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5 October 1981

USSR Report

TRANSPORTATION

(FOUO 6/81)

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AIR

FRENCH PRESS: THE NEW SOVIET HELICOPTER MI-26

Paris AIR & COSMOS in French No 864, 13 Jun 81 pp 67-68

[Article by J.M.: "The Mi-26, New Giant Soviet Helicopter"]

[Text] AIR ET COSMOS was able to examine in detail the Mi-26, a new giant Soviet helicopter, one of the great new productions in this 34th Exhibition.

In 1975, presence of the huge twin-engine Mi-12 made a sensation, both because of the impressive dimensions of the aircraft and because of its weight, its payload and its installed power (26,000 horsepower).

But that mastodon did not go beyond the prototype stage, in spite of the possibilities that it offered for transporting heavy unit loads. That double Mi-6 must not have been easy to operate, especially in a turbulent atmosphere. After its presentation at Le Bourget, no more mention was heard of it. The Mi-6 (presented for the first time at Le Bourget in 1967) and its derivatives--Mi-10 and Mi-10K, on the other hand--were mass produced (700 units, according to reliable sources). But a machine that is now ancient is involved and the appearance of a successor is normal, but a definitely heavier and more powerful successor, a bit more modern also, although its inspection, certainly too rapid, was at times somewhat deceptive from the point of view of modernness and an examination of performance.

Composite Materials on the Main Blades

The rotor has eight traditionally constructed blades. Each blade consists of a metal spar to which segmented boxes made of composite materials are attached (this is something new, at least on a Soviet helicopter). These blades are completely connected on a traditional, but compact, rotor head, having, nevertheless, the good feature of taking eight blades. The main transmission box is power cooled by a front blower clearly visible on the photographs.

The two turboshaft engines are Soloviev D-136, directly derived from the D-36 dual-flow turboshaft engine, which equips the Yak-42 tri-jet and the Antonev-72 twin-jet. The D-36 is a three-shaft engine, as is the D-136 also, but with a different architecture. The front blower and its low-pressure turbine are gone to the benefit of a free turbine responsible for recovering power.

11,400 Horsepower per Engine

At maximum takeoff speed (8,300 rpm), power increases to 11,400 horsepower in a standard atmosphere (Z = 0, t = 15°C). At ISA [International Standard Atmosphere] + 15, that is to say at 30°C, it is still 11,000 horsepower.

The corresponding fuel consumption is slightly less than 200 grams per horsepower/hour or 220 grams at half-power.

On the Mi-26, the two D-126 engines, placed forward of the BTP [main rotor shaft], are equipped with deicing ring-shaped intakes preventing snow from entering. In fact, the Mi-26 is presented as an all-weather machine.

The anticouple rotor (7.61 meters in diameter!) is also deiced. Its horizontal tail structure has variable pitch.

The tricycle landing gear has a moderate apparent travel.

Access to the fuselage is had both by means of side doors (front and rear) and by means of a a rear axial ramp, making it possible to load large vehicles, tanks, trucks, and so on). The dimensions of the cabin, impressive because of its height, are quite larger than for the Mi-6 (2.50 X 2.65 X 12 meters, or 80 cubic meters), but they were not given. A very large hatch is provided in the floor in the center, under the BTP, making it possible to pass the sling (in case of a load hung under the fuselage) and the cable of a rescue winch.

In addition, two electric winches slide on inside rails. They facilitate handling loads in the cabin. The control rods for the piloting system and pitch, as well as the transmission shaft to the anticouple rotor, run on the ceiling.

Forward, a ladder and a hatchway make easy access possible, on the outside, to the engines.

Like On a Ship

Because of its dimensions and its large almost vertical windows, the flight deck makes one think of the bridge of a ship. Provision is made for a crew of four or five persons: two pilots, a flight engineer (on the right), a mechanical engineer (on the left), then, in the center, a fifth member of the flight crew. Instrumentation is very traditional, but it is reminiscent of the cockpit of an aircraft (or of a helicopter) in the 1960's.

The announced performance does not exceed a reasonable average. The machine brought to Le Bourget is a prototype. The degree of vibration is said to be very satisfactory, owing to the 8-bladed rotor.

