Procedure for the Control and Prevention of Foreign Object Debris

1. PURPOSE

This document establishes the standards for a baseline program for the control and prevention of foreign object debris (FOD) and the resulting foreign object damage (FOD) caused by this debris.

2. SCOPE

This procedure applies to all products being manufactured within the organization.

3. REFERENCES

NAS 412   National Aerospace Standard
MF7F210   Foreign Object Debris Incident Report

4. PROCEDURE

4.1 Definitions:

Foreign Object (FO) or Foreign Object Debris (FOD) – A substance, debris or article alien to an aircraft or system, which would potentially cause damage.

- *Environmental FOD* – any FOD identified around each assembly work area or in shipping material…i.e., food, beverages, etc.
- *Supplier FOD* – any damage or malfunction attributed to a foreign object that can be expressed in physical or economic terms which may degrade the product's required safety and/or performance characteristics
- *Intrinsic FOD* – any FOD identified as loose debris found in assembly process…i.e., snipped wires, metal shavings, etc.

Foreign Object Damage (FOD) - Any damage or malfunction attributed to a foreign object that can be expressed in physical or economic terms which may or may not degrade the product's required safety and/or performance characteristics.

Focal Point - The designated FOD Prevention Program Administrator(s) are designers, administrators and responsible parties of a well designed FOD Prevention Program.

4.2 Responsibilities

Vitron has designated the Mechanical Assembly and the Electronics Assembly Leads as the Focal Points. These positions have the following responsibilities:

- Ability to identify and implement FOD preventive measures as necessary.
- Conduct audits of work areas to assess effectiveness of the FOD program and report findings to management.
- Assure that FOD incidents are thoroughly investigated and reported.
- When necessary corrective actions will be issued to ensure corrective measures are implemented to prevent recurrence.

The respective leads and managers of each area within the company are responsible for the following:

- Ensuring that all FOD procedures are being followed
- Ensure that training for FOD has been completed in their respective areas
- Ensure proper reporting when FOD is identified
- Respond to FOD corrective actions as necessary

4.3 Process

Vitron has implemented the following systems to prevent FOD.

Clean as you go:

All employees have been informed their respective areas must remain clean. Housekeeping is part of their regular job functions.

- Clean the immediate area when work cannot continue.
- Clean the immediate area when work debris has the potential to migrate to an out of sight or inaccessible area and cause damage and/or give the appearance of poor workmanship.
- Ensure that all FOD is removed at completion of task, before next planned operation or inspection point.
- Clean the immediate area after work is completed and prior to inspection.
- Clean at the end of each shift.
- If you drop something or hear something drop - pick it up.

Chit System (does not apply to electronics at this time):

- Each individual must sign a chit for each tool or part taken. This chit is kept at the selected control point for inventory.
- Each individual must sign his/her name or number to a check out sheet located on each tool hook
- Each individual is given "X" number of metal/plastic disks with his/her name or number on them. The employee must place one of these on the hook or in the cutout for each tool taken. If the employee borrows a tool from another he/she must give that person a chit as well. At the end of the shift all employees must account for their chits. Each chit has the potential to become FOD so employees must control them.

Shadow Box/Shadow Boards:

- A tool box or storage board with specific, marked locations for each tool so that a missing tool will be readily noticeable.

Basic Elements of Program:

- Assembly sequencing and maintenance/manufacturing techniques that include proper care and use of assembly/maintenance equipment, and protective devices.
- Handling of material
- Housekeeping
- Control of tools and personal items
- Control of hardware/consumables and hazardous material
- Incident investigation/reporting - *"lessons learned"*
- Awareness/employee feedback.

4.4 Training

The primary objective of a FOD prevention training program is to increase employee awareness to the causes and effects of FOD, promote active involvement through specific techniques, and stress good work habits through work disciplines.

