"FIFTY BELOW"

Operating an Autogiro in the Antarctic : The Report of a Pilot Attached to the Byrd Expedition

ON the way south the motor and Autogiro units had to be prepared for flying in sub-zero weather. The motor was cowled and lagged in the usual manner, and each oil line was lagged with asbestos, then taped and shellacked. An asbestos-lined metal box was made for the oil sumps. Each cylinder of the motor was cowled up to the combustion chamber and a special cowling was made to go over the opening around the crank case. In this manner all openings were covered, so that most of the air flowing through the motor was stopped. A paste was made out of flake asbestos and water for the lower starter unit; this was put on, and then covered with asbestos cloth, taped and shellacked.

An early Kellett cabin Autogiro, of the type used on the Byrd expedition.

Although somewhat belated, there is unusual interest in this report by the pilot, W. S. McCormick, on the operation of the Kellett Autogiro which formed one of Rear-Admiral Byrd's aircraft fleet on his Antarctic expedition in 1933-1934. It at least demonstrates that extreme cold provides aircraft operators with far more severe problems than does extreme heat

There was also a special drain on the bottom of this unit so that after each flight all the oil could be drained from the system. The Marfax grease in the rotor head and upper starter unit was replaced with a combination of Pyroil and regular heavy Veedol grease. The Houdil oil in the dampers was replaced with straight Pyroil. There was no change in the landing gear struts. The rubber bumper blocks were left on the rotor head, and they became very hard in the cold weather; however, the blades were not noticeably rougher.

After arriving at the Bay of Whales the Autogiro was rigged and flown from the Bay of Little America approximately seven miles away. The usual procedure was followed in revving up the blades. The ski freeze to the snow, which makes it very convenient in starting the blades; after about 110 rotor revs have been obtained the ski break loose.

Before leaving the United States the blades were flattened one degree. This resulted in their turning somewhat faster, and a somewhat longer run was required in take-offs; however, a big advantage was gained in landing in high winds. The highest wind in which the Autogiro was flown was 20 to 25 m.p.h. Upon landing there was no hesitancy—that is, there was no tendency of the ship to balloon.

A Rescue Flight

In January, February and March, 1934, approximately seven hours were flown, which was mostly local reconnaissance. The temperature during this time was from 30 below to 25 above zero Fahrenheit. The most outstanding flight of this period was the location of the lost airplane, for on that occasion the Autogiro carried an overload of 384 lb., with a tent strapped to the side and a sledge lashed underneath the fuselage. Terrain was bumpy and traversed by high sastrugi. Difficulty was found in turning the ship around after landing, for the wind tended to make her into a weathercock. On these flights the wind speed was 20 m.p.h.

During the winter nights the blades and tail surfaces were removed and put in a tunnel under the wings of one of the airplanes, and the tail was set up on a box so that the ship was in a flying position. A snow wall was then constructed from the surface to the bottom of the fuselage and wings. The work on the motor was just the usual twenty-hour check, and no further work was needed. It was thought inadvisable to use rubber in the mountings. Asbestos lining was installed before leaving the States; however, this was replaced by a regular rubber mounting washer during this period.

In August the blades and tail surfaces were installed on the Autogiro in temperature of 60 to 67 degrees below zero Fahrenheit. Specially constructed tents were placed over the tail and around the rotor head so that heat could be applied before tightening up and safetying the various nuts, bolts and clevis pins. The motor was started and the blades revved up and tested in a temperature of 62 degrees below zero and found to work satisfactorily and normally.

During the month of September ten meteorological flights were made; the coldest temperature flown in was 57 degrees below zero and the warmest was 41 below. In preparing for flight in these sub-zero temperatures it would take from one and one-half hours to two hours to thaw-out the motor sufficiently, using two very powerful Van Praag blow torches inside the windproof tent.

Quick Getaway

The front ski of the Autogiro were almost always about two feet under the surface, so that it was approximately in a flying position, and the controls and blades were individually secured to small planks of wood sunk four feet in the snow. After the securing lines were all taken off and the snow shovelled from the ski, the ramp shovelled to the surface and the motor started, it was necessary to keep it turning at about 1,000 to 1,200 revs and to get in the air as quickly as possible, otherwise the motor and oil would both cool off very rapidly, which meant a possibility of motor failure during the take-off.

Due to the fact that the motor had to be run so fast to keep from cooling, the clutch was not used in starting the blades: each take-off was a taxi-off. The rotor head, upper starter unit and dampers were not heated prior to a flight.

After a flight the Autogiro was taxied to the pit, oil drained, snow shovelled on the ski, and the blades and all the control surfaces secured so that in blizzards there would be no danger of it being blown away. In this manner the machine weathered temperature of 73 degrees below zero Fahrenheit and winds as high as 60 m.p.h.

On September 28 I taxied down the barrier in the usual manner for a take-off on the tenth meteorological flight. Upon leaving the snow I knew there was something radically wrong. The nose of the ship wanted to go right