of the sleeve cold-worked hole. For example, in Refs. 2–4, specific tests were performed to determine the influence of the split location on fatigue performance of the split-sleeve cold-worked hole. There were no discernible differences in life due to split location. Locations away from the split were found to be the more likely failure initiation site and, regardless of split orientation, a minimum life improvement of 3:1 was demonstrated. Further, it is estimated that there are over 20×10^6 split-sleeve cold-worked holes in aerospace service, dating back almost 20 years, with no reported failures. It is inconceivable that all of these holes were processed with the split away from the most critical area of the hole.

In conclusion, there is ample evidence that split-sleeve cold-working is effective and provides significant fatigue life improvement regardless of the position of the split. There is also evidence that fatigue enhancement due to split-sleeve cold-working is not axisymmetric with respect to the hole, with the area opposite from the split being the more likely failure location. There is no evidence, as Leftheris and Schwarz suggest, that there will be an area around the hole unaffected by the cold-working process. Any advances in the state-of-the-art of measurement of residual strains would be welcomed by the many users and investigators of residual stress-inducing processes. Before publishing any further findings, however, it is strongly recommended that Leftheris and Schwarz perform a thorough literature review. They would find their present conclusions contradicted by significant amounts of empirical and in-service data.

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Reply by Author to Michael A. Landy

Basil P. Leftheris*
Grumman Corporation, Bethpage, New York

The important message of our work was that the residual compressive stresses induced in a hole with a split sleeve are not uniform. The second message implied in our work was that the split sleeve induces residual stresses in two modes:

1) Expanding the sleeve from which material around the hole is forced radially outward causes tension-hoop stress and compression-radial stress. In this region, there is an obvious (seen with the naked eye) deformation on the surface (bulging).

2) In the area where the seam is, however, there is tension-hoop stress without the radial-compression stress. The result is a different deformation on the surface (depression, thinning).

Both regions result in compressive-residual stresses and, assuming *uniform thickness* and *isotropic materials*, there is fatigue life enhancement in both regions. There are, however, cases where the hole may be in a region where there is nonuniform stiffness (e.g., a hole drilled in a tube). In this case, the region of the seam may cause visible or invisible cracks as the mandrel is pulled through. Such cases may occur near weldments, near slight changes of thickness, or near the region where the seam is only under hoop tension. This occurs whenever the mandrel works like a wedge.

Another conclusion of our work was that finite-element codes used to analyze the residual stresses and strains around the hole by assuming axisymmetric conditions cannot be used for comparison with results obtained with the split-sleeve method. Such codes must include the geometry surrounding the hole, and they must model the deformation of the sleeve expansion in order to be trustworthy.

A final conclusion was that many investigators who used the split-sleeve method used specimens machined from large blocks of aluminum. Their results might have been different if they had used sheets of aluminum as received.

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*Senior Staff Scientist, Structural Mechanics Corporate Research Center.