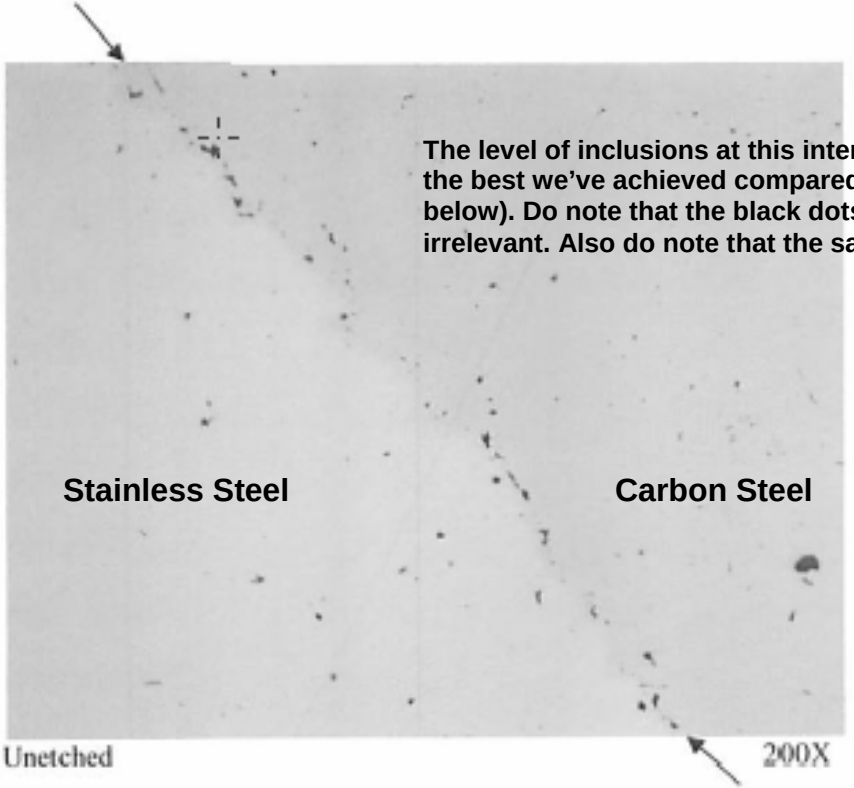
Summary of SDI-Pittsboro Report on Cladinox rolled at Roanoke in September



The level of inclusions at this interface is more than good enough but not the best we've achieved compared to samples we rolled in the UK (see below). Do note that the black dots visible elsewhere than the interface are irrelevant. Also do note that the sample is as yet "unetched"

FIG 1. Optical micrograph of sample 1 showing a fine line of small particles at the SS – Carbon Steel interface between the arrows.

No Inclusions at interface of this UK sample from bars we rolled in 2012. This would be our quality "bench-mark" for perfect bonding which we would strive to attain under production conditions with the right Quality Control Procedures and Protocols in place

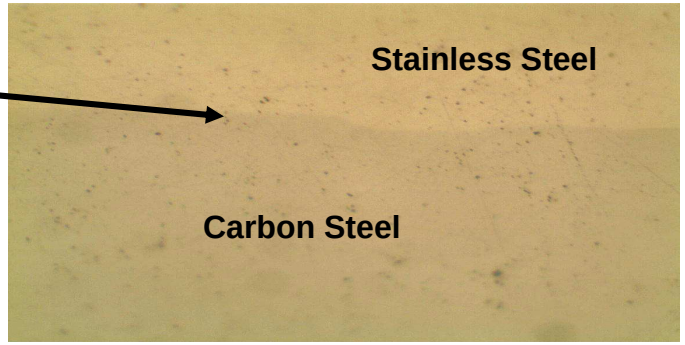
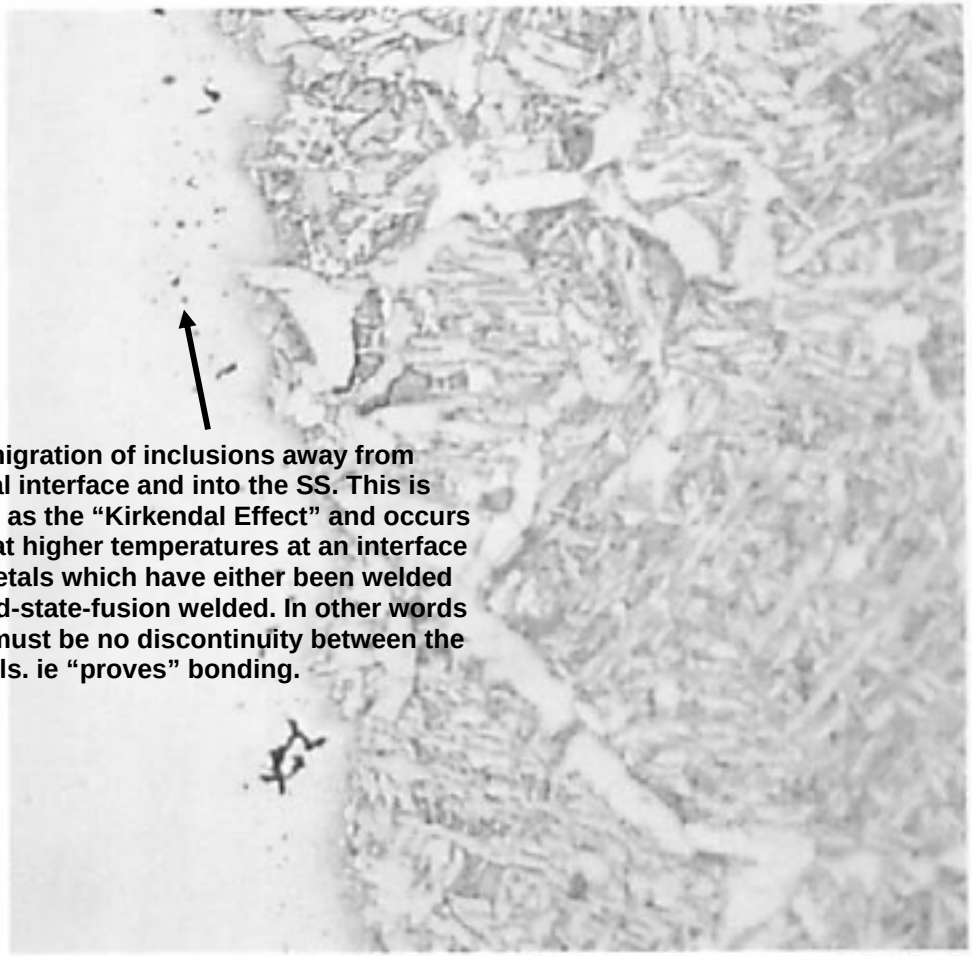


FIG 3. Optical micrographs of sample 2 showing the bond between the SS cladding and carbon steel after being etched. The carbon steel basemetal exhibited a darker etching bainitic and grain boundary ferritic microstructure. The nonmetallic particles appear to be located just within the SS overlay, which was not attacked (etched) by the 2% Nital and therefore appears "white".
Nital Etch



Note migration of inclusions away from original interface and into the SS. This is known as the "Kirkendal Effect" and occurs when at higher temperatures at an interface of 2 metals which have either been welded or solid-state-fusion welded. In other words there must be no discontinuity between the 2 metals. ie "proves" bonding.

Note electronic imaging which more clearly shows merging of the 2 steels across an indistinct interface. Atoms from the CS have merged/migrated into the SS and vice versa. True solid state fusion.

SEM SEI electronic image at 500X at the SS – CS interface

Stainless Steel

Carbon Steel