Chacteristics and Performance of Giant Soviet Helicopters

	Mi-6	Mi-10	Mi-10K	Mi-12	Mi-26
Diameter of rotor (meters)	35	35	35	35 X 2	32
Swept area (square meters)	960	960	960	1,920	804
Number of blades	5	5	5	2 X 5	8
Fuselage length (meters)	33.18	32.86	32.86	37.00	33.72
Diameter of anticouple (tail unit) (meters)	6.3	6.3	6.3	none	7.6
Installed power (horsepower)	2 X 5,500	2 X 5,500	2 X 6,500	4 X 6,500	2 X 11,400
Weight empty (kilograms)	27,240	27,300	24,680	--	28,200
Normal total weight (kilograms)	40,500	38,000	38,000	97,000	49,500
Maximum total weight (kilograms)	42,500	43,700	--	105,000	56,000
Payload (kilograms)	12,000	15,000	--	38,000	20,000
Weight with sling (kilograms)	9,000	8,000	11,000	--	20,000
Maximum speed (kilometers/hours)	300	200	--	260	295
Cruising speed (kilometers/hours)	250	180	250	240	255
Service ceiling (meters)	4,500	3,000	3,000	3,500	4,500*
Range (kilometers) with	620	250	--	500	800
payload (kilograms)	8,000	12,000	--	35,000	--
Ferry range (kilometers)	1,450	--	795	--	--

* Hovering, outside ground effect: 1,800 meters.

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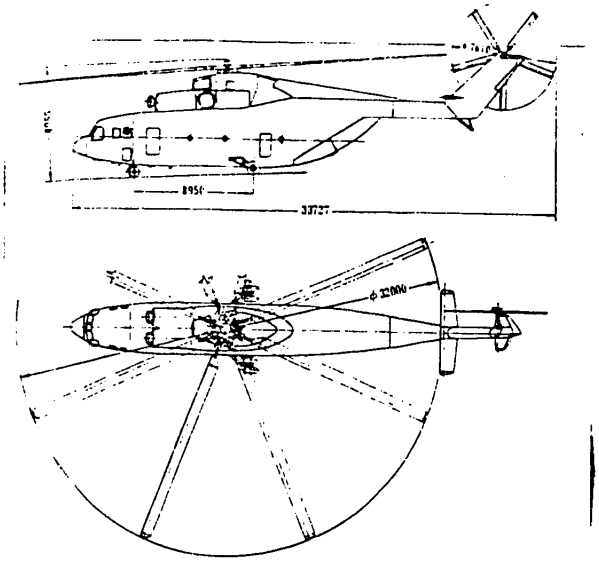
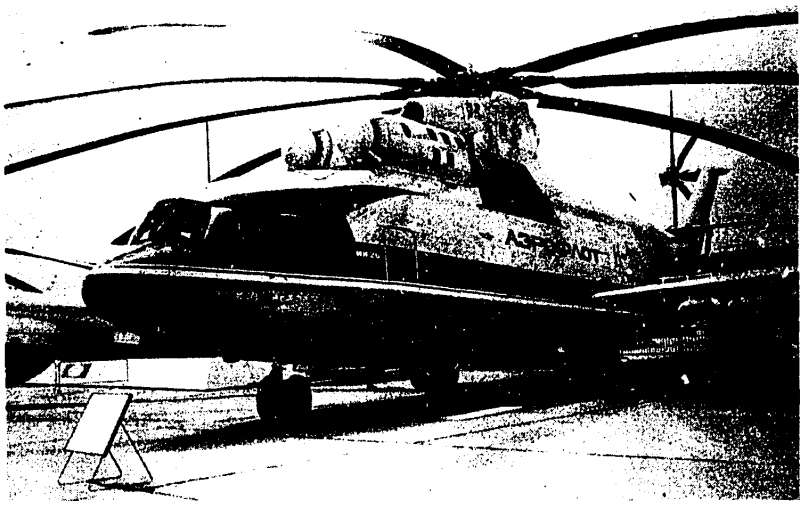
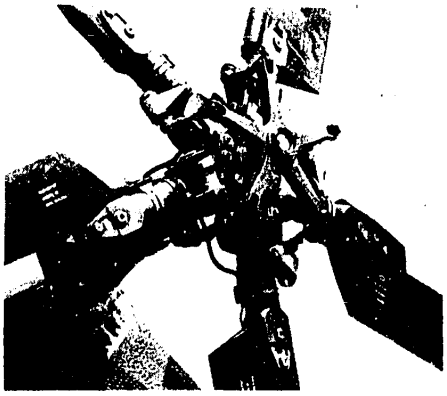


