

# The Aeronautical Monument from Michałowice, Poland

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**Abstract:** *After World War I Romania was sized with contradictory feelings: on the one hand: a general euphoria, stimulating many ambitions, on the other hand, the fear that everything that had been obtained through the sacrifice of half a million Romanian soldiers could have been lost. The insecurity of its borders and the fear of the revisionist forces counterattack determined Romania to conclude a treaty of alliance with Poland (March 3, 1921), then to join the countries that were part of the Little Entente (Czechoslovakia, the Kingdom of Yugoslavia). It was followed by France, terrified by its inability to stop the expansion of Germany.*

**Key Words:** *aviation, development, testing, flights, cooperation, relationships, monument, associations*

Analyzing the cooperation between Romania and Poland in the aviation field I found many historical reference marks that originated over 90 years ago. The emergence and development of the aeronautical phenomenon in both countries followed a path that often interfered. After the First World War, Romania and France founded the Franco-Romanian Society of Air Navigation - CFRNA which opened the first transcontinental airline in the world. Paris was linked to Istanbul passing through Eastern European capitals, including Warsaw.

There are also other interesting arguments. In 1804, Iordache Cuparencu born in Iasi (1784) reached Warsaw with the Kolter theater troupe and gave acrobatic performances in Bracka Street. In 1806 he started to build a balloon made of glued paper with a basket and hot air produced by a little stove installed on board. The first public ascent was made in June 1806 in Warsaw, in the Foxal Garden when the balloon reached up to the church of St. Cross. The balloon caught fire but Cuparencu was able to escape. Second flight took place on December 6, 1806 in Vilnius with another paper balloon. This time he traveled 2.5 km.

His third ascent was in Warsaw in July 1808, at the same place, the Foxal Garden when he reached a height of about 1280 m. In 1811 he joined the Polish army as an artillery officer.

He seems to be the inventor of mechanical theater being confined for his shows performed in Poland during 1830-1842. He died in 1844 and was buried in the Greek Orthodox cemetery of Wola.

Part of information about Iordache Cuparencu was obtained in 2001 from Piotr Lopalewski by some Romanian historians, head of research department of the Polish Aviation Museum in Krakow. Data were also received from Prof. Boleslaw Orłowski, a

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well-known researcher at the Institute of Science History of the Polish Academy of Sciences (Instytut Historii Nauk-PAN).). These examples show that even since the 19th century there were some important cultural links between the Romanian Principalities and Poland. It is known the great interest of Romanian inventors Henri Coanda and Ion Stroescu in the aeronautical scientific work of the famous researcher S. Drzewiecki (*Le Vol Plane Essai d'Une Solution Mecanique du Probleme, 1891 - French Edition*).

After World War I Romania was sized with contradictory feelings: on the one hand: a general euphoria, stimulating many ambitions, on the other hand, the fear that everything that had been obtained through the sacrifice of half a million Romanian soldiers could have been lost.

The insecurity of its borders and the fear of the revisionist forces counterattack determined Romania to conclude a treaty of alliance with Poland (March 3, 1921), then to join the countries that were part of the Little Entente (Czechoslovakia, the Kingdom of Yugoslavia). It was followed by France, terrified by its inability to stop the expansion of Germany.

In 1925 the Conference from Locarno took place and it was signed the famous Pact Kellogg - Briand between the U.S. Secretary of State and the French Minister of Foreign Affairs, joined by other countries which pledged to abandon the use of force as a continuation of their policy. The immediate result: an increased budget for weapons.

In a short time, the Little Entente countries realized that diplomatic barrier standing in the way of Germany would not last. At the conference held in 1927 at Ioachymow, the three components of the Little Entente states decided the development of a mutual economic plan. Each state preserved its sovereignty, but had to remove the economic weaknesses within the alliance, so far focused more on political and diplomatic side. Numerous bilateral economic treaties were signed. Subsequently, economic cooperation deepened with the establishment of the Economic Alliance. Regarding the military cooperation, every state conceived a detailed plan of economic and industrial mobilization in case of war. Starting with France, all states began to arm themselves.

