

## SECTION 6. PROPELLER TRACKING AND VIBRATION

**8-107. GENERAL.** To ensure smooth powerplant operations, first start with a properly-installed propeller. Each propeller should be checked for proper tracking (blades rotating in the same plane of rotation). Manufacturer's recommendations should in all cases be followed.

### 8-108. PROPELLER TRACKING

**CHECK.** The following is a simple procedure that can be accomplished in less than 30 minutes:

**a. Chock the aircraft** so it cannot be moved.

**b. Remove one spark plug** from each cylinder. This will make the propeller easier and safer to turn.

**c. Rotate one of the blades** so it is pointing down.

**d. Place a solid object** (e.g. a heavy wooden block that is at least a couple of inches higher off the ground than the distance between the propeller tip and the ground) next to the propeller tip so that it just touches (see figure 8-30), or attach a pointer/indicator to the cowling itself.

**e. Rotate the propeller slowly** to see if the next blade "tracks" through the same point (touches the block/pointer). Each blade track should be within 1/16-inch (plus or minus) from the opposite blade's track.

**f. If the propeller is out of track,** it may be due to one or more propeller blades being bent, a bent propeller flange, or propeller mounting bolts that are either over or under-torqued. An out-of-track propeller will cause vibration and stress to the airframe and engine, and may cause premature propeller failure.

**8-109. VIBRATION.** Although vibration can be caused by the propeller, there are numerous other possible sources of vibration which can make troubleshooting difficult.

**a. If a propeller vibrates,** whether due to balance, angle, or track problems, it typically vibrates, throughout the entire RPM range, although the intensity of the vibration may vary with the RPM. If a vibration occurs only at one particular RPM or within a limited RPM range (e.g. 2200-2350 RPM), the vibration is not normally a propeller problem but a problem with a poor engine/propeller match.

**b. If a propeller vibration is suspected** but cannot be positively determined, if possible, the ideal troubleshooting method is to temporarily replace the propeller with one which is known to be airworthy and test fly the aircraft.

**c. There are numerous allowable tolerances** in blade angles, balance, track, and blade width and thickness dimensions. These tolerances have been established through many years of experience. The degree to which these factors affect vibration is sometimes disputed and can involve significant repair bills, which may or may not cure a vibration problem. Reliance upon experienced, reputable propeller repair stations is the owner's best method of dealing with these problems.

**d. Blade shake** is not the source of vibration problems. Once the engine is running, centrifugal force holds the blades firmly (approximately 30-40,000 lbs.) against blade bearings.

**e. Cabin vibration** can sometimes be improved by reindexing the propeller to the crankshaft. The propeller can be removed, rotated 180°, and re-installed.

f. **The propeller spinner** can be a contributing factor to an out-of-balance condition. An indication of this would be a noticeable spinner “wobble” while the engine is running.

This condition is normally caused by inadequate shimming of the spinner front support or a cracked or deformed spinner.

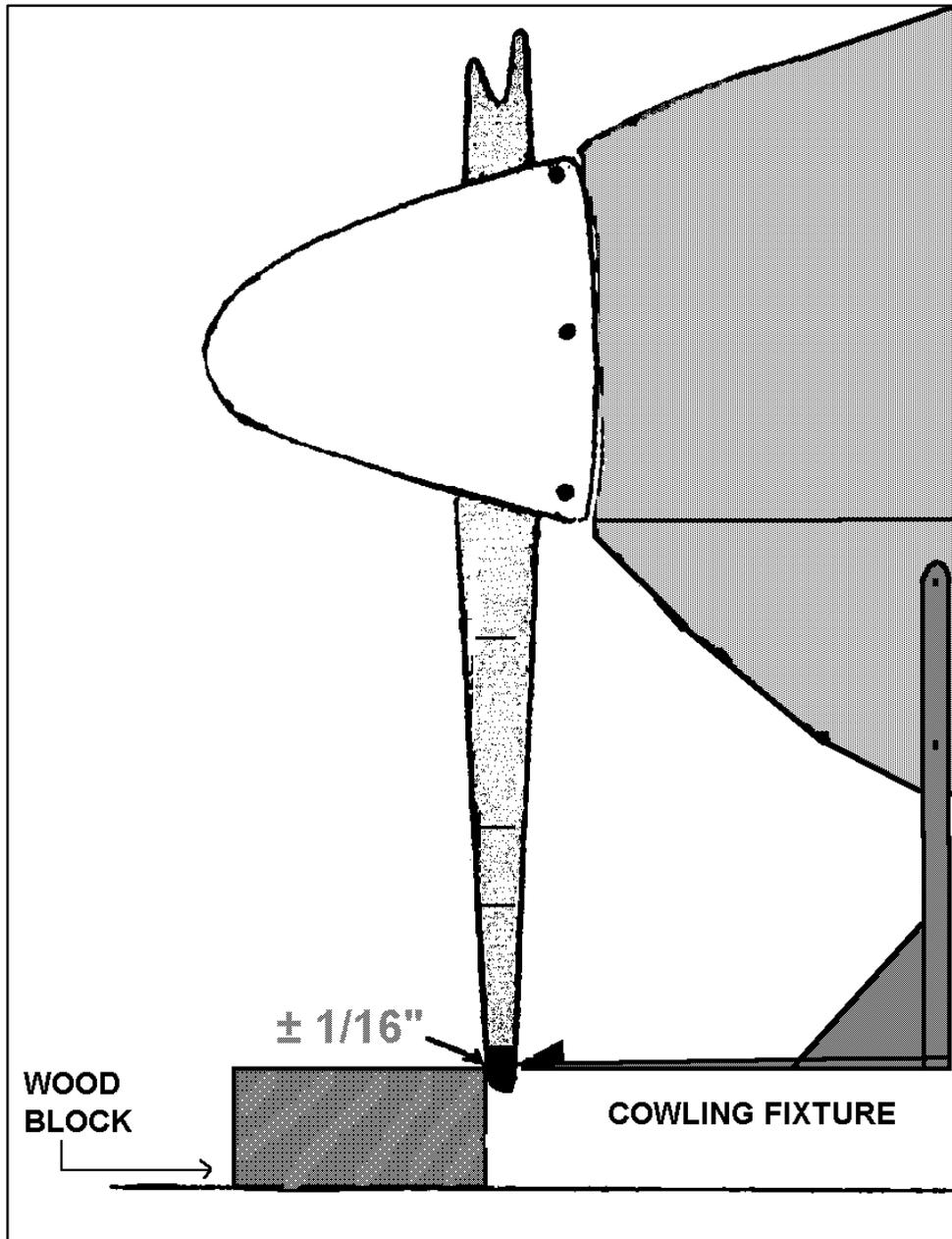


FIGURE 8-30. Propeller tracking (wood block or cowling fixture shown).

8-110.—8-129. [RESERVED.]