

Figure 41 (continued): Macro and stereo photographs of bolt 240°-7 taken at 45° increments.



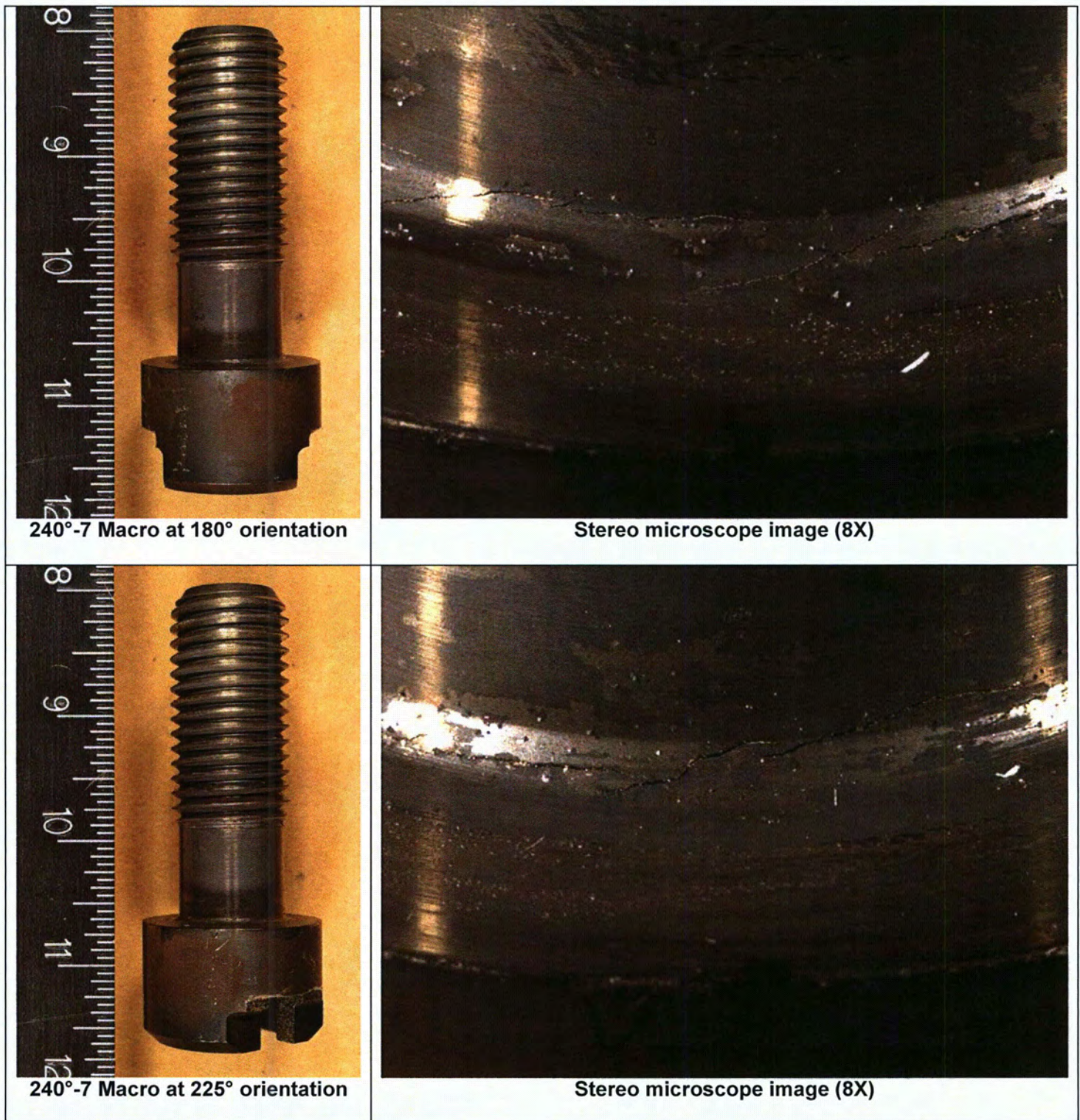


Figure 41 (continued): Macro and stereo photographs of bolt 240°-7 taken at 45° increments.