In 1928 one of the largest military air contests of the Little Entente was organized at which Poland also attended. On the morning of August 4 participating crews were at the airfield in Prague, two days later, they took off on the air route Prague, Krakow, Warsaw, Lwow, Iasi, Bucharest (Baneasa). The next air route stage was Bucharest, Belgrade, Brno and Prague.

There followed a series of contacts with Poland. In 1929, the Polish General Staff requested to the Romanian party to collaborate on the development of railway directly linking Poland to Romania, and also on proposals for a plan of economic cooperation during peacetime and warfare. Maybe it was a pure coincidence that the Minister of War in Romania was a general whose origins came from Poland, Henri Cihoski.

In order to ensure stable air links between Bucharest and the capitals of states that joined the Little Entente an agreement on the air navigation between Romania and Poland was signed on May 9, 1930. On June 1, the air traffic from Bucharest to Gdansk started at a rate of three times a week. Romanian state pledged to jointly exploit the air route Bucharest – Warsaw by a national airline together with LOT Polish companies.

Shortly after signing the documents, the Polish built on Baneasa airport a building for staff providing the aircraft arrivals from Warsaw and the passengers boarding / unboarding. On June 28, 1931 opened the airline Gdansk, Thessaloniki, via Warsaw, Bucharest, and Sofia. Two days later Romania and Poland have signed a new commitment to mutual support

in case of attack on their eastern borders. Each of the two states disposed of 17 infantry divisions, two cavalry divisions and 20 aviation squadrons as intervention forces.

Between 3 and July 9, 1937 the conference of Romanian and Polish major staffs was held in Bucharest. They discussed the forces situation at that time, conduct of operations in the junction area, organization of permanent defense of the junction area, including through aviation. There were exchanges of information on Soviet army.

These contacts also increased the mediation role of military economic relations that would materialize in aeronautical construction by building in Romania under license some types of Polish jet fighters and trainers, including the famous PZL.

Also, it should be emphasized the connections in the sport aviation field, which were maintained at a very high level by the International Aeronautical Federation President himself, the Romanian Prince George Valentin Bibescu. Between 27 and 30 August 1936 he chaired the Federation conference held in the Polish capital. As a premonition, the members of the flying clubs affiliated to the federation discussed the problem of overflights prohibited areas, the militarized ones. During his stay in Poland, Prince Bibescu visited Wieliczka plants. From his initiative, numerous international competitions offered the occasion of sport confrontation between the Romanian and Polish pilots. There were many cases where, orders and medals of one of the two countries have rewarded the other country airmen's merits.

During the invasion of Poland by German troops, part of Polish aviators took refuge in Romania; some valuable Polish engineers started to work for aviation factories in Bucharest and Brasov. One of them, Iakimiuk, became friend of the Romanian engineer Radu Manicatide and after the war, got in France to the famous company Sud-Aviation where he got a helping hand to the Romanian delegation which was negotiating the license of the "Allouette" helicopters.

After the Second World War, Romania and Poland were among the states in the Soviet sphere of influence. Later on, the two became the members of the Warsaw Pact. A new collaboration, this time in the field of helicopters is to be mentioned in the 60s. The first helicopter purchased by Romania and manufactured in Poland, arrived in 1959 and was used by the Reed Central. It was flown by the pilot Aurel Damian who was trained by the supplier. Later on, in 1962, four officers were selected to be trained as pilots. Mr. Iacob Mihai and Lt. maj. Nae Constantin.

The other two, Cpt. Eng. Rafael Teodorescu and Cpt. Ioan Gogescu were prepared for maintenance and technical operation of helicopters SM-1 and SM-2. Each pilot totalized 10 hours of dual and single control flight. After qualification in Poland, the four pilots returned home, and in a short time two helicopters SM1 were brought for school and training, registered 01 and 02, then three other SM-2 SC helicopters for transport missions, registered 28, 29 and 30.

