

Chapter One

cause a noticeable vibration in the corresponding pilot control. Other causes include flying the aircraft at an airspeed in excess of the designed normal operating speed and vibrations stemming from engine or propeller-related malfunctions.

It is unlikely that a vibration-causing problem can be cured in flight. The best a pilot can hope for, in most cases, is to attempt to reduce the vibration by reducing power and/or airspeed. It is also important to avoid any increase in the load factor, so make very gentle turns, climbs, and descents. Take it as easy as possible and land the aircraft as soon as practical.

Under the Surface

The final consideration during the exterior preflight is what's going on under the surface, where you can't easily detect problems. Rust and corrosion are facts of life; all aircraft have it somewhere at one time or another. Rust is oxidation that occurs when ferrous metals such as iron or steel react with oxygen. The symptom is a reddish discoloration that, in its early stages of development, can often be totally removed simply by rubbing with a clean rag then applying a coat of wax to protect the area. If it is a bit more persistent, it may be necessary to rub the area with a synthetic fiber or stainless steel brush; never use a steel wire brush, as it will cause more problems in the long run. Once the rust is removed, it is necessary to paint it with a zinc chromate primer, then repaint to match the surrounding area. A reddish-brown crustiness indicates a more advanced development of rust. When you remove the surface rust, pitting will be evident in the metal. This situation requires a mechanic's evaluation.

A major problem associated with rust is that it often occurs in hidden areas where, left unnoticed, it easily develops to an advanced stage. Typical locations include in the belly of the aircraft, inside control surfaces, inside the wings and empennage, and inside steel-tube members of float planes. Aircraft that operate in wet environments regularly, or operate near salt water, should be routinely and frequently inspected by a qualified mechanic. This is particularly true for aircraft that have been converted into seaplanes or amphibians by removing the wheels and replacing them with floats. Those aircraft should be checked frequently because they didn't get the factory corrosion proofing always put on newly manufactured aircraft built for amphibious use, such as the Lake Renegade in Figure 1-2.

Corrosion is another form of oxidation that occurs when oxygen reacts with metal. For instance, it is aluminum oxide that causes shiny aluminum alloy surfaces to dull. Corrosion that occurs on a surface under the paint will become noticeable as surface flaking, pitting, blistering, or bubbles. In its early stages, corrosion may be removed with a gentle cleaning. In the advanced stages of corrosion, after pitting in the metal has occurred, corrective measures require the attention of a mechanic.

Corrosion can also be the result of an electrochemical process and is easily recognized as a grayish-white powder such as that which forms on the terminals of a battery. It involves dissimilar, nonferrous metals such as aluminum, copper or magnesium, where they directly contact one another or are indirectly connected through an electrolyte. Certain chemicals, such as battery acid or fumes, exhaust gases, and even acid rain will interact with dissimilar metals placed side by side. Other chemicals such as insecticides