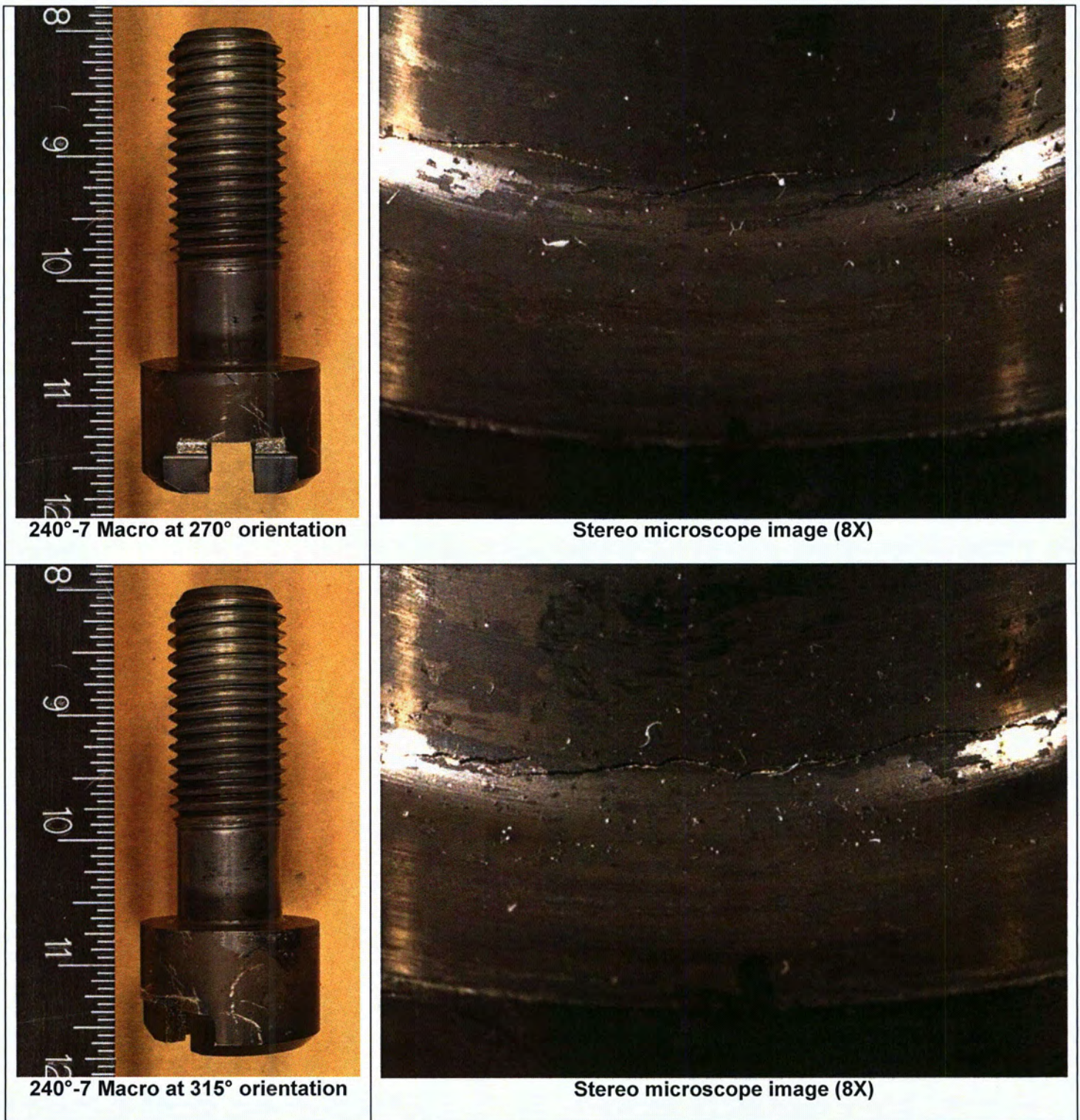


Figure 41 (continued): Macro and stereo photographs of bolt 240°-7 taken at 45° increments.



