

PREPRODUCTION INITIATIVE-NELP PORTABLE DIGITAL VIDEO MICROSCOPE TEST PLAN

SITE: NAS NORTH ISLAND

1.0 OBJECTIVE

This test plan describes the data collection procedure for evaluating the Olympus Portable DVM-1 Digital Video Microscope in an operational environment at the Aircraft Intermediate Maintenance Department (AIMD), 500 Division, Naval Air Station North Island (NASNI), San Diego, CA. The system will be used to perform and assist in nondestructive inspections (NDI) of support equipment and aircraft components. The data collected will be used to evaluate the unit's overall performance, its ability to interface with site operations, and its ability to reduce the amount of hazardous materials used and generated by reducing the quantity of liquid penetrant solution required during NDI inspections.

2.0 DESCRIPTION

In Navy NDI facilities, technicians currently use a liquid penetrant inspection method to locate surface discontinuities in metallic aircraft and non-aircraft components. With this method, a penetrant solution is applied to the surface of the component to be inspected and, after a given dwell time, the part is inspected to determine whether the solution has penetrated and located a discontinuity. To highlight discontinuities and provide better visual contrast, a fluorescent penetrant solution is often used in conjunction with an ultraviolet (UV) light source. When the inspection is complete, the liquid penetrant is removed from the component surface.

Since the liquid penetrant is a hazardous material and must be handled and disposed of properly, an alternate inspection method that will reduce the amount of penetrant solution is desirable. The portability, high powered magnification, accessories, and archiving capabilities of the portable digital video microscope should provide the means for reducing the amount of liquid penetrant required for NDI inspections, while enhancing existing liquid penetrant inspection techniques.

3.0 TEST PROCEDURE

The portable digital video microscope will be tested in an operational environment. Quantitative and qualitative data will be collected to determine the unit's overall performance, its ability to interface with site operations, and its ability to reduce the amount of hazardous materials used and generated by reducing the quantity of liquid penetrant solution used when performing NDI inspections.

3.1 Approach

One Olympus Portable DVM-1 digital video microscope will be evaluated during this test period. Data will be collected for approximately three months and should be gathered, recorded, and reported in accordance with this test plan. During the test period, the necessary quantitative and qualitative data will be acquired from one operational data sheet and one repair data sheet. The Operational Data Sheet must be completed each time the digital video microscope is used to conduct an NDI inspection. The Repair Data Sheet must be completed each time a repair is performed on the digital video microscope.

3.1.1 Instructions for Completing the Operational Data Sheet

Date: Record the date on which the unit was used.

Technician(s) Name: Indicate who operated the unit.

Technician(s) Rank: Indicate the rank of the technician(s) who operated the unit.

Technician(s) Phone Number: Indicate the phone number of the technician(s) who operated the video microscope.

Name/Description of Part: Indicate the name of the part that was inspected. Describe the part's physical characteristics, identify the name of the aircraft/equipment from which the part originated, and describe the part's purpose and location on the aircraft/equipment.

“Typical” Inspection Method: Indicate the inspection method that would normally be used to inspect the indicated part if the video microscope were not available.

Inspection Time Required with “Typical” Method (min./hr.): Indicate the average amount of time it would take to inspect the indicated part using the “typical” inspection method.

Quantity of Penetrant Used with “Typical” Method (if applicable): Indicate the average quantity of penetrant (e.g. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or one ounce; pint; gallon; etc.) required to inspect the indicated part using the “typical” inspection method.

Problems with the “Typical” Method: Describe any problems and limitations associated with inspecting the indicated part using the “typical” inspection method.

Reason(s) for Using the Video Microscope: List the reason(s) the video microscope was used to replace or assist the “typical” inspection method on the indicated part.

Was the Video Microscope Used in Conjunction with the “Typical” Method?: Circle “Yes” if the video microscope was used in conjunction with the “typical” method equipment to inspect the indicated part. Circle “No” if the video microscope was the only piece of equipment used to inspect the indicated part.