Moreover, there have been numerous other contacts between military and civilian aeronautics representatives of the two countries including visits of military delegation at ministers' level. Also, the close friendship, developed within the *Intercosmos* program between the Romanian and Polish spacemen is well-known, and is still maintaining nowadays

A few years ago, a good collaborator of ARPIA, Col. Cristian Scarlat, former Director of the National Office for Heroes Memory told me about a Polish monument erected in memory of Romanian and Polish airmen. From his explanation it resulted that the monument appearance and condition, at the time, were not good at all. Time, wind, moisture and frost had deteriorated it faster than expected by our neighbors, designers, pilots and visitors. Our colleague Lieutenant (r) Vulpoiou Ioan, Head of Department within ARPIA, had the chance to

discover on the internet a material about this monument located in Michalowice, near Warsaw. This author is, Roman Wozniak who entitled his article, ZAPOMNIANY POMNIK LOTNIKÓW MICHAŁOWICACH W (The Forgotten Aviation Monument at Mihałowice). In the article was also mentioned the following text engraved on the monument:

**MAM - FARR - ARPA  
AND  
THE AERONAUTICAL CIRCLE  
FROM  
- ROMANIA -  
BRING THEIR PIOUS HOMAGE TO  
DISTINGUISHED AIRMEN AND  
TECHNICIANS WHO SACRIFICED THEIR LIVES ON THE ALTAR OF THE  
AERONAUTICAL SCIENCE  
AT - 7-XI-1936  
LT-CDOR – MIHAIL PANTAZI  
INC - AV - JERZY RZEWNICKI  
CPT-ENG-ROMAN POPESCU  
SECR-TECH - JERZY SZRAJER**



In the first half of 1933, engineer Zbysław Ciołkosz began working -for the Polish Aerospace Industry (PZL)- on a transport plane for 10 to 12 passengers, called PZL 30 and powered by two Pratt & Whitney engines of 295 kW (400 HP). The project was contracted by Polish Airlines in 1934. Subsequently LOT dropped PZL 30 and bought Lockheed L 10A Electra. Industrial Department has received then, Colonel T. Karpinski's suggestion to convert the prototype PZL 30 into a bomber. In such circumstances in March 1936 the P.30 BI prototype was flown by Bolesław Orliński on the Okecie airport. This plane, with a weight of 2891 kg was named Żubr (European Bison). Tests were conducted at the Institute of Aviation Technology between April 24 and July 3, 1936 achieving a maximum speed of 277 km / h and a ceiling of 4600 m although the engine power was quite low. The P & W engines were changed with the Pegasus VIII ones to improve the bomber performances.

The P30 B.II plane - such modified and having a mass of 4004 kg, became the series model number LWS 6 ŻUBR whose production began in Lublin Aircraft Plants in fall of 1936. It was tested at the same Institute of Aviation (ITL) from September 23 to October 28. Romania was interested in that bomber and negotiated the purchase of 24 pieces equipped with GNOME-RHONE engines. On November 7, 1936 during a flight demonstration, the P 30 B.II prototype, carrying on board the members of the Romanian Military Delegation which had arrived in Warsaw, lost an engine and a few wing elements. The pilot Jerzy Rzewnicki, the technician Jerzy Rzewnicki and the two Romanian air officers were buried under its remains. This disaster determined Romania to abandon this contract and stop the manufacturing of LWS 6 ŻUBR aircraft. Engineer Z. Ciołkosz was withdrawn from this project, which gave a new impulse to the construction of LWS 6 aircraft whose developing was entrusted to engineer Jerzy Teisser.

The Production prototype LWS 6 – with two vertical tails flew at Lublin in late 1937. In 1938 the production was resumed on 15 ŻUBR aircraft, with a single vertical tail. Since 1937, the production model received the signal code LWS 4.

The aircraft was completed in the second half of 1938 but was not a success and therefore it was subjected to endless reconfigurations absorbing large amounts of money.

In 1939 the building of another prototype whose wing tubular structure was made of welded chrome-vanadium was started, resulting in a decrease in weight with 300 kg. In the summer of 1939 ten ŻUBR aircraft were used for training, five were in reserve and one at the plant in Lublin. The aircraft didn't carry out operational flights. During the war, the Germans LUFTWAFFE used some of them for crews training in blind flight.