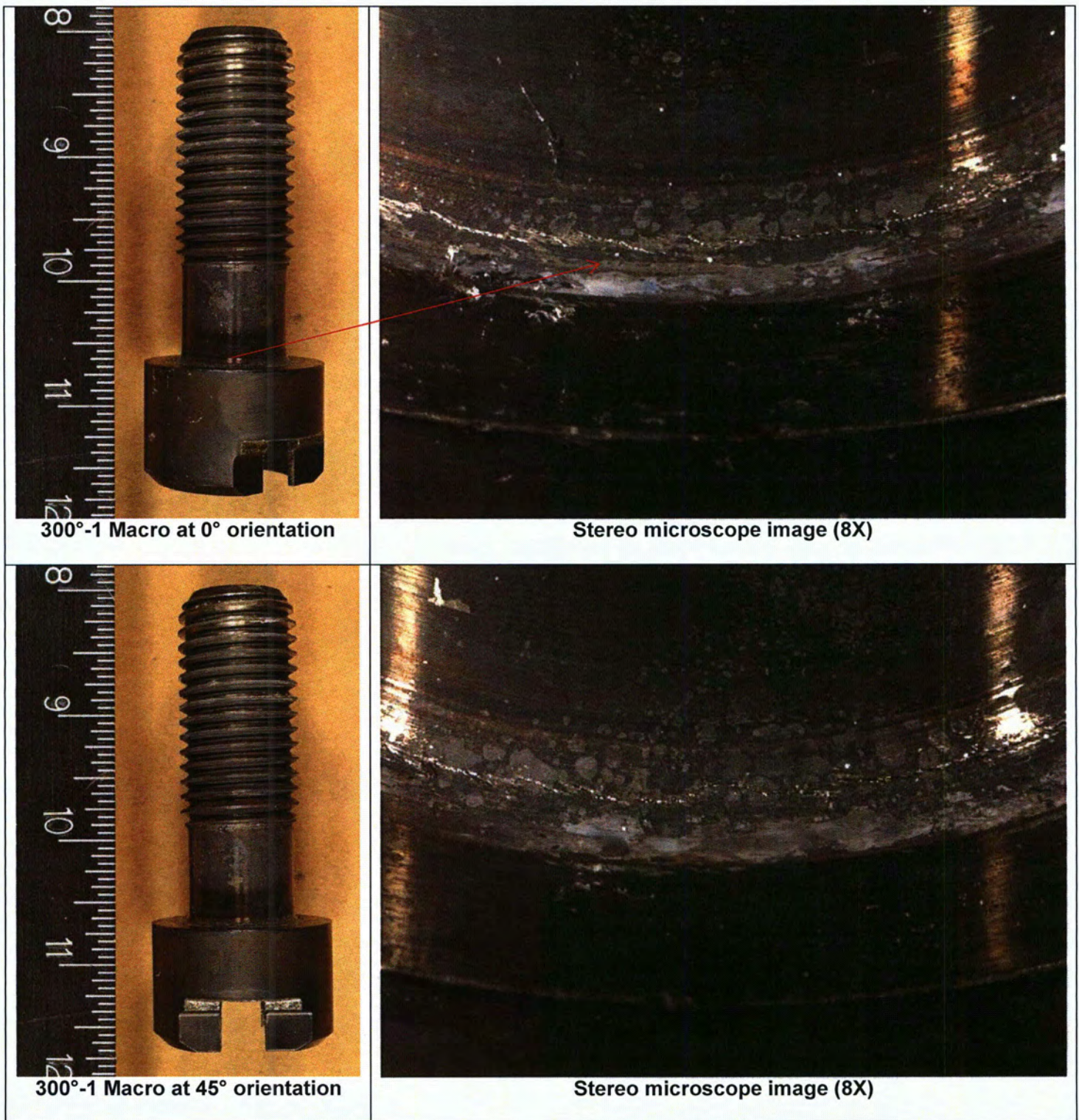


Figure 42: Macro and stereo photographs of bolt 300°-1 taken at 45° increments.



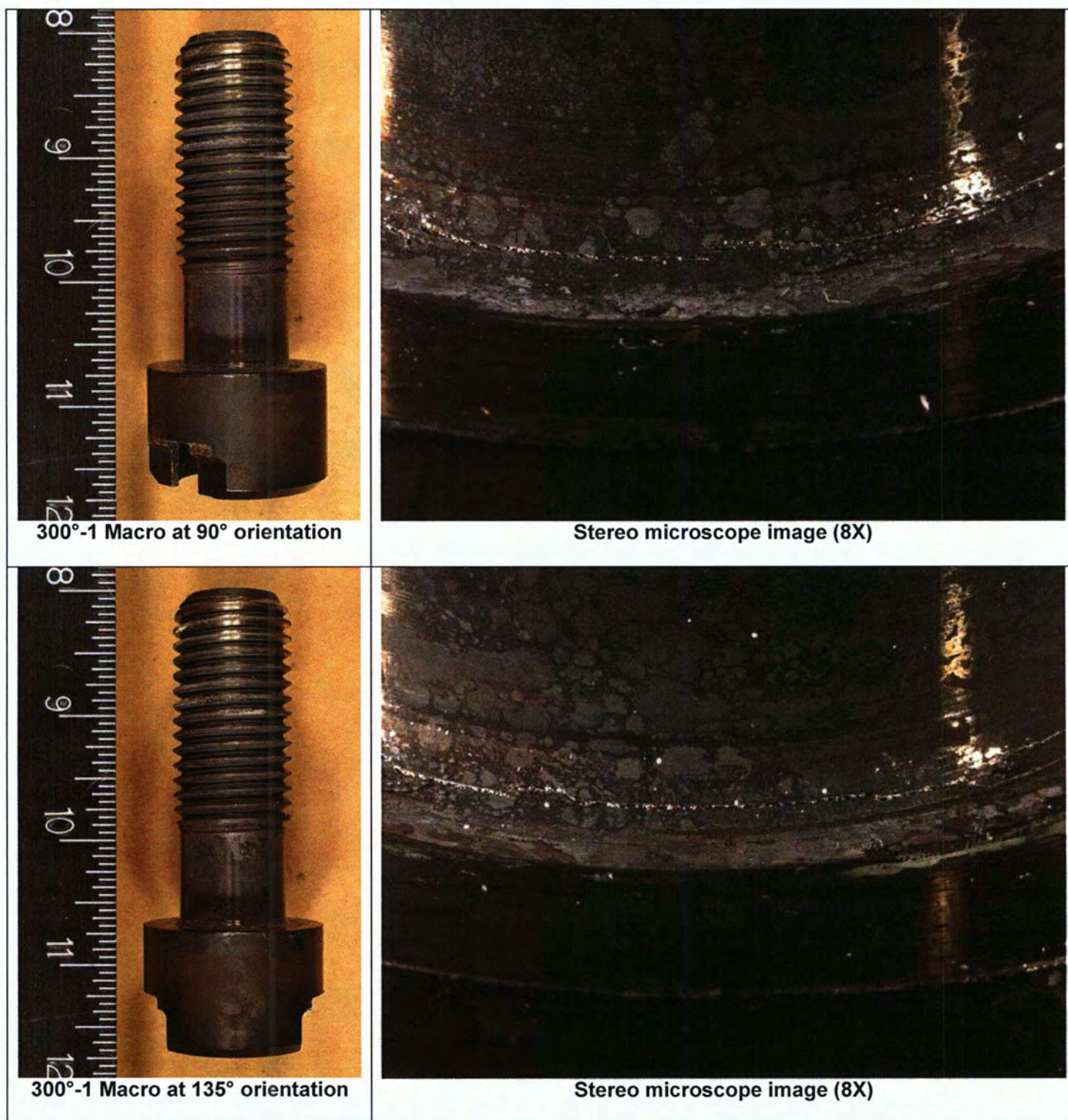
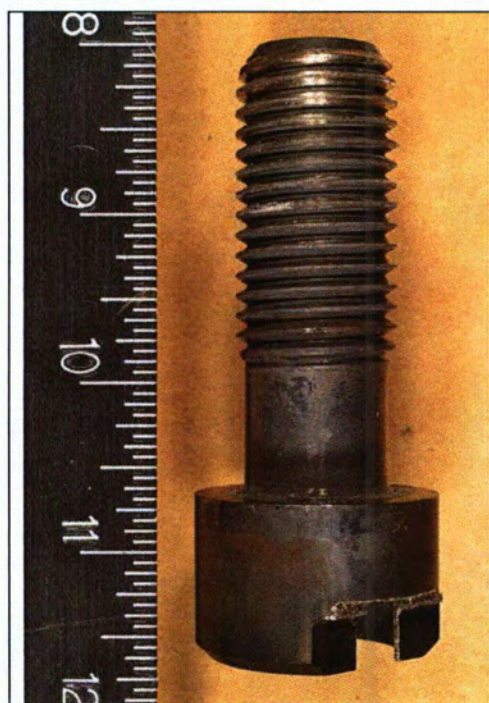


