

Failure Analysis of an Ice Detector on the Austria 13 Helicopter

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**CURE / Engineering
Sikorsky Aircraft**

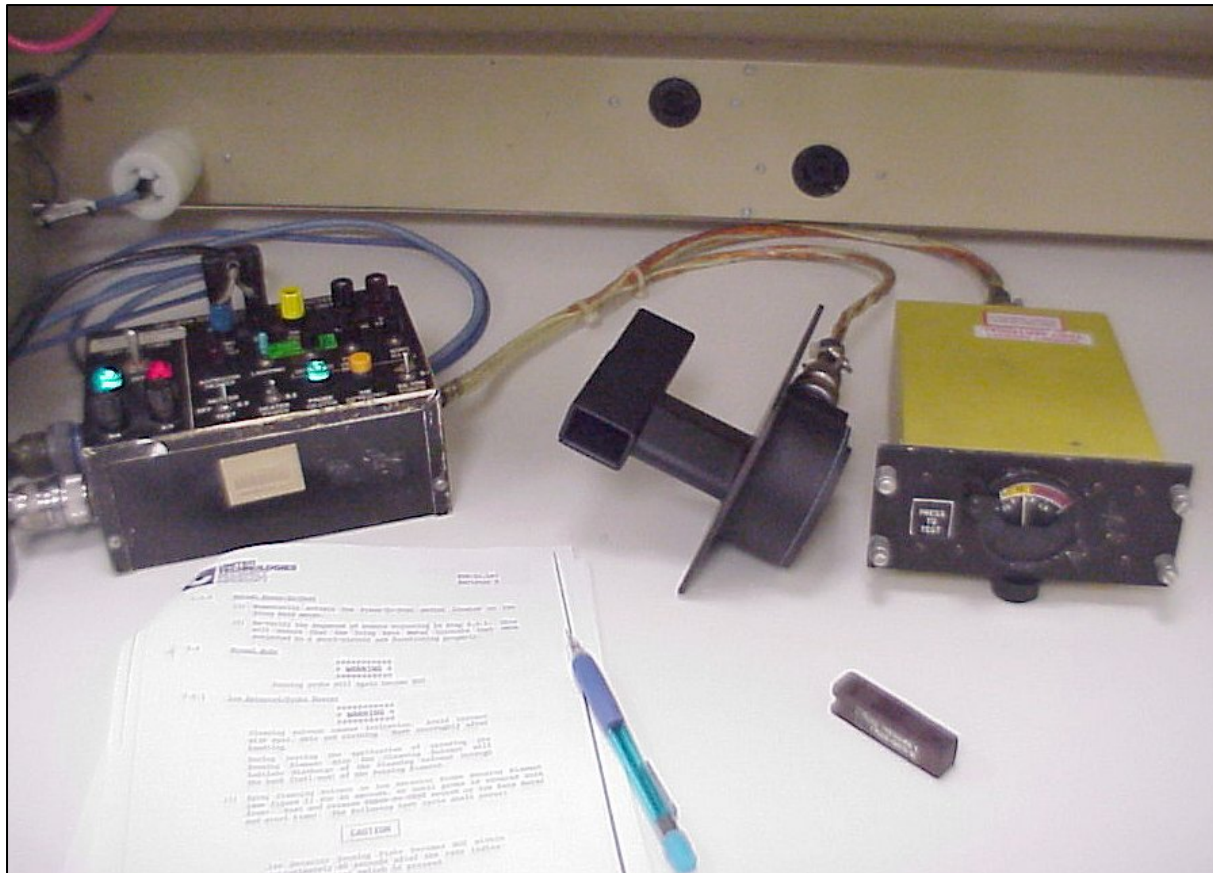
April 30, 2004



Sikorsky

A United Technologies Company

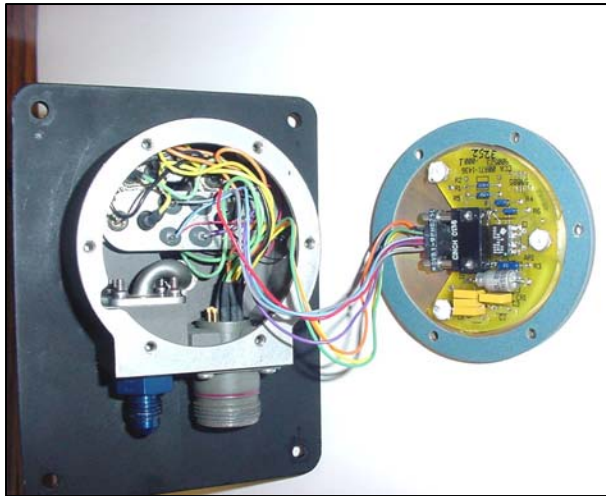
Bench testing in Sikorsky QA Lab confirmed the malfunction during performance of the Austria 13



