Operating Tips . . .
FOR BETTER NAVION FLYING

VOL. 2 NO. 3

Published by the Field Service Department of the Ryan Aeronautical Company, San Diego, to help those who own, operate, and service Navion airplanes obtain the full utility and satisfaction of which the Navion is capable.

FEBRUARY 1951

THROTTLE-PROPELLER COORDINATION

The importance of proper balance between engine rpm and manifold pressure as related to long trouble free engine service cannot be over emphasized. Some pilots in striving for longer range and greater fuel economy may from time to time operate with too low an engine rpm for the throttle setting selected. In many cases this tendency dates back to the pilot training period during World War II when most pilots were taught that by operating the high powered supercharged engines in their military type planes at a lower rpm and somewhat higher manifold pressure they could still develop the required power but with less gas consumption. This was true and it probably did not do any serious damage to these higher power engines, but the same cannot be said for the engines used in the average single engine private plane today. The truth of the matter is that the use of high manifold pressures at low engine rpm during flights at low or medium altitudes (5000 ft) imposes power loads on these engines which are detrimental to their service life. A comparison can be drawn in the automotive field by keeping the foot accelerator fully open while attempting to climb a long steep hill in high gear. The engine will have a tendency to "lug" with consequent detonation and overheating. This practice has damaged many an automobile engine and it is even more apt to do damage to your aircraft engine because of the nature of its cooling and design. To insure lower temperatures and consequent longer life expectancy from the engine, it is recommended that the propeller rpm's be increased with increased throttle settings and that overall horsepower output of the engine be reduced by <u>both</u> throttle and rpm reduction.

Sensible application of power and the realization that an aircraft engine will give service comparable to automotive equipment <u>only</u> if properly handled, will assure hundreds of hours of trouble-free flying. Since the cost and weight of instruments to thoroughly analyze engine conditions in flights limits their use to airline equipment, the performance of the engine in the Navion will rely, for a large part, on the knowledge and care of its operator.

A proper combination of manifold pressure, engine rpm <u>and air speed</u> during a climb is especially important to the long life of your engine. Therefore, we offer the following specific recommendations for this flight category with both the Continental and Lycoming engines.

CONTINENTAL E185 TYPE

Normal Climb = Manifold pressure not to exceed 26 in. hg., engine speed 2200 rpm. IAS 95 mph.

Emergency Climb (Short Duration Only) = Set throttle in full throttle position to obtain correct power enrichment, engine speed 2300 rpm, IAS 80 mph. (2600rpm for one minute only on take-off.)

LYCOMING GO-435-C2 TYPE

Normal Climb – Manifold pressure 25 in. hg., engine speed 2800 rpm, IAS 100-105 mph.

Emergency Climb (Short Duration Only) = Manifold pressure 26 in. hg., engine speed 3000 rpm. IAS 85 mph. (3400 rpm for two minutes only on take-off.)

See your Navion Operation Manual for recommended cruising power setting.

ON THE USE OF RECAPPED TIRES

If circumstances make it necessary for you to use recapped main, or nose gear tires on your Navion, do not forget to consider the wheel well clearance problem sometimes created by the increase in tire diameter which occasionally results from recapping. The only way you can be absolutely certain that a recapped tire is not going to chafe a hydraulic line or structural member in the wheel well is to place the airplane on jacks and run a gear retraction test. Often it will only be nesessary to readjust the stop nut on the strut extension control rod to better center the wheel in the wheel well and so obtain a satisfactory wheel clearance, or on the other hand rerouting a hydraulic line or two may make the use of recaps possible. In any event, don't fail to check wheel clearance whenever recapped tires are used as it is economical insurance against a condition that could cause serious trouble.

The matter of tire balance is also very important especially in respect to the nose gear tire and it is recommended that all recapped tires be checked for static and dynamic balance after installation on the wheels and before installation of the wheel on the airplane. Cold parches of the correct weight should be cemented inside the tire casing on the tread centerline to obtain proper balance.

NAVION SERVICE PUBLICATION DISTRIBUTION POLICY

Several letters are received each month from Navion owners asking the factory to put their favorite mechanic on the mailing list for Navion Service Publications. Many independent repair shops have also written us requesting this special service. Naturally we would like to put all these people on our mailing list, but if we complied with all such requests we would soon be in the printing and distribution business on a major scale with a mailing list over which we would have little or no control. Therefore, we ask you Navion owners, all of whom should be on our mailing list, to give your mechanic an opportunity to read <u>your</u> copy of <u>all</u> bulletins we send you and maintain a permanent file of these bulletins for future reference. Should you sell your Navion, please see that your service publication file accompanies the airplane when the new owner takes possession.

SIMPLE EXTERNAL BATTERY TERMINALS FOR ANY NAVION

The following method of supplying external battery power to the electrical system of any Navion was devised by an ingenious Navion distributor located in one of the colder parts of the U. S. to assist him in the accomplishment of cold weather starts. The beauty of this system is that no special leads or terminals are needed to connect the extra battery into the existing electrical system. Here's how its done. First cut a 1-1/4 inch diameter hole in the left side engine mount skin just below the top longeron and directly beneath the rearmost cowl Dzus fastener. Cover this hole with a plate of 1/4 inch thick Micarta sheet attached with eight rivets or machine screws to the inside wall of the engine mount skin. Then, install a 3/8 inch diameter bolt in the center ot the Micarta disc and another 3/8 inch diameter bolt through the engine mount skin itself just 2 inches directly aft. Ground the rearmost bolt to the firewall with a heavy piece of copper webbing and run a heavy cable lead from the bolt in the Micarta disc to the positive terminal on the starter, or starter solenoid. The installation we saw had cup shaped nuts on each of the terminal bolts so that any kind of heavy battery lead could be held onto the terminals by a mechanic with little chance of their slipping off and shorting. The cup shaped receptacles also make it possible to get a better contact without the use of clips or any other special wire terminal. As soon as the engine starts, the external battery wires are pulled away from the terminals on the airplane and the ships battery and generator take over the job of supplying all electric energy to the system. If you're having trouble with engine kick-back on very cold starts because the ships battery is not able to spin the engine fast enough through compression, the use of an external electric power source as described above will probably do the trick. It is recommended that local DAMI approval of all such installations be obtained.