

Perfect Point and the National Institute for Aviation Research (NIAR)

Perfect Point and NIAR entered a partnership in October 2018. NIAR was under contract to complete the structural teardown of three fighter airframes that had completed structural fatigue testing. Perfect Point offered to assist NIAR by providing Perfect Point's Fastener Separation Technology (FST) - E-drill to perform this work. In exchange, Perfect Point requested that NIAR perform an independent evaluation of our E-drill by collecting objective data on E-drill's performance and ability to reduce damage, foreign object debris (FOD), and consumable material costs as compared to the standard twist-drill fastener removal process. NIAR will analyze the collected data and provide an independent assessment of the E-drill for use by industry.

Dr. Melinda Laubach-Hock, Director of NIAR's Aging Aircraft Lab, is well-known and respected by her peers, with expertise that spans 16 years of performing commercial and military structural teardowns. NIAR's Aging Aircraft Lab performs structural teardown on military aircraft including KC-135, B-52, C-130, C-5, F-35, and others. NIAR also employs students from Wichita State University in a cooperative educational program, allowing the next generation of technicians, engineers, and program managers to address MRO workforce challenges.

So far, according to Dr. Laubach-Hock, her technicians have removed over 11,000 fasteners with a damage rate of less than 0.1% on combined composite and metallic structure. Some of the early observations by NIAR include:

- Productivity increased substantially after implementing the E-drill. Of the three fighters involved in structural analysis, one was done with traditional drilling, and the other two have been done with E-drill assistance. Time to project completion was greatly reduced by using E-drill on the final two aircraft.
- E-drill has been beneficial to the technicians by not only significantly reducing damage during fastener removal, but also the ergonomic benefits of E-drill as compared to the twist drill. Technicians performing the teardown changed their approach to allow them to use E-drill for fastener removal whenever they can. Vibration, noise, fatigue, and the force required to remove a hard metal fastener with E-drill is far less than with the conventional twist drill.
- Technicians also observed that during punch out of a fastener after using a conventional twist drill, the hole is often scored, and the exit hole is often damaged due to punching the shank through the hole. Dr. Laubach-Hock noted that a fastener removed using E-drill did not cause exit hole damage. Dr. Laubach-Hock also noted significant hole quality improvement for hard metallic fasteners removed with E-drill.



If her paper is selected, Dr. Laubach-Hock plans to share her findings and recommendations with her peers at the 35th annual Aircraft Structural Integrity Program (ASIP) conference on 2-5 Dec 2019.