Inspection Time Required with Video Microscope (min./hr.): Indicate the amount of time required to inspect the indicated part using the video microscope method.

Video Microscope Lens(es) Used: Circle one or both of the video microscope magnification lenses (i.e., 10x–70x or 50x–200x) used during the inspection.

Quantity of Penetrant Used with the Video Microscope (if applicable): Indicate the quantity of penetrant (e.g. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or one ounce; pint; gallon; etc.) required to inspect the indicated part using the video microscope.

Video Microscope Attachments Used (circle all applicable): Circle all video microscope attachments used during the inspection and indicate any other unlisted attachments used.

Most Advantageous Video Microscope Features: List the video microscope features and/or accessories that gave the video microscope an advantage over the “typical” inspection method during inspection of the indicated part.

Problems Encountered with the Video Microscope: List any problems or deficiencies that were encountered with the video microscope during inspection of the indicated part.

Additional Comments: Provide any additional comments concerning the system.

3.1.2 Instructions for Completing the Repair Data Sheet

Note: The video microscope vendor can be phoned for technical assistance; however, under no circumstances should NASNI AIMD personnel contact the vendor to arrange repairs. All repair requests should be directed to the Pollution Prevention Equipment Program (PPEP) point of contact (POC) at either Lakehurst or UTRS.

Date: Record the date on which the unit was repaired.

Technician(s) Name: Indicate the name of the technician who performed the repair.

Technician(s) Rank: Indicate the rank of the technician(s) performing the repair.

Description of Equipment Failure: Describe the failure and how it affected the video microscope.

Description of Cause: Describe the cause of the video microscope failure, if known.

Repair Parts Required: List all parts required to repair the video microscope.

Amount of Downtime Due to Damage/Repair (hr./days): Record the amount of time the equipment was out of service.

Unit/Procedure Modifications to Prevent Future Recurrences: Describe any possible unit or inspection technique modifications that could have prevented the failure.

Additional Comments: Provide any additional comments concerning the system.

3.2 REPORTING COLLECTED DATA

The data sheets are a concise method of data collection. The sheets should be completed each time the digital video microscope is used to conduct an NDI inspection and whenever repairs to the unit are necessary. During the test period, periodic status reports on the evaluation will be submitted to NAWCADLKE. The final report will include information on the unit's overall performance, its ability to interface with site operations, and its ability to reduce the amount of hazardous materials used and generated by reducing the quantity of liquid penetrant solution during NDI inspections. All completed data sheets should be faxed.

OPERATIONAL DATA SHEET

NAS North Island AIMD

NDI Lab (619) 545-6744

Date: _____

Technician(s) Name: _____ Technician(s) Rank: _____

Technician(s) Phone No.: _____

Name/Description of Part:

“Typical” Inspection Method: _____

Inspection Time Required with “Typical” Method (min./hr.): _____

Quantity of Penetrant Used with “Typical” Method (if applicable): _____

Problems with the “Typical” Method:

Reason(s) for Using the Video Microscope:

Was the Video Microscope Used in Conjunction with the “Typical” Method (circle one): Yes No

Inspection Time Required with Video Microscope (min./hr.): _____

Video Microscope Len(s) Used (circle one or both): 10X-70X 50X-200X

Quantity of Penetrant Used with the Video Microscope (if applicable): _____

Video Microscope Attachments Used (circle all applicable): Rigid Probe Stand UV Light Other _____

Most Advantageous Video Microscope Features:

Problems Encountered with the Video Microscope:

Additional Comments:

REPAIR DATA SHEET

NAS North Island AIMD

NDI Lab (619) 545-6744

Date: _____

Technician(s) Name: _____ **Technician(s) Rank:** _____

Description of Equipment Failure:

Description of Cause:

Repair Parts Required:

Amount of Downtime Due to Damage/Repair (hr./days): _____

Unit/Procedure Modifications to Prevent Future Recurrences:

Additional Comments:
