight and Balance Data - CAA2173 Aircraft Radio Station - Equipment Approval Levels - CAA2129 (To be inserted by the certifying Engineer) Revision 3</p>	<p>11-7-97</p>	

Amendment Record Sheet

Rev No.	Title or Affected Sections	Signature	Date
3			1-4-98

This page is provided for the notification of any revisions by you as the owner. See cover page for your responsibility

LIST OF EFFECTIVE PAGES

(A) CAA Pages:

Page	Dated	Page	Dated
Approval Page	12.01.95	(i)	12.01.95
LEP	25.08.97	(ii)	12.01.95

(B) Manufacturers Basic Manual:

Sections 1 through 5 and 9 of the PAA Approved WSK "PZL-Swidnik" S.A. PW-5 "SMYK" Sailplane Flight Manual, issued 8 March 1994 and revised to Revision 1 dated July 1996.

(C) CAA Supplemental Data:

Supplement A Weight and Balance Data

Approved:



Date: 25 August 1997

for Director of Civil Aviation

INTRODUCTION

GENERAL

This Flight Manual comprises pages and documents listed in the List of Effective Pages (LEP) together with applicable approved supplements listed therein.

The Flight Manual shall be carried in the aircraft on all flights. It is the responsibility of the pilot in command to be familiar with the contents of this manual and to comply with all limitations and directions contained therein relating to the operation of the aircraft.

SUPPLEMENTS

Approved supplements are listed in the List of Effective Pages. The owner must ensure that all approved supplements applicable to this particular aircraft are obtained and incorporated in the Flight Manual. Incorporation is to be recorded in the Amendment Record Sheet.

AMENDMENTS

It is the owner's responsibility to ensure that amendments are incorporated on receipt of, and in accordance with, instructions issued on behalf of the Director. No amendments, endorsements or entries may be made except in accordance with the preceding paragraph or the Director's instructions.

Approval of revisions to documents which form part of the Flight Manual but are not supplied by CAA is notified by amendment of the List of Effective Pages. Such revisions are to be made on receipt of the LEP amendment, but not before. If revisions notified as approved have not been received the owner shall arrange for their urgent supply and take the necessary action on receipt.

AMENDMENT RECORD SHEET

NO	TITLE	PAGES AFFECTED	SIGNATURE	DATE

Amendments to this Flight Manual will be issued to the registered owner of the aircraft and must be incorporated and recorded on this sheet as soon as they are received.

W S K "PZL - Ś W I D N I K" S.A.
Al. Lotników Polskich 1, 21-045 Świdnik, POLAND

SAILPLANE FLIGHT MANUAL

Model: **PW - 5 "SMYK"**

Serial No: **17.05.015**

Registration:

Document No: **PW-5 / IWL / II / 94**

Date of issue: **March 8th, 1994**

In Polish original pages identified by "Appr." are approved by Polish
aviation authority:

**General Inspectorate of Civil Aviation
Civil Aircraft Inspection Board**

Seal:

Original date of approval:

This Manual should be always on the sailplane board
--

This sailplane is to be operated in compliance with information and
limitations contained herein.

The English translation has been made to the best of our knowledge and
belief, but in case of uncertainty the Polish original is authoritative.

The English translation has been made by Wiesław Stafiej.

Weight and Balance Data



ZK-GSN

A new sheet is to be completed whenever revised weight and balance data is established either by weighing or calculation.

Aircraft Make and Model

PW-5

EMPTY WEIGHT (see Note 1)

188.8 KG

Datum Reference

Wing Root Leading edge

C of G POSITION (state Fwd or Aft of Datum)

59.63cm Aft

MOMENT

11258.144

Data established by weighing/~~calculation~~ (delete as appropriate)

Performed by (state name and Licence/Approval No.)

Shields Sailplanes

On (date)

24-2-99

Reason

Repairs

Report Ref (if applicable)

If established by calculation, state when aircraft last weighed.

Notes:

1. Empty weight includes unusable fuel, fixed ballast, full operating fluids and items in the equipment List over page.

EQUIPMENT LIST

The following items of removable equipment are included in the empty weight data over page. Refer to Aircraft Logbook for details:

ASI

ALT

Compass

VARIO x2

Battery

Radio

Transponder



0.1 RECORD OF REVISIONS

Any revision of the present Manual, except actual weighing data, must be recorded in the following table and in case of approved Sections endorsed by the responsible airworthiness authority.

