

REPORT OF TRAVEL

CONTRACT: W31 P4Q-05-A-0030/T.O.010

REPORT DATE: 21 APR 10

DATES OF TRIP: 12-16 APR 10

DESTINATION: 1109th AVCRAD located in Groton, CT

PURPOSE OF TRIP: The purpose of this trip was to provide AMCOM G-4 Technology Integration Branch (TIB) support, at the request of the 1109th Aviation Classification Repair Activity Depot (AVCRAD) located in Groton, CT, for the implementation of the U.S. Technology Type VIII Plastic Media Blast (PMB) into their system.

PERSONNEL MAKING TRIP: Mr. Chuck Younger, NeXolve Corp., supporting the U.S. Army Aviation & Missile Command (AMCOM) G-4 Technology Integration Branch.

ATTENDEES: Mr. Leonard Banks, Environmental Manager, 1109th AVCRAD; Mr. Vinny LiBrizzo, Type VIII PMB Instructor/Advisor, US Technology; Mr. Terry Zurn, Technical Inspector, 1109th AVCRAD; Mr. Bob Lord, Technical Inspector, 1109th AVCRAD; Mr. Rorry Williams, Maintenance/Blaster, 1109th AVCRAD; Mr. John Kerouack, Maintenance/Blaster, 1109th AVCRAD; Mr. Michael Hurtley, Maintenance/Blaster, 1109th AVCRAD; Mr. Mark Cinotti, Maintenance/Blaster, 1109th AVCRAD; Mr. Patrick Cianciolo, Maintenance/Blaster, 1109th AVCRAD; Mr. George Lewis, Maintenance/Blaster, 1109th AVCRAD; Mr. Allen Crouch, Maintenance/Blaster, 1109th AVCRAD; Mr. Bill Lewerk, Maintenance/Blaster, 1109th AVCRAD; Mr. Lindsey Saunders, Maintenance/Blaster, 1109th AVCRAD; Mr. Steven Petit, Maintenance/Blaster, 1109th AVCRAD; Mr. Scott Burdick, Maintenance/Blaster, 1109th AVCRAD; Mr. Stephen Stamper, Blade Shop Supervisor, 1109th AVCRAD; Mr. Clifton Park, Maintenance/Blaster, 1109th AVCRAD; Mr. Randy Peckham, Blade Shop Sander/Blaster, 1109th AVCRAD; Mr. Marc Perreault, Maintenance/Blaster, 1109th AVCRAD; Mr. David Seamon, Maintenance/Blaster, 1109th AVCRAD; Mr. Thomas Newman, Maintenance/Blaster, 1109th AVCRAD; Mr. Shane Smith, Maintenance/ Blaster, 1109th AVCRAD; Mr. Richard Wilkinson, Maintenance/Blaster, 1109th AVCRAD; Mr. Bill Humes, AED Liaison Engineer, 1109th AVCRAD; and Mr. Brian Burridge, Publications Assistant, 1109th AVCRAD.

SUMMARY OF TRIP: At the request of Mr. Leonard Banks, Environmental Manager for the 1109th AVCRAD located in Groton, CT, the AMCOM G-4 TIB provided support for the implementation of the U.S. Technology Type VIII PMB into their system for mechanical coatings removal on Army assets during the week of 12-16 APR 10. Also providing Type VIII PMB support, education, and instruction during this transition and implementation phase was Mr. Vinny LiBrizzo of U.S. Technology. The Type VIII (30-60 size) PMB, also known as and sometimes referred to as "Magic", is a plastic hybrid of amino thermoset resins with a reinforcing fiber combination based on emerging technologies that was developed specifically

for the coating removal, or stripping, of composite components, but can also be used on metallic substrates as well. The Type VIII requires less air pressure than traditional blasting medias (i.e. Type V PMB); therefore there is less chance of substrate damage.

