

## FOR BETTER NAVION FLYING

### ANTIDOTE FOR DRAGGING BRAKES

A recent investigation into the cause of dragging brakes on some Navions has revealed that most cases are due to the pressure on the brake adjusting valve being set too high.

This adjuster valve is the one mounted adjacent to the brake master cylinder on late model airplanes equipped with Hayes-Goodrich brakes. Early model Navions equipped with these brakes as standard equipment have the adjuster valve located on the wing centerline between the two main gear wheel wells.

It has been discovered that mechanics will occasionally adjust this valve for an excessively high brake system pressure in an effort to eliminate "spongy" brakes. This is not the correct way to correct for "sponginess" and is not the purpose for which the valve was intended.

That "spongy" feeling, which is sometimes felt in the brake actuating handle, is invariably caused by excessive quantities of air in the brake lines. The only effective method of eliminating this air is by a thorough and complete bleeding of the brake system, using the method prescribed on page 5 of the Navion Service Manual—Then allow brakes to set for several minutes with pressure applied and bleed brakes a second time using same procedure. This second bleeding helps to purge the system of any air that may have been trapped in the brake expander tube during the first bleeding.

On the other hand, the basic design of the brake adjuster valve is such that heat generated in the system by the use of the brakes or by a large increase in outside air temperature causes the fluid to expand and be displaced through the valve back into the hydraulic reservoir. The adjuster valve, being in effect a one-way check valve, traps this fluid and it cannot be replaced after the system cools off unless the brake handle is pulled and released at least once prior to moving or taxing the airplane. This will unseat the adjuster valve and permit the displaced fluid to be replaced and enable the pilot to get positive brake action with just one stroke of the handle on subsequent brake operations.

The real purpose of the brake adjuster valve is to provide a variable means for trapping some pressure in the lower portion of the system to compensate for brake

shoe wear. This pressure holds the brake shoes out further as the need may be to take up the clearance caused by shoe wear.

### HOW TO TIGHTEN FAIRING ATTACHING SCREWS

You may find it hard to believe there could be a special tightening technique that would make the fairing screws on your Navion stay put longer, but believe it or not the manufacturer of these screws advises that such is the case.

A special self-locking nut is used in conjunction with the fairing attaching screws on the Navion. These nuts are stamped and formed out of sheet spring steel. When a screw is screwed into one of these nuts, the threads of the screw are engaged by two spring steel prongs located on opposite sides of the screw. As the screw becomes tight, these prongs start to deflect and press tighter against the screw threads; therefore, when the screws are tightened to apparent tightness, an additional 1/4 to 1/2 turn should be applied to deflect the prongs of the nut sufficiently to provide constant spring pressure against the screw threads. This spring pressure makes it difficult for vibration to loosen the screws and so decreases the chances of their becoming lost or loosened after just a few hours flying. The use of a Phillips screwdriver on which the point is in good condition is necessary when applying the above technique as a dull screwdriver will not give sufficient grip on the screw head to prevent screwdriver slippage and screw head damage. Overtightening must also be avoided as the nut may be damaged or the screw sheared off.

### COWL FLAPS — THEIR PURPOSE AND OPERATION

In this day of striving for manufacturing and operating simplification in aircraft, you can bet your bottom dollar your Navion would not be equipped with adjustable cowl flaps if they did not serve a vital purpose. You don't find cowl flaps on the smaller, lower-powered airplanes, because the heat rejection of a low horsepower engine is naturally less than that of a higher

horsepower power plant. Consequently, when the Navion's power was increased, it was desirable to provide an adjustable cooling control (cowl flaps) to handle the increased heat.

The Navion cowl flaps are adjustable because more cooling is needed on take-off, climb and at high cruising power than is necessary during normal cruising at about 60% of normal rated power. If it were not possible to decrease the cooling at lower power, the engine would run too cold for best efficiency, and by the same token it would run too hot at high power if the cooling capacity could not be increased at will.

Now it's easy to see where cowl flaps can cause trouble if not operated correctly – so we provide a cylinder head temperature gauge as a guide for proper cowl flap adjustment during cruise. On take-off, a different problem presents itself in that there is necessarily some lag in the indication on these gauges – so it is possible for combustion chamber temperatures to

increase at a faster rate than the gauge can follow; therefore, airplane manufacturers recommend that cowl flaps be placed in the "full open" position for all take-off and initial climb operations.

All experienced pilots realize that take-off and initial climb is the most critical phase of aircraft engine operation; therefore, it is during this flight phase that it is especially important the manufacturer's recommendations in respect to cowl flap operation be adhered to religiously. Prolonged ground running of the engine during warm or mild weather also requires that the cowl flaps be placed in the "full open" position.

This article was prompted by some reports of engine damage that could definitely be traced to mis-use of the engine cowl flaps by the pilot. Remember, there's nothing complicated about their operation, just a normal amount of care and attention to recommended procedure is all that's required.

