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TURBINE-POWERED MI-8

NEW EQUIPMENT FROM THE FIVE YEAR PLAN

COUNTRY: USSR

TECHNICAL TRANSLATION

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TURBINE-POWERED MI-8,
NEW EQUIPMENT FROM THE FIVE YEAR PLAN

by

V. A. Kuznetsov

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V. A. Kuznetsov
Deputy Chief Designer in Aviation Industry

The helicopter factory, directed by the general constructor of aviation equipment who has received the Lenin prize, and the award of Hero of Socialistic Work, Mihail Leont'yevich Mil', has developed helicopters of several types - the MI-1 and MI-4 with piston action and the MI-2, MI-6, MI-8 and MI-10 which are turbine powered. Such a variety of vertically flying machines makes it possible to use them widely for carrying out the most varied assignments. It must be said that helicopters have already taken a permanent place in Soviet air transport, because aviation without airports essentially simplifies a number of conditions in the transportation of people and freight.

Helicopters with the trade mark "MI" can be seen everywhere in our country and even abroad. The most common are the MI-1 and MI-4. In previous years the heavy MI-6 helicopter with a carrying capacity of six to eight tons and 12 tons for distances respectively of 640 and 250 kilometers, has come into service.

Working basically under the severe conditions of the Far North, in Siberia and Tyumen', the MI-6 transports oil derricks, gas pipes, equipment and specialists to inaccessible places and in this way significantly shortens the time required for building industrial enterprises.

The creation of helicopters with gas-turbine action has made it possible to significantly raise the ratio between commercial loads and flying weight with practically no increase in the prime cost of one kilogram of construction. This tangibly improves the economic indicators.

To replace the MI-1 helicopter the MI-2 with two turbine-powered engines of 400 horsepower each was developed next.

The MI-4 and MI-8 were put into use together. The MI-8 is basically the same geometrical dimensions (diameter of the lift and tail screws) as the MI-4 and the carrying capacity is twice as large.

The MI-8 helicopter underwent a large series of tests under ground conditions and in flight. The assemblies were tested in every way by long dynamic loading on stands. The high reliability of the machine was tested by long flights. In particular this included an unparalleled flight to Japan and back. The general distance of 20,000 kilometers was passed without any troubles in flight.

The MI-8 has been shown twice in Paris aeronautics and space shows where it always received flattering appraisals.

Making its appearance as a middle class helicopter with a maximum carrying capacity of four tons, the MI-8 has developed into two variants - transport and passenger. The transportation variant was intended to transport wheeled equipment, engineering material and other freight. There are assemblies for the lashing of outside suspension systems making it possible to lift large machines as freight weighing up to three tons. The outside suspension system in the form of a hinged mechanism with a lock guarantees smooth flight with loads which are put down automatically by pressing an electrical button. On the right side above the door, which can be shifted, is an assembly for setting up an unhyphenated board derrick, capable of handling loads up to 200 kilograms. The cabin is loaded with it from the rear through a special trap. The dimensions of the cabin of the transport helicopter are: length 5.15 meters (on the floor) and 7.5 (with the flaps open), width 2.34 and height 1.82.

In the passenger model, the MI-8 seats 24 people in soft chairs. At the desire of a client, the passenger area can be re-equipped for 32 places or, with greater comfort, for eight or ten people. Baggage and soft freight are placed at the end of the cabin in the flaps. Synthetic materials are used to trim the passenger cabin, chairs and closet. Soundproofing and heat insulation are used. The ventilator is equipped with air conditioning, ventilation and heating systems.

Just like the transport, the passenger helicopter may easily be re-equipped as an ambulance right at the airport. In the cabin of the MI-8 ambulance helicopter 12 stretchers and convertible seats are set up for medical personnel.

The MI-8 crew consists of two men: the pilot of the helicopter and a second pilot or navigator. In the aisle of the pilot cabin is found a convertible chair for a flight engineer or flight leader.

Two turbo-powered motors with free turbines connected to the main reduction gear are installed on the helicopter; they are TB2-117's constructed by S. P. Izotov. The take-off power of each engine is 1500 horsepower. The automatic regulating system maintains the revolutions of the flight propeller within given limits and guarantees identical power to each engine. The regulating system increases the power of an operating engine up to the take-off point by stopping the other. In case of necessity it is possible to transfer to manual control of the engines. A bushing on the flight screw has hydraulic dampers which facilitates use and guarantees less susceptibility of the machine to ground resonance.

The flight screw has five blades. The blade of a rectangular form in the plane has a pressed duraluminum longeron. To it are attached tail parts with honeycomb filling. A pneumatic system of signaling damage to the longeron is provided.

The fuel system of the helicopter includes an inside tank for 346 kilograms and two outside suspension tanks for 1104 kilograms of kerosine. In order to increase the length of flight, a supplementary tank holding 710 kilograms of fuel can be placed in the freight bin. The compartments of the supply tank, the engines, the reducing gear and the cabin heaters are equipped with a fire fighting system worked either automatically or manually. The hydraulic system of the helicopter consists of two autonomous systems (a basic one and a reserve one). They furnish hydro-reinforcement to the control system. Transfer of the hydraulic apparatus from the basic system to the reserve system is automatic. There is a control on the pilot's instrument panel to check on each of the systems.

A four-channeled autopilot guarantees helicopter stability from the point of view of listing, course, yaw, and height. The autopilot works by a differential circuit. It permits the pilot to interfere in the work of the autopilot. The pilot navigational equipment forms a complex required for flight under complex meteorological conditions both day and night in all latitudes.

Outside contact with the earth and other helicopters

(airplanes) is maintained with the aid of short wave and ultra short wave (command) radio sets, while internal communication between members of the crew is taken care of by a telephone system.

The heating elements for the electro-thermal anti-icing system are located on the panes of the pilot cabin and on the blade holders of the flight and rear screws. An electrical signaling device warns of icing. It automatically switches on the anti-icing system. The system can also be switched on by hand.

The sources of the direct current are two starter generators with a power of 18 kilowatts and six storage batteries. The latter are intended for automatic supply to the engines on the ground, or in the air, if the generators shut off, and guarantee that the electrical components necessary for flight will work for a half hour. A generator with a power of 35 kilowatts provides alternating current to the radial-navigational equipment, the anti-icing system and the control apparatus.

In planning the MI-8 a great deal of attention was given to making its technical service convenient. Supervision of the engines, of the main reducing gear compartment, of the hydropanel, of automatic bending device and of the bushing for the flight screw can be handled without special ground equipment. For this purpose there are suitable lateral cowling covers forming a working platform in an open situation. They are reached through holes in the crew cabin.

The commercial load of a helicopter depends on the height and distance of the trip to be made. At a height of 1450 meters, for example, the MI-8 is capable of vertical flight with a load of three tons and can carry it a distance of 250 kilometers. With this load the helicopter can make a vertical landing on the ground at a height of 1850 meters. In this case the dynamic ceiling is equal to 5200 meters.

On the whole in regard to its economic properties, the MI-8 helicopter approaches airplanes. Finally, considering the fact that a specific characteristic of helicopters is to land at and make flights from small areas into the center of any inhabited points or quite close to them, the helicopter significantly shortens the time of air shipments. From this position, too, the purposeful use of helicopters and their profitability must be appreciated.

The collective of our construction office hopes that the MI-8 helicopters will gain their due place among the other freight and passenger machines of the Air Fleet.



Helicopter Plans



Обслуживание силовой установки

Power Plant Servicing

Technical Flight Properties

General Data

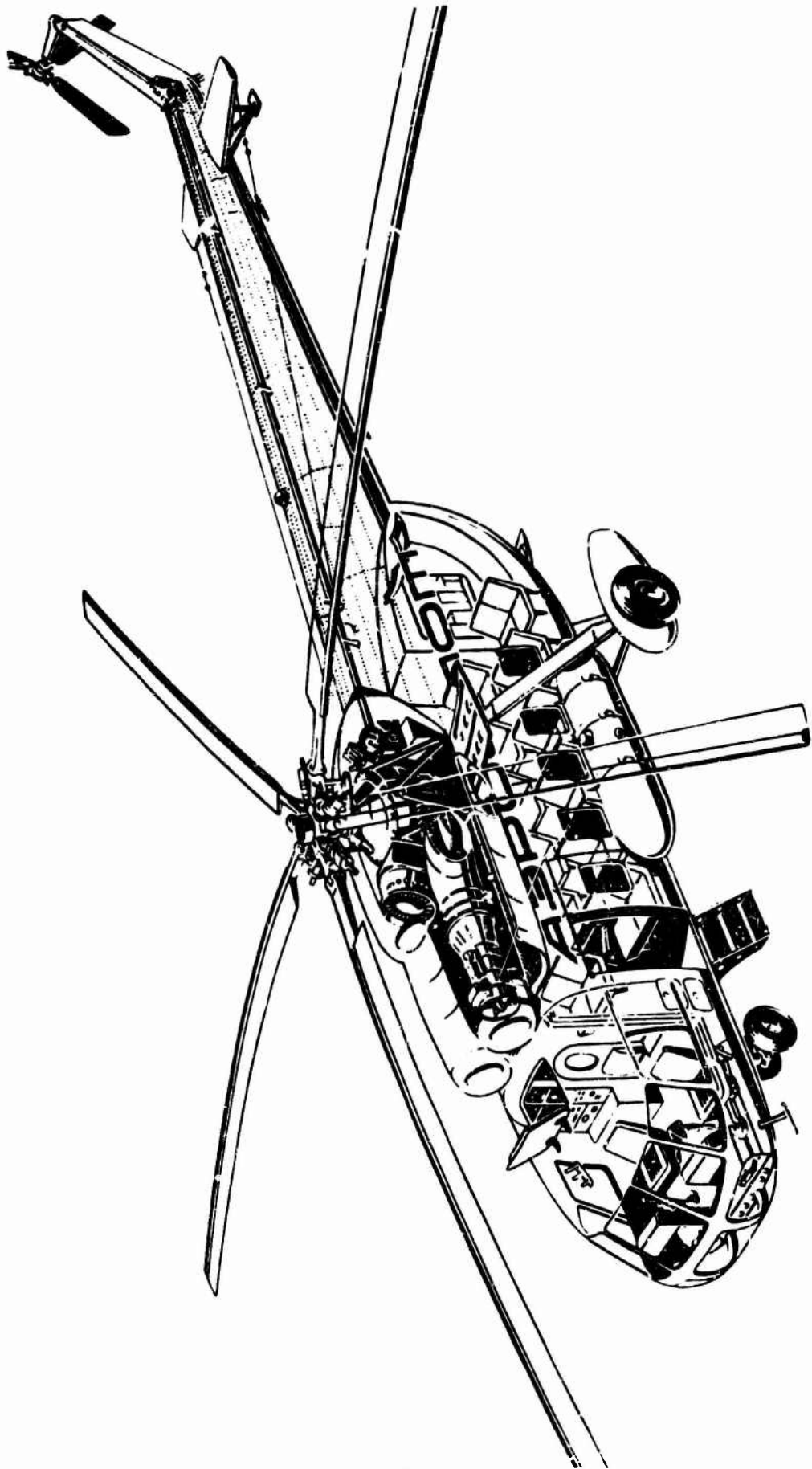
Crew	2 men
Maximum speed:	
With maximum weight	236 km/h
With normal weight	250 km/h
With weight suspended outside	180 km/h
Cruising speed:	
With maximum weight	205 km/h
With normal weight	225 km/h
Dynamic ceiling with maximum flight weight	4500 meters
Length of flight in the transport model (5 per cent reserve fuel)	
With maximum flight weight	425 km
With normal flight weight	450 km
With the model	650 km
Flight distance in the passenger model with 28 passengers and supplementary weight of 560 kg (fuel reserve for 30 minutes of flight)	360 km

Weight Data

Maximum flight weight	12000 kg
Normal flight weight	11100 kg
Maximum commercial load	4000 kg
Maximum load suspended outside	3000 kg
Refueling:	
Full utilization	1450 kg
in the model	2160 kg
Complete oil refueling	60 kg

Geometrical Data

Length of the helicopter:	
With rotating flight and rear screws	25.28 meters
Without flight and rear screws	18.31 m
Standing height	5.6 m
Flight screw:	
Diameter	21.29 m
Number of blades	5



Composite Diagram

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KEY WORDS	LINK A		LINK B		LINK C	
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