On Monday, 12 APR, approximately 10,000 lbs. of the Type VIII PMB was loaded into the 1109th AVCRAD's plastic media blasting system. Afterwards, Vinny LiBrizzo made sure the system was functioning properly and made all of the necessary adjustments (air pressure calibrations, filter screens for separating spent blast media, etc.). Double venturi nozzles also had to be added to all of the blasting airlines (total of four) since that is one of the required parameters for using the Type VIII PMB. (Fig. 1)

After all work to get the system up and running and calibrated, Vinny proceeded to blast a portion of one of the CH-47 main rotor blades for the 1109th AVCRAD's top rotor blade Technical Inspector, Staff Sgt. Steve Barrett. (Fig. 2 & 3) Staff Sgt. Barrett stated he had never seen a rotor blade look so good after having the paint completely removed and exposing all of the composite and metallic substrates with absolutely no damage whatsoever anywhere on the stripped portion. (Figs. 4 & 5) After his inspection, Staff Sgt. Barrett gave the "thumbs up" for stripping all of the remaining CH-47 blades that had been provided for the Type VIII transition.



Fig. 1.



Fig. 2.

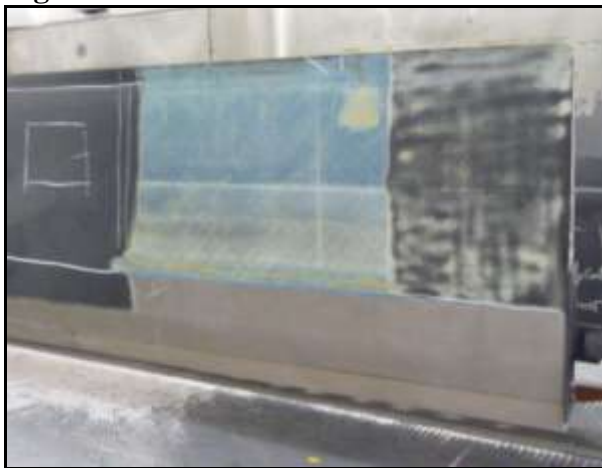


Fig. 3. *Close-up of stripped CH-47 blade tip*

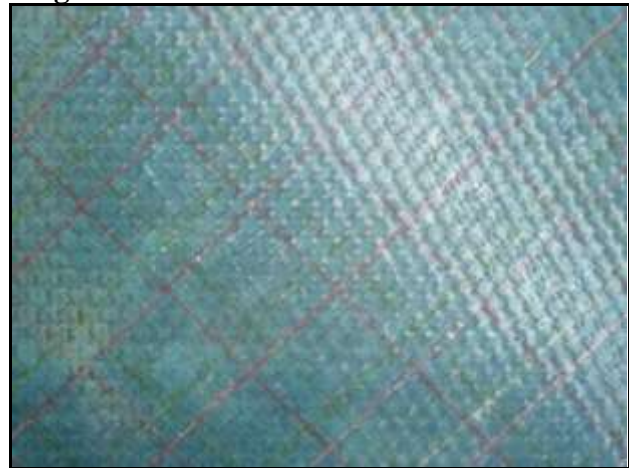


Fig. 4. *Close-up of CH-47 composite material*



Fig. 5. *Another close-up of the CH-47 composite material after stripping with Type VIII PMB*

On Tuesday, 13 APR, U.S. Technology representative Vinny LiBrizzo devoted the entire morning to classroom time with the 1109th AVCRADs maintenance/blaster personnel who will be using the new Type VIII PMB for stripping parts, components, rotor blades, and airframes. Vinny spent this time showing videos of the Type VIII PMB in action and giving the specifics necessary for the proper usage this blast media. All personnel were required to take notes during this classroom time for testing at a later time. Some of the most important facts to remember pertaining to the Type VIII PMB are:

- Use of a Double-Venturi nozzle for Type VIII PMB blasting is mandatory (prevents hot-spots when blasting)
- Chalk mark every blade section before blasting with Type VIII (this will be illustrated later in report – Fig. 6)
- Air pressures are between 10 psi and 40 psi when using Type VIII PMB
- Dwell time when blasting with Type VIII is 1 second or less
- Angle(s) of impingement is 0 to 90 degrees for the Type VIII material
- Stand-off distance from component is between 4 to 18 inches using Type VIII PMB
- Always do an “air moisture check” before and during blasting by turning off the Type VIII media feed and blast the air at 15 psi on an old face shield and look for moisture and/or oil. There should never be any wet/oily residue present.

