PREPRODUCTION INITIATIVE-NELP
WALK-IN MULTIMEDIA BLAST BOOTH
TEST PLAN

1.0 OBJECTIVE

This test plan describes the procedures for gathering performance data on the walk-in multimedia blast booth using Polymedia Lite (PML) and sodium bicarbonate blast media. The unit is being evaluated as a means for removing paint from composite/fiberglass components.

2.0 DESCRIPTION

Paint is currently removed from fiberglass life raft canisters via hand sanding and other mechanical means. However, these methods can damage the surface of components. Technical data have shown that removing paint using sodium bicarbonate and PML does not damage the surface of components—as long as correct procedures are followed.

The blast booth is an enclosed unit that provides air and media flow for dry blasting. The blast booth consists of a hopper (for media supply), a blasting chamber with a grated floor (for media return flow), hoses (for air and media flow), a control panel (for pressure and volume adjustment), and a dust collector (for the final collection and disposal of spent media and paint waste). During the blasting process, the media (depending on its particle size) is returned through the grated floor to either the media supply or the dust collector. The blast booth then separates spent PML from the removed paint and recirculates the PML through the blast booth until the particle size becomes too fine for recirculation. The PML is then sent to the dust collector for disposal. However, because of the comparatively low density of sodium bicarbonate, only one cycle is possible.

From the dust collector, the paint waste is disposed of according to local regulations. Spent sodium bicarbonate can be dissolved in water for easy filtration/separation from the paint—thereby reducing the amount of hazardous waste requiring disposal.

3.0 TEST PLAN

The following sections describe the test, test procedures, and directions for collecting and recording test data.

3.1 Test Description

Currently, paint is stripped from life raft canisters and antennae sections via hand sanding and other mechanical means. This test will compare this current method to the walk-in multimedia blast booth method. The environmental and economic impacts will be analyzed after one year of operation.

The equipment to be blasted includes:

- life raft canister sections
- antennae sections (approximately 18 feet in length)
- radomes.

3.2 Test Procedure

Data from hand-sanding processes will be used to establish a baseline for comparison with blast booth data. This will allow equipment to be evaluated for indicators such as net present value, cost/benefit analysis, return on investment, and payback period.

Four months of data gathering will be required for each blast media used. Sodium bicarbonate will be the first blast media tested.

3.2.1 Hand Sanding Method

The hand sanding process will continue until it is replaced by the walk-in multimedia blast booth. During this period, appropriate process data, observations, and additional comments will be entered in Table 1.

3.2.2 Blast Booth Method

Before blasting, operators will be trained on the use of the walk-in multimedia blast booth and current Navy instructions. Blasting parameters—such as blasting pressure, media flow, stand-off distance, dwell time, blasting angle, and number of passes—will be adjusted to achieve optimum performance. Information on these blasting parameters is provided below.

Operator skill and training are two of the most important factors for maximizing productivity. Experienced operators will have to try different combinations of variables to achieve optimum results. After blasting, enter the data, observations, and additional comments in Table 1.

3.2.3 Blasting Parameters

- **Blasting Pressure**: Higher blast pressure results in more work being performed because of the increased velocity of the abrasive when it strikes the work surface. For example, sodium bicarbonate blasting media are approximately half as dense as sand. This means that the velocity of the sodium bicarbonate striking the work surface must be increased by approximately 45% to achieve the equivalent amount of work. PML varies by manufacturer and composition of the media. However, with any media used, optimum pressure will depend on the composition of the substrate being blasted. Operators must determine the appropriate pressure for maximum blasting efficiency without pitting the substrate.

- **Media Flow:** Using too little media will reduce productivity, while using too much media will result in substrate pitting and excess waste. Testing will confirm the operating flow rates for each substrate. Adjust flow rates during the operational test period to achieve optimum performance.

- **Stand-Off Distance:** The distance between the blast nozzle and the work surface affects the aggressiveness of the cutting action and the size of the blast pattern. Stand-off distance is controlled by the operator. This distance should allow for optimum productivity at all times.

