Improve performance of joined hot formed steel parts by Virtual Prototyping on a lightweight car body

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Recent lightweight programs push the adoption of innovative steels, among them hot-formed and high-grade of dual-phase (DP) steels, and favor tailored forming techniques to locally strengthen or increase ductility in car body. This added complexity is combined to intrinsic manufacturing process variations on the production line, and may drive an undesirable increase of safety margins due to uncertainty on the end-product. The present paper addresses some CAE challenges to assess mixed steels components at the manufacturing and performance levels. Namely, the use of ESI virtual tools and chains with Sysweld and VPS is evaluated and correlated for (i) varying spot weld processes impact on the as-manufactured spot weld joint (ii) influence of tailored steel forming on joints and (iii) assembly performance based on the example of an automotive part.