Each individual's notes would eventually be copied and placed in their personnel files along with a certificate from Vinny, if given, which certifies them as Type VIII trained and capable blasters. One of requirements of U.S. Technology, and Vinny, is that purchasers of the Type VIII PMB will be properly educated and trained by an experienced Type VIII representative. This Type VIII material works flawlessly in the hands of an experienced user, but as with anything which has been approved; if it is used incorrectly it can be devastating and detrimental to components and/or processes.

After the classroom time and lunch had been completed, it was time to start blasting with the Type VIII PMB. Since there were only four airlines available in the blast room, the actual Type VIII blasting instruction could only take place with four blasters each per session. Each session would yield one completely stripped CH-47 main rotor blade including all four lightning strike panels. As a point of reference, it was learned from experienced blade sanding technicians at the 1109th AVCRAD that the average time to strip an entire rotor blade by hand-sanding was about 14 hours. In the first session involving the Type VIII PMB stripping of a CH-47 rotor blade, including all lightning strike panels, it took approximately 2 hours with only three blasters and Vinny in the booth giving instruction and guidance. (Figs. 6 – 12)



Fig. 6. Note chalk marked areas for blasting



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10. Vinny, Terry Zurn (Technical Inspector), & Thomas Newman admiring the results of the CH-47 main rotor blade stripped with the Type VIII PMB



Fig. 11. Other side of the CH-47 blade.



Fig. 12. Previous repairs become visible after blasting with Type VIII – no damage!



Fig. 13. Here is an excellent example of how good the Type VIII PMB removes coatings from composite substrates on the CH-47 rotor blades. The white square section to the left is one of the lightning strike panels. It is a very delicate area on the blade to remove coating from without damaging it. When using the Type VIII PMB, the topcoat only is first removed on the lightning strike panel at a setting of 15 psi. After the topcoat has been completely removed, the pressure is then turned down to 10 psi and blasting continues down to the white lightning strike substrate seen here. The circle to the right of the lightning strike panel is another example of repair work.

