

A Case Study of Grain Slippage in Platinum Wirewound RTD's

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The phenomenon of grain slippage in fine platinum wire resistors was described in the literature by Dr. Fremont Reizman at the 1986 ISTFA (International Society for Testing and Failure Analysis) Symposium in a presentation entitled "Failure of Platinum Resistance Temperature Sensors"¹. (Dr. Reizman was a physics of failure analyst at Hughes Aircraft Company at the time.) In the reported case, a thermal sensor made by Rosemont Aerospace (now Goodrich Sensor Systems) had opened due to a grain in the platinum resistive wire 'slipping' and creating a Break (electrical open) in the wire. Unfortunately the text of this presentation does not appear in that years proceedings for some reason and there has been infrequent data on the phenomenon since then. This may be due to this being a low production rate component (Most suppliers admit to only manufacturing approximately 500 devices in a year and an ESA presentation claimed they knew of 3 reported incidents of failures due to grain slippage which would make it a rare occurrence. However, for space applications, rare can be too high if the risk is not understood.) This phenomenon is still being seen and based upon the lack of data and the somewhat disturbing appearance of this anomaly, Raytheon decided to take another look at the issue. Our process and our results will be described.