The new or amended text in the revised page will be indicated by a black vertical line in the left hand margin and the Revision No, and the date will be shown on the bottom left hand corner of the page.

Rev. No	Affected Section	Affected pages	Date of issue	Approval	Date of approval	Date of insertion	Signature



0.2 LIST OF EFFECTIVE PAGES

Section	Page	Date of issue	Section	Page	Date of issue
0	(i)	23 Feb.'94	5	5.1	23 Feb.'94
	(ii)	4 Nov.'94		Appr.5.2	4 Nov.'94
	(iii)	23 Feb.'94		Appr.5.3	4 Nov.'94
1				5.4	4 Nov.'94
	1.1	23 Feb.'94	6	6.1	23 Feb.'94
	1.2	23 Feb.'94		6.2	23 Feb.'94
	1.3	23 Feb.'94		6.3	23 Feb.'94
	1.4	23 Feb.'94	7	7.1	23 Feb.'94
	1.5	4 Nov.'94		7.2	23 Feb.'94
2	2.1	23 Feb.'94		7.3	23 Feb.'94
	Appr.2.2	4 Nov.'94		7.4	23 Feb.'94
	Appr.2.3	4 Nov.'94		7.5	23 Feb.'94
	Appr.2.4	23 Feb.'94	8	8.1	23 Feb.'94
	Appr.2.5	4 Nov.'94		8.2	4 Nov.'94
	Appr.2.6	4 Nov.'94		8.3	23 Feb.'94
	Appr.2.7	4 Nov.'94		8.4	23 Feb.'94
3	3.1	23 Feb.'94	9	9.1	23 Feb.'94
	Appr.3.2	4 Nov.'94		9.2	23 Feb.'94
4	4.1	23 Feb.'94			
	Appr.4.2	23 Feb.'94			
	Appr.4.3	23 Feb.'94			
	Appr.4.4	23 Feb.'94			
	Appr.4.5	23 Feb.'94			
	Appr.4.6	23 Feb.'94			
	Appr.4.7	23 Feb.'94			
	Appr.4.8	23 Feb.'94			
	Appr.4.9	4 Nov.'94			
	Appr.4.10	4 Nov.'94			
	Appr.4.11	4 Nov.'94			
	Appr.4.12	23 Feb.'94			



0.3 TABLE OF CONTENTS

	Section
<i>GENERAL</i> (a non-approved section)	1
<i>LIMITATIONS</i> (an approved section)	2
<i>EMERGENCY PROCEDURES</i> (an approved section)	3
<i>NORMAL PROCEDURES</i> (an approved section)	4
<i>PERFORMANCE</i> (a partly approved section)	5
<i>WEIGHT AND BALANCE</i> (a non-approved section)	6
<i>SAILPLANE AND SYSTEM DESCRIPTION</i> (a non-approved section)	7
<i>SAILPLANE HANDLING, CARE AND MAINTENANCE</i> (a non-approved section)	8
<i>SUPPLEMENTS</i>	9



PW-5 "SMYK"
Sailplane Flight Manual

SECTION 1

GENERAL

- 1.1 INTRODUCTION
- 1.2 CERTIFICATION BASIS
- 1.3 WARNINGS, CAUTIONS AND NOTES
- 1.4 DESCRIPTIVE DATA
- 1.5 THREE-VIEW DRAWING
- 1.6 ABBREVIATIONS



PW-5 "SMYK"
Sailplane Flight Manual

1.1 INTRODUCTION

This Flight Manual has been prepared to provide pilots and instructors with the information for safe and efficient operation of PW-5 "Smyk" sailplane.

This Manual includes the material required by Joint Airworthiness Requirements JAR-22 and supplementary information supplied by the sailplane manufacturer.

1.2 CERTIFICATION BASIS

This type of sailplane has been approved by Civil Aircraft Inspection Board in accordance with Joint Airworthiness Requirements JAR-22 - issue of May 7th, 1987 with Change 4 and amendments: 22/90/1, 22/91/1.

The Type Certificate No **BG-194** has been issued on March 10th, 1994, category of airworthiness "U" (utility).