In 1937 the Romanians erected a memorial to the four pilots, on the very place of the catastrophe while local authorities gave the name of: *Aviation* and *Romania* to the crossroad, Streets. The Romanian text engraved on the commemorative plaque recorded all that I've described above.

Under the engraved text- the author continues- a beautiful emblem includes a propeller having a damaged blade supported from the both sides by bird wings into a new expression of unfulfillment. Here we can feel the Romanian specificity creating such a plastic and realistic vision of the tragedy, as happened here on this land. About the monument several papers were written in 1997 and 1998, but still nobody said that it „belongs to us” (a n:to Poland).

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LWS.4A Żubr

#### ***Dane podstawowe***

Producent: Lubelska Wytwórnia Samolotów

Konstruktor: Zbysław Ciolkosz

Typ: średni bombowiec

Konstrukcja: mieszana metalowo-drewniana

Załoga: 4 osoby

#### ***Historia***

Data oblotu: marzec 1936

Lata produkcji: 1938

Wycofanie ze służby: 1942

Egzemplarze: 15

Dane techniczne:

Napęd: 2 × silnik gwiazdowy Bristol Pegasus VIII, Moc: 670 KM

#### ***Wymiary***

Rozpiętość: 18,5 m

Długość: 15,40 m

Wysokość: 4,0 m

Powierzchnia nośna: 49,50 m<sup>2</sup>

Masa Własna: 4788 kg

Masa Startowa: 6876 kg

#### ***Osiągi***

Prędkość maksymalna 341 km/h

Prędkość wznoszenia 6,8 m/s

Pułap 6700 m

Zasięg 750 km

#### ***Dane operacyjne***

Uzbrojenie: 5 × karabinów maszynowych Vickers kaliber 7,9 mm, do 660 kg bomb

Użytkownicy: Polska, Niemcy

Źródło: Wikipedia

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The pilot of the ŻUBR-aircraft was Jerzy RZEWNICKI, 36 years old, a lieutenant in reserve, engineer, founder of the magazine "Skrzydłata Polska" (Polish Wings, magazine founded in 1930 that still exists today). He should prove the aircraft performances to the Romanian officers Mihail PANTAZI and Roman POPESCU who would also lose their lives in that disaster. The fourth victim was Jerzy SZRJR 24 years old, reserve lieutenant, who was on the plane as a technical-observer. Both Polish officers were buried at the Military Cemetery WARSZAWA-POWAŻKA.

The monument fell prey to the ravages of time and rust crept in all possible places.

The remains of the monument were cared for by Anton Kowalski, a neighbour that kept what fell off or was not yet scrapped and „valorized” as waste metal.

Anton Kowalski takes care of the monument as one of the faithful people settled on these lands The laced metal lattice and the entire construction soars toward the skies. Each flier, a member of the crew of this plane has a distinctive element represented on the monument. Everything has a regression and an end, although the construction of the monument had to last for more than one hundred years. The winds and weather put their marks on the monument.

It survives somehow (n.a. at the time the document was written), perhaps because Michałowice benefits from the proximity of the Okęcie airport. Most of the citizens in our village are linked to aviation, working as technicians, pilots and other airport-related jobs! The airman's monument is also remembrance of the friendship between our peoples once neighbors, with similar traits and purposes but also under similar threats. Does a similar monument exist in Romania too? Maybe any of our readers knows more about this...

3-4 years ago, the author insistently informed all village inhabitants, officials of Military and Civil Aviation and Ministry of Culture, Aviation Seniors and all people interested in aviation about the need of the urgent repair of the monument.

Since then and until now, the author of the mentioned article, Mr. Roman Wozniak, a specialist in civil aviation tried by all means and methods to concentrate forces, media, supporters and sympathizers of aviation, aiming to restore, renovate and unveil again the Monument. All his efforts have been successful! Hats off!

Our story relates further the moment of the new unveil of the Romanian and Polish airmen monument on Monday, November 7, 2011. It was the date when 75 years ago, during testing, the PZL 30 Zubr bomber crashed at Michałowice in the Warsaw airport area. The crew's members were: Mihail Pantazi, Eng. Roman Popescu, Jerzy Rzewnicki and Jerzy Szrjer.