Figure 42 (continued): Macro and stereo photographs of bolt 300°-1 taken at 45° increments.

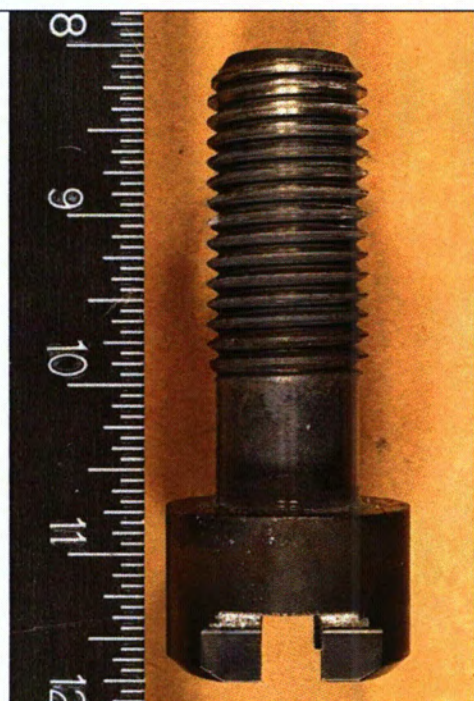




300°-1 Macro at 180° orientation



Stereo microscope image (8X)



300°-1 Macro at 225° orientation



Stereo microscope image (8X)

Figure 42 (continued): Macro and stereo photographs of bolt 300°-1 taken at 45° increments.