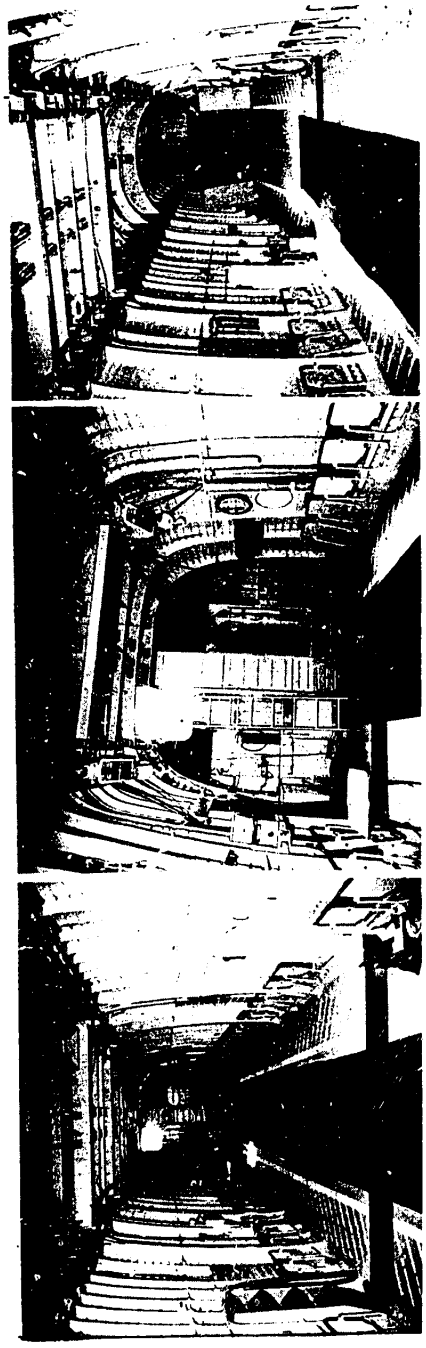
Above, primary 2-dimensional plan of the new helicopter; below, the pilot's cabin offers remarkable visibility, thanks to its large vertical windows.



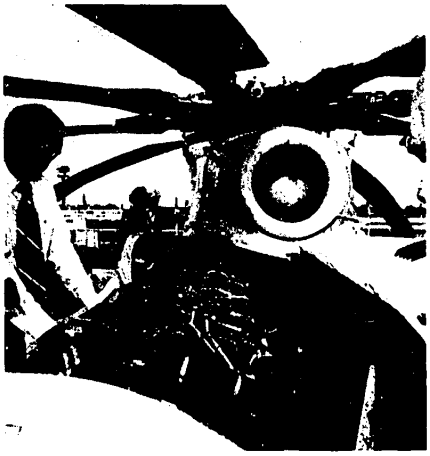
The Mi-26 prototype photographed at Le Bourget. There it unloaded a housetrailer, used day and night.



Detail of the system of variable pitch of the anticouple rotors.



Details of the cargo hold of the Mi-26, seen from front and back. Center, the access ladder to the engine.



Above the fuselage: inspection of the main rotor shaft and the engine installation.

10,042
CSO: 3100/823

MISCELLANEOUS

PILOT PNEUMATIC CONTAINER TRANSPORT SYSTEM OUTLINED

Moscow PROMYSHLENNYY TRANSPORT in Russian No 3, Mar 81 p 14

[Article by A. M. Aleksandrov and Yu. A. Tsimbler ("Transprogress" Special Design Bureau, Moscow): "The 'Lilo-2' In Action"]

> [Text] We have already written in our magazine (No 9, 1977) of scientific research and experimental design work in the field of pneumatic pipe container transport (KPT) carried out by the "Transprogress" SKB [Special Design Bureau] in the 10th Five-Year Plan. Since then tests have been conducted at test sites and on stands which have made it possible to finalize the design and basic technological solutions of elements of the first generation pf pneumatic container transport systems for carrying bulk freight through pipelines 1,220 millimeters in diameter. The theoretical basis for gas dynamic computation of the new transport systems and methods to be employed have been verified.

Two types of experimental pneumatic container transport (KPT) installations have been developed over the last few years:

One is 600 mm in diameter and is meant to be used to transport parts and other freight packaged in containers capable of carrying 400 kilograms each and of being handled in trains of several units;

The other system has a cross section of 200 X 400 mm and is intended for delivering books, documents, small parts, tools, metal items, samples, and so on, in containers with a capacity of up to 25 kg.

Currently two machine-building plants are operating 600-mm pneumatic container systems designed by the "Transprogress" special design bureau.

The KPT28 system went into operation in Tul'skaya Oblast in 1979. The first section of the KPT2 ("Lilo-2") system went into operation in the Georgian SSR at the end of 1980. It is the world's largest dual-pipe pneumatic container transport system. Its pipes are 1,220 millimeters in diameter, and they are used to haul gravel over a distance of 17.5 kilometers from a quarry in Shulaveri settlement to

a plant which manufactures reinforced concrete structural elements in the town of Marneuli. There are three trains running on the line, each made up of eight containers and two pneumatic locomotives. The number of trains will be gradually increased to 12. The loaded trains are driven to Marneuli by two air impeller stations, and the empty trains are returned back to the quarry by one station. The stations are equipped with TV175-1.6 air impellers built by the "Uzbekkhimmash" plant in Chirchik. Each station has five 250-kilowatt units. Distance between the trains is regulated by means of bypass devices built into the pipeline.

Maintenance and repairs of the rolling stock are carried out at a technical maintenance section at the loading station, equipped with special ducts to position the trains for repairs and with pipe sections to house them when not in operation.

New techniques and methods of cleaning trash, dirt and scale from inside the pipes were successfully employed in the first section of the pipeline.

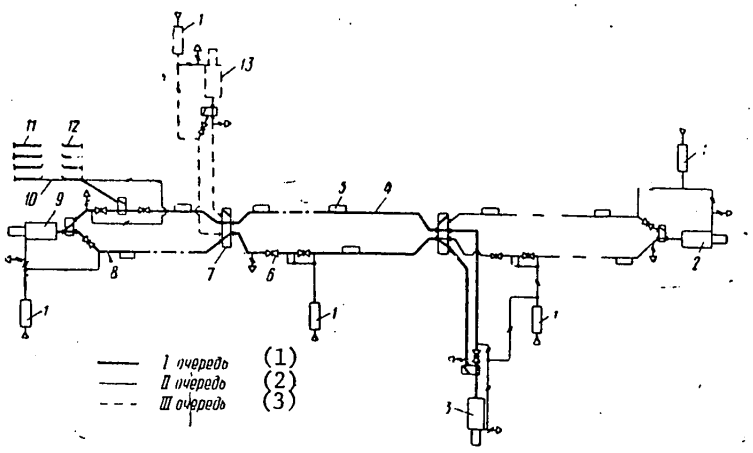
When the second section goes into operation the system's handling capacity will increase to 2 million tons, with 1.8 million tons of gravel being hauled over a distance of 37.7 kilometers to Tbilisi, and 0.22 million tons going to the Marneuli plants. The project, which was developed jointly with the "Gruzgiprovodkhoz" institute, provides for a third section of the system, which will incorporate a new quarry at Imiri settlement. The total length of the "Lilo-2" will reach 41.3 kilometers. It will eventually have 26 trains in operation (one train delivering 30 tons of gravel to the unloading station every 6.4 minutes).

The pneumatic container transport system will yield an economic effect of 3.5 million rubles per year, and it will free 265 dump-trucks for other purposes. Haulage costs will be 1.05 rubles per ton (as compared with 3.3 rubles per ton by motor transport).

The system will operate in an automatic mode at all stages. Processes are monitored and controlled by a special telemechanical system developed by the "Promavtomatika" Scientific Production Association in Groznyy.

Extensive introduction of pneumatic container transport systems in the economy continues to be a difficult problem. Costs and construction time have been pushed up considerably by the persistent practice of contracting nonspecialized machine-building plants and construction and installation organizations to carry out the necessary work. The experience acquired in setting up the KPT 28 and "Lilo-2" systems also confirms this.

The "Transprogress" Special Design Bureau is expanding its operations as a specialized design and development agency. As such it is already engaging, albeit on a small scale, in building and installing specialized equipment for pneumatic container transport systems. In the future it is planned to set up a building, installation and starting-up administration under the auspices of the Special Design Bureau. It would have local sections as well as a central repair depot and a production training center. This will make it possible to accelerate the introduction of pneumatic container transport systems.



Schematic Diagram of the "Lilo-2" Pneumatic Container Transport System.
1. Air impeller station. 2. Unloading station in Tbilisi. 3. Unloading station at Marneuli plant. 4. Pipeline for empty trains. 5. Bypass devices. 6. Sliding gates. 7. Shunting points. 8. Pipeline for loaded trains. 9.Loading station at Shulaveri quarry. 10. Moveable ducts. 11. Pipe sections for parking trains. 12. Repair ducts. 13. Loading station at Imiri quarry.

Key:
1. First section
2. Second section
3. Third Section

9681
CSO: 1829/337

END