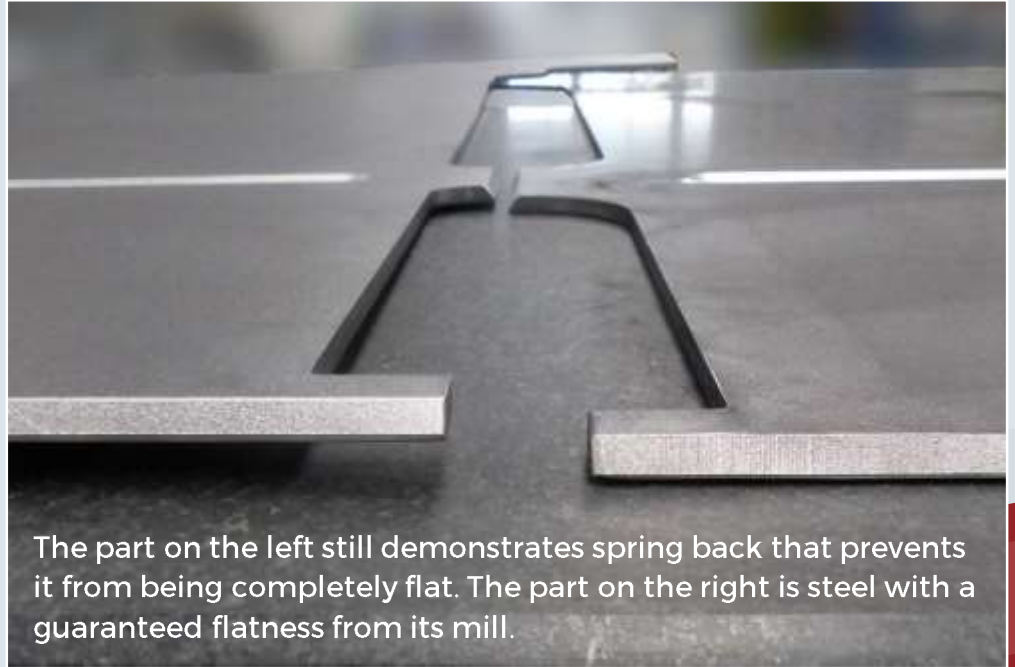


The importance of part levelling in metal fabrication

Flat parts can boost bending and welding productivity and keep customers happy

The sheet metal that gets delivered to a metal fabricating company looks flat enough right? But looks can be deceiving, and that is especially true with metal. What might seem flat at first is likely to lose its flatness during fabricating.

This makes sense when you consider what happens to the raw material before it's delivered to the shop. Sheets and plates come from the mills in coils. In metal service centres, these coils are uncoiled, straightened, and finally cut to length. Although the sheets appear to be flat, they still have stress inside. (The stress is evident in the material's grain.)



The part on the left still demonstrates spring back that prevents it from being completely flat. The part on the right is steel with a guaranteed flatness from its mill.

When these materials are cut using a thermal power source, such as a laser or plasma cutting machine, the stress is released, and the results are obvious. Parts become uneven. This goes for both thin and thick metal parts.

This also goes for both ferrous and nonferrous parts. The use of the assist gas during cutting actually plays a large part in this process. For example, when oxygen is used for cutting carbon steel, the oxygen reacts with the metal in an exothermic reaction. That introduces a great amount of heat to the cutting zone, which allows the cutting process to occur rapidly. (The by-product of this chemical reaction is an oxidized edge, which needs to be cleaned to allow for paint adhesion.) The additional heat, however, also releases more stress in the metal. Cutting with nitrogen, an inert gas, reduces the heat input when compared to oxygen, but even with the gentler process, stresses are still being released.

This can become particularly troublesome for the fab shop with new laser cutting technology because some parts may tilt on the slats after being laser-cut and become an obstacle for the cutting head, especially when cutting speeds reach 30 m/min. or more and acceleration of more than 2 m/s² has become the standard. A very expensive piece of fabricating technology runs the risk of being wrecked by an uneven part on the cutting bed.

Any blanking process is able to release stress first introduced during coiling. That stress probably is most evident in the metal's spring back after the cutting or punching is done. (Punching works the material to the point that additional stress is released in material. This can be seen on the newly perforated parts, for instance.)

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Combating the Material Stresses

What are metal fabricators to do to combat the stresses introduced during coiling and released after the parts have been cut or punched?

Experience has shown that the choice of material is crucial. Instead of choosing steel based on cost, choose from a reliable supplier like Coen Steel who has a reputation of delivering steel with a guaranteed flatness. Coen Steels Laser grade sheet has +-3mm flatness over 1 meter square.

Reaping the Benefits

When steel quality becomes consistent, expect to reap the benefits straight away. Less re-workings, Less scrap, less labour, less costs!