ZEBRA CASE STUDY

Zebra Technologies Provides Durable UID Labeling Solution for J.C. Bamford Excavators Ltd.

JCB's new military excavator can do 60 mph on highways, but it wasn't going anywhere without a UID labeling system from Zebra Technologies and A2B Tracking Solutions.

Zebra 105SL Tabletop Printer

Challenge

J.C. Bamford Excavators Ltd. (JCB) is a Staffordshire, England-based manufacturer of heavy equipment, such as backhoe loaders, excavators and telescopic handlers, used for construction, agricultural, compaction and other industrial applications. It also makes diesel engines for industrial equipment and machinery. JCB's North American headquarters are based in Savannah, Ga., where it supports a sizeable contract for the U.S. Department of Defense (DoD).

One of JCB's current military contracts is providing the U.S. Army with crew protection, 36,000-pound, high-mobility engineered excavators (HMEEs). “The Army didn't have anything like this in their inventory,” said Tom Cooper, Engineering Project Manager for JCB. “The idea was to have an excavator that could maintain convoy speeds on its own instead of having to be placed on a trailer pulled by a large truck. Basically, we designed a backhoe that can do 60 mph and rides like a Cadillac.”

Because the HMEE and JCB's other high-performance products are used for military construction projects and mission critical applications for several military operations including Iraq and Afghanistan, the DoD included JCB in its Unique Identification (UID) program, which involves labeling and recording high value parts and complete products sold to the U.S. military. The DoD's UID MIL STD 130 mandate calls for suppliers to apply a permanent, machine readable 2-D Data Matrix bar code—on all parts and components valued at more than $5,000. The data collected is uploaded to the IUID Registry at significant milestone events in order to enable lifecycle visibility of DoD assets.

After looking at the A2B system, which included a UID label printer from Zebra Technologies, in addition to several other suppliers, the company determined that the A2B/Zebra package was the best fit. Using a durable synthetic label means the company does not have to use more expensive and time-consuming direct part marking methods. “I attended a trade show and noticed that there were Zebra printers in a lot of the booths. It seemed to be an industry leader and a good fit for our need,” said Cooper.

Solution

JCB's goal was to meet the DoD's UID requirement by producing symbols that will remain readable through the item's lifecycle is a challenge, particularly for products like the HMEE, which will spend its service life racing down rough roads and digging vast quantities of abrasive material.

The MIL STD 130 UID Registry also calls for the ability to manage an item (IUID) parent/child relationship correctly and accurately. That means that an IUID's embedded relationships must be managed manually or with a scan, starting with an end item and progressing to its components, including assemblies, subassemblies and finally the lowest replaceable unit. Nine separate IUIDs were needed for the HMEE—eight components that are individually identified (children) plus the finished product (parent).

JCB turned to UID experts at A2B Tracking and their UID Comply!® data management system. A2B, in turn, recommended Zebra® Z-Ultimate® label material and a Zebra 105*SL*™ thermal transfer printer. Z-Ultimate is polyester media that includes a permanent adhesive and protective facestock that makes it suitable for lifetime identification in indoor and outdoor environments. JCB uses one of A2B's pre-defined MIL STD 130 templates, the Zebra Label C, a 1-by-3-inch label.

The all-metal Zebra 105*SL* printer is rugged enough for use in the factory and precise enough to print compact, high-quality Data Matrix 2-D bar codes that UID marking requires. A2B's UID Comply! software drives the UID data management and label generation process. Using a PC next to the bar code label printer, JCB workers follow simple on-screen prompts to enter basic information about the order. The UID Comply! software then automatically performs database lookups, creates UID records that associate component children with the finished parent product, formats the UID symbol data and directs the printing of a UID bar code. The software also extracts and formats the information needed to report to the DoD and can automatically make the electronic submission to the UID Registry.

The UID system is also useful for managing discontinued parts. "The DoD needs a vehicle for retiring parts and entire products from use and checking them out of the Registry when they have outlived their usefulness," said Marc Corriveau, national sales manager for A2B. "The DoD wants to make sure it doesn't have an inflated database of parts and equipment, and UID provides that capability."

Results

Major cost items requiring UID tags on the HMEE include the axle, transmission, torque converter and engine. "We first looked at putting metal tags on them, but that wasn't very feasible," said Cooper. The Zebra polyester UID labels were far simpler to apply and have been very durable, according to Cooper. "The tag labeling has survived all our testing very well," he said. "They're placed in accessible but protected parts of the machine where they won't take direct hits from branches or debris. In some cases, we can put the tags on existing data plates."

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The labels are oil- and chemical-resistant and can handle a wide range of temperatures, such as the hot engine valve cover on JCB's application.

JCB maintains a UID traceability sheet (traveler) as an HMEE progresses through its assembly stages and different serial numbers are detected. During final assembly, testing and repainting operations, the information on the traveler is entered into the UID Comply! system, where the labels are generated. The information is entered into an Excel® spreadsheet that can be sent to the DoD registry, although uploading directly to the Registry is an option. After final assembly and repainting, the labeling areas are wiped down and the labels are applied.

JCB's UID compliance system also allows spare parts to be matched up with the machine's original parts based on specific models and vehicle build-dates. JCB makes sure its machines in the field get new UID labels as needed, even if it involves traveling to Army bases and changing out spare parts inventory with new parts. By using the UID system, JCB and the Army are able to trace where a part has been and its repair and failure rates.

The UID Comply! system and the Zebra printer have performed well. Implementation and training support from A2B helped get the system up and running quickly. "It's a pretty intuitive program, the printer is fast, and the printing accuracy is what we'd expected—which is important because that label is very small," said Cooper.

One challenge was dust in the manufacturing environment during a construction project. The small number of labels on the outside of the roll, if exposed to dust when the printer is idle for several weeks, can be degraded, so JCB has enclosed the printer in a cabinet.

JCB has several pending DoD contracts that may require UID Comply, and the company also does business in other countries that are considering the same kind of system. When JCB wins new contracts requiring UID compliance, it plans to use and expand the Zebra/A2B package. "We are in compliance with current regulations, but if the DoD changes the specification and starts requiring UID labels for lower-dollar-value items, that will probably produce a huge surge with many more parts having to be labeled," Cooper said.

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