The handicraft, the monument and the details, as seen in the attached images, confirm that the structure and architecture are of Romanian design. The memorial was made by students of the *Industrial High School Carol the IInd* of Bucharest. It is the school where Lt.commander Mihail Pantazi had taught the engines course until the year of his death. The monument was inaugurated in 1937, survived the Second World War and the communist period. It started deteriorating, and a retired Polish airman, now journalist, as I've already informed the readers, searched the history and origin of the monument. Then he provoked the Polish Sejm (Parliament), embassies, and hosts to react.

An ARPIA member, on his own expense, attended the debates due to technical, financial and organizational issues, along with Polish media, the representative of the Polish Parliament and the Romanian Embassy in Warsaw. The Senior Aviators Club, The National Association of Aviation Techniques and The Polish Air Force Association, have restored the monument with the support of Mihałowice Village Hall and the Romanian Embassy in Warsaw.

Its aspect is impressive, causing interest, piety and reverence. The area is monitored and at night is electrically lighted. On Monday, November 7, 2011, within a very impressive official military and religious ceremony, the new unveil of the monument took place. A great local audience and representatives from all backgrounds and institutions honored the event.

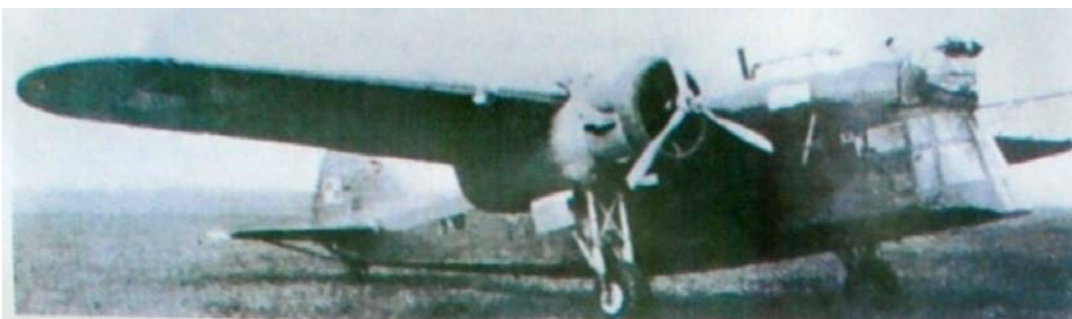
The monument is built on the site of the plane crash and adjacent streets have been named "Romania Street" and "Aviation Street" to honor the heroes who fell doing their duty.

Initially ARPIA answered the host's invitation with a promise that three persons will participate, one being a member of the acrobatic flight group "Yacarii Acrobati". He intended to go there in his plane to greet the commemorated heroes with a flight salute. Romanian aviation has indeed fantastic folks! They love the kinsmanship between the fliers of this world, but organizing and weather problems along with announcements and participations in various events cancelled the flight to Poland and this elegant professional salute. On the site I joined discussions with several persons and was pleasantly surprised, beyond expectations even, that in Poland they know a lot about the evolution of Romanian aviation, and about the two Romanian heroes. Yes, indeed, Lt. commander Mihail Pantazi, along with Petre Ivanovici and Max Manolescu was a long-time member of the high aerobatics group "Dracii Rosii" (the Red Devils). In fact it was the same Mihail Pantazi that held the record for flights above South Africa!

*The Aviation Legends Foundation* in Poland, a very active non-governmental organization, tried to obtain new information, details and addresses about the well-known Romanian airplane, the IAR-80 and PZL 11f / PZL 24 once found, the evidence from Romania. When I returned in Romania and opened my e-mail I found a lot of questions meant to obtain further information to enrich their knowledge and publications. Before and after the date of November 7 2011 I found quite a lot comments about the monument and the tribute to the four pilots on the internet, in local newspapers and at several broadcasting and television shows, including *Radio Romania Actualități* and also at a meeting I attended in Poland where I met a few bodies whose members were pilots. Their honorable gesture to restaure the monument together with the Romanian Embassy in Warsaw and the village hall of Mihałowice is to be remarked and appreciated both in writing and maybe in the near future, even by some institutional and moral rewards. As the author of these lines and a member of the Romanian delegation, as a soldier and an airman I can say that I and my colleagues, we felt on-site the consideration and consistency of a common effort of paying homage to four pilots - heroes who died on a mission which meant the substance of connection between two countries whose ways often have interfered. Their mission was one of responsibility and prestige in favor of national defense, based on a unitary conception and mutual support in the danger that would arise in Europe at the end of the fourth decade.

