Supplementary Material for:

**A study on the constitutive equation of HC420LA steel subjected to high strain rates**

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TABLE SI Analysis results of tensile process from DIC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strain rate | Maximum load time | Fracture time | Ultimate average Eyy | Fracture strain(P0) |
| 0.001 s-1 | 243 s | 336 s | 0.230 | 0.492 |
| 0.1 s-1 | 2.5 s | 3.5 s | 0.241 | 0.539 |
| 10 s-1 | 30.1 ms | 45.6 ms | 0.321 | 0.579 |
| 50 s-1 | 6.1 ms | 8.5 ms | 0.330 | 0.611 |
| 250 s-1 | 0.85 ms | 2.02 ms | 0.378 | 0.775 |
| 500 s-1 | 0.43 ms | 0.81 ms | 0.392 | 0.876 |

TABLE SII Parameters of the Johnson-Cook model for the HC420LA steel

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Steel | *A* | *B* | *n* | *C* |
| HC420 LA | 431 | 571 | 0.51 | 0.0095 |

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FIG. S1 Comparison of the relative errors between predicted values and experimental values of the two models: (a) AARE versus strain rate column graph, and (b) RMSE versus strain rate column graph

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FIG. S2 Experimental results and comparison with the modified Johnson-Cook model (Strain rate = 100 s-1)

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FIG. S3 Mesh in the gauge section of the dynamic tensile specimen