this damage may also be considered to have been due to cavitation corrosion. Impingement attack would equally be suppressed by cathodic protection and Preiser and Tytell do not discuss how cavitation corrosion in service can be distinguished from impingement attack. They do differentiate between the two and note that since the attack on their rotated rod specimens occurred on the trailing half rather than the leading half the damage to the film was caused by cavitation rather than impingement forces in these experiments.

Cathodic protection at low current densities has practically no effect on cavitation deformation or fracture since the damage is almost entirely due to mechanical forces. The damage can be reduced or prevented, however, if very high currents are used. Current densities of the order of 250 amps/ft^2 have been found by other workers to be necessary to prevent damage by cavitation in experiments using magnetostriction apparatus. The hydrogen that is freely evolved from the protected metal at these current densities is believed to act as a resilient gas cushion between the collapsing vapour cavities and the metal surface. Entrained air has a similar effect in reducing cavitation damage and is sometimes introduced into hydraulic systems to prevent cavitation.

In cavitation fatigue metal is not removed directly by mechanical forces and electrochemical corrosion consequently plays an important part. In this case cathodic protection at low current densities greatly reduces the severity of attack since it prevents removal of metal by corrosion, but it does not prevent damage completely since the repeated collapse of cavities on the same part of the metal surface can still cause fatigue cracking. To prevent this requires, as in the case of cavitation deformation or fracture, a current density sufficient to give hydrogen evolution.

To provide a controlled range of current densities in their experiments Preiser and Tytell used impressed current cathodic protection with a platinum-clad tantalum anode. The advantages of platinum-clad tantalum over other anode materials for cathodic protection in sea water have been discussed in a previous paper by the same authors (2).

H. S. C.

References

1 H. S. Preiser and B. H. Tytell .. The Electrochemical Approach to Cavitation Damage and Its Prevention, *Corrosion*, 1961, **17** (11), 535T

2 H. S. Preiser and B. H. Tytell .. Some Platinum Anode Designs for Cathodic Protection of Active Ships, *Corrosion*, 1959, **15** (11), 596T

High-Temperature Properties of Platinum Metals

STRENGTH AND DEFORMATION CHARACTERISTICS

Some two years ago the Battelle Memorial Institute submitted to the U.S. Office of Naval Research a report on "High-Temperature Properties and Alloying Behaviour of the Refractory Platinum-Group Metals", designed to survey the literature and thence to reveal areas in which investigation is needed. A further report, by R. W. Douglass, C. A. Krier and R. I. Jaffee, has now been issued, under the same title, describing the results of three years of study. The experimental work now reported was based largely on the results of the earlier literature survey.

Much of the report, running to 170 pages, is concerned with the strength properties of the more refractory platinum metals at high temperatures, and includes studies of strength-temperature relationships, deformation characteristics, strain and structure sensitivity and fracture initiation and propagation characteristics. At high temperatures the mechanical strengths of rhodium and iridium are shown to be superior to those of tungsten, molybdenum, tantalum and niobium.

Other sections of this report deal with fabrication, alloying behaviour and oxidation.