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Effect of SiC abrasive breakdown on the wear rate of WC-12wt%Co alloy

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6. CONCLUSIONS

This investigation has provided evidence that SiC abrasive breakdown and clogging by wear debris during wear tests cause a reduction in WC-12wt%Co wear rates. As wear progressed, the SiC abrasives blunted, increasing the abrasive/specimen contact area, resulting in a reduction in the WC-12wt%Co wear rates. Wear debris clogging the interstices between the abrasive grits caused a further reduction in the WC-12wt%Co wear rates by adding to the abrasive/specimen contact area already created by blunting. The increased contact areas provided a greater distribution of the applied stress. Blunting also reduced the cutting ability of the SiC grits.

Increasing the load resulted in an increase in the WC-12wt%Co wear rate under "Ideal" wear conditions. Under the 'No debris' and 'With debris' test conditions, the increased load resulted in a faster deterioration of the SiC grits. As wear progressed the effect of load became insignificant.

The wear mechanisms formed were influenced by the break down of the SiC grits. This led to variations in the size of the contact area between the specimen and the SiC grits. The wear scars were representative of hard abrasive wear, which was characterized by extensive grooving, Co binder extrusion and cracking and fragmentation of WC grains.