Our mandate, as members ARPIA is to strengthen the collaboration started long ago between our countries and to support further on the image of Romanian aviation. The homage moment was significant if we also mention that Poland and Romania's national days are at close dates - November, 11 and December, 1 respectively - whose historical significance originated in 1918 under the same historical circumstances.





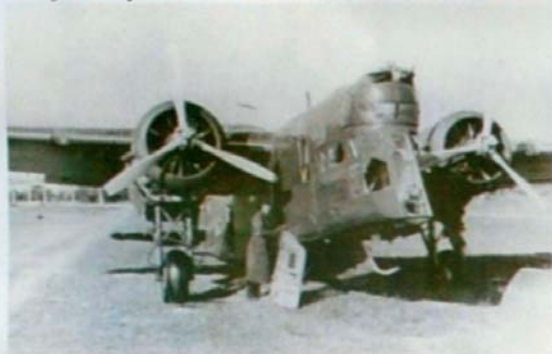
## LWS.4A Żubr

### LWS.4A Żubr znany też jako PZL.30 Żubr i LWS.6 Żubr

Dwusilnikowy średni bombowiec i samolot szkolny, wyprodukowany w niewielkiej liczbie w Lubelskiej Wytwórni Samolotów przed wybuchem II wojny światowej.

### Historia

Projekt samolotu powstał w wyniku złożonego w 1933 roku, przez Ministerstwo Komunikacji, zamówienia na samolot pasażerski dla PLL LOT. Gdy projekt samolotu był już na ukończeniu i rozpoczęto budowę prototypu, Polskie Linie Lotnicze zakupiły samoloty Douglas DC-2. Zamówienie zostało anulowane, koszty prac pokrył Skarb Państwa zaś na bazie projektu postanowiono opracować bombowiec mogący zabrać do 1200 kg ładunku bomb. W tym samym czasie opracowywano projekt nowoczesnego bombowca PZL.37 Łoś. Samolot PZL.30 miał stanowić zabezpieczenie na wypadek porażki projektu. Z tego powodu, w przeciwieństwie do nowatorskiego "Łosia", miał on mieć bardziej tradycyjną konstrukcję, opartą na koncepcji francuskiego Poteza-54. Pierwszy prototyp oznaczony jako PZL.30B został oblatany w marcu 1936 co miało miejsce tylko na trzy miesiące przed pierwszym lotem PZL.37. Prototyp samolotu był poważnie zmodyfikowany, z uwagi na słabe osiągi. Zastosowano mocniejsze silniki (680 KM zamiast 400 KM) i cięższe, w pełni wciągane podwozie. Nie wzmocniono przy tym struktury wytrzymałościowej maszyny. Tak zmieniona wersja otrzymała oznaczenie PZL-30BII. Samolot został zaakceptowany i postanowiono o



produkcji nielicznej serii w fabrykach lubelskiej wytwórni LWS. Została nadana mu nazwa Żubr i rozpoczęto przygotowania do produkcji 16 maszyn dla polskiego lotnictwa wojskowego.

Opracowano również odmianę eksportową z francuskimi silnikami Gnome-Rhone 14K, którą zaproponowano Rumunii. Lotnictwo polskie zamówiło 16 "Żubrów", natomiast lotnictwo rumuńskie zamierzało zakupić 24 egzemplarze. Produkcję seryjną planowano rozpocząć w LWS, gdzie inż. Ciołkosz został

kierownikiem biura konstrukcyjnego. Celem zapoznania się z samolotem do Polski przybyła delegacja lotnictwa rumuńskiego. 7 XI 1936r. podczas lotu pokazowego doszło w Michałowicach do katastrofy prototypu. Zginęła cała załoga: polska z ITL oraz znajdująca się na pokładzie delegacja rumuńska. Przyczyną katastrofy były wady konstrukcyjne skrzydła. W konsekwencji Rumunia zrezygnowała z zakupu "Żubrów", a prace nad samolotem zostały zahamowane.



