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Fire Detection System

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Abstract
The most Improtant; How to knowMethods of fire detect or overheat Conditions and one of the most dangerous threats to an aircraft, either in The detectors flight or on ground. fors are placed in Conditions, the detectors should be placed in the Vario be monitored, to be reciprocating More Zones 1, as fires are detected in engine aircraft using of the overheat detectors, one or Rate of temperature rise detectors and observation by crew! members, In addition to those methods. other types of detectors are used seldom used to detect engine fire protection systems and but are seldom used to detect letect engine eng fire, as Smoke detectors are better suited to monitor areas such as baggage Compartment's and the other types of detectors is or include Carbon monoxide detectors.

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I. Introduction

The three types used of detectors most Commonly used for fast detection of fires are the rate of rise, radiation Sensing, and overheat. detectors.

Detection System Requirements; fire protection system on modern aircraft do not rely on observation system by crew members as a primary method of fire detection An ideal fire detection system Will include as many possible of the following features

- A system which will not cause false Warning under any false or ground operating Conditions

Accurate indication that is out Rapid indication of a fire and accurate Location of the fire.

- Indication that fire has re-ignited, and Continuous indication for duration of fire.
- Means of electrically testing the detector system from the aircraft Cockpit.

Detectors which resist extreme to oil, water vibration, extreme temperature, Maintenance handling.

Result and discution A fire Zone is an area or designed by the region of the manufacturer to an air craft require fire detection and fire extinguishing Ia high degree of inherent equipment and al fire resistance Engine fire detectors are Located according to fire zones.

Each engine and nacelle area usually is divided into three zones Similar to the Zoned necelle as fig. 1

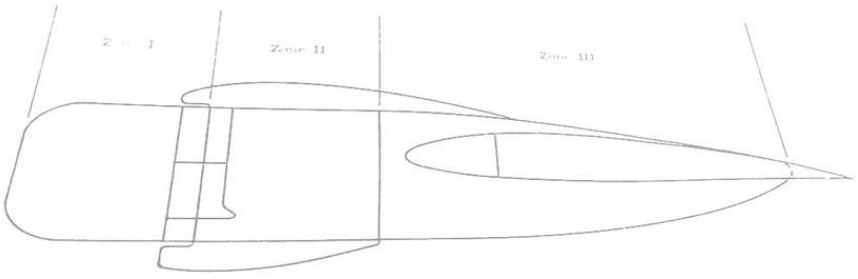

Fig 1

Zone. I identifies the engine power section. area Forward of the Coul Flap trallir ring edges and inner ring baffles. Zone II The engine accessory section area baffles andthe fire wall.

And Zone. IIIidentifies the necelle and area aft of the fire wall other areas on multi-engine aircraft are jorovided with fire detection and protection systems.

These areas include baggage Compartments auxiliary powerplant installations. Combustion heater installations, and other hazardous areas .

A Single Wire Thermal Switch

This system is Configured with several heat Sensitive thermal switches Contain a set of Contacts that are normally open and which close at a preset heat value.

As shown in fig.z As the switch the heat sensitive arms with heats up, ive. Contacts are attached punch the direction opposite of the electrical terminal.

This Completes an electrical Circuit to a warning indicator in to the Cockpit.

This system automatically resets itselfwhen Cool.

28 V.DC is applied to both paths of the thermal Switch Loop.

If a fire occurs which closes any of the Switches, a path to ground is Completed through the closed switch with the Loop arrangement.

One open Circuit Can occur and the system Can still provide protection at all of the fire surveillance points, The dimming Relay shown provides night operationsts

The test switch tests the entire Loop. and will show the operator whether will and open Circuit is present in Loop will cause a false fire warning indication.

The thermo Couple system; is Constructed of two dissimilar metals such as chromel and Constant The point where these metals are Joined and will be exposed to the heat of a fire Called a hot junction There is also a reference junction enclosed in a dead air ir space between twe insulation blocks.

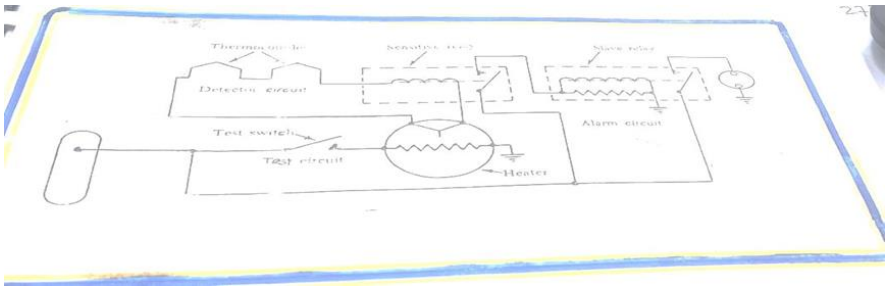

Fig 3 Thermo Couple System

A metal Cage Surrounds the thermocouple to give mechanical protection with exithout hindering, free of air to stayjunction.

If the temperature thermo, thermocouple couple rises rapidly, the produces tempertureduces a voltage because.

II. Conclusion

Fire Detection System Troubleshooting The following troubleshooting procedures represent the most common difficulties encountered in engine firs detection systems:

- Intermittent alarms are mont often caused by an intermittent short in the detecotr system wiring Soch shorts may be caused by a loose wire that occasionally touches a near by terminal, a frayed wire brushing against a structure, or a sensing element rubbing against a structural member long enough to wear through the insulation. Intermittent faults often can be located by moving wires to re-create the short.

2. Fire alarms and warning lights can occur when no engine

Five of overhanditionsainte Bach false alarmanantly located by lacnoting the ninsanainetuop connections from the control unit. If the Faton alarm vases when the engine sonning loop diamonnected, the fault in in the disconnected sensing tome, which should be examined for areas which have been bont into contact with hot parts of the engine. If no bent cloment can be found, the shorted section can be located by isolating the connecting elements consecutively around the entire loop.

3. Kinks and sharp beads in the sensing element can cause an internal wire to short intermittently to the outer tubing. The fault can be located by checking the sensing element with a megger while tapping the element in the suspected areas to produce the short.

4. Moisture in the detection system aeldon causes a false fire alarm. If, however, moisture does cause on alarm. the warning will persist until the contamination is removed or boils away and the resistance of the loop returns to its normal value.

5. Failure to obtain an alarm simal when the test switch is actuated may be caused by a defective test switch or control unit, the lack of electrical power, inoperative indicator light, or an opening in the sensing element or connecting wiring. When the test switch fails to provide an alarm, the continuity of a two-wire sensing loop can

be determined by opening the loop and measuring the resistance. In a single-wire, continuous-loop system, the center conductor should be grounded.

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