- **Dwell Time:** How fast the operator moves the nozzle determines how much surface is covered and how aggressive the abrasive cuts are. Faster movement results in more surface coverage and less aggressive cuts (*i.e*., fewer hot spots).

- **Blast Angle:** For minimum aggressiveness and maximum pattern size, the nozzle should be positioned at a 90 degree angle (*i.e.,* perpendicular) to the work surface. For most applications, an angle of 60 degrees to 70 degrees is recommended. For removing thick layers of coatings, an angle of 20 degrees to 30 degrees will often cut under and lift off the coating without abrading away the full thickness. Operators should always blast in the direction of the work (*i.e.,* toward the area to be cleaned). This will ensure that the blast stream is always cutting toward the coating, and stripping will be more efficient. Testing will confirm the optimum blast angle for each blast media.

- **Number of Passes:** Several passes to remove one layer is more efficient than one pass that abrades the full thickness of the coating. This is especially true for coatings that are thicker than 20 mils. Several passes provide for more even paint stripping and reduced substrate pitting.

3.2.4 Instructions for Completing Table 1

- **Date:** Enter the day, month, and year on which you are stripping the paint.

- **Part Number:** Enter the NSN or equivalent for the part you are stripping.

- **Description:** Enter a description of the part that you are stripping (*e.g.,* life raft canister, antenna section, etc.).

- **Condition Before Paint Removal:** Using the following codes, describe the condition of the part before paint removal. For example, severe chipping would be described by the code 5C.

  - **Degree of Severity:** 1 (slight) through 5 (severe)
  - **Chipping** = C
  - **Scaling** = S
  - **Peeling** = P

- **Method of Paint Removal:** Enter H for hand sanding or B for blast booth.

- **Time Required to Remove Paint:** Enter the time (in hours and tenths) required to completely remove paint.

- **Quantity/Type of Consumable Materials Used:** Enter the type of media and other consumable materials used. Specify amount used (*e.g.,* sodium bicarbonate-225 lbs. or sand paper-25 sheets #120, etc.).

- **Quality of the Part Surface After Paint Removal:** Use the following scale to indicate the quality of the part surface after paint removal—1 (complete restoration) through 5 (minimal restoration).

- **Name and Pay Grade of Operator:** List safety observer for blasting unit operation on a separate line; include time and note job function in comments section.

- **Comments:** Add descriptive comments. Additional space is also available at the bottom of the sheet.

4.0 REPORTING

The data entry forms are a concise method of data collection. Forms should be completed as equipment is used. Data will be collected for 6 months. During this time, periodic status reports on the testing will be submitted to NAWCADLKE. Please fax forms as they are completed (or at least on a monthly basis) to Stephanie Williams at 609-667-7586.

The final report will include detailed results and observations, assess the efficiency and cost-effectiveness of the unit, and evaluate its ability to interface with site operations

TABLE 1

DATA SHEET FOR STRIPPING OF PAINT

1	2	3	4	5	6	7	8	9	10
Date	Part Number	Description	Condition Before Paint Removal	Method of Paint Removal	Time Required to Remove Paint	Quantity/ Type of Consumable Materials Used	Quality of the Part Surface After Paint Removal	Name and Pay Grade of Operator	Comments

Comments:

COLUMNS:

1. **DD/MM/YY.**
2. **NSN or equivalent**
3. **Life raft canister, antenna section, etc.**
4. **1 (slight) through 5 (severe). Chipping (C), scaling (S), peeling (P). Example: severe chipping = 5C.**
5. **Hand sanding (H) or blast unit (B).**
6. **Enter time (in hours and tenths) required to completely remove paint.**
7. **Type of media and other consumable materials. Specify amount used (sodium bicarbonate-225 lbs., or sandpaper-25 sheets #120, etc.).**
8. **1 (complete restoration) through 5 (minimal restoration).**
9. **List safety observer for blasting unit operation on a separate line; include time and note job function in comments section.**
10. **Add descriptive comments on reverse side of sheet.**