Doug Mitchell - London

SERVICE BULLETIN

Continental Motors Corporation
Aircraft Engine Division

205 MARKET STREET
MUSKEGON, MICH., U. S. A.
CABLE ADDRESS: "CONTENT"

June 21, 1946

M46-23

TO: All Authorized and Approved Service Stations, Parts Distributors, Dealers, and Engine Owners

SUBJECT: Valve Troubles

Gentlemen:

At this particular time and dating back to shortly after V-J Day, there seems to be more valve troubles than at any time in history. This applies to automobiles as well as aircraft and nearly every other kind of internal combustion engine.

Frankly, we have no definite and positive answer because the trouble seems to come from numerous causes, and each may have to have its individual cure. However, we have made a very complete study of the valve trouble that has been encountered with Continental aircraft engines, and the following discussion should be of great benefit to you. We do know that a great deal of valve trouble can be stopped if these points are studied, watched for and corrected if possible.

1. Gum content in the gasoline. The maximum allowable gum content (glass dish method) of any gasoline we recommend for use in any of our engines is 6 milligrams per 100 cc of fuel. Most gasoline refineries specify less gum than this, but we have found in numerous cases the gum content much higher. A few days ago we checked one fuel that had 21 milligrams per cc gum, which is 3 1/2 times the allowable amount. In this case, plenty of valve trouble was being experienced. In another instance, 9 milligrams gum per 100 cc of fuel was found, and some valve trouble was being had then. There is nothing that we can do to the engine to make it run on gum. The gasoline, rather than the lubricating oil, seems to be the big offender. If you are having trouble, insist that your particular gasoline be analyzed by your local agent and do not accept a standard specification sheet as proof of what <u>you</u> have. Take a sample from your own tank and have it analyzed. Maybe you have a dirty tank, deteriorated gasoline hose or something of your own making that has contributed to what would first appear as poor quality fuel.

2. Lead content. Lead up to 1/2 cc per gallon should not cause you any trouble, and in some cases even more lead may give you satisfactory service, but if you are having trouble, hold the lead down to not more than 1/2 cc per gallon. If you must use higher lead, just remember that you are not likely to get the valve life which otherwise could be expected.

2. Just a few days ago, we drained some gasoline out of a ship which supposedly had 80 octane no lead fuel. We found the gas to be 88 octane and with 2.2 cc of lead per gallon. There again, do not accept anything but a laboratory analysis of what you actually have in your tank.

3. Octane rating. The octane rating of a gasoline is not so important so long as the minimum octane (73 for most Continental engines) is up to the required level. The octane will not injure the engine, but since 80 octane is as high as you can go, so far as we know, without also getting lead, then we suggest that you use gasoline not higher than 80 octane--and preferably with no lead at all. Many places have discontinued the 73 octane aviation fuel and have substituted the 80 octane clear or with not more than 1/2 cc of lead per gallon. If these gasolines meet the specifications that are published for them, then they are perfectly good for use in our engines so far as we know now. Remember, all leaded fuels are colored. Non-leaded fuels seldom have any dye in them at all.

4. Upper cylinder lubricators. There are very many different kinds of additives for use in both or either the gasoline and oil. We have had reports all the way from complete relief from valve trouble to no relief at all. We haven't had any reports reflecting any damage to the engine. We have not been able to definitely tie down these "good reports" nor to find consistent duplications of them and we therefore have arrived at the conclusion that these additives possibly do help under certain specific conditions, but we are unable to say what the conditions are. Our general advice is to try these if you like, and if they help you, fine, if they don't, then discontinue their use.

5. Cowling. Be sure that the cowling on your ship is in the proper repair. The cooling air that goes by the engine without touching it, doesn't help cool it, so be sure that no cowling brackets are broken, that there are no large escape areas where air can leak out of the upper "scoop" section of the cowling, and particularly that the cowling is tight fitting at the rear and at the rear end of the center line of the cylinders.

6. Valve guides. If gum is forming on the valve stem, you might delay its actually sticking the valve by one of the following:

   (1) Cutting off the part of the exhaust valve guide that extends beyond the guide boss into the exhaust port ("A" series only) (See drawing)

   (2) Increasing the exhaust valve to stem clearance to .004". (.006" service maximum) ("A" series only).

7. Stellite faced valves. In the A and C75 engines we use a stellite faced exhaust valve, while in the A65 we use an austenitic valve without the stellite facing. We have not found that in the A65 engine, if the speed of 2300 RPM is not exceeded, that the stellite facing will give you any great resistance to the kind of troubles now being experienced.

8. Regrinding valves. Be sure that all of the following items are observed and closely followed: ("A" and "C" series) (See drawing)

(1) Grind (or cut) seats to a 45° angle and to a width of not less than 1/16" nor more than 3/32".

(2) Be sure grind (or cut) is smooth and clean and that there are no burrs on the edges.

(3) Reface the valve to 45°.

