

## CASE STUDY

**CLIENT: International Automotive Tier One Stamper and Supplier of SUV and Pick-Up Truck Frame Assemblies.**

**GOAL 1: Improve Results of Incumbent Lubricant – (a) Improve tool life of new and uncoated tools. (b) Eliminate galling experienced with incumbent lube. (c) Reduce cost of lubricant.**

**GOAL 2: Benchmark Lubricant for Tool Coating, Maximize Lubricant Use Efficiency, and Eliminate Wash Procedures Prior to Welding.**

**GOAL 3: Maximize Lubricant Use Efficiency, Delivery, and Application.**

### **PROJECT:**

(1) An International Automotive Tier One Supplier opened a new stamping and assembly plant to stamp and assemble frames for SUVs and Pick-Up trucks for a major US automotive OEM and to enhance its competitive position in order to garner other OEM customers. The steel used in this operation was heavy gauge HRS and High Strength Low Alloy (HSLA). The company started operations with a synthetic lubricant that had been marketed to the industry as an advanced technology product formulated for ultra high strength steel. This lubricant was considered expensive. The dies were new and uncoated and the lubricant had to be used at 1:1 in order to stamp parts. Yet the company still experienced some galling and tool wear.

MSF introduced its multiphase performance synthetic lubricant (see Feb. '06; *Metalforming* magazine article, "Selecting Lubricants for Advanced High Strength Steel"), Eco Draw® HVRG4. The price for MSF's product provided an immediate savings of 25%. The company discovered that Eco Draw® HVRG4 could be used at 1:3 and provided better part and tooling protection than the former lubricant.

**The overall savings exceeded 50%. Galling on parts was reduced and scoring on uncoated tools was eliminated.**

(2) After several weeks use with Eco Draw® HVRG4, the company began to coat tools with TD coating and ION Bond. MSF and the client began studies of lubricant dilutions and tool coating life to determine the most efficient lubricant dilution ratio. Initial studies settled at 1:5 dilutions. Parts were run for four weeks and several hundred part runs. Tool coatings were evaluated for wear. No adverse effect was noticed. Next dilutions were reduced to 1:9. Similar part runs were performed and tool coatings were evaluated again. No adverse effect was observed.

Next the original lubricant and a second supplier lubricant were brought in for two comparative tests. The evaluation was performed based upon most effective dilution ratio, cleanability, operator response (odor, residue level, skin irritation, etc) and use cost. Ultimately, the company selected MSF's Eco Draw® HVRG4 as the lubricant for use in their operations. **This lubricant has been in use for several months at 1:9 with no adverse effects to tool coatings, tool life, and part quality.**

Next the MSF and the company attempted to eliminate a wash procedure that had been used to wash parts prior to welding. Parts stamped with the previous lubricant required washing to avoid carbonization and lacquering effect that showed through in the subsequent paint operations. Eco Draw<sup>®</sup> HVRG4 was applied to blanks at 1:5 to 1:9 and stamped. These parts were sent through the weld cells without washing. **Parts welded without carbonization or adverse effects to weld quality. No adverse effects were experienced in the paint operations. The company successfully eliminated post-process wash operations.**

(3) Once the lubricant and lubricant dilution ratio had been established, MSF worked with the company to integrate Minimum Quantity Application (MQA<sup>™</sup>) procedures. First, MSF introduced individual Spray Rite spray application systems. These stand-alone systems provided a system to test controlled spray application techniques to reduce lubricant volume applied to blanks. Initial tests were very successful and reduced lubricant use by 20%.

Next, MSF designed a system for controlled application at each press supplied by a central proportion and distribution unit. The unit mixes and supplies lubricant to each press, where PLCs are programmed to apply controlled amounts of lubricant for each stamping job. Lubricant waste will be completely eliminated. Lubricant mix ratios will be made without error.