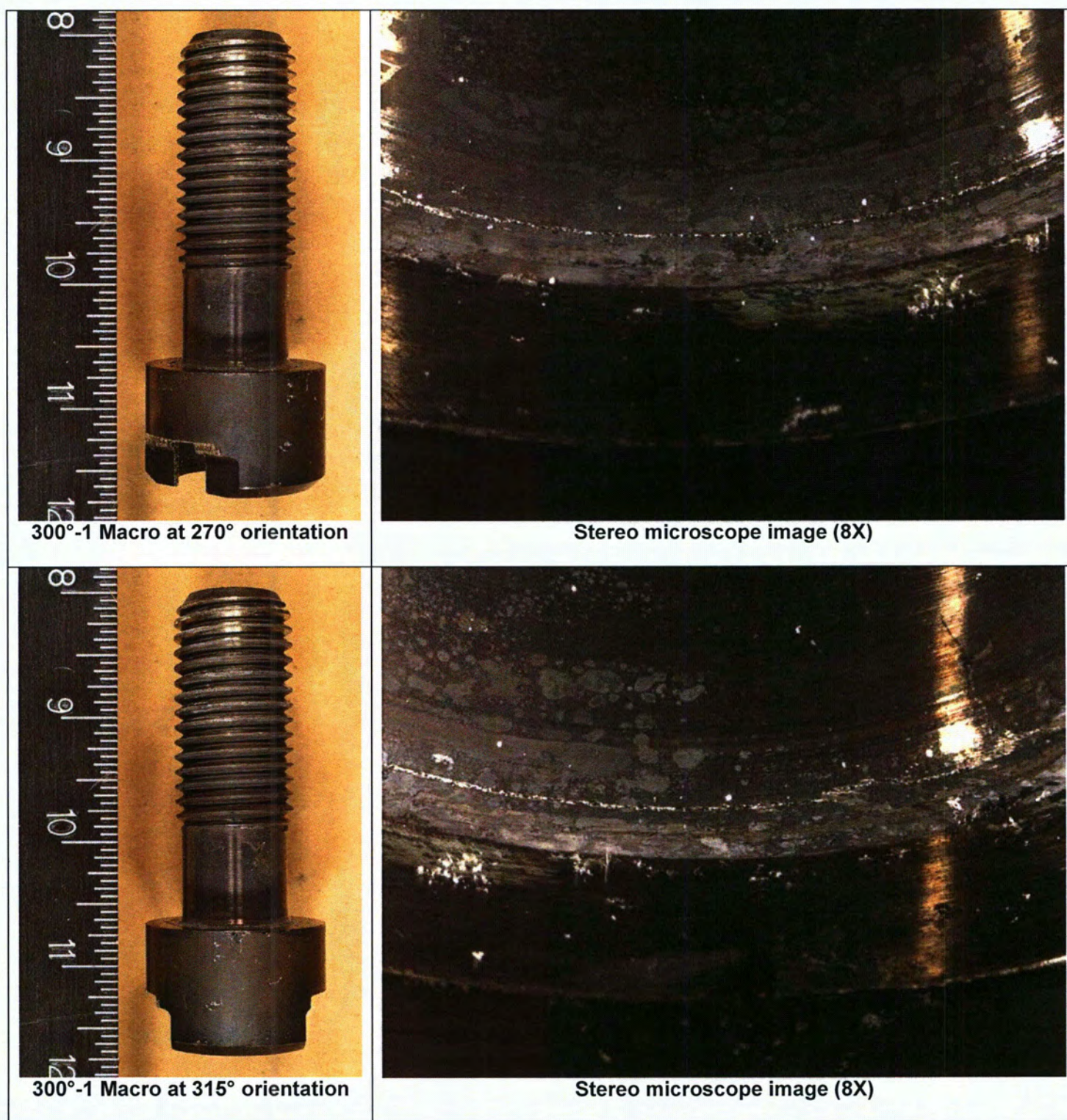


Figure 42 (continued): Macro and stereo photographs of bolt 300°-1 taken at 45° increments.



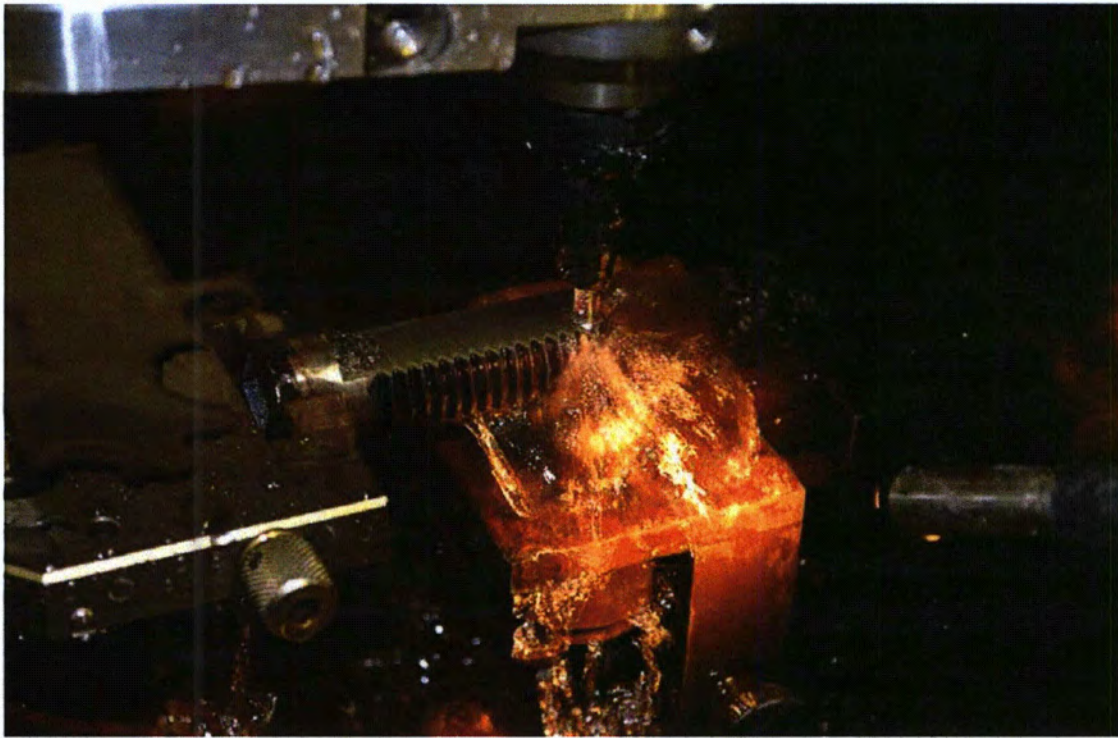


Figure 43: Wire EDM was used to section each bolt for destructive examinations. The above photo shows initial machining of the threaded region for hardness and tensile testing.

