Operating Tips . . .

FOR BETTER NAVION FLYING

Vol. 1 No. 4

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.

APRIL 1950

TESTS INDICATE CARBURETOR MODIFICATION AND RELOCATION OF ENGINE THERMOCOUPLE DESIRABLE

Recent flight tests conducted at the Ryan Plant by Continental, Bendix-Stromberg and Ryan engineers revealed that No. 5 is normally the hottest cylinder on the E-185-3 engine in the Navion during average cruise operation. The one exception to this rule is that No. 1 and No. 2 cylinders will run hotter than No. 5 during high power operation (2300+ rpm) IF the throttle is **NOT** in the **"FULL FORWARD"** position.

In view of the cylinder head temperature pattern plotted during the tests referred to above, it is now felt that the most accurate all-purpose thermocouple location is under the top spark plug on No. 5 cylinder. Moving the cylinder head temperature gauge thermocouple from No. 2 to No. 5 cylinder, as suggested above, should be a comparatively simple matter in the case of installations purchased from the Ryan Aeronautical Company as the thermocouple lead furnished with these kits was long enough to reach any cylinder on the engine.

It is definitely recommended that the throttle be kept in the FULL FORWARD position for all engine operation above 2300 rpm, as this will hold the carburetor power enrichment valve open during all high power operation, which improves mixture distribution and so reduces the possibility of rear cylinder over-heating.

In the case of Navions on which Bendix-Stromberg Carburetor Bulletin No. 678, or Continental Bulletin No. M49-7, has been accomplished, the power enrichment valve is automatically held open over a greater percentage of the total throttle travel; thereby relieving the pilot of the responsibility for keeping the throttle wide open as recommended above. Since it is desirable to eliminate the human element insofar as possible in airplane operating procedures, it is recommended that Bendix-Stromberg Bulletin No. 678 be accomplished on all carburetors at the earliest convenience.

If the above recommendations are followed, the chances of piston siezure, ring freezing, cylinder head cracking, and valve burning will be reduced to a minimum.

OVERLOAD DAMAGE (Reprinted from March Issue of Skyways Magazine)

You know what happens when you drop your watch on the floor. Unless the crystal breaks, it'll probably look as good as it did before, but chances are it'll stop running or will begin to gain or lose time. The damage isn't visible, but it's there nevertheless. The shock load caused by the blow against the floor was transmitted through the case to the inside works, and the delicate innards of a timepiece aren't designed to withstand shock loading.

The same line of reasoning applies to an airplane that is brought in to a rough landing, or that has unusual loads imposed on it in other ways. It may look just the same as it did before. It will probably fly, but if the load was greater than the design strength of any of the parts it affected, something somewhere had to give. The damage may not be noticeable. It may not affect immediate performance.

Every part in an airplane is designed for specific steady or reoccurring loads, with a margin of safety for occasional overloads. Weight considerations prevent designing for accidental overloads, or consistent overloading within the margin of safety.

The pilot should school himself to recognize operational and non-operational factors that produce overloads, and should be able to analyze overloads relative to their ability to cause damage. This is simple and requires only a bit of clear thinking. It is evident that a shock load is liable to cause more damage than the same load applied gradually. It is evident also that if the part receiving the load can cushion its effect, damage will be less extensive.

The careful pilot will avoid overloads when he can, but avoidance is not always possible. Overloads must be considered a normal possibility and countered by thorough inspection. The degree of inspection required will depend on the magnitude of the overload and how and where it is applied. Sometimes visual inspection and checking with ordinary tools will suffice. At other times it will be necessary to remove suspected parts and have them inspected magnetically or by X-ray.

This implies that only a licensed mechanic is capable of making the inspection. In some cases this is true. But in all cases it is up to the pilot to determine when an overload has occurred ahd when inspection for overload damage is necessary.

Difficulty of detecting overload damage diminishes in direct proportion to the extent of the damage. It is easy to see a badly bent or broken part. It is much harder to detect a small crack, a slight misalignmeni or slightly loosened rivets. Strains that have reached the point of failure can be detected only by accurate measurement to determine distortion of the part. Cracks may be almost microscopic in size, yet offer an excellent bed for subsequent stress concentrations.

There is a better than even chance that you won't find anything wrong after an overload. Modern airplanes are built to take a lot of abuse and come through unscathed. But don't drop your guard and hide behind this extra measure of safety. Instead, add your own intelligence to that margin.

When damage is discovered, the pilot will have to use his own judgment regarding its correction. It is up to him to determine whether or not a licensed mechanic must be called in. Common sense is the best dictator under these conditions. CAA regulations limit what a pilot can do in the way of repairing his own airplane, and are a good guide when in doubt.

A logical and central course to follow is to avoid overloads when possible, but when they do occur, make certain whether or not damage has resulted regardless of the steps that must be taken. When a question exists, seek the safest answer. Safety and gravity are the major opposing forces in aviation. Line up with safety on your side.

NAVION NOSE WHEEL BALANCE IMPORTANT

All three tire and wheel assemblies on each new Navion are dynamically balanced at the factory prior to delivery. Balance of all three wheels is important, but proper nosewheel balance is essential, if nosewheel "shimmy" is to be minimized.

Rebushing the nosewheel steering linkage has long been used as a field fix for nosewheel shimmy, with the result that the trouble may recur in from 50 to 100 hours of flying or less. Rebushing, coupled with balancing of the nosewheel and tire assembly, is the most effective method of obtaining lasting relief from nosewheel shimmy on the Navion.

Nosewheel static balance can be checked and corrected in the field by using the following procedure: Remove nosewheel from airplane and take both bearings out of the wheel. Wash bearings in clear gasoline.

After the bearings have been thoroughly washed to eliminate all grease drag, they should be re-installed in the wheel and the wheel axle inserted. Then, while holding axle shaft level, let the wheel revolve until heavy side is down. Balance wheel so that it remains stationary in any position by taping rubber cold patches of varying size and weight to the outside of casing on side opposite to heavy side.

IMPORTANT

Balancing cold patches must be taped and cemented in exact center of wheel tread.

After wheel is statically balanced by method described above, remove bearings and disassemble wheel so that cold patch previously taped to outside of tire can be cemented inside tire casing in exactly the same location that it was taped on outside. You can now relubricate wheel bearings, reassemble wheel and tire and install wheel assembly on airplane.

The method described above gives a reasonable degree of balance accuracy, which will add considerably to the service life of nosewheel steering linkage bushings.

NO OTHER PLANE COMBINES
SO MANY FEATURES SO WELL