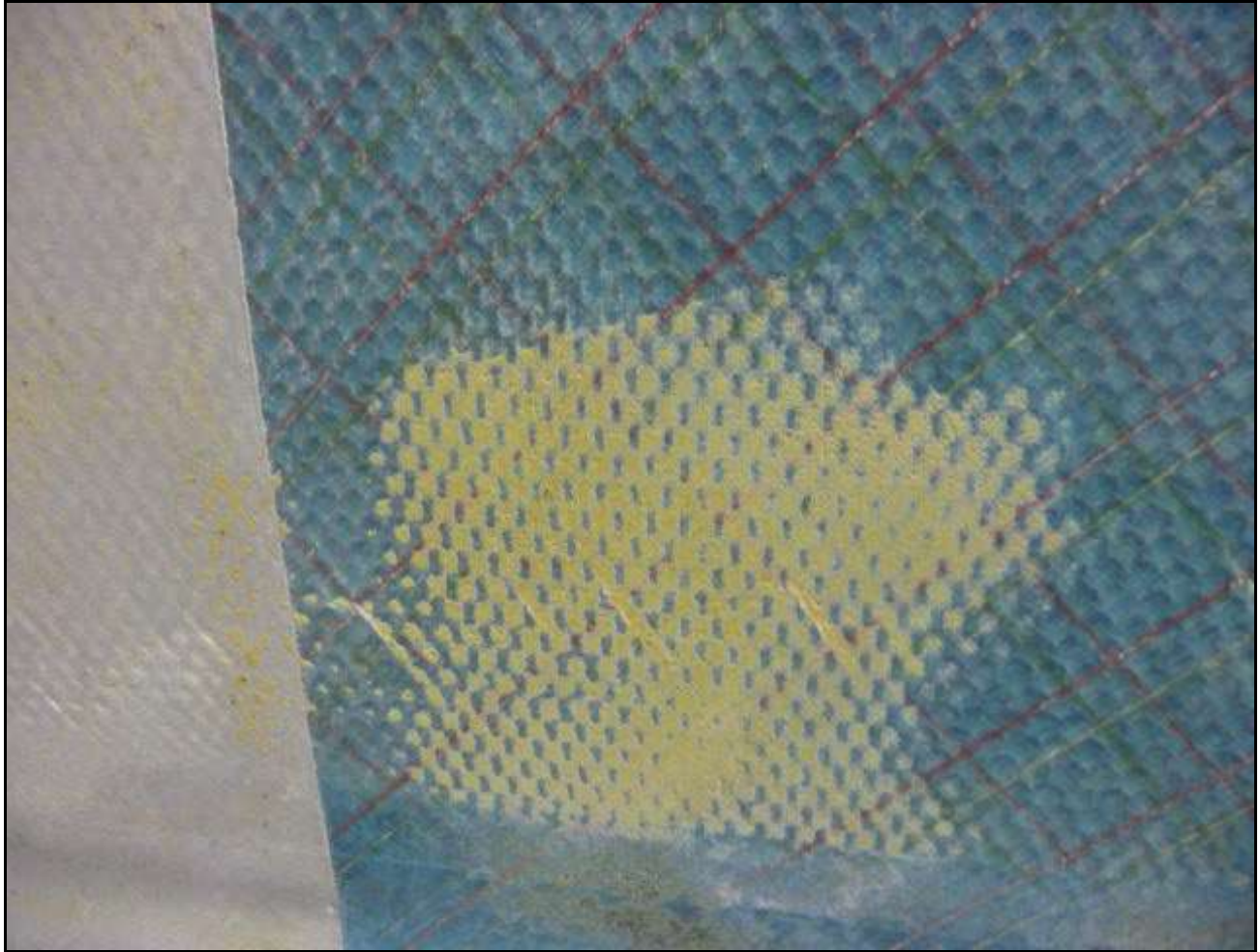


Fig. 14. Another close-up showing the edge of the lightning strike panel on the left and some repair/patch work material in the center (yellowish color). Notice the Type VIII PMB did not disturb the repair material in the dimples of the composite rotor blade substrate, nor did the Type VIII disturb, or roughen, the edges of the very delicate lightning strike panel material.

Type VIII PMB instruction and blasting continued on throughout the entire day, as it did on Wednesday and Thursday, 14-15 APR. As word of the Type VIII PMB success started making its way around the AVCRAD, so did the personnel wanting to try it on other parts of the helicopters there were presenting really big problems for them to depaint. As you will see in the following pictures, complete 100% success was realized using the Type VIII PMB to remove coatings on all challenges that were offered.

Figures 15 -20 show a Hover Infrared Suppression System (HIRSS) Extender removed from a UH-60 helicopter. This component is located around the aft engine exhaust and is constantly being exposed to high heat exhaust temperatures. The Chemical Agent Resistant Coating (CARC) is essentially baked onto this part around the high temperature areas which makes it very difficult to effectively remove the coatings. This HIRSS extender was not completely stripped using the Type VIII PMB due to time constraints. The areas shown that were stripped with the Type VIII PMB were deemed the most difficult areas to remove the baked on coatings

per the 1109th AVCRAD maintenance and blaster crew. Notice the browned aluminum after being stripped with the Type VIII PMB (Figs. 16, 18, & 20). These are the areas exposed to the highest amount of heat as is evidenced by the discoloration. The Type VIII PMB completely and efficiently removed all instances of baked-on CARC both inside and outside of the unit at 25 psi.



