Contribution ID: **14** Type: **Oral Presentation - a full paper will be submitted**

# Research on laser cladding Fe-based alloy coating to enhance high-temperature friction and wear properties of H13 die steel

*Wednesday, 26 March 2025 11:40 (20 minutes)*

Hot stamping is a mature manufacturing process in the field of automobile manufacturing. The surface strengthening and toughening of mold steel play a very important role in improving the service life of hot stamping in high temperature and high stress environments. This work uses laser cladding to clad FeCrW-SiV alloy onto the surface of H13 mold steel. The prepared coating has good metallurgical bonding with the substrate, and the coating structure is fine martensite and uniformly distributed carbides, which is the key to improving the high-temperature wear resistance of the surface. SEM was used to observe the surface structure morphology and carbide distribution and size of the prepared coating. High-temperature friction and wear is one of the many failure modes of molds. Wear will not only change the mold surface geometry but also the surface roughness, and normal stress will cause further wear between the wear debris and the mold surface. Reducing stamped product quality and resulting in more rework costs. Designed to simulate hot stamping environments at 200℃, 300℃, and 400℃ to conduct high-temperature hardness and high-temperature friction and wear experiments on the coating. Test the hardness changes at different high temperatures and maintain high hardness in high temperature environments. As the temperature rises, the friction and wear COF curve will also show a slight upward trend, mainly due to the formation of oxide layers in high temperature environments. A white light diffractometer was used to observe the scratch depth after friction and wear to verify the adhesive wear and oxidative wear during high temperature friction.

## Speaker Country

China

## Are you interested in publishing the paper in a Steel Research International special issue?

Yes

**Primary author:** Mr CAO, Qizheng (Shanghai University)

**Presenter:** Mr CAO, Qizheng (Shanghai University)

**Session Classification:** Materials, Properties & Microstructure

**Track Classification:** Processing: Additive manufacturing of tools