Museum

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weapon."

The objective is to essentially sterilize the weapon of any "vices," or defects, that may be found on or in it before reassembly and introduction to the display cases.

"Vices can be very complicated – they can be anything from nicotine residue from the weapon residing in the home of a heavy smoker, insect carcasses or feces, household paint, rust or dirt," said Husted. "Some or all of these things can be found on donated weapons, and before we can put the pieces on exhibit, these things have to be sterilized so we don't cross-contaminate other items. Cross-contamination can be a very serious problem for the longevity of the collection."

Once an artifact or weapon is placed inside a display case, the case essentially becomes a micro-environment. If contaminants such as mold, mildew or other vices are introduced into the display, they can cascade onto other items in the exhibit and possibly damage them, so the museum goes to great lengths to prevent contamination from happening in the first place.

"When a firearm comes into the museum, we conduct what we refer to as detailed disassembly," said Husted. "A Soldier will generally perform what is called field stripping, and sometimes a depot-level shop will rebuild weapons from complete disassembly, but in our case, we have to perform detailed disassembly on every single weapon that we receive and place in the exhibits."

The most time-consuming part of preserving historical weapons is the cleaning portion of the operation, which for a handgun in good condition, might take more than 40 hours to complete. The ultrasonic cleaning system makes it possible to reduce that time expenditure to less than 20 hours, ensuring a significant time and cost saving for the museum.

"The museum's collection is well over 300 firearms, dating from the mid-1700s all the way up to weapons that are coming off the battlefields today," said Husted, "and preserving them is a very labor-intensive undertaking for any museum."

As the first National Guard museum to adopt this technology, the MAFM is setting the trend for other similar museums across the nation by paving the way with research and experience that will assist other museums considering the adoption of this time saving device.

When the machine first got here, I had to do some research before we started working with it, and I contacted the National Firearms Museum for guidance and opinions," said Husted. "There are pros and cons to it – you can't use it on every type of metal or plating, and there are certain components that you can't put in it because of the structural damage that may result from the ultrasonic cavitations in the machine."

MAFM Arms Conservator Glenn Husted stands next to the Crest Ultrasonic Cleaning System during the treatment of weapons parts in the Arms Conservatory.

Another consideration is the pitting that results from advanced rust formation. The machine's vibrations work the cleaning solution into the pits in the metal surface, and if the pits are deep enough, the cavitations can actually crack thin metal parts completely in half.

"Most weapons use springs to generate the force used to fire them, and if that spring is rusted to the point that the pit goes through the spring, the cavitation inside the pit hole can destroy the spring, so that's one example of a type of part we specifically don't treat with the machine," said Husted. "past that, it's up to the judgement of the operator to assess each component that might be put in there and decide whether or not to use the machine to treat it."

The machine was designed for use in cleaning weapons that see regular use, such as police or military issued weapons, but there are added dimensions to consider when cleaning historical weapons.

"When we looked at what the manufacturer provided in the way of instructions, we found that those instructions were adequate to the task of cleaning service weapons in regular use," said Husted, "but we had to sit down and basically re-write the manual before we put the first gun in there, in order to instruct staff and volunteers on how to use it safely and in such a way as to avoid damaging any components or parts."

The machine can also be used to clean artifacts from other departments of the museum, and is large enough to accommodate items up to three feet in length.

"If the General Conservator has a metal artifact that is substantial enough to warrant use of the machine, their shop can use it to reduce the time and labor cost of preserving artifacts as well," said Husted. "The uses are limited only by our imagination."

Another important aspect of the technology is that it results in little or no environmental impact during or after use. The cleaning solution is a non-toxic, biodegradable solvent that, according to the instructions, can be used up to 130 times on weapons in good condition.

"This technology is a huge improvement over the old cleaning methods, because when we get done and have to dispose of the 5 ½ gallons of fluid left over from the machine, all it turns out to be is biodegradable rusty water," said Husted. "The tank is heated to a minimum of 130 degrees, so we do have to wear some protective equipment like gloves, but as far as what the chemicals or fluids do, it's no threat to us or the environment."

Now that the MAFM has begun to put this technology into regular use, they are now in a position to share their knowledge of the safe and efficient employment of ultrasonic cleaning methods for the preservation of historic artifacts.

"We go to annual conferences with other National Guard museums across the country, and not only were we the first to adopt this machine, but we also provide technical support to other museums in the form of PowerPoint presentations that detail how to set up and run arms conservation labs," said Husted. "It really depends on the leadership emphasis of the museum – some museums are totally focused on simply getting stuff out for public display, but we at the Mississippi Armed Forces Museum try to find a happy medium in which we try to combine getting stuff out on display and taking responsible care of what the public gives us."

The support of the state's Military Department is instrumental for the success of a museum conservation program, and good support means that artifacts will receive a level of stabilizing care that will ensure they are passed forward into the future as far as possible.

"We have great support from the Mississippi Military Department, and this translates to a more professional institution, and we in turn feel a responsibility to help other institutions where and when we can," said Husted. "This pays off when other museums become aware of who we are and what we can do. Maybe they have a key piece of Mississippi history that doesn't fit into their state's storyline, and they see us as a competent destination for that artifact and are inclined to send it our way. The citizens of Mississippi benefit from this."

U.S. Army Photos by Staff Sgt. Kenny Hatten, CSJFTC Public Affairs

A fully disassembled M-1915 Chauchat automatic rifle waits to be immersed in the ultrasonic cleaner as part of the preservation process at the museum.