NASA TECH BRIEF

Wear Studies Made of Slip Rings and Gas Bearing Components

The wear and performance characteristics of slip ring and rotor assemblies were investigated by means of neutron activation analysis techniques. The same techniques were also used to investigate some of the problems arising from environmental conditions with special reference to surface contamination.

The neutron activation analysis technique was particularly suitable for study of the wear characteristics of the slip ring assemblies since gold constitutes one of the major surface structural materials and is highly sensitive to neutron activation. Studies were made of the rate of wear of slip rings as a function of running time for characteristic brush contact forces and rotor speeds. Consistent results were obtained which indicated that the approach was satisfactory.

Thermal neutron activation analysis techniques are normally not applied to materials where the elements involved do not activate readily, such as carbon, hydrogen, oxygen, and other elements represented in organic compounds. However, sample activations of some of the materials involved in the structural components showed that they contained, in addition to the organic compounds, sufficient amounts of easily activatable trace elements to make it reasonable to attempt to try and isolate these elements in the surface contaminant.

Two approaches were made to the problem of identification of the nature of the surface contaminant. One procedure consisted of collecting and activating samples of the surface contaminant and then comparing the results obtained to the results expected from nearby structural components.

The second approach investigated step by step the factors that went into the manufacture and preparation of the assemblies to determine which process was responsible for the residue. It was found that small but significant amounts of residue were being left behind during the cleaning of the assemblies.

The investigations showed that neutron activation analysis techniques could be successfully applied to measurement of wear parameters for the specific assemblies of interest.

Note:

Inquiries concerning this innovation may be directed to:

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No patent action is contemplated by NASA.

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