

Technical Briefs

TELEDYNE CONTINENTAL - AIRCRAFT ENGINE

Technical Brief

Document No. **T93-7**

Date of Issue: **23 April 1993**

Pictures: **None**

Subject: **DETONATION AND PREIGNITION**

The terms "detonation and preignition" have been commonly used in the spark ignition industry for years. The causes and differences between the two are often not thoroughly understood.

DETONATION

Detonation occurs when the unburned fuel/air mixture ahead of the flame front on the combustion chamber ignites spontaneously, accompanied by a metallic sound of ring or knock. It may be attributable to many factors including:

1. The use of low octane fuels such as automobile gasoline or jet fuel.
2. Excessively lean mixtures especially at high power levels. Lean mixtures may be caused by an improperly calibrated fuel system or even a partially blocked injection nozzle.
3. Very high induction air temperatures.

The sound of detonation is not normally detectable in the cockpit due to normal engine and propeller noises. However, it may be indicated by a rapid rise of cylinder head temperature, if the cylinder in question is being monitored.

PREIGNITION

The real danger of detonation is that it commonly leads to preignition which can cause severe engine damage. By definition, preignition occurs prior to the normal passage of the spark.

The immediate cause of preignition is a local hot spot such as a glowing combustion deposit or excessively hot spark plug electrode. Another common cause is attributable to contaminated magneto which allows cross firing between cylinders to occur.

Whether the problem is preignition, detonation or a combination of both, the end result will be a rough engine, by which time the damage may have been sustained. Proper maintenance and operation are the best means of preventing such a situation. Attention should therefore be directed towards the following:

1. Fuel system calibration and maintenance
2. Ignition system maintenance including the spark plugs and magneto interiors
3. Fuel mixture leaning procedures.