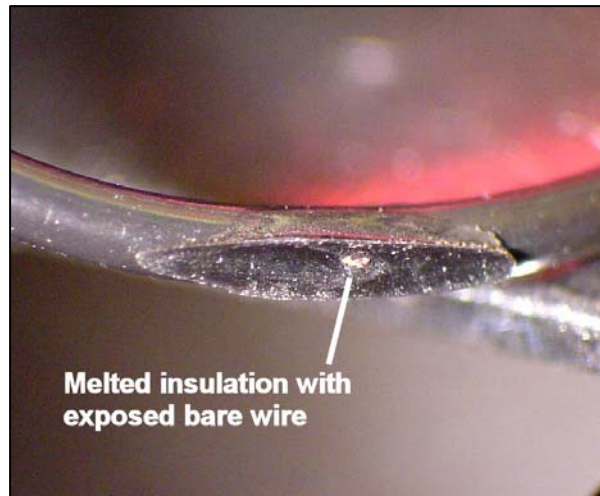
Failed step 5.4.1: Probe heater of ice detector



This talk presents the root cause of malfunctions of an ice detector removed from the Austria 13



Teardown Examination



Melted insulation with exposed bare wire

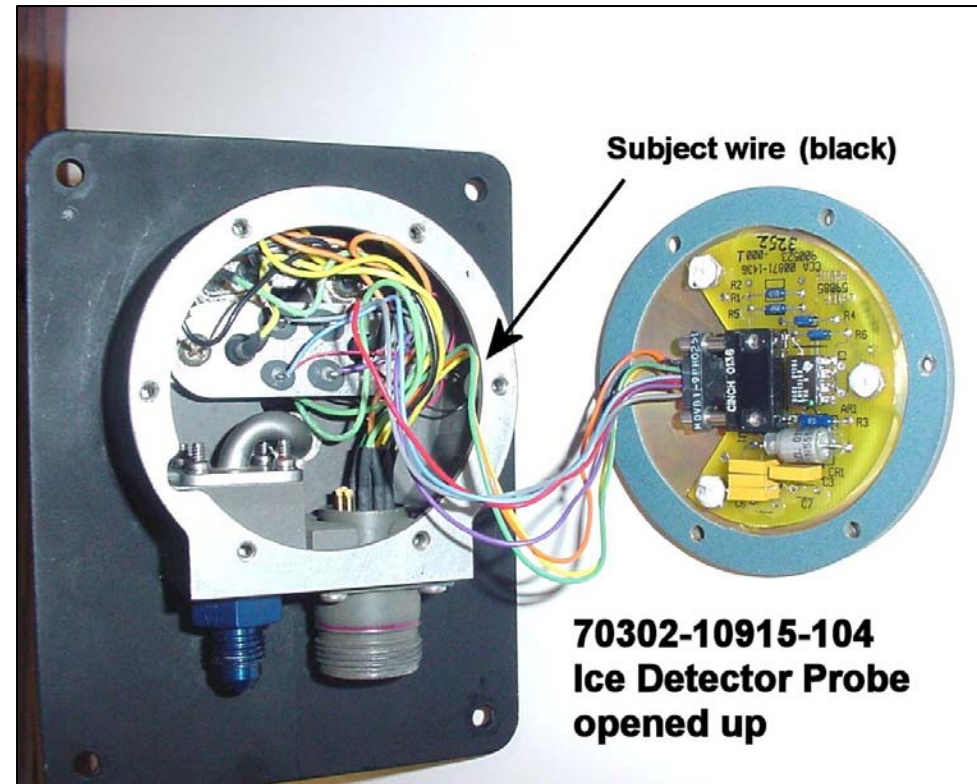
Determination of Root Cause



Teardown examination revealed uncontrolled location of interconnecting wires

Wires were not tied into harnesses

Final positions of wires in assembled unit cannot be controlled or inspected



Close examination revealed wire in contact with housing and exposed wire at point of contact

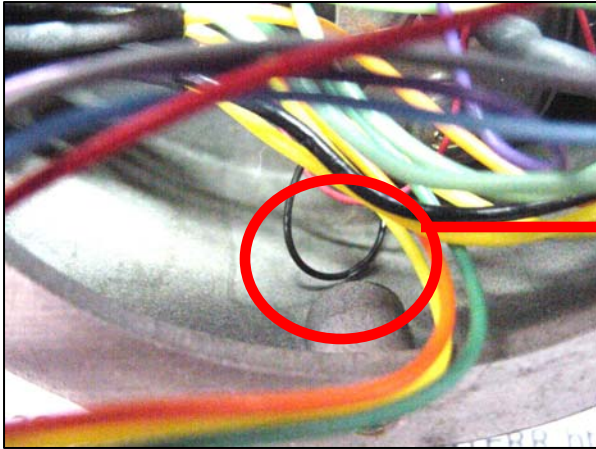
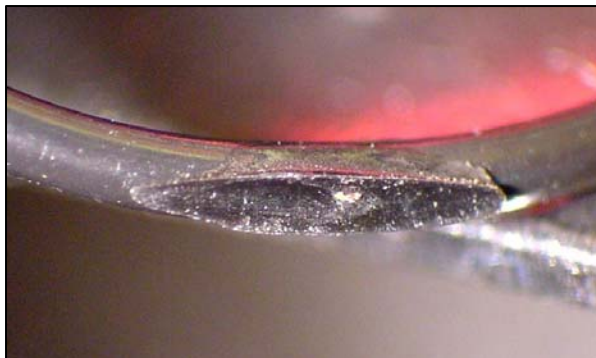


