Is My Cylinder Really Glazed?

By Jessica Nordlander

As we borescope cylinders, there will inevitably be unusual findings. The way an image is captured and interpreted can have a significant impact on pre-buys and maintenance decisions. Glazing is a relatively rare finding, but it has real consequences for cylinder health.

Cylinder wall glazing is typically caused by improper operation during the break-in period, specifically by operating at power settings that are too low for the piston rings to seat properly against the cylinder walls.

When glazing is present, known symptoms can be high oil consumption and sometimes cause loss of engine power; however, no symptoms need to be present for glazing to occur. Glazing appears brownish or coffee-colored on the cylinder walls.

Identifying this condition in images can be tricky and requires a keen eye and some understanding of how digital images are made in the confines of the cylinder.

When examining a cylinder with oil running through it, a camera with an attached light introduces glare, reflection, and white balance challenges. The oil in the engine may already have a hint of brown color. As you insert your scope into the cylinder, you may notice different glimmers and reflections on the valve, piston, walls, or objects as you move and adjust the scope. Color changes can also occur depending on the lighting, especially when capturing and reviewing images.

For instance, when you look at an image of the cylinder wall, you may see piston deposits reflecting on it, which could initially appear as pitting to an untrained eye. A flexible borescope has ridges on the shaft that will reflect off the cylinder wall and give the false impression of wash-boarding. White balance can throw off the color of an exhaust valve head, causing the heat signature to be impossible to read. This will look like the image of the valve is washed out or overexposed.

Recently, I encountered some images that would appear to show glazing on the cylinder walls, as depicted in the photos, prompting me to write this article. Yes, it does give the impression of glazing, displaying the right color.

However, let's take a closer look (**Photo 1**). Note the variation in brown color, which can be produced by dirty oil (**Photo 2**).

The first thing that made me question the glazing was the inconsistent and patchy appearance of the color, while the second photo shows the same cylinder with almost no color.

As you will notice, this is how the camera picks up the white balance, reflects the brown in the oil, and then plays a trick on the human eye. When I look at these photos, I look beyond the image in front of me. I ask, what information is given or not? Does anything look irregular or abnormal? What is due to lighting, photo trickery, etc.? With this cylinder, no high oil consumption was reported, no engine power loss, and no irregularities.

After further discussion with Dave Pasquale [whose videos on engine borescoping are free in the ABS Learning Center at *www.bonanza.org* – ed.], we agreed that this was likely not glazing. However, there are a few ways to be sure.

Photo 1

Photo 2

Photo 3

1. Easiest method: If the airplane is accessible, scope the cylinder walls. Usually if you are reviewing photos supplied by others, the airplane is not accessible.
2. Have the client fly the airplane for an hour and retake the photos.
3. Have the client retake some photos with different views around the cylinder wall.

We decided to retake the images since that is what we would have recommended. A second set of images with proper white balance looks very different and shows no glazing at all (**Photo 3**).

After reviewing the new photos, it was evident the cylinder was clean and fresh, with no signs of glazing. The cylinder was grey, as a new one would be. Prematurely concluding a cylinder is glazed could result in unnecessary removal, which could cause additional maintenance-induced risk as well as unnecessary expense and downtime.

There is an art as well as a science in analyzing cylinder images, and the experience of the reviewer can make a real difference. It is easy to jump to conclusions when looking at a single image. In this case, expensive cylinder rework was avoided after getting a few additional inexpensive images.

Jessica Nordlander is Manager of Borescope Analysis for Pasquale Aviation in Pennsylvania and provides borescope analysis for Savvy Aviation.

VAL
AMERICA'S BEST BUY IN AVIONICS

Panel Mounted Systems-
COM 2000 VHF Communications Transceiver
NAV 2000 VOR/LOC/GS Navigation Receiver
INS 429 VOR/LOC/GS/MB Navigation (Receiver/Indicator)

Remote Mounted Systems-
COM 2KR Vhf Communications Transceiver
NAV 2KR VOR/LOC/GS Navigation Receiver.