Training Subjects Include:

- Proper storage, shipping and handling of material, components, and equipment (as pertinent to each area)
- Housekeeping (clean as you go)
- Cleaning and inspection of components and assemblies (as applicable)

- Accountability/control of tools and hardware.
- Control of personal items, equipment, and consumables.
- How to report FOD incidents

4.5 Parts Protection and Materials Handling

- All employees will receive instructions on how assure compliance with packaging, handling, and/or shipping and storage requirements as they relate to each area.
- Materials and accessories used in the packaging, handling, shipping and storage which have intimate contact with the part or assembly shall be clean and free of debris.
- Parts and assemblies shall be packaged in a manner that will preclude any chance of one item making contact with another during normal handling operations.
- Particular care must be taken with items that are subject to damage by Electrostatic Discharge (ESD). ESD can be considered FOD damage. The use of proper handling, grounding controls, and ESD protective packaging is required in certain areas.
- Consideration will be given to the visibility/detection of material used for protection so that the material itself doesn't become FOD.

Visually inspect all packaging, handling, shipping and storage containers for the following:

- Nicks, dents, holes, abrasions, scratches, etc., which may be detrimental to the function and integrity of the part or assembly.
- Grease, preservatives, corrosion products, and other materials foreign to the item.
- FOD shows up as dirt, grime, debris, metal shavings or filings

4.6 Hardware Control and Accountability

The primary objective of hardware accountability is to assure control of loose hardware and parts. There are many effective methods that can be established for control of hardware (nuts, bolts, screws, cotter pins, rivets, etc.):

− "Clean-As-You-Go."
− Kit hardware by task
− Furnish and specify tote trays

FOD Sensitive Area Controls:

− Hardware will be segregated and identified
− Hardware taken onto the assembly shall be stored in a container
− Any hardware removed from the assembly that cannot be retained must be completely removed from the assembly

4.7 Lost Items

Any time an item is lost during an assembly, manufacturing or maintenance task, cease activity in the affected area and initiate a search for the item. Continue this search until the item is found or adequate assurances are made that the item is not contained within the product. If an item cannot be located after a search has been completed, annotate applicable forms with a description of the item and search procedure followed.

Employees shall be aware that proper reporting of lost tools, hardware, or other items will not result in disciplinary action.

Failure to report or concealing a lost tool, lost foreign object, found tool, or found foreign object to the appropriate area Lead, is grounds for disciplinary action up to and including dismissal

4.8 Assembly and Shop Operations
As applicable, the following shall be included as standard operating practices:

- Practice '*clean as you go*".
- Upon completion of final machining operation, clean the product to assure that it is free of debris.
- Adequately protect hardware and equipment from splatter accumulation during brazing, soldering, welding and like operations.
- Inspect components and equipment for damage prior to installation and repair as necessary. Always ensure part integrity before installation.
- Verify required protective devices (dust covers, temporary seals, etc.) are present and properly installed. Items with protective devices missing are to be inspected for FOD, cleaned if necessary and protective devices installed.
- Protect products by using FOD barriers, foam pads, covers, etc. Always protect sensitive areas and potential FOD entrapments (engine, open fuel line, harnesses, etc.)

4.9 Reporting and Investigations
All incidents of actual or potential FOD shall be reported and investigated. When a FOD incident occurs, operations shall immediately cease and an investigation initiated to determine the cause. Corrective action will be required to preclude similar *occurrences* from happening in the future *"lessons learned."* Cause may be determined by visual observation, analysis, or by location of the object.

A foreign object or tool found during an inspection, audit or abandoned within a FOD sensitive/critical area will be documented using the FOD Incident Report. When in doubt, Quality will make final determination whether a found item is considered a foreign object or tool.

A FOD Incident Report will include the following:
- Date
- Part name (nomenclature)
- Serial number (when applicable)
- Part location
- Who, When, and How discovered
- Description of FOD
- Root cause/corrective action
- Reported by

These reports shall be directed to the applicable FOD Focal Point. The focal point will ensure all affected personnel are aware of all potential (near mishap)/actual FOD reports which will facilitate feedback ("lessons learned").

5. QUALITY RECORDS
All Quality records shall be maintained in accordance with the Procedure for Control of Quality Records, VM4P020.

MF7F210   FOD Incident Report