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Johnson-Cook Strength Model Constants for VascoMax 300 and 1080 Steels JOHN D. CINNAMON, A.N. PALAZOTTO, Z. KENNAN, Department of Aeronautics and Astronautics, Air Force Institute of Technology, WPAFB, OH, N.S. BRAR, D. BAJAJ, Impact Physics Lab, University of Dayton Research Institute, Dayton, OH 45469 — High strength steels, VascoMax 300 and 1080 steel, are characterized under tension at strain rates of ∼1/s, ∼500/s, ∼1000/s, and ∼1500/s and at high temperatures (1000°F for Vascomax 300 and 1080 steel to 750°F) using the quai-static and split Hopkinson bar techniques. The data on 1080 steel exhibit a strain hardening response, whereas VascoMax 300 steel showed diminishing flow stress beyond yielding because of localized necking in gauge section of the tested specimens. The tension data are analyzed to determine the Johnson-Cook (J-C) strength model constants for the two steels. The J-C model constants A, B, n, C, and m for 1080 steel are 0.514 GPa, 2.83 GPa, 0.612, 0.031, and 0.890, respectively. For Vascomax 300 steel A=2.07 GPa; B=1.98 GPa; n=0.416; C=0.006; m=1.425. The temperature softening constant "m" for Vascomax 300 steel show variation with strain rate and need to be reevaluated in view of its unusual behavior in declining flow stress above yielding. In addition, an analysis of the necking observed in the tested specimens of both the steels is presented.

Nachhatter Brar
University of Dayton Research Institute

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