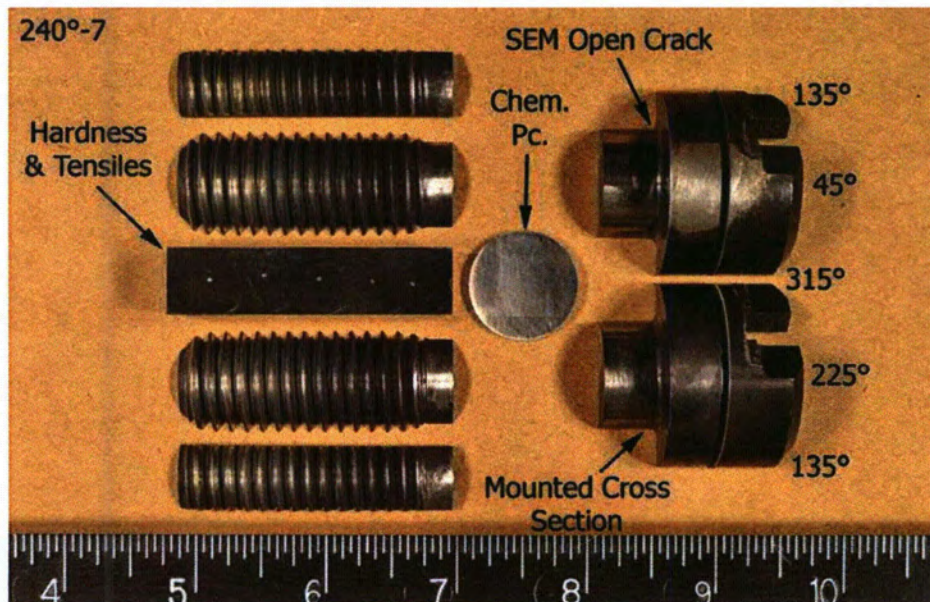


Figure 44: Section photograph for bolt 240°-7 showing the typical locations chosen for subsequent analysis. The five Rockwell C hardness indents are visible on the upper surface of the hardness/tensile blank.



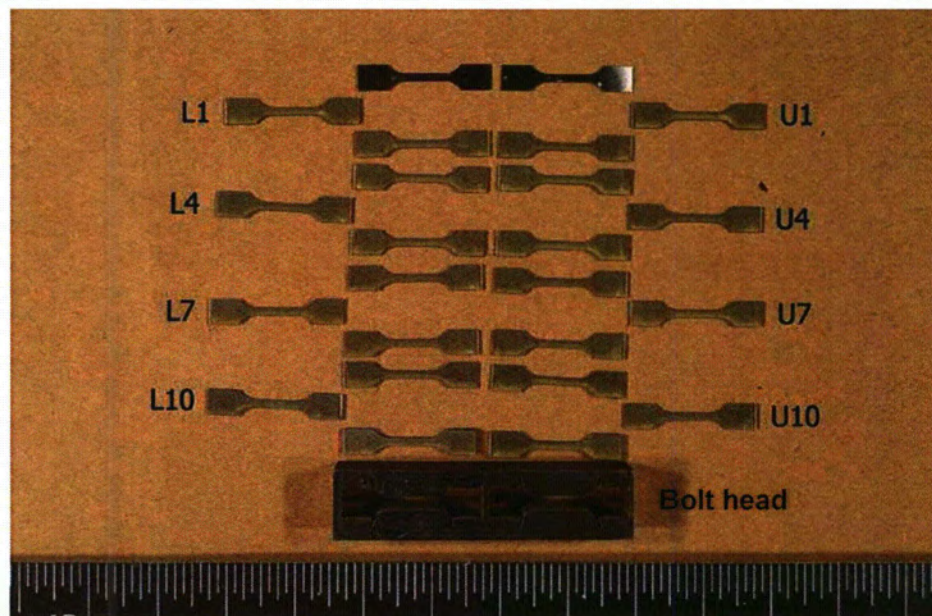


Figure 45: Typical location of tensile specimens machined from each bolt. The IDs of the tested specimens are shown.

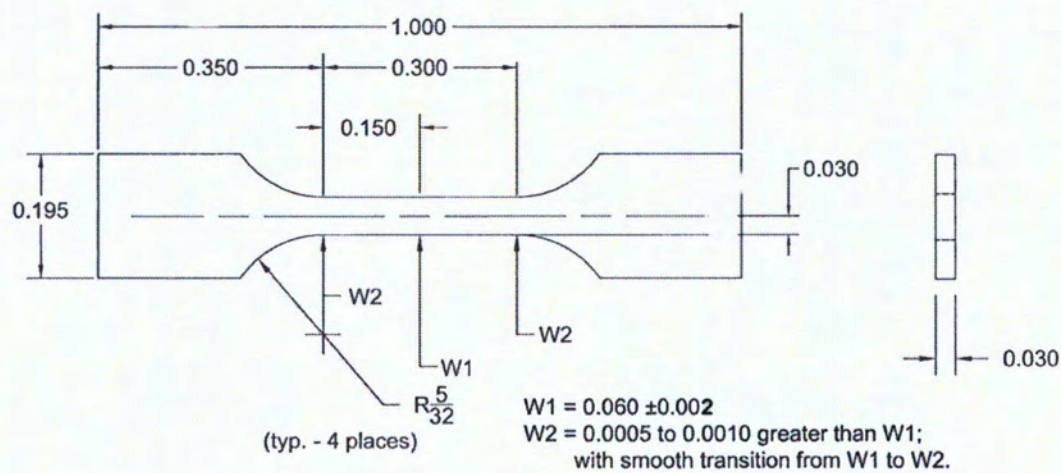


Figure 46: Miniature tensile specimen design showing dimensions.





