Aviation technicians can attest that the last thing you want happening when working on a fastener is to have the tool slip. The result can be detrimental not only to the work, but painful for your hands. Using the right tool can make a substantial difference in getting a job done safely and on time. The Flank Drive system of tools from Snap-on have earned a reputation for success in the aerospace industry by increasing applied torque while preventing the corners of fasteners from rounding off, and are a great time saver for technicians.

But technicians can’t finish a job if they don’t readily have access to their tools. That’s where tool control and management comes in. A lost or missing tool can be disastrous in the aerospace industry. A socket mistakenly left behind on an aircraft, hangar or ramp becomes a FOD (foreign object damage) hazard and poses a safety risk. A properly devised tool management program will help keep track of your tools, minimize FOD concerns — all the while making your MRO a more efficient operation.

Using the Right Tools – Flank Drive

Every aircraft contains thousands of fasteners. The unique design requirements of miniaturization for saving space and weight, coupled with the extremes in temperatures, vibration and other stress result in significant problems in the removal of fasteners during servicing. The problem occurs when technicians try to remove these fasteners with standard wrenches and sockets. Often, there’s not enough torque or contact available to break the fasteners free, which causes them to round off and the tool to slip. This causes a safety issue to the technician in the form of skinned hands and knuckles; if the technician is working on an elevated platform and the tool slips while he’s pulling it toward him, he could fall back and be in danger of falling off the platform.

But what kinds of fasteners can be difficult to remove?

• Skin panel fasteners — usually with internal wrenching recesses which are often filled with paint or dirt can present challenging service problems.
• Airframe structural fasteners — generally made of high strength materials and located in confined areas can present a variety of service problems. The fasteners are usually external wrenching with 12-point or spline wrenching shape.
• Propulsion system fasteners — those used in jet engines are not only high-strength and located in confined areas, but are subjected to high heat and a corrosive environment. This can lead to removal torque levels that can be more than three times the installation or tightening torque guidelines. Trying to remove these three types of high-strength 12-point fasteners with standard, conventional tools can cause wrenches and sockets to break, but more often the fastener becomes rounded, making fastener removal all the more challenging.

But why is the tool slipping in the first place? The answer lies in the design of the fastener, wrench and socket. In most industries, the relationship between the stud and fastener is that the fastener is about 1.5 times the size of the stud. However, in aerospace, the stud is the one that’s larger than the fastener — which is typically six-point as opposed to 12-point. Having a smaller fastener means more torque needs to be applied to it.

A conventional double hex socket places the stress and torque at the corners of the socket and the fastener. When you apply torque to the fastener, the first part that
before the corners are distorted severely required to loosen the nut is not attainable socket, and the tip of the fastener. The torque tip of either the six- or 12-point wrench or placing all the stress at its thinnest point — the bust them loose, but conventional tools are need a tremendous amount of torque to — this is called the point stress concentration. touches it is the corner of the wrench or socket — that is called the point stress concentration. All the stress of the tool is placed solely at its tip, which is also the thinnest part of the wrench or socket. Fasteners in aviation often need a tremendous amount of torque to burst them loose, but conventional tools are placing all the stress at its thinnest point — the tips of either the six- or 12-point wrench or socket, and the tip of the fastener. The torque required to loosen the nut is not attainable before the corners are distorted severely. touche...
To get started, a technician scans their employee badge, unlocking the box to gain entry. Each badge is coded so that only one specific person can then access the box, and all tool withdrawals and returns are recorded to that user. A 7” monitor affixed to the top of the box visually shows the technician each drawer, and what tool has been taken. As the box is accessed to remove or return tools, the system scans each tool in the drawer to determine its status. An audio system also announces tool issue and return. If tool status is questionable, the system can display the disputed tool transaction on the LCD screen or it can be identified in the audit image at the administrator’s PC. User log data and time-date information is available for every transaction. After the technician logs out, the software can forward drawer images and log files to the PC where they are stored for later access.

Digital imaging technology offers several advantages to the aerospace industry. For starters, it reduces FOD concerns. If a technician checks out 15 tools and later returns 14 tools, the audio system announces not only that a tool is missing, but which one, and the technician now knows to go back and find that tool. In the JetLite incident, if the engineer or technician had been using a tool box outfitted with digital imaging technology, it would have alerted them that the expander tool hadn’t been returned. This real-time information cuts down on potential FOD issues.

The information that digital imaging can bring to organizations, such as the military and commercial MROs, can be very useful. Being able to quickly determine that all the tools are back and that nothing’s been left behind, who used which tool, and when they used it, can be a helpful asset in a tool control program. There are a number of reasons why this information is important. First, if you’re working under an analog system and something’s lost, you don’t know who lost it. Secondly, you don’t know where it was taken to be used, so it’s going to be difficult to find it. Finally, there’s no history of what tools were used to do which jobs or what tools are in the tool box that aren’t being used at all. Digital imaging gives MROs, administrators and technicians a more detailed view of overall tool use and brings greater accountability to a tool control program.

Summary
Technology is the driving force behind new advances on tools, equipment and tool control measures. The ability to safety and efficiently remove a fastener on one hand, while allowing MROs to fully track those tools are just two examples of the industry recognizing a problem and responding to a need. The tooling needs of tomorrow are here today.

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