Fig. 15. *HIRSS Extender from UH-60 before blasting with Type VIII PMB (outside)* **Fig. 16.** *HIRSS Extender from UH-60 after blasting with Type VIII PMB (outside)*



Fig. 17. *HIRSS Extender from UH-60 before blasting with Type VIII PMB (inside)* **Fig. 18.** *HIRSS Extender from UH-60 after blasting with Type VIII PMB (inside)*

The following photos, figures 19 & 20, show the inside of the HIRSS extender unit. Looking at figure 19, the inside of the unit is covered with a black, sooty colored backed on CARC paint which has been directly exposed to exhaust heat from the UH-60 engine. Figure 20 illustrates the inside of the HIRSS extender unit after it has been blasted with the Type VIII PMB. There is paint left on the inside of the HIRSS unit to give a better before and after comparison. Again, the presence of the discolored aluminum here gives realization to the high heat areas of this part.



Fig. 19. *HIRSS Extender from UH-60 before blasting with Type VIII PMB (inside)*



Fig. 20. *HIRSS Extender from UH-60 after blasting with Type VIII PMB (inside)*

Another component the AVCRAD was interested in blasting with the Type VIII PMB was the AH-64 bell cranks (Fig. 21). An AMCOM team, consisting of AED AH-64 representatives, had recently visited the 1109th AVCRAD in mid-January 2010 and approved the 1109th AVCRAD to strip these bell cranks with plastic media blast (PMB) for reconditioning these parts for theater since they are no longer currently being made and are very hard to come by.

The reconditioning process of these bell cranks involves first stripping them with PMB (Fig. 22), then etching with Ridoline 4450, a hot water rinse followed by a hot deionized (DI) water rinse, followed by a Alodine 5900 ready-to-use (RTU) treatment, followed by another hot water rinse then a hot deionized (DI) water rinse before drying. The bell crank then goes to non-destructive inspection (NDI) after which it makes it way to the machine shop for blending and testing the holes with a go-no-go gauge. If the hole(s) test good, regular bushings are then pressed in. If the hole(s) test bad, the parts are set aside because that process is currently being worked on.



Fig. 21. *AH-64 bell crank before blasting with the Type VIII PMB*



Fig. 22. *AH-64 bell crank after blasting with the Type VIII PMB*

Figure 23 below illustrates a UH-60 main rotor blade tip which had been removed and stripped to substrate using the Type VIII PMB. This was done in approximately 4 minutes at 10 psi. Again, absolutely no damage was done to the part during blasting.

Figures 24 - 38 gives a summary of an OH-58 helicopter being prepped for Type VIII PMB blasting, then being transferred to the blasting bay, and the resulting photographs after being stripped with Type VIII PMB. There was no damage done to any part of the OH-58 helicopter.

Figures 25 - 28 show the different aluminum thicknesses mapped out on the OH-58 fuselage. The aluminum thicknesses range from 0.016" to 0.040". The reason this is important to map out before going into the blast booth is so the blaster will know what air pressure to strip those parts of the fuselage will be. According to U.S. Technology Type VIII PMB blasting instruction, on aluminum skins between 0.016" to 0.031" thickness; the Type VIII PMB air pressure should be set at 10 psi to 15 psi. On aluminum skins between 0.032" to 0.063" thickness; the Type VIII PMB air pressure can be moved up to settings between 15 psi to 25 psi. Having the proper air pressures matched to the material skin thicknesses prevents damage to the aluminum substrate when using the Type VIII PMB to strip the helicopter.



Fig. 23. Composite/Metal UH-60 Blade tip after **Fig. 24.**



Fig. 25.

Fig. 26.



Fig. 27.



Fig. 28.