Figure 47: Bolt 240-7 after breaking open the crack for SEM/EDS. The two mating halves of the crack are shown. The head side of the fracture (to left) was analyzed by SEM/EDS.

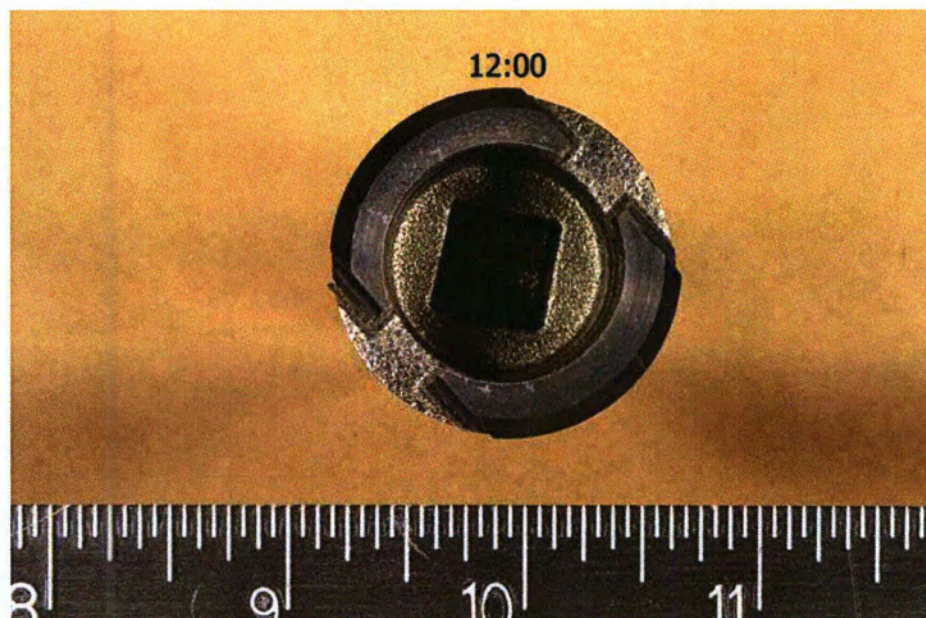


Figure 48: Bolt 300-1 showing plunge cut EDM surface, which removed much of the in-service cracking. Thickness measurements taken around the circumference indicated the EDM was skewed slightly toward the 270° direction (i.e. to the left in photo).





Figure 49: Macro photograph showing the open crack surface for bolt 120°-2. The areas within the white rectangles are shown at higher magnification in the following figures.