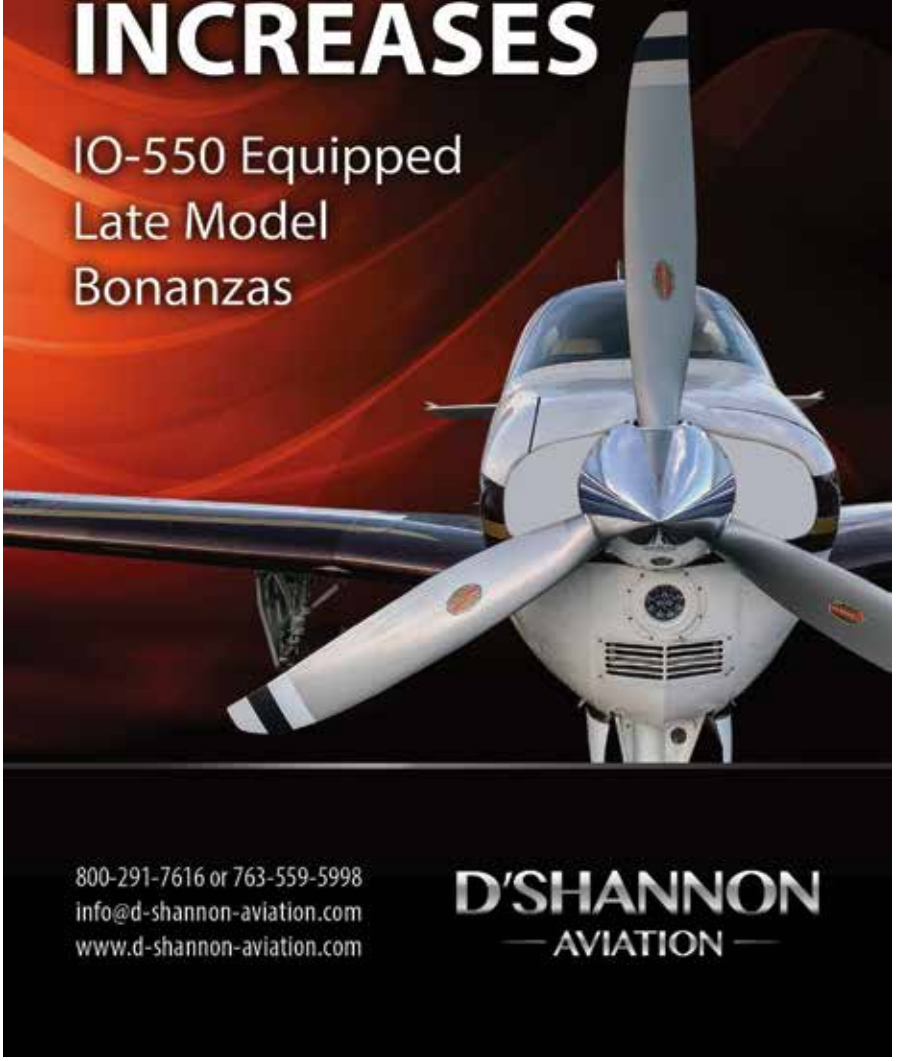
VIEW OUR "MADE IN USA" FULL FEATURED AVIONICS AT
www.valavionics.com

VISA MasterCard

MADE IN U. S. A.

VAL Avionics, Ltd. 2950 Pringle Road S.E., Salem, Oregon 97302
800.255.1511 503.370.9429 FAX 503.370.9885

D'Shannon has received approval for the most comprehensive
GROSS WEIGHT INCREASES
IO-550 Equipped Late Model Bonanzas



800-291-7616 or 763-559-5998
info@d-shannon-aviation.com
www.d-shannon-aviation.com

D'SHANNON AVIATION