Po katastrofie PZL-30BII samolot został przebudowany. Nowy prototyp oznaczony jako LWS.6 otrzymał wzmocnioną konstrukcję. Pierwszy egzemplarz nowej wersji ukończono 7 grudnia 1937 roku. Loty próbne w ITL rozpoczęto w styczniu 1938 roku. Modernizacja (głównie wzmocnienie konstrukcji płata

poprzez pogrubienie użytej do budowy sklejki) spowodowała wzrost masy własnej samolotu, a co za tym idzie zmniejszenie udźwigu maszyny. Ograniczyło to drastycznie ładunek zabieranych bomb. Z pełnym obciążeniem, nie mógł on operować z lotnisk polowych. Na miękkiej nawierzchni, nie był w stanie osiągnąć odpowiedniej do startu prędkości. Po zmniejszeniu masy, nie był w stanie zabrać niemal żadnego ładunku bomb. Te cechy ostatecznie zdyskwalifikowały go, jako samolot bojowy. Mimo to zamówiono wariant seryjny, pod ponownie zmienionym oznaczeniem - LWS.4A. Początkowo posiadał on usterzenia pionowe wzorowane na PZL-30BII, które później zostało zmienione poprzez zwiększenie powierzchni i zmianę obrysu. Seria produkcyjna liczyła 15 samolotów. Została ona zbudowana w 1938 r.

Planowano także budowę wodnosamolotu LWS-5, jako wariantu "Żubra" dla lotnictwa morskiego. Jednak projekt został zaniechany wobec zbyt dużej masy samolotu w stosunku do jego zbyt małego udźwigu bomb.

#### Slużba

Dostawy nowych samolotów do jednostek lotniczych, rozpoczęły się jesienią 1938. Przystarzałe już w momencie rozpoczęcia produkcji i gorsze pod każdym względem od konkurencyjnego "Łosia", od razu powędrowały do jednostek szkoleniowych, jako maszyny treningowe. Tutaj na jaw wyszły kolejne usterki. Należała do nich zła konstrukcja podwozia (nieodpowiednie silniki elektryczne). Powodowała ona kłopoty z jego chowaniem. Ostatecznie, we wszystkich samolotach, podwozie zostało na stałe zablokowane w pozycji "wypuszczone".

W roli samolotów szkolnych, nie były uzbrojone. Nie wzięły tym samym udziału w walkach kampanii wrześniowej. Kilka maszyn uległo zniszczeniu podczas niemieckich nalotów na polskie bazy lotnicze. Kilka egzemplarzy trafiło jednak w ręce Niemców. Paradoksalnie jednostki szkoleniowe Luftwaffe korzystały z "Żubrów" dłużej niż lotnictwo polskie, bo do 1942 r.

#### Opis techniczny

Wolnonośny górnopłat o konstrukcji mieszanej metalowo-drewnianej. Podwozie samolotu klasyczne, dwukółowe, chowane. Załogę stanowiły cztery osoby: pilot, dowódca-bombardier, radiotelegrafista i tylny strzelec. Stanowisko bombardiera znajdowało się w przeszklonym "nosie", uzbrojonym w strzelającą do przodu karabin maszynowy. Stosowano silniki gwiazdowe Bristol Pegasus VIII (normalna moc: 670 KM, maksymalna: 700 KM) lub (tylko pierwszy prototyp) słabszy Pratt Whitney Wasp Junior. Uzbrojenie strzeleckie stanowiło 5 karabinów maszynowych Vickers kaliber 7,9 mm. W wersji seryjnej mógł przenosić do 660 kg bomb.

Źródło: Wikipedia



Photos: Roman Woźniak and slt.(r) Ioan Vulpoiu

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