Figure 50: OD of 120°-2 near 90°, 50X



Figure 51: Center of Figure 50, 500X





Figure 52: Mid-diameter of 120°-2, 50X

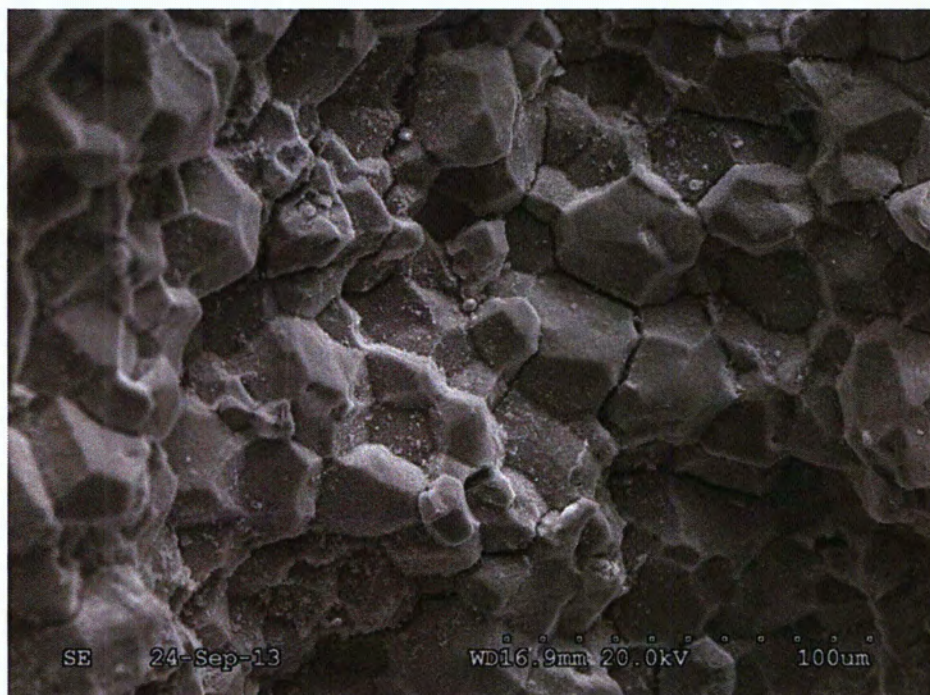


Figure 53: Center of Figure 52, 500X





Figure 54: Center of 120°-2 fracture, 50X

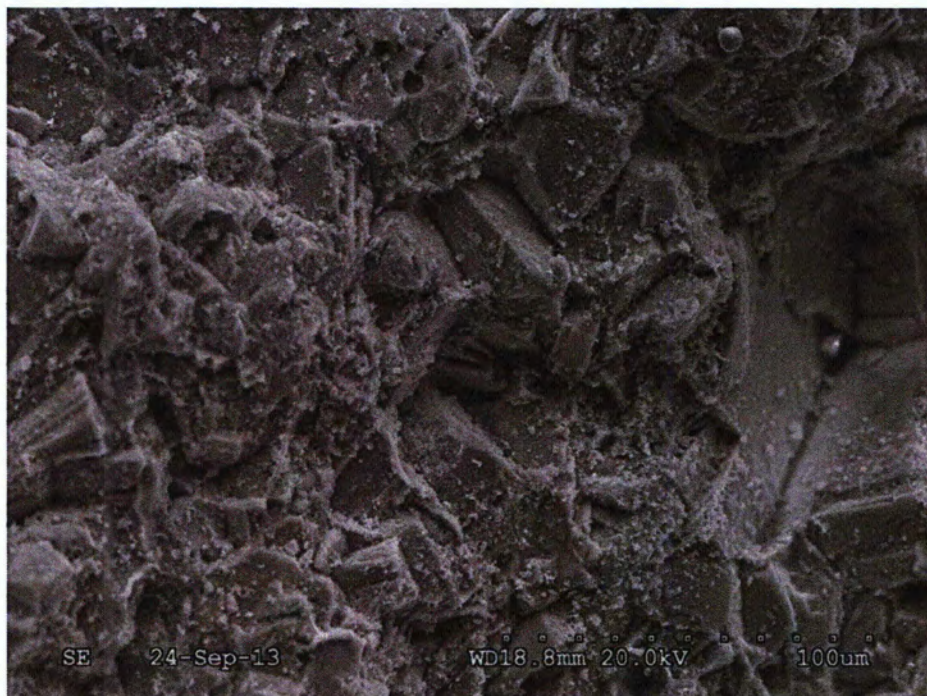


Figure 55: Center of Figure 54, 500X



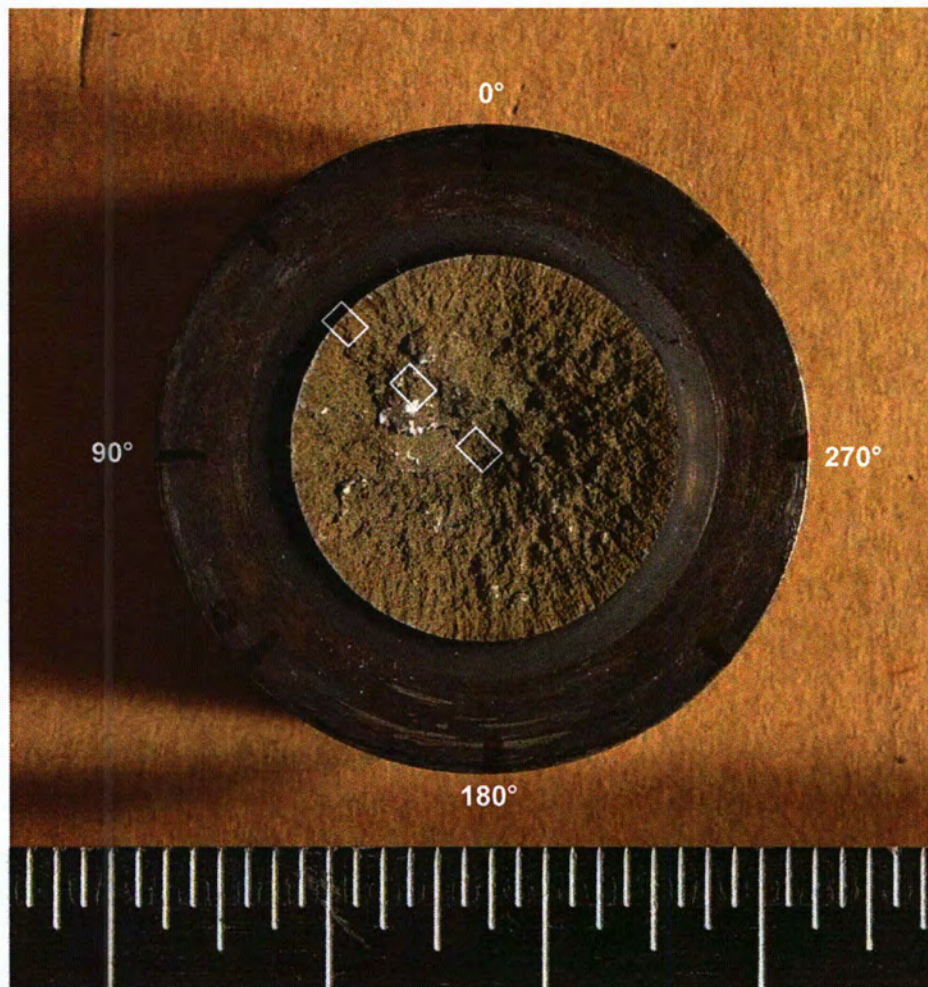


Figure 56: Macro photograph showing the open crack surface for bolt 120°-6. The areas within the white rectangles are shown at higher magnification in the following figures.