1.3 WARNINGS, CAUTIONS, NOTES

WARNING:

MEANS THAT THE NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO AN IMMEDIATE OR IMPORTANT DEGRADATION OF THE FLIGHT SAFETY

CAUTION:

MEANS THAT THE NON-OBSERVATION OF THE CORRESPONDING PROCEDURE LEADS TO A MINOR OR TO A MORE OR LESS LONG TERM DEGRADATION OF THE FLIGHT SAFETY

NOTE:

Draws the attention on any special item not directly related to safety, but which is important or unusual.



1.4 DESCRIPTIVE DATA

SAILPLANE DESCRIPTION

PW-5 "Smyk" is the single-seat sailplane with the cantilever mid-wing and standard tailplane arrangement. The structure is all glass-epoxy composite.

The wings of trapeze contour with bow-shaped ends. The wings are of monospar structure with sandwich shells.

The plate air brake extended on the upper wing surface only.

The fuselage shells are of monocoque structure, stiffened with frames.

Rudder is fabric covered.

The cockpit is equipped with in flight adjustable pedals and back rest adjustable on ground. The canopy opens forwards.

The fixed undercarriage contains of the main wheel with shock absorber and drum brake, front wheel and tail skid with small wheel.

Two take-off hooks are installed (nose hook for aerotowing and C.G. hook for winch-launching).

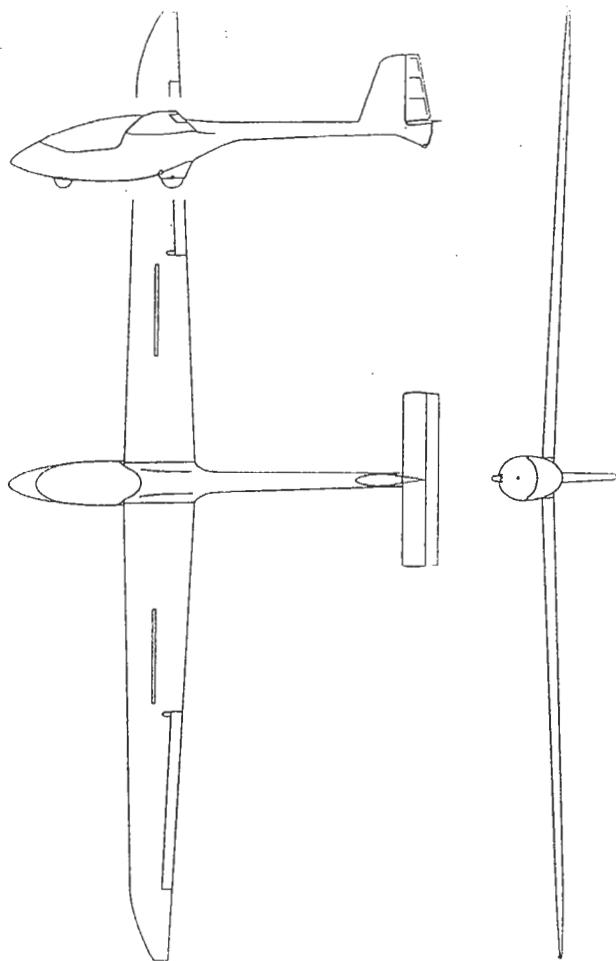
BASIC DATA

wing span	13.44 m
length	6.22 m
height	1.86 m
wing area	10.16 m ²
aspect ratio.....	17.8
wing loading	29.5 kg/m ²
Mean Standard Chord	0.798 m



PW-5 "SMYK"
Sailplane Flight Manual

1.5 THREE-VIEW DRAWING



PW-5 "Smyk" sailplane
Fig. 1 - 1



1.6 ABBREVIATIONS

CAS - calibrated airspeed means indicated airspeed of a sailplane, corrected for position (due to position of pressure ports on sailplane) and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.

C.G.- centre of gravity.

daN - decanewton.

h - hour.

IAS - indicated airspeed means the speed of a sailplane as shown on its pitot - static airspeed indicator uncorrected for airspeed indicator system error. In this Manual zero instrument error is assumpt.

m - meter.

ft - feet

kg - kilogram.

kts - knots

s - second.

Vs1 - means the stall speed or the minimum steady flight speed obtained in a specific configuration.