Photo shows that wire in contact with housing

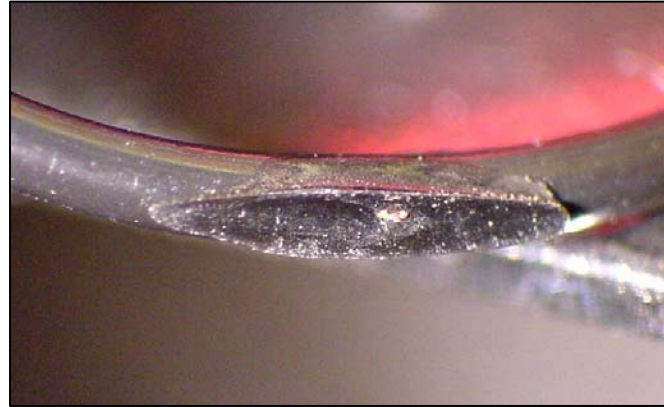


Microscopic photography reveals abraded insulation

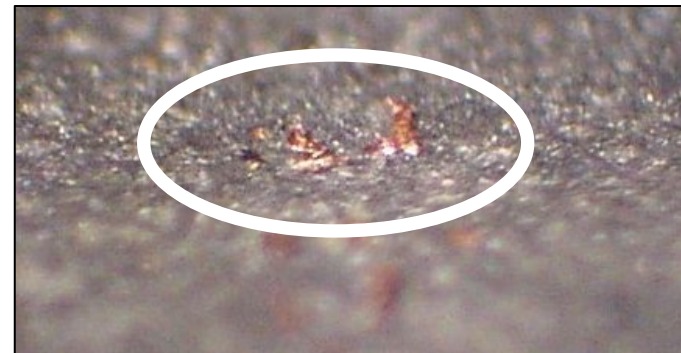


Material transferred from conductor to housing confirms abrasion and therefore short circuit

Abraded wire insulation exposing conductor



Copper from wire transferred to housing at point of abrasion



In summary, the unit failed because of a short-circuit created by abrasion of wire insulation

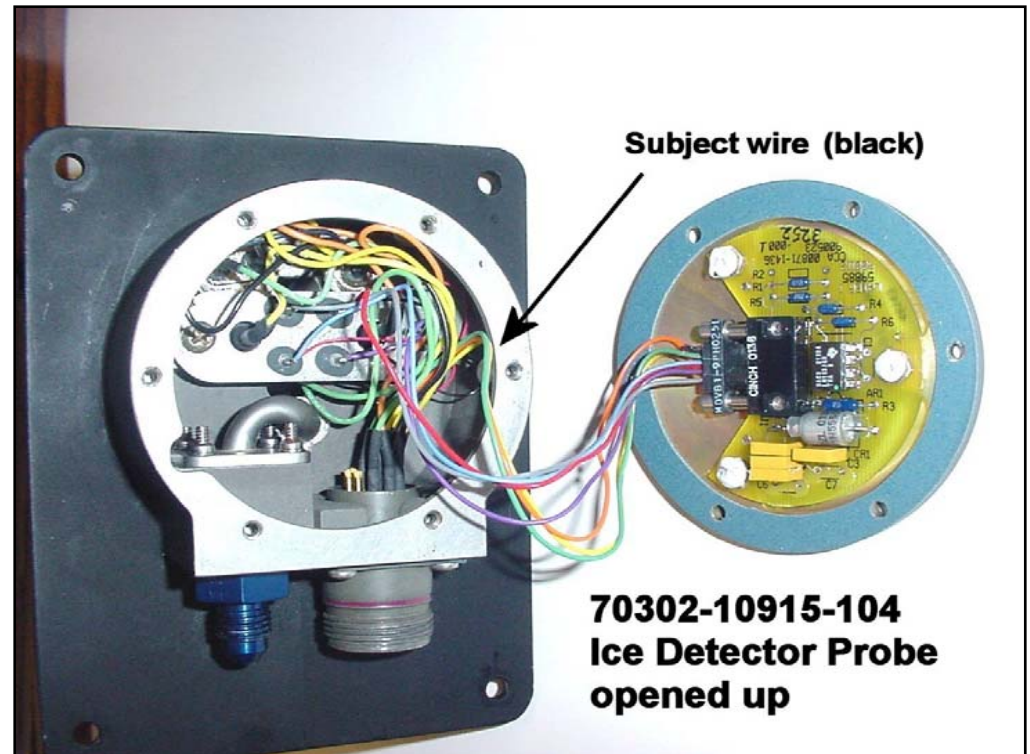
Wires not harnessed to prevent contact with housing



Wire abraded against housing, exposing conductor



Short circuit to ground created where wire contacted housing



Questions?