Fig. 29. OH-58 on the way to the blasting bay

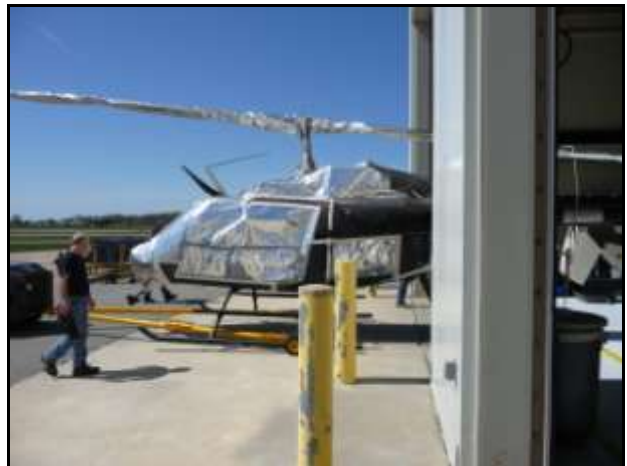


Fig. 30. OH-58 on the way to the blasting bay



Fig. 31. OH-58 in the blasting bay



Fig. 32. 0.016" aluminum section after stripping

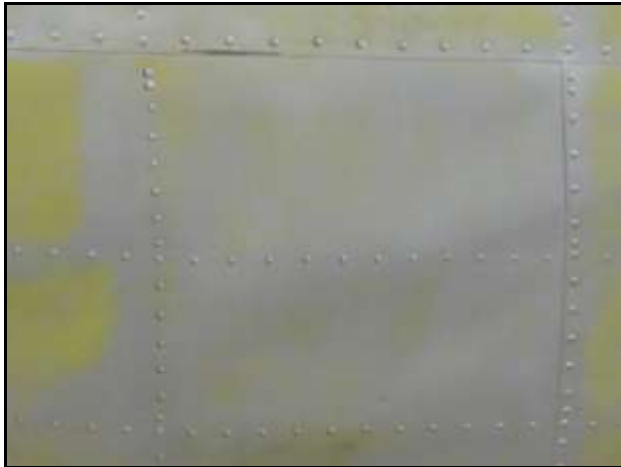


Fig. 33. Close-up of 0.016" aluminum section



Fig. 34. Close-up of tail boom root – 0.040"



Fig. 35. 0.020" aluminum driveshaft cover



Fig. 36. 0.016" aluminum – see Fig. 28



Fig. 37. OH-58 landing skid area



Fig. 38. OH-58 landing skid

ACTIONS RESULTING FROM TRIP: The 1109th AVCRAD located in Groton, CT will be using the U.S. Technology Type VIII PMB for coatings removal on many different parts, components, structures, and helicopters. But they are really looking to use it on main rotor blades and become a complete rework facility to provide services such as blade repairs and reconditioning with a quick turnaround time. This will be huge benefit to the AVCRAD in that it will bring more business and money to the facility. The 1109th AVCRAD is looking at doubling its repair and paint facility footprint by 2015 and hiring more personnel to accommodate this growth.

SUMMARY / RECOMMENDATIONS: Boeing Aircraft has already approved the Type VIII PMB for all of their CH-47 main rotor blade and airframe stripping processes. Corpus Christi Army Depot (CCAD) has also adopted the Type VIII PMB for the stripping of rotor blades and airframes. The AMCOM G-4 TIB also coordinated a demonstration of the Type VIII PMB at Fort Rucker, located in Enterprise, AL. Fort Rucker will be ramping up their facilities to strip entire rotor blades with the Type VIII PMB in the future at their new “state-of-the-art” paint facility. And know, the 1109th AVCRAD in Groton, CT has implemented the Type VIII PMB for their blasting processes with their blasters being Type VIII PMB certified by U.S. Technology representative Vinny LiBrizzo with 100% success. The AMCOM G-4 TIB has also been providing support to the 1109th AVCRAD before and during this Type VIII PMB transition and implementation phase and will continue to do so to insure this material, and it’s processes, live up to the AVCRAD’s full expectations and satisfaction.

DISCLAIMER: This is a Trip Report produced by a contractor supporting the U.S. Army Aviation and Missile Command (AMCOM) G-4 Technology Integration Branch. It is simply a statement of the facts during the implementation of this technology at the 1109th AVCRAD located in Groton, CT. This report is not to be construed as an advertisement, nor as an endorsement for U.S. Technology Type VIII plastic media blast material by the U.S. Army.