SECTION 2

LIMITATIONS

- 2.1 INTRODUCTION
- 2.2 AIRSPEED
- 2.3 AIRSPEED INDICATOR MARKINGS
- 2.4 WEIGHT
- 2.5 CENTRE OF GRAVITY
- 2.6 APPROVED MANOEUVRES
- 2.7 MANOEUVRING LOAD FACTORS
- 2.8 KINDS OF OPERATIONS
- 2.9 MINIMUM EQUIPMENT
- 2.10 AEROTOW AND WINCH-LAUNCHING
- 2.11 OTHER LIMITATIONS
- 2.12 LIMITATIONS PLACARDS



2.1 INTRODUCTION

Section 2 includes operating limitations, air speed indicator markings, limitations placards necessary for safe operation of the sailplane. The limitations included in this Section and in Section 9 have been approved by Civil Aircraft Inspection Board.

2.2 AIRSPEED

Airspeed limitations and their operational significance are shown below:

	Speed	kts IAS	Remarks
V _{NE}	Never exceed speed	121.5	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection
V _{RA}	Rough air speed	81	Do not exceed this speed except in smooth air and then only with caution. Examples of rough air are: lee-wave rotor, thunderclouds, etc.
V _A	Manoeuvring speed	81	Do not make full or abrupt control movement above this speed, because under certain conditions the sailplane may be overstressed by full control movement.
V _W	Maximum winch launching speed	65	Do not exceed this speed during winch-launching.
V _T	Maximum aerotowing speed	81 (CAS =80)	Do not exceed this speed during aerotowing.



2.3 AIR SPEED INDICATOR MARKINGS

Airspeed indicator markings and their colour-code significance are shown below:

Marking	kts IAS value or range	Significance
Green arc	41 - 81	<i>Normal operating range.</i> (Lower limit is 1.1 V_{S1} at maximum weight and front limit C.G. location. The upper limit is the rough air speed).
Yellow arc	81 - 121	Manoeuvres must be conducted with caution and only in smooth air. See: NOTE.
Red line	121	Maximum speed for all operations. See: NOTE.
Yellow triangle	51	Approach speed at maximum weight.



PW-5 "SMYK" Sailplane Flight Manual

2.4 WEIGHT

maximum weight	300 kg
maximum fuselage and tailplane weight	112 kg
maximum load in luggage compartment.....	5 kg

2.5 CENTRE OF GRAVITY

Centre of Gravity range for flight:

- front limit	20% of Mean Standard Chord 23.5 cm aft of root chord leading edge
- rear limit	42% of Mean Standard Chord 41.0 cm aft of root chord leading edge.

The way of C.G. location finding and the C.G. location range for empty sailplane are described in MAINTENANCE MANUAL.

WARNING:

**THE SAILPLANE MAY BE SAFETY OPERATED ONLY
WHEN LOADED IN RANGE DEFINED IN SECTION 6 OF
THIS MANUAL.**

2.6 APPROVED MANOEUVRES

This sailplane is certified in the Utility Category.

The following manoeuvres are allowed :

- looping,
- stall turn,
- spinning,
- spiral.

Performing technique and recommended entry speeds are contained in Section 4 of this Manual.



2.7. MANOEUVRING LOAD FACTORS

Limit load factors are :

- for V_A = 81 kts airspeed +5.3 / -2.65
- for V_{NE} = 121.5 kts airspeed +4.0 / -1.5

2.8 KINDS OF OPERATION

- day flying,
- cloud flying,
- aerobatic manoeuvres (according to item 2.6 of this Manual).

2.9 MINIMUM EQUIPMENT

- 4 pieces pilot's belts,
- airspeed indicator (marked per item 2.3 of this Manual),
- altimeter,
- total energy variometer,
- variometer,
- magnetic compass,
- side-slip and turn indicator,
- transceiver,
- power supply.

CAUTION:

DURING THE FLIGHT PILOT MUST HAVE BACK PARACHUTE ATTACHED.



2.10 AEROTOW AND WINCH - LAUNCHING

AEROTOW

The hook for aerotowing (nose hook) is located before the front wheel.

- maximum aerotowing airspeed $V_T = 81$ kts
(CAS = 80 kts)
- maximum force damaging the towing cable or safety link 700 daN
- minimum towing cable length 20 m

WARNING:

THE AEROTOWING WHEN USING THE C.G. HOOK IS NOT PERMITTED.

