Servo Technology experience 2016

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Where Servo has come from

- Automotive sector needed to reduce weight
- Steel suppliers responded increased development of HSLA materials
- Intent was to use gage reduction to reduce weight without sacrificing strength in safety components

Press suppliers responded to market need

- Press builders had to develop new capabilities to form these materials
- First introduction to servo press was in the early 90’s
- Gage reduction was an effective strategy and it became a significant aspect of new car design

Starting in the 90’s

- Automotive component manufacturers adopted the servo presses
- Other industries working with very high yield strength materials adopted fairly early as well
- Component manufacturers interested in in die assembly and tapping operations also experimented with the technology

The early 2000's…

- The first decade's economic challenges hampered growth in this market
- High investment in yet fairly new technology led most to proceed with caution

Starting in 2010 and later…

- Interest in servo surged
- Investment in servo increased
- The technology was widely accepted

Where are we today on the supply side?

- The first builders into the market have thousands of machines running, some in production for multiple decades
- More press manufacturers are getting into the technology
- Increased competition and higher volume will lead to lower costs for the technology

Servo press - users views

- People are comfortable the technology is stable
- There is a wider understanding of how the technology brings benefit
- Increasing percentage of presses shipped are servo

Factors driving an increasing expansion of the servo press market

- Continuing efforts to reduce vehicle weights
- Other markets finding benefits in HSLA
- Servo's abilities increase productivity and reduce costs

Other markets benefit from HSLA

- HSLA at or near CRS per pound
- gage reduction = cost reduction per piece
- Thinner materials means more linear feet per coil
  - Less coils transported = lower shipping costs
  - Less coil changes = less labor costs and fewer crashes

- Thinner gage = less scrap = reduced costs
- Lower part weights = reduce shipping costs
- Other internal costs for material handling are reduced

Servo abilities increase productivity and reduce costs

- Increased output allowing expansion of sales with less additions in buildings or staff
- Fewer production lines mean less press and auxiliary equipment to purchase and maintain

Automation and transfer

- Servo presses integrate more efficiently into automation increasing output there too
  - Automation input/overlap
- Servo with transfer leads to higher output
  - Match stroke to transfer time
  - Reduce “hop” at bottom link presses struggled with

- Servo presses make in-die processes easier that increase productivity
  - In Die tapping
  - In die assembly
  - Complicated stroke profiles

Optimized stroke speeds reduces costs associated with lubrication

- Slow draw (over radius only)
- Requires less lube
- Requires less cleaning

- Generates less heat
- Better part dimensional stability
- Increases tool life 2x or more

Reduces tooling costs

- May avoid coatings
- Remove stations
  - Start draws higher but slow ram velocity = less re-draws and less hardening
  - Avoid restrike stations

- Less tool maintenance
- Avoid slug pulling
- Fewer mishits on die trials and thread ups

Reduced material costs

- Forming harder materials without cracking
- Form materials without annealing
- Forming at room temp instead of hot

- Draw with less cracking
- Draw perhaps without DQ material
- Eliminate or greatly reduce rejected material

Rejected coil running on servo 4 times normal running rate

So what have we learned over the last 20 years about the servo presses?

- Reduction of reverse load
- Reducing spring back
- Ease of in die value added operations
- Higher output

- Better part quality
- Better tool life
- Incredibly flexible to handle tooling and material issues
- Allows one work center to work efficiently on wider application range

- Reduced tooling costs
- Reduced material costs
- Reduced rejected coils
- Reduced soft costs

Servo press technology will largely replace mechanical presses