

Introduction to Advanced High-strength Steels—

Part II: Processing Considerations

By Daniel J. Schaeffler, Ph.D, Contributing Writer

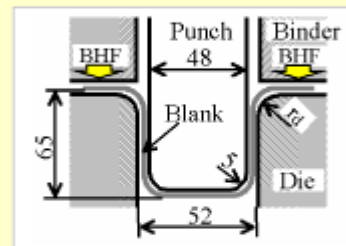
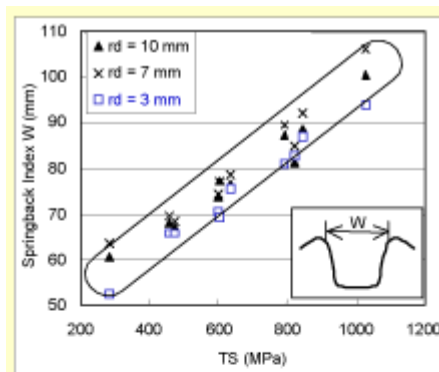
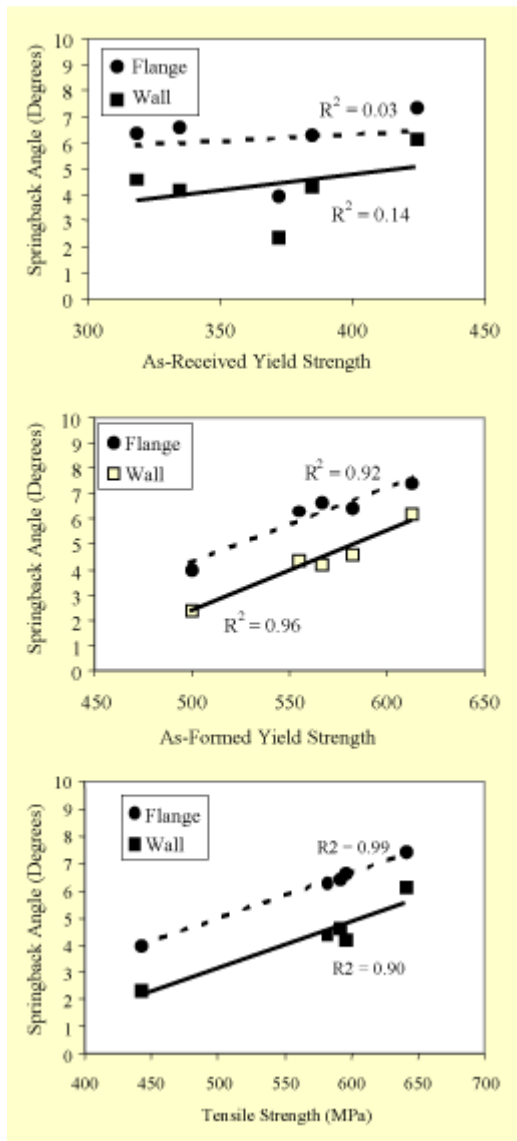
September 13, 2005

Understanding and compensating for the challenges associated with processing advanced high-strength steels (AHSS) can help you minimize springback, edge cracking, trimming, wrinkling, and die wear.

Part I of this two-part series presented an overview of advanced high-strength steels (AHSS). This article addresses issues encountered when processing these grades.

Using AHSS in appropriate applications offers opportunities for reduced product weight, enhanced crash performance, manufacturing process consolidation, and cost reduction. However, because these grades have different microstructures, chemistries, and properties, die processing must be optimized to take advantage of the differences. Proactively addressing the associated challenges can help minimize costly tryout.

Springback



| Grade | Microstructure | YP (MPa) | TS (MPa) | EL (%) |
|--------|-----------------|----------|----------|--------|
| 270E | IF | 163 | 282 | 54 |
| 440W-1 | FP (C-Mn) | 354 | 455 | 39 |
| 440W-2 | FB (C-Mn) | 334 | 440 | 37 |
| 440R | FB (HSLA) | 396 | 471 | 36 |
| 590Y | DP | 338 | 602 | 33 |
| 590R | FB (HSLA) | 480 | 605 | 28 |
| 590T | TRIP | 445 | 631 | 39 |
| 780T | TRIP | 472 | 820 | 32 |
| 780YL | DP (low yield) | 480 | 840 | 22 |
| 780YM | DP (high yield) | 532 | 775 | 23 |
| 980Y | DP | 726 | 1020 | 16 |

IF : Interstitial Free (EDDS) Ferrite

FP : Ferrite + Pearlite

FB : Ferrite + Bainite

DP : Ferrite + Martensite

TRIP : Ferrite + Bainite + Retained Austenite