Wear Plate Processing Data

Performing hot and cold work operations on any through hardened wear plate requires caution due to the high hardness of the product. Utilize operators experienced in working with hardened alloys. Follow sound procedures, appropriate for the general classifications of those alloys, and wear the appropriate safety attire, such as safety goggles, gloves and helmet.

Cobalt or carbide drills are not required. Nitrided (hardened) twist drills, or High Speed (M-2 type) drills should be more than adequate. Use generous coolant, (20% soluble oil). Use high quality equipment with sufficient capacity to avoid chatter and vibration. Lower speed and increase pressure to avoid "glazing". Where possible use a hand feed as opposed to a power feed. Power feeds tend to over power and create small chips which may lodge, or jam. Hand feed allows greater control and "feel" to maintain a scraping type of motion, (long chip). Utilize a pilot hole, then follow-up with a reamer type of action. "Dubb" (or dull) the edge on the second drill to create a scraping motion as opposed to a cutting action.

General Tips for Drill Bit Preparation
Grind away the metal behind the lip to obtain clearance. (10° is preferred). Most drill failures, that occur when drilling hard plate, are along the land, not at the entry point. Thin the point significantly at the entry point.
A WORD ON TAPPING: Tapped holes are difficult to accomplish in hardened wear plates. In many cases, where there is a requirement for tapped holes, the best method is to do an oversize "drill through", insert a plug, and tap the plug. If you are required to tap into the wear plate, ensure that the hole size is as large or larger than the thickness of the plate. Start with a smaller "pilot" hole.

Rhino-Tuf is a true "FORMABLE" grade of wear plate. The carbon equivalency rating (C.E.) is one of the lowest in the industry. FORM AGAINST THE GRAIN. Forming any hard plate should only be attempted by persons experienced in forming hard plate. Hand grind edges to remove slag and eliminate potential crack initiation points. Insure plate is at room temp., or slightly warmer. Allow minimum bend radius of 12T, (12 times the thickness of the plate). Best results will be obtained by utilizing multiple hits to form the radius. Use a broad nose top die and an "open" bottom die.

These products are readily welded utilizing the "***Standard Low-Hydrogen Method"***. (E7018). **When welding any hardened wear plate product, ELIMINATE MOISTURE. MINIMIZE HEAT and avoid DRAMATIC TEMPERATURE CHANGE:** Preheat the weld area. (In instances where pre-heat is not possible, use of a 309 Stainless Rod may be considered.) A preheat and interpass temperature of 150°F to 350°F is generally sufficient, (350°F to 450°F for 500BHN Plate). Exact furnace controlled temperature is not required, a heat crayon should suffice. When using a torch, move rapidly and evenly to provide a general increase in temperature. Maintain preheat temperature during weld. Allow the assembly to slow-cool. (**NOTE**: that preheating also will cause evaporation of any residual moisture in the weld area.)

Use the smallest diameter electrode that will do the job. (Stick welding is preferred simply because of the tendency of the semi-automatic process to apply too great of a deposit.). Travel rapidly and use several small stringer beads. Cold work applied prior to welding (machining, forming, etc.), may result in stress build-up. Every attempt to insure proper alignment of the welded sections should be made. "Dogging", or clamping to correct alignment problems, will result in retained stress. To help minimize welding stresses, peen the beads, after each pass, while they are still hot.

ELIMINATE MOISTURE:

Make sure welding rods are completely dry. Use rods from a sealed container, or utilize a portable oven per the directions of the manufacturer of the welding rods. Remember that All Quench and Tempered Wear Plate products are engineered to address severe wear. The tensile properties of these products are very high (200,000PSI), for that reason structural welds, and welds requiring strengths at those levels are to be avoided. Your adherence to sound welding practice, the employment of ***The Standard Low Hydrogen Process,*** attention to surface cleanliness, and awareness of the effect of retained stress, will greatly improve your chances of obtaining exceptional welds.