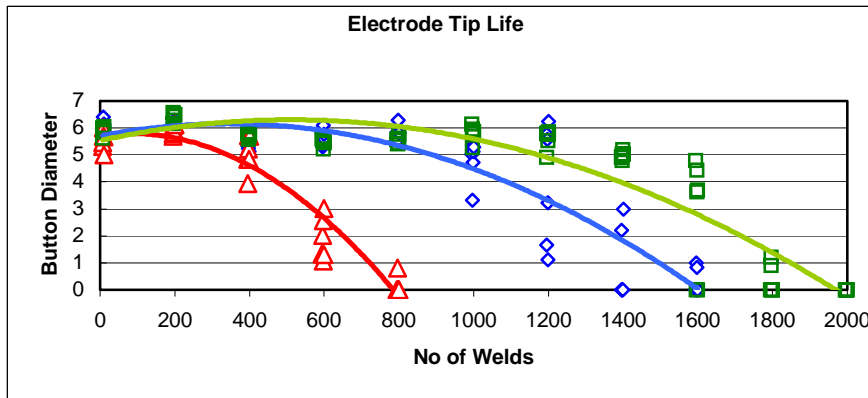


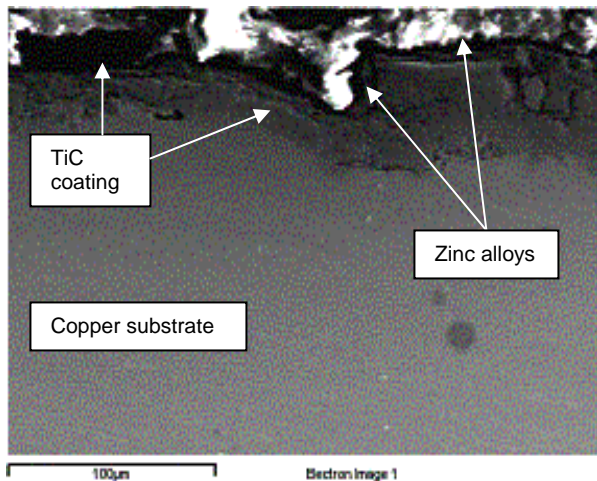


HARDENED TICAPS™/HARDCAPS™

Hardcaps™ underlying copper alloy is mechanically ball-peened, which strengthens and hardens the copper prior to the application of Huys' patented titanium carbide coating. This discovery arose from research and development at the University of Waterloo by Prabhjit Sidhu who has generated a 20% to 40%, (depending upon welding parameters and materials being welded), increase in electrode life with Huys' new "Hardened TiCaps™ or Hardcaps™.



The University of Waterloo's graph above illustrates electrode life of copper chromium (red), the improvement with regular TiCaps™ (blue), and new Hardcaps™ (green). Longer life means **reduced costs, less down time and less maintenance**. Hardcaps™ maintain TiCaps™ legendary non-sticking characteristics. Any copper alloy can be employed with the Hardcaps™ process.



The University of Waterloo has taken the scanning electron microscope photograph of an electrode at left at 1,600 welds on galvanized steel. The curvy lines at the top show the deformation of the copper after repeated welding. Notice that zinc compounds on the galvanized steel are trying to attack the copper that lies under Huys' patent titanium carbide (TiC) coating to form brass. The zinc is easily vaporized during welding and rapidly degrades copper. Notice that the TiC adheres to the copper after repeated heating and cooling of the electrode. **The Huys TiC coating effectively retards intermetallic alloying between copper and zinc.** The result of slowing the collapse of the electrode is longer life – and lower costs. **Now, with Hardcaps™, typical CuCr and CuCrZr alloys are hardened on the surface, effectively delaying the deformation of copper – creating even longer life.**

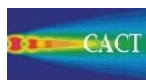
Welding parameters used by Prof. Prabhjit Sidhu: .7mm thick sheet (HDG), American Welding Society procedures Table 3, current: 10,000A, force: 440 lbf +/- 10 lbf, welding time: 11 cycles, welding rate: 25 welds/min, cooling water: 4 L/min, hold time: 5 cycles.

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Centre for Advanced Coating Technologies
Centre pour l'Application de Couches



For more information, call 1-416-747-1611 or e-mail us at sales@HuysIndustries.com