(4) Lap the valve to the seat until full and clean contact is obtained.

(5) Do not "groove" the seat into the valve face. Make sure the valve refacing and seat grindings are true so that a full lapped surface is obtained without undue lapping.

(6) Be sure that the valve head has not been refaced to such an extent that it is "sharp" around the perimeter.

(7) When finished lapping, wipe all valve lapping compound from the valve and seat, then thoroughly wash.

The above suggestions and discussions may not cure your valve troubles. Nevertheless, we have cured a great deal of trouble by some of the procedures and tests suggested above, and we believe that you, too, will get some help from these suggestions.

Very truly yours,

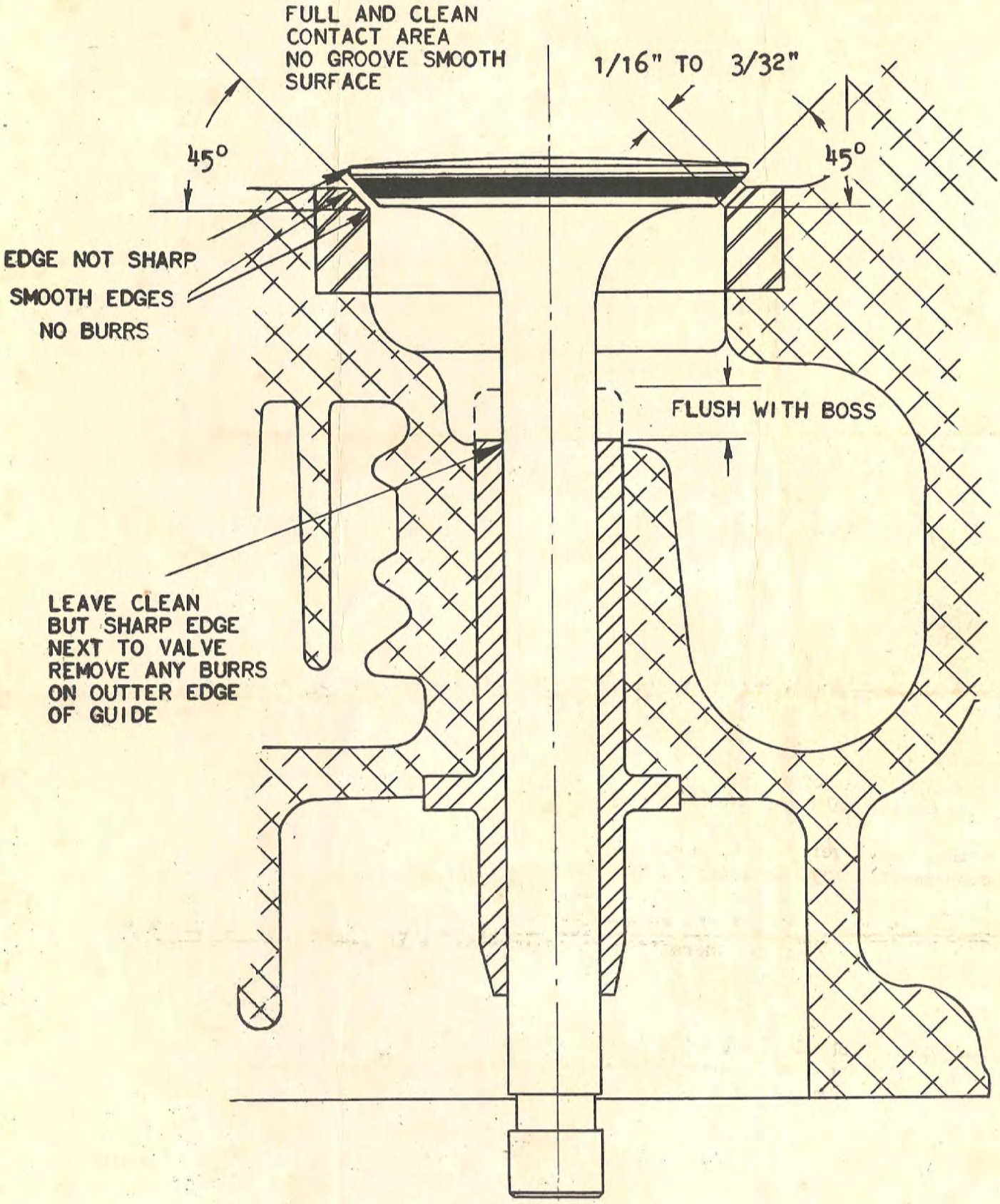
CONTINENTAL MOTORS CORPORATION

Aircraft Engine Division

R. D. Nicks P.N.

R. D. Hicks

Service Manager



SCHEMATIC DRAWING SHOWING VALVES, SEAT & GUIDE MODIFICATIONS AND ASSEMBLY INSTRUCTIONS FOR USE WITH SERVICE BULLETINS M46-23.