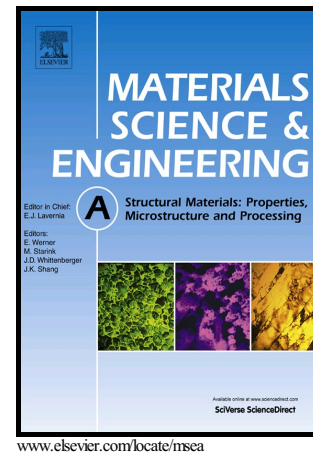


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Peikang Xia, Ilchat Sabirov, Jon Molina-Aldareguia, Patricia Verleysen, Roumen Petrov



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## Mechanical behavior and microstructure evolution of a quenched and partitioned steel during drop weight impact and punch testing

Peikang Xia<sup>a, b, \*</sup>, Ilchat Sabirov<sup>a</sup>, Jon Molina-Aldareguia<sup>a</sup>,  
Patricia Verleysen<sup>c</sup>, Roumen Petrov<sup>c, d</sup>

<sup>a</sup> IMDEA Materials Institute, Calle Eric Kandel 2, Getafe, 28906 Madrid, Spain

<sup>b</sup> Universidad Politécnica de Madrid, E.T.S. de Ingenieros de Caminos, 28040 Madrid, Spain

<sup>c</sup> Department of Electrical Energy, Metals, Mechanical constructions & Systems, Research group Materials Science and Technology, Ghent University, Technologiepark 903, 9052 Gent, Belgium

<sup>d</sup> Delft University of Technology, Department of Materials Science and Engineering, Mekelweg 2, 2628, CD Delft, The Netherlands

### Abstract

In this work, a Fe-0.25C-3.0Mn-1.5Si-0.023Al-0.015Cr (wt. %) steel was subjected to the Q&P treatment, and its mechanical behavior and microstructure evolution during drop weight impact testing and quasi-static punch testing were thoroughly analyzed. It is shown that the 1 mm thick Q&P steel sheet can withstand 110 J impact energy without any (micro) cracking, which is well above the impact resistance of DP 1180 steel. The local true plastic strain can reach 53.4% in biaxial stretching showing excellent formability of the material. The microstructure characterization shows that the volume fraction of retained austenite decreases exponentially with increasing plastic strain under dynamic biaxial stretching.

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\* Corresponding author.

Peikang Xia, IMDEA Materials Institute, Calle Eric Kandel 2, Getafe, 28906, Madrid, Spain.

Phone: +34 91 549 34 22

E-mail addresses: xia.peikang@imdea.org, xia.peikang@gmail.com

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