WINCH-LAUNCHING

The hook for winch-launching (C.G. hook with automatic release) is located before the main wheel on the left side of fuselage.

CAUTION:

THE WINCH-LAUNCHING WHEN USING THE FRONT HOOK IS NOT PERMITTED.

- maximum winch-launching speed $V_W = 65$ kts
- maximum force damaging the cable or safety link 700 daN

2.11 OTHER LIMITATIONS

- 1) Flying in known icing conditions is not permitted.
- 2) Night flying is not permitted.
- 3) Aerobatic manoeuvres in rough air are prohibited.
- 4) The pilots of body + parachute weight of below 60 kg must have the front limit location of the back rest.
- 5) The flights on the altitude of above 16400 ft are prohibited.



2.12 LIMITATIONS PLACARDS

Maximum winch-launching speed	$V_W = 65$ kts
Maximum aerotowing speed.....	$V_T = 81$ kts
Manoeuvring airspeed.....	$V_A = 81$ kts
Allowed manoeuvres: looping, stall turn, spinning, spiral	

Empty sailplane weight	max. 190 kg
Maximum weight	300 kg
Maximum cockpit load	110 kg
Minimum pilot's + parachute weight	55 kg
Maximum force damaging the towing cable or safety link.....	700 daN

WARNING:

**PILOTS OF BODY + PARACHUTE WEIGHT OF BELOW 60
KG MUST HAVE THE BACK-REST AT FRONT LIMIT
LOCATION.**

luggage max. 5 kg

The other placards are shown in Section 7.

Location of the placards is described in MAINTENANCE
MANUAL.



PW-5 "SMYK"
Sailplane Flight Manual

SECTION 3

EMERGENCY PROCEDURES

- 3.1 INTRODUCTION**
- 3.2 CANOPY JETTISON**
- 3.3 BAILING OUT**
- 3.4 STALL RECOVERY**
- 3.5 SPIN RECOVERY**
- 3.6 SPIRAL DIVE RECOVERY**



3.1 INTRODUCTION

Section 3 provides the procedures in emergency conditions

3.2. CANOPY JETTISON

- 01 |
- 1) Pull the canopy emergency jettison handle full.
 - 2) Catch the canopy locks hand-grips and push the canopy strongly forward off.

3.3. BAILING OUT

- 01 |
- 1) Jettison the canopy.
 - 2) Release the safety belts.
 - 3) Bail out of the sailplane (if the sailplane rotates bail out towards the rotation).

3.4 STALL RECOVERY

Release the control stick.

3.5 SPIN RECOVERY

- 1) Check ailerons neutral.
- 2) Apply full rudder opposite to the direction of the spin.
- 3) Ease the stick forward until rotation ceases.
- 4) Centralise rudder and ease out of the ensuing dive.

3.6 SPIRAL DIVE RECOVERY

- 01 |
- 1) Cancel the bank with the co-ordinated aileron and rudder deflection.
 - 2) Recover the sailplane out of the dive.



SECTION 4

NORMAL PROCEDURES

- 4.1 INTRODUCTION
- 4.2 RIGGING AND DE-RIGGING
- 4.3 PRE-FLIGHT INSPECTION
- 4.4 INSPECTION BEFORE TAKE-OFF
- 4.5 NORMAL PROCEDURES AND RECOMMENDED SPEEDS
 - 4.5.1 PROCEDURES BEFORE TAKE-OFF
 - 4.5.2 TAKE-OFF
 - 4.5.3 FLIGHT
 - 4.5.4 APPROACH
 - 4.5.5 LANDING
 - 4.5.6 FLIGHT RAIN
 - 4.5.7 AEROBATICS
- 4.6 PROCEDURES AFTER FLIGHTS



4.1 INTRODUCTION

Section 4 provides the procedures of normal sailplane operation. The normal procedures associated with additional equipment can be found in Section 9.

4.2 RIGGING AND DE-RIGGING

- A) Rigging team: 2 persons (or 3 persons without the rigging jigs).
B) Rigging jigs: fuselage support, wing tip support (of about 1.2 m height).
C) Sequence of rigging procedures:
1. clean and grease all the assembling fittings, bolts and control system connections,
 2. put the fuselage on the support (in case no support is in disposition one person holds the fuselage), open the canopy, put the airbrake cockpit lever backwards, open the inspection hole on the fuselage,
 3. assemble the right-hand wing first. Insert the spar end into the fuselage. Fit together the wing and fuselage fittings, insert the right-hand main bolt to "1/2" location (bolt lever locate in the grip) then insert the left-hand main bolt into "1/2" location too (as above) - insert the right-hand rear bolt till to stop- (see Fig. 4 -2),

CAUTION:

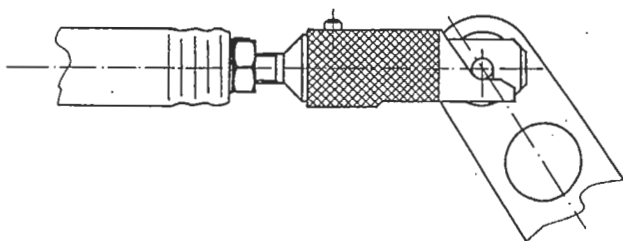
THE BOLTS SHALL BE INSERTED BY HAND ONLY, NO TOOL ALLOWED. IN CASE OF JAMMING (EXCESSIVE DRAG) BREAK THE RIGGING AND CHECK THE BOLTS FOR CORRECT CLEANING.

4. support the wing tip (in case of having no support one person should hold the wing),
5. rigging of the left-hand wing: insert the spar end into the fuselage, fit together the wing and fuselage fittings. insert the rear bolt till to stop, insert the left-hand main bolt till to securing it with the latch then insert the right-hand main bolt in the same manner,
6. connect the control systems of aileron and air brake (see Fig. 4 -1),

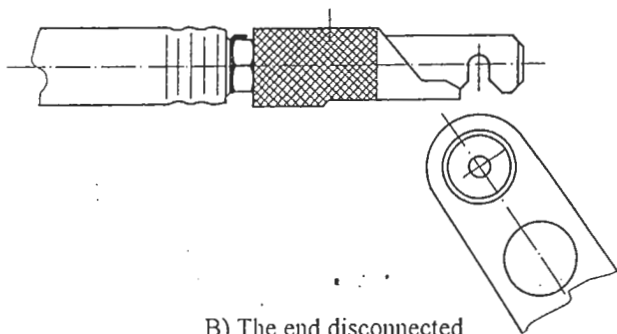


7. rigging of the tailplane: deflect the rudder till to stop, fit the tailplane to fuselage (the stabiliser front pins must engage the fuselage fittings), insert the rear bolt (placing the latch in lower position) till to securing with the latch. The elevator control circuit is connected automatically, (see Fig. 4 -3),
8. check securing of the main bolts of wings and rear bolt of tailplane and connection of control systems, close the inspection hole on the fuselage.

De-rigging requires the inverted sequence.



A) The connected and secured end



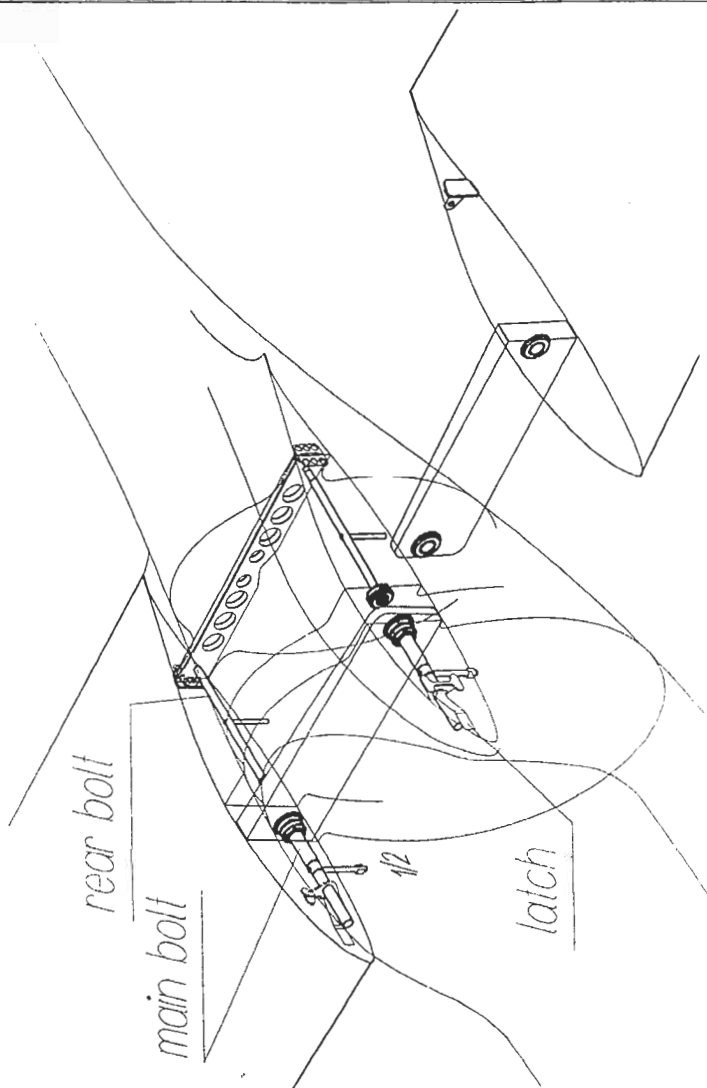
B) The end disconnected

Connection of control system of aileron and air brake with disconnectable ends.

Fig. 4 - 1



PW-5 "SMYK"
Sailplane Flight Manual

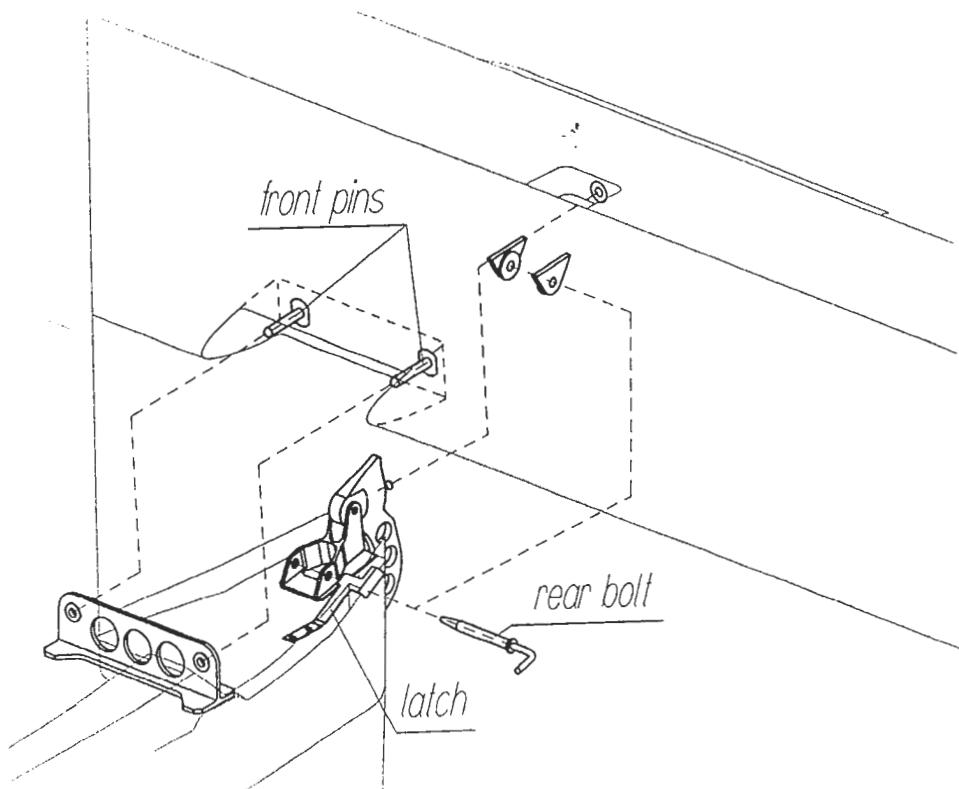


Rigging the wings

Fig. 4 - 2



PW-5 "SMYK" Sailplane Flight Manual



Rigging the tailplane

Fig. 4 - 3



4.3 PRE - FLIGHT INSPECTION

NOTE:

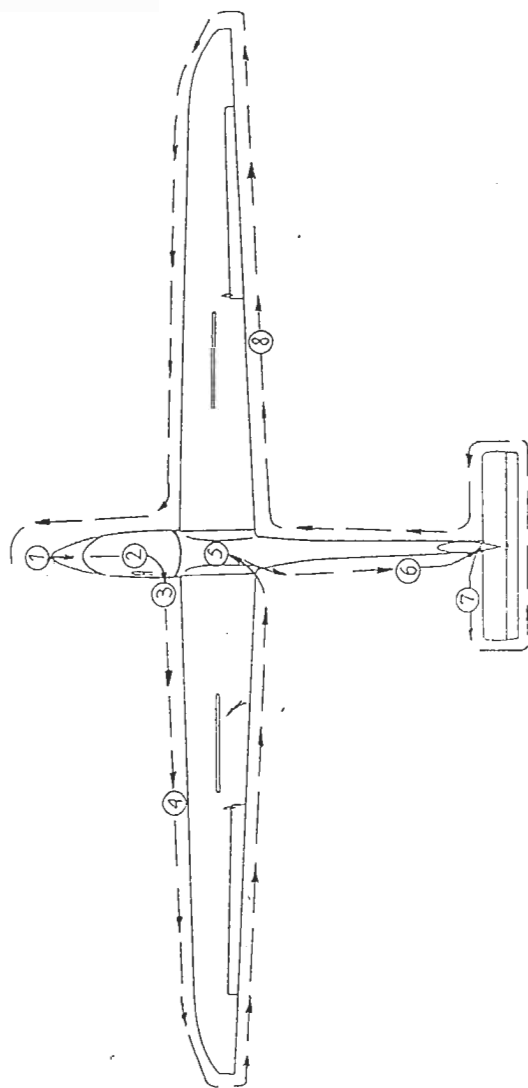
Before the flight the validity of Airworthiness Certificate and the updating of periodic inspections should be checked.

The pre-flight inspection and after every rigging inspection are recommended to be performed according to the diagram (see Fig. 4 - 4):

- 1.- check the fuselage front part, surface condition, the pressure ports being not obscured,
- 2.- check the condition of perspex surface, open the canopy,
 - check the wing connection bolts to be inserted and secured,
 - check the instruments and installation connection,
 - check the correct operation of the elevator, rudder and ailerons, maximum deflections, plays and friction,
 - check the correct operation of air brake - the maximum extended position and locking in the retracted position,
 - check the operation of trimming device,
 - check the operation of front and C.G. take-off hooks,
 - check the cockpit for the moveable items - remove,
 - check the opening and locking of the canopy,
 - check the safety belts, pilot's back-rest, seat pillow,
- 3.- check the condition and pressure in pneumatics,
 - check the rollability of the wheels,
 - check the operation of wheel brake and shock absorber,
- 4.- inspect the upper and lower wing surface as well as leading and trailing edges,
 - check the ailerons, surface condition, suspension, plays, deflections, friction,
 - check the air brake, condition, plays, extending, retracting, fitting the caps into the contour,
- 5.- check the connection of control systems of aileron and brake,



PW-5 "SMYK"
Sailplane Flight Manual



Pre - flight inspection
Fig. 4 - 4



- 6.- check the fuselage rear part, especially bottom part and tail skid,
 - check the fin, surface condition,
 - check the rudder for fabric covering damages, upper hinge and cable fitting securing,
- 7.- check the tailplane, fitting, securing, surface condition,
 - check the elevator deflections, plays, friction,
- 8.- as in item 4.

4.4 INSPECTION BEFORE TAKE-OFF

- check the fastening bolts to be in position and secured,
- check the tailplane for the correct rigging and securing,
- open the inspection hole and check the aileron and air brake control system ends for correct connection and securing,
- check the correct operation of control surfaces and air brake namely without jamming, excessive play and that they have the full movements.

4.5 NORMAL PROCEDURES AND RECOMMENDED SPEEDS

4.5.1 PROCEDURES BEFORE TAKE-OFF

- check and put on the parachute,
- adjust the pilot's back-rest,
- take place in the cockpit,
- fasten and tighten the belts,
- adjust the pedals,
- make the full movements of control surfaces, pull the towing cable release handle, extend and retract the air brake,
- check the transceiver operation,
